Permit to Construct Application

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DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE AQP PROGRAM

Yanke Machine Shop, Inc.
4414 South Gekeler Lane
Boise, Idaho, 83716

Prepared for:

Idaho Department of Environmental Quality
Air Quality Division
1410 N. Hilton
Boise, Idaho 83706

Prepared by:

Hildebrand & Associates, LLC

4623 E. Pegasus Ct
Boise, Idaho 83716
(208) 761.5121

May 3rd, 2013

APPENDIX A

PERMIT TO CONSTRUCT APPLICATION FORMS

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

General Information **Form GI**
Revision 7
2/18/10

Please see instructions on page 2 before filling out the form.

All information is required. If information is missing, the application will not be processed.

IDENTIFICATION

1. Company Name	2. Facility Name:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.

3. Brief Project Description:	Permit to Construct Application

FACILITY INFORMATION

4. Primary Facility Permit Contact Person/Title	John Alverson		Operations Manager	
5. Telephone Number and Email Address	(208) 342-8901		johnalverson@yankemachine.com	
6. Alternate Facility Contact Person/Title	N/A		N/A	
7. Telephone Number and Email Address	N/A		N/A	
8. Address to Which the Permit Should be Sent	4414 S. Gekeler Lane			
9. City/County/State/Zip Code	Boise	Ada	Idaho	83716
10. Equipment Location Address (if different than the mailing address above)	4414 S. Gekeler Lane			
11. City/County/State/Zip Code	Boise	Ada	Idaho	83716
12. Is the Equipment Portable?	☐ Yes ☒ No			
13. SIC Code(s) and NAICS Code	Primary SIC: 3441	Secondary SIC:	NAICS: 332312	
14. Brief Business Description and Principal Product	Yanke Machine Shop, Inc. Provides Metal Fabrication and Industrial Machining Services to The Mining, Agricultural and Food Processing Industries.			
15. Indentify any adjacent or contiguous facility that this company owns and/or operates	Yanke Energy, Inc.			
16. Specify the reason for the application	☒ Permit to Construct (PTC) For Tier I permitted facilities only: If you are applying for a PTC then you must also specify how the PTC will be incorporated into the Tier I permit. ☐ Incorporate the PTC at the time of the Tier I renewal ☐ Co-process the Tier I modification and PTC ☐ Administratively amend the Tier I permit to incorporate the PTC upon your request (IDAPA 58.01.01.209.05.a, b, or c) ☐ Tier I Permit ☐ Tier II Permit ☐ Tier II/Permit to Construct			

CERTIFICATION

In accordance with **IDAPA 58.01.01.123** (Rules for the Control of Air Pollution in Idaho), I certify based on information and belief formed after reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete.

17. Responsible Official's Name/Title	John Alverson	Operations Manager	
18. Responsible Official Address	4414 S. Gekeler Lane, Boise, Idaho 83716		
19.Responsible Official Telephone Number	(208) 342-8901		
20. Responsible Official Email Address	johnalverson@yankemachine.com		
21. Responsible Official's Signature	John Alverson	Date:	5-3-13

22. ☒ Check here to indicate that you would like to review the draft permit prior to final issuance.

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
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Cover Sheet for Air Permit Application – Permit to Construct **Form CSPTC**

Please see instructions on page 2 before filling out the form.

COMPANY NAME, FACILITY NAME, AND FACILITY ID NUMBER

1. Company Name	Yanke Machine Shop, Inc.		
2. Facility Name	Yanke Machine Shop, Inc.	3. Facility ID No.	001-00297
4. Brief Project Description - One sentence or less	Permit to Construct Application		

PERMIT APPLICATION TYPE

5. ☐ New Source ☐ New Source at Existing Facility ☐ PTC for a Tier I Source Processed Pursuant to IDAPA 58.01.01.209.05.c
☒ Unpermitted Existing Source ☐ Facility Emissions Cap ☐ Modify Existing Source: Permit No.:____ Date Issued:____
☐ Required by Enforcement Action: Case No.:____

6. ☒ Minor PTC ☐ Major PTC

FORMS INCLUDED

Included	N/A	Forms		DEQ Verify
☒	☐	Form CSPTC – Cover Sheet		☐
☒	☐	Form GI – Facility Information		☐
☒	☐	Form EU0 – Emissions Units General (13)		☐
☐	☒	Form EU1– Industrial Engine Information	Please specify number of EU1s attached: ____	☐
☐	☒	Form EU2– Nonmetallic Mineral Processing Plants	Please specify number of EU2s attached: ____	☐
☒	☐	Form EU3– Spray Paint Booth Information	Please specify number of EU3s attached: 1	☐
☐	☒	Form EU4– Cooling Tower Information	Please specify number of EU3s attached: ____	☐
☐	☒	Form EU5 – Boiler Information	Please specify number of EU4s attached: ____	☐
☐	☒	Form CBP– Concrete Batch Plant	Please specify number of CBPs attached: ____	☐
☐	☒	Form HMAP – Hot Mix Asphalt Plant	Please specify number of HMAPs attached: ____	☐
☐	☒	PERF – Portable Equipment Relocation Form		☐
☐	☒	Form AO – Afterburner/Oxidizer		☐
☐	☒	Form CA – Carbon Adsorber		☐
☐	☒	Form CYS – Cyclone Separator		☐
☐	☒	Form ESP – Electrostatic Precipitator		☐
☒	☐	Form BCE– Baghouses Control Equipment		☐
☐	☒	Form SCE– Scrubbers Control Equipment		☐
☐	☒	Form VSCE – Venturi Scrubber Control Equipment		☐
☐	☒	Form CAM – Compliance Assurance Monitoring		☐
☒	☐	Forms EI– Emissions Inventory		☐
☒	☐	PP – Plot Plan		☐
☒	☐	Forms MI1 – MI4 – Modeling	(Excel workbook, all 4 worksheets)	☐
☒	☐	Form FRA – Federal Regulation Applicability		☐

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AIR PERMIT APPLICATION

Revision 6
10/7/09

For each box in the table below, CTRL+click on the blue underlined text for instructions and information.

IDENTIFICATION	
1. Company Name: Yanke Machine Shop, Inc.	2. Facility Name: Yanke Machine Shop, Inc.
3. Brief Project Description: Permit to Construct Application	

APPLICABILITY DETERMINATION	
4. List applicable subparts of the New Source Performance Standards (NSPS) (40 CFR part 60). Examples of NSPS affected emissions units include internal combustion engines, boilers, turbines, etc. The applicant must thoroughly review the list of affected emissions units.	List of applicable subpart(s): ☑ Not Applicable
5. List applicable subpart(s) of the National Emission Standards for Hazardous Air Pollutants (NESHAP) found in 40 CFR part 61 and 40 CFR part 63. Examples of affected emission units include solvent cleaning operations, industrial cooling towers, paint stripping and miscellaneous surface coating. EPA has a web page dedicated to NESHAP that should be useful to applicants.	List of applicable subpart(s): **40 CFR Part 63 Subpart XXXXXX** ☐ Not Applicable
6. For each subpart identified above, conduct a complete a regulatory analysis using the instructions and referencing the example provided on the following pages. **Note** - Regulatory reviews must be submitted with sufficient detail so that DEQ can verify applicability and document in legal terms why the regulation applies. Regulatory reviews that are submitted with insufficient detail will be determined incomplete.	☑ A detailed regulatory review is provided (Follow instructions and example). ☐ DEQ has already been provided a detailed regulatory review. Give a reference to the document including the date.

IF YOU ARE UNSURE HOW TO ANSWER ANY OF THESE QUESTIONS, CALL THE AIR PERMIT HOTLINE AT 1-877-5PERMIT

It is emphasized that it is the applicant's responsibility to satisfy all technical and regulatory requirements, and that DEQ will help the applicant understand what those requirements are prior to the application being submitted but that DEQ will not perform the required technical or regulatory analysis on the applicant's behalf.

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline - 1-877-5PERMIT

PERMIT TO CONSTRUCT APPLICATION

Revision 3
4/5/2007

Please see instructions on page 2 before filling out the form.

Company Name:	**Yanke Machine Shop, Inc.**
Facility Name:	Yanke Machine Shop, Inc.
Facility ID No.:	001-00297
Brief Project Description:	Permit to Construct Application

SUMMARY OF FACILITY WIDE EMISSION RATES FOR CRITERIA POLLUTANTS - POINT SOURCES

1.	2.	3.											
		PM_{10}		SO_2		NO_x		CO		VOC		Lead	
Emissions units	Stack ID	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Point Source(s)													
Natural Gas Combustion (19 units)	See EI	0.04	0.18	0.003	0.014	0.532	2.33	0.447	1.96	0.03	0.13	0.00	0.00
Abrasive Blasting	BB 1	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spray Painting	PB 1	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	23.95	23.35	0.00	0.00
Metalizing	Lathe 1	1.87E-04	2.18E-04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.22	0.38	0.00	0.01	0.53	2.33	0.45	1.96	23.98	23.48	0.00	0.00

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PERMIT TO CONSTRUCT APPLICATI(

Please see instructions on page 2 before filling out the form.

Company Name:	
Facility Name:	
Facility ID No.:	
Brief Project Description:	

SUMMARY OF FACILITY WIDE EMISSION RATES FOR CRITERIA POLLUTANTS - FUGITIVE SOURCES

1.	2.	3.										
		PM_{10}		SO_2		NO_X		CO		VOC		Lead
Fugitive Source Name	Fugitive ID	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr
Fugitive Source(s)												
name of fugitive source1	Welding	2.96E-01	5.23E-01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.04E-06
Total		0.30	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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PERMIT TO CONSTRUCT APPLICATION

Revision 3
3/27/2007

Please see instructions on page 2 before filling out the form.

Company Name:
Facility Name:
Facility ID No.:
Brief Project Description:

POINT SOURCE STACK PARAMETERS

1.	2.	3a.	3b.	4.	5.	6.	7.	8.	9.	10.
Emissions units	**Stack ID**	**UTM Easting (m)**	**UTM Northing (m)**	**Base Elevation (m)**	**Stack Height (m)**	**Modeled Diameter (m)**	**Stack Exit Temperature (K)**	**Stack Exit Flowrate (acfm)**	**Stack Exit Velocity (m/s)**	**Stack orientation (e.g., horizontal, rain cap)**
Point Source(s)										
Blasting Booth Exhaust	STCK1	565824	4823669	869	6.1	0.86	Ambient	19040	0.01	Horizontal
Paint Booth Exhaust	STCK2	565999	4823631	868.81	9.75	0.3444	Ambient	10450	52.93	VERTICAL
East Paint Booth Heater (100,000 BTU/hr)	STCK3	565997	4823620	869.24	8.53	0.0762	322.04	1205	50	VERTICAL
West Paint Booth Heater (100,000 BTU/hr)	STCK4	566016	4823621	868.58	8.53	0.0762	322.04	5585	50	VERTICAL
Fabrication Shop Heater #1 (360,000 BTU/hr)	STCK5	566032	4823618	868.49	8.23	0.2032	338.71	Rainhat	0.001	VERTICAL
Fabrication Shop Heater #2 (360,000 BTU/hr)	STCK6	566032	4823607	868.86	8.23	0.2032	338.71	Rainhat	0.001	VERTICAL
Fabrication Shop Heater #3 (360,000 BTU/hr)	STCK7	566032	4823595	869.26	8.23	0.2032	338.71	Rainhat	0.001	VERTICAL
Fabrication Shop Heater #4 (360,000 BTU/hr)	STCK8	566032	4823582	869.69	8.23	0.2032	338.71	Rainhat	0.001	VERTICAL
Fabrication Shop Heater #5 (360,000 BTU/hr)	STCK9	566033	4823569	870.12	8.23	0.2032	338.71	Rainhat	0.001	VERTICAL
Fabrication Shop Heater #6 (360,000 BTU/hr)	STCK10	565985	4823618	869.49	8.23	0.2032	338.71	Rainhat	0.001	VERTICAL
Fabrication Shop Heater #7 (360,000 BTU/hr)	STCK11	565985	4823605	869.92	8.23	0.2032	338.71	Rainhat	0.001	VERTICAL
Fabrication Shop Heater #8 (360,000 BTU/hr)	STCK12	565986	4823594	870.29	8.23	0.2032	338.71	Rainhat	0.001	VERTICAL
Fabrication Shop Heater #9 (360,000 BTU/hr)	STCK13	565987	4823570	871.1	8.23	0.2032	338.71	Rainhat	0.001	VERTICAL
Fabrication Shop Heater #10 (360,000 BTU/hr)	STCK14	565986	4823558	871.58	8.23	0.2032	338.71	Rainhat	0.001	VERTICAL
Machine Shop Heater #1 (360,000 BTU/hr)	STCK15	565986	4823558	871.58	7.32	0.2032	338.71	Rainhat	0.001	VERTICAL
Machine Shop Heater #2 (226,000 BTU/hr)	STCK16	566018	4823441	877.39	7.32	0.2032	333.15	Rainhat	0.001	VERTICAL
Machine Shop Heater #3 (226,000 BTU/hr)	STCK17	566020	4823441	877.39	7.32	0.2032	333.15	Rainhat	0.001	VERTICAL
Machine Shop Heater #4 (226,000 BTU/hr)	STCK18	566021	4823441	877.39	7.32	0.1016	333.15	Rainhat	0.001	VERTICAL
Machine Shop Heater #5 (226,000 BTU/hr)	STCK19	566021	4823441	877.39	7.32	0.1016	333.15	Rainhat	0.001	VERTICAL
Warehouse heater #1 (125,000 BTU/hr)	STCK20	566033	4823556	870.56	8.23	0.0762	322.04	Rainhat	0.001	VERTICAL
Warehouse heater #2 (226,000 BTU/hr)	STCK21	566034	4823545	870.92	8.23	0.101	333.15	Rainhat	0.001	VERTICAL
Machine Shope Lathe/Fume Hood	STCK22	566039	4823486	876.35	9.14	1.06	Ambient	12990	6.947	VERTICAL
(insert more rows as needed)										

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PERMIT TO CONSTRUCT APPLICATION

Revision 3
4/5/2007

Please see instructions on page 2 before filling out the form.

Company Name:	Yanke Machine Shop, Inc.
Facility Name:	Yanke Machine Shop, Inc.
Facility ID No.:	001-00297
Brief Project Description:	Permit to Construct Application

FUGITIVE SOURCE PARAMETERS

1. Emissions units	2. Stack ID	3a. UTM Easting (m)	3b. UTM Northing (m)	4. Base Elevation (m)	5. Release Height (m)	6. Easterly Length (m)	7. Northerly Length (m)	8. Angle from North (°)	9. Initial Vertical Dimension (m)	10. Initial Horizontal Dimension (m)
Area Source(s)										
name of the emissions unit1	NA									
Volume Source(s)										
Welding Bay #1 Emissions from Bay Door	VOL1	565983.34	4823416.24	878.43	4.88	4.88	4.88		3.12	1.13
Welding Bay #2 Emissions from Bay Door	VOL2	565983.61	4823427.05	877.89	4.88	4.88	4.88		3.12	1.13
Welding Bay #3 Emissions from Bay Door	VOL3	565983.54	4823438.87	877.61	4.88	4.88	4.88		3.12	1.13
Welding Bay #4 Emissions from Bay Door	VOL4	565983.95	4823461.68	877.4	4.88	4.88	4.88		3.12	1.13
Welding Bay #5 Emissions from Bay Door	VOL5	565983.35	4823479.05	877.67	4.88	4.88	4.88		3.12	1.13
Welding Bay #6 Emissions from Bay Door	VOL6	565983.40	4823492.46	876.51	4.88	4.88	4.88		3.12	1.13
Welding Bay #7 Emissions from Bay Door	VOL7	566039.31	4823417.99	878.22	4.88	4.88	4.88		3.12	1.13
Welding Bay #8 Emissions from Bay Door	VOL8	566040.22	4823427.15	877.85	4.88	4.88	4.88		3.12	1.13
Welding Bay #9 Emissions from Bay Door	VOL9	566039.31	4823439.52	877.44	4.88	4.88	4.88		3.12	1.13
Welding Bay #10 Emissions from Bay Door	VOL10	566040.68	4823460.59	876.93	4.88	4.88	4.88		3.12	1.13
Welding Bay #11 Emissions from Bay Door	VOL11	566040.22	4823478.92	876.79	4.88	4.88	4.88		3.12	1.13
Welding Bay #12 Emissions from Bay Door	VOL12	566040.22	4823496.79	874.7	4.88	4.88	4.88		3.12	1.13
Welding Bay #13 Emissions from Bay Door	VOL13	565978.83	4823556.81	871.75	6.71	6.71	6.71		3.12	1.56
Welding Bay #14 Emissions from Bay Door	VOL14	565978.37	4823570.10	871.12	6.71	6.71	6.71		3.12	1.56
Welding Bay #15 Emissions from Bay Door	VOL15	565977.91	4823595.29	870.25	6.71	6.71	6.71		3.12	1.56
Welding Bay #16 Emissions from Bay Door	VOL16	565976.03	4823606.34	869.88	6.71	6.71	6.71		3.12	1.56
Welding Bay #17 Emissions from Bay Door	VOL17	565977.98	4823620.36	869.41	6.71	6.71	6.71		3.12	1.56
Welding Bay #18 Emissions from Bay Door	VOL18	566037.93	4823619.94	868.42	6.71	6.71	6.71		3.12	1.56
Welding Bay #19 Emissions from Bay Door	VOL19	566039.00	4823605.92	868.89	6.71	6.71	6.71		3.12	1.56
Welding Bay #20 Emissions from Bay Door	VOL20	566037.93	4823592.98	869.32	6.71	6.71	6.71		3.12	1.56
Welding Bay #21 Emissions from Bay Door	VOL21	566040.08	4823569.81	870.1	6.71	6.71	6.71		3.12	1.56

Welding Bay #22 Emissions from Bay Door	VOL22	566040.08	4823553.63	870.63	6.71	6.71	6.71		3.12	1.56
(insert more rows as needed)										

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PERMIT TO CONSTRUCT APPLICATION

Revision 3
4/5/2007

Please see instructions on page 2 before filling out the form.

Company Name:	Yanke Machine Shop, Inc.
Facility Name:	Yanke Machine Shop, Inc.
Facility ID No.:	001-00297
Brief Project Description:	Permit to Construct Application

BUILDING AND STRUCTURE INFORMATION

1.	2.	3.	4.	5.	6.	7.
Building ID Number	**Length (ft)**	**Width (ft)**	**Base Elevation (m)**	**Building Height (m)**	**Number of Tiers**	**Description/Comments**
Building 1 ID - Blasting Building	179.00	93.00	869.10	13.41	1	Blasting Building
Building 2 ID - Machine Shop	179.00	153.00	877.06	6.71	1	Machine Shop
Building 3 ID - Fab Building	304.00	160.00	870.15	7.62	1	Fab Building
Building 4 ID - Shed	18.00	15.00	876.48	4.00	1	Shed
Building 5 ID - Utility Building	113.00	91.00	873.32	6.71	1	Utility Building
(insert more rows as needed)						

DEQ AIR QUALITY PROGRAM
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Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	ABRASIVE BLASTING
6.	EU ID Number:	BB 1
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	RUEMLIN
9.	Model:	UNKNOWN
10..	Maximum Capacity:	6,000 LBS
11.	Date of Construction:	1996
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	3,510 HOURS A YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☒ Yes ☐ No (If Yes, indicate all that apply below)
	☒ Operation Hour Limit(s):	3,510 HOURS/YEAR
	☐ Production Limit(s):	
	☒ Material Usage Limit(s):	628,303 LBS/YEAR
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	MAXIMUM CAPACITY

DEQ AIR QUALITY PROGRAM
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Emissions Units - Spray Paint Booth Information **Form EU3**
Revision 5
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc	001-00297

4. Brief Project Description: Yanke Machine Shop, Inc is applying for a PTC

BOOTH INFORMATION

5. Booth Type: ☐ New Booth ☒ Unpermitted Existing Booth
☐ Modification to a Permitted Booth, Permit #: , Date Issued:

6. Construction Date:

SPRAY GUN DESCRIPTION AND SPECIFICATIONS

Gun No.	7. Manufacturer	8. Model	9. Type	10. Transfer Eff. %	11. Rated Capacity (gal/hr)
1	Graco	G40 AA	Airless	65	5- 9 ounces/min
2	Binks	2100	Conventional	65	5 - 9 ounces/min
3	Graco	Contractor 2 88420	Airless	65	5 - 9 ounces/min
4					

Number of guns to be used simultaneously: Three (3)

SPRAY MATERIAL DESCRIPTION AND SPECIFICATIONS

12. Type of Spray Material Used	13. Type of Material Coated	14. Max. Usage (gal/day)	15. Solid TAP/HAP Content (lb/gal)	16. VOC TAP/HAP Content (lb/gal)	17. MSDS Atta (Y/N)
See EI	Metal	See EI	See EI	See EI	Yes

REQUEST FOR PERMIT LIMITATIONS

18. Are you requesting any permit limits? ☐ No ☒ Yes. If Yes, check all that apply below and fill in requested limit(s)

☒ Operation Hour Limits: 11 hours/day & 1,950 hours per year
☐ Production Limits:
☒ Material Usage Limits: See EI
☐ Other:

19. Rationale for Requesting the Limit(s): Production Limits

EMISSION CONTROL DEVICE (FILTER[b]) DESCRIPTION AND SPECIFICATIONS

Stack Served	20. Filter Manufacturer	21. Model	22. PM Control Efficiency(%)[a]	23. Dimension (Total Area, Thickness and Number of Filters)
Stack 1	TDB	TBD	99.00 %	TBD
Stack 2				
Stack 3				
Stack 4				

Notes: a. Provide either stack test data or vendor's documentation to support the control efficiency specified above.
b. Fill out and submit appropriate control equipment form(s) if this booth has a control device(s) other than a filter system.

BOOTH OPERATING SCHEDULE (indicate hours/day, hours/year, or other)

24. Actual Operation:	25. Maximum Operation:
1,300 hours per year	11 hours/day and 1,950 hours/year

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	NATURAL GAS HEATERS
6.	EU ID Number:	FAB 1 - FAB 10
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	MODINE
9.	Model:	PDP400AE0130
10..	Maximum Capacity:	10 IDENTICAL 361,000 BTU (3,610,000 BTU TOTAL)
11.	Date of Construction:	2011
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	8,760 HOURS A YEAR

REQUESTED LIMITS

24. Are you requesting any permit limits? ☐ Yes ☒ No (If Yes, indicate all that apply below)

- ☐ Operation Hour Limit(s):
- ☐ Production Limit(s):
- ☐ Material Usage Limit(s):
- ☐ Limits Based on Stack Testing: Please attach all relevant stack testing summary reports
- ☐ Other:

25. Rationale for Requesting the Limit(s):

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	MACHINE SHOP NATURAL GAS HEATER
6.	EU ID Number:	MS 1
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	MODINE
9.	Model:	PDP400AE0130
10..	Maximum Capacity:	361,000 BTU
11.	Date of Construction:	2011
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	8,760 HOURS A YEAR

REQUESTED LIMITS

24. Are you requesting any permit limits? ☐ Yes ☒ No (If Yes, indicate all that apply below)

- ☐ Operation Hour Limit(s):
- ☐ Production Limit(s):
- ☐ Material Usage Limit(s):
- ☐ Limits Based on Stack Testing: Please attach all relevant stack testing summary reports
- ☐ Other:

25. Rationale for Requesting the Limit(s):

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
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Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	MACHINE SHOP NATURAL GAS HEATER
6.	EU ID Number:	MS 2
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	MODINE
9.	Model:	PDP250AE0130
10..	Maximum Capacity:	226,000 BTU
11.	Date of Construction:	2011
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	8,760 HOURS A YEAR

REQUESTED LIMITS

24. Are you requesting any permit limits? ☐ Yes ☒ No (If Yes, indicate all that apply below)

- ☐ Operation Hour Limit(s):
- ☐ Production Limit(s):
- ☐ Material Usage Limit(s):
- ☐ Limits Based on Stack Testing: Please attach all relevant stack testing summary reports
- ☐ Other:

25. Rationale for Requesting the Limit(s):

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Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	MACHINE SHOP NATURAL GAS HEATER
6.	EU ID Number:	MS 3
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	MODINE
9.	Model:	PDP250AE0130
10..	Maximum Capacity:	226,000 BTU
11.	Date of Construction:	2011
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	8,760 HOURS A YEAR

REQUESTED LIMITS

24. Are you requesting any permit limits? ☐ Yes ☒ No (If Yes, indicate all that apply below)

- ☐ Operation Hour Limit(s):
- ☐ Production Limit(s):
- ☐ Material Usage Limit(s):
- ☐ Limits Based on Stack Testing: Please attach all relevant stack testing summary reports
- ☐ Other:

25. Rationale for Requesting the Limit(s):

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Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	MACHINE SHOP NATURAL GAS HEATER
6.	EU ID Number:	MS 4
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	MODINE
9.	Model:	PDP250AE0130
10..	Maximum Capacity:	226,000 BTU
11.	Date of Construction:	2011
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	8,760 HOURS A YEAR

REQUESTED LIMITS

24. Are you requesting any permit limits? ☐ Yes ☒ No (If Yes, indicate all that apply below)

- ☐ Operation Hour Limit(s):
- ☐ Production Limit(s):
- ☐ Material Usage Limit(s):
- ☐ Limits Based on Stack Testing: Please attach all relevant stack testing summary reports
- ☐ Other:

25. Rationale for Requesting the Limit(s):

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Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	MACHINE SHOP NATURAL GAS HEATER
6.	EU ID Number:	MS 5
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	MODINE
9.	Model:	PDP250AE0130
10..	Maximum Capacity:	226,000 BTU
11.	Date of Construction:	
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	8,760 HOURS A YEAR

REQUESTED LIMITS

24. Are you requesting any permit limits? ☐ Yes ☒ No (If Yes, indicate all that apply below)

- ☐ Operation Hour Limit(s):
- ☐ Production Limit(s):
- ☐ Material Usage Limit(s):
- ☐ Limits Based on Stack Testing: Please attach all relevant stack testing summary reports
- ☐ Other:

25. Rationale for Requesting the Limit(s):

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Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	METALIZING
6.	EU ID Number:	LATHE 1
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	SULZER METCO
9.	Model:	16 E
10..	Maximum Capacity:	0.813 - 4.73 MM WIRE
11.	Date of Construction:	1942
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS/YEAR
23.	Maximum Operation:	2,340 HOURS/YEAR

REQUESTED LIMITS

24. Are you requesting any permit limits? ☒ Yes ☐ No (If Yes, indicate all that apply below)

☒	Operation Hour Limit(s):	2,340 HOURS/YEAR
☐	Production Limit(s):	
☒	Material Usage Limit(s):	SEE METALIZING MATERIALS IN PTC
☐	Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
☐	Other:	

25. Rationale for Requesting the Limit(s): WORKING CAPACITY

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Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	NATURAL GAS HEATER
6.	EU ID Number:	PBH 1 & PBH 2
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	BRYANT
9.	Model:	UNKNOWN
10..	Maximum Capacity:	TWO IDENTICAL 100,000 BTU (200,000 BTU TOTAL)
11.	Date of Construction:	ESTIMATED IN THE 1980'S
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	8,760 HOURS A YEAR

REQUESTED LIMITS

24. Are you requesting any permit limits? ☐ Yes ☒ No (If Yes, indicate all that apply below)

- ☐ Operation Hour Limit(s):
- ☐ Production Limit(s):
- ☐ Material Usage Limit(s):
- ☐ Limits Based on Stack Testing: Please attach all relevant stack testing summary reports
- ☐ Other:

25. Rationale for Requesting the Limit(s):

DEQ AIR QUALITY PROGRAM
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Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	WAREHOUSE NATURAL GAS HEATER
6.	EU ID Number:	WH 1
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	BRYANT
9.	Model:	46602
10..	Maximum Capacity:	125,000 BTU
11.	Date of Construction:	ESTIMATED 1970 -1980
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	8,760 HOURS A YEAR

REQUESTED LIMITS

24. Are you requesting any permit limits? ☐ Yes ☒ No (If Yes, indicate all that apply below)

- ☐ Operation Hour Limit(s):
- ☐ Production Limit(s):
- ☐ Material Usage Limit(s):
- ☐ Limits Based on Stack Testing: Please attach all relevant stack testing summary reports
- ☐ Other:

25. Rationale for Requesting the Limit(s):

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Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	WAREHOUSE NATURAL GAS HEATER
6.	EU ID Number:	WH 2
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	MODINE
9.	Model:	PDP250AE0130
10..	Maximum Capacity:	226,000 BTU
11.	Date of Construction:	2011
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	8,760 HOURS A YEAR

REQUESTED LIMITS

24. Are you requesting any permit limits? ☐ Yes ☒ No (If Yes, indicate all that apply below)

- ☐ Operation Hour Limit(s):
- ☐ Production Limit(s):
- ☐ Material Usage Limit(s):
- ☐ Limits Based on Stack Testing: Please attach all relevant stack testing summary reports
- ☐ Other:

25. Rationale for Requesting the Limit(s):

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Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
Yanke Machine Shop, Inc.	Yanke Machine Shop, Inc.	001-00297

4. Brief Project Description: Permit to Construct Application

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	WELDING & Grinding
6.	EU ID Number:	WELD 1
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	VARRIOUS TYPES OF WELDING RODS & GRINDING ABRASIVE
9.	Model:	SEE WELDING MATERIALS IN PTC
10..	Maximum Capacity:	SEE WELDING MATERIAL IN PTC
11.	Date of Construction:	1942
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:

15. Date of Installation: 16. Date of Modification (if any):

17. Manufacturer and Model Number:

18. ID(s) of Emission Unit Controlled:

19. Is operating schedule different than emission units(s) involved? ☐ Yes ☐ No

20. Does the manufacturer guarantee the control efficiency of the control equipment? ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee)

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency						

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	2,340 HOURS A YEAR
23.	Maximum Operation:	24 HOURS/DAY

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☒ Yes ☐ No (If Yes, indicate all that apply below)
	☒ Operation Hour Limit(s):	24 HOURS A DAY AND 3,510 HOURS/YEAR
	☐ Production Limit(s):	
	☒ Material Usage Limit(s):	55,406 LBS RODS/YEAR
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	DOES NOT HAVE THE CAPACITY TO DO MORE

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For assistance, call the
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Baghouse Control Equipment **Form BCE**
Revision 6
2/18/10

Complete this form for each baghouse. Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name	2. Facility Name:
Yanke Machine Shop, Inc	Yanke Machine Shop, Inc.

3. Brief Project Description: Permit to Construct Application

BAGHOUSE INFORMATION

4. Baghouse Manufacturer: ASECO MADSEN	5. Baghouse Model: NA	6. Baghouse Equipment ID: BH 1 - System 1

7 (a). Baghouse particulate matter emission concentration. **Note: Provide information in 7(a)-(c) or answer question #8 below.**	_____ gr/dscf	*Manufacturers typically provide guarantees in grains per dry standard cubic foot (gr/dscf). Provide a copy of the guarantee, or other documentation, with the application along with a description of the types of bags that must be used to achieve the emission concentration.* ***Emission concentrations less than 0.01 gr/dscf will receive additional scrutiny by DEQ and a source test of the baghouse may be required.*** *If a guarantee is not provided then you must document how you obtained the emission concentration. Without documentation the application is not complete.*
7 (b). Percentage PM_{10} Or Provide PM_{10} Emission Concentration	_____ % _____ gr/dscf	*What percentage of the PM concentration listed in question #7(a) is PM_{10}. You must provide documentation as to how the percentage was determined (i.e per the baghouse manufacturer). Without documentation the application is not complete.*
7 (c). Baghouse flow rate	_____ dscfm	*Provide the baghouse flow rate in dry standard cubic feet per minute. Actual cubic feet per minute may be given in lieu of dscfm* ***if it is documented*** *that moisture content is insignificant. You must provide documentation as to how this flow rate was determined (i.e. per the exhaust fan manufacturer, combustion evaluation, etc.). Without documentation the application is not complete.*
8. Baghouse particulate matter control efficiency. **Note: Not needed if section #7 is completed.**	_____ % PM control 99.9 % PM_{10} control	*Applicant's providing the control efficiency of the baghouse must provide control efficiency for both PM and PM_{10}. Provide a copy of the control efficiency documentation with the application. Documentation must include a description of the types of bags that must be used to achieve the control efficiency. Without documentation the application is not complete.*
9. Is the baghouse equipped with a bag leak detector?	☐ Yes ☒ No	*If a bag leak detector is installed provide documentation on the leak detector, including; how the leak detector functions and what level of the output signal indicates that a bag is leaking. Without documentation the application is not complete.*

APPENDIX B

PLOT PLAN

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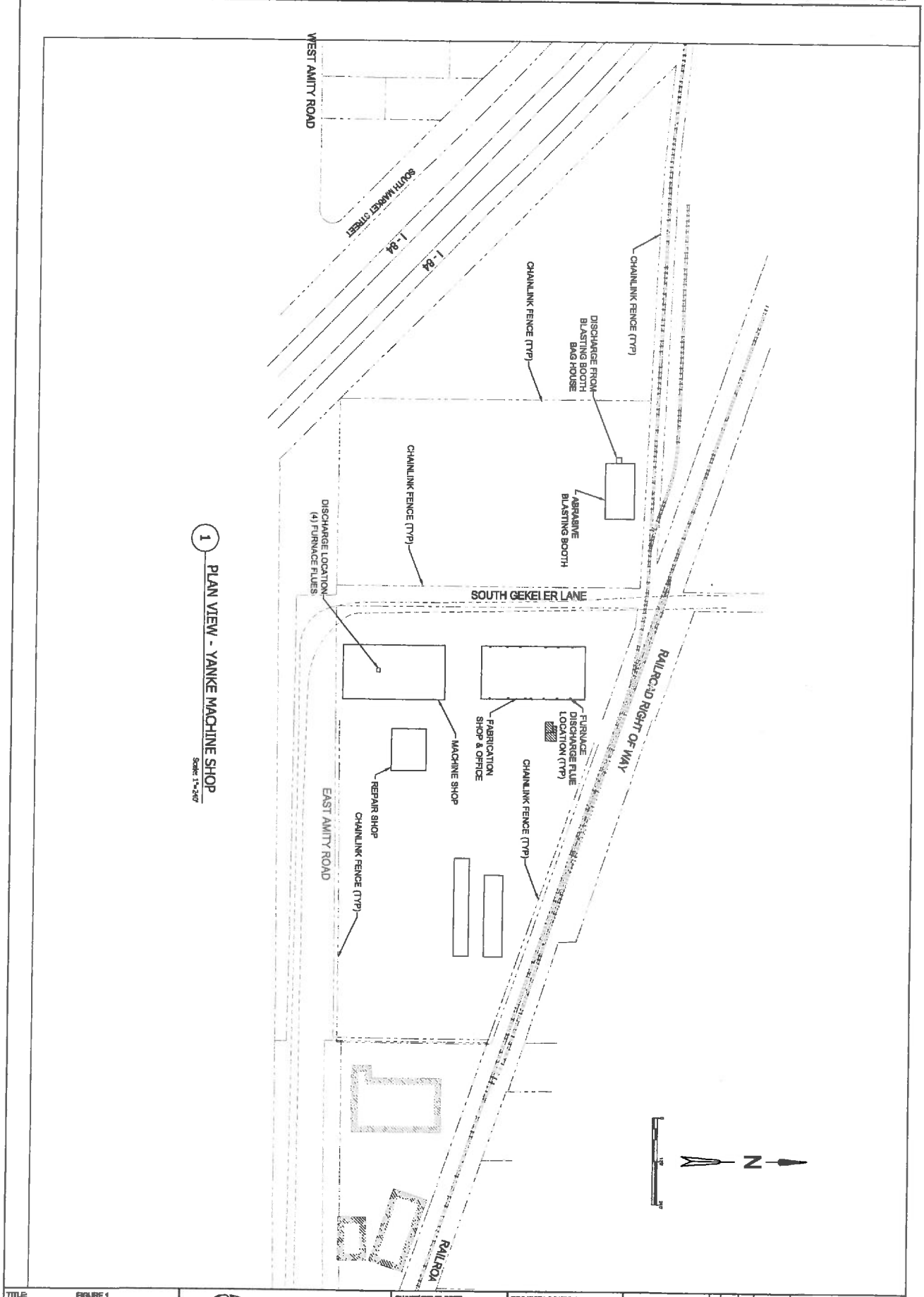

1 PLAN VIEW - YANKE MACHINE SHOP

Scale: 1"=240'

TITLE: FIGURE 1
YANKE MACHINE SHOP
SITE PLAN

CENTRA CONSULTING INC

OWNER/DEVELOPER:

PROJECT LOCATION:

PROJECT CONTACT:

VISIONS	No.	BY	DATE	DESCRIPTION
	A	CSA	00/00/0000	ISSUE FOR APPROVAL

APPENDIX C

WELDING MATERIAL SAFETY DATA SHEETS

AlcoTec
A Subsidiary of The ESAB Group, Inc.

#1

SAFETY DATA SHEET

Revised: January 9, 2012 Supersedes: December 20, 2011

Product Name: **ALUMINUM WELDING WIRE AND METALLIZING WIRE**
Emergency Phone: 1-717-637-8911 or 1-800-424-9300

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Chemical Formula: Mixture.
Other Designations: AlcoTec ALMIGWELD (Aluminum spooled and drum packed electrode)
AlcoTec ALTIGWELD (Aluminum straight length welding rod)
Aluminum Metallizing Wire (coils and spools)
AlumaArc (Aluminum spooled electrode and straight length welding rod)
Manufacturer: AlcoTec Wire Corporation, 2750 Aero Park Drive, Traverse City, MI 49686-9263 USA
Product Use: Welding, Filler Metal, Metallizing, Brazing

2. HAZARDS INFORMATION

EMERGENCY OVERVIEW

Solid, silvery, odorless. Non-flammable as supplied. Small chips, fine turnings, and dust from processing may ignite readily.
Explosion/fire hazards may be present when (See Sections 5, 7 and 10 for additional information):

- Dust or fines are dispersed in the air.
- Fines or dust are in contact with other metal oxides (e.g., rust).
- Chips, fines, or dust are in contact with water.
- Molten aluminum is in contact with water/moisture or other metal oxides.

Dust or fume from welding can cause eye, skin, or upper respiratory tract irritation; metal fume fever; lung diseases, neurological effects and other systemic effects.

Potential Health Effects
EYES: Fume can cause irritation. Ultraviolet radiation from welding can cause flash burns.
SKIN: Can cause irritation. Ultraviolet radiation from welding can cause flash burns.
INHALATION: Can cause respiratory tract irritation, metal fume fever, and other health effects listed below:
Cancer hazard

Aluminum is welded in a protective, inert atmosphere such as argon or helium using the MIG or TIG process. Welding processes generate welding fumes and an intense ultraviolet radiation that results in the formation of ozone, and oxides of nitrogen. Ultraviolet radiation from welding can also cause flash burns to the eyes and skin.

- The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).
- Exposure to low levels of ozone can cause irritation of the eyes, nose, and throat. Inhalation can cause chest tightness, headache, shortness of breath, cough, wheeze, nausea, and narrowing of airways. Symptoms disappear when removed from exposure.
- Exposure to high levels of ozone may cause acute respiratory distress with shortness of breath, pulmonary changes, hemorrhage, and pulmonary edema (fluid in the lungs). Symptoms of pulmonary edema may be delayed for one or more hours. Exposure of test animals and human tissue to high concentrations has shown chromosomal changes, reproductive effects, blood changes, and death from lung congestion.
- Oxides of nitrogen can cause irritation of the eyes, skin (when moist), and respiratory tract. Exposure to high levels of nitrogen oxides can cause delayed pulmonary edema (fluid in the lungs) which may be fatal. Nitric oxide can cause formation of methemoglobin, which decreases the blood's ability to carry oxygen. Chronic overexposure can cause pulmonary fibrosis (scarring of the lungs).
- Overexposure to Aluminum dust/fines and fumes can cause reduced lung function and may be associated with neurological effects.

- Overexposure to magnesium oxide fumes can cause respiratory tract irritation and fever, chills, shortness of breath, and malaise (metal fume fever). Temporary symptoms can include fever, chills, nausea, vomiting, and muscular pain.
- Chronic exposure to inert dusts of silicon can cause increased airway resistance and contributes to chronic bronchitis. Intratracheal administration of silicon in rabbits produced significant pulmonary lesions.
- Exposure to zinc oxide fumes subsequent to burning, welding, and molten metal work can result in fever, chills, shortness of breath, and malaise (metal fume fever), and upper respiratory tract irritation. Temporary symptoms can include fever, chills, nausea, vomiting, and muscular pain. Exposure to dust or fines presents a low health risk by inhalation.
- Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.
- Hexavalent chromium (Chrome VI) can cause asthma, kidney damage, primary irritant dermatitis, sensitization dermatitis, skin ulceration, and pulmonary edema (fluid in the lungs). Chronic inhalation or overexposure has been associated with lung, nasal, and gastrointestinal cancer. Hexavalent chromium is listed as carcinogenic to humans by IARC (Group 1)*. Chromium and some of its compounds are listed as carcinogenic by the NTP. Hexavalent chromium compounds may be generated during welding operations, with alloys containing chromium. A SIGNIFICANT AMOUNT OF THE CHROMIUM IN THE FUMES CAN BE HEXAVALENT CHROMIUM, WHICH HAS A VERY LOW EXPOSURE LIMIT, 0.005 mg/m^3 (5µg/m^3).
- The potential for overexposure to copper fume may exist when welding, flame cutting, etc. Overexposure to copper dust/mists can cause irritation of the eyes, skin, and upper respiratory tract. Chronic overexposure may result in blood disorders (anemia), and skin and hair discolorations. Overexposure to copper fume can result in respiratory tract irritation, nausea, and fever, chills, shortness of breath and malaise (metal fume fever).
- Nickel dust and fume can cause skin sensitization, allergic contact dermatitis, and conjunctivitis. Chronic inhalation of high levels of nickel can cause irritation of airways and lungs, lung fibrosis (scarring of the lungs), nasal septum perforation, nasal sinusitis, respiratory sensitization and asthma. Nickel compounds have been associated with cancer of lungs, larynx, and paranasal sinuses in humans. Nickel compounds are listed on the NTP and are listed as carcinogenic to humans by IARC (Group 1)*. Nickel metal is possibly carcinogenic to humans as defined by IARC (Group 2B)*.
- Beryllium can cause irritant dermatitis, allergic contact dermatitis, and skin granulomas. Inhalation of excessive levels of beryllium can result in acute pneumonitis (inflammation of the lung tissues).

  Beryllium can cause lung sensitization in susceptible individuals. Chronic inhalation of dust and fumes by these sensitized individuals can result in a serious, progressive disease called Chronic Beryllium Disease (CBD). This disease, often misdiagnosed as sarcoidosis, is an allergic condition in which the lung tissues become inflamed. This inflammation, sometimes accompanied with fibrosis (lung scarring), restricts the uptake of oxygen into the blood stream. CBD can, over time, be fatal.

  Inhalation of beryllium has produced lung tumors in animals. Beryllium is listed on the NTP and is known to be carcinogenic to humans by IARC (Group 1)*. *(See Section 8)*
- Lead inorganic dust and fume is listed as a possibly carcinogenic to humans by IARC Group 2B*. Overexposure to lead dust or fume can cause weakness of extremities (peripheral neuropathy), stomach disturbances, harm to the kidneys, liver, central nervous system, blood and blood forming tissues, and reproductive organs. Overexposure to lead has been associated with human reproductive effects (e.g. reduced fertility and damage to the fetus of exposed pregnant women). Lead is a cumulative toxic metal by inhalation or ingestion.
- Warning: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & safety Code 25249.5 et seq.)

Medical conditions aggravated by exposure to the product:

Chronic lung disease, skin rashes, and asthma.

***IARC CLASSIFICATIONS:**

Group 1: The agent is carcinogenic to humans.

There is sufficient evidence that a casual relationship existed between exposure to the agent and human cancer.

Group 2B: The agent is possibly carcinogenic to humans.

Generally includes agents for which there is limited evidence in humans in the absence of sufficient evidence in experimental animals.

3. COMPOSITION INFORMATION ON INGREDIENTS

Alloy Ingredients: (% by weight shown as a maximum or a range, except for Aluminum, which is a minimum % by weight)

Alloy	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Zr	Ti	Others Each [1]	Others Total	Al
1100	0.95 =	Si+Fe	0.05-0.20	0.05	--	--	--	0.10	--	--	0.05	0.15	99.00
1350	0.10	0.40	0.05	0.01	--	0.01	--	0.05	--	--	0.03 [3]	0.10	99.50
1188	0.06	0.06	0.005	0.01	0.01	--	--	0.03	--	0.01	0.01 [4]	--	99.88
1199	0.006	0.006	0.006	0.002	0.006	--	--	0.006	--	0.002	0.002 [7]	--	99.99
2319	0.20	0.30	5.8-6.8	0.20-0.40	0.02	--	--	0.10	--	0.10-0.20	0.05 [5]	0.15	Rmnd [2]
4043	4.5-6.0	0.8	0.30	0.05	0.05	--	--	0.10	--	0.20	0.05	0.15	Rmnd [2]
4047 (718)	11.0-13.0	0.8	0.30	0.15	0.10	--	--	0.20	--	--	0.05	0.15	Rmnd [2]
4145 (716)	9.3-10.7	0.8	3.3-4.7	0.15	0.15	0.15	--	0.20	--	--	0.05	0.15	Rmnd [2]
4643	3.6-4.6	0.8	0.10	0.05	0.10-0.30	--	--	0.10	--	0.15	0.05	0.15	Rmnd [2]
5087	0.25	0.40	0.05	0.7-1.1	4.5-5.2	0.05-0.25	--	0.25	0.10-0.20	0.15	0.05	0.15	Rmnd [2]
5183	0.40	0.40	0.10	0.50-1.0	4.3-5.2	0.05-0.25	--	0.25	--	0.15	0.05	0.15	Rmnd [2]
5356	0.25	0.40	0.10	0.05-0.20	4.5-5.5	0.05-0.20	--	0.10	--	0.06-0.20	0.05	0.15	Rmnd [2]
5554	0.25	0.40	0.10	0.50-1.0	2.4-3.0	0.05-0.20	--	0.25	--	0.05-0.20	0.05	0.15	Rmnd [2]
5556	0.25	0.40	0.10	0.50-1.0	4.7-5.5	0.05-0.20	--	0.25	--	0.05-0.20	0.05	0.15	Rmnd [2]
5654	0.45 =	Si+Fe	0.05	0.01	3.1-3.9	0.15-0.35	--	0.20	--	0.05-0.15	0.05	0.15	Rmnd [2]
5754	0.40	0.40	0.10	0.50	2.6-3.6	0.30	--	0.20	--	0.15	0.05	0.15	Rmnd [2]
206.0	0.10	0.15	4.2-5.0	0.20-0.50	0.15-0.35	--	0.05	0.10	--	0.15-0.30	0.05 [6]	0.15	Rmnd [2]
C355.0 (4009)	4.5-5.5	0.20	1.0-1.5	0.10	0.40-0.6	--	--	0.10	--	0.20	0.05	0.15	Rmnd [2]
A356.0 (4008)	6.5-7.5	0.20	0.20	0.10	0.25-0.45	--	--	0.10	--	0.20	0.05	0.15	Rmnd [2]
357.0	6.5-7.5	0.15	0.05	0.03	0.45-0.6	--	--	0.05	--	0.20	0.05	0.15	Rmnd [2]

Notes:

[1] Beryllium shall not exceed 0.0003 percent.

[2] Rmnd = remainder.

[3] 1350 may contain Gallium, 0.03% (max.), Boron 0.05% (max.), and Vanadium plus Titanium, 0.02% (max.).

[4] 1188 may contain Gallium, 0.03% (max.), and Vanadium, 0.05% (max.).

[5] 2319 contains Vanadium, 0.05-0.15% and Zirconium, 0.10-0.25%.

[6] 206.0 may contain Tin, 0.05% (max.).

[7] 1199 may contain 0.005% each (max.) of Gallium and Vanadium.

4. FIRST AID MEASURES

EYES: Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician.

SKIN: Wash thoroughly with soap and water. Consult a physician if irritation persists.

INHALATION: Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide CPR for persons without pulse or respirations. Consult a physician immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES: Non-flammable as shipped. Small chips and dust from processing may ignite readily.

FIRE/EXPLOSION: May be a potential hazard under the following conditions:

- Dusts or fines dispersed in the air can be explosive.
- Chips, fines and dust in contact with water can generate flammable/explosive hydrogen gas. These gases could present an explosion hazard in confined or poorly ventilated spaces.
- Fines and dust in contact with certain metal oxides (e.g., rust). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source.
- Molten aluminum in contact with water/moisture or other metal oxides (e.g., rust). Moisture entrapped by molten aluminum can be explosive. Contact of molten aluminum with other metal oxides can initiate a thermite reaction.

EXTINGUISHING MEDIA: Use fire fighting methods and materials that are appropriate for surrounding fire. Use coarse water spray on chips or turnings. For fines, dust or molten aluminum, use Class D extinguishing agents.

DO NOT USE: Halogenated extinguishing agents on small chips/fines. Do not use water in fighting fires around molten aluminum.

FIRE FIGHTING INSTRUCTIONS: Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

6. ACCIDENTAL RELEASE MEASURES

SMALL/LARGE SPILL: If molten: Contain the flow using dry sand or salt flux as a dam. Do not use shovels or hand tools to halt the flow of molten aluminum. Allow the spill to cool before remelting as scrap.

7. HANDLING AND STORAGE

Product should be kept dry. Avoid generating dust. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different.

REQUIREMENTS FOR PROCESSES WHICH GENERATE DUSTS OR FINES

- If processing of these products includes operations where dust or extremely fine particulate is generated, obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F1 and National Fire Protection Association (NFPA) brochures listed in Section 16. Use non-sparking handling equipment. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during aluminum dust handling and transfer operations. (See Section15).
- Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.
- Do not allow chips, fines or dust to contact water, particularly in enclosed areas.
- Avoid all ignition sources. Good housekeeping practices must be maintained.

REQUIREMENTS FOR REMELTING OF ALUMINUM SCRAP MATERIAL AND/OR INGOT

- Molten aluminum and water can be an explosive combination. The risk is greatest when there is sufficient molten aluminum to entrap or seal off the water. Water and other forms of contamination on or contained in aluminum scrap or remelt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops of water can lead to violent explosions.

- All tooling and containers which come in contact with molten aluminum must be preheated or specially coated and rust free. Molds and ladles must be preheated or oiled before casting. Any surfaces that may contact molten aluminum (i.e., concrete) should be specially coated.
- Drops of molten aluminum in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Circulation of the water and removal of the aluminum particles minimize the hazards.

During melting operations, the following minimum guidelines should be observed:

- Inspect all aluminum materials before furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.
- Store materials in dry, heated areas with any cracks or cavities pointed downwards.
- Preheat and dry large or heavy items such as ingot adequately before charging into a furnace containing molten aluminum. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the internal metal temperature of the coldest item of the batch to 400°F and then hold at that temperature for 6 hours.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use with adequate explosion-proof ventilation to meet the limits listed in Section 2.

RESPIRATORY PROTECTION: Use NIOSH-approved respiratory protection [dust, fume, high efficiency dust/fume mask for lead, or other (organic vapor)] as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 2.

EYE PROTECTION: Welders should use appropriate equipment (e.g. welder's helmet, face shield, filter lens) to prevent eye irritation or flash burns.

SKIN PROTECTION: Wear impervious gloves to avoid any skin injury.

- The presence of airborne beryllium has been detected during the welding of aluminum alloys with beryllium content at only 0.002% by weight. In accordance with OSHA 29 CFR 1910.252: Welding or cutting operations involving beryllium-containing base or filler metals shall be done using local exhaust ventilation and airline respirators unless atmospheric tests under the most adverse conditions have established that the workers' exposures is within the acceptable concentrations defined by 29 CFR 1910.1000. In all cases, workers in the immediate vicinity of the welding or cutting operations shall be protected as necessary by local exhaust ventilation or airline respirators.
- Good industrial hygiene practices, including reducing occupational exposures to as low as reasonably achievable, are recommended. Where employees are exposed to beryllium above the PEL or where excessive contamination of clothing with beryllium is possible, adequate protective clothing should be provided to prevent contamination of personal clothing. Personnel assigned to launder such clothing should be advised of beryllium's presence and potential health effects.
- Sampling to establish lead level exposure is advised where exposure to airborne particulate or fumes is possible. Consult OSHA Lead Standard 29 CFR 1910.1025 for specific health/industrial hygiene precautions and requirements to follow when handling lead compounds.

Revised: January 9, 2012 Supersedes: December 20, 2011

Product Name: **ALUMINUM WELDING WIRE AND METALLIZING WIRE**

EXPOSURE LIMITS:

			EXPOSURE LIMITS (TWA in mg/m^3 unless noted)	
Component	**CAS No.**	**Form**	**ACGIH TLV**	**OSHA PEL**
Aluminum	7429-90-5	Total dust, fume Respirable	 1	15 5
Beryllium and Beryllium Compounds	7440-41-7	All compounds as Be	0.00005	0.002, 0.005 Ceiling, 0.025 for 30 minutes
Chromium	7440-47-3	Metals Cr II compounds Cr III compounds, inorganic Cr VI compounds, water soluble Cr VI compounds, water insoluble	0.5 — 0.5 as Cr 0.05 as Cr 0.01 as Cr	1 0.5 as Cr 0.5 as Cr 0.005 as Cr VI 0.005 as Cr VI
Copper	7440-50-8	Fume Dust/mist	0.2 1	0.1 1
Gallium	7440-55-3		None	None
Iron	7439-89-6	Oxide dust & fume (as Fe)	5 (respirable)	10
Lead	7439-92-1	Elemental and inorganic compounds	0.05 as Pb	0.05 as Pb
Magnesium	7439-95-4	Oxide fume	10 (inhalable)	15 (total particulate)
Manganese	7439-96-5	Fume	0.2	5 (ceiling)
Nickel	7440-02-0	Metal Soluble inorganic compounds Insoluble inorganic compounds	1.5 as Ni 0.1 as Ni (inhalable) 0.2 as Ni (inhalable)	1 as Ni 1 as Ni 1 as Ni
Silicon	7440-21-3	Total dust Respirable	TLV withdrawn —	15 5
Titanium	7440-32-6	Oxide dust	10	15 (total particulate)
Vanadium	7440-62-2	Respirable dust Fume	0.05 as V_2O_5 (inhalable)	0.5 (ceiling) as V_2O_5 0.1 (ceiling) as V_2O_5
Zinc	7440-66-6	Oxide fume Total Oxide dust Respirable oxide dust	— — 2, 10 (STEL)	5 15 5
Zirconium	7440-67-7	Elemental	5, 10 (STEL)	5 (compounds only)

Possible hazards during processing by welding, or arc spray metallizing

	ACGIH TLV	OSHA PEL
Ozone (light, heavy work)	0.1, 0.05 ppm	0.1 ppm
Nitric oxide	25 ppm	25 ppm
Nitrogen dioxide	3, 5ppm (STEL)	5 ppm (ceiling)

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Solid
BOILING POINT:	Not applicable
FREEZE-MELT POINT:	970°-1215°F (521°-657°C)
VAPOR PRESSURE (mm):	Not applicable
VAPOR DENSITY (air = 1):	Not applicable
SOLUBILITY IN WATER:	None
SPECIFIC GRAVITY:	Not determined
DENSITY:	Approximately 0.1 lb/in^3
pH:	Not applicable
ODOR:	None
ODOR THRESHOLD (ppm):	Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION:	Not applicable

10. STABILITY AND REACTIVITY

Stable under normal conditions of use, storage, and transportation as shipped. Chips, fines, dust and molten aluminum are considerable more reactive with the following:

- **Water:** Slowly generates flammable/explosive hydrogen gas and heat. Generation rate is greatly increased with smaller particles (e.g., fines and dusts).
  Molten aluminum can react violently/explosively with water or moisture, particularly when the water is entrapped.
- **Heat:** Oxidizes at a rate dependent upon temperature and particle size.
- **Strong oxidizers:** Violent reaction with considerable heat generation.
  Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten.
- **Acids and alkalis:** Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts).
- **Halogenated compounds:** Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided aluminum.
- **Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides):** A violent thermite reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for initiation.
  Molten aluminum can react violently without external ignition source.
- **Iron powder:** An explosive reaction forming hydrogen gas occurs when heated above 1470°F (600°C).

11. TOXICOLOGICAL INFORMATION

LD_{50} or LC_{LO} found for oral, dermal or inhalation routes of administration:

Nickel:	oral rat LD_{50}: 9000 mg/kg body weight
Silicon:	oral rat LD_{50}: 3160 mg/kg body weight
Manganese:	oral rat LD_{50}: 9000 mg/kg body weight
Iron:	intraperitoneal rabbit LD_{LO}: 20 mg/kg - no toxic effect noted

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL/CHEMICAL FATE INFORMATION: Not available.

Revised: January 9, 2012 Supersedes: December 20, 2011

Product Name: **ALUMINUM WELDING WIRE AND METALLIZING WIRE**

13. DISPOSAL CONSIDERATION

Collect scrap for remelting and recycling. To maintain metal purity, it may be desirable to segregate this scrap from other alloys.

RCRA Status: Characterize in accordance with 40 CFR 261 or state equivalent.

14. TRANSPORT INFORMATION

USA DOT: Not Regulated - Enter the proper freight classification, "SDS Number," and "Product Name" on the shipping paperwork.

Canadian TDG Hazard Class & PIN: Not regulated.

15. REGULATORY INFORMATION

All electrical equipment must be suitable for use in hazardous atmospheres involving aluminum powder in accordance with 29 CFR 1910.307. The National Electrical Code, NFPA 70, contains guidelines for determining the type and design of equipment and installation, which will meet this requirement.

U.S. Federal Regulations

TSCA STATUS: All components of this product are listed on the TSCA inventory.

CERCLA HAZARDOUS SUBSTANCES: Beryllium, Chromium, Chromium compounds, Copper, Lead, Manganese, Nickel, Zinc.

SARA TITLE III:

Section 311/312 Physical and Health Hazard Categories: Immediate (acute), delayed (chronic) if particulates/fumes are generated during processing.

Section 313 Toxic Chemicals: Aluminum (fume/dust), Beryllium, Chromium, Copper, Lead, Manganese, Nickel, Vanadium (fume/dust), and Zinc (fume/dust).

State Regulations

PENNSYLVANIA "Special Hazardous Substance": Beryllium; Nickel; Chromium compounds, hexavalent.

International Regulations

CANADIAN DOMESTIC SUBSTANCES LIST: All components of this product are listed on the Canadian DSL.

EUROPEAN COMMUNITY: All components of this product are listed on ECOIN, the European Core Inventory.

16. OTHER INFORMATION

STATUS: Changes in Section 1.

PREPARED BY: Hazardous Materials Control Committee

- OSHA Standard 29 CFR 1910.1025 (Lead)
- OSHA Standard 29 CFR 1910.252
- ANSI 249.1, Safety in Welding and Cutting
- Aluminum Association's Bulletin F-1,"Guidelines for Handling Aluminum Fines Generated during Various Aluminum Fabricating Operations." The Aluminum Association, 900 19th Street, NW, Washington, DC 20006.
- NFPA 65, Standard for Processing and Finishing of Aluminum (NFPA phone: 800-344-3555)
- NFPA 70, Standard for National Electrical Code
- NFPA 77, Standard for Static Electricity
- Guide to Occupational Exposure Values-I 997, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
- Dept. of Health and Human Services, NIOSH: Registry of Toxic Effects of Chemical Substances, 1985-86 Edition
- Sax, N. Irving: Dangerous Properties of Industrial Materials, Van Nostrand Reinhold Co., Inc., 1984

SAFETY DATA SHEET

This Safety Data Sheet complies with Regulation (EC) No. 1907/2006, ISO 11014-1 and ANSI Z400.1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: DUAL SHIELD AND ESAB MILD STEEL AWS A5.20 T-1, T-2, T-9 & T-12 FLUX CORED WELDING ELECTRODES
Application: Arc Welding
Classification: AWS A5.20
Supplier: THE ESAB GROUP, INC., 801 Wilson Avenue, Hanover, PA 17331
Telephone No.: 1-717-637-8911, 1-800-933-7070
Emergency No.: 1-717-637-8911 and 1-800-424-9300 (CHEMTREC)
Web site: www.esabna.com

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2. HAZARDS IDENTIFICATION

Emergency Overview: Metal wires in varying colors. These products are normally not considered hazardous as shipped. Gloves should be worn when handling to prevent cuts and abrasions.

Some of products contain nickel, which is classified as toxic by prolonged inhalation, a skin sensitizer and a suspect carcinogen. Nickel powder is harmful for the environment. Some of these products contain cryolite. Cryolite is classified as toxic and dangerous for the environment. Some of these products contain potassium fluorosilicate which is classified as toxic by inhalation, skin contact, and ingestion. In the form that these substances are present in these products, they do not contribute to a hazard classification of the products. These products contain titanium dioxide which is possibly carcinogenic. These products contain quartz, but normally not in an inhalable fraction. Quartz can cause silicosis and may cause cancer.

Skin contact is normally no hazard but should be avoided to prevent possible allergic reactions.

Persons with a pacemaker should not go near welding or cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device.

When these products are used in a welding process, the most important hazards are heat, radiation, electric shock and welding fumes.

Heat: Spatter and melting metal can cause burn injuries and start fires.

Radiation: Arc rays can severely damage eyes or skin.

Electricity: Electric shock can kill.

Fumes: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes. Chronic overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.

3. COMPOSITION/INFORMATION ON INGREDIENTS

These products are preparations of flux cored wire.

Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification[1]	IARC[2]	NTP[3]	OSHA List[4]
Aluminum	--	7429-90-5	231-072-3	F; R15 R10 stabllized F; R15-17 pyrophoric	--	--	--
Aluminum Oxide	--	1344-28-1	215-691-6	No	--	--	--
Carbon	--	7440-44-0	231-153-3	No	--	--	--
Cryolite	01-2119511565-43	15096-52-3	239-148-8	T; R48/23/25 Xn; R20/22 N; R51-53	--	--	--
Iron	01-2119462838-24	7439-89-6	231-096-4	No	--	--	--
Iron Oxide	--	1309-37-1	215-168-2	No	--	--	--
Lithium Fluoride	--	7789-24-4	232-152-0	No	--	--	--
Magnesium	--	7439-95-4	231-104-6	No	--	--	--
Manganese	--	7439-96-5	231-105-1	No	--	--	--

Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification[1]	IARC[2]	NTP[3]	OSHA List[4]
Nickel Powder	--	7440-02-0	231-111-4	Carc. Cat. 3; R40 T; R48/23 R43 R52/53	2B	S	--
Potassium Fused Flux							
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Manganous Oxide	--	1344-43-0	215-695-8	No	--	--	--
Potassium Oxide	--	12136-45-7	235-227-6	No	--	--	--
Silicon Dioxide (amorphous)	--	60676-86-0	262-373-8	No	--	--	--
Potassium Silicofluoride	--	16871-90-2	240-896-2	T; R23/24/25	--	--	--
Silicon	--	7440-21-3	231-130-8	No	--	--	--
Silicon Dioxide	--	14808-60-7	238-878-4	T; R45	1	K	--
Sodium Fluoride	--	7681-49-4	231-667-8	T; R25 Xi; R36/38, R32	--	--	--
Sodium Fused Flux							
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Manganous Oxide	--	1344-43-0	215-695-8	No	--	--	--
Sodium Oxide	--	12401-86-4	215-208-9	No	--	--	--
Silicon Dioxide (amorphous)	--	60676-86-0	262-373-8	No	--	--	--
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Zirconium	--	7440-67-7	231-176-9	F; R15-17	--	--	--
Zirconium Dioxide	--	1314-23-4	215-227-2	No	--	--	--

(1) Hazard Classification according to European Council Directive 67/548/EEC, for R-phrases, see Section 16.
(2) Evaluation according to the International Agency for Research on Cancer.
1 –Carcinogenic to humans. 2A – Probably carcinogenic to humans. 2B – Possibly carcinogenic to humans.
(3) Classification according to the 11th Report on Carcinogens, published by the US National Toxicology Program.
K – Known Carcinogen S – Suspect Carcinogen
(4) Carcinogen listing according to OSHA, Occupational Safety & Health Administration (USA).

APPROXIMATE COMPOSITION (Wt. %)

"All Position" T-1, T-9 & T 12 Electrodes

Product Trade Name	Dual Shield 70 Ultra Plus	Dual Shield 71 RC	Dual Shield 7100 LC	Dual Shield 7100 Ultra	ESAB 71	Dual Shield II 70 Ultra	Dual Shield II 70 HYN
Aluminum	--	<0.5	<0.5	<0.5	<0.5	--	--
Aluminum Oxide	<0.5	<1	<0.5	<0.5	<0.5	0.2-1	0.2-1
Carbon	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	0.2-1	0.2-1	0.2-1	0.2-1	0.2-1	0.2-1	0.2-1
Manganese	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5
Nickel	--	--	--	--	--	--	<0.5
Potassium Oxide	--	<0.5	<0.5	<0.5	<0.5	<0.3	<0.3
Silicon	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5
Silicon Dioxide	0.2-1	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5
Sodium Oxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium Oxide	8-11	8-11	8-11	6-9	6-9	6-9	6-9
Zirconium Dioxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)
AWS Classification	E71T-1M/T-9M	E71T-1C/T-9C	E71T-1C-DH8/ T-1M/T-9C-DH8/ T-9M	E71T-1C-DH8/ T-1M-D/ T-9C-DH8/ T-9M-D	E71T-1C/T-1M/ T-9C/T-9M	E71T-1M/T-12M	E71T-1M/T-12M

Product Trade Name	Dual Shield II 70LC	Dual Shield II 70LF	Dual Shield II 70T-12	Dual Shield II 70T-12H4	Dual Shield II 71 ULTRA	Dual Shield 700X	Dual Shield 710X
Aluminum	<0.5	--	--	--	<0.5	--	<0.5
Aluminum Oxide	0.2-1	0.2-1	0.2-1	0.2-1	<0.5	<0.5	<0.5
Carbon	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<0.5	<0.5	<0.5	0.5-2	<0.5	<0.5	<0.5
Magnesium	0.2-1	0.2-1	0.2-1	0.2-1	0.2-1	--	0.2-1
Manganese	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	2.5-4	1.5-3.5
Manganese Oxide	--	--	--	--	--	0.2-1.0	--
Nickel	--	<0.5	--	--	0.1-0.5	--	0.1-0.5
Potassium Oxide	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5
Silicon	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	1-2.5	0.5-1.5
Silicon Dioxide	0.5-1.5	0.5-1.5	0.5-2	0.5-1.5	0.5-1.5	0.5-2	0.5-1.5
Sodium Oxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium Oxide	6-9	6-9	6-9	6-9	6-9	4.5-6.5	8-11
Zirconium Dioxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)
AWS Classification	E70T-1C/T-9C	E71T-1M/T-12M	E71T-1MJ/T-12MJ	E71T-1M-JH4/T-12M-JH4	E71T-1C-J/ T-12C-J	E70T-1C	E71T-1C-DH8/ T-1M/ T-9C-DH8/T-9M

Product Trade Name	Dual Shield 710X-M	Dual Shield II 711X	Dual Shield II 712X	Dual Shield II 71 HYD	Dual Shield 7210
Aluminum	<0.5	<0.5	--	<0.5	<0.5
Aluminum Oxide	<0.5	<0.5	0.2-1	<0.5	<0.5
Carbon	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	0.2-1	0.2-1	0.2-1	0.2-1	0.2-1
Manganese	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5
Nickel	--	0.1-0.5	--	0.1-0.5	0.1-0.5
Potassium Oxide	<0.5	<0.3	<0.3	<0.3	<0.5
Silicon	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5
Silicon Dioxide	0.5-1.5	0.5-1.5	0.5-2	0.5-1.5	0.5-1.5
Sodium Oxide	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium Oxide	8-11	6-9	6-9	6-9	8-11
Zirconium Dioxide	<0.5	<0.5	<0.5	<0.5	<0.5
Iron	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)
AWS Classification	E71T-1C/ T-1M-DH8/ T-9C/T-9M-DH8	E71T-1C-JDH8/ T-12C-JDH8	E71T-1M-JH8/ T-12M-JH8	E71T-1C/T-12C	E71T-1C/T-9C

"Downhand" T-1 & T-9 Electrodes

Product Trade Name	Dual Shield 111-RB	Dual Shield 70-GB	Dual Shield 78	Dual Shield R-70 ULTRA
Aluminum	0.1-0.5	--	--	--
Aluminum Oxide	<0.5	<0.5	<0.5	<0.5
Carbon	<0.2	<0.2	<0.2	<0.2
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<0.5	<0.5	<0.5	0.5-2
Magnesium	0.1-0.5	0.1-0.5	--	--
Manganese	1.5-3.0	1.5-3.0	3-4.5	3-4.5
Manganese Oxide	0.2-1.0	--	0.2-1.0	0.2-1.0
Nickel	--	--	--	0.1-0.5
Potassium Oxide	<0.3	<0.3	<0.3	<0.3
Silicon	0.5-2.0	<0.5	--	<0.5
Silicon Dioxide	0.5-1.5	0.5-1.5	1-3	0.5-1.5
Sodium Oxide	<0.5	<0.5	<0.5	<0.5
Titanium Oxide	2.5-4.5	5.5-7.5	4.5-6.5	5.0-7.0
Zirconium	0.1-0.5	--	0.1-0.5	--
Zirconium Dioxide	<0.5	<0.5	<0.5	<0.5
Iron	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)
AWS Classification	E70T-1C	E70T-GM	E70T-1C	E70T-1C-DH8/ T-1M/T-9C-DH8/T-9M

"Downhand" T-2 Electrodes

Product Trade Name	Dual Shield T-63
Aluminum	--
Aluminum Oxide	<0.5
Carbon	<0.2
Iron Oxide	1-3
Manganese	2.5-5
Manganese Oxide	0.2-1
Silicon	0.5-3
Silicon Dioxide	0.5-1.5
Sodium Oxide	<1
Titanium Oxide	4.5-6.5
Zirconium Dioxide	<0.5
Iron	Bal. (>80)
AWS Classification	E70T-2C

4. FIRST AID MEASURES

Inhalation: If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.

Eye contact: For radiation burns due to arc flash, see physician. To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.

Skin contact: For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.

Electric shock: Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.

General: Move to fresh air and call for medical aid.

5. FIRE FIGHTING MEASURES

No specific recommendations for welding consumables. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation. Wear self-contained breathing apparatus as fumes or vapors may be harmful.

6. ACCIDENTAL RELEASE MEASURES

Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse.

Personal precautions: refer to Section 8.

Environmental precautions: refer to Section 13.

7. HANDLING AND STORAGE

Handling:

Handle with care to avoid stings and cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest.

Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.

Storage:

Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust.

Engineering measures:

Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep working place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

Personal protective equipment:

Use respirator or air supplied respirator when welding or brazing in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear and body protection like welders gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance. For information about welding fume analysis refer to Section 10.

Substance		CAS#	ACGIH TLV [1] mg/m^3	OSHA PEL [2] mg/m^3
Aluminum	(metal and insoluble compounds)	7429-90-5	1**	15*, 5**
Aluminum Oxide		1344-28-1	1** (as Al)	15*, 5**
Carbon		7440-44-0	None	None
Cryolite	(as F)	15096-52-3	2.5	2.5
Iron and Iron Oxides		7439-89-6	5**	10 (fume)
Iron Oxide		1309-37-1	5**	10 (fume)
Lithium Fluoride	(as F)	7789-24-4	2.5	2.5
Magnesium		7439-95-4	None	None
Manganese and inorganic compounds	(as Mn)	7439-96-5	0.2	5 Ceiling
Nickel, elemental		7440-02-0	1.5***	1
Potassium Fused Flux				
Titanium Oxide		13463-67-7	10	15*
Manganous Oxide	(as Mn)	1344-43-0	0.2	5 Ceiling
Potassium Oxide		12136-45-7	None	None
Silicon Dioxide (amorphous)		60676-86-0	Withdrawn	10 mg/m^3 ### %SiO_2+2

Substance		CAS#	ACGIH TLV [1] mg/m³	OSHA PEL [2] mg/m³
Potassium Silicofluoride	(as F)	16871-90-2	2.5	2.5
Silicon		7440-21-3	Withdrawn	15*, 5**
Silicon Dioxide (quartz)		14808-60-7	0.025**	10 mg/m³ ### / %SiO_2+2
Sodium Fluoride	(as F)	7681-49-4	2.5	2.5
Sodium Fused Flux				
Titanium Oxide		13463-67-7	10	15*
Manganous Oxide	(as Mn)	1344-43-0	0.2	5 Ceiling
Sodium Oxide		12401-86-4	None	None
Silicon Dioxide (amorphous, fused)		60676-86-0	Withdrawn	10 mg/m³ ### / %SiO_2+2
Titanium Oxide		13463-67-7	10	15*
Zirconium & Zirconium Compounds	(as Zr)	7440-67-7	5, 10 (STEL)	5
Zirconium Dioxide	(as Zr)	1314-23-4	5, 10 (STEL)	5

(1) Threshold Limit Values according to American Conference of Governmental Hygienists, 2012

(2) Permissible Exposure Limits according to the Occupational Safety & Health Administration (USA)

Unless noted, all values are for 8 hour time weighted averages (TWA).

* Total dust, ** Respirable fraction, *** Inhalable fraction.

Respirable dust

NOTE: Some of these products may not contain all of the materials listed. For details of composition, refer to the COMPOSITION TABLES in Section 3.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Solid, non-volatile with varying color.

Melting Point: >1000°C/>1800°F

10. STABILITY AND REACTIVITY

General: These products are only intended for normal welding purposes.

Stability: These products are stable under normal conditions.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

When these products are used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.

The amount of fumes generated from these products varies with welding parameters and dimensions but is generally no more than 5 to 15 g/kg consumable. Fumes from these products may contain compounds of the following chemical elements: Fe, O, Mn, Zr, Ni, F, Na, Si, K, Al, Li, Mg and Ti. The rest is not analyzed, according to available standards.

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 8. Manganese and nickel have low exposure limits, in some countries, that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

11. TOXICOLOGICAL INFORMATION

Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fumes is difficult because of varying base materials, coatings, air contamination and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

Acute toxicity: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.

Chronic toxicity: Overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Prolonged inhalation of titanium dioxide above safe exposure limits can cause cancer. Inhalable quartz is a respiratory carcinogen; however, the process of welding converts crystalline quartz to the amorphous form which is not considered to be a carcinogen.

12. ECOLOGICAL INFORMATION

Welding consumables and materials could degrade/weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

Nickel powder is harmful for the environment. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Some of these products contain cryolite, which is classified by European Council Directive 67/548/EEC, as toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal and local regulations. Use recycling procedures if available.

USA RCRA: These products are not considered hazardous waste if discarded.

Residues from welding consumables and processes could degrade and accumulate in soils and groundwater. Welding slag from these products typically contain mainly the following components originating from the powder filling of the flux cored wire: Fe, O, Mn, Zr, Ni, F, Na, Si, K, Al, Li, Mg and Ti.

14. TRANSPORT INFORMATION

No international regulations or restrictions are applicable.

15. REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and SPARKS can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

Canada: WHMIS classification: Class D; Division 2, Subdivision A

Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

USA: Under the OSHA Hazard Communication Standard, these products are considered hazardous.

These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA Title III

Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ (lb)	TPQ (lb)
Product is a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class

As shipped: Immediate In use: Immediate delayed

EPCRA/SARA Title III 313 Toxic Chemicals

The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA 313 reporting. See Section 3 for weight percent.

Ingredient name	Disclosure threshold
Manganese	1.0% de minimis concentration
Nickel	0.1% de minimis concentration

16. OTHER INFORMATION

This Safety Data Sheet has been revised due to modifications to Section 3. This SDS supersedes 7971-1-AQ.

Refer to ESAB "Welding and Cutting - Risks and Measures", F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating" available from ESAB, and to:

USA: Contact ESAB at www.esabna.com or 1-800-ESAB-123 if you have questions about this SDS.

American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org.

OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.

NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

These products have been classified according to the hazard criteria of the CPR and the SDS contains all the information required by the CPR.

Explanation of risk phrases mentioned in this SDS:

R-phrases:

R10 – Flammable.

R15 – Contact with water liberates extremely flammable gases.

R17 – Spontaneously flammable in air.

R20/22 – Harmful by inhalation and if swallowed.

R23/24/25 – Toxic by inhalation, in contact with skin and if swallowed.

R25 – Toxic if swallowed.

R32 – Contact with acids liberates very toxic gas.

R36/38 – Irritating to eyes and skin.

R40 – Limited evidence of a carcinogenic effect.

R43 – May cause sensitization by skin contact.

R45 – May cause cancer.

R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation.

R48/23/25 – Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

R51 – Toxic to aquatic organisms.

R52/53 – Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R53 – May cause long-term adverse effects in the aquatic environment.

ESAB requests the users of these products to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of these products a user should:

- notify its employees, agents and contractors of the information on this SDS and any product hazards/safety information.
- furnish this same information to each of its customers for these products.
- request such customers to notify employees and customers for the same product hazards and safety information.

The information herein is given in good faith and based on technical data that ESAB believes to be reliable. Since the conditions of use are outside our control, we assume no liability in connection with any use of this information and no warranty, expressed or implied is given. Contact ESAB for more information.

SAFETY DATA SHEET

This Safety Data Sheet complies with Regulation (EC) No. 1907/2006, ISO 11014-1 and ANSI Z400.1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: SHIELD-BRIGHT AND SHIELD-BRIGHT X-TRA FLUX CORED STAINLESS STEEL ELECTRODES
Application: Arc Welding
Classification: AWS A5.22
Supplier: THE ESAB GROUP, INC., 801 Wilson Avenue, Hanover, PA 17331
Telephone No.: 1-717-637-8911, 1-800-933-7070
Emergency No.: 1-717-637-8911 and 1-800-424-9300 (CHEMTREC)
Web site: www.esabna.com

#3

2. HAZARDS IDENTIFICATION

Emergency Overview: Metal wires in varying colors. These products are normally not considered hazardous as shipped. Gloves should be worn when handling to prevent cuts and abrasions.

These products contain nickel, which is classified as toxic by prolonged inhalation, a skin sensitizer and a suspect carcinogen. Nickel powder is harmful for the environment. Some of these products contain cryolite. Cryolite is classified as toxic and dangerous for the environment. Some of these products contain potassium fluorosilicate which is classified as toxic by inhalation, skin contact, and ingestion. In the form that these substances are present in these products, they do not contribute to a hazard classification of the products. These products contain titanium dioxide which is possibly carcinogenic. These products contain quartz, but normally not in an inhalable fraction. Quartz can cause silicosis and may cause cancer.

Avoid eye contact or inhalation of dust from these products. Skin contact is normally no hazard but should be avoided to prevent possible allergic reactions.

Persons with a pacemaker should not go near welding or cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device.

When these products are used in a welding process, the most important hazards are heat, radiation, electric shock and welding fumes.

Heat: Spatter and melting metal can cause burn injuries and start fires.

Radiation: Arc rays can severely damage eyes or skin.

Electricity: Electric shock can kill.

Fumes: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes. Chronic overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.

3. COMPOSITION/INFORMATION ON INGREDIENTS

These products are preparations of flux cored wire.

Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification[1]	IARC[2]	NTP[3]	OSHA List[4]
Aluminum Oxide	--	1344-28-1	215-691-6	No	--	--	--
Chromium	--	7440-47-3	231-157-5	No	--	--	--
Copper	--	7440-50-8	231-159-6	No	--	--	--
Fluoride Compounds							
Cryolite	01-2119511565-43	15096-52-3	239-148-8	T; R48/23/25 Xn; R20/22 N; R51-53	--	--	--
Lithium Fluoride	--	7789-24-4	232-152-0	No	--	--	--
Potassium Silico Fluoride	--	16871-90-2	240-896-2	T; R23/24/25	--	--	--
Sodium Fluoride	--	7681-49-4	231-667-8	T; R25 Xi; R36/38, R32	--	--	--
Iron	01-2119462838-24	7439-89-6	231-096-4	No	--	--	--
Iron Oxide	--	1309-37-1	215-168-2	No	--	--	--

Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification[1]	IARC[2]	NTP[3]	OSHA List[4]
Manganese	--	7439-96-5	231-105-1	No	--	--	--
Mineral Silicates	All substances with CAS # of 14808-60-7 are considered to be quartz.						
Bentonite Clays	--	1302-78-9	215-108-5	No	--	--	--
Chlorite	--	14808-60-7	238-878-4	T; R45	1	K	--
Feldspar	--	14808-60-7	238-878-4	T; R45	1	K	--
Hectorite	--	14808-60-7	238-878-4	T; R45	1	K	--
Pyrropholite	--	14808-60-7	238-878-4	T; R45	1	K	--
Wollanstanite	--	14808-60-7	238-878-4	T; R45	1	K	--
Zircon	--	14808-60-7	238-878-4	T; R45	1	K	--
Molybdenum	--	7439-98-7	231-107-2	No	--	--	--
Nickel	--	7440-02-0	231-111-4	Carc. Cat. 3; R40 T; R48/23 R43	2B	S	--
Nickel Powder	--	7440-02-0	231-111-4	Carc. Cat. 3; R40 T; R48/23 R43 R52/53	2B	S	--
Niobium	--	7440-03-1	231-113-5	No	--	--	--
Potassium Fused Flux							
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Manganous Oxide	--	1344-43-0	215-695-8	No	--	--	--
Potassium Oxide	--	12136-45-7	235-227-6	No	--	--	--
Silicon Dioxide (amorphous)	--	60676-86-0	262-373-8	No	--	--	--
Silicon	--	7440-21-3	231-130-8	No	--	--	--
Silicon Dioxide	--	14808-60-7	238-878-4	T; R45	1	K	--
Sodium Fused Flux							
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Manganous Oxide	--	1344-43-0	215-695-8	No	--	--	--
Sodium Oxide	--	12401-86-4	215-208-9	No	--	--	--
Silicon Dioxide (amorphous)	--	60676-86-0	262-373-8	No	--	--	--
Sodium Oxide	--	1313-59-3	215-208-9	No	--	--	--
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Zirconium	--	7440-67-7	231-176-9	F; R15-17	--	--	--
Zirconium Dioxide	--	1314-23-4	215-227-2	No	--	--	--

(1) Hazard Classification according to European Council Directive 67/548/EEC, for R-phrases, see Section 16.

(2) Evaluation according to the International Agency for Research on Cancer.
1 –Carcinogenic to humans. 2A – Probably carcinogenic to humans. 2B – Possibly carcinogenic to humans.

(3) Classification according to the 11th Report on Carcinogens, published by the US National Toxicology Program.
K – Known Carcinogen S – Suspect Carcinogen

(4) Carcinogen listing according to OSHA, Occupational Safety & Health Administration (USA).

APPROXIMATE COMPOSITION (Wt. %)

Product Trade Name	Shield-Bright 308H	Shield-Bright 308L	Shield-Bright 309H	Shield-Bright 309L	Shield-Bright 309LMo	Shield-Bright 312	Shield-Bright 316H
Aluminum Oxide	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	17-20	17-20	21-24	21-24	21-24	25-28	17-20
Copper	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Manganese	1-3	1-3	1-3	1-3	1-3	1-3	1-3
Manganese Oxide	--	--	--	--	--	--	--
Mineral Silicates	<1	<1	<1	<1	<1	<1	<1
Molybdenum	<0.5	<0.5	<0.5	<0.5	1-3	<0.5	1-3
Nickel	8-10	8-10	10-12	10-12	10-12	8-10	9-11
Niobium	--	--	--	--	--	--	--
Potassium Oxide	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Silicon	0.2-2	0.2-2	0.2-2	0.2-2	0.2-2	0.2-2	0.2-2
Silicon Dioxide	<1	<1	<1	<1	<1	<1	<1
Sodium Oxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium Oxide	8-12	8-12	8-12	8-12	8-12	8-12	8-12
Zirconium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Zirconium Dioxide	<2	<2	<2	<2	<2	<2	<2
Iron	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)
AWS A5.22 Classification	E308HT1-1 E308HT1-4	E308LT1-1 E308LT1-4	E309T1-1/T1-4 E309HT1-1/T1-4	E309LT1-1 E309LT1-4	E309LMoT1-1 E309LMoT1-4	E312T1-1 E312T1-4	E316T1-1/T1-4 E316HT1-1/T1-4

Product Trade Name	Shield-Bright 316L	Shield-Bright 317L	Shield-Bright 347	Shield-Bright 347H	Shield-Bright 2209	Shield-Bright 2594	Shield-Bright 410NiMo	Cryo-Shield 308L
Aluminum Oxide	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	17-20	17-20	17-20	17-20	21-23	23-25	10-13	17-20
Copper	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Manganese	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
Manganese Oxide	--	--	--	--	--	<0.5	--	--
Mineral Silicates	<1	<1	<1	<1	<1	<1	<1	<1
Molybdenum	1-3	2-4	<0.5	<0.5	2-4	2-4	<0.5	<0.5
Nickel	9-11	10-12	8-10	8-10	7-9	8-10	3-5	8-10
Niobium	--	--	<1	<1	--	--	--	--
Potassium Oxide	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Silicon	0.2-2	0.2-2	0.2-2	0.2-2	0.2-2	0.2-2	0.2-2	0.2-2
Silicon Dioxide	<1	<1	<1	<1	<1	<1	<1	<1
Sodium Oxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium Oxide	8-12	8-12	8-12	8-12	8-12	8-12	5-8	8-12
Zirconium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Zirconium Dioxide	<2	<2	<2	<2	<2	<2	<2	<2
Iron	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>70)	Bal. (>45)
AWS A5.22 Classification	E316LT1-1 E316LT1-4	E317LT1-1 E317LT1-4	E347T1-1 E347T1-4	E347T1-1/T1-4 E347HT1-1/T1-4	E2209T1-1 E2209T1-4	E2594T1-4	E410NiMoT1-1 E410NiMoT1-4	E308LT1-1J E308LT1-4J

Product Trade Name	Shield-Bright X-tra 308	Shield-Bright X-tra 308L	Shield-Bright X-tra 309L	Shield-Bright X-tra 309LMo	Shield-Bright X-tra 316L	Shield-Bright X-tra 317L	Shield-Bright X-tra 347
Aluminum Oxide	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	17-20	17-20	21-24	21-24	17-20	17-20	18-20
Copper	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<0.5
Manganese	1-3	1-3	1-3	1-3	1-3	1-3	1-3
Manganese Oxide	--	--	--	1-2	--	1-2	0.2-1
Mineral Silicates	<1	<1	<1	<1	<1	<1	<1
Molybdenum	<0.5	<0.5	<0.5	2-4	2-4	2-4	<0.5
Nickel	8-10	8-10	10-13	10-13	10-13	10-13	8-10
Niobium	--	--	--	--	--	--	0.5-1
Potassium Oxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silicon	0.2-2	0.2-2	0.2-2	0.2-2	0.2-2	0.2-2	0.2-1
Silicon Dioxide	1-4	1-4	1-4	1-4	1-4	1-4	0.5-2
Sodium Oxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium Dioxide	2-5	2-5	2-5	2-5	2-5	2-5	2-5
Zirconium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Zirconium Dioxide	<2	<2	<2	<2	<2	<2	<2
Iron	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)	Bal. (>45)
AWS A5.22 Classification	E308LT0-1 E308LT0-4	E308LT0-1 E308LT0-4	E309LT0-1 E309LT0-4	E309LMoT0-1 E309LMoT0-4	E316LT0-1 E316LT0-4	E317LT0-1 E317LT0-4	E347T0-1 E347T0-4

4. FIRST AID MEASURES

Inhalation: If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.

Eye contact: For radiation burns due to arc flash, see physician. To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.

Skin contact: For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.

Electric shock: Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.

General: Move to fresh air and call for medical aid.

5. FIRE FIGHTING MEASURES

No specific recommendations for welding consumables. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation. Wear self-contained breathing apparatus as fumes or vapors may be harmful.

6. ACCIDENTAL RELEASE MEASURES

Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container Wear proper protective equipment while handling these materials. Do not discard as refuse.

Personal precautions: refer to Section 8.

Environmental precautions: refer to Section 13.

7. HANDLING AND STORAGE

Handling:

Handle with care to avoid stings and cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest

Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.

Storage:

Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust.

Engineering measures:

Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep working place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

Personal protective equipment:

Use respirator or air supplied respirator when welding or brazing in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear and body protection like welders gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance. For information about welding fume analysis refer to Section 10.

Substance		CAS#	ACGIH TLV [1] mg/m³	OSHA PEL [2] mg/m³
Aluminum Oxide		1344-28-1	1** (as Al)	15*, 5**
Chromium Compounds		7440-47-3		
Metal	(as Cr)		0.5	1
Cr (VI), inorganic, water insoluble	(as Cr)		0.01	0.005
Cr (VI), inorganic, water soluble	(as Cr)		0.05	0.005
Copper	(fume, as Cu)	7440-50-8	0.2	0.1
	(dust and mists, as Cu)		1	1
Fluoride Compounds				
Cryolite	(as F)	15096-52-3	2.5	2.5
Lithium Fluoride	(as F)	7789-24-4	2.5	2.5
Potassium Silico Fluoride	(as F)	16871-90-2	2.5	2.5
Sodium Fluoride	(as F)	7681-49-4	2.5	2.5
Iron	(as iron oxide)	7439-89-6	5**	10 (fume)
Iron Oxide		1309-37-1	5**	10 (fume)
Manganese and inorganic compounds	(as Mn)	7439-96-5	0.2	5 Ceiling
Mineral Silicates (no exposure anticipated)				
All substances with CAS # of 14808-60-7 are considered to be quartz.				
Bentonite Clays		1302-78-9	None	None
Chlorite Silica-Crystalline-Quartz		14808-60-7	0.025**	$\frac{10\ mg/m^3}{\%SiO_2+2}$ ###
Feldspar Silica-Crystalline-Quartz		14808-60-7	0.025**	$\frac{10\ mg/m^3}{\%SiO_2+2}$ ###
Hectorite Silica-Crystalline-Quartz		14808-60-7	0.025**	$\frac{10\ mg/m^3}{\%SiO_2+2}$ ###
Pyrropholite Silica-Crystalline-Quartz		14808-60-7	0.025**	$\frac{10\ mg/m^3}{\%SiO_2+2}$ ###
Wollanstanite Silica-Crystalline-Quartz		14808-60-7	0.025**	$\frac{10\ mg/m^3}{\%SiO_2+2}$ ###
Zircon Silica-Crystalline-Quartz		14808-60-7	0.025**	$\frac{10\ mg/m^3}{\%SiO_2+2}$ ###
Molybdenum	(metal and insoluble compounds, as Mo)	7439-98-7	3 **, 10 ***	15*
	(soluble compounds, as Mo)		0.5 **	5
Nickel, elemental		7440-02-0	1.5***	1
Niobium		7440-03-1	None	None
Potassium Fused Flux				
Titanium Oxide		13463-67-7	10	15*
Manganous Oxide	(as Mn)	1344-43-0	0.2	5 Ceiling
Potassium Oxide		12136-45-7	None	None
Silicon Dioxide (amorphous)		60676-86-0	Withdrawn	$\frac{10\ mg/m^3}{\%SiO_2+2}$ ###

Substance		CAS#	ACGIH TLV [1] mg/m³	OSHA PEL [2] mg/m³
Silicon		7440-21-3	Withdrawn	15*, 5**
Silicon Dioxide (quartz)		14808-60-7	0.025**	$\frac{10\ mg/m^3}{\%SiO_2+2}$ ###
Sodium Fused Flux				
Titanium Oxide		13463-67-7	10	15*
Manganous Oxide	(as Mn)	1344-43-0	0.2	5 Ceiling
Sodium Oxide		12401-86-4	None	None
Silicon Dioxide (amorphous, fused)		60676-86-0	Withdrawn	$\frac{10\ mg/m^3}{\%SiO_2+2}$ ###
Sodium Oxide		1313-59-3	None	None
Titanium Oxide		13463-67-7	10	15*
Zirconium & Zirconium Compounds	(as Zr)	7440-67-7	5, 10 (STEL)	5
Zirconium Dioxide	(as Zr)	1314-23-4	5, 10 (STEL)	5

(1) Threshold Limit Values according to American Conference of Governmental Hygienists, 2012

(2) Permissible Exposure Limits according to the Occupational Safety & Health Administration (USA)

Unless noted, all values are for 8 hour time weighted averages (TWA).

* Total dust, ** Respirable fraction, *** Inhalable fraction.

^ Value from OSHA expressed in PPM and value shown is conversion to mg/m^3

Respirable dust

NOTE: Some of these products may not contain all of the materials listed. For details of composition, refer to the COMPOSITION TABLES in Section 3.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Solid, non-volatile with varying color.

Melting Point: >1000°C/>1800°F

10. STABILITY AND REACTIVITY

General: These products are only intended for normal welding purposes.

Stability: These products are stable under normal conditions.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

When these products are used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.

The amount of fumes generated from these products varies with welding parameters and dimensions but is generally no more than 5 to 15 g/kg consumable. Fumes from these products may contain compounds of the following chemical elements: Fe, O, Mn, Zr, Cr, Ni, F, Na, Si, K, Al, Mo, Cu, Nb, Li, and Ti. The rest is not analyzed, according to available standards.

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 8. A significant amount of the chromium in the fumes can be hexavalent chromium, which has a very low exposure limit in some countries. Manganese and nickel also have low exposure limits, in some countries, that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

11. TOXICOLOGICAL INFORMATION

Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fumes is difficult because of varying base materials, coatings, air contamination and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

Acute toxicity: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.

Chronic toxicity: Overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Prolonged inhalation of titanium dioxide above safe exposure limits can cause cancer. Inhalable quartz is a respiratory carcinogen; however, the process of welding converts crystalline quartz to the amorphous form which is not considered to be a carcinogen.

12. ECOLOGICAL INFORMATION

Welding consumables and materials could degrade/weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

Nickel powder is harmful for the environment. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Some of these products contain cryolite, which is classified by European Council Directive 67/548/EEC, as toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal and local regulations. Use recycling procedures if available.

USA RCRA: Unused products or product residue containing chromium is considered hazardous waste if discarded, RCRA ID characteristic Toxic Hazardous Waste D007.

Residues from welding consumables and processes could degrade and accumulate in soils and groundwater. Welding slag from these products typically contain mainly the following components originating from the powder filling of the flux cored wire: Fe, O, Mn, Zr, Cr, Ni, F, Na, Si, K, Al, Mo, Cu, Nb, Li, and Ti.

14. TRANSPORT INFORMATION

No international regulations or restrictions are applicable.

15. REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and SPARKS can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

Canada: WHMIS classification: Class D; Division 2, Subdivision A

Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

USA: Under the OSHA Hazard Communication Standard, these products are considered hazardous.

These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA Title III

Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ (lb)	TPQ (lb)
Product is a solid solution in the form of a solid article.	–	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class

As shipped: Immediate In use: Immediate delayed

EPCRA/SARA Title III 313 Toxic Chemicals

The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA 313 reporting. See Section 3 for weight percent.

Ingredient name	Disclosure threshold
Chromium	1.0% de minimis concentration
Copper	1.0% de minimis concentration
Manganese	1.0% de minimis concentration
Nickel	0.1% de minimis concentration

16. OTHER INFORMATION

This Safety Data Sheet has been revised due to modifications to Sections 3 and 8. This SDS supersedes 7968-AB.

Refer to ESAB "Welding and Cutting - Risks and Measures", F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating" available from ESAB, and to:

USA: Contact ESAB at www.esabna.com or 1-800-ESAB-123 if you have questions about this SDS.

American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org.

OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.

NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

These products have been classified according to the hazard criteria of the CPR and the SDS contains all the information required by the CPR.

Explanation of risk phrases mentioned in this SDS:

R-phrases:

R15 – Contact with water liberates extremely flammable gases.

R17 – Spontaneously flammable in air.

R20/22 – Harmful by inhalation and if swallowed.

R23/24/25 – Toxic by inhalation, in contact with skin and if swallowed.

R25 – Toxic if swallowed.

R32 – Contact with acids liberates very toxic gas.

R36/38 – Irritating to eyes and skin.

R40 – Limited evidence of a carcinogenic effect.

R43 – May cause sensitization by skin contact.

R45 – May cause cancer.

R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation.

R48/23/25 – Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

R51 – Toxic to aquatic organisms.

R52/53 – Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R53 – May cause long-term adverse effects in the aquatic environment.

ESAB requests the users of these products to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of these products a user should:

- notify its employees, agents and contractors of the information on this SDS and any product hazards/safety information.
- furnish this same information to each of its customers for these products.
- request such customers to notify employees and customers for the same product hazards and safety information.

The information herein is given in good faith and based on technical data that ESAB believes to be reliable. Since the conditions of use are outside our control, we assume no liability in connection with any use of this information and no warranty, expressed or implied is given. Contact ESAB for more information.

COR-MET®

MATERIAL SAFETY DATA SHEET

#4

TOOL AND DIE ELECTRODES

COR-MET INC., 12500 GRAND RIVER RD, BRIGHTON MI 48116
EMERGENCY NO. (810) 227-3251

MSDS NO. ELTDFAX REV: 4 DATE: November 3, 2008
REVISED BY: WD

SECTION 1 - PRODUCT IDENTIFICATION

Product Type: Iron Base Tool and Die Electrodes
Cor-Met Inc. Trade Name: 4130, 4130LN, 4140, 4340, F15, F25, F35, F40, F45, F54, F58, F580, F581, F59, F63, F64, F65

SECTION 2 - HAZARDOUS INGREDIENTS

IMPORTANT! This section covers the material from which this product is manufactured. The fumes and gases produced during welding with this product are covered by section 5. The term "hazardous" in Hazardous Ingredients should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

		Exposure Limit (mg/m^3)		
SUBSTANCE	**CAS NO.**	**ACGIH TLV**	**OSHA PEL**	**STEL**
Calcium Carbonate	1317-65-3	N/E	15	--
Calcium Fluoride	7789-75-5	2.5 (as F)	2.5 (as F)	--
Carbon black	1333-86-4	3.5	3.5	--
Chromium	7440-47-3			
Metal and Cr III compounds		0.5	0.5	--
Insoluble Cr VI compounds		0.01	0.005 0.1 (CL)	--
Columbium	7440-03-1	10 (ND)	5 (R - dust)	--
Copper	7440-50-8			
Dusts and mists		1	1	--
Iron	7439-89-6	5 (oxide fume)	10 (total particulate)	--
Iron Oxide	1309-37-1	5 (R)	10 (oxide fume)	--
Manganese	7439-96-5	0.2	5	3 (fume)
Molybdenum	7439-98-7			
Metal and insoluble compounds		10 (I)	15	--
		3 (R)	15	
Nickel	7440-02-0			--
Elemental		1.5 (I)	1	--
Insoluble inorganic compounds		0.2 (I)	N/E	--
		3 (R)	15	
Potassium Titanate	12030-97-6	N/E	N/E	--
Silicon	7440-21-3	N/E	5 (R)	--
Titanium Dioxide	13463-67-7	10	15 (Total dust)	--
Tungsten	7440-33-7	5	N/E	3
Vanadium	1314-62-1	N/E	N/E	--

NOTES: CL = Ceiling Limit, STEL = Short Term Exposure Limit, TLV = Threshold Limit Value, ND = Nuisance Dust, PEL = Permissible Exposure Limit - OSHA(29CFR1910), N/E = Not Established (insufficient data), R = Respirable fraction, I = Inhalable fraction, -- = Not Specified

These products contain toxic chemicals subject to the reporting requirements of section 313 of Title III of SARA and 40 CFR Part 372.

SECTION 3 - PHYSICAL AND CHEMICAL CHARACTERISTICS

Material is a solid core wire coated with fluxes and metal alloys.

Vapor pressure – NA
Flash Point - NA

SECTION 4 – PHYSICAL HAZARDS

NO HAZARDS EXIST UNTIL THIS PRODUCT IS USED IN ARC WELDING

Nonflammable Welding arc and sparks can ignite combustible and flammable products. Refer to American National Standard Z49.1, Safety in Welding and Cutting published by the American Welding Society, 550 N.W. LeJeune Road Miami, FL 33126 for fire prevention and protection information during the use of welding and allied procedures.

SECTION 5 - HAZARDOUS DECOMPOSITION PRODUCTS

Welding fumes and gases cannot be classified simply. The composition and quantity of both depend on the metal being welded, the process, procedures, and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coating on the metal being welded (such as paint, plating, or galvanizing), the number of welders and volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, and the presence of contaminates in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities).

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 2. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 2, plus those from the base metal and coating, ect., as noted above.

Fume constituents of this product would include: fluorides, complex oxides of nickels, chromium, tungsten, iron, calcium, manganese, silicon, titanium, and molybdenum. Also, other fume constituents include nickel and nickel compounds, chromium and chromium compounds, tungsten and tungsten compounds.

The following chemicals may also be present in the fumes:

		Exposure Limit (mg/m^3)		
SUBSTANCE	**CAS NO.**	**ACGIH TLV**	**OSHA PEL**	**STEL**
Aluminum	7429-90-5	10	5 (R)	--
Calcium Carbonate	1317-65-3	N/E	15	--
Calcium Fluoride	7789-75-5	2.5 (as F)	2.5 (as F)	--
Calcium Oxide	1305-78-8	2	5	--
Chromium	7440-47-3			
Insoluble Cr VI compounds		0.01	0.005 0.1 (CL)	--
Chromium Oxide	1333-82-0	0.05 (as Cr)	0.1	--
Columbium	7440-03-1	10 (ND)	5 (R - dust)	--
Iron Oxide	1309-37-1	5 (R)	10 (oxide fume)	--
Manganese	7439-96-5	0.2	5	3
Molybdenum	7439-98-7			
Metal and insoluble compounds		10 (I)	15	--
		3 (R)	15	
Nickel	7440-02-0			
Elemental		1.5 (I)	1	--
Insoluble inorganic compounds		0.2 (I)	N/E	--
Nickel (soluble)	7440-02-0	0.1	1	--
Silica (amorphous)	7631-86-9	N/E	20 mppcf	--
Titanium Dioxide	13463-67-7	10	15 (Total dust)	--
Tungsten	7440-33-7	5	N/E	3

NOTES: CL = Ceiling Limit, STEL = Short Term Exposure Limit, TLV = Threshold Limit Value, PEL = Permissible Exposure Limit - OSHA(29CFR1910), N/E = Not Established (insufficient data), I = Inhalable fraction, R = Respirable fraction, mppcf = Million Particles Per Cubic Foot, -- = Not Specified

Threshold Limit Value

The ACGIH recommended general limit for welding Fume NOC (not otherwise classified) is $5mg/m^3$. ACGIH - 19xx preface states "The TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations." Most welding, even with primitive ventilation does not produce exposures inside the welding helmet above $5mg/m^3$. Specific fume constituents may modify the TLV.

SECTION 6 - HEALTH HAZARD

Effects of Overexposure

Electric arc welding may create one or more of the following health hazards:

Arc Rays can injure eyes and burn skin.
Electric shock can kill. See section 9.
Fumes and gases can be dangerous to your health.

Short Term (Acute) Overexposure Effects

Aluminum – Irritation of the respiratory system.
Calcium Carbonate - Irritation of eyes, skin, cough.
Calcium oxide – Dust or fumes may cause irritation of the respiratory system, skin and eyes.
Carbon Black – None specified.

Chromium – Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage, and asthma like symptoms. Swallowing chromium (IV) salts can cause severe injury or death. Dust on skin can cause ulcers. Eyes may be burned by chromium (VI) compounds. Allergic reactions may occur in some people.
Chromium Oxide – N/A.
Columbium – Dust or fumes may cause irritation of the respiratory system, skin and eyes due to mechanical defects.
Copper – Metal fume fever characterized by metallic taste, tightness in chest, and fever. Symptoms may last 24 to 48 hours following overexposure.
Fluorides – Fluoride compounds evolved may cause skin and eye burns, pulmonary edema, and bronchitis.
Iron, Iron oxide – None are known. Treat as a nuisance dust or fume.
Manganese – Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and body aches. Recovery is usually complete within 48 hours of the overexposure.
Molybdenum – Irritation of the eyes, nose and throat.
Nickel, Nickel compounds – Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction.
Potassium Titanate – N/A.
Silica (amorphous) – Dust and fumes may cause irritation to the respiratory system, skin and eyes.
Silicon – May cause mechanical irritation to the eyes and the respiratory tract.
Titanium dioxide – Irritation of the respiratory system.
Tungsten – Dust may cause irritation of the skin and eyes. Inhalation of dust may cause airway obstructive asthma, which is reversible following exposure. Symptoms include tightening of the chest and a productive cough.
Vanadium – Respiratory effects, bronchitis, emphysema, pulmonary edema, and bronchial pneumonia.
Welding fumes – May result in discomfort such as dizziness and nausea, or dryness or irritation of nose, throat and eyes.

Long Term (Chronic) Overexposure Effects

Aluminum – Pulmonary fibrosis and emphysema.
Calcium Carbonate – chronic ingestion (>8 g/day) may cause blood and kidney disorders.
Calcium oxide – Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia.
Carbon Black – Lungs may be affected by repeated or prolonged exposure at very high concentrations.
Chromium – Ulceration and perforation of nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung cancers. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds.
Chromium Oxide – Prolonged contact with the skin may cause dermatitis. Fibrosis of the lungs may occur.
Columbium – No adverse long term health effects have been reported in the literature.
Copper – Copper poisoning has been reported in the literature from exposure to high levels of copper. Liver damage can occur due to copper accumulating in the liver characterized by cell destruction and cirrhosis. High levels of copper may cause anemia, jaundice, and central nervous system damage characterized by nerve fiber separation and cerebral degeneration.
Fluorides – Serious bone erosion (osteoporosis) and mottling of teeth.
Iron, Iron oxide fumes – Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear over time when exposure to iron and its compounds ceases.
Manganese – May effect central nervous system. Symptoms may be similar to Parkinson's disease and can include slowness, changes in handwriting, gait impairment, muscle spasms, and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese should be seen by a physician for early detection of neurologic problems.
Molybdenum – Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty breathing and anemia.
Nickel, nickel compounds – Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers.
Potassium Titanate – N/A.
Silica (amorphous) – Research indicates that silica is present in welding fumes in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential.
Silicon – Not specified.
Titanium dioxide – Pulmonary irritation and slight fibrosis.
Tungsten – Long term overexposure may cause pulmonary fibrosis characterized by a rapid onset of cough, sputum and dyspnea on exertion.
Vanadium – Repeated exposure may cause bronchitis, an asthma-like allergy, kidney damage, and anemia.
Welding fumes – Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or siderosis.

Medical Condition Aggravated By Exposure

Preexisting respiratory or allergic conditions may occur in some workers.

SECTION 7 - ROUTES OF ENTRY OR EXPOSURE

The primary routes of entry are the respiratory system, eyes and/or skin.

SECTION 8 - CARCINOGENICITY

SUBSTANCE	CAS NO.	OSHA	NTP	IARC
Chromium	7440-47-3	Not listed	Yes (hexavalent compounds)	Yes (VI compounds)
Nickel	7440-02-0	Not listed	Yes (compounds)	Yes (compounds)

As designated by OSHA, the NTP Annual Report, and IARC Monographs.

Warning: This product contains or produces a chemical known to the State of California to cause cancer (California Health & Safety Code Section 25249.5 et seq.).

SECTION 9 - PRECAUTIONS FOR SAFE HANDLING AND USE/APPLICABLE CONTROL MEASURES

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, Safety in Welding and Cutting published by the American Welding Society, and OSHA Publication 2206 (29CFR1910), US Government Printing Office, Washington D.C. 20402 for more detail on many of the following.

VENTILATION: Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases below TLVs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

RESPIRATORY PROTECTION: Use respirable fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below TLV.

EYE PROTECTION: Wear helmet or use face shield with filter lens. Select shade from AWS publication F2.2. Provide protective screens and flash goggles, if necessary, to shield others.

PROTECTIVE CLOTHING: Wear hand, head, and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSE Z49.1. This includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, and dark, substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

WASTE DISPOSAL METHOD: Prevent waste from contamination surrounding environment. Discard any product, residue, disposable container or liner in an environmentally acceptable manner compliant with federal, state, and local regulations.

SECTION 10 – EMERGENCY FIRST AID PROCEDURES

Call for medical aid. Employ first aid techniques recommended by the American Red Cross.

COR-MET INC. BELIEVES THIS DATA TO BE ACCURATE, BUT NO WARRANTY, EXPRESSED OR IMPLIED, IS MADE.

HOBART BROTHERS

MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet (MSDS) is for U.S. manufactured or distributed welding consumables and related products and may be used to comply with OSHA's Hazard Communication standard, 29 CFR 1910.1200, and Superfund Amendements and Reauthorization Act (SARA) of 1986 Public Law 99-499. The OSHA standard must be consulted for specific requirements. This Safety Data Sheet complies with European Commission Directive 89/106/EEC, 91/155/EEC, ISO 11014-1 and ANSI Z400.1. This document is translated in several languages and available on our website at www.hobartbrothers.com, from your sales representative or by calling customer service at 1 (937) 332-4000.

SECTION 1 – IDENTIFICATION

Manufacturer Name: HOBART BROTHERS COMPANY
Address: 101 TRADE SQUARE EAST, TROY, OH 45373
Website: www.hobartbrothers.com

Telephone No: 1 (937) 332-4000
Emergency No: 1 (800) 424-9300

#5

Product Type: SHIELDED METAL ARC WELDING (SMAW) ELECTRODES

GROUP A: Product For: CARBON STEEL
AWS Specification: E6010, E6011, E6012, E6013, E6022, E7014, E7024-1

GROUP B: Product For: LOW HYDROGEN CARBON STEEL
AWS Specification: E7016, E7018, E7018-1, E7018-M

GROUP C: Product For: LOW HYDROGEN, LOW ALLOY STEEL
AWS Specification: E7018-A1, E7018-G, E8018-B2, E8018-B2L, E8018-B6, E8018-B8, E8018-C1, E8018-C2, E8018-C3, E8018-G, E9015-B9, E9018-B3, E9018-B3L, E9018-M, E10018-D2, E10018-M, E10518-M, E11018-M, E12018-M

GROUP D: Product For: HIGH STRENGTH CELLULOSE CARBON STEEL
AWS Specification: E7010-P1, E8010-P1, E9010-G, E9010-P1

SECTION 2 – IDENTIFICATION OF HAZARDS

IMPORTANT - This section covers the hazardous materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are also addressed in Section 8. The term "hazardous" in this section should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

HAZARDOUS INGREDIENT	CAS	EINECS[Γ]	REGULATORY HAZARD CLASSIFICATION/DESIGNATION 67/548/EEC[Δ]	IARC[E]	NTP[Z]	OSHA[H]	65[Θ]
ALUMINUM OXIDE	1344-28-1	215-691-6	None	---	---	---	---
CALCIUM CARBONATE	1317-65-3	215-279-6	None	---	---	---	---
CELLULOSE	9004-34-6	232-674-9	None	---	---	---	---
CHROMIUM	7440-47-3	231-157-5	O - R9; Carc 1[Φ] - R45; Muta 2 - R46; Repr 3 - R62; T+ - R26; T - R24/25, R48/23; C - R35, R42/43; N - R50, R53[ΣΣΣ]	1[ΣΣ], 3[Σ]	K[ΣΣ]	X[ΣΣ]	X[ΣΣ]
FLUORSPAR	7789-75-5	232-188-7	None	---	---	---	---
IRON	7439-89-6	231-096-4	None	---	---	---	---
MAGNESIUM CARBONATE	546-93-0	208-915-9	None	---	---	---	---
MANGANESE	7439-96-5	231-105-1	Xn - R20/22[Y]	---	---	---	---
MICA	12001-26-2	None	None	---	---	---	---
MOLYBDENUM	7439-98-7	231-107-2	Xn - R48/20/22; Xi - R36/37[X]	---	---	---	---
NICKEL	7440-02-0	231-111-4	Carc 3[Φ] - R40; T - R43, R48/23	1	K	X	X
POTASSIUM OXIDE	12136-45-7	235-227-6	None	---	---	---	---
SILICA	14808-60-7	238-878-4	Xn - R48/20, R40/20	1[Ψ]	K	X	X
(Amorphous Silica Fume)	69012-64-2	273-761-5	None	3	K	---	X
SILICON	7440-21-3	231-130-8	None	---	---	---	---
SODIUM OXIDE	1313-59-3	215-208-9	None	---	---	---	---
STRONTIUM CARBONATE	1633-05-2	216-643-7	None	---	---	---	---
TITANIUM DIOXIDE	13463-67-7	236-675-5	None	2B	---	---	---

Γ – European INventory of Existing Chemical Substances Number Δ - European Union Directive 67/548/EEC – Annex 1 E – International Agency for Research on Cancer (1 – Human Carcinogen, 2A – Probably Carcinogenic to Humans, 2B – Possibly Carcinogenic to Humans, 3 – Unclassifiable as to Carcinogenicity in Humans, 4 Probably Not Carcinogenic to Humans) Z – US National Toxicology Program (K – Known Carcinogen, S – Suspected Carcinogen) H – OSHA Known Carcinogen List Θ – California Proposition 65 (X – On Proposition 65 list) --- Dashes indicate the ingredient is not listed with the IARC, NTP, OSHA or 65 Φ – Carcinogen, Mutagen or Reproductive Category per European Council Directive 67/548/EEC Annex I Σ – Metal and Chromium III Compounds ΣΣ – Chromium VI Compounds ΣΣΣ – Chromium (VI) Trioxide EU 67/548/EEC Classification/Designation Y – Manganese Dioxide EU 67/548/EEC Classification/Designation X – Molybdenum Trioxide EU 67/548/EEC Classification/Designation Ψ – Silica Crystalline α-Quartz

The following symbols correspond with the EU 67/548/EEC column above are in European Union Directive 67/548/EEC Annex 1 and EC 1272/2008 Annex VI – Table 3.2:

Xn – Harmful

Xi – Irritant

O - Oxidizer

C – Corrosive

N – Dangerous for the Environment

T – Toxic

T+ - Extremely Toxic

WARNING! - Avoid breathing welding fumes and gases, they may be dangerous to your health. Always use adequate ventilation. Always use appropriate personal protective equipment.

PRIMARY ROUTES OF ENTRY: Respiratory System, Eyes and/or Skin.
ELECTRIC SHOCK: Arc welding and associated processes can kill. See Section 8.
ARC RAYS: The welding arc can injure eyes and burn skin.
FUMES AND GASES: Can be dangerous to your health.

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures and electrodes used. Most fume ingredients are present as complex oxides and compounds and not as pure metals. When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in this section, plus those from the base metal and coating, etc., as noted above. Monitor for the materials identified in the list within this section.
Fumes from the use of this product may contain complex oxides or compounds of the following elements and molecules: amorphous silica fume, calcium oxide, chromium, fluorspar or fluorides, manganese, nickel, silica and strontium. Other reasonably expected constituents of the fume would also include complex oxides of iron, titanium,

silicon and molybdenum. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating or galvanizing), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1, available from the "American Welding Society", P.O. Box 351040, Miami, FL 33135. Also, from AWS is F1.3 "Evaluating Contaminants in the Welding Environment - A Sampling Strategy Guide", which gives additional advice on sampling.

SECTION 3 - HAZARDOUS INGREDIENTS

CONTENT PERCENTAGE BY INGREDIENTS

INGREDIENT	CAS	EINECS	GROUP AND %WEIGHT A	B	C	D
ALUMINUM OXIDE	1344-28-1	215-691-6	<5	---	---	---
CALCIUM CARBONATE	1317-65-3	215-279-6	<2	<2	---	---
CELLULOSE	9004-34-6	232-674-9	<5	<5	<5	<5
CHROMIUM	7440-47-3	231-157-5	---	---	<9	---
FLUORSPAR	7789-75-5	232-188-7	---	1-12	4-15	---
IRON	7439-89-6	231-096-4	70-90	60-80	60-90	70-90
MAGNESIUM CARBONATE	546-93-0	208-915-9	<2	<5	<1	<1
MANGANESE	7439-96-5	231-105-1	1-5	1-5	1-5	1-5
MICA	12001-26-2	None	<5	---	---	---

INGREDIENT	CAS	EINECS	GROUP AND %WEIGHT A	B	C	D
MOLYBDENUM	7439-98-7	231-107-2	---	---	<2	<1
NICKEL	7440-02-0	231-111-4	---	---	<5	<2
POTASSIUM OXIDE	12136-45-7	235-227-6	<2	<2	<2	<2
SILICA	14808-60-7	238-878-4	<7	<8	<7	<7
(Amorphous Silica Fume)	69012-64-2	273-761-5	---	---	---	---
SILICON	7440-21-3	231-130-8	---	<2	<5	<2
SODIUM OXIDE	1313-59-3	215-208-9	<2	<2	<2	<2
STRONTIUM CARBONATE	1633-05-2	216-643-7	---	<2	<2	---
TITANIUM DIOXIDE	13463-67-7	236-675-5	<14	<10	<5	<5

--- Dashes indicate the ingredient is not present within the group of products

SECTION 4 – FIRST AID MEASURES

INHALATION: If breathing is difficult provide fresh air and contact physician. **EYE/SKIN INJURIES:** For radiation burns, see physician.
Section 11 of this MSDS covers the acute effects of overexposure to the various ingredients within the welding consumable. Section 8 of this MSDS lists the exposure limits and covers methods for protecting yourself and your co-workers.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. Welding arcs and sparks can ignite combustibles and flammable products. Unused welding consumables may remain hot for a period of time after completion of a welding process. See American National Standard (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Solid objects can be picked up and placed into a container. Wear proper personal protective equipment while handling. Do not discard as general trash.

SECTION 7 - HANDLING AND STORAGE

HANDLING: No specific requirements in the form supplied. Handle with care to avoid cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and product labels.
STORAGE: Keep separate from acids and strong bases to prevent possible chemical reactions.

SECTION 8 - EXPOSURE CONTROL AND PERSONAL PROTECTION

Read and understand the instructions and the labels on the packaging. Welding fumes do not have a specific OSHA PEL or ACGIH TLV. The OSHA PEL for Particulate – Not Otherwise Classified (PNOC) is 5 mg/m^3 – Respirable Fraction, 15 mg/m^3 – Total Dust. The ACGIH TLV for Particles – Not Otherwise Specified (PNOS) is 3 mg/m^3 -- Respirable Particles, 10 mg/m^3 – Inhalable Particles. The individual complex compounds within the fume may have a lower OSHA PEL or ACGIH TLV than the OSHA Particulate – Not Otherwise Classified (PNOC) and ACGIH Particles – Not Otherwise Specified (PNOS). An Industrial Hygienist, the OSHA Permissible Exposure Limits for Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits. European Union Occupational Exposure Limits (EU OEL) are listed with the most stringent limit among the EU member nations. All exposure limits are in milligrams per cubic meter (mg/m^3).

INGREDIENT	CAS	EINECS	OSHA PEL	ACGIH TLV	EU OEL
ALUMINUM OXIDE##	1344-28-1	215-691-6	5 R*	1 R* {A4}	1.5 R*(Aerosol) - Germany; 2 - Poland
CALCIUM CARBONATE	1317-65-3	215-279-6	5 R*, 5 (as CaO)	3 R*, 2 (as CaO)	3 R* (Aerosol) – Switzerland; 10 I* (Aerosol) – UK
CELLULOSE	9004-34-6	232-674-9	5 R*	10	3 R* (Aerosol) – Switzerland; 10 I* (Aerosol) – UK
CHROMIUM#	7440-47-3	231-157-5	1 (Metal)	0.5 (Metal) {A4}	0.1 I* (Aerosol) - Switzerland
			0.5 (Cr II & Cr III Cpnds)	0.5 (Cr III Cpnds) {A4}	0.005; 0.01*** - Denmark
			0.005 (Cr VI Cpnds)	0.05 (Cr VI Sol Cpnds) {A1}	0.005 (Total Aerosol); 0.015***(Total Aerosol) - Sweden
				0.01 (Cr VI Insol Cpnds) {A1}	
FLUORSPAR	7789-75-5	232-188-7	2.5 (as F)	2.5 (as F) {A4}	1 I* (Aerosol as F); 4*** (Aerosol as F) - Germany
IRON+	7439-89-6	231-096-4	5 R*	5 R* (Fe_2O_3) {A4}	3 R* (Aerosol as Fe_2O_3) – Switzerland
					7*** (as Fe_2O_3) - Denmark
MAGNESIUM CARBONATE	546-93-0	208-915-9	5 R*	3 R*	3 R* (Aerosol) – Switzerland; 10 I* (Aerosol) – UK
MANGANESE#	7439-96-5	231-105-1	5 CL ** (Fume)	0.2 I* {A4} ♦	0.02 R*(Aerosol); 0.16 R*** (Aerosol) - Germany
			1, 3 STEL*** ■	0.02 R* ♦, ♦♦	0.2 I*(Aerosol) - Germany
					0.2; 0.4*** - Denmark
MICA	12001-26-2	None	3 R*	3 R*	0.8 R*(Aerosol); 10 I* (Aerosol) – UK
MOLYBDENUM	7439-98-7	231-107-2	5 R*	3 R*; 10 I* (Ele and Insol)	3 R* - Spain;
				0.5 R* (Sol Cpnds) {A3}	4; 10*** - Poland
NICKEL#	7440-02-0	231-111-4	1 (Metal)	1.5 I* (Ele) {A5}	0.05; 0.1*** - Denmark
			1 (Sol Cpnds)	0.1 I* (Sol Cpnds) {A4}	
			1 (Insol Cpnds)	0.2 I* (Insol Cpnds) {A1}	
POTASSIUM OXIDE	12136-45-7	235-227-6	5 R*	3 R*	1.5 R*(Dust NOS - Aerosol) - Germany
SILICA++	14808-60-7	238-878-4	0.1 R*	0.025 R* {A2}	0.1 (Fused, Respirable Dust) - Denmark
					0.2*** (Fused, Respirable Dust) - Denmark
(Amorphous Silica Fume)	69012-64-2	273-761-5	0.8	3 R*	2 I*; 4 I*** - Denmark
SILICON+	7440-21-3	231-130-8	5 R*	3 R*	4 R* (Aerosol); 10 I* (Aerosol) - Denmark
SODIUM OXIDE	1313-59-3	215-208-9	5 R*	3 R*	1.5 R*(Dust NOS - Aerosol) - Germany
STRONTIUM CARBONATE+	1633-05-2	216-643-7	5 R*	3 R*	1.5 R* (as Dust - NOS) - Germany
TITANIUM DIOXIDE	13463-67-7	236-675-5	15 (Dust)	10 {A4}	1.5 R* - Germany

R* - Respirable Fraction R*** - Respirable Fraction - Short Term Exposure Limit I* - Inhalable Fraction I*** - Inhalable Fraction - Short Term Exposure Limit ** - Ceiling Limit *** - Short Term Exposure Limit + - As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified" by ACGIH ++ - Crystalline silica is bound within the product as it exists in the package. However, research indicates silica is present in welding fume in the amorphous (noncrystalline) form #- Reportable material under Section 313 of SARA ## - Reportable material under Section 313 of SARA only in fibrous form ■ - NIOSH REL TWA and STEL ♦ - Listed under ACGIH Notice of Intended Changes for Mn in 2010 ♦♦ - Limit of 0.02 mg/m^3 is proposed for Respirable Mn in 2011 by ACGIH Ele –

Element Sol – Soluble Insol – Insoluble Inorg – Inorganic Cpnds – Compounds NOS – Not Otherwise Specified {A1} - Confirmed Human Carcinogen per ACGIH {A2} - Suspected Human Carcinogen per ACGIH {A3} - Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH {A4} - Not Classifiable as a Human Carcinogen per ACGIH {A5} - Not Suspected as a Human Carcinogen per ACGIH (noncrystalline) form

VENTILATION: Use enough ventilation, local exhaust at the arc or both to keep the fumes and gases below the PEL/TLV/OELs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.
RESPIRATORY PROTECTION: Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the regulatory limits.
EYE PROTECTION: Wear helmet or use face shield with filter lens. As a rule of thumb begin with Shade Number 14. Adjust if needed by selecting the next lighter and/or darker shade number. Provide protective screens and flash goggles, if necessary, to shield others from the weld arc flash.
PROTECTIVE CLOTHING: Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection as well as dark nonsynthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.
PROCEDURE FOR CLEANUP OF SPILLS OR LEAKS: Not applicable
SPECIAL PRECAUTIONS (IMPORTANT): Maintain exposure below the PEL/TLV/OEL. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV/OEL. Always use exhaust ventilation. Refer to the following sources for important additional information: American National Standard (ANSI) Z49.1; Safety in Welding and Cutting published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington, DC 20402.

SECTION 9 – PHYSICAL AND CHEMCIAL PROPERTIES

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded.
PHYSICAL STATE: Cored Wire
ODOR: N/A
COLOR: Gray
FORM: Coated Rod

SECTION 10 – STABILITY AND REACTIVITY

GENERAL: Welding consumables applicable to this sheet are solid and nonvolatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base metal preparation and base metal coatings. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters.
STABILITY: This product is stable under normal conditions.
REACTIVITY: Contact with acids or strong bases may cause generation of gas.

SECTION 11 – TOXICOLOGICAL INFORMATION

SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS: **Welding Fumes** - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes. **Aluminum Oxide** - Irritation of the respiratory system. **Calcium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Chromium** - Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage and asthma-like symptoms. Swallowing chromium (VI) salts can cause severe injury or death. Dust on skin can form ulcers. Eyes may be burned by chromium (VI) compounds. Allergic reactions may occur in some people. **Fluorides** - Fluoride compounds evolved may cause skin and eye burns, pulmonary edema and bronchitis. **Iron, Iron Oxide** - None are known. Treat as nuisance dust or fume. **Magnesium, Magnesium Oxide** - Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. **Manganese** - Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure. **Mica** - Dust may cause irritation of the respiratory system, skin and eyes. **Molybdenum** - Irritation of the eyes, nose and throat. **Nickel, Nickel Compounds** - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction. **Potassium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Silica (Amorphous)** - Dust and fumes may cause irritation of the respiratory system, skin and eyes. **Sodium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Strontium Compounds** - Strontium salts are generally non-toxic and are normally present in the human body. In large oral doses, they may cause gastrointestinal disorders, vomiting and diarrhea. **Titanium Dioxide** - Irritation of respiratory system.
LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS: **Welding Fumes** - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis." **Aluminum Oxide** - Pulmonary fibrosis and emphysema. **Calcium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Chromium** - Ulceration and perforation of nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung cancers. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds. **Fluorides** - Serious bone erosion (Osteoporosis) and mottling of teeth. **Iron, Iron Oxide Fumes** - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to iron and its compounds ceases. Iron and magnetite (Fe_3O_4) are not regarded as fibrogenic materials. **Magnesium, Magnesium Oxide** - No adverse long term health effects have been reported in the literature. **Manganese** - Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurologic problems. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. **Mica** - Prolonged overexposure may cause scarring of the lungs and pneumoconiosis characterized by cough, shortness of breath, weakness and weight loss. **Molybdenum** - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. **Nickel, Nickel Compounds** - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers. **Potassium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Silica (Amorphous)** - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential. **Sodium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Strontium Compounds** - Strontium at high doses is known to concentrate in bone. Major signs of chronic toxicity, which involve the skeleton, have been labeled as "strontium rickets". **Titanium Dioxide** - Pulmonary irritation and slight fibrosis.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Persons with pre-existing impaired lung functions (asthma-like conditions). Persons with a pacemaker should not go near welding and cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device. Respirators are to be worn only after being medically cleared by your company-designated physician.
EMERGENCY AND FIRST AID PROCEDURES: Call for medical aid. Employ first aid techniques recommended by the American Red Cross. If irritation or flash burns develop after exposure, consult a physician.
CARCINOGENICITY: Chromium VI compounds, nickel compounds and silica (crystalline quartz) are classified as IARC Group 1 and NTP Group K carcinogens. Titanium dioxide compounds are classified as IARC Group 2B carcinogens. Chromium VI compounds, nickel compounds, silica (crystalline quartz) and welding fumes must be considered as carcinogens under OSHA (29 CFR 1910.1200).
CALIFORNIA PROPOSITION 65: For Group B, C and D products: WARNING: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.) For Group A products: WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

SECTION 12 – ECOLOGICAL INFORMATION

Welding processes can release fumes directly to the environment. Welding wire can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

SECTION 13 – DISPOSAL CONSIDERATIONS

Use recycling procedures if available. Discard any product, residue, packaging, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

SECTION 14 – TRANSPORT INFORMATION

No international regulations or restrictions are applicable. No special precautions are necessary.

SECTION 15 – REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label and the material safety data sheet. Observe all local and federal rules and regulations. Take all necessary precautions to protect yourself and others.

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA TITLE III: Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	**RQ(lb)**	**TPQ (lb)**
Products on this MSDS are a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class
As shipped: Immediate
In use: Immediate delayed

EPCRA/SARA TITLE III 313 TOXIC CHEMICALS: The following metallic components are listed as SARA 313 "Toxic Chemicals" and potentially subject to annual SARA 312 reporting: Chromium, Manganese and Nickel. See Section 3 for weight percentage.

CANADIAN WHMIS CLASSIFICATION: Class D; Division 2, Subdivision A

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

SECTION 16 – OTHER INFORMATION

The following Risk and Safety Phrase Texts and Hazard Statements correspond with the columns labeled - EU 67/548/EEC within Section 2 of this material safety data sheet. Take appropriate precautions and protective measures to eliminate or limit the associated hazard.

EU Directive 67/548/EEC - Risk Phrase Texts
R9 – Explosive when mixed with combustible material
R20/22 – Harmful by inhalation and if swallowed
R24/25 – Toxic in contact with skin and if swallowed
R26 – Very toxic by inhalation
R35 – Causes severe burns
R36/37 – Irritating to eyes and respiratory system
R40 – Limited evidence of a carcinogenic effect
R40/20 – Harmful: possible risk of irreversible effects through inhalation
R42/43 – May cause sensitization by inhalation and skin contact
R43 – May cause sensitization by skin contact
R45 – May cause cancer
R46 – May cause heritable genetic damage
R48/20 – Harmful: danger of serious damage to health by prolonged exposure through inhalation
R48/20/22 – Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed
R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation
R50 – Very toxic to aquatic organisms
R53 – May cause long-term adverse effects in the aquatic environment
R62 – Possible risk of impaired fertility

For additional information please refer to the following sources:
USA: American National Standard (ANSI) Z49.1 "Safety in Welding and Cutting", ANSI/American Welding Society (AWS) F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWS F3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org.
OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.
Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.
NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.
UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".
Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

Hobart Brothers Company strongly recommends the users of this product study this MSDS, the product label information and become aware of all hazards associated with welding. Hobart Brothers Company believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Hobart Brothers Company cannot make any expressed or implied warranty as to this information.

#6

HOBART BROTHERS

MSDS NO: 415889
REVISED: November 19, 2012
C0358

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MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet (MSDS) is for U.S. manufactured or distributed welding consumables and related products and may be used to comply with OSHA's Hazard Communication standard, 29 CFR 1910.1200, and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499. The OSHA standard must be consulted for specific requirements. This Safety Data Sheet complies with European Commission Directive 89/106/EEC, 91/155/EEC, ISO 11014-1 and ANSI Z400.1. This document is translated in several languages and available on our website at www.hobartbrothers.com, from your sales representative or by calling customer service at 1 (937) 332-4000.

SECTION 1 – IDENTIFICATION

Manufacturer Name: HOBART BROTHERS COMPANY
Address: 101 TRADE SQUARE EAST, TROY, OH 45373
Website: www.hobartbrothers.com

Telephone No: 1 (937) 332-4000
Emergency No: 1 (800) 424-9300

Products Type: TUBULAR ARC WELDING ELECTRODES FOR FLUX CORED, METAL CORED AND COMPOSITE SUBMERGED ARC WELDING

GROUP A: Product For: Gas Shielded Carbon and Low Alloy Steel
Trade Name: E71T-1M; **ECLIPSE** RXR-XLS, ULTIMET 716; **EXCEL-ARC 71**; **FABCO** 82HD, 85, 90, HORNET, RXR, RXR-XLS, TR70, XL-71; **FABCOR** 80XLS, 86R, 96, 702, F6; **FABDUAL** T9M, T91M; **FLUX-COR** 2, 7, 37, 80A1; **GALVACOR**; **HOBART** E71T-GS; **METAL-COR** 6, 6L, 80D2, EN-VISION; **METALLOY** 70, 70R, 70X, 71, 76, 80D2, EM12K-S, EM13K-S, X-CEL; **SPEED-ALLOY** 70, 71, 71A, 71-V, 719, 75, 105D2; **SPEED-COR** 6; **SUPER-COR**; **TM** 11, 22, 37, 55, 72, 73, 81A1, 95D2, 105D2, 711M, 791, 811A1, RX7; **TRIPLE-7, 8**; **VERSATILE**; **VERTI-COR** I, II, III; **VISION** AP70, HiDep 70, MetCOR 70

GROUP B: Product For: Self-Shielded Carbon Steel
Trade Name: **FABSHIELD** 4, 21B, 23, 55, 7027; **SELF-SHIELD** 4, 11, 11GS; **SPEED-SHIELD** 11, GS; **TM** 44, 121, 123

GROUP C: Product For: Carbon and Low Alloy Steel
Trade Name: **EXCEED** 71Ni1C, 71Ni1M, 71T1C, 71T1M, 81K2C, 81K2M, **FABCO** 70XHP, 81K2-C, 91K2-C, 107G, 110, 110K3-M, 115, 712M, 750M, 803, MIL-101-TM; **FABCO XTREME** 120, B2, B3, B3V; **FABCOR** CVN, EDGE, EDGE MC, 209, 1100; **FABSHIELD** 3Ni1, 71K6, 79T8, 79T8-Ni2, 81N1, 81N1+, 81N2, K54, XLNT-6, XLR-8, X80, X90, X100, OFFSHORE 71Ni, OFFSHORE 81Ni; **FLUX-COR** 90K2; **FORMULA** XL8Ni1, XL8Ni1-C, XL525, XL550; **MATRIX**; **METAL-COR** MAXIM; **METALLOY** 71 SG, 80B2, 80N1, 80N2, 90, 90B3, 100, 100F3-S, 110, 120-S, B2-S, B3-S, F2-S, N1-S, N2-S, VANTAGE, VANTAGE D2, VANTAGE Ni1, W-S; **MX2**; **PREMIER** 70; **PW**-201; **SPEED-ALLOY** 81Ni1-V, 81Ni2-V, 85, 91B3, 111-V, 115, 125, 712, 712M, 790; **TM** 71 HYD, 81B2, 81N1, 81N2, 81W, 91B3, 91K2, 91N2, 95K2, 101K3, 111K3, 115, 125K4, 770, 771, 71HYN, 811B2, 811N1, 811N2, 811N3, 811W, 881K2, 910, 911B3, 911N2, 991K2, 101, 1101K3-C, 1101K3-M; **VERTI-COR** 70, 72, 81Ni2, 91B3, 91K2, 91Ni2, IINi1

GROUP D: Product For: Corrosion Resisting Steel
Trade Name: **FABCOR** 409; **FABLOY** 409, 439; **FABTUF** 960; **METAL-COR** 409, 409Cb, 439; **METALLOY** 18CrCb, 409, 439; **POWERCORE** 91; **SPEED-ALLOY** 5055; **TM** B6, B9

SECTION 2 – IDENTIFICATION OF HAZARDS

IMPORTANT - This section covers the hazardous materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are also addressed in Section 8. The term "hazardous" in this section should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

HAZARDOUS INGREDIENT	CAS	EINECS[Γ]	REGULATORY HAZARD CLASSIFICATION/DESIGNATION 67/548/EEC[Δ]	IARC[E]	NTP[Z]	OSHA[H]	65[Θ]
ALUMINUM	7429-90-5	231-072-3	F - R10, R15, R17	---	---	---	---
ALUMINUM OXIDE	1344-28-1	215-691-6	None	---	---	---	---
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	Carc 3[Φ] - R40	2B	---	---	X
BARIUM FLOURIDE	7787-32-8	232-108-0	None	---	---	---	---
CALCIUM CARBONATE	1317-65-3	215-279-6	None	---	---	---	---
CERIUM OXIDE	1306-38-3	215-150-4	None	---	---	---	---
CHROMIUM	7440-47-3	231-157-5	O - R9; Carc 1[Φ] - R45; Muta 2 - R46; Repr 3 - R62; T+ - R26; T - R24/25, R48/23; C - R35, R42/43; N - R50, R53[ΣΣΣ]	1[ΣΣ], 3[Σ]	K[ΣΣ]	X[ΣΣ]	X[ΣΣ]
COBALT	7440-48-4	231-158-0	Xn; R42/43, R53	2B	---	X	X
COPPER	7440-50-8	231-159-6	None	---	---	---	---
FLUORSPAR	7789-75-5	232-188-7	None	---	---	---	---
IRON	7439-89-6	231-096-4	None	---	---	---	---
IRON OXIDE	1309-37-1	215-168-2	None	3	---	---	---
LITHIUM CARBONATE	554-13-2	209-062-5	F - R14/15; C - R34[T]	---	---	---	---
LITHIUM FLUORIDE	7789-24-4	232-152-0	F - R14/15; C - R34[T]	---	---	---	---
LITHIUM OXIDE	12057-24-8	235-019-5	F - R14/15; C - R34[T]	---	---	---	---
MAGNESIUM	7439-95-4	231-104-6	F - R11, R15, R17	---	---	---	---
MAGNESIUM OXIDE	1309-48-4	215-171-9	None	---	---	---	---
MANGANESE	7439-96-5	231-105-1	Xn - R20/22[Y]	---	---	---	---
MANGANESE OXIDE	1344-43-0	215-171-9	None	---	---	---	---
MOLYBDENUM	7439-98-7	231-107-2	Xn - R48/20/22; Xi - R36/37[X]	---	---	---	---
NICKEL	7440-02-0	231-111-4	Carc 3[Φ] - R40; T - R43, R48/23	1	K	X	X
SILICA	14808-60-7	238-878-4	Xn - R48/20, R40/20	1[Ψ]	K	X	X
(Amorphous Silica Fume)	69012-64-2	273-761-5	None	3	K	---	X
SILICON	7440-21-3	231-130-8	None	---	---	---	---
STRONTIUM FLUORIDE	7783-48-4	232-000-3	None	---	---	---	---
TITANIUM	7440-32-6	231-142-3	None	---	---	---	---
TITANIUM DIOXIDE	13463-67-7	236-675-5	None	---	---	---	---
ZIRCONIUM	7440-67-7	231-176-9	F - R15, R17	2B	---	---	X

Γ – European INventory of Existing Chemical Substances Number Δ - European Union Directive 67/548/EEC – Annex 1 E – International Agency for Research on Cancer (1 – Human Carcinogen, 2A – Probably Carcinogenic to Humans, 2B – Possibly Carcinogenic to Humans, 3 – Unclassifiable as to Carcinogenicity in Humans, 4 Probably Not Carcinogenic to Humans) Z – US National Toxicology Program (K – Known Carcinogen, S – Suspected Carcinogen) H – OSHA Known Carcinogen List Θ – California Proposition 65 (X – On Proposition 65 list) --- Dashes indicate the ingredient is not listed with the IARC, NTP, OSHA or 65 Φ – **Carc**inogen, **Muta**gen or **Repro**ductive Category per European Council Directive 67/548/EEC Annex I Σ – Metal and Chromium III Compounds ΣΣ – Chromium VI Compounds ΣΣΣ – Chromium (VI) Trioxide EU 67/548/EEC Classification/Designation Y – Manganese Dioxide EU 67/548/EEC Classification/Designation X – Molybdenum Trioxide EU 67/548/EEC Classification/Designation T – Lithium EU 67/548/EEC Classification/Designation Ψ – Silica Crystalline α-Quartz

The following symbols correspond with the EU 67/548/EEC column above are in European Union Directive 67/548/EEC Annex 1 and EC 1272/2008 Annex VI – Table 3.2:

F – Flammable

Xn – Harmful

Xi – Irritant

O - Oxidizer

C – Corrosive

N – Dangerous for the Environment

T – Toxic

T+ - Extremely Toxic

WARNING! - Avoid breathing welding fumes and gases, they may be dangerous to your health. Always use adequate ventilation. Always use appropriate personal protective equipment.

PRIMARY ROUTES OF ENTRY: Respiratory System, Eyes and/or Skin.
ELECTRIC SHOCK: Arc welding and associated processes can kill. See Section 8.

ARC RAYS: The welding arc can injure eyes and burn skin.
FUMES AND GASES: Can be dangerous to your health.

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures and electrodes used. Most fume ingredients are present as complex oxides and compounds and not as pure metals. When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in this section, plus those from the base metal and coating, etc., as noted above. Monitor for the materials identified in the list within this section.

Fumes from the use of this product may contain complex oxides or compounds of the following elements and molecules: amorphous silica fume, antimony trioxide, barium, calcium oxide, chromium, cobalt, copper, fluorspar or fluorides, lithium, manganese, nickel, silica and strontium. Other reasonably expected constituents of the fume would also include complex oxides of iron, titanium, silicon and molybdenum. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating or galvanizing), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1 and F1.3, available from the "American Welding Society", 8669 Doral Blvd., Suite 130, Doral, FL 33166.

SECTION 3 – HAZARDOUS INGREDIENTS

INGREDIENT	CAS	EINECS	GROUP AND %WEIGHT A	B	C	D
ALUMINUM	7429-90-5	231-072-3	<2	<5	<3[6]	---
ALUMINUM OXIDE	1344-28-1	215-691-6	---	---	<3	---
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	---	---	<1[12]	---
BARIUM FLOURIDE	7787-32-8	232-108-0	---	<12[1]	<12[3]	---
CALCIUM CARBONATE	1317-65-3	215-279-6	<2	<2[7]	---	---
CERIUM OXIDE	1306-38-3	215-150-4	---	---	<2[11]	---
CHROMIUM	7440-47-3	231-157-5	---	---	<3	5-20
COBALT	7440-48-4	231-158-0	---	---	<1[10]	---
COPPER	7440-50-8	231-159-6	<1[2]	---	<2[2]	---
FLUORSPAR	7789-75-5	232-188-7	<5[5]	<10	<5	---
IRON	7439-89-6	231-096-4	75-98	75-95	75-98	75-95
IRON OXIDE	1309-37-1	215-168-2	---	---	<12	---
LITHIUM CARBONATE	554-13-2	209-062-5	---	---	<2	---
LITHIUM FLUORIDE	7789-24-4	232-152-0	---	<2[9]	<2[9]	---

INGREDIENT	CAS	EINECS	GROUP AND %WEIGHT A	B	C	D
LITHIUM OXIDE	12057-24-8	235-019-5	---	---	<2	---
MAGNESIUM	7439-95-4	231-104-6	---	<3	<2	---
MAGNESIUM OXIDE	1309-48-4	215-171-9	---	<3	<2	---
MANGANESE	7439-96-5	231-105-1	<5	<2	<4	<2
MANGANESE OXIDE	1344-43-0	215-171-9	---	---	<2	---
MOLYBDENUM	7439-98-7	231-107-2	<1	---	<2	<2
NICKEL	7440-02-0	231-111-4	---	---	<4	<1
SILICA	14808-60-7	238-878-4	<2	<2	<2	---
(Amorphous Silica Fume)	69012-64-2	273-761-5	---	---	---	---
SILICON	7440-21-3	231-130-8	<4	<2[4]	<4	<2
STRONTIUM FLUORIDE	7783-48-4	232-000-3	---	<2[8]	---	---
TITANIUM	7440-32-6	231-142-3	---	<2	<2	<2
TITANIUM DIOXIDE	13463-67-7	236-675-5	<10	<4[4]	<10	<2
ZIRCONIUM	7440-67-7	231-176-9	---	---	<1	---

--- Dashes indicate the ingredient is not present within the group of products (1) Present only in FABSHIELD 21B, 23; TM 121, 123; SELF-SHIELD 11, 11GS (2) Present only in FABCO 110K3-M; GALVACOR; METALLOY WS; TM-81W, 811W (3) Present only in FABCO XTREME 120, B2, B3; FABSHIELD 3Ni1, 71K6, 79T8, 81N1, 81N1+, 81N2, XLNT-6; FABSHIELD OFFSHORE 71Ni (4) Present only in FABSHIELD 55 (5) Present only in METALLLOY EM13K-S; SPEED-ALLOY 105D2; TM 55, 75A1, 95D2, 105D2 (6) Present only in FABCO XTREME 120, B2, B3; FABSHIELD 3Ni1, 71K6, 79T8, 81N1, 81N1+, 81N2, XLNT-6; FABSHIELD OFFSHORE 71Ni (7) Present only in FABSHIELD 7027 (8) Present only in FABSHIELD 21B; TM 121 (9) Present only in FABCO 750M; FABSHIELD 7027 (10) Present only in FABSHIELD 71K6, 81N1, 81N2 (11) Present only in FABSHIELD 79T8, 81N1+, XLNT-6; FABSHIELD OFFSHORE 71Ni; (12) Present only in FABCOR CVN; MATRIX; METAL-COR MAXIM; METALLOY VANTAGE, VANTAGE CVN, VANTAGE D2, VANTAGE Ni1

SECTION 4 – FIRST AID MEASURES

INHALATION: If breathing is difficult provide fresh air and contact physician. **EYE/SKIN INJURIES:** For radiation burns, see physician.
Section 11 of this MSDS covers the acute effects of overexposure to the various ingredients within the welding consumable. Section 8 of this MSDS lists the exposure limits and covers methods for protecting yourself and your co-workers.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. Welding arcs and sparks can ignite combustibles and flammable products. Unused welding consumables may remain hot for a period of time after completion of a welding process. See American National Standard (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Solid objects can be picked up and placed into a container. Wear proper personal protective equipment while handling. Do not discard as general trash.

SECTION 7 - HANDLING AND STORAGE

HANDLING: No specific requirements in the form supplied. Handle with care to avoid cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and product labels.
STORAGE: Keep separate from acids and strong bases to prevent possible chemical reactions.

SECTION 8 - EXPOSURE CONTROL AND PERSONAL PROTECTION

Read and understand the instructions and the labels on the packaging. Welding fumes do not have a specific OSHA PEL or ACGIH TLV. The OSHA PEL for Particulate – Not Otherwise Classified (PNOC) is 5 mg/m^3 – Respirable Fraction, 15 mg/m^3 – Total Dust. The ACGIH TLV for Particles – Not Otherwise Specified (PNOS) is 3 mg/m^3 – Respirable Particles, 10 mg/m^3 – Inhalable Particles. The individual complex compounds within the fume may have a lower OSHA PEL or ACGIH TLV than the OSHA Particulate – Not Otherwise Classified (PNOC) and ACGIH Particles – Not Otherwise Specified (PNOS). An Industrial Hygienist, the OSHA Permissible Exposure Limits for Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits. European Union Occupational Exposure Limits (EU OEL) are listed with the most stringent limit among the EU member nations. All exposure limits are in milligrams per cubic meter (mg/m^3).

INGREDIENT	CAS	EINECS	OSHA PEL	ACGIH TLV	EU OEL
ALUMINUM###	7429-90-5	231-072-3	5 R* (Dust)	1 R* {A4}	4 I*; 1.5 R* - Germany
ALUMINUM OXIDE##	1344-28-1	215-691-6	5 R*	1 R* {A4}	1.5 R*(Aerosol) - Germany; 2 – Poland
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	0.5 (as Sb)	0.5 (as Sb) {A2}	0.1 I*; 0.4*** - Hungary
					0.1 I* (Aerosol); 0.4*** (Aerosol) - Austria
BARIUM FLOURIDE#	7787-32-8	232-108-0	0.5 (as Ba)	0.5 (as Ba) {A4}	0.5 I* (Aerosol as Ba), 4*** (Aerosol as Ba) - Germany
CALCIUM CARBONATE	1317-65-3	215-279-6	5 R*, 5 (as CaO)	3 R*, 2 (as CaO)	10 I* (Aerosol) – UK; 3 R* (Aerosol) - Switzerland
CERIUM OXIDE	1306-38-3	215-150-4	5 R* (Dust), 15 (Dust)	3 R* (Dust), 10 (Dust)	4 I*; 1.5 R* (as Dust - NOS) - Germany
CHROMIUM#	7440-47-3	231-157-5	1 (Metal)	0.5 (Metal) {A4}	0.1 I* (Aerosol) - Switzerland
			0.5 (Cr II & Cr III Cpnds)	0.5 (Cr III Cpnds) {A4}	0.005; 0.01*** - Denmark
			0.005 (Cr VI Cpnds)	0.05 (Cr VI Sol Cpnds) {A1}	0.005 (Total Aerosol); 0.015***(Total Aerosol) - Sweden
				0.01 (Cr VI Insol Cpnds) {A1}	
COBALT	7440-48-4	231-158-0	0.1 (Dust and Fume)	0.02 {A3}	0.01 I*; 0.02*** - Denmark
COPPER	7440-50-8	231-159-6	0.1 (Fume), 1 (Dust)	0.2 (Fume), 1 (Dust)	0.1 I* (Aerosol); 0.2 I*** (Aerosol) - Germany
					0.1; 0.2*** - Denmark
FLUORSPAR	7789-75-5	232-188-7	2.5 (as F)	2.5 (as F) {A4}	1 I* (Aerosol as F); 4*** (Aerosol as F) - Germany
IRON+	7439-89-6	231-096-4	5 R*	5 R* (Fe_2O_3) {A4}	3 R* (Aerosol as Fe_2O_3) – Switzerland
					7*** (as Fe_2O_3) - Denmark
IRON OXIDE	1309-37-1	215-168-2	10 (Oxide Fume)	5 R* (Fe_2O_3) {A4}	3 R* (Aerosol as Fe_2O_3) – Switzerland
					7*** (as Fe_2O_3) - Denmark
LITHIUM CARBONATE	554-13-2	209-062-5	5 R* (Dust), 15 (Dust)	3 R* (Dust), 10 (Dust)	4 I*; 1.5 R* (as Dust - NOS) - Germany
LITHIUM FLUORIDE	7789-24-4	232-152-0	2.5 (as F)	2.5 (as F) {A4}	2.5 - UK
LITHIUM OXIDE	12057-24-8	235-019-5	1 ■ ■	3 R* (Dust), 10 (Dust)	4 I*; 1.5 R* (as Dust - NOS) - Germany
MAGNESIUM+	7439-95-4	231-104-6	5 R*	3 R*	3 R* (Aerosol) - Switzerland

AGNESIUM OXIDE	1309-48-4	215-171-9	15 (Fume, Total Part)	10 I* {A4}	4 I*(Aerosol); 1.5 R*** (Aerosol) - Germany
MANGANESE#	7439-96-5	231-105-1	5 CL ** (Fume) 1, 3 STEL*** ■	0.2 I* {A4} ♦ 0.02 R* ♦, ♦♦	3 R* (Aerosol as Mg) – Switzerland 4 I*(Aerosol as Mg); 1.5 R*** (Aerosol as Mg) - Germany 0.02 R*(Aerosol); 0.16 R*** (Aerosol) - Germany 0.2 I*(Aerosol) - Germany 0.2; 0.4*** - Denmark
MANGANESE OXIDE	1344-43-0	215-171-9	5 CL ** (Fume) 1, 3 STEL*** ■	0.2 I* {A4} ♦ 0.02 R* ♦, ♦♦	0.02 R*(Aerosol); 0.16 R*** (Aerosol) - Germany 0.2 I*(Aerosol) - Germany 0.2; 0.4*** - Denmark
MOLYBDENUM	7439-98-7	231-107-2	5 R*	3 R*; 10 I* (Ele and Insol) 0.5 R* (Sol Cpnds) {A3}	3 R* - Spain; 4; 10*** - Poland
NICKEL#	7440-02-0	231-111-4	1 (Metal) 1 (Sol Cpnds) 1 (Insol Cpnds)	1.5 I* (Ele) {A5} 0.1 I* (Sol Cpnds) {A4} 0.2 I* (Insol Cpnds) {A1}	0.05; 0.1*** - Denmark
SILICA++	14808-60-7	238-878-4	0.1 R*	0.025 R* {A2}	0.1 (Fused, Respirable Dust) - Denmark 0.2*** (Fused, Respirable Dust) - Denmark
(Amorphous Silica Fume)	69012-64-2	273-761-5	0.8	3 R*	2 I*; 4 I*** - Denmark
SILICON+	7440-21-3	231-130-8	5 R*	3 R*	4 R* (Aerosol); 10 I* (Aerosol) - Denmark
STRONTIUM FLUORIDE	7783-48-4	232-000-3	2.5 (as F)	2.5 (as F) {A4}	1 I* (Aerosol as F); 4*** (Aerosol as F) - Germany
TITANIUM+	7440-32-6	231-142-3	5 R*	3 R*	1.5 R* (as TiO_2) - Germany
TITANIUM DIOXIDE	13463-67-7	236-675-5	15 (Dust)	10 {A4}	1.5 R* - Germany
ZIRCONIUM	7440-67-7	231-176-9	5 (Zr Cpnds)	5, 10 STEL*** (Zr Cpnds) {A4}	1 I* (Aerosol); 0.1 I*** (Aerosol) - Germany

R* - Respirable Fraction R*** - Respirable Fraction - Short Term Exposure Limit I* - Inhalable Fraction I*** - Inhalable Fraction - Short Term Exposure Limit ** - Ceiling Limit *** - Short Term Exposure Limit + - As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified" by ACGIH ++ - Crystalline silica is bound within the product as it exists in the package. However, research indicates silica is present in welding fume in the amorphous (noncrystalline) form #- Reportable material under Section 313 of SARA ## - Reportable material under Section 313 of SARA only in fibrous form ### - Reportable material under Section 313 of SARA as dust or fume ■ - NIOSH REL TWA and STEL ■ ■ - AIHA Ceiling Limit of 1 mg/m^3 ♦ - Listed under ACGIH Notice of Intended Changes for Mn in 2010 ♦♦ - Limit of 0.02 mg/m^3 is proposed for Respirable Mn in 2011 by ACGIH Ele – Element Sol – Soluble Insol – Insoluble Inorg – Inorganic Cpnds – Compounds NOS – Not Otherwise Specified {A1} - Confirmed Human Carcinogen per ACGIH {A2} - Suspected Human Carcinogen per ACGIH {A3} - Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH {A4} - Not Classifiable as a Human Carcinogen per ACGIH {A5} - Not Suspected as a Human Carcinogen per ACGIH (noncrystalline) form

VENTILATION: Use enough ventilation, local exhaust at the arc or both to keep the fumes and gases below the PEL/TLV/OELs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.
RESPIRATORY PROTECTION: Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the regulatory limits.
EYE PROTECTION: Wear helmet or use face shield with filter lens. As a rule of thumb begin with Shade Number 14. Adjust if needed by selecting the next lighter and/or darker shade number. Provide protective screens and flash goggles, if necessary, to shield others from the weld arc flash.
PROTECTIVE CLOTHING: Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection as well as dark nonsynthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.
PROCEDURE FOR CLEANUP OF SPILLS OR LEAKS: Not applicable
SPECIAL PRECAUTIONS (IMPORTANT): Maintain exposure below the PEL/TLV/OEL. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV/OEL. Always use exhaust ventilation. Refer to the following sources for important additional information: American National Standard (ANSI) Z49.1; Safety in Welding and Cutting published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington, DC 20402.

SECTION 9 – PHYSICAL AND CHEMCIAL PROPERTIES

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded.
PHYSICAL STATE: Cored Wire
ODOR: N/A
COLOR: Gray
FORM: Round Wire

SECTION 10 – STABILITY AND REACTIVITY

GENERAL: Welding consumables applicable to this sheet are solid and nonvolatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base metal preparation and base metal coatings. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters.
STABILITY: This product is stable under normal conditions.
REACTIVITY: Contact with acids or strong bases may cause generation of gas.

SECTION 11 – TOXICOLOGICAL INFORMATION

SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS: Welding Fumes - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes. **Aluminum Oxide** - Irritation of the respiratory system. **Antimony Compounds** - Irritation of nose, throat, eyes and skin. **Barium** - Aching eyes, rhinitis, frontal headache, wheezing, laryngeal spasms, salivation or anorexia. **Calcium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Chromium** - Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage and asthma-like symptoms. Swallowing chromium (VI) salts can cause severe injury or death. Dust on skin can form ulcers. Eyes may be burned by chromium (VI) compounds. Allergic reactions may occur in some people. **Cobalt** - Pulmonary irritation, cough, dermatitis, weight loss. **Copper** - Metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. **Fluorides** - Fluoride compounds evolved may cause skin and eye burns, pulmonary edema and bronchitis. **Iron, Iron Oxide** - None are known. Treat as nuisance dust or fume. **Lithium Compounds** - Overexposure may cause tremor and nausea. **Magnesium, Magnesium Oxide** - Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. **Manganese, Manganese Oxide** - Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure. **Molybdenum, Cerium Oxide** - Irritation of the eyes, nose and throat. **Nickel, Nickel Compounds** - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction. **Silica (Amorphous)** - Dust and fumes may cause irritation of the respiratory system, skin and eyes. **Strontium Compounds** - Strontium salts are generally non-toxic and are normally present in the human body. In large oral doses, they may cause gastrointestinal disorders, vomiting and diarrhea. **Titanium Dioxide** - Irritation of respiratory system. **Zirconium** - May cause irritation of the eyes, nose and throat due to mechanical effects.
LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS: Welding Fumes - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis." **Aluminum Oxide** - Pulmonary fibrosis and emphysema. **Antimony Compounds** - Metal fume fever, dermatitis, keratitis, conjunctivitis and ulceration and perforation of the nasal septum. Avoid conditions in which fresh hydrogen will react with antimony to form stibine which is extremely toxic. **Barium** - Long term overexposure to soluble barium compounds may cause nervous disorders and may have deleterious effects on the heart, circulatory system and musculature. **Calcium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Chromium** - Ulceration and perforation of nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung cancers. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds. **Cobalt** - Repeated overexposure to cobalt compounds can produce reduced pulmonary function, diffuse nodular fibrosis of lungs and respiratory hypersensitivity. **Copper** - Copper poisoning has been reported in the literature from exposure to high levels of copper. Liver damage can occur due to copper accumulating in the liver characterized by cell destruction and cirrhosis. High levels of copper may cause anemia and jaundice. High levels of copper may cause central nervous system damage characterized by nerve fiber separation and cerebral degeneration. **Fluorides** - Serious bone erosion (Osteoporosis) and mottling of teeth. **Iron, Iron Oxide Fumes** - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to iron and its compounds ceases. Iron and magnetite (Fe_3O_4) are not regarded as fibrogenic materials. **Lithium Compounds** - May be considered as potentially teratogenic. **Magnesium, Magnesium Oxide** - No adverse long term health effects have been reported in the literature. **Manganese, Manganese Oxide** - Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's disease and can include slowness, changes in handwriting, gait

impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurologic problems. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. **Molybdenum, Cerium Oxide** - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. **Nickel Nickel Compounds** - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers. **Silica (Amorphous)** - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential. **Strontium Compounds** - Strontium at high doses is known to concentrate in bone. Major signs of chronic toxicity, which involve the skeleton, have been labeled as "strontium rickets". **Titanium Dioxide** - Pulmonary irritation and slight fibrosis. **Zirconium** - May cause pulmonary fibrosis and pneumoconiosis.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Persons with pre-existing impaired lung functions (asthma-like conditions). Persons with a pacemaker should not go near welding and cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device. Respirators are to be worn only after being medically cleared by your company-designated physician.

EMERGENCY AND FIRST AID PROCEDURES: Call for medical aid. Employ first aid techniques recommended by the American Red Cross. If irritation or flash burns develop after exposure, consult a physician.

CARCINOGENICITY: Chromium VI compounds, nickel compounds and silica (crystalline quartz) are classified as IARC Group 1 and NTP Group K carcinogens. Titanium dioxide, antimony trioxide compounds and cobalt compounds are classified as IARC Group 2B carcinogens. Chromium VI compounds, cobalt compounds, nickel compounds, silica (crystalline quartz) and welding fumes must be considered as carcinogens under OSHA (29 CFR 1910.1200).

CALIFORNIA PROPOSITION 65: For Group C and D products: WARNING: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.) For Group A and B products: WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

SECTION 12 – ECOLOGICAL INFORMATION

Welding processes can release fumes directly to the environment. Welding wire can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

SECTION 13 – DISPOSAL CONSIDERATIONS

Use recycling procedures if available. Discard any product, residue, packaging, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

SECTION 14 – TRANSPORT INFORMATION

No international regulations or restrictions are applicable. No special precautions are necessary.

SECTION 15 – REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label and the material safety data sheet. Observe all local and federal rules and regulations. Take all necessary precautions to protect yourself and others.

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA TITLE III: Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	**RQ(lb)**	**TPQ (lb)**
Products on this MSDS are a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class
As shipped: Immediate
In use: Immediate delayed

EPCRA/SARA TITLE III 313 TOXIC CHEMICALS: The following metallic components are listed as SARA 313 "Toxic Chemicals" and potentially subject to annual SARA 312 reporting: Antimony Trioxide, Chromium, Cobalt, Copper, Lithium Carbonate, Manganese, and Nickel. See Section 3 for weight percentage.

CANADIAN WHMIS CLASSIFICATION: Class D; Division 2, Subdivision A

CANADIAN CONTROLLED PRODUCTS REGULATION: This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

SECTION 16 – OTHER INFORMATION

The following Risk and Safety Phrase Texts and Hazard Statements correspond with the columns labeled - EU 67/548/EEC within Section 2 of this material safety data sheet. Take appropriate precautions and protective measures to eliminate or limit the associated hazard.

EU Directive 67/548/EEC - Risk Phrase Texts

R9 – Explosive when mixed with combustible material
R10 – Flammable
R11 – Highly flammable
R14/15 – Reacts violently with water, liberating extremely flammable gases
R15 – Contact with water liberates extremely flammable gases
R17 – Spontaneously flammable in air
R20/22 – Harmful by inhalation and if swallowed
R24/25 – Toxic in contact with skin and if swallowed
R26 – Very toxic by inhalation
R34 – Causes burns
R35 – Causes severe burns
R36/37 – Irritating to eyes and respiratory system
R40 – Limited evidence of a carcinogenic effect
R40/20 – Harmful: possible risk of irreversible effects through inhalation
R42/43 – May cause sensitization by inhalation and skin contact
R43 – May cause sensitization by skin contact
R45 – May cause cancer
R46 – May cause heritable genetic damage
R48/20 – Harmful: danger of serious damage to health by prolonged exposure through inhalation
R48/20/22 – Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed
R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation
R50 – Very toxic to aquatic organisms
R53 – May cause long-term adverse effects in the aquatic environment
R62 – Possible risk of impaired fertility

For additional information please refer to the following sources:

USA: **American National Standard (ANSI) Z49.1** "Safety in Welding and Cutting", **ANSI/American Welding Society (AWS) F1.5** "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", **ANSI/AWS F1.1** "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", **AWSF3.2M/F3.2** "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org.
OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.
Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.
NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: **WMA Publication 236 and 237,** "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Canada: **CSA Standard CAN/CSA-W117.2-01** "Safety in Welding, Cutting and Allied Processes".

Hobart Brothers Company strongly recommends the users of this product study this MSDS, the product label information and become aware of all hazards associated with welding. Hobart Brothers Company believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Hobart Brothers Company cannot make any expressed or implied warranty as to this information.

#1

HOBART BROTHERS

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D0059
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MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet (MSDS) is for U.S. manufactured or distributed welding consumables and related products and may be used to comply with OSHA's Hazard Communication standard, 29 CFR 1910.1200, and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499. The OSHA standard must be consulted for specific requirements. This Safety Data Sheet complies with European Commission Directive 89/106/EEC, 91/155/EEC, ISO 11014-1 and ANSI Z400.1. This document is translated in several languages and available on our website at www.hobartbrothers.com, from your sales representative or by calling customer service at 1 (937) 332-4000.

SECTION 1 – IDENTIFICATION

Manufacturer/Supplier Name: HOBART BROTHERS COMPANY
Address: 101 TRADE SQUARE EAST, TROY, OH 45373
Website: www.hobartbrothers.com

Telephone No: (937) 332-4000
Emergency No: (800) 424-9300

Product Type: GAS METAL ARC WELDING (GMAW) SOLID WIRE
AWS Specification: ER70S-2, ER70S-3, ER70S-6, AND ER80S-D2

SECTION 2 – IDENTIFICATION OF HAZARDS

IMPORTANT - This section covers the hazardous materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are also addressed in Section 8. The term "hazardous" in this section should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

HAZARDOUS INGREDIENT	CAS	EINECS[Γ]	REGULATORY HAZARD CLASSIFICATION/DESIGNATION 67/548/EEC[Δ]	IARC[E]	NTP[Z]	OSHA[H]	65[Θ]
COPPER	7440-50-8	231-159-6	None	---	---	---	---
IRON	7439-89-6	231-096-4	None	---	---	---	---
MANGANESE	7439-96-5	231-105-1	Xn - R20/22[Y]	---	---	---	---
MOLYBDENUM	7439-98-7	231-107-2	Xn - R48/20/22; Xi - R36/37[X]	---	---	---	---
SILICON	7440-21-3	231-130-8	None	---	---	---	---
(Amorphous Silica Fume)	69012-64-2	273-761-5	None	3	K	---	X

Γ – European INventory of Existing Chemical Substances Number Δ - European Union Directive 67/548/EEC – Annex 1 E – International Agency for Research on Cancer (1 – Human Carcinogen, 2A – Probably Carcinogenic to Humans, 2B – Possibly Carcinogenic to Humans, 3 – Unclassifiable as to Carcinogenicity in Humans, 4 Probably Not Carcinogenic to Humans) Z – US National Toxicology Program (K – Known Carcinogen, S – Suspected Carcinogen) H – OSHA Known Carcinogen List Θ – California Proposition 65 (X – On Proposition 65 list) --- Dashes indicate the ingredient is not listed with the IARC, NTP, OSHA or 65 Φ – **Carc**inogen, **Muta**gen or **Repro**ductive Category per European Council Directive 67/548/EEC Annex I Y – Manganese Dioxide EU 67/548/EEC Classification/Designation X – Molybdenum Trioxide EU 67/548/EEC Classification/Designation

The following symbols correspond with the EU 67/548/EEC column above are in European Union Directive 67/548/EEC Annex 1 and EC 1272/2008 Annex VI – Table 3.2:

Xn – Harmful

Xi – Irritant

WARNING! - Avoid breathing welding fumes and gases, they may be dangerous to your health. Always use adequate ventilation. Always use appropriate personal protective equipment.

PRIMARY ROUTES OF ENTRY: Respiratory System, Eyes and/or Skin.
ELECTRIC SHOCK: Arc welding and associated processes can kill. See Section 8.
ARC RAYS: The welding arc can injure eyes and burn skin.
FUMES AND GASES: Can be dangerous to your health.

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures and electrodes used. Most fume ingredients are present as complex oxides and compounds and not as pure metals. When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in this section, plus those from the base metal and coating, etc., as noted above. Monitor for the materials identified in the list within this section.
Fumes from the use of this product may contain complex oxides or compounds of the following elements and molecules: amorphous silica fume, copper and manganese. Other reasonably expected constituents of the fume would also include complex oxides of iron and molybdenum. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating or galvanizing), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1, available from the "American Welding Society", P.O. Box 351040, Miami, FL 33135. Also, from AWS is F1.3 "Evaluating Contaminants in the Welding Environment - A Sampling Strategy Guide", which gives additional advice on sampling.

SECTION 3 – HAZARDOUS INGREDIENTS

INGREDIENT	CAS	EINECS	%WEIGHT
COPPER (1)	7440-50-8	231-159-6	0.1-0.5
IRON	7439-89-6	231-096-4	95
MANGANESE	7439-96-5	231-105-1	1-5
MOLYBDENUM (2)	7439-98-7	231-107-2	0.1-1
SILICON	7440-21-3	231-130-8	0.5-1.5
(Amorphous Silica Fume)	69012-64-2	273-761-5	

(1) - Copper, if contained in the product, is clearly visible and only present as a surface coating. (2) – Present only in ER80S-D2. --- Dashes indicate the ingredient is not present within the group of products

SECTION 4 – FIRST AID MEASURES

INHALATION: If breathing is difficult provide fresh air and contact physician.
EYE/SKIN INJURIES: For radiation burns, see physician.
Section 11 of this MSDS covers the acute effects of overexposure to the various ingredients within the welding consumable. Section 8 of this MSDS lists the exposure limits and covers methods for protecting yourself and your co-workers.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. Welding arcs and sparks can ignite combustibles and flammable products. Unused welding consumables may remain hot for a period of time after completion of a welding process. See American National Standard (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Solid objects can be picked up and placed into a container. Wear proper personal protective equipment while handling. Do not discard as general trash.

SECTION 7 - HANDLING AND STORAGE

HANDLING: No specific requirements in the form supplied. Handle with care to avoid cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and product labels.
STORAGE: Keep separate from acids and strong bases to prevent possible chemical reactions.

SECTION 8 - EXPOSURE CONTROL AND PERSONAL PROTECTION

Read and understand the instructions and the labels on the packaging. Welding fumes do not have a specific OSHA PEL or ACGIH TLV. The OSHA PEL for Particulate – Not Otherwise Classified (PNOC) is 5 mg/m^3 – Respirable Fraction, 15 mg/m^3 – Total Dust. The ACGIH TLV for Particles – Not Otherwise Specified (PNOS) is 3 mg/m^3 – Respirable Particles, 10 mg/m^3 – Inhalable Particles. The individual complex compounds within the fume may have a lower OSHA PEL or ACGIH TLV than the OSHA Particulate – Not Otherwise Classified (PNOC) and ACGIH Particles – Not Otherwise Specified (PNOS). An Industrial Hygienist, the OSHA Permissible Exposure Limits for Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits. European Union Occupational Exposure Limits (EU OEL) are listed with the most stringent limit among the EU member nations. All exposure limits are in milligrams per cubic meter (mg/m^3).

INGREDIENT	CAS	EINECS	OSHA PEL	ACGIH TLV	EU OEL
COPPER	7440-50-8	231-159-6	0.1 (Fume), 1 (Dust)	0.2 (Fume), 1 (Dust)	0.1 I* (Aerosol); 0.2 I*** (Aerosol) - Germany 0.1; 0.2*** - Denmark
IRON+	7439-89-6	231-096-4	5 R*	5 R* (Fe_2O_3) {A4}	3 R* (Aerosol as Fe_2O_3) – Switzerland 7*** (as Fe_2O_3) - Denmark
MANGANESE#	7439-96-5	231-105-1	5 CL** (Fume) 1, 3 STEL*** ■	0.2 I* {A4} ♦ 0.02 R* ♦, ♦♦	0.02 R*(Aerosol); 0.16 R*** (Aerosol) - Germany 0.2 I*(Aerosol) - Germany 0.2; 0.4*** - Denmark
MOLYBDENUM	7439-98-7	231-107-2	5 R*	3 R*; 10 I* (Ele and Insol) 0.5 R* (Sol Cpnds) {A3}	3 R* - Spain; 4; 10*** - Poland
SILICON+	7440-21-3	231-130-8	5 R*	3 R*	4 R* (Aerosol); 10 I* (Aerosol) - Denmark
(Amorphous Silica Fume)	69012-64-2	273-761-5	0.8	3 R*	2 I*; 4 I*** - Denmark

R* - Respirable Fraction R*** - Respirable Fraction - Short Term Exposure Limit I* - Inhalable Fraction I*** - Inhalable Fraction - Short Term Exposure Limit ** - Ceiling Limit *** - Short Term Exposure Limit + - As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified" by ACGIH ■ - NIOSH REL TWA and STEL ♦ - Listed under ACGIH Notice of Intended Changes for Mn in 2010 ♦♦ - Limit of 0.02 mg/m^3 is proposed for Respirable Mn in 2011 by ACGIH Ele – Element Sol – Soluble Insol – Insoluble Inorg – Inorganic Cpnds – Compounds NOS – Not Otherwise Specified {A3} - Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH {A4} - Not Classifiable as a Human Carcinogen per ACGIH

VENTILATION: Use enough ventilation, local exhaust at the arc or both to keep the fumes and gases below the PEL/TLV/OELs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.
RESPIRATORY PROTECTION: Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the regulatory limits.
EYE PROTECTION: Wear helmet or use face shield with filter lens. As a rule of thumb begin with Shade Number 14. Adjust if needed by selecting the next lighter and/or darker shade number. Provide protective screens and flash goggles, if necessary, to shield others from the weld arc flash.
PROTECTIVE CLOTHING: Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection as well as dark nonsynthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.
PROCEDURE FOR CLEANUP OF SPILLS OR LEAKS: Not applicable
SPECIAL PRECAUTIONS (IMPORTANT): Maintain exposure below the PEL/TLV/OEL. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV/OEL. Always use exhaust ventilation. Refer to the following sources for important additional information: American National Standard (ANSI) Z49.1; Safety in Welding and Cutting published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington, DC 20402.

SECTION 9 – PHYSICAL AND CHEMCIAL PROPERTIES

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded.
PHYSICAL STATE: Cored Wire
ODOR: N/A
COLOR: Gray
FORM: Round Wire

SECTION 10 – STABILITY AND REACTIVITY

GENERAL: Welding consumables applicable to this sheet are solid and nonvolatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base metal preparation and base metal coatings. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters.
STABILITY: This product is stable under normal conditions.
REACTIVITY: Contact with acids or strong bases may cause generation of gas.

SECTION 11 – TOXICOLOGICAL INFORMATION

SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS: Welding Fumes - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes. **Copper** - Metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. **Iron, Iron Oxide** - None are known. Treat as nuisance dust or fume. **Manganese** - Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure. **Molybdenum** - Irritation of the eyes, nose and throat. **Silica (Amorphous)** - Dust and fumes may cause irritation of the respiratory system, skin and eyes.
LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS: Welding Fumes - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis." **Copper** - Copper poisoning has been reported in the literature from exposure to high levels of copper. Liver damage can occur due to copper accumulating in the liver characterized by cell destruction and cirrhosis. High levels of copper may cause anemia and jaundice. High levels of copper may cause central nervous system damage characterized by nerve fiber separation and cerebral degeneration. **Iron, Iron Oxide Fumes** - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to iron and its compounds ceases. Iron and magnetite (Fe_3O_4) are not regarded as fibrogenic materials. **Manganese** - Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurologic problems. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. **Molybdenum** - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. **Silica (Amorphous)** - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Persons with pre-existing impaired lung functions (asthma-like conditions). Persons with a pacemaker should not go near welding and cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device. Respirators are to be worn only after being medically cleared by your company-designated physician.
EMERGENCY AND FIRST AID PROCEDURES: Call for medical aid. Employ first aid techniques recommended by the American Red Cross. If irritation or flash burns develop after exposure, consult a physician.
CARCINOGENICITY: Welding fumes must be considered as carcinogens under OSHA (29 CFR 1910.1200).

CALIFORNIA PROPOSITION 65: WARNING: These products contain or produce a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.)

SECTION 12 – ECOLOGICAL INFORMATION

Welding processes can release fumes directly to the environment. Welding wire can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

SECTION 13 – DISPOSAL CONSIDERATIONS

Use recycling procedures if available. Discard any product, residue, packaging, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

SECTION 14 – TRANSPORT INFORMATION

No international regulations or restrictions are applicable. No special precautions are necessary.

SECTION 15 – REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label and the material safety data sheet. Observe all local and federal rules and regulations. Take all necessary precautions to protect yourself and others.

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA TITLE III: Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	**RQ(lb)**	**TPQ (lb)**
Products on this MSDS are a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class
As shipped: Immediate In use: Immediate delayed

EPCRA/SARA TITLE III 313 TOXIC CHEMICALS: The following metallic components are listed as SARA 313 "Toxic Chemicals" and potentially subject to annual SARA 312 reporting: Manganese. See Section 3 for weight percentage.

CANADIAN WHMIS CLASSIFICATION: Class D; Division 2, Subdivision A

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

SECTION 16 – OTHER INFORMATION

The following Risk and Safety Phrase Texts and Hazard Statements correspond with the columns labeled - EU 67/548/EEC within Section 2 of this material safety data sheet. Take appropriate precautions and protective measures to eliminate or limit the associated hazard.

EU Directive 67/548/EEC - Risk Phrase Texts
R20/22 – Harmful by inhalation and if swallowed
R36/37 – Irritating to eyes and respiratory system
R48/20/22 – Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed

For additional information please refer to the following sources:

USA: **American National Standard (ANSI) Z49.1** "Safety in Welding and Cutting", **ANSI/American Welding Society (AWS) F1.5** "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", **ANSI/AWS F1.1** "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", **AWSF3.2M/F3.2** "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org. **OSHA Publication 2206 (29 C.F.R. 1910),** U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. **Threshold Limit Values and Biological Exposure Indices**, American Conference of Governmental Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA. **NFPA 51B** "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.
UK: **WMA Publication 236 and 237**, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".
Canada: **CSA Standard CAN/CSA-W117.2-01** "Safety in Welding, Cutting and Allied Processes".

Hobart Brothers Company strongly recommends the users of this product study this MSDS, the product label information and become aware of all hazards associated with welding. Hobart Brothers Company believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Hobart Brothers Company cannot make any expressed or implied warranty as to this information.

#8

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards .This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard (29 CFR 1910.1200). Other government regulations must be reviewed for applicability to these products.

WARNING: PRODUCT COMPONENTS PRESENT HEALTH AND SAFETY HAZARDS. READ AND UNDERSTAND THIS MATERIAL SAFETY DATA SHEET (M.S.DS.). ALSO, FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES. This product may contain Chromium and/or Nickel, which are listed by OSHA, NTP, or IARC as being a carcinogen or potential carcinogen. Use of this product may expose you or others to fumes and gases at levels exceeding those established by the American Conference of Governmental Industrial Hygienists (ACGIH) or the Occupational Safety and Health Administration (OSHA) The information contained herein relates only to the specific product. If the product is combined with other materials, all component properties must be considered. **BE SURE TO CONSULT THE LATEST VERSION OF THE MSDS. MATERIAL SAFETY DATA SHEETS ARE AVAILABLE FROM HARRIS PRODUCTS GROUP** salesinfo@jwharris.com 513-754-2000 **www.harrisproductsgroup.com**

STATEMENT OF LIABILITY-DISCLAIMER

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PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): COPPER BASED ALLOYS, INCLUDING: SILICON BRONZE, PHOSPHOR BRONZE C, DEOXIDIZED COPPER, ALUMINUM BRONZE A2, ALUMINUM BRONZE A1

CHEMICAL NAME/CLASS:	Metal Alloy
SYNONYMS:	Not Applicable
PRODUCT USE:	Metal Welding
DOCUMENT NUMBER:	0079
SUPPLIER/MANUFACTURER'S NAME:	**HARRIS PRODUCTS GROUP**
ADDRESS:	4501 Quality Place Mason, Ohio 45040
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
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DATE OF PREPARATION:	August 20, 2010

2. COMPOSITION and INFORMATION ON INGREDIENTS*

NOMINAL COMPOSITION WEIGHT % WIRE									
ALLOY	**Cu**	**Zn**	**Sn**	**Mn**	**Fe**	**Si**	**P**	**Al**	**Pb**
Silicon Bronze	Balance	1.0	1.0	1.5	0.50	2.8-4.0		0.01	0.02
Deoxidized Copper	Balance		1.0	0.50		0.50	0.15	0.01	0.02
Phosphor Bronze C	Balance		7.0-9.0				0.10-0.35	0.01	0.02
Aluminum Bronze A1	Balance	0.20		0.50		0.10		6.0-8.5	0.02
Aluminum Bronze A2	Balance	0.20			1.5			8.5-11.0	0.02

*Single values are maximum percentages.

2. COMPOSITION and INFORMATION ON INGREDIENTS (Continued)

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL			OTHER
			TWA mg/m³	STEL mg/m³	TWA mg/m³	STEL mg/m³	IDLH mg/m³	mg/m³
Aluminum (exposure limits are for aluminum, metal dust and aluminum, welding fume, as aluminum)	7429-90-5	See Table Previous Page	10 (dust) 5 (fumes)	NE	15 (Total dust) 5 (Respirable fraction) 5 (fume) (vacated 1989 PEL)	NE	NE	NIOSH RELs: TWA = 10 (Total dust); 5 (Respirable fraction); 5 (fumes) DFG MAK: TWA = 1.5 (dust - Respirable fraction)
Copper (exposure limits are for copper fume and dusts and mists, as Cu)	7440-50-8	See Table Previous Page	0.2 (fume) 1 (dust and mists)	NE	0.1 (fume) 1 (dust and mists)	NE	100	NIOSH RELs: TWA 1 = (dust); 0.1 (fume) DFG MAKs: TWA = 0.1 (fume-Respirable fraction); 1 (dusts & mists-inhalable fraction) PEAK = 2 MAK, 30 min., average value Carcinogen: EPA-D (dusts & mists)
Iron (exposure limits are for Iron Oxide dust and fume as Fe)	1309-37-1	See Table Previous Page	5, A4 (Not Classifiable as a Human Carcinogen)	NE	10	NE	2500	NIOSH REL: TWA = 5 DFG MAK: TWA = 6 (Respirable Fraction) Carcinogen: IARC-3, TLV-A4
Lead (exposure limits are for Lead, elemental & inorganic compounds, as Pb)	7439-92-1	See Table Previous Page	0.05, A3 (Confirmed Animal Carcinogen)	NE	0.05 (see 29 CFR 1910.1025)	NE	100	NIOSH REL: TWA = < 0.1; Blood Lead Content <0.06 mg/100 g whole blood. DFG MAKs: TWA = 0.1 (Measured as the inhalable fraction of the aerosol) DFG MAK Pregnancy Risk Classification: B Carcinogen: EPA-B2 IARC-2B, TLV-A3
Manganese (exposure limits are for Manganese, elemental, inorganic compounds, and fume, as manganese)	7439-96-5	See Table Previous Page	0.2	NE	1 (vacated 1989 PEL)	5 (ceiling) 3 (vacated 1989 PEL)	500	NIOSH RELs: TWA = 1 STEL = 3 DFG MAK: TWA = 0.5 (Inhalable Fraction) PEAK = 10•MAK 30 min., average value DFG MAK Pregnancy Risk Classification: C Carcinogen: EPA-D

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): The ACGIH has an established exposure limit for Welding Fumes, Not Otherwise Classified. The Threshold Limit Value is 5 mg/m³. NIOSH classifies welding fumes as carcinogens. Single values shown are maximum, unless otherwise noted.

NOTE (2): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

2. COMPOSITION and INFORMATION ON INGREDIENTS (Continued)

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		IDLH	OTHER
			TWA mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	mg/m^3	mg/m^3
Phosphorous (yellow)	7723-14-0	See Table Previous Page	0.1	NE	0.1	NE	5	NIOSH REL: TWA = 0.1 DFG MAKs: TWA = 0.1 PEAK = 2•MAK 5 min., momentary value DFG Pregnancy Risk Classification: D Carcinogen: EPA-D
Silicon	7440-21-3	See Table Previous Page	10	NE	15 (Total dust) 5 (Respirable fraction) 10 (Total dust) (vacated 1989 PEL)	NE	NE	NIOSH REL: TWA = 10 (Total dust; 5 (Respirable fraction)
Tin, metal	7440-31-5	See Table Previous Page	2	NE	2	NE	100	NIOSH REL: TWA = 2
Zinc Exposure limits given are for Zinc oxide, Fume & Dust	7440-66-6	See Table Page 1	5 (fume) 10 (dust)	10 (fume)	5 (fume) 5 (total dust) 15 (dust, respirable dust) 5 (dust, respirable dust, Vacated 1989 PEL)	NE	500	NIOSH RELs: TWA = 5 (dust & fume) STEL = 10 (fume), 15 (ceiling, 15 min., dust) DFG MAK: TWA = 1.5 (Respirable Fraction, fume) Carcinogen: EPA-D

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): The ACGIH has an established exposure limit for Welding Fumes, Not Otherwise Classified. The Threshold Limit Value is 5 mg/m^3. NIOSH classifies welding fumes as carcinogens. Single values shown are maximum, unless otherwise noted.

NOTE (2): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: These products consist of odorless, light yellow to dark brown metal rods. There are no immediate health hazards associated with these products. These products are not flammable nor reactive. If involved in a fire, these products may generate irritating fumes and a variety of metal oxides. Copper, components of these products, are sensitizers upon repeated or prolonged exposure. Additionally, Lead (present in some of these products in trace amounts) is a suspect human carcinogen. Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: During welding operations, the most significant route of over-exposure is via inhalation of fumes.

INHALATION: Inhalation of large amounts of particulates generated by these products during metal processing operations may result in irritation. Inhalation of copper oxide and zinc oxide fumes can cause metal fume fever. Initial symptoms of metal fume fever can include a metallic or sweet taste in the mouth, dryness or irritation of the throat, and coughing. Later symptoms (after 4–48 hours) can include sweating, shivering, headache, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, and tiredness. Repeated over-exposures, via inhalation, to the dusts or fumes generated by these products during welding operations may have adverse effects on the lungs with possible pulmonary edema and emphysema (life-threatening lung injuries). Chronic over-exposure to Copper dust may cause tiredness, stuffiness, diarrhea, and vomiting. Refer to Section 10 (Stability and Reactivity) for information on the specific composition of welding fumes and gases. This product contains trace amounts of lead. Exposure to Lead fumes is not anticipated to be significant during occupational use of this product.

3. HAZARD IDENTIFICATION (Continued)

CONTACT WITH SKIN or EYES: Contact of these products with the skin is not anticipated to be irritating. Rare cases of allergic contact dermatitis have been reported in people working with copper dust. Contact with these products can be physically damaging to the eye (i.e. foreign object). Fumes generated during welding operations can be irritating to the skin and eyes.. Symptoms of skin over-exposure may include irritation and redness. Contact with the molten wire will burn contaminated skin or eyes.

SKIN ABSORPTION: Skin absorption is not known to be a significant route of over-exposure for any component of these products.

INGESTION: Ingestion is not anticipated to be a route of occupational exposure for these products. If swallowed call physician immediately! Do not induce vomiting unless directed by medical personnel. Rinse mouth with water if person is conscious. Never give fluids or induce vomiting if person is unconscious, having convulsions, or not breathing.

INJECTION: Though not a likely route of occupational exposure for these products, injection (via punctures or lacerations in the skin) may cause local reddening, tissue swelling, and discomfort.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation In Lay Terms. Symptoms associated with over-exposure to these products and the fumes generated during welding operations are as follows:

ACUTE: The chief acute health hazard associated with these products would be the potential for irritation of contaminated skin and eyes when exposed to fumes during welding operations. Inhalation of large amounts of particulates generated by these products during metal processing operations may result in irritation. Inhalation of copper oxide and zinc oxide fumes can cause metal fume fever. Inhalation of large amounts of particulates generated by these products during metal processing operations can result in pneumoconiosis (a disease of the lungs). Contact with the molten material will burn contaminated skin or eyes. Severe ingestion over-exposure to Copper (a component of these products) may be fatal.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH	(BLUE)	2
FLAMMABILITY	(RED)	0
REACTIVITY	(YELLOW)	0
PROTECTIVE EQUIPMENT		X

EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8

For routine industrial applications for the wires

See Section 16 for Definition of Ratings

CHRONIC: Chronic skin over-exposure to the fumes of these products during welding operations may produce dermatitis (red, inflamed skin). Chronic over-exposure to Copper dust may cause tiredness, stuffiness, diarrhea, vomiting, discoloration of the skin and eyes, and kidney and liver disorder. Additionally, rare cases of allergic contact dermatitis have been reported in people working with copper dust. Exposure to high levels of airborne Lead may produce symptoms of anemia, insomnia, weakness, constipation, nausea and abdominal pain. Prolonged exposure may result in kidney and nervous system involvement. Women of child-bearing age should avoid exposure to Lead due to post natal effects. Lead, a trace component of these products, is potentially carcinogenic to humans. Refer to Section 11 (Toxicological Information) for further information.

TARGET ORGANS: For fumes: ACUTE: Skin, eyes, respiratory system. CHRONIC: Skin, respiratory system, kidneys, central nervous system, and liver.

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take a copy of label and MSDS to health professional with victim.

SKIN EXPOSURE: If fumes generated by welding operations involving this product contaminate the skin, begin decontamination with running water. If molten material contaminates the skin, immediately begin decontamination with cold, running water. Minimum flushing is for 15 minutes. Victim must seek medical attention if any adverse reaction occurs.

EYE EXPOSURE: If fumes generated by welding operations involving this product enter the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek immediate medical attention.

4. FIRST-AID MEASURES (Continued)

INHALATION: If fumes generated by welding operations involving this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions.

INGESTION: Ingestion is not a likely route of exposure for these products. If swallowed call physician immediately! Do not induce vomiting unless directed by medical personnel. Rinse mouth with water if person is conscious. Never give fluids or induce vomiting if person is unconscious, having convulsions, or not breathing.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin, respiratory disorders, kidney and liver disorders may be aggravated by prolonged over-exposures to the dusts or fumes generated by these products. Additionally, lead over-exposures can cause adverse effects on the human reproductive system.

RECOMMENDATIONS TO PHYSICIANS: Very heavy intoxication with Lead (a component of this product) can sometimes be detected by formation of a dark line on the gum margins, the so-called "lead line." Treat symptoms and eliminate over-exposure. Be observant for renal problems and encephalopathy in the event of chronic over-exposures. Zinc (a component of this product) is antagonistic to the toxic effects of lead. Refer to the OSHA Lead Standard (29 CFR 1910.1025; paragraph J) for specific information on Medical Surveillance requirements (i.e. Biological Monitoring, Medical examinations and consultations, blood tests and re-examination protocol).

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not flammable.
AUTOIGNITION TEMPERATURE: Not flammable.
FLAMMABLE LIMITS (in air by volume, %):
Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS:

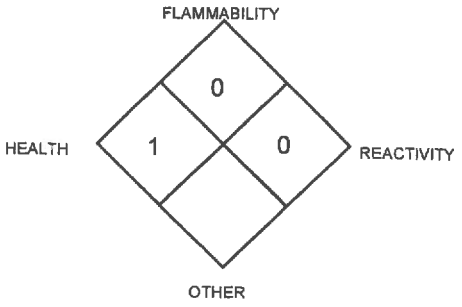
Water Spray: YES	Carbon Dioxide: YES
Halon: YES	Foam: YES
Dry Chemical: YES	Other: Any "ABC" Class

UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, these products may generate irritating fumes and a variety of copper, zinc, and aluminum and other metal compounds. The molten material can present a significant thermal hazard to firefighters.

Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Not applicable.

NFPA RATING



See Section 16 for Definition of Ratings

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: These products are solid wire, with no spill or leak hazards.

PART III *How can I prevent hazardous situations from occurring*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting these products ON YOU or IN YOU. Wash thoroughly after handling these products. Do not eat or drink while handling these products. Use in a well-ventilated location. Use ventilation and other engineering controls to minimize potential exposure to these products.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Avoid breathing fumes of these products during welding operations. Open containers on a stable surface. Packages of these products must be properly labeled. When these products are used during welding operations, follow the requirements of the Federal Occupational Safety and Health Welding and Cutting Standard (29 CFR 1910 Subpart Q) and the safety standards of the American National Standards Institute for welding and cutting (ANSI Z49.1).

Store packages in a cool, dry location. Storage in an atmosphere that is wet, moist, or highly humid may lead to corrosion of these products. Store away from incompatible materials (see Section 10, Stability and Reactivity).

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in Section 2 (Composition and Information on Ingredients). Prudent practice is to ensure eyewash/safety shower stations are available near areas where these products are used.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed (i.e. a Weld Fume Respirator, or Air-Line Respirator for welding in confined spaces), U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Respiratory Protection is recommended to be worn during welding operations. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). NIOSH respiratory protection recommendations for Copper (a main component of these products) are provided as follows:

CONCENTRATION	**RESPIRATOTY EQUIPMENT**
Up to 5 mg/m^3:	Dust and mist respirator.
Up to 10 mg/m^3:	Dust and mist respirator except single-use and quarter-mask respirator (if not present as a fume); or Supplied Air Respirator (SAR).
Up to 25 mg/m^3:	Powered air-purifying respirator with dust and mist filter(s); or SAR operated in a continuous-flow mode.
Up to 50 mg/m^3:	Full-facepiece respirator with high-efficiency particulate filter(s); or full-facepiece Self-Contained Breathing Apparatus (SCBA); or full-facepiece SAR; or powered air-purifying respirator with tight-fitting facepiece and high-efficiency particulate filter.
Up to 100 mg/m^3:	Positive pressure, full-facepiece SAR.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

NOTE: Follow the specific respiratory selection guidelines of the OSHA Lead Standard in regulated areas (as defined by 29 CFR 1910.1025)

EYE PROTECTION: Safety glasses. When these products are used in conjunction with welding, wear safety glasses, goggles, or face-shield with filter lens of appropriate shade number (per ANSI Z49.1-1988, "Safety in Welding and Cutting").

HAND PROTECTION: Wear gloves for routine industrial use. When these products are used in conjunction with welding, wear gloves that protect from sparks and flame (per ANSI Z49.1-1988, "Safety in Welding and Cutting").

BODY PROTECTION: Wear body protection appropriate for task.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Copper, a main component of these products, unless otherwise indicated:

RELATIVE VAPOR DENSITY (air = 1): Not applicable.
SPECIFIC GRAVITY (water = 1): 7.6-8.95 (For product)
SOLUBILITY IN WATER: Insoluble.
VAPOR PRESSURE, mm Hg @ 20°C: Not applicable.
EVAPORATION RATE (nBuAc = 1): Not applicable.
pH: Not applicable.
ODOR THRESHOLD: Not applicable.
BOILING POINT: 2595°C (4703°F)
FREEZING/MELTING POINT: 865-1243°C (1590-2270°F) [For product]
COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not applicable.

The following information is for the products:

APPEARANCE AND COLOR: These products consist of odorless, light yellow to dark brown solid metal rods.
HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance is a distinctive characteristic of these products.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition products can include copper, zinc, aluminum and lead compounds and a variety of metal oxides.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong acids, strong oxidizers, some halogenated compounds and mercury.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Uncontrolled exposure to extreme temperatures, incompatible materials.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Presented below are human toxicological data available for the components of these products present in concentration greater than 1%. Other data for animals are available for the components of these products, but are not presented in this Material Safety Data Sheet.

COPPER:
TDLo (oral, human) = 120 µg/kg; gastrointestinal tract effects

IRON:
TDLo (oral, child) = 77 mg/kg; BAH, gastrointestinal tract, blood effects

LEAD:
Cytogenic Analysis System (unreported route, human) = 50 :g/m^3
TDLo (oral, women) 450 mg/kg; peripheral and central nervous system effects
TCLo (inhalation, human) = 10 :g/m^3; gastrointestinal and liver effects

MANGANESE:
TCLo (Inhalation, man) = 2300 µg/m^3; BRN, central nervous system effects

ZINC:
Skin Irritancy (human) = 300 µg/ 3 days/ intermittent; mild
TCLo (inhalation, human) = 124 mg/m^3/ 50 minutes; pulmonary system, skin effects

SUSPECTED CANCER AGENT: The components of these products are listed as follows:

COPPER: EPA-D (Not Classifiable as to Human Carcinogenicity)
IRON (as Iron Oxide): IARC-3 Possibly Carcinogenic to Humans);,ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen)
LEAD: ACGIH-A3 (Animal Carcinogen); EPA-B2 (Probable Human Carcinogen-Sufficient Evidence from Animal Studies, Inadequate Evidence or no Data from Epidemiologic Studies); IARC-2B (Possibly Carcinogenic to Humans); Cytogenetic Analysis-Human-Unreported 50 mg/m^3
PHOSPHORUS: EPA-D (Not Classifiable as to Human Carcinogenicity)
MANGANESE: EPA-D (Not Classifiable as to Human Carcinogenicity)
ZINC: EPA-D, Not Classifiable as to Human Carcinogenicity (inadequate human and animal evidence of carcinogenicity or no data available)

The other components of these products are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: These products' dusts or fumes may be irritating to contaminated skin and eyes. Fumes may be irritating to the respiratory system.

SENSITIZATION TO THE PRODUCT: Rare cases of allergic contact dermatitis have been reported in people working with copper dust.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of these products and their components on the human reproductive system.

Mutagenicity: These products are not reported to produce mutagenic effects in humans. Animal mutation data are available for Lead (a trace component of these products); these data were obtained during clinical studies on specific animal tissues exposed to high doses of this compound.

Embryotoxicity: Lead, a component of these products, is a potential human embryotoxin.

Teratogenicity: These products are not reported to cause teratogenic effects in humans. Clinical studies on test animals exposed to relatively high doses of Copper, and Lead (components of these products) indicates teratogenic effects.

Reproductive Toxicity: These products are not reported to cause reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of Lead and Copper (components of these products) indicate adverse reproductive effects.

A mutagen is a chemical, which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical, which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical, which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance, which interferes in any way with the reproductive process.

11. TOXICOLOGICAL INFORMATION(Continued)

BIOLOGICAL EXPOSURE INDICES: The following Biological Exposure Indices (BEIs) have been determined for the components of this product.

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
LEAD • Lead in blood	• Not critical	• 30 mg/100 ml

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of these products are expected to persist in the environment for an extended period of time. Additional environmental data are available as follows:

COPPER:
Solubility: Insoluble.
There is no evidence of any biotransformation for copper compounds.
Copper is accumulated by all plants and animals.
BCF Algae = 12; plants = 1,000; invertebrate = 1,000, fish = 667 and fish = 200(Soluble copper salts).

LEAD: Solubility: Insoluble in water. Biological Half-Life for lead in bones of humans is 10 years. Bioconcentration: Lead was absorbed (by fresh water filed crab) through the gills, and distributed to the haenolymph to hepatopancrease, muscle, and exoskeleton. Lead bioaccumlated over the course of the study showed a high degree of organ specificity.

ZINC: Solubility: Insoluble In water. Biological Half-Life for normal humans 162-500 days. Bioconcentration: The Bioconcentration Factor in edible portions of *Crassostrea virgina,* adult oyster) is 16,700 (total zinc).

EFFECT OF MATERIAL ON PLANTS or ANIMALS: These products are not expected to cause adverse effects on plant or animal life. Specific data on test animals are available but are not presented in this Material Safety Data Sheet.

EFFECT OF CHEMICAL ON AQUATIC LIFE: These products may cause adverse effects on aquatic life, especially if large quantities are released into bodies of water. Additional data are available as follows:

COPPER:
LC_{50} (fathead minnows) = 0.14 ppm in hard water
LC_{50} (bluegill) = 0.02 ppm in soft water
LC_{50} (brook trout) = 0.09 ppm in soft water
LC_{50} (*Anguilla* American eel) 96 hours = 6.4
MATC (*Oncorhynctshawtsch* chinook salmon) = 0.0074
NOAEL (*Oncorhynctshawtsch* chinook salmon) = 0.0074
MATC (*Salmo gairdneri* brown trout) = 0.01901
NOAEL (*Salmo gairdneri* brown trout) = 0.0114
LOAEL (*Salmo gairdneri* brown trout) = 0.0317

IRON:
LC (*Gymnodinium spendens*, plankton) = 1-30 mg/L/ 48 hours
LC (*Isocrysis galbana*, plankton) > 35 mg/L/ 48 hours
TC (*Isocrysis galbana*, plankton) = 1-30 mg/L/ 48 hours; growth inhibition
TC (*Thalassiosira pseudonana*, plankton) = 8-20 mg/L/ 48 hours; growth inhibition

IRON (continued):
LC (*Glenodiunium halli*, plankton) = 10 - 100 mg/L/ 48 hours
TC (*Glenodiunium halli*, plankton) = 0.5-10 mg/L/ 48 hours; growth inhibition

LEAD:
LC_{50} (Japanese quail) =, males, females, 14 days old, oral (5-day ad libitum in diet) = 5,000 ppm. At 1,000, 2236, and 5000 ppm, onset of toxic symptoms began at 7 days and remised at 11-12 days
Concentration for fresh and salt water fish, 0.1
Lobster die after 20 days when kept in lead-lined tanks.
LC_{50} (brook tout) = 0.13 ppm
LC_{50} (rainbow trout) = 0.43 ppm

ZINC: Odorless zinc poisoning causes inflamed gills in fish. Laboratory studies of Atlantic salmon, rainbow trout, carp, and goldfish have shown avoidance reactions by these fish to zinc in water.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. These products, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

EPA WASTE NUMBER: Wastes of this product should be analyzed for Toxicity Characteristic Leach Procedure chemicals, as follows: Lead: D008, Regulated Level: 0.4 mg/L

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS NOT HAZARDOUS (Per 49 CFR 172.101) BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Not applicable.
HAZARD CLASS NUMBER and DESCRIPTION: Not applicable.
UN IDENTIFICATION NUMBER: Not applicable.
PACKING GROUP: Not applicable.
DOT LABEL(S) REQUIRED: Not applicable.
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 2000: Not applicable.

14. TRANSPORTATION INFORMATION (Continued)

MARINE POLLUTANT: The Department of Transportation (49 CFR 172.101, Appendix B), lists Copper, metal powder, and Lead compounds, soluble, n.o.s., as Marine Pollutants. These components are not present in the specific forms listed and therefore these products do not meet the marking requirement of 49 CFR 172.322.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This material is not considered as dangerous goods, per regulations of Transport Canada.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of these products are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Aluminum (fume or dust)	No	No	Yes
Copper	No	Yes	Yes
Lead	No	Yes	Yes
Manganese	No	No	Yes
Phosphorous	Yes	Yes	Yes
Zinc	No	Yes	Yes (fume or dust)

U.S. SARA THRESHOLD PLANNING QUANTITY: Phosphorous 100 lb (45.4 kg)

U.S. TSCA INVENTORY STATUS: The components of these products are listed on the TSCA Inventory.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Copper = 5000 lbs (2270 kg); Lead = 10 lbs (4.45 kg); Phosphorous 1 lb (0.454 kg)Zinc = 1000 lbs (454 kg) [for metal particles under 100 micrometers in diameter].

OTHER U.S. FEDERAL REGULATIONS: Lead is regulated under 1910.1025.

U.S. STATE REGULATORY INFORMATION: The components of these products are covered under specific State regulations, as denoted below:

Alaska-Designated Toxic and Hazardous Substances: Copper Fume, Dust, & Mist, Manganese, Lead, Tin, Aluminum, Metal and Oxide dust, welding fumes

California-Permissible Exposure Limits for Chemical Contaminants: Copper, Manganese, Silicon, Lead, Tin, Aluminum.

Florida-Substance List: Copper Fume, Dust, & Mist, Manganese, Lead, Tin, Zinc.

Illinois-Toxic Substance List: Copper, Manganese, Silicon, Lead, Zinc, Aluminum.

Kansas-Section 302/313 List: Copper, Manganese, Zinc, Aluminum.

Massachusetts-Substance List: Copper, Manganese, Lead, Tin, Zinc, Aluminum.

Minnesota-List of Hazardous Substances: Copper Dust & Mists, Manganese, Silicon, Lead, Tin, Aluminum, Metal and Oxide dust, welding fumes.

Missouri-Employer Information/Toxic Substance List: Copper, Manganese, Silicon, Lead, Tin, Aluminum.

New Jersey-Right to Know Hazardous Substance List: Copper, Manganese, Lead, Tin, Zinc, Aluminum.

North Dakota-List of Hazardous Chemicals, Reportable Quantities: Copper, Zinc.

Pennsylvania-Hazardous Substance List: Copper, Manganese, Silicon, Tin, Zinc, Aluminum.

Rhode Island-Hazardous Substance List: Copper Fume, Dust, & Mist, Manganese, Silicon, Lead, Tin, Zinc, Aluminum.

Texas-Hazardous Substance List: Copper Fume, Manganese, and Lead.

West Virginia-Hazardous Substance List: Copper Fume, Manganese, and Lead.

Wisconsin-Toxic and Hazardous Substances: Copper Fume, Manganese, and Lead.

15. REGULATORY INFORMATION (Continued)

ADDITIONAL U.S. REGULATIONS (continued):

CALIFORNIA PROPOSITION 65 Lead is present in some of these products in trace amounts and is on the California Proposition 65 Lists. **WARNING: This product may contain chemicals, and when used for welding may produce fumes or gases containing chemicals, known to the State of California to cause cancer, and/or birth defects (or other reproductive harm.)**

LABELING (Precautionary Statements):

WARNING: PROTECT yourself and others. Read and understand this information.

FUMES AND GASES can be hazardous to your health.

ARC RAYS can injure eyes and burn skin.

ELECTRIC SHOCK can kill.

- Before Use, read and understand the manufacturer's instructions. Material Safety Data Sheets (MSDSs), and your employer's safety policies.
- Keep your head out of the fumes.
- Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area.
- Wear correct eye, ear, and body protection.
- Do not touch live electrical parts.
- See American National Standard Z49.1 *Safety in Welding, Cutting, and Allied Processes*, published by the American Welding Society, 550 N.W. LeJeune Road, Miami, Florida 33126. OSHA Safety and Health Standards, available from the U.S. Government Printing Office, Washington, DC 20402.

DO NOT REMOVE THIS INFORMATION

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The components of these products are on the DSL Inventory.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of these products are not on the CEPA Priorities Substances Lists.

CANADIAN WHMIS SYMBOLS: **D2-A/D2-B:** Materials causing other toxic effects.

16. OTHER INFORMATION

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
858/565-0302

DATE OF PRINTING: August 25, 2010

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard (29 CFR 1910.1200). Other government regulations must be reviewed for applicability to these products. The information contained herein relates only to the specific product. If the product is combined with other materials, all component properties must be considered. To the best of the Harris Products Group knowledge, the information and recommendations contained in this publication are reliable and accurate as of the date of issue. However, accuracy, suitability, or completeness are not guaranteed, and no warranty, guarantee, or representation, expressed or implied, is made by Harris Products Group. as to the absolute correctness or sufficiency of any representation contained in this and other publications Harris Products Group. assumes no responsibility in connection therewith; nor can it be assumed that all acceptable safety measures may not be required under particular or exceptional conditions or circumstances. Data may be changed from time to time. Be sure to consult the latest edition.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these, which are commonly used, include the following:

CAS #: This is the Chemical Abstract Service Number, which uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV** - Threshold Limit Value - an airborne concentration of a substance, which represents conditions under which it is generally believed that nearly all workers, may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average **(TWA)**, the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level **(C)**. Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration.

PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL, which was vacated by Court Order. **IDLH** - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called Recommended Exposure Levels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. Reactivity Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure causes death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m^3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information:** **BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. **Ecological Information:** EC is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **U.S.: EPA** is the U.S. Environmental Protection Agency. **DOT** is the U.S. Department of Transportation. **SARA** is the Superfund Amendments and Reauthorization Act. **TSCA** is the U.S. Toxic Substance Control Act. **CERCLA (or Superfund)** refers to the Comprehensive Environmental Response, Compensation, and Liability Act. Labeling is per the American National Standards Institute (**ANSI Z129.1**). **CANADA: CEPA** is the Canadian Environmental Protection Act. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **TC** is Transport Canada. **DSL/NDSL** are the Canadian Domestic/Non-Domestic Substances Lists. **The CPR is the Canadian Product Regulations.** This section also includes information on the precautionary warnings, which appear, on the materials package label.

#9

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards .This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard (29 CFR 1910.1200). Other government regulations must be reviewed for applicability to these products.

WARNING: PRODUCT COMPONENTS PRESENT HEALTH AND SAFETY HAZARDS. READ AND UNDERSTAND THIS MATERIAL SAFETY DATA SHEET (M.S.DS.). ALSO, FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES. This product may contain Chromium and/or Nickel which are listed by OSHA, NTP, or IARC as being a carcinogen or potential carcinogen. Use of this product may expose you or others to fumes and gases at levels exceeding those established by the American Conference of Governmental Industrial Hygienists (ACGIH) or the Occupational Safety and Health Administration (OSHA) The information contained herein relates only to the specific product. If the product is combined with other materials, all component properties must be considered. **BE SURE TO CONSULT THE LATEST VERSION OF THE MSDS. MATERIAL SAFETY DATA SHEETS ARE AVAILABLE FROM HARRIS PRODUCTS GROUP** 513-754-2000 **www.harrisproductsgroup.com**

STATEMENT OF LIABILITY-DISCLAIMER

To the best of the Harris Products Group knowledge, the information and recommendations contained in this publication are reliable and accurate as of the date prepared. However, accuracy, suitability, or completeness are not guaranteed, and no warranty, guarantee, or representation, expressed or implied, is made by Harris Products Group. as to the absolute correctness or sufficiency of any representation contained in this and other publications; Harris Products Group. assumes no responsibility in connection therewith; nor can it be assumed that all acceptable safety measures are contained in this and other publications, or that other or additional measures may not be required under particular or exceptional conditions or circumstances . Data may be changed from time to time.

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): **Listed in Section 2 under Class**
CHEMICAL NAME/CLASS: **STAINLESS STEEL WIRE OR RODS AND **SUPER MISSILEWELD TIG and 99T**

SYNONYMS: Not Applicable
PRODUCT USE: Metal Welding
DOCUMENT NUMBER: 0106
SUPPLIER/MANUFACTURER'S NAME: **HARRIS PRODUCTS GROUP**
ADDRESS: 4501 Quality Place Mason, Ohio 45040
EMERGENCY PHONE: CHEMTREC: 1-800-424-9300
BUSINESS PHONE: 513-754-2000 **FAX** 513-754-8778
DATE OF PREPARATION: November 24, 2010

2. COMPOSITION and INFORMATION ON INGREDIENTS

Class	C	Cr	Ni	Mo	Mn	Si	Cu	Fe
99T	-	-	Balance	-	0.50	-	-	-
3SMW **	0.20	35.00	25.00	3.00	2.50	1.00	(c)	Balance
ER308	0.08	19.5-22.0	9.0-11.0	0.75	1.0-2.5	0.30-0.65	0.75	Balance
ER308H	0.06	19.5	10.0	-	0.70-1.0	0.70	0.75	Balance
ER308L	0.03	19.5-22.0	9.0-11.0	0.75	1.0-2.5	0.30-0.65	0.75	Balance
ER308LSi	0.03	19.5-22.0	9.0-11.0	0.75	1.0-2.5	0.65-1.00	0.75	Balance
ER309	0.12	23.0-25.0	12.0-14.0	0.75	1.0-2.5	0.30-0.65	0.75	Balance
ER309L	0.03	23.0-25.0	12.0-14.0	0.75	1.0-2.5	0.30-0.65	0.75	Balance
ER309LSi	0.03	23.0-25.0	12.0-14.0	0.75	1.0-2.5	0.65-1.00	0.75	Balance
ER310	0.08-0.15	25.0-28.0	20.0-22.5	0.75	1.0-2.5	0.30-0.65	0.75	Balance
ER312	0.12	28.0-32.0	8.0-10.5	0.75	1.0-2.5	0.30-0.65	0.75	Balance
ER316	0.08	18.0-20.0	11.0-14.0	2.0-3.0	1.0-2.5	0.30-0.65	0.75	Balance
ER316H	0.08	18.0-20.0	11.0-14.0	2.0-3.0	0.05-2.0	0.50-1.0	0.75	Balance
ER316L	0.03	18.0-20.0	11.0-14.0	2.0-3.0	1.0-2.5	0.30-0.65	0.75	Balance
ER316LSi	0.03	18.0-20.0	11.0-14.0	2.0-3.0	1.0-2.5	0.65-1.00	0.75	Balance
ER317L	0.03	18.5-20.5	13.0-15.0	3.0-4.0	1.0-2.5	0.30-0.65	0.75	Balance
ER330	0.03	15.0-20.0	32.0-37.0	-	1.5-3.0	0.25-0.50	0.75	Balance

ER347 (a)	0.08	19.0-21.5	9.0-11.0	0.75	1.0-2.0	0.30-0.65	0.75	Balance
ER410	0.12	11.5-13.5	0.6	0.75	0.6	0.5	0.75	Balance
ER420	0.25 – 0.40	12.0 – 14.0	0.60	0.75	0.60	0.50	0.75	Balance
ER630 (b)	0.05	16.0-16.75	4.5-5.0	0.75	0.25-0.75	0.75	3.25-4.00	Balance
Single values are maximums, P and S =0.30% max. each , a: Cb(Nb)+Ta = 10XC min./1.0 max. , b= Cb(Nb)+Ta 0.15-0.30 c = Ti, Ta & Cb = 1.50 max each								

2. COMPOSITION and INFORMATION ON INGREDIENTS (Continued)

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR					
		ACGIH-TLV		OSHA-PEL		NIOSH	OTHER
		TWA mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	IDLH mg/m^3	mg/m^3
Iron (exposure limits are for iron oxide dust and	7439-89-6	5	NE	10	NE	2500	NIOSH REL: TWA = 5 DFG MAK: TWA = 1.5 (respirable fraction) Carcinogen: IARC-3, TLV-A4
Manganese (exposure limits are for Manganese, elemental, inorganic compounds, and fume, as Mn)	7439-96-5	0.2	NE	1 (vacated 1989 PEL)	5 (ceiling) 3 (vacated 1989 PEL)	500	NIOSH REL: TWA = 1 STEL = 3 DFG MAKs: TWA = 0.5 (inhalable fraction) PEAK = 10•MAK 30 min., average value Carcinogen: EPA-D
Silicon	7440-21-3	10	NE	15 (Total dust) 5 (Respirable fraction) 10 (Total dust) (vacated 1989 PEL)	NE	NE	NIOSH REL: TWA = 10 (total dust), 5 (respirable fraction)
Molybdenum	7439-98-7	10 NIC-10 (inhalable fraction) NIC-3 (respirable fraction)	NE	15 10 (vacated 1989 PEL)	NE	5000	DFG MAK: TWA = 4 (inhalable fraction)
Niobium	7440-03-1	NE	NE	NE	NE	NE	NE
Phosphorus	7723-14-0	0.1	NE	0.1	NE	5	NIOSH REL: TWA = 0.1 DFG MAK: TWA = 01 (respirable fraction) PEAK = 2•MAK, 5 min., momentary value DFG MAK Pregnancy Risk Classification: D Carcinogen: EPA-D
Sulfur	7704-34-9	NE	NE	NE	NE	NE	NE
Carbon (exposure limits are for Particles Not Otherwise Specified)	7440-44-0	10 (Inhalable) 3 (Respirable)	NE	50 mppcf or 15 (Total Dust) 15 mppcf or 5 (Respirable Fraction)	NE	NE	DFG MAKs: TWA = 4 (Inhalable fraction); 1.5 (Respirable Fraction)
Copper (exposure limits are for "Copper fume, as Cu")	7440-50-8	0.2 (fume) 1 (dusts & mists)	NE	0.1 (fume) 1 (dusts & mists)	NE	100	NIOSH REL: TWA = 0.1 DFG MAK: TWA = 0.1 (Inhalable Fraction) PEAK = 2•MAK 30 min., average value Carcinogen: EPA-D

NE = Not Established. mppcf = Millions of Particles Per Cubic Foot See Section 16 for Definitions of Terms Used.

NOTE (1): The ACGIH has an established exposure limit for Welding Fumes, Not Otherwise Classified. The Threshold Limit Value is 5 mg/m^3. NIOSH classifies welding fumes as carcinogens. Single values shown are maximum, unless otherwise noted.

NOTE (2): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. These products have been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

2. COMPOSITION and INFORMATION ON INGREDIENTS (Continued)

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR					
		ACGIH-TLV		OSHA-PEL		NIOSH	OTHER
		TWA mg/m³	STEL mg/m³	TWA mg/m³	STEL mg/m³	IDLH mg/m³	mg/m³
Chromium (Chromium, metal)	7440-47-3	0.5 0.5 (Cr. III)* 0.05 (Cr. VI,)*	NE	1.0 0.5 (Cr. III)* 5.0 ug/m³ (CrVI)	NE	250	NIOSH REL : TWA = 0.5 Carcinogen: EPA-D, EPA-CBD, IARC-3, TLV-A4 Cr.VI; IARC-1, TLV-A1
Nickel (exposure limits are for Nickel, elemental metal)	7440-02-0	1.5 (inhalable fraction)	NE	1	NE	10	NIOSH REL: TWA = 0.015 Carcinogen: IARC-2B, MAK-1, NIOSH-Ca, NTP-R, TLV-A5

NE = Not Established. See Section 16 for Definitions of Terms Used. * Compounds as Cr. & Cr. VI Water Soluble

NOTE (1): The ACGIH has an established exposure limit for Welding Fumes, Not Otherwise Classified. The Threshold Limit Value is 5 mg/m³. NIOSH classifies welding fumes as carcinogens. Single values shown are maximum, unless otherwise noted.

NOTE (2): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. These products have been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: These products consist of solid metal rods that are odorless. There are no immediate health hazards associated with these products. The Nickel and Chromium components of some of these products are suspect carcinogens. These products are not flammable nor reactive. If involved in a fire, these products may generate irritating iron fumes, a variety of iron compounds, carbon dioxide, carbon monoxide, and metal oxides. Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: During welding operations, the most significant route of over-exposure is via inhalation of fumes.

INHALATION: Inhalation is not anticipated to be a significant route of over-exposure to the coated rods. Inhalation of large amounts of particulates generated by this product during metal processing operations may result in pneumoconiosis (a disease of the lungs). Repeated over-exposures, via inhalation, to the dusts or fumes generated by this product during welding operations may have adverse effects on the lungs with possible pulmonary edema and emphysema (life-threatening lung injuries). Nickel (a component of some of these products) can cause pulmonary asthma in hypersensitive individuals. Damage to lungs can occur. Inhalation of dusts and fumes of Iron can also cause metal fume fever. Inhalation of copper oxide fumes, which may be generated by some of these products during welding operations, can cause metal fume fever and Chronic over-exposure to Copper dust may cause tiredness, stuffiness, diarrhea, and vomiting. Symptoms of metal fume fever can be delayed 24-48 hours. Refer to Section 10 (Stability and Reactivity) for information on the specific composition of welding fumes and gases.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH	(BLUE)	2
FLAMMABILITY	(RED)	0
REACTIVITY	(YELLOW)	0
PROTECTIVE EQUIPMENT		X

EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8

For routine industrial applications for the rods

See Section 16 for Definition of Ratings

CONTACT WITH SKIN or EYES: Contact of the rod form of these products with the skin is not anticipated to be irritating. Contact with the rod form of these products can be physically damaging to the eye. Fumes generated during welding operations can be irritating to the skin and eyes. Contact with the hot rods will burn contaminated skin or eyes. Due to the presence of Nickel, prolonged exposure of the eyes may result in sensitization resulting in conjunctivitis (inflammation of the mucous membranes of the eyes). Symptoms of skin over-exposure may include irritation and redness; prolonged or repeated skin over-exposures may lead to allergic contact dermatitis. Contact with the hot electrodes or rods will burn contaminated skin or eyes.

3. HAZARD IDENTIFICATION (Continued)

SKIN ABSORPTION: Skin absorption is not anticipated to be a significant route of over-exposure to the components of these products.

INGESTION: Ingestion is not anticipated to be a route of occupational exposure for these products.

INJECTION: Though not a likely route of occupational exposure for these products, injection (via punctures or lacerations in the skin) may cause local reddening, tissue swelling, and discomfort.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation In Lay Terms. Symptoms associated with over-exposure to these products and the fumes generated during welding operations are as follows:

ACUTE: The chief acute health hazard associated with these products would be the potential for irritation of contaminated skin and eyes when exposed to fumes during welding operations. Inhalation of large amounts of particulates generated by these products during metal processing operations can result in pneumoconiosis (a disease of the lungs). Inhalation of copper oxide fumes can cause metal fume fever. Rare cases of allergic contact dermatitis have been reported in people working with copper dust. Severe ingestion over-exposure to Copper (a component of some of these products) may be fatal. In extreme cases, burns may occur from contact that are generated during thermal decomposition. Contact with the molten material will burn contaminated skin or eyes.

CHRONIC: Chronic skin over-exposure to the fumes generated during welding operations may produce dermatitis (red, inflamed skin). Repeated over-exposures to the fumes generated by these products via inhalation can have adverse effects on the lungs (e.g., pulmonary edema and emphysema). Repeated or prolonged ingestion exposures to > 50–100 mg of Iron per day can result in deposition of iron in the body tissues, which can cause disease. Hypersensitivity to Nickel is common and can cause allergic contact dermatitis, pulmonary asthma, conjunctivitis and inflammatory reactions. Chronic over-exposure to Copper dust may cause tiredness, stuffiness, diarrhea, vomiting, discoloration of the skin and eyes, and kidney and liver disorder. Repeated over-exposures to the fumes generated by these products via inhalation can have adverse effects on the lungs (e.g., pulmonary edema and emphysema). Refer to Section 11 (Toxicological Information) for further information.

TARGET ORGANS: For fumes: ACUTE: Skin, eyes, respiratory system. CHRONIC: Skin, respiratory system, pancreas and liver.

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take a copy of label and MSDS to health professional with victim.

SKIN EXPOSURE: If fumes generated by welding operations involving these products contaminate the skin, begin decontamination with running water. If molten material contaminates the skin, immediately begin decontamination with cold, running water. Minimum flushing is for 15 minutes. Victim must seek medical attention if any adverse reaction occurs.

EYE EXPOSURE: If fumes generated by welding operations involving these products enter the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek immediate medical attention.

INHALATION: If fumes generated by welding operations involving these products are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions.

INGESTION: If swallowed call physician immediately! Do not induce vomiting unless directed by medical personnel. Rinse mouth with water if person is conscious. Never give fluids or induce vomiting if person is unconscious, having convulsions, or not breathing.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin, respiratory, pancreas, and liver disorders may be aggravated by prolonged over-exposures to the dusts or fumes generated by these products.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

5. FIRE-FIGHTING MEASURES (Continued)

FLASH POINT: Not flammable.

NFPA RATING

AUTOIGNITION TEMPERATURE: Not flammable.
FLAMMABLE LIMITS (in air by volume, %):
Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

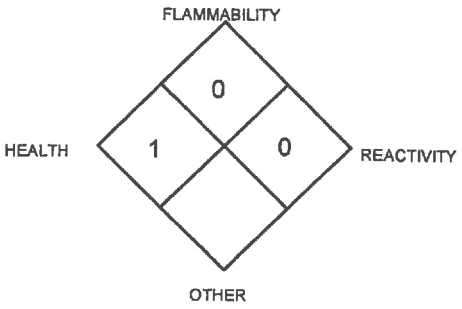
FIRE EXTINGUISHING MATERIALS: These products are not flammable; use fire-extinguishing agents appropriate for surrounding materials.

Water Spray: YES
Carbon Dioxide: YES
Halon: YES
Foam: YES
Dry Chemical: YES
Other: Any "ABC" Class.

UNUSUAL FIRE AND EXPLOSION HAZARDS · When involved in a fire, these products may decompose and produce iron fumes, a variety of nickel, iron , copper and a variety of metal compounds and metal oxides. The hot material can present a significant thermal hazard to firefighters.

Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Not applicable.



See Section 16 for Definition of Ratings

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Not applicable.

PART III *How can I prevent hazardous situations from occurring*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting these products ON YOU or IN YOU. Wash thoroughly after handling these products. Do not eat or drink while handling these products. Use ventilation and other engineering controls to minimize potential exposure to these products.

STORAGE AND HANDLING PRACTICES: All employees who handle these products should be trained to handle it safely. Use in a well-ventilated location. Avoid breathing fumes of these products during welding operations. Open containers on a stable surface. Packages of these products must be properly labeled. When these products are used during welding operations, follow the requirements of the Federal Occupational Safety and Health Welding and Cutting Standard (29 CFR 1910 Subpart Q) and the safety standards of the American National Standards Institute for welding and cutting (ANSI Z49.1). Store packages in a cool, dry location. Store away from incompatible materials (see Section 10, Stability and Reactivity).

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Not applicable.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in Section 2 (Composition and Information on Ingredients). Prudent practice is to ensure eyewash/safety shower stations are available near areas where these products are used.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed (i.e. a Weld Fume Respirator, or Air-Line Respirator for welding in confined spaces), U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Respiratory Protection is recommended to be worn during welding operations. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998 The following are NIOSH recommendations for respirator selection for Welding fumes, based on NIOSH REL:

CONCENTRATION	RESPIRATORY EQUIPMENT FOR WELDING FUMES
At Concentrations above the NIOSH REL, or where there is no REL, at any Detectable Concentration:	Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode; or any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape:	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter; or any appropriate escape-type, self-contained breathing apparatus
NOTE:	IDLH Concentration: Potential NIOSH carcinogen. [Not determined yet].

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

EYE PROTECTION: Safety glasses. When these products are used in conjunction with welding, wear safety glasses, goggles, welding helmet or face-shield with filter lens of appropriate shade number (per ANSI Z49.1-1988, "Safety in Welding

and Cutting"). If necessary, refer to U.S. OSHA 29 CFR 1910.133, or appropriate Canadian Standards. If necessary, refer to U.S. OSHA 29 CFR 1910.138, or appropriate Standards of Canada.

HAND PROTECTION: Wear gloves for routine industrial use. When these products are used in conjunction with welding, wear gloves that protect from sparks and flame (per ANSI Z49.1-1988, "Safety in Welding and Cutting"). If necessary, refer to U.S. OSHA 29 CFR 1910.138, or appropriate Standards of Canada.

BODY PROTECTION: None normally needed for normal circumstances of use. Use body protection appropriate for task (i.e. apron, coveralls, chemically resistant boots). If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for elemental iron:

RELATIVE VAPOR DENSITY (air = 1): Not applicable.
SPECIFIC GRAVITY (water = 1): 7.86
SOLUBILITY IN WATER: Insoluble.
VAPOR PRESSURE, mm Hg @ 20°C: Not applicable.
ODOR THRESHOLD: Not applicable.
EVAPORATION RATE (nBuAc = 1): Not applicable.
FREEZING/MELTING POINT: 1535°C (2795°F)
pH: Not applicable.
BOILING POINT: 3000°C (5432°F)
COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not applicable.

The following information is for these products:

APPEARANCE AND COLOR: These products consist of solid rods, which are odorless.
HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance is a distinctive characteristic of these products.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Iron fumes, a variety of iron compounds, carbon dioxide, carbon monoxide, metal oxides.

NOTE: The composition and quality of welding fumes and gases are dependent upon the metal being welded, the process, the procedure, and the filler used. Other conditions that could also influence the composition and quantity of fumes and gases to which workers may be exposed include the following: any coatings on metal being welded (e.g., paint, plating, or galvanizing), the number of welders and the volume of the work area, the quality of ventilation, the position of the welder's head with respect to the fume plume, and the presence of other contaminates in the atmosphere. When the filler is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 2 (Composition and Information on Ingredients). Fume and gas decomposition products, and not the ingredients in the filler, are important. Concentration of the given fume or gas component may decrease or increase by many times the original concentration. New compounds in the filler may form. Decomposition products of normal operations include not only those originating from volatilization, reaction, or oxidation of the product's components but also those from base metals and any coating (as noted previously). The best method to determine the actual composition of generated fumes and gases is to take an air sample from inside the welder's helmet if worn or in breathing zone. For additional information, refer to the American Welding Society Publication, "Fumes and Gases in the Welding Environment".

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong acids, strong oxidizers, halogens, phosphorous.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid uncontrolled exposure to extreme temperatures and incompatible materials.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Presented below are human toxicological data available for the components of these products present in concentration greater than 1%. Other data for animals are available for the components of these products, but are not presented in this Material Safety Data Sheet.

PHOSPHORUS (YELLOW):
LDLo (oral, woman) = 22 mg/kg; cardiovascular effects
TDLo (oral, woman) = 11 mg/kg
LDLo (oral, human) = 1400 µg/kg
LDLo (oral, woman) = 4600 µg/kg; pulmonary system, gastrointestinal tract, skin effects
TDLo (oral, woman) = 2600 µg/kg

MANGANESE:
TCLo (inhalation, man) = 2300 µg/m^3; BRN, central nervous system effects **IRON:** TDLo (oral, child) = 77 mg/kg; BAH, gastrointestinal tract, blood effects
SULFUR: Eye Irritancy (human) = 8 ppm **COPPER:** TDLo (oral, human) = 1200 µg/kg; gastrointestinal tract effects

11. TOXICOLOGICAL INFORMATION (Continued)

SUSPECTED CANCER AGENT: The components of these products are listed as follows:

COPPER: EPA-D (Not Classifiable as to Human Carcinogenicity)

CHROMIUM: ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen; agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of lack of data), EPA-D (Not Classifiable as to Human Carcinogenicity (inadequate human and animal evidence of carcinogenicity or no data available), EPA-CBD (Cannot Be Determined); IARC-3 (Unclassifiable as to Carcinogenicity in Humans)

PHOSPHOROUS: EPA-D (Not Classifiable as to Human Carcinogenicity)

CHROMIUM VI: ACGIH TLV-A1 (Confirmed Human Carcinogen : Agent is carcinogenic to humans based epidemiologic studies of, or convincing clinical evidence in, exposed humans),EPA-A (Human Carcinogen: sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer), IARC-1(Carcinogenic to Humans: sufficient evidence of carcinogenicity),NIOSH-X (Carcinogen defined with no further categorization),NTP-1(Known to be carcinogenic: sufficient evidence from human studies), MAK-1(Substances which are considered to be carcinogenic for man because adequate results of long-term animal studies or evidence from animal and epidemiological studies)

CHROMIUM OXIDE: ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen; agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of lack of data), EPA-D (Not Classifiable as to Human Carcinogenicity (inadequate human and animal evidence of carcinogenicity or no data available), EPA-CBD (Cannot Be Determined); IARC-3 (Unclassifiable as to Carcinogenicity in Humans)

IRON (as Iron Oxide): ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen; agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of lack of data), IARC-3 (Unclassifiable as to Carcinogenicity in Humans)

MANGANESE: EPA-D (Not Classifiable as to Human Carcinogenicity)

NICKEL: ACGIH TLV-A5 (Not Suspected as a Human Carcinogen), IARC-2B (Possibly Carcinogenic to Humans), MAK-1(Substances That Cause Cancer in Man and Which Can Be Assumed to Make a Significant Contribution to Cancer Risk), NIOSH-Ca (Potential Occupational Carcinogen with No Further Categorization), NTP-R (Reasonably Anticipated to Be A Human Carcinogen)

The other components of these products are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: Dusts or fumes of these products may be irritating to contaminated skin and eyes. Fumes may be irritating to the respiratory system.

SENSITIZATION TO THE PRODUCT: Hypersensitivity to the Nickel component of these products can cause allergic contact dermatitis, asthma, and conjunctivitis. Rare cases of allergic contact dermatitis have been reported in people working with copper dust.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of these products and their components on the human reproductive system.

Mutagenicity: These products are not reported to produce mutagenic effects in humans. Animal mutation data are available for the, Chromium (III) Oxide, Molybdenum, Nickel, components of these products; these data were obtained during clinical studies on specific animal tissues exposed to high doses of this compound.

Embryotoxicity These products are not reported to produce embryotoxic effects in humans.

Teratogenicity: These products are not reported to cause teratogenic effects in humans. Clinical studies on test animals exposed to relatively high doses of the Copper, Molybdenum, and Nickel components of these products indicate teratogenic effects.

Reproductive Toxicity: These products are not reported to cause reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of the Copper, Molybdenum and Phosphorus components of these products indicate adverse reproductive effects.

A mutagen is a chemical, which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical, which causes damage to a developing embryo (i.e., within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical, which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance, which interferes in any way with the reproductive process.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of these products are expected to persist in the environment for an extended period of time. Iron, the major component in some of these products, will react with water and air to form a variety of stable iron oxides. The following environmental data are available for components of these products:

CHROMIUM: Chromium (metal) is insoluble in water, and is not oxidized by air, even in the presence of much moisture. The biological half-life of Chromium is listed as 0.5, 5.9, and 83.4 days, respectively, for three different components. Snails show a bioaccumulation factor of $1x10^6$ (total Chromium).

PHOSPHORUS (RED): Bioconcentrates in sediments, clams, fish, birds, and mammals.

COPPER: Solubility: Insoluble. There is no evidence of any biotransformation for copper compounds. Copper is accumulated by all plants and animals. BCF Algae = 12; plants = 1,000; invertebrate = 1,000, fish = 667 and fish =200 (Soluble copper salts).

NICKEL: Water solubility: Insoluble. Nickel is stable in air at ordinary temperature and is not affected by water. No data were found to suggest that nickel is involved in any biological transformation in the aquatic environment.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: These products are not expected to cause adverse effects on plant or animal life. Animal studies on copper, manganese, nickel, and silicon indicate various health effects after ingestion and exposures. **SULFUR:** Carrot and bean production is greatly reduced with high sulfur residues in the soil.

EFFECT OF CHEMICAL ON AQUATIC LIFE: These products may cause adverse effects on aquatic life, especially if large quantities are released into bodies of water. Low chronic aquatic limits indicate a high chronic hazard, it may be concentrated to toxic levels in food chain. The Nickel component of these products is toxic to aquatic life. Exposure of 0.095 ppm of Nickel for 3 weeks to Daphnid and Fathead minnows affected reproduction in these fish.

PHOSPHORUS (RED): Radioactive phosphorus has been concentrated by factors of 75,000 by waterfowl and up to 850,000 by aquatic life.

SULFUR: TLm (mosquito fish) 10,000 ppm/ 96 hours/ fresh water

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. These products, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

EPA WASTE NUMBER: Wastes of these products should be tested per the Toxicity Characteristic Leaching Procedures requirements of RCRA to determine if such wastes meet the following characteristic: D007 (Chromium) 5.0 mg/L (Regulated Level).

14. TRANSPORTATION INFORMATION

THESE PRODUCTS ARE NOT HAZARDOUS (Per 49 CFR 172.101) BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Not applicable.
HAZARD CLASS NUMBER and DESCRIPTION: Not applicable.
UN IDENTIFICATION NUMBER: Not applicable.
PACKING GROUP: Not applicable.
DOT LABEL(S) REQUIRED: Not applicable.
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 2000: Not applicable.

MARINE POLLUTANT: No component of these products is designated as a marine pollutant by the Department of Transportation (49 CFR 172.101, Appendix B). The Department of Transportation (49 CFR 172.101, Appendix B), lists Copper, metal powder as a Marine Pollutant. This component is not present in the specific form listed and therefore, this product does not meet the marking requirement of 49 CFR 172.322.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: These products are not considered as dangerous goods, per regulations of Transport Canada.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of these products are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Chromium	No	Yes	No
Copper	No	Yes	Yes
Chromium (III) Oxide (Chromium Compound Category)	No	Yes	Yes
Manganese	No	No	Yes
Nickel	No	Yes	Yes

15. REGULATORY INFORMATION (Continued)

ADDITIONAL U.S. REGULATIONS:

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of these products. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs. (4,540 kg) therefore applies, per 40 CFR 370.20.

U.S. TSCA INVENTORY STATUS: The components of these products are listed on the TSCA Inventory.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Chromium = 5000 lbs; Copper =5000 lbs.; Nickel = 100 lbs; RQs for Chromium, Copper, and Nickel are applicable to particles 100 micrometers or less in diameter.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

STATE REGULATORY INFORMATION: The components of these products are covered under specific State regulations, as denoted below:

Alaska-Designated Toxic and Hazardous Substances:, Chromium, Copper Fume, Chromium (III) Compounds), Molybdenum, Nickel, Phosphorus .

California-Permissible Exposure Limits for Chemical Contaminants:, Chromium, Copper, Manganese, Nickel, Phosphorus , Silicon, and.

Florida-Substance List: Chromium, Copper, Manganese, Molybdenum, Nickel, Sulfur and Phosphorus.

Illinois-Toxic Substance List: Chromium, Copper, Manganese, Nickel, Phosphorus, Silicon, Molybdenum, , and.

Kansas-Section 302/313 List: Chromium, Manganese, Nickel, and Copper.

Massachusetts-Substance List: Chromium, Chromium (III) Oxide, Copper, Sulfur Manganese, Molybdenum, Nickel, Phosphorus.

Michigan-Critical Materials Register: Chromium, Copper, and Nickel.

Minnesota-List of Hazardous Substances:, Chromium, Manganese, Nickel, , Silicon, and Phosphorus.

Missouri-Employer Information/Toxic Substance List:, Chromium, Chromium (III) Oxide, Copper , Manganese, Molybdenum, Nickel, Phosphorus, Silicon,.

New Jersey-Right to Know Hazardous Substance List: Chromium, Chromium (III) Oxide, Copper, Phosphorus , Manganese, Molybdenum, Nickel, Sulfur ,.

North Dakota-List of Hazardous Chemicals, Reportable Quantities: Chromium, Copper, Nickel, and Phosphorus.

Pennsylvania-Hazardous Substance List: Copper, Chromium, Manganese, Molybdenum, Nickel, Sulfur , Silicon, and Phosphorus.

Rhode Island-Hazardous Substance List:, Chromium, Copper Fume, Manganese, Molybdenum, Nickel, Sulfur , Silicon, and Phosphorus.

Texas-Hazardous Substance List: Chromium, Manganese, Copper Fume Molybdenum, Nickel, and Phosphorus.

West Virginia-Hazardous Substance List: Chromium, Phosphorus, Manganese, Molybdenum, Nickel, and Copper Fume.

Wisconsin-Toxic and Hazardous Substances: Chromium, Manganese, Molybdenum, Nickel, Copper Fume and Phosphorus.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The Chromium and Nickel components of these products are on the California Proposition 65 List. **WARNING: These products may contain chemicals, and when used for welding may produce fumes or gases containing chemicals, known to the State of California to cause cancer, and/or birth defects (or other reproductive harm.)**

LABELING (Precautionary Statements):

WARNING:

PROTECT yourself and others. Read and understand this information.
FUMES AND GASES can be hazardous to your health.
ARC RAYS can injure your eyes and burn skin.
ELECTRIC SHOCK can kill.

- Before use, read and understand the manufacturer's instructions. Material Safety Data Sheets (MSDSs), and your employer's safety policies.
- Keep your head out of the fumes.
- Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area.
- Wear correct eye, ear, and body protection.
- See American National Standard Z49.1 *Safety in Welding, Cutting, and Allied Processes*, published by the American Welding Society, 550 N.W. LeJeune Road, Miami, Florida 33126. OSHA Safety and Health Standards, *29 CFR 1910*, available from the U.S. Government Printing Office, Washington, DC 20402.

DO NOT REMOVE THIS INFORMATION.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The components of these products are on the DSL Inventory.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: Not applicable.

CANADIAN WHMIS SYMBOLS: Class D2A/D2B: Materials Causing Other Toxic Effects-Contains Potential Sensitizer

16. OTHER INFORMATION

DATE OF PRINTING: November 24, 2010

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard (29 CFR 1910.1200). Other government regulations must be reviewed for applicability to these products. The information contained herein relates only to the specific product. If the product is combined with other materials, all component properties must be considered. To the best of the Harris Products Group knowledge, the information and recommendations contained in this publication are reliable and accurate as of the date of issue. However, accuracy, suitability, or completeness are not guaranteed, and no warranty, guarantee, or representation, expressed or implied, is made Harris Products Group. as to the absolute correctness or sufficiency of any representation contained in this and other publications Harris Products Group. assumes no responsibility in connection therewith; nor can it be assumed that all acceptable safety measures may not be required under particular or exceptional conditions or circumstances. Data may be changed from time to time. Be sure to consult the latest edition.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these, which are commonly used, include the following:

CAS #: This is the Chemical Abstract Service Number, which uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV** - Threshold Limit Value - an airborne concentration of a substance, which represents conditions under which it is generally believed that nearly all workers, may be repeatedly exposed without adverse effect. The duration

must be considered, including the 8-hour Time Weighted Average **(TWA)**, the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level **(C)**. Skin absorption effects must also be considered.
OSHA - U.S. Occupational Safety and Health Administration.
PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL, which was vacated by Court Order. **IDLH** - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called Recommended Exposure Levels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:
HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. Reactivity Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).
NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure causes death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:
Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:
Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m^3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo, LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information: BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. **Ecological Information:** EC is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:
This section explains the impact of various laws and regulations on the material. **U.S.: EPA** is the U.S. Environmental Protection Agency. **DOT** is the U.S. Department of Transportation. **SARA** is the Superfund Amendments and Reauthorization Act. **TSCA** is the U.S. Toxic Substance Control Act. **CERCLA (or Superfund)** refers to the Comprehensive Environmental Response, Compensation, and Liability Act. Labeling is per the American National Standards Institute (**ANSI Z129.1**). **CANADA: CEPA** is the Canadian Environmental Protection Act. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **TC** is Transport Canada. **DSL/NDSL** are the Canadian Domestic/Non-Domestic Substances Lists. **The CPR is the Canadian Product Regulations**. This section also includes information on the precautionary warnings, which appear, on the materials package label.

KOBELCO

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Date of issue : 2011-10-14

#10

MATERIAL SAFETY DATA SHEET (MSDS)

For Welding Consumables and Related Products
Complies with OSHA Hazard Communication Standard 29 C.F.R. 1910.1200

SECTION I – IDENTIFICATION	
Identity: KOBELCO ELECTRODES FOR FLUX CORED ARC WELDING	
Manufacture's Name: KOBE STEEL, LTD. Supplier's Name: KOBE STEEL, LTD.	Emergency Telephone No: +81-3-5739-6331
Supplier's Address: 5-9-12 Kitashinagawa Shinagawa-Ku Tokyo JAPAN	Telephone No. for Information: +81-3-5739-6331 Facsimile No. : +81-3-5739-6960
Product Trade Designation DW-309LP	Product Classifications A5.22 E309LT1-1 A5.22 E309LT1-4

SECTION II - HAZARDOUS INGREDIENTS

IMPORTANT: THIS SECTION COVERS THE MATERIALS FROM WHICH THE PRODUCT IS MANUFACTURED. THE FUMES AND GASES PRODUCED DURING WELDING WITH NORMAL USE OF THIS PRODUCT ARE COVERED IN SECTION V.

THE TERM "HAZARDOUS" IN "HAZARDOUS MATERIALS" SHOULD BE INTERPRETED AS A TERM REQUIRED AND DEFINED IN OSHA HAZARD COMMUNICATION STANDARD (29 C.F.R. 1910.1200) AND IT DOES NOT NECESSARILY IMPLY THE EXISTENCE OF ANY HAZARD.

Ingredient	(CAS No.)	APPROX wt(%)	TLV (mg/m^3) (1)
Iron	7439-89-6	Balance	5 (Oxide)
Chromium	7440-47-3	13-33	0.5
Nickel	7440-02-0	5-18	1.5
Titanium dioxide	13463-67-7	3-13	10
Zirconium oxide	1314-23-4	≦5	5 as Zr
Silicon dioxide	7631-86-9	≦3	(N/A)
Manganese	7439-96-5	≦3	0.2
Chromium(IV)	-	-	0.005
Others (Aluminum oxide, Titanium etc.)	-	≦5	-
Aluminum oxide	1344-28-1	-	(N/A)
Titanium	7440-32-6	-	(N/A)

(1) American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV [R]).

SECTION III – PHYSICAL DATA

NOT APPLICABLE

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Non-Flammable: Welding arc and sparks can ignite combustibles. See Z-49.1 referenced in Section VII .

SECTION V - REACTIVITY DATA

HAZARDOUS DECOMPOSITION PRODUCTS:

Welding fumes cannot be classified simply. Their composition and quantity are dependent upon the metal being welded, the process, procedures and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing),number of welds and volume of work area, quality and amount of ventilation, position of welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities).

When the electrode is consumed, the fume and gas decomposition products are different in percent and form from the ingredients listed in Section II. Fume and gas decomposition products, not the ingredients in the electrode, are important. Decomposition products include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II plus those from base metal, coating, etc. as noted above. These components are virtually always present as complex compounds and not as metals (Characterization of Arc Welding Fume: American Welding Society).

Reasonably expected fume constituents from these products would include fluorides and complex oxides of iron, manganese, silicon, and, when present, nickel, chromium, molybdenum, and copper. Monitor for the materials identified in Section II. Fumes from the use of these products may also contain manganese, chromium(Cr(III) and Cr(VI)), nickel, fluorides, calcium oxides, amorphous silica, and copper whose exposure limits lower than the 5mg/m3 PEL/TLV for general welding fume.*

Maximum fume guideline and PEL for this product(based on Cr(VI) content) is 0.2mg/m3

Keep exposure as low as possible. Indoors, use local exhaust; outdoors, a respirator may be required.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

* Occupational Safety and Health Administration (OSHA) states that permissible exposure limit of Cr(VI) is 0.005 mg/m3 as an 8-hour time-weighted average.

One recommended way to determine the composition and quantity of fumes and gases to which 71workers are exposed is to take an air sample inside the welders helmet, if worn, or in the worker's breathing zone. ANSI/AWS F1.1, available from the American Welding Society, P.O. Box 351040, Miami, FL 33135.

SECTION VI - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for welding fume NOC (Not Otherwise Classified) is 5mg/m^3. The ACGIH 1984-1985 preface states: "The TLV-TWA should be used as guides in the control of health hazards and should not be used as firm lines between safe and dangerous concentration." See Section V for specific fume constituents which may modify this TLV.

Effects of Overexposure: FUMES AND GASES can be dangerous to your health.

SHORT-TERM (ACUTE) OVEREXPOSURE to welding fumes may result in discomfort such as: dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

LONG TEAM (CHRONIC) OVEREXPOSURE may lead to siderosis (iron deposits in the lung) and is believed by some investigators to affect pulmonary function.

ARC RAYS can injure eyes and burn skin.

ELECTRIC SHOCK can kill. See Section VII.

Emergency & First Aid Procedures: Call for medical aid. Employ first aid techniques recommended by the American Red Cross.

Carcinogenicity:

Chromium VI and nickel compounds must be considered carcinogens according to OSHA(29 CFR 1910.1200). Chromium VI compounds are classified as IARC Group 1 and NTP Group 1 carcinogens. Nickel compounds are classified as IARC Group 1 and NTP Group 2 carcinogens. Welding fumes must be considered as possible carcinogens under OSHA(29CFR 1910.1200).

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE/APPLICABLE CONTROL MEASURES

Read and understand the manufacture's instructions and the precautionary label on this product. See American National Standard Z-49.1, Safety in Welding and Cutting, published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Washington, D.C. 20402 for more detail on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases below the TLV's in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

Respiratory Protection: Use respirable fume respirator or air supplies respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens. As a rule of thumb, start with a shade which is too dark to see the weld zone. Then go to the next lighter shade which gives sufficient view of the weld zone. Provide protective screens and flash goggles, if necessary, to shield others.

Protective Clothing: Wear head, hand and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z-49.1. At a minimum, this includes welder's gloves and a protective face shield and may include arm protectors, aprons hats, shoulder protection, as well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

Procedure for Cleanup of Spills or Leaks: NOT APPLICABLE

Waste Disposal Method: Prevent waste from contaminating surrounding environment. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with Federal, State and Local regulations.

#11

WELDING PRODUCTS
MUREX®
FILLER METAL PRODUCTS

Date:	10/12/2012	MSDS No.:	US-W203M
Trade Name:	Murematic S4 Plus		
Sizes:	All		
Supersedes:	2/20/07		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Hazard Communication Standard 29CFR 1910.1200 Rev. October 1988

SECTION I - IDENTIFICATION

Manufacturer/ Supplier: The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, OH 44117-1199
(216) 481-8100

Product Type: Carbon Steel Electrode

Classification: AWS ER70S-4

SECTION II - HAZARDOUS MATERIAL (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section V; see it for industrial hygiene information.
CAS Number shown is representative for the ingredients listed.
(1) The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in the Hazards Communication Standard and does not necessarily imply the existence of any hazard. All materials are listed on the TSCA inventory.

Ingredients:	CAS No.	Wt.%	TLV mg/m^3	PEL mg/m^3
Carbon steel wire		100	10*	10*
Nominal wire composition:				
Total manganese *****	7439-96-5	< 2.0	0.2	1.0(c)
Total copper including plated coating *****	7440-50-8	< 0.5	0.2(a)	0.1(a)
Iron	7439-89-6	bal.	10*	10*

Supplemental Information:

(*) Not listed. Nuisance value maximum is 10 milligrams per cubic meter. PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

(c) Values are for manganese fume. STEL (Short Term Exposure Limit) is 3.0 milligrams per cubic meter. Values are those proposed by OSHA in 1989. Present PEL is 5.0 milligrams per cubic meter (ceiling value).

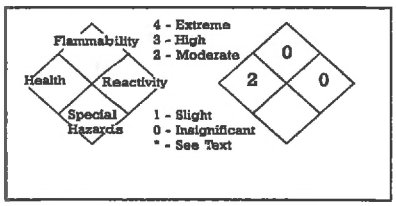
(a) Values are for copper fume.

SECTION III - HAZARD DATA

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See Z49.1 referenced in Section VI. Product is inert, no special handling or spill procedures required. Not regulated by DOT.

(CONTINUED ON SIDE TWO)

Product:	**Murematic S4 Plus**
Date:	**10/12/2012**



SECTION IV - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m³. ACGIH-1999 preface states that the TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations. See Section V for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists. Units are milligrams per cubic meter of air.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:
Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema).

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Arc Rays can injure eyes and burn skin. Skin cancer has been reported.
Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Emergency and First Aid Procedures: Call for medical aid. Employ first aid techniques recommended by the American Red Cross.
IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques.
IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide; secondarily complex oxides of copper, manganese and silicon when used with gas shielding.

Maximum fume exposure guideline for this product (based on manganese content) is 2.0 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

SECTION VI AND VII

CONTROL MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL, 33126 (both available for free download at http://www.lincolnelectric.com/community/safety/) and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. Keep exposure as low as possible.

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin . . . or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local Regulations unless otherwise noted. No applicable ecological information available.

#12

LINCOLN ELECTRIC

Date:	2/15/2011	MSDS No.:	US-M210
Trade Name:	Fleetweld 5P+		
Sizes:	All		
Supersedes:	3/19/2008		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Hazard Communication Standard 29CFR 1910.1200 Rev. October 1988

SECTION I - IDENTIFICATION

Manufacturer/ Supplier: The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, OH 44117-1199
(216) 481-8100

Product Type: Covered Electrode

Classification: AWS E6010

SECTION II - HAZARDOUS MATERIAL (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section V; see it for industrial hygiene information.
CAS Number shown is representative for the ingredients listed. All ingredients listed may not be present in all sizes.
(1) The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in the Hazards Communication Standard and does not necessarily imply the existence of any hazard. All materials are listed on the TSCA inventory.

Ingredients:	CAS No.	Wt.%	TLV mg/m^3	PEL mg/m^3
Cellulose and other carbohydrates	65996-61-4	5	10*	15*
Silicates and other binders	1344-09-8	< 5	10*	15*
Titanium dioxides	13463-67-7	< 5	10	15
Iron	7439-89-6	< 5	10*	15*
Limestone and/or calcium carbonate	1317-65-3	< 5	10*	15
Manganese and/or manganese alloys and compounds (as Mn)*****	7439-96-5	1	0.2	5 (c)
Iron oxides	65996-74-9	< 0.5	5	10
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	< 0.5	10*	15*
Carbon steel core wire	7439-89-6	85	10*	10*

Supplemental Information:

(*) Not listed. The OSHA PEL for nuisance particles is 15 milligrams per cubic meter. The ACGIH guideline for total particulate is 10 milligrams per cubic meter. PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxides is 5 milligrams per cubic meter.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

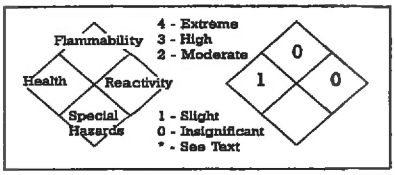
(c) Value is for manganese fume. Present PEL is 5 milligrams per cubic meter (ceiling value). Values proposed by OSHA in 1989 were 1.0 milligrams per cubic meter TWA and 3.0 milligrams per cubic meter STEL (Short Term Exposure Limit).

SECTION III - HAZARD DATA

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See Z49.1 referenced in Section VI.
Product is inert, no special handling or spill procedures required. Not regulated by DOT.

(CONTINUED ON SIDE TWO)

Product:	**Fleetweld 5P+**
Date:	**2/15/2011**



SECTION IV - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m³. ACGIH-1999 preface states that the TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations. See Section V for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists. Units are milligrams per cubic meter of air.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:
Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema).

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Titanium dioxide is listed on the IARC (International Agency for Research on Cancer) as a Group 2B carcinogen (possibly carcinogenic to humans based on animal studies). WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Arc Rays can injure eyes and burn skin. ***Skin cancer has been reported.***
Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Emergency and First Aid Procedures: Call for medical aid. Employ first aid techniques recommended by the American Red Cross.
IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques.
IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide; secondarily complex oxides of manganese, silicon, sodium and titanium.

Maximum fume exposure guideline for this product is 5.0 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

SECTION VI AND VII

CONTROL MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL, 33126 (both available for free download at http://www.lincolnelectric.com/community/safety/) and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. ***Keep exposure as low as possible.***

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin . . . or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local Regulations unless otherwise noted. No applicable ecological information available.

#13

LINCOLN ELECTRIC

Date:	12/1/2010	MSDS No.:	US-M260
Trade Name:	Jetweld 1		
Sizes:	All		
Supersedes:	12/1/2007		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Hazard Communication Standard 29CFR 1910.1200 Rev. October 1988

SECTION I - IDENTIFICATION

Manufacturer/ Supplier: The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, OH 44117-1199
(216) 481-8100

Product Type: Covered Electrode

Classification: AWS E7024-1

SECTION II - HAZARDOUS MATERIAL (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section V; see it for industrial hygiene information.
CAS Number shown is representative for the ingredients listed. All ingredients listed may not be present in all sizes.
(1) The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in the Hazards Communication Standard and does not necessarily imply the existence of any hazard. All materials are listed on the TSCA inventory.

Ingredients:	CAS No.	Wt.%	TLV mg/m^3	PEL mg/m^3
Iron	7439-89-6	30	10*	15*
Titanium dioxides	13463-67-7	10	10	15
Silicates and other binders	1344-09-8	< 5	10*	15*
Manganese and/or manganese alloys and compounds (as Mn)*****	7439-96-5	< 5	0.2	5 (c)
Mineral silicates	1332-58-7	< 5	5**	5**
Cellulose and other carbohydrates	65996-61-4	< 5	10*	15*
Aluminum oxide and/or Bauxite	1344-28-1	0.5	10*	15
Limestone and/or calcium carbonate	1317-65-3	0.5	10*	15
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	0.5	10*	15*
Quartz	14808-60-7	< 0.5	#0.025**	#0.1**
Lithium compounds (as Li)	554-13-2	< 0.5	10*	15*
Carbon steel core wire	7439-89-6	45	10*	15*

Supplemental Information:

(*) Not listed. The OSHA PEL for nuisance particles is 15 milligrams per cubic meter. The ACGIH guideline for total particulate is 10 milligrams per cubic meter. PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxides is 5 milligrams per cubic meter.

(**) As respirable dust.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

(c) Value is for manganese fume. Present PEL is 5 milligrams per cubic meter (ceiling value). Values proposed by OSHA in 1989 were 1.0 milligrams per cubic meter TWA and 3.0 milligrams per cubic meter STEL (Short Term Exposure Limit).

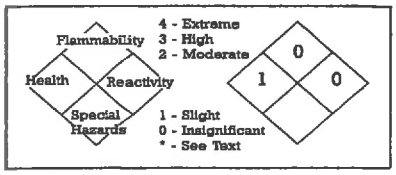
(#) Crystalline silica (quartz) is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a carcinogenic risk to humans.

SECTION III - HAZARD DATA

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See Z49.1 referenced in Section VI. Product is inert, no special handling or spill procedures required. Not regulated by DOT.

(CONTINUED ON SIDE TWO)

Product:	**Jetweld 1**
Date:	**12/1/2010**



SECTION IV - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m³. ACGIH-1999 preface states that the TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations. See Section V for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists. Units are milligrams per cubic meter of air.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:
Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema).

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Titanium dioxide is listed on the IARC (International Agency for Research on Cancer) as a Group 2B carcinogen (possibly carcinogenic to humans based on animal studies). Respiratory exposure to the crystalline silica present in this welding electrode is not anticipated during normal use. Respiratory overexposure to airborne crystalline silica is known to cause silicosis, a form of disabling pulmonary fibrosis which can be progressive and may lead to death. Crystalline silica is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans. WARNING: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.)

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*
Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Emergency and First Aid Procedures: Call for medical aid. Employ first aid techniques recommended by the American Red Cross.
IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques.
IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide; secondarily complex oxides of lithium, manganese, potassium, silicon, sodium, and titanium.

Maximum fume exposure guideline for this product (based on manganese content) is 2.5 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

SECTION VI AND VII

CONTROL MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL, 33126 (both available for free download at http://www.lincolnelectric.com/community/safety/) and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local Regulations unless otherwise noted. No applicable ecological information available.

#14

LINCOLN ELECTRIC

Date:	10/1/2011	MSDS No.:	US-CW323
Trade Name:	Outershield 71 Elite		
Sizes:	All		
Supersedes:	8/1/2008		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Hazard Communication Standard 29CFR 1910.1200 Rev. October 1988

SECTION I - IDENTIFICATION

Manufacturer/ Supplier: The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, OH 44117-1199
(216) 481-8100

Product Type: Flux Cored Electrode

Classification: AWS E71T-1C
E71T-9C

SECTION II - HAZARDOUS MATERIAL (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section V; see it for industrial hygiene information.
CAS Number shown is representative for the ingredients listed. All ingredients listed may not be present in all sizes.
(1) The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in the Hazards Communication Standard and does not necessarily imply the existence of any hazard. All materials are listed on the TSCA inventory.

Ingredients:	CAS No.	Wt.%	TLV mg/m^3	PEL mg/m^3
Titanium dioxides	13463-67-7	5	10	15
Manganese and/or manganese alloys and compounds (as Mn)*****	7439-96-5	< 5	0.2	5 (c)
Iron	7439-89-6	< 5	10*	15*
Mineral silicates	1332-58-7	< 5	5**	5**
Aluminum oxide and/or Bauxite	1344-28-1	1	10*	15
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	0.5	10*	15*
Titanium and/or titanium alloys (as Ti)	12719-90-3	< 0.5	10*	15*
Magnesium and/or magnesium alloys and compounds (as Mg)	7439-95-4	< 0.5	10*	15*
Aluminum and/or aluminum alloys (as Al)*****	7429-90-5	< 0.5	10*	15
Boron alloys (as B)	11108-67-1	< 0.5	10*	15*
Quartz	14808-60-7	< 0.5	#0.025**	#0.1**
Carbon steel tube	7439-89-6	85	10*	15*

Supplemental Information:

(*) Not listed. The OSHA PEL for nuisance particles is 15 milligrams per cubic meter. The ACGIH guideline for total particulate is 10 milligrams per cubic meter. PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxides is 5 milligrams per cubic meter.

(**) As respirable dust.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

(c) Value is for manganese fume. Present PEL is 5 milligrams per cubic meter (ceiling value). Values proposed by OSHA in 1989 were 1.0 milligrams per cubic meter TWA and 3.0 milligrams per cubic meter STEL (Short Term Exposure Limit).

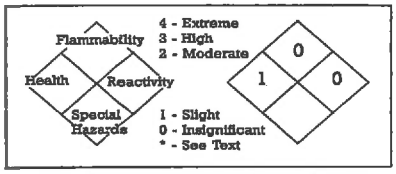
(#) Crystalline silica (quartz) is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a carcinogenic risk to humans.

SECTION III - HAZARD DATA

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See Z49.1 referenced in Section VI.
Product is inert, no special handling or spill procedures required. Not regulated by DOT.

(CONTINUED ON SIDE TWO)

Product:	**Outershield 71 Elite**
Date:	**10/1/2011**



SECTION IV - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m^3. ACGIH-1999 preface states that the TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations. See Section V for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists. Units are milligrams per cubic meter of air.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:
Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema).

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Titanium dioxide is listed by the IARC (International Agency for Research on Cancer) as a Group 2B carcinogen (possibly carcinogenic to humans based on animal studies). Respiratory exposure to the crystalline silica present in this welding electrode is not anticipated during normal use. Respiratory overexposure to airborne crystalline silica is known to cause silicosis, a form of disabling pulmonary fibrosis which can be progressive and may lead to death. Crystalline silica is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans. WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*
Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Emergency and First Aid Procedures: Call for medical aid. Employ first aid techniques recommended by the American Red Cross.
IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques.
IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide; secondarily complex oxides of manganese, silicon, sodium and titanium.

Maximum fume exposure guideline for this product (based on manganese content) is 3.0 milligrams per cubic meter.
Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

SECTION VI AND VII

CONTROL MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL, 33126 (both available for free download at http://www.lincolnelectric.com/community/safety/) and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local Regulations unless otherwise noted. No applicable ecological information available.

#15

LINCOLN ELECTRIC

Date:	7/2/2010	MSDS No.:	US-CW307
Trade Name:	Outershield 71M		
Sizes:	All		
Supersedes:	8/1/2008		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Hazard Communication Standard 29CFR 1910.1200 Rev. October 1988

SECTION I - IDENTIFICATION

Manufacturer/ Supplier: The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, OH 44117-1199
(216) 481-8100

Product Type: Flux Cored Electrode

Classification: AWS E71T-1CJ H8, E71T-1MJ H8, E71T-9CJ H8, E71T-9MJ H8

SECTION II - HAZARDOUS MATERIAL (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section V; see it for industrial hygiene information.
CAS Number shown is representative for the ingredients listed. All ingredients listed may not be present in all sizes.
(1) The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in the Hazards Communication Standard and does not necessarily imply the existence of any hazard. All materials are listed on the TSCA inventory.

Ingredients:	CAS No.	Wt.%	TLV mg/m^3	PEL mg/m^3
Titanium dioxides	13463-67-7	10	10	15
Iron	7439-89-6	< 5	10*	15*
Manganese and/or manganese alloys and compounds (as Mn)*****	7439-96-5	< 5	0.2	5 (c)
Mineral silicates	1332-58-7	1	5**	5**
Magnesite	1309-48-4	< 0.5	10*	15
Quartz	14808-60-7	< 0.5	#0.05**	#0.1**
Boron alloys (as B)	11108-67-1	< 0.5	10*	15*
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	< 0.5	10*	15*
Carbon steel tube	7439-89-6	85	10*	15*

Supplemental Information:

(*) Not listed. The OSHA PEL for nuisance particles is 15 milligrams per cubic meter. The ACGIH guideline for total particulate is 10 milligrams per cubic meter. PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxides is 5 milligrams per cubic meter.

(**) As respirable dust.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

(c) Value is for manganese fume. Present PEL is 5 milligrams per cubic meter (ceiling value). Values proposed by OSHA in 1989 were 1.0 milligrams per cubic meter TWA and 3.0 milligrams per cubic meter STEL (Short Term Exposure Limit).

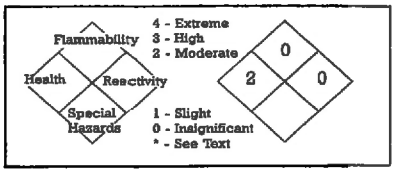
(#) Crystalline silica (quartz) is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a carcinogenic risk to humans.

SECTION III - HAZARD DATA

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See Z49.1 referenced in Section VI.
Product is inert, no special handling or spill procedures required. Not regulated by DOT.

(CONTINUED ON SIDE TWO)

Product:	**Outershield 71M**
Date:	**7/2/2010**



SECTION IV - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m^3. ACGIH-1999 preface states that the TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations. See Section V for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists. Units are milligrams per cubic meter of air.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:
Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema).

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Respiratory exposure to the crystalline silica present in this welding electrode is not anticipated during normal use. Respiratory overexposure to airborne crystalline silica is known to cause silicosis, a form of disabling pulmonary fibrosis which can be progressive and may lead to death. Crystalline silica is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans. WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*
Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Emergency and First Aid Procedures: Call for medical aid. Employ first aid techniques recommended by the American Red Cross.
IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques.
IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxides; secondarily fluorides and complex oxides of manganese, potassium, silicon, sodium and titanium..

Maximum fume exposure guideline for this product (based on manganese content) is 1.5 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

SECTION VI AND VII

CONTROL MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE

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Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local Regulations unless otherwise noted. No applicable ecological information available.

#16

LINCOLN® ELECTRIC

Date:	5/17/2011	MSDS No.:	US-W95
Trade Name:	ER70S-6		
Sizes:	All		
Supersedes:	4/1/2008		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Hazard Communication Standard 29CFR 1910.1200 Rev. October 1988

SECTION I - IDENTIFICATION

Manufacturer/ Supplier: The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, OH 44117-1199
(216) 481-8100

Product Type: Carbon Steel Electrode

Classification: AWS ER70S-6

SECTION II - HAZARDOUS MATERIAL (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section V; see it for industrial hygiene information.
CAS Number shown is representative for the ingredients listed.
(1) The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in the Hazards Communication Standard and does not necessarily imply the existence of any hazard. All materials are listed on the TSCA inventory.

Ingredients:	CAS No.	Wt.%	TLV mg/m^3	PEL mg/m^3
Carbon steel wire		100	10*	10*
Nominal wire composition:				
Total manganese *****	7439-96-5	< 2.0	0.2	5 (c)
Total copper including plated coating *****	7440-50-8	< 0.5	0.2(a)	0.1(a)
Iron	7439-89-6	bal.	10*	10*

Supplemental Information:

(*) Not listed. The OSHA PEL for nuisance particles is 15 milligrams per cubic meter. The ACGIH guideline for total particulate is 10 milligrams per cubic meter. PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxides is 5 milligrams per cubic meter.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

(c) Value is for manganese fume. Present PEL is 5 milligrams per cubic meter (ceiling value). Values proposed by OSHA in 1989 were 1.0 milligrams per cubic meter TWA and 3.0 milligrams per cubic meter STEL (Short Term Exposure Limit).

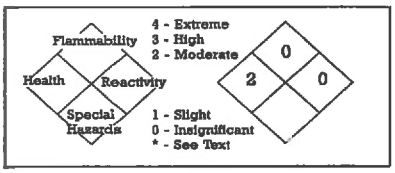
(a) Values are for copper fume.

SECTION III - HAZARD DATA

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See Z49.1 referenced in Section VI. Product is inert, no special handling or spill procedures required. Not regulated by DOT.

(CONTINUED ON SIDE TWO)

Product:	**ER70S-6**
Date:	**5/17/2011**



SECTION IV - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m^3. ACGIH-1999 preface states that the TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations. See Section V for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists. Units are milligrams per cubic meter of air.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:
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Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*
Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

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IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques.
IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide; secondarily complex oxides of copper, manganese and silicon when used with gas shielding.

Maximum fume exposure guideline for this product (based on manganese content) is 1.5 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

SECTION VI AND VII

CONTROL MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL, 33126 (both available for free download at http://www.lincolnelectric.com/community/safety/) and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local Regulations unless otherwise noted. No applicable ecological information available.

#17

LINCOLN® ELECTRIC

Date:	11/2/2012	MSDS No.:	US-W301-C
Trade Name:	Lincoln Carbon Steel Cut Lengths		
Sizes:	All		
Supersedes:	4/1/07		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Hazard Communication Standard 29CFR 1910.1200 Rev. October 1988

SECTION I - IDENTIFICATION

Manufacturer/ Supplier: The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, OH 44117-1199
(216) 481-8100

Product Type: Bare Cut Length Rods

Products: *Lincoln* R45, R60, ER70S-2, ER70S-3, ER70S-6

SECTION II - HAZARDOUS MATERIAL (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section V; see it for industrial hygiene information.
CAS Number shown is representative for the ingredients listed.
(1) The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in the Hazards Communication Standard and does not necessarily imply the existence of any hazard. All materials are listed on the TSCA inventory.

Ingredients:	CAS No.	Wt.%	TLV mg/m^3	PEL mg/m^3
Carbon steel wire		**100**	**10***	**10***
Nominal wire composition:				
Total manganese *****	**7439-96-5**	**< 2**	**0.2**	**5 (c)**
Total copper including plated coating *****	**7440-50-8**	**< 0.5**	**0.2(a)**	**0.1(a)**
Titanium (ER70S-2 only)	**12719-90-3**	**< 0.5**	**10***	**10***
Aluminum *** (ER70S-2 only)**	**7429-90-5**	**< 0.5**	**1.0**	**10**
Zirconium (ER70S-2 only)	**12004-83-0**	**< 0.5**	**5**	**5**
Iron	**7439-89-6**	**bal.**	**10***	**10***

Supplemental Information:

(*) Not listed. Nuisance value maximum is 10 milligrams per cubic meter. PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

(a) Values are for copper fume.

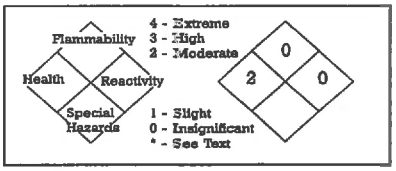
(c) Value is for manganese fume. Present PEL is 5 milligrams per cubic meter (ceiling value). Values proposed by OSHA in 1989 were 1.0 milligrams per cubic meter TWA and 3.0 milligrams per cubic meter STEL (Short Term Exposure Limit).

SECTION III - HAZARD DATA

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See Z49.1 referenced in Section VI. Product is inert, no special handling or spill procedures required. Not regulated by DOT.

(CONTINUED ON SIDE TWO)

Product:	**Lincoln Carbon Steel Cut Lengths**
Date:	**11/2/2012**



SECTION IV - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m^3. ACGIH-1999 preface states that the TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations. See Section V for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists. Units are milligrams per cubic meter of air.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:
Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema).

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*

Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Emergency and First Aid Procedures: Call for medical aid. Employ first aid techniques recommended by the American Red Cross.
IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques.
IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

SECTION V - REACTIVITY DATA

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide; secondarily complex oxides of copper, manganese and silicon when used with gas shielding.

Maximum fume exposure guideline for this product (based on manganese content) is 1.5 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

SECTION VI AND VII

CONTROL MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL, 33126 (both available for free download at http://www.lincolnelectric.com/community/safety/) and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin . . . or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local Regulations unless otherwise noted. No applicable ecological information available.

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Böhler Thyssen
WELDING

MATERIAL SAFETY DATA SHEET

May be used to comply with Osha's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labour
Occupational Safety and Health Administration
(Non-Mandatory Form) Form Approved OMB No. 1218-0072

Maybe used to comply with **Council Directive 93/112/EC** concerning **Council Directive 91/155/EEC** relating to the classification, packaging and labelling of dangerous substances, referenced in the Official Journal of the European Communities, **European Regulation L 314/38**

Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I – Identification

Product: **UTP 6824LC** **AWS SPEC: E309L-16**
Product Type: Shielded Metal Arc Welding Electrode

Suppliers name: **Bohler Thyssen Welding USA, Inc**

Address: **10401 Greenbough Drive, Stafford, TX 77477**	Telephone number for information: **01-281-499-1212**
Date prepared: 6/07	Signature of preparer: **M. Isenhart**

Section II - Hazardous* Ingredients

Important: This section covers the materials from which this product is manufactured. The fumes and gases produced during normal use when welding with this product are covered by section V.

Ingredient	CAS#	OSHA PEL mg/m³	ACGIH TLV mg/m³	other limits recommended	approx. wt.-% (optional)
Wire or rod					
Chromium (Cr)	7440-47-3	TWA 0.5	TWA 0.5		19.5
Iron (Fe)	7439-89-6	TWA 10.0	TWA 5.0		Balance
Carbon (C)	7440-44-0	TWA 5.0 respirable fraction TWA15.0 total dust	TWA 10.0 inhalable fraction TWA 3.0 respirable fraction	inert	0.04
Manganese (Mn)	7439-96-5	TWA 5.0 ceiling	TWA 0.2		1.7
Nickel (Ni)	7440-02-0	TWA 1.0	TWA 1.5		9.7
Coating or Filling					
Alkali Aluminium Fluoride	15096-52-3	TWA 2.5	TWA 2.5		27
Alkali Silicate &	N/R	TWA 5.0 respirable fraction TWA 15.0 total dust	TWA 10.0 inhalable fraction TWA 3.0 respirable fraction		27
Earth Alkali Fluoride	N/R	TWA 2.5	TWA 2.5		
Chromium (Cr)	7440-47-3	TWA 1.0	TWA 0.5		20
Fluoride	16984-48-8	TWA 2.5	TWA 2.5		12
Iron (Fe)	7439-89-5	TWA 10.0	TWA 5.0		0.45
Manganese (Mn)	7439-96-5	TWA 5.0 ceiling	TWA 0.2		1.8
Nickel (Ni)	7440-02-0	TWA 1.0	TWA 1.5		6.5
Titanium Dioxide (Rutile)	1317-80-2	TWA 15.0 total dust	TWA 10.0		30

* The term „Hazardous" in „Hazardous Ingredients" should be interpreted as a term required and defined in the OSHA Hazard Communication Standard (29 CFR Part 1910.1200) and does not necessarily imply the existence of any hazard.

A1 Listed by ACGIH as a Human Carcinogen
A2 Listed by ACGIH as a Suspected Human Carcinogen
A3 Listed by ACGIH as an Animal Carcinogen
C Listed by OSHA as a Human Carcinogen
N/R Not reported or listed
mppcf Million Particles per Cubic Foot
BEI Listed by ACGIH as a substance for which there are biological exposure indices

WARNING: This product contains or produces a chemical known to the state of California to cause cancer.
WARNING: This product contains or produces a chemical known to the state of California to cause birth defects or other reproductive harm.
IMPORTANT: This section covers the material from which this product is manufactured. The fumes and gases

produced during welding with this product are covered by SECTION VI.

Section III - Physical and Chemical Characteristics

Boiling Point	**N/A**	Specific Gravity (H_20 = 1)	**N/A**
Vapour Pressure (mm Hg.)	**N/A**	Melting Point	**N/A**
Vapour Density (air = 1)	**N/A**	Evaporation Rate (Butyl Acetate = 1)	**N/A**
Solubility in Water	**insoluble**		
Appearance and Odour	**Unalloyed and low alloyed basic coated electrodes are welding consumables consisting of a solid core wire and a gray coating, no specific odor**		

Section IV - Fire and Explosion Hazard Data

Flash Point (Method used)	Flammable Limits	LEL	UEL
non-flammable	**N/A**	**N/A**	**N/A**

Extinguishing Media **N/A**

Special fire fighting procedures: **N/A**

IMPORTANT! Product is non flammable! Welding arc and spark can ignite combustibles and flammables. Refer to ANSI/ASC Z 49.1-1983 Section 6 for fire prevention during the use of welding and allied products.

Unusual fire and explosion hazards:
N/A

Section V – Reactivity Data

Stability	Unstable	-	Conditions to avoid	**N/A**
	Stable	X		

Incompatibility (Materials to avoid): **N/A**

Hazardous Decomposition or By-products:

Important: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, and the process, procedures, and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, galvanising, or phosphate coatings on steels which would produce phosphine gas), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapours from cleaning and degreasing activities which may be decomposed by the arc into toxic gases such as phosgene).

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in **SECTION II**. Fume and gas decomposition products, and not the ingredients in the electrode are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the electrode. Also, new compounds not in the electrodes may form. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in **SECTION II**, plus those from the base metal and coating, etc..., as noted above.

Reasonably expected fume constituents of this product would include: Example for Carbon dioxide shielded flux-cored electrode (AWS 5.20 E70-T-1): Reasonably expected fume constituents of this product would include: primarily oxides of Iron; secondarily complex oxides of Manganese, Silicon, Titanium and Sodium. The present ACGIH TLV for Manganese, 0.2 mg/m3 will result in a significant reduction from the 5 mg/m3 general welding fume (NOC) level. Example for Stainless Steel covered electrodes (AWS 5.4): Reasonably expected fume constituents of this product would include: primarily fluorides and complex oxides of Iron and Silicon, secondarily complex oxides of Manganese, titanium, chromium, nickel, sodium and potassium. **The present 1995 OSHA PEL (Permissible Exposure Limit) for hexavalent Chromium (Cr^{+6}) is 0.05 mg/m3 which will result in a significant reduction from the 5 mg/m^3 general welding fume (NOC) level.** The limit of 0.05 mg/m^3 for hexavalent chromium from the decomposition products in these electrodes comes from the limit shown at the bottom of OSHA Table Z-2, which is for 0.1 mg of CrO3- which calculates to 0.05 mg of Cr+6/m^3. It applies to soluble chromates of the types found in covered stainless electrode fumes. Reasonably expected gaseous constituents would include Carbon monoxide and Carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample from inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1 and ANSI/AWS F1.2-1992

Hazardous/Polymerisation	May occur	-	Conditions to avoid	**N/A**
	Will not occur	X		

Böhler Thyssen
WELDING

Section VI - Health Hazard Data

Route(s) of entry Inhalation (**) Skin (***) Ingestion **(not likely)**

**** Inhalation of fume.**

***** Rays from welding operations can injure eyes and burn skin.**

Health Hazards (acute and chronic)

Welding electrodes and wires are non-hazardous solids at ambient temperature. Actual exposure should be determined by monitoring the fume in the operator's breathing zone. Compounds of Chromium and Nickel in the fume should be considered possible carcinogens per OSHA29. CFR 1910. 1200. No clear association, however, has been established between Cr and Ni in welding fume and the development of cancer.

Short term overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat or eyes and may aggravate pre-existing respiratory problems (e.g. asthma, emphysema). **See SECTIONS IV and VII.** Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness, and convulsions. In extreme cases it can cause loss of consciousness and death.to welding fumes may result in discomfort, dizziness, nausea, or dryness or irritation of the throat.

Long term overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. The primary entry route for welding fumes and gases is by inhalation Bronchitis and some lung fibrosis have been reported. Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis and spinal column. May cause skin rash.

Arc Rays can injure eyes and burn skin. Electric Shock can kill. Before use, read and understand the manufacturer's instructions., MSDSs, and your employer's safety practices. Keep your head out of the fumes. Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area. Wear correct eye, ear, and body protection.. Do not touch live electrical parts. See American National Standard Z49.1, and OSHA Safety and Health Standards.

Carcinogenicity

NICKEL: The International Agency for Research on Cancer indicates nickel refining and "certain nickel compounds" were cancer-causing, but could not state with certainty which forms of nickel may be carcinogenic. The National Toxicology Program lists nickel powder, nickel subsulfide, nickel oxide, nickel carbonate, nickel carbonyl and nickelocene as substances "that may reasonably anticipated to be carcinogens." Because of this, the OSHA Hazard Communication Standard requires that everyone who manufactures or imports these substances or mixtures or alloys containing these substances must warn of a cancer hazard on their MSDS's and labels. This warning is mandated by OSHA even though studies have not demonstrated cancer risks associated with the use of nickel. Intramuscular injection and implantation of nickel powder produced localized tumors in rats and mice. Inhalation studies using animals showed no evidence of carcinogenicity.

CHROMIUM: The International Agency for Research on Cancer and The National Toxicology Program indicates there is sufficient evidence for carcinogenicity of chromium compounds both in humans and experimental animals. IARC notes that "the compounds responsible for the carcinogenic effect in humans cannot be specified." Studies with chromium metal and trivalent forms of chromium compounds have shown inadequate evidence for carcinogenicity in both animals and humans.

CRYSTALLINE SILICA: The National Toxicology Program indicates there is sufficient evidence for the carcinogenicity or respirable crystalline silica in experimental animals. Increases in incidence of lung cancers have been found in inhalation studies in rats. An IARC working group reported there is limited evidence for the carcinogenicity of crystalline silica in humans.

Sign and symptoms of exposure:

Short term exposure to welding fumes may result in discomfort, dizziness, nausea, or dryness or irritation of the throat.

Medical conditions generally aggravated by exposure:

Individuals with impaired pulmonary functions or illness my have symptoms exacerbated by fume irritants.

Emergency and first aid procedures:

Remove from dust or fume exposure. If breathing has stopped perform artificial respiration. Summon medical aid immediately.

Section VII/VIII - Precautions for Safe Handling and Use

Steps to be taken in case material is released or spilled **N/A**

Waste Disposal Method: Prevent waste from contaminating the surrounding environment. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations

Precautions to be taken in handling and storing: Avoid humidity and temperature shocks.

Other precautions: Electric shock from arc welding equipment can kill. When welding welding arc or torch flame may be a source of ignition of combustible.

Section VIII – Control Measures

special protection information and precautions : Read and understand the manufacturer's instruction and the precautionary label on the product. See American National Standard Z49.1 and OSHA Publication (29 CFR 1910 Hazard Communication Standard for more detail on many of the following.

Ventilation: Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases from the worker's breathing

zone and the general area. Train the welder to keep his head out of the fumes. Keep exposures as low as possible

Respiratory Protection: Use respirable fumes respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the recommended exposure limit.

Eye Protection: Wear helmet or use face shield with filter lens. Provide protective screens and flash goggles, if necessary, to shield others. As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go the next lighter shade which gives sufficient view of the weld zone.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, and well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

REFERENCED STANDARDS

In this publication, reference is made to the standards listed below. Copies are available from the indicated sources.

Official Journals of the European Communities L 314/38, L174/54, referencing Council Regulations 93/112/EC, 91/155/EEC, 88/379/EEC and 67/548/EEC

American Welding Society, Inc.
550 N.W. LeJeune Road
Miami, FL 33126
AWS F1.1-1992 Methods for Sampling Airborne Particulates Generated by Welding and Allied Processes
AWS F1.2-1992 Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission for Welding and Allied Processes

American National Standards Institute
11 West 42nd Street
New York, NY 10036
ANSI Z49.1-1994 Safety in Welding, Cutting and Allied Processes

Superintendent of Documents Administration
U.S. Government Printing Office
Washington, DC 20402
OSHA Standard 29 CFR 1910 Toxic and Hazardous Substances
Subpart Z
1910.1000 Air Contaminants Table Z-2

U.S. Department of Labor
Occupational Safety and Health Administration
200 Constitution Avenue
Room N-3101
Washington, DC 20210
OSHA Standard 29 CFR Material Safety Data Sheet (Non-Mandatory Form) 1910.1200

Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460
Sections 311, 312, 313 Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA)

American Conferencel of Governmental Industrial Hygienists
Technical Affairs Office
Kemper Woods Center
1330 Kemper Meadow Drive
Cincinnati, OH 45240 Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)

The information of this MSDS was obtained from sources we believe are reliable. However, this information is provided without any representation of warranty, expressed or implied, regarding accuracy or correctness.

Material Safety Data Sheet
acc. to ISO/DIS 11014

Printing date 11/20/2006 Reviewed on 11/17/2006

1 Identification of substance

· **Product details**

· **Trade name: UTP 6820 LC**
· **Application of the substance / the preparation** electrodes for welding

· **Manufacturer/Supplier:**
Boehler Thyssen Welding USA Inc.

PO Box 721678
HOUSTON, Texas 77272-1678

phone 281 499 1212
fax 281 261 7895

· **Information department:** QS department

2 Composition/Data on components

· **Chemical characterization**
· **Description:** Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:**

7440-47-3	chromium		10-25%
13463-67-7	titanium dioxide		10-25%
7440-02-0	nickel	Xn, Xi; R 40-43	2.5-10%
471-34-1	calcium carbonate		2.5-10%
7439-96-5	manganese	Xn; R 20-48	≤ 2.5%

· **Additional information:**
Warning: This product contains or produces a chemical known to the state of California to cause cancer.

3 Hazards identification

· **Hazard description:**
General: Different kinds of fume and dust occur during the welding and grinding process. Chromium-VI compounds and nickel oxides might occur, which are classified as carcinogenic. In addition irritant substances such as fluorides and manganese oxides as well as fine dusts (mostly iron oxides) occur.
Health Hazards (acute and chronic) Welding electrodes and wires are non-hazardous solids at ambient temperature.
Actual exposure should be determined by monitoring the fume in the operator's breathing zone. Compounds of Chromium and Nickel in the fume should be considered possible carcinogens per OSHA29. CFR 1910. 1200. No clear association, however, has been established between Cr and Ni in welding fume and the development of cancer. Short term overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat or eyes and may aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness, and convulsions. In extreme cases it can cause loss of consciousness and death.
Long term overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function.
Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. The primary entry route for welding fumes and gases is by inhalation. Bronchitis and some lung fibrosis habe been reported. Repeated exposure to fluorides may cause excessive calcification of

(Contd. on page 2)

Material Safety Data Sheet
acc. to ISO/DIS 11014

Printing date 11/20/2006 Reviewed on 11/17/2006

Trade name: UTP 6820 LC

(Contd. of page 1)

the bone and calcification of ligaments of the ribs, pelvis and spinal column. May cause skin rash.
Overexposure to hexavalent chromium and nickel present in welding fume can present the risk of lung cancer, asthma and damage to the nose and skin.
Arc rays can injure eyes and burn skin. Electric shock can kill. Before use, read and understand the manufacturer's instructions, MSDS's and your employer's safety practices. Keep your head out of the fumes. Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area. Wear correct eye, ear and body protection. Do not touch live electrical parts. See American National Standard Z49.1, and OSHA Safety and Health Standards.
Carcinogenicity
Nickel: The International Agency for Research on Cancer indicates nickel refining and "certain nickel compounds" were cancer-causing, but could not state with certainly which forms of nickel may be carcinogenic. The National Toxicology Program lists nickel powder, nickel subsulfide, nickel oxide, nickelcarbonate, nickel carbonyl and nickelocene as substances "that may reasonably anticipated to be carcinogens". Because of this, the OSHA Hazard Communication Standard requires that everyone who manufactures or imports these substances or mixtures or alloys containing these substances must warn of a cancer hazard on their MSDS's and labels. This warning is mandated by OSHA even though studies have not demonstrated cancer risks associated with the use of nickel. Intramuscular injection and implantation of nickel powder produced localized tumors in rats and mice. Inhalation studies using animals showed no evidence of carcinogenicity.
Chromium: The International Agency for Research on Cancer and the National Toxicology Program indicates there is sufficient evidence for carcinogenicity of Chromium compounds both in humans and experimental animals. IARC notes that "the compounds responsible for the carcinogenic effect in humans cannot be specified". Studies with chromium metal and trivalent forms of chromium compounds have shown inadequate evidence for carcinogenicity in both animals and humans.
Crystalline silica: The National Toxicology Program indicates there is sufficient evidence for the carcinogenicity or respirable crystalline silica in experimental animals. Increases in incidence of lung cancers have been found in inhalation studies in rats. An IARC working group reported there is limited evidence for the carcinogenicity of crystalline silica in humans.
Other precautions: Electric shock from arc welding equipment can kill. When welding arc or torch flame may be a source of ignition of combustible.

· **Information pertaining to particular dangers for man and environment:** Not applicable.
· **Classification system:**
· **NFPA ratings (scale 0 - 4)**

Health = 0
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = *0
Fire = 0
Reactivity = 0

4 First aid measures

· **General information:** No special measures required.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:** If skin irritation continues, consult a doctor.

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· **After eye contact:** Rinse opened eye for several minutes under running water.
· **After swallowing:** If symptoms persist consult doctor.

5 Fire fighting measures

· **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
· **Protective equipment:** No special measures required.

6 Accidental release measures

· **Person-related safety precautions:** Not required.
· **Measures for environmental protection:** Do not allow to enter sewers/ surface or ground water.
· **Measures for cleaning/collecting:** Pick up mechanically.
· **Additional information:** No dangerous substances are released.

7 Handling and storage

· **Handling:**
· **Information for safe handling:** Prevent formation of dust.
· **Information about protection against explosions and fires:** No special measures required.

· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** None.

*
8 Exposure controls and personal protection

· **Additional information about design of technical systems:**
Ventilation: Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. Keep exposures as low as possible
Respiratory Protection: Use respirable fumes respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the recommended exposure limit.

· **Components with limit values that require monitoring at the workplace:**	
7440-47-3 chromium	
PEL	1 mg/m³
REL	0.5 mg/m³
TLV	0.5 mg/m³
13463-67-7 titanium dioxide	
PEL	15* mg/m³ *Total dust
REL	Lowest feasible conc.; (LOQ 0.2 mg/m3)
TLV	10 mg/m³

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7440-02-0 nickel	
PEL	1 mg/m³
REL	0.015 mg/m³
TLV	1.5 I mg/m³
471-34-1 calcium carbonate	
PEL	15*; 5** mg/m³ *Total dust **Respirable fraction
REL	10*; 5** mg/m³ *Total dust **Respirable fraction
TLV	10 mg/m³ (e)
7439-96-5 manganese	
PEL	Short-term value: C 5 mg/m³ as Mn
REL	Short-term value: 3 mg/m³ Long-term value: 1 mg/m³ as Mn
TLV	0.2 mg/m³ as Mn

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Personal protective equipment:**
· **General protective and hygienic measures:** Wash hands before breaks and at the end of work.
· **Breathing equipment:** Use suitable respiratory protective device in case of insufficient ventilation.
· **Protection of hands:** Heat protection gloves
· **Material of gloves** Leather gloves
· **Eye protection:**
Wear helmet or use face shield with filter lens. Provide protective screens and flash goggles, if necessary, to shield others. As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go the next lighter shade which gives sufficient view of the weld zone.
· **Body protection:** Protective work clothing

9 Physical and chemical properties

· **General Information**	
Form:	Solid
Color:	Grey
Odor:	Odorless
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	Undetermined.
· **Flash point:**	Not applicable.
· **Auto igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product does not present an explosion hazard.

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· **Density:**	Not determined.
· **Solubility in / Miscibility with Water:**	Insoluble.

*
10 Stability and reactivity

· **Thermal decomposition / conditions to be avoided:**
No decomposition if used according to specifications.
· **Dangerous reactions** No dangerous reactions known.
· **Dangerous products of decomposition:**
Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, and the process, procedures, and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, galvanising, or phosphate coatings on steels which would produce phosphine gas), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapours from cleaning and degreasing activities which may be decomposed by the arc into toxic gases such as phosgene).
When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in SECTION II. Fume and gas decomposition products, and not the ingredients in the electrode are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the electrode. Also, new compounds not in the electrodes may form. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in SECTION II, plus those from the base metal and coating, etc..., as noted above. Reasonably expected fume constituents of this product would include: Example for Carbon dioxide shielded flux-cored electrode (AWS 5.20 E70-T-1): Reasonably expected fume constituents of this product would include: primarily oxides of Iron; secondarily complex oxides of Manganese, Silicon, Titanium and Sodium. The present ACGIH TLV for Manganese, 0.2 mg/m3 will result in a significant reduction from the 5 mg/m3 general welding fume (NOC) level. Example for Stainless Steel covered electrodes (AWS 5.4): Reasonably expected fume constituents of this product would include: primarily fluorides and complex oxides of Iron and Silicon, secondarily complex oxides of Manganese, titanium, chromium, nickel, sodium and potassium.
The present 1995 OSHA PEL (Permissible Exposure Limit) for hexavalent Chromium (Cr +6) is 0.05 mg/m3 which will result in a significant reduction from the 5 mg/m3 general welding fume (NOC) level. The limit of 0.05 mg/m3 for hexavalent chromium from the decomposition products in these electrodes comes from the limit shown at the bottom of OSHA Table Z-2, which is for 0.1 mg of CrO3- which calculates to 0.05 mg of Cr+6/m3. It applies to soluble chromates of the types found in covered stainless electrode fumes. Reasonably expected gaseous constituents would include Carbon monoxide and Carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample from inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1 and ANSI/AWS F1.2-1992

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11 Toxicological information

· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**	
7440-02-0 nickel	
Intraperitoneal LD50	250 mg/kg (rat)

· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** Sensitization possible through skin contact.
· **Additional toxicological information:**
Workers exposed to hexavalent chrome (Cr+6) are at an increased risk of developing lung cancer. It also possible that occupational exposure to (Cr+6) may result in asthma, and damage to the nasal epithelia and skin. To avoid any risk follow the requirements of the OSHA rule for hexavalent chromium published on February 28, 2006 in the U.S. Federal Register, pages:10099-10385 which established an 8-hour time-weighted average (TWA) exposure limit of 5 micrograms of hexavalent chrome per cubic meter of air (5 µg/m³). This is a considerable reduction from the previous PEL of 1 milligram per 10 cubic meters of air (1 mg/10 m³, or 100 µg/m³) reported as CrO3, which is equivalent to a limit of 52 µg/m³ as (Cr+6)). This rule also contains ancillary provisions for worker protection such as requirements for exposure determination, preferred exposure control methods, including a compliance alternative for a small sector for which the new PEL is infeasible, respiratory protection, protective clothing and equipment, hygiene areas and practices, medical surveillance, recordkeeping, and start-up dates that include four years for the implementation of engineering controls to meet the PEL.

12 Ecological information

· **General notes:**
Water hazard class 1 (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

13 Disposal considerations

· **Product:**
· **Recommendation:** Must be specially treated adhering to official regulations.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **DOT regulations:**
· **Hazard class:** -

· **Land transport ADR/RID (cross-border):**
· **ADR/RID class:** -

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· **Maritime transport IMDG:**
· **IMDG Class:** -
· **Marine pollutant:** No

· **Air transport ICAO-TI and IATA-DGR:**
· **ICAO/IATA Class:** -

· **Transport/Additional information:** Not dangerous according to the above specifications.

*

15 Regulations

· **Sara**

· **Section 355 (extremely hazardous substances):**
None of the ingredient is listed.

· **Section 313 (Specific toxic chemical listings):**

7440-47-3	chromium
7440-02-0	nickel
7439-96-5	manganese
7429-90-5	aluminium powder (pyrophoric)
7440-50-8	copper
7440-48-4	cobalt

· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

7440-47-3	chromium
7440-02-0	nickel
7440-48-4	cobalt

· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Cancerogenity categories**

· **EPA (Environmental Protection Agency)**

7439-96-5	manganese	D
7440-50-8	copper	D

· **IARC (International Agency for Research on Cancer)**

7440-47-3	chromium	3
13463-67-7	titanium dioxide	3

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7440-02-0	nickel	2B
7631-86-9	silicon dioxide, chemically prepared	3
7440-48-4	cobalt	2B

· **NTP (National Toxicology Program)**

7440-02-0	nickel	R

· **TLV (Threshold Limit Value established by ACGIH)**

7440-47-3	chromium	A4
13463-67-7	titanium dioxide	A4
7440-02-0	nickel	A5
7440-48-4	cobalt	A3

· **MAK (German Maximum Workplace Concentration)**

7440-02-0	nickel	1
7440-48-4	cobalt	2

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

13463-67-7	titanium dioxide
7440-02-0	nickel

· **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients is listed.

· **Product related hazard informations:**
The product is not subject to identification regulations according to directives on hazardous materials.

· **Hazard-determining components of labelling:**
nickel

· **National regulations:**

· **Water hazard class:** Water hazard class 1 (Self-assessment): slightly hazardous for water.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing MSDS:** QS department
· **Contact:**
Ms. Monica Isenhart
phone +1-281-499 1212
· *** Data compared to the previous version altered.**

#20

Böhler Thyssen
WELDING

MATERIAL SAFETY DATA SHEET

May be used to comply with Osha's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.	U.S. Department of Labour Occupational Safety and Health Administration (Non-Mandatory Form) Form Approved OMB No. 1218-0072

Maybe used to comply with **Council Directive 93/112/EC** concerning **Council Directive 91/155/EEC** relating to the classification, packaging and labelling of dangerous substances, referenced in the Official Journal of the European Communities, **European Regulation L 314/38**

Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I – Identification

Product: **UTP 6820MOLC** **AWS SPEC: E316L-16**
Product Type: Shielded Metal Arc Welding Electrode

Suppliers name: **Bohler Thyssen Welding USA, Inc**

Address: **10401 Greenbough Drive, Stafford, TX 77477**	Telephone number for information: **01-281-499-1212**
Date prepared: 6/07	Signature of preparer: **M. Isenhart**

Section II - Hazardous* Ingredients

Important: This section covers the materials from which this product is manufactured. The fumes and gases produced during normal use when welding with this product are covered by section V.

Ingredient	CAS#	OSHA PEL mg/m³	ACGIH TLV mg/m³	other limits recommended	approx. wt.-% (optional)
Wire or rod					
Carbon (C)	7440-44-0	TWA 5.0 respirable fraction TWA15.0 total dust	TWA 10.0 inhalable fraction TWA 3.0 respirable fraction	inert	**0.4**
Chromium (Cr)	7440-47-3	TWA 0.5	TWA 0.5		**17-20.0**
Manganese (Mn)	7439-96-5	TWA 5.0 ceiling	TWA 0.2		**1.0-2.0**
Molybdenum (Mo)	7439-98-7	TWA 5.0 soluble compounds TWA 15.0 total dust	A3		**2.0-3.0**
Nickel (Ni)	7440-02-0	TWA 1.0	TWA 1.5		**10-13**
Coating or Filling					
Alkali Silicate	N/R	TWA 5.0 respirable fraction TWA 15.0 total dust	TWA 10.0 inhalable fraction TWA 3.0 respirable fraction		**25-35**
Chromium (Cr)	7440-47-3	TWA 1.0	TWA 0.5		**9-15**
Earth Alkali Carbonate	471-34-1	TWA 5.0 respirable fraction TWA 15.0 total dust	TWA 10.0 inhalable fraction TWA 3.0 respirable fraction		**8-12**
Earth Alkali Fluoride	N/R	TWA 2.5	TWA 2.5		**3-5**
Iron Carbon Poor	7439-89-6	TWA 10.0	TWA 5.0 inhalable fraction		**4-8**
Manganese (Mn)	7439-96-5	TWA 5.0 ceiling	TWA 0.2		**1-3**
Molybdenum (Mo)	7439-98-7	TWA 5.0 soluble compounds TWA 15.0 total dust	A3		**0.5-1.5**
Nickel (Ni)	7440-02-0	TWA 1.0	TWA 1.5		**2-4**

* The term „Hazardous" in „Hazardous Ingredients" should be interpreted as a term required and defined in the OSHA Hazard Communication Standard (29 CFR Part 1910.1200) and does not necessarily imply the existence of any hazard.

A1 Listed by ACGIH as a Human Carcinogen
A2 Listed by ACGIH as a Suspected Human Carcinogen
A3 Listed by ACGIH as an Animal Carcinogen
C Listed by OSHA as a Human Carcinogen
N/R Not reported or listed
mppcf Million Particles per Cubic Foot

BEI Listed by ACGIH as a substance for which there are biological exposure indices

WARNING: This product contains or produces a chemical known to the state of California to cause cancer.
WARNING: This product contains or produces a chemical known to the state of California to cause birth defects or other reproductive harm.
IMPORTANT: This section covers the material from which this product is manufactured. The fumes and gases produced during welding with this product are covered by SECTION VI.

Section III - Physical and Chemical Characteristics

Boiling Point	**N/A**	Specific Gravity (H_20 = 1)	**N/A**
Vapour Pressure (mm Hg.)	**N/A**	Melting Point	**N/A**
Vapour Density (air = 1)	**N/A**	Evaporation Rate (Butyl Acetate = 1)	**N/A**
Solubility in Water	**insoluble**		
Appearance and Odour	**Unalloyed and low alloyed basic coated electrodes are welding consumables consisting of a solid core wire and a gray coating, no specific odor**		

Section IV - Fire and Explosion Hazard Data

Flash Point (Method used)	Flammable Limits	LEL	UEL
non-flammable	**N/A**	**N/A**	**N/A**

Extinguishing Media **N/A**

Special fire fighting procedures: **N/A**
IMPORTANT! Product is non flammable! Welding arc and spark can ignite combustibles and flammables. Refer to ANSI/ASC Z 49.1-1983 Section 6 for fire prevention during the use of welding and allied products.

Unusual fire and explosion hazards:
N/A

Section V – Reactivity Data

Stability	Unstable	-	Conditions to avoid	**N/A**
	Stable	X		

Incompatibility (Materials to avoid): **N/A**

Hazardous Decomposition or By-products:

Important: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, and the process, procedures, and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, galvanising, or phosphate coatings on steels which would produce phosphine gas), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapours from cleaning and degreasing activities which may be decomposed by the arc into toxic gases such as phosgene).

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in **SECTION II**. Fume and gas decomposition products, and not the ingredients in the electrode are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the electrode. Also, new compounds not in the electrodes may form. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in **SECTION II**, plus those from the base metal and coating, etc..., as noted above.

Reasonably expected fume constituents of this product would include: Example for Carbon dioxide shielded flux-cored electrode (AWS 5.20 E70-T-1): Reasonably expected fume constituents of this product would include: primarily oxides of Iron; secondarily complex oxides of Manganese, Silicon, Titanium and Sodium. The present ACGIH TLV for Manganese, 0.2 mg/m3 will result in a significant reduction from the 5 mg/m3 general welding fume (NOC) level. Example for Stainless Steel covered electrodes (AWS 5.4): Reasonably expected fume constituents of this product would include: primarily fluorides and complex oxides of Iron and Silicon, secondarily complex oxides of Manganese, titanium, chromium, nickel, sodium and potassium. **The present 1995 OSHA PEL (Permissible Exposure Limit) for hexavalent Chromium (Cr^{+6}) is 0.05 mg/m3 which will result in a significant reduction from the 5 mg/m^3 general welding fume (NOC) level.** The limit of 0.05 mg/m^3 for hexavalent chromium from the decomposition products in these electrodes comes from the limit shown at the bottom of OSHA Table Z-2, which is for 0.1 mg of CrO3- which calculates to 0.05 mg of Cr+6/m^3. It applies to soluble chromates of the types found in covered stainless electrode fumes. Reasonably expected gaseous constituents would include Carbon monoxide and Carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample from inside the welder's helmet if worn or in

the worker's breathing zone. See ANSI/AWS F1.1 and ANSI/AWS F1.2-1992

Hazardous/Polymerisation	May occur	-	Conditions to avoid	**N/A**
	Will not occur	X		

Section VI - Health Hazard Data

Route(s) of entry Inhalation (**) Skin (***) Ingestion **(not likely)**

**** Inhalation of fume.**

***** Rays from welding operations can injure eyes and burn skin.**

Health Hazards (acute and chronic)

Welding electrodes and wires are non-hazardous solids at ambient temperature. Actual exposure should be determined by monitoring the fume in the operator's breathing zone. Compounds of Chromium and Nickel in the fume should be considered possible carcinogens per OSHA29. CFR 1910. 1200. No clear association, however, has been established between Cr and Ni in welding fume and the development of cancer.

Short term overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat or eyes and may aggravate pre-existing respiratory problems (e.g. asthma, emphysema). **See SECTIONS IV and VII.** Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness, and convulsions. In extreme cases it can cause loss of consciousness and death.to welding fumes may result in discomfort, dizziness, nausea, or dryness or irritation of the throat.

Long term overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. The primary entry route for welding fumes and gases is by inhalation Bronchitis and some lung fibrosis have been reported. Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis and spinal column. May cause skin rash.

Arc Rays can injure eyes and burn skin. Electric Shock can kill. Before use, read and understand the manufacturer's instructions., MSDSs, and your employer's safety practices. Keep your head out of the fumes. Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area. Wear correct eye, ear, and body protection.. Do not touch live electrical parts. See American National Standard Z49.1, and OSHA Safety and Health Standards.

Carcinogenicity

NICKEL: The International Agency for Research on Cancer indicates nickel refining and "certain nickel compounds" were cancer-causing, but could not state with certainty which forms of nickel may be carcinogenic. The National Toxicology Program lists nickel powder, nickel subsulfide, nickel oxide, nickel carbonate, nickel carbonyl and nickelocene as substances "that may reasonably anticipated to be carcinogens." Because of this, the OSHA Hazard Communication Standard requires that everyone who manufactures or imports these substances or mixtures or alloys containing these substances must warn of a cancer hazard on their MSDS's and labels. This warning is mandated by OSHA even though studies have not demonstrated cancer risks associated with the use of nickel. Intramuscular injection and implantation of nickel powder produced localized tumors in rats and mice. Inhalation studies using animals showed no evidence of carcinogenicity.

CHROMIUM: The International Agency for Research on Cancer and The National Toxicology Program indicates there is sufficient evidence for carcinogenicity of chromium compounds both in humans and experimental animals. IARC notes that "the compounds responsible for the carcinogenic effect in humans cannot be specified." Studies with chromium metal and trivalent forms of chromium compounds have shown inadequate evidence for carcinogenicity in both animals and humans.

CRYSTALLINE SILICA: The National Toxicology Program indicates there is sufficient evidence for the carcinogenicity or respirable crystalline silica in experimental animals. Increases in incidence of lung cancers have been found in inhalation studies in rats. An IARC working group reported there is limited evidence for the carcinogenicity of crystalline silica in humans.

Sign and symptoms of exposure:

Short term exposure to welding fumes may result in discomfort, dizziness, nausea, or dryness or irritation of the throat.

Medical conditions generally aggravated by exposure:

Individuals with impaired pulmonary functions or illness my have symptoms exacerbated by fume irritants.

Emergency and first aid procedures:

Remove from dust or fume exposure. If breathing has stopped perform artificial respiration. Summon medical aid immediately.

Section VII/VIII - Precautions for Safe Handling and Use

Steps to be taken in case material is released or spilled **N/A**

Waste Disposal Method: Prevent waste from contaminating the surrounding environment. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations

Precautions to be taken in handling and storing: Avoid humidity and temperature shocks.

Other precautions: Electric shock from arc welding equipment can kill. When welding welding arc or torch flame may be a source of ignition of combustible.

Section VIII – Control Measures

special protection information and precautions : Read and understand the manufacturer's instruction and the precautionary label on the product. See American National Standard Z49.1 and OSHA Publication (29 CFR 1910 Hazard Communication Standard for more detail on many of the following.

Ventilation: Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. Keep exposures as low as possible

Respiratory Protection: Use respirable fumes respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the recommended exposure limit.

Eye Protection: Wear helmet or use face shield with filter lens. Provide protective screens and flash goggles, if necessary, to shield others. As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go the next lighter shade which gives sufficient view of the weld zone.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, and well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

REFERENCED STANDARDS

In this publication, reference is made to the standards listed below. Copies are available from the indicated sources.

Official Journals of the European Communities L 314/38, L174/54, referencing Council Regulations 93/112/EC, 91/155/EEC, 88/379/EEC and 67/548/EEC

American Welding Society, Inc.
550 N.W. LeJeune Road
Miami, FL 33126
AWS F1.1-1992 Methods for Sampling Airborne Particulates Generated by Welding and Allied Processes
AWS F1.2-1992 Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission for Welding and Allied Processes

American National Standards Institute
11 West 42nd Street
New York, NY 10036
ANSI Z49.1-1994 Safety in Welding, Cutting and Allied Processes

Superintendent of Documents Administration
U.S. Government Printing Office
Washington, DC 20402
OSHA Standard 29 CFR 1910 Toxic and Hazardous Substances
Subpart Z
1910.1000 Air Contaminants Table Z-2

U.S. Department of Labor
Occupational Safety and Health Administration
200 Constitution Avenue
Room N-3101
Washington, DC 20210
OSHA Standard 29 CFR Material Safety Data Sheet (Non-Mandatory Form) 1910.1200

Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460
Sections 311, 312, 313 Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA)

American Conferencel of Governmental Industrial Hygienists
Technical Affairs Office
Kemper Woods Center
1330 Kemper Meadow Drive
Cincinnati, OH 45240 Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)

The information of this MSDS was obtained from sources we believe are reliable. However, this information is provided without any representation of warranty, expressed or implied, regarding accuracy or correctness.

#21

BOHLER THYSSEN WELDING USA, INC.
MATERIAL SAFETY DATA SHEET

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements, see Referenced Standards in Detailed Explanation.

SECTION I IDENTITY

Product: UTP ECONOCAST 55 AWS or other spec: ENiFe-CI Product Type: Shielded Metal Arc Welding Electrode
Manufacturer/Distributor Name: **BOHLER THYSSEN WELDING USA, INC.** Address: **10401 GREENBOUGH STAFFORD, TEXAS 77477**
Telephone Number: (281) 499-1212 **1-800-527-0791** Date Prepared: **REVISED 10/97**

SECTION II HAZARDOUS INGREDIENTS/COMPONENTS

Chemical Identity	CAS	OSHA PEL(mg/m^3)	ACGIH TLV(mg/m^3)	PERCENT
ELECTRODE COATING:				27%
EARTH ALKALI CARBONATE	471-34-1	TWA-5-Respirable 15-Total	TWA-10-Inhalable 3-Respirable	40.0%
EARTH ALKALI FLUORIDE	N/R	TWA-2.5	TWA-2.5	7.0%
IRON OXIDE	1309-37-1	TWA-10	TWA-5-Inhalable	14.0%
GRAPHITE	7782-42-5	TWA-15 mppcf	TWA-2 RESPIRABLE DUST	14.0%
ALUMINUM	7429-90-5	TWA-5-Respirable 15-Total	TWA-10	8.5%
IRON	7439-89-6	TWA-10	TWA-5	9.5%
ALKALI SILICATE	N/R	TWA-5-Respirable 15-Total	TWA-10-Inhalable 3-Respirable	7.0%
CORE WIRE:				73%
IRON	7439-89-6	TWA-10	TWA-5	60.0%
NICKEL	7440-02-0	TWA-1	TWA-0.5 Inhalable	40.0%

IMPORTANT! This section covers the material from which this product is manufactured. The fumes and gases produced during welding with this product are covered by **SECTION VI.** The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in OSHA 2265 (29 CFR 1910.1200) and does not necessarily imply the existence of any hazard.

SECTION III PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point: N/A Specific Gravity(H_2O=1) N/A Vapor Pressure(mmHg.): N/A Melting Point N/A
Vapor Density (AIR-1): N/A Evaporation Rate N/A Solubility in Water: N/A

Appearance and Odor: Stick Electrode with Black Coating, Solid, No Specific Odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point(Method Used): N/A Flammable Limits N/A LEL-N/A UEL-N/A Extinguishing Media: N/A
Special Fire Fighting Procedures: N/A Unusual Fire and Explosion Hazards: N/A

See Section IV in Detailed Explanation

SECTION V REACTIVITY DATA

Stability: Unstable N/A Stable N/A Conditions to avoid N/A
Incompatibility (Materials to avoid): N/A
Hazardous Decomposition or Byproducts: See Section V in Detailed Explanation

Hazardous Polymerization May occur N/A Will not occur N/A Conditions to avoid N/A

SECTION VI HEALTH HAZARD DATA

Route(s) of entry: Inhalation? ** Skin? Unlikely Ingestion? Unlikely
**** Gases and fumes generated while welding may be dangerous to your health.** See Section VI in Detailed Explanation
Irritation of Mucous Membranes from Welding Fumes
Carcinogenicity: Nickel X (See Section VI in Detailed Explanation)
Signs and Symptoms of Over Exposure:
Short-term (acute): See Section VI in Detailed Explanation
Long-term (chronic): See Section VI in Detailed Explanation
Emergency and First Aid Procedures: In Case of Fume Inhalation Remove to Fresh Air. Employ First Aid Techniques Recommended by the American Red Cross. In an Emergency Call Physician.
WARNING: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Sec. 25249.5 et. seq.)

SECTION VII PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in case material is released or spilled N/A
Waste Disposal Method: Prevent Waste from Contaminating Surrounding Environment. Discard Any Product, Residue, Disposable Container or Liner in an Environmentally Acceptable Manner, in Full Compliance with Federal, State, and Local Regulations.
Precautions to be taken in handling and storing: Cool and Dry Storage

Other Precautions: When Welding, Brazing, or Soldering: Welding Arc or Torch Flame May Be a Source of Ignition of Combustible Product.

#57

SECTION VIII CONTROL MEASURES

Respiratory Protection (specify type): See Section VIII in Detailed Explanation
Ventilation: Local Exhaust required in semi-open or poorly ventilated space. See Section VIII in Detailed Explanation
Protective Gloves: See Section VIII in Detailed Explanation
Other Protective Clothing or Equipment: See Section VIII in Detailed Explanation
Work/Hygienic Practices: See Section VIII in Detailed Explanation

The information in this MSDS was obtained from sources we believe are reliable. However, this information is provided without any representation of warranty, expressed or implied, regarding accuracy or correctness.

Chromium (Cr^{+6}) is 0.05 mg/m^3 which will result in a significant reduction from the 5 mg/m^3 general welding fume (NOC) level. The limit of 0.05 mg/m^3 for hexavalent chromium from the decomposition products in these electrodes comes from the limit shown at the bottom of OSHA Table Z-2, which is for 0.1 mg of CrO^{3-} which calculates to 0.05 mg of Cr^{+6}/m^3. It applies to soluble chromates of the types found in covered stainless electrode fumes. Reasonably expected gaseous constituents would include Carbon monoxide and Carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample from inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1 and ANSI/AWS F1.2-1992

SECTION VI HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: The ACGIH recommended general limit for welding fume NOC- (not otherwise classified) is 5 mg/m^3. ACGIH-1995 (or latest date) preface states, "These values are not fine lines between safe and dangerous concentrations and should not be used by anyone untrained in the discipline of industrial hygiene." See **SECTION V** for specific fume constituents which may modify the TLV.

EFFECTS OF OVER EXPOSURE:
WARNING: PROTECT yourself and others. Read and understand this information.
FUMES AND GASES can be dangerous to your health.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat or eyes and may aggravate pre-existing respiratory problems (e.g. asthma, emphysema). See **SECTIONS IV and VII.** Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness, and convulsions. In extreme cases it can cause loss of consciousness and death.

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. The primary entry route for welding fumes and gases is by inhalation Bronchitis and some lung fibrosis have been reported. Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis and spinal column. May cause skin rash.

Arc Rays can injure eyes and burn skin. Electric Shock can kill. Before use, read and understand the manufacturer's instructions., MSDSs, and your employer's safety practices. Keep your head out of the fumes. Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area. Wear correct eye, ear, and body protection.. Do not touch live electrical parts. See American National Standard Z49.1, and OSHA Safety and Health Standards.

CARCINOGENICITY:

NICKEL: The International Agency for Research on Cancer indicates nickel refining and "certain nickel compounds" were cancer-causing, but could not state with certainty which forms of nickel may be carcinogenic. The National Toxicology Program lists nickel powder, nickel subsulfide, nickel oxide, nickel carbonate, nickel carbonyl and nickelocene as substances "that may reasonably anticipated to be carcinogens." Because of this, the OSHA Hazard Communication Standard requires that everyone who manufactures or imports these substances or mixtures or alloys containing these substances must warn of a cancer hazard on their MSDS's and labels. This warning is mandated by OSHA even though studies have not demonstrated cancer risks associated with the use of nickel. Intramuscular injection and implantation of nickel powder produced localized tumors in rats and mice. Inhalation studies using animals showed no evidence of carcinogenicity.

CHROMIUM : The International Agency for Research on Cancer and The National Toxicology Program indicates there is sufficient evidence for carcinogenicity of chromium compounds both in humans and experimental animals. IARC notes that "the compounds responsible for the carcinogenic effect in humans cannot be specified." Studies with chromium metal and trivalent forms of chromium compounds have shown inadequate evidence for carcinogenicity in both animals and humans.

SECTION VIII CONTROL MEASURES

SPECIAL PROTECTION INFORMATION AND PRECAUTIONS
Read and understand the manufacturer's instruction and the precautionary label on the product. See American National Standard Z49.1 and OSHA Publication (29 CFR 1910 Hazard Communication Standard for more detail on many of the following.

VENTILATION
Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. Keep exposures as low as possible

RESPIRATORY PROTECTION
Use respirable fumes respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the recommended exposure limit.

EYE PROTECTION
Wear helmet or use face shield with filter lens. Provide protective screens and flash goggles, if necessary, to shield others. As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go the next lighter shade which gives sufficient view of the weld zone.

PROTECTIVE CLOTHING
Wear hand, head, and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, and well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

BOHLER THYSSEN WELDING USA, INC.
MSDS DETAILED EXPLANATION

REFERENCED STANDARDS

In this publication, reference is made to the standards listed below. Copies are available from the indicated sources.

American Welding Society, Inc.
550 N.W. LeJeune Road
Miami, FL 33126

AWS F1.1-1992	Methods for Sampling Airborne Particulates Generated by Welding and Allied Processes
AWS F1.2-1992	Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission for Welding and Allied Processes

American National Standards Institute
11 West 42nd Street
New York, NY 10036

ANSI Z49.1-1994	Safety in Welding, Cutting and Allied Processes

Superintendent of Documents Administration
U.S. Government Printing Office
Washington, DC 20402

OSHA Standard 29 CFR 1910 Toxic and Hazardous Substances
Subpart Z

1910.1000	Air Contaminants Table Z-2

U.S. Department of Labor
Occupational Safety and Health Administration
200 Constitution Avenue
Room N-3101
Washington, DC 20210

OSHA Standard 29 CFR 1910.1200	Material Safety Data Sheet (Non-Mandatory Form)

Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

Sections 311, 312, 313	Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA)

American Conferencel of Governmental Industrial Hygienists
Technical Affairs Office
Kemper Woods Center
1330 Kemper Meadow Drive
Cincinnati, OH 45240

Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)

SECTION IV FIRE AND EXPLOSION HAZARD DATA
IMPORTANT! (Non Flammable) Welding arc and sparks can ignite combustibles and flammables. Refer to American National Standard Z49.1 for fire prevention and protection information during the use of welding and allied procedures.

SECTION V REACTIVITY DATA

HAZARDOUS DECOMPOSITION PRODUCTS

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in **SECTION II.** Fume and gas decomposition products, and not the ingredients in the electrode are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the electrode. Also, new compounds not in the electrodes may form. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in **SECTION II**, plus those from the base metal and coating, etc..., as noted above.
Reasonably expected fume constituents of this product would include:
Example for Carbon dioxide shielded flux-cored electrode (AWS 5.20 E70-T-1): Reasonably expected fume constituents of this product would include: primarily oxides of Iron; secondarily complex oxides of Manganese, Silicon, Titanium and Sodium. The present ACGIH TLV for Manganese, 0.2 mg/m^3 will result in a significant reduction from the 5 mg/m^3 general welding fume (NOC) level. Example for Stainless Steel covered electrodes (AWS 5.4): Reasonably expected fume constituents of this product would include: primarily fluorides and complex oxides of Iron and Silicon, secondarily complex oxides of Manganese, titanium, chromium, nickel, sodium and potassium. **The present 1995 OSHA PEL (Permissible Exposure Limit) for hexavalent**

SECTION IX: DOCUMENTARY INFORMATION

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information in this document is believed to be correct as of the date of issuance. However, **NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED, OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION, OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE.**

This information and product are furnished on the condition that the person receiving them shall make his own determination as to the suitability of each product, process and application for his particular purpose, and on the condition that he assumes the risk of his use thereof.

APPENDIX D

GRINDING MATERIAL SAFETY DATA SHEETS

APPENDIX E

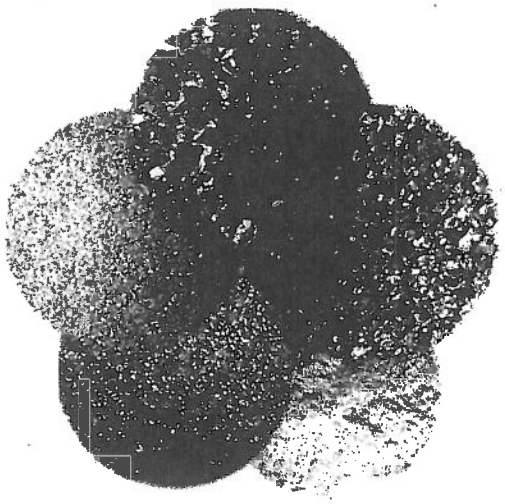
ABRASIVE BLASTING MATERIAL SAFETY DATA SHEETS

Crushed Glass Abrasive

No Free Silica

NIOSH Recommends Crushed Glass Replace Silica Sand

Sharp Angular Grains
No Free Silica
Lower Density
Lighter Weight
Environmentally Responsible
Government-Approved
Recommended by NIOSH



Environmentally Green

Compare to Silica Sand & Mineral Slag

Delivers clean, bright finish
Requires less abrasive by weight to do the job
Faster clean-up and lower disposal costs
Excellent re-use of glass waste
Safer handling compared to most slag products
Recommended by NIOSH Study
Meets Federal Government abrasive specification MIL-A-22262-B (SH)

Coarse 16/30, 16/50 Grit Coarse blends excellent for Concrete, Structural Steel, Tanks, Shipyards, Water Filtration and Swimming Pool Restoration. Removes Mill Scale, Heavy Rust, Pavement Striping and Thick Coatings. Good for recycling blast operations. Mil 3.0 - 4.5

Medium 30/50, 30/80 Grit General blends for Concrete, Structural Steel, Tanks and Shipyards. Removes Light Rust, Paint and Typical Coatings. Great blend for General Surface Preparation, Log Home Restoration and Elastomeric Coatings. Mil 1.0 - 3.0

Fine 50/80, 80/120 Grit Finer blends for smoother finishes on Wood, Aluminum, Fiberglass, and Other Delicate Substrates. Good for Graffiti Removal, Powder Coating Preparation, Medical Parts Cleaning, Log Home, Boat and Auto body Restoration. Mil 0.5 - 1.0

A Product of:

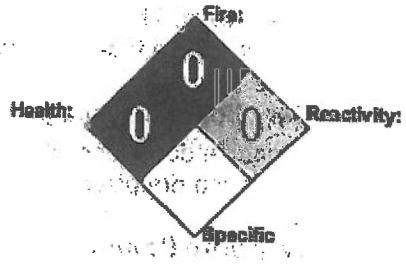
Environmental Abrasives Warehouse
4301 Federal Way
Boise, ID 83716
(208) 947-1351

sales@enviroabrasives.com
www.enviroabrasives.com

MSDS Material Safety Data Sheet

ENVIRONMENTAL ABRASIVES

Crushed Glass Abrasive



1. Company Identification

Manufacturer:
Environmental Abrasives LLC
4301 Federal Way
Boise, ID 83715
Phone (208) 947-1351

Emergency Phone:
CHEMTREC 800-424-9300

2. Product Identification

Product Name: Crushed Glass Abrasive
Product Description: Abrasive media manufactured from recycled glass
Product Identifier: Soda-Lime Glass, Glass Oxide

3. Physical and Chemical Properties

CAS Number	65997-17-3	**Specific Gravity**	2.45 – 2.55 g/cm^3
Physical State	Grain or Powder	**pH**	NA
Color/Appearance	Brownish	**Solubility**	Negligible
Odor	Oderless	**Melting Point**	Approximately 730 °C
		Percent Volatile	NA

4. Hazard Identification

ACUTE: Contact or high dust concentrations; may cause mechanical eye irritation and upper respiratory irritation. Prolonged skin contact with dust may result in dryness.
CHRONIC: Chronic exposure to dusts may cause pneumoconiosis. There are no known medical conditions aggravated by exposure to this product.

Glass abrasive is not classified as a hazardous material by the criteria of the OSHA Hazard Communication Standard,Title 29, Code of Federal Regulations, Section 1910.1200, Hazard Communication.
Nuisance Dust concern
Contains no free (or crystalline) silica; all components are amorphous/non-crystalline

5. First Aid Information

Ingestion: Do not induce vomiting. If symptoms occur, contact a physician.
Inhalation: Remove to fresh air. If symptoms persist, contact a physician.
Skin Contact: Wash with water.
Eye Contact: Flush with water.

6. Fire Fighting Measures

Flash Point: N/A
Flammable Properties: Material will not burn. Use media that is appropriate for fighting surrounding fire.
Clothing: Wear appropriate protective clothing.
Respirators: Wear a NIOSH-approved (or equivalent) respirator.

KLEEN BLAST

ABRASIVES

Wholesale Equipment, Parts, and Supplies
A Division of CanAm Minerals Inc.

HEADQUARTERS:

50 Oak Ct., Suite 210 Danville, CA 94526 (925) 831-9800 (800) 356-7323 FAX (925) 831-9183

WAREHOUSES:

Tacoma, WA
1448 St. Paul Ave.
Tacoma, WA 98421
(253) 383-2168
(800) 228-4786
FAX (253) 383-2267

Portland, OR
1815 N. Columbia Blvd.
Portland, OR 97217
(503) 228-3965
(800) 634-8499
FAX (503) 228-6807

Hayward, CA
30028 Industrial Pkwy. S.W.
Hayward, CA 94544
(510) 471-2100
(800) 227-1134
FAX (510) 471-2447

Chula Vista, CA
676 Moss St.
Chula Vista, CA 91911
(619) 427-4711
FAX (619) 427-4733

Material Safety Data Sheet
Complies with ANSI Z400.1 Draft Standard
for the Preparation of Material Safety Data Sheets,
Copyright 1991, Chemical Manufacturers Association

U.S. Department of Labor
Complies with OSHA Hazard Communication
Standard 29 CFR 1910.1200

Section 1: CHEMICAL PRODUCT AND CHEMICAL IDENTIFICATION

Identity (as used on label and list): **Kleen Blast**
Synonym(s): 8-12 (Large), 16, 16-30, 35, 30-60 (Fine)
(numbers indicated are all nomenclature for sizing)

Manufacturer's Name: **CanAm Minerals dba Kleen Blast**
Emergency Telephone: **(925) 831-9800**
Information Telephone: **(925) 831-9800**

Address: **50 Oak Ct., Suite 210**
Danville, CA 94526

Prepared by: Director of Health & Safety
Date Prepared: 30th December 2009
Revised: December, 2009

OSHA REGULATORY STATUS

While this material is not classified as hazardous under OSHA regulations, this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Physical/Chemical Characteristics

Boiling Point	NA	Specific Gravity (H20=1)	2.8
Vapor Pressure (mm Hg)	NA	Melting Point	2400 F
Vapor Density (Air=1)	NA	Evaporation Rate	None
Solubility in Water	None	(Butyl Acetate=1)	None

Section 4: HAZARD SYMOBOLS:

HAZARD SYMBOLS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS)

Physical Hazard	0
Protective Equipment	

HMIS PERSONAL PROTECTIVE EQUIPMENT RATING: Industrial Use situations: A; Safety Glasses.

CANADIAN WHMIS SYMBOLS:

Not Applicable

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Section 5: FIRE AND EXPLOSION HAZARD

Flash Point (Method Used):	NA	
Flammable Limits:	LEL: NA	UEL: NA
Pyrophoric, oxidizer, organic peroxide:	No	
Pressurized during shipment:	No	
Extinguishing Media:	NA	
Special Fire Fighting Procedures:	NA	
Unusual Fire/Explosion Hazards:	NA	

Reactivity Data

Stability:	Stable
Conditions to avoid:	None
Materials to avoid (incompatibility):	None
Hazardous decomposition or by-products:	None
Hazardous polymerization:	Will not occur

First Aid Measures - Continued

Emergency and first aid procedures – *likely only in extreme and unusual conditions:*

Trunk/torso/limbs:	Follow procedures appropriate to abrasion or trauma injuries
Skin:	Follow procedures appropriate to abrasion injuries.
Eyes:	Flush thoroughly with cool running water.
Inhalation:	Follow procedures appropriate to dust inhalation.
Ingestion:	Not likely.
Note to physicians:	No toxic substances are present in this product.

Section 7: ACCIDENTAL RELEASE MEASURES

Loading/unloading: A release will pose a housekeeping problem. Material should be swept or vacuumed into appropriate containers.

Waste disposal method: If the spent grit remains uncontaminated per the Resource Recovery and Conservation Act (RCRA), then the material meets the definition of a solid waste and may be disposed of per local regulations.

If the spent grit material has been used in a manner that accumulates contaminates at levels above those specified under RCRA, then the waste is defined as hazardous and must be managed per federal or state regulations governing hazardous waste.

Precautions to be taken in handling and storing: Follow good housekeeping practices to reduce practices to reduce airborne emissions. Use approved respiratory protection and clothing in abrasive blast environments.

Exposure Controls: Respiratory protection: NIOSH-approved respiratory equipment for abrasive blast environments. Personal protection: NIOSH-approved garments and head gear during blasting operations.

Engineering controls: Always use engineering controls to limit exposures to

Local Exhaust	**Mechanical Exhaust**	**Special Exhaust**	**Other**
During loading/Unloading	May be appropriate during processing.	May be appropriate during normal abrasive blasting operations.	May be required during unusual abrasive blasting operations.

Air Resources Board

Mary D. Nichols, Chairman
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

January 18, 2012

Mr. Fionn O'Neill
Kleen Blast Division – CanAm Minerals
50 Oak Court
Danville, California 94526

Dear Mr. O'Neill:

We are pleased to inform you that the abrasive products listed below are certified for permissible dry outdoor blasting.

Kleen Blast Division – CanAm Minerals
50 Oak Court #210
Danville, California 94526

www.kleenblast.com
Fionn O'Neill
(925) 831-9800
Fax: (925) 831-9183
fionn@kleenblast.com

Plant: Pacific Abrasives & Supply, Incorporated
2465 Carson Road
Grand Forks, British Columbia
Canada

Brand Name or Grade:	Expires:
Kleen Blast #16/30	8/31/12
Kleen Blast #35	8/31/12
Kleen Blast #30/60	8/31/12

Plant: 676-B Moss Street
Chula Vista, California

Brand Name or Grade:	Expires:
Kleen Blast #16-30 15% Blastox	8/31/13
Kleen Blast #35 15% Blastox	8/31/13

If you have questions or need further assistance, please contact Ms. Kathryn Gugeler at (916) 322-0221 or via email at kgugeler@arb.ca.gov, or I can be reached at (916) 445-4686 or via email at amacpher@arb.ca.gov.

Sincerely,

Angus MacPherson, Manager
Testing and Certification Section
Monitoring and Laboratory Division

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: http://www.arb.ca.gov.

APPENDIX F

BAG HOUSE FILTER DATA

AESCO SINCE 1980
AESCO MADSEN
MADSEN SINCE 1910

Asphalt Equipment

& Service Company

Madsen Iron Works

1531 20th Street NW

Auburn, WA 98001

253-939-4150

fax 253-939-1576

AESCO/MADSEN
EMISSION CONTROL

AESCO/MADSEN OFFERS THAT AN AESCO/MADSEN BAGHOUSE WITH PROPER USE AND SUBJECT TO THE CONDITIONS DESCRIBED BELOW, THE PLANT, WHEN EQUIPPED WITH THE BAGHOUSE WILL OPERATE TO 99.9% EFFICIENCY STANDARD FOR ASPHALT CONCRETE PLANTS.

THIS OPERATING EFFICIENCY IS STRICTLY CONDITIONAL UPON THE FOLLOWING:

1. THE PLANT SHALL BE PREPARED, MAINTAINED AND OPERATED IN ACCORDANCE WITH AESCO/MADSEN'S WRITTEN AND VERBAL INSTRUCTION TO PURCHASER AND WITHIN THE PARAMETERS INDICATED IN AESCO/MADSEN'S OPERATING MANUALS.

2. THE ASPHALTIC CONCRETE INGREDIENTS UTILIZED SHALL BE AS FOLLOWS:

   A. AGGREGATE WHICH IS NATURAL, CLEAN AND NORMAL FOR ASPHALT CONCRETE PRODUCTION.

   B. ASPHALT CEMENT WHICH IS OF A TYPE HAVING A LOW PARAFFIN CONTENT AND HIGH TEMPERATURE SMOKE POINT.

Building Systems Technologies, PLLC

NEBB Certification No. 3387

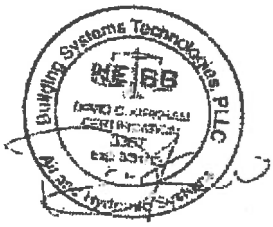
CERTIFIED TESTING, ADJUSTING, AND BALANCING REPORT

DATE: January 24, 2013

PROJECT: Yanke Machine Shop
Boise, Idaho

MECHANICAL CONTRACTOR: YMC, Inc.
Meridian, Idaho

ELEVATION: 2,842 Feet



The data presented in this report is a record of system measurements and final adjustments that have been obtained in accordance with the current edition of the NEBB Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

Any variances from design quantities, which exceed NEBB or specification tolerances are noted in the General Comments. Submission of this report fulfills our contractual obligations.

7198 W. Victory - Boise, ID 83709
office 208.362.5245 - fax 208.445.0801

www.bstcx.com

BST

Test and Balance - Cx

www.bstcx.com

DUCT TEST SHEET

BST PROJECT ID:	TBD	TEST DATE:	1-2013
READINGS BY:	MM & PM		
TEST APPARATUS:	Pitot Tube		

PROJECT: Yanke Machine Shop SYSTEM: Furnace

AREA SERVED	INLET			DESIGN AIRFLOW (CFM)	ACTUAL AIRFLOW (CFM)	% OF DESIGN	NOTES
	NO.	TYPE	SIZE				
West Furnace							
West Paint Booth	1	Duct	23" X 18"	--	5,585	--	
Totals				--	**5,585**	--	
East Furnace							
West Paint Booth	1	Duct	23" X 18"	--	1,205	--	
Totals				--	**1,205**	--	

7198 W. Victory - Boise, ID 83709
office 208.362.5245 - fax 208.445.0801

CERTIFIED PROFESSIONAL
Devin C. Kirkham

BST

Test and Balance - Cx

www.bstcx.com

AIR TEST SHEET

BST PROJECT ID:	TBD	TEST DATE:	1-2013
READINGS BY:	MM & PM		
TEST APPARATUS:	Pitot Tube		

PROJECT: Yankee Machine Shop **SYSTEM:** Exhaust

AREA SERVED	OUTLET			DESIGN AIRFLOW [CFM]	ACTUAL AIRFLOW [CFM]	% OF DESIGN	NOTES
	NO.	TYPE	SIZE				
Metal Lathing Fan							
Metal Lath. Hood	1	Duct	42" ø	--	12,990	--	
Totals				--	**12,990**	--	
Paint Booth Fan							
Paint Booth	1	Duct	32" X 20"	--	10,450	--	
Totals				--	**10,450**	--	
Sand Blast Fan							
Sand Blast Booth	1	Duct	34" ø	--	19,040	--	
Totals				--	**19,040**	--	

7198 W. Victory - Boise, ID 83709

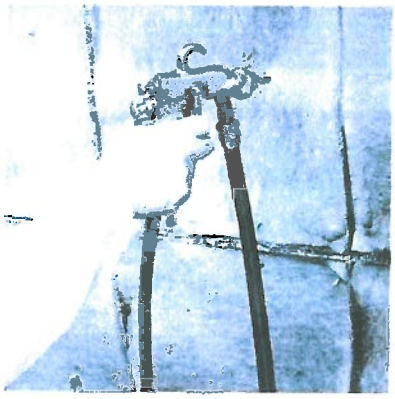
office 208.362.5245 - fax 208.445.0801

CERTIFIED PROFESSIONAL
David C. Kirkham

APPENDIX G

SPRAY GUN DATA

2100 . . . THE NEXT GENERAT



- Corrosion resistant stainless steel fluid passages designed for waterborne materials
- Curved, ergonomic handle reduces fatigue
- Integrated head has fewer parts for quick repair
- Stainless steel threads won't cross-thread, increasing life
- Lowered trigger pivot point reduces fatigue
- Cheater valve adjusts air at the gun, saving operator time
- New **"Maximum Delivery"** air nozzles have better atomization for greater product finish with less material

The 2100 spray gun is a durable, full-sized gun that is comfortable, well balanced, and easy to use. A specially designed grip measurably improves operator control, balance, and spray quality. Supported by the largest selection of air nozzles in the industry, the model 2100 will spray all conventional coatings, including those with high solids. The 2100 spray gun features a forged aluminum body that has been precision machined, and brass air nozzles and knobs that are nickel plated. These features ensure that the 2100 gun will withstand many years of use under the toughest working conditions.

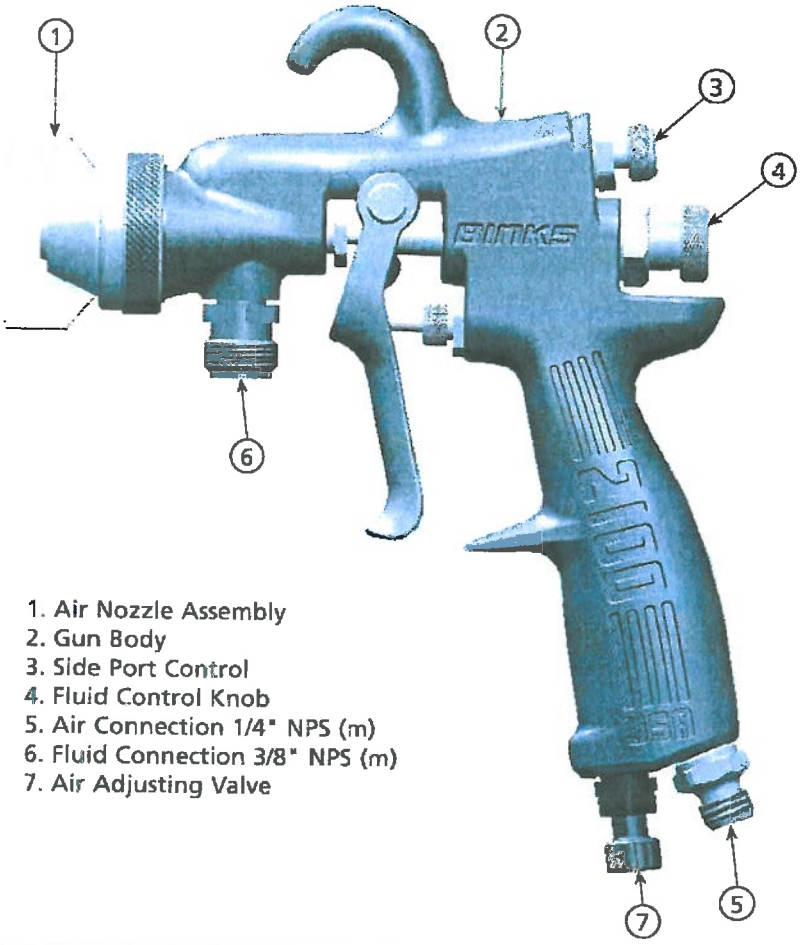
BINKS

Binks Model 2100™ SPRAY GUN

2100-XXXX-X

This gun is used mostly To spray primers & Enamels

Your new Binks spray gun is exceptionally rugged in construction, and is built to stand up under hard, continuous use. However, like any other fine precision instrument, its most efficient operation depends on a knowledge of its construction, operation, and maintenance. Properly handled and cared for, it will produce beautiful, uniform finishing results long after other spray guns have worn out.



1. Air Nozzle Assembly
2. Gun Body
3. Side Port Control
4. Fluid Control Knob
5. Air Connection 1/4" NPS (m)
6. Fluid Connection 3/8" NPS (m)
7. Air Adjusting Valve

TYPES OF INSTALLATION

SIPHON FEED CUP HOOKUP

Air pressure for atomization is regulated at extractor. The amount of fluid is adjusted by fluid control screw on gun. viscosity of paint, and air pressure (see figure 1).

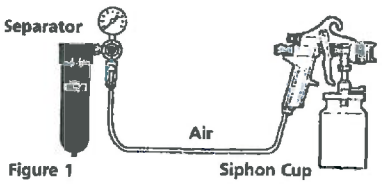


Figure 1

PRESSURE FEED CUP HOOKUP

For fine finishing with limited spraying.

Air pressure for atomization is regulated at extractor; fluid pressure at cup regulator. For heavy fluids and internal mix nozzle spraying, fluid adjusted by control screw on gun.

Pressure cup also available less regulator (see figure 2).

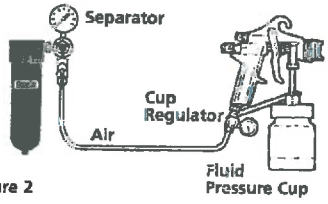


Figure 2

PRESSURE FEED TANK HOOKUP

For medium production spraying (single regulator).

Air pressure for atomization is regulated at extractor, fluid pressure at tank regulator (see figure 3).

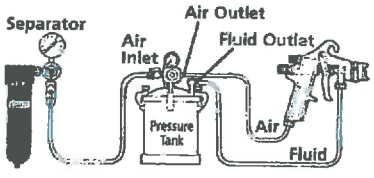


Figure 3

PRESSURE FEED TANK HOOKUP

For portable painting operations (double regulator).

Air pressure for atomization and fluid supply is regulated by two individual air regulators on tank (see figure 4).

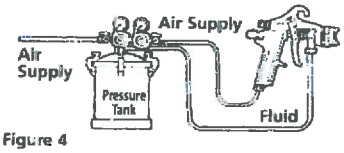


Figure 4

PRESSURE FEED CIRCULATING HOOKUP

For heavy production spraying.

Air pressure atomization regulated at extractor. Fluid pressure regulated at fluid regulator (see figure 5).

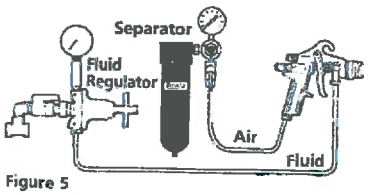
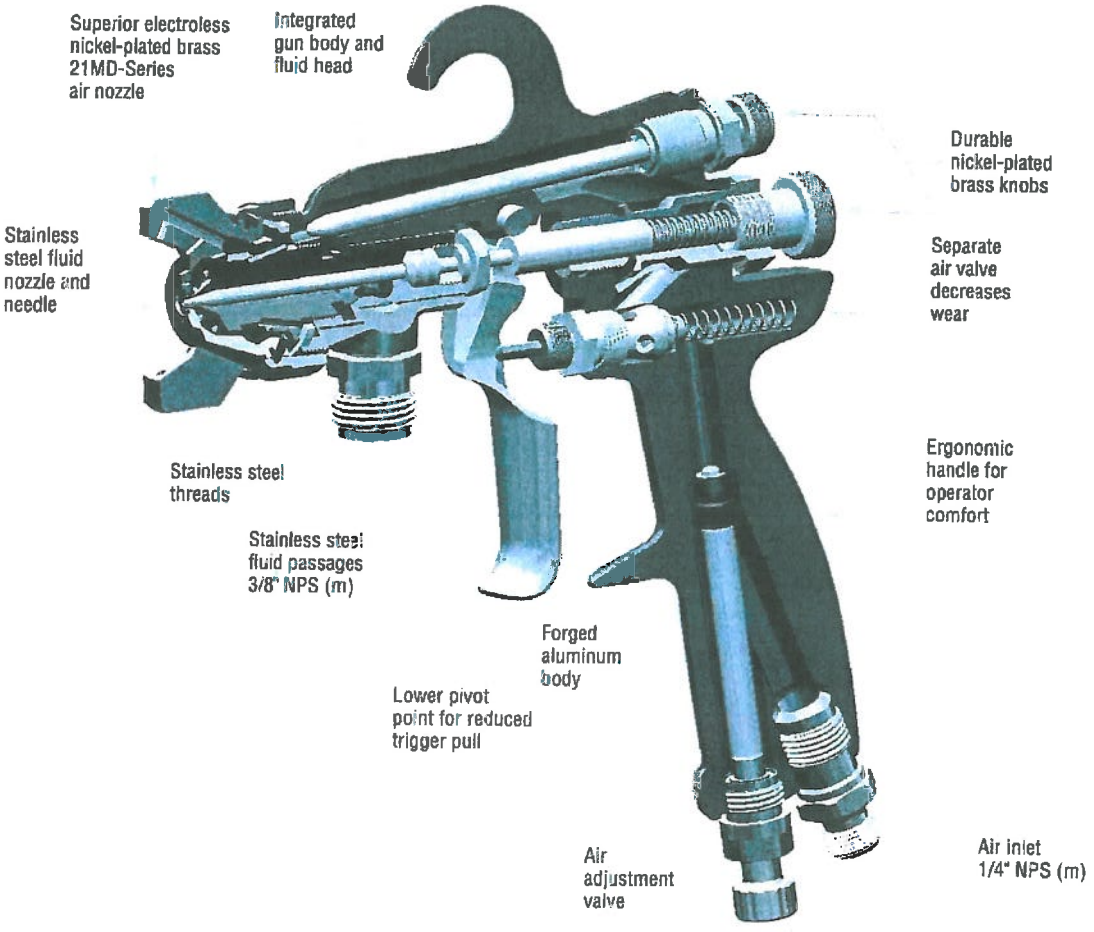


Figure 5

Replaces Part Sheet 77-2895R-6 | Part Sheet 77-2895R-7

ATION IN SPRAY GUN TECHNOLOGY.



Maximum Delivery Air Nozzles

Type of Fluid to be Sprayed	Air Nozzle	Type	CFM at			Max. Pattern @ 8"	Fluid Nozzle	Fluid Needle Numbers
			30 PSI	50 PSI	70 PSI			
VERY THIN TO MEDIUM 14-30 Sec. Zhan 2	46-21MD-1	SE	12	17.3	23	11"	66SS	565
VERY THIN TO MEDIUM 14-40 Sec. Zhan 2	46-21MD-2	SE	15.2	22.2	29.6	11"	66SS	565
	46-21MD-2	SE	12.5	18.3	24.4	13"	67SS	567
VERY THIN TO MEDIUM 14-30 Sec. Zhan 2	46-21MD-3	PE	11.6	16.6	22.2	16"	63BSS	563A

NOTE: 21MD-1 AND 21MD-2 air nozzles can be used with pressure set-ups producing spray patterns approximately 12" wide.
PE – Pressure External. SE – Siphon External

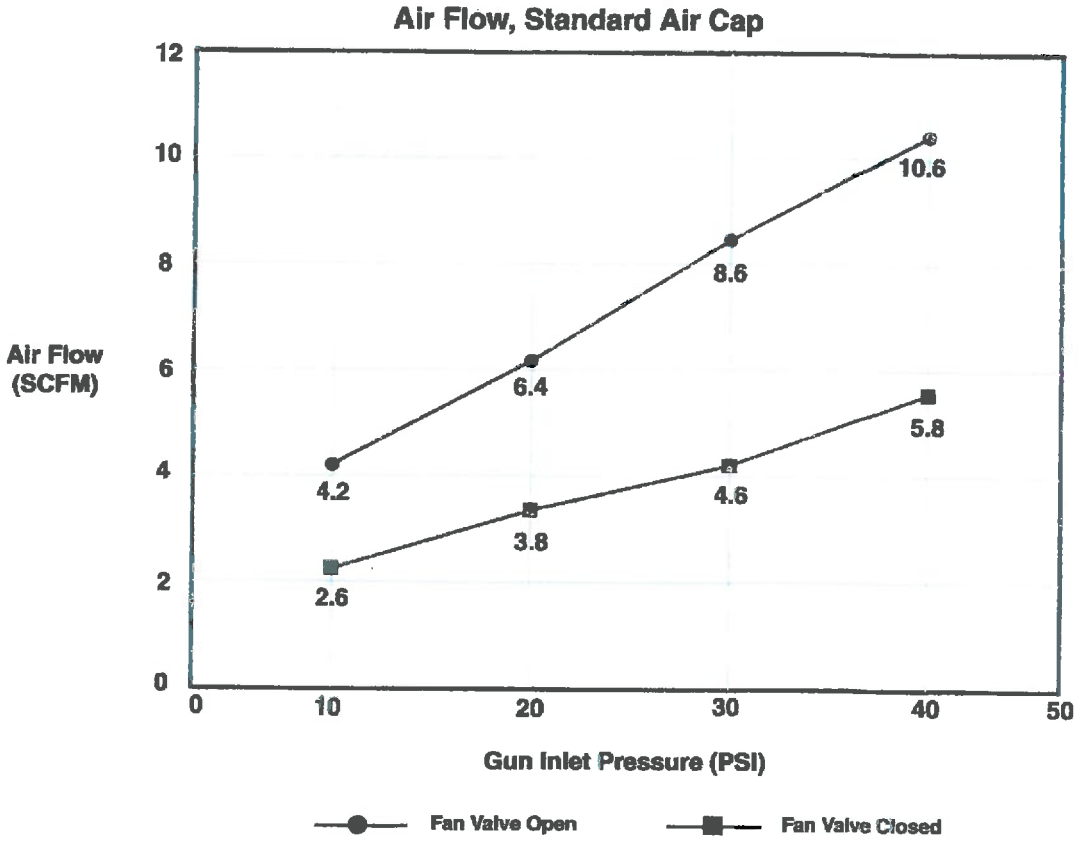
BINKS

For G40 AA Series Gun

Technical Data

Category	Data
Maximum Working Fluid Pressure	Model G15: 1500 psi (10 MPa, 105 bar) Model G40: 4000 psi (28 MPa, 280 bar)
Maximum Working Air Pressure	100 psi (0.7 MPa, 7 bar)
Maximum Gun Inlet Air Pressure for HVLP Operation	14 psi (0.098 MPa, 0.98 bar)
Maximum Working Fluid Temperature	110°F (43°C)
Fluid Inlet	1/4-18 npsm
Air Inlet	1/4-18 npsm (R1/4-19) compound male thread
Gun Weight	16 oz (450 grams)
*Sound Pressure at 20 psi (140 kPa, 1.4 bar)	66.9 dB(A)
*Sound Pressure at 100 psi (0.7 kPa, 7 bar)	80.0 dB(A)
*Sound Power at 20 psi (140 kPa, 1.4 bar)	76.8 dB(A)
*Sound Power at 100 psi (0.7 kPa, 7 bar)	89.9 dB(A)
Wetted Parts	Stainless Steel, Carbide, Ultra High Molecular Weight Polyethylene, Engineered Plastic, PTFE, Nylon, Fluoro-elastomer

* *All readings were taken with the fan valve fully closed (full fan size), at 20 psi (140 kPa, 1.4 bar) and 100 psi (0.7 kPa, 7 bar), and at the assumed operator position. Sound Power was tested to ISO 9614-2.*



APPENDIX H

PAINT MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheet

Date of issue 2 October 2012
Version 6

1. Product and company identification

Product name	: AMERLOCK 2/400 NEUTRAL TINT RESIN
Code	: AK2-T3/05
Supplier	: PPG Industries, Inc. One PPG Place Pittsburgh, PA 15272
Emergency telephone number	: (412) 434-4515 (U.S.) (514) 645-1320 (Canada) 01-800-00-21-400 (Mexico)
Technical Phone Number	: 888-977-4762

2. Hazards identification

Emergency overview : WARNING!

COMBUSTIBLE LIQUID AND VAPOR. CAUSES RESPIRATORY TRACT IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF INHALED OR SWALLOWED. MAY CAUSE EYE IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

Keep away from heat, sparks and flame. Do not breathe vapor or mist. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation	: May be harmful if inhaled. Severely irritating to the respiratory system. Can irritate eyes, nose, mouth and throat.
Ingestion	: May be harmful if swallowed.
Skin	: May cause an allergic skin reaction.
Eyes	: Moderately irritating to eyes.

Over-exposure signs/symptoms

Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing
Ingestion	: No specific data.
Skin	: Adverse symptoms may include the following: irritation redness
Eyes	: Adverse symptoms may include the following: irritation watering redness
Medical conditions aggravated by over-exposure	: Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Epoxy resin (MW < 700)	25068-38-6	40 - 70
Talc , not containing asbestiform fibres	14807-96-6	15 - 40
1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich	68515-49-1	1 - 5
1,2,4-trimethylbenzene	95-63-6	0.1 - 1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do NOT induce vomiting.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

Flammability of the product : Combustible liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous combustion products : Decomposition products may include the following materials:
carbon oxides
halogenated compounds
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Use spark-proof tools and explosion-proof equipment. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not breathe vapor or mist. Do not swallow. Do not get on skin or clothing. Avoid contact with eyes. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. Vapors are heavier than air and may spread along floors. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. If this material is part of a multiple component system, read the Material Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Do not store above the following temperature: 120F / 49C.

8 . Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	PPG
Talc , not containing asbestiform fibres	TWA	2 mg/m³ R	20 mppcf Z	2 mg/m³ R	2 mg/m³ R	Not established
1,2,4-trimethylbenzene	TWA	25 ppm	Not established	25 ppm	25 ppm	Not established
	STEL	Not established	Not established	Not established	35 ppm	Not established

Key to abbreviations

A = Acceptable Maximum Peak
ACGIH = American Conference of Governmental Industrial Hygienists.
C = Ceiling Limit
F = Fume
IPEL = Internal Permissible Exposure Limit
OSHA = Occupational Safety and Health Administration.
R = Respirable
Z = OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances
S = Potential skin absorption
SR = Respiratory sensitization
SS = Skin sensitization
STEL = Short term Exposure limit values
TD = Total dust
TLV = Threshold Limit Value
TWA = Time Weighted Average

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses with side shields.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check

appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	: Liquid.
Flash point	: Closed cup: 55°C (131°F)
Explosion limits	: Lower: 1.1%
Color	: Not available.
Odor	: Not available.
pH	: Not available.
Boiling/condensation point	: 37.78°C (>100°F)
Melting/freezing point	: Not available.
Specific gravity	: 1.41
Density (lbs / gal)	: 11.77
Vapor pressure	: 1.96 kPa (7.2 mm Hg) [room temperature]
Vapor density	: Not available.
Volatility	: 37% (v/v), 2.1% (w/w)
Evaporation rate	: 0.57 (butyl acetate = 1)
Partition coefficient: n-octanol/water	: Not available.
% Solid. (w/w)	: 87.9

10 . Stability and reactivity

Stability	: Stable under recommended storage and handling conditions (see Section 7).
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
Materials to avoid	: Reactive or incompatible with the following materials:,acids,oxidizing materials,strong alkalis
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Epoxy resin (MW < 700)	LD50 Oral	Rat	>2 g/kg	-
	LD50 Dermal	Rabbit	>2 g/kg	-
1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich	LD50 Oral	Rat	>60000 mg/kg	-
	LD50 Dermal	Rabbit	16000 mg/kg	-
1,2,4-trimethylbenzene	LD50 Oral	Rat	5 g/kg	-
	LC50 Inhalation	Rat	18000 mg/m3	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Target organs : Contains material which causes damage to the following organs: central nervous system (CNS).
Contains material which may cause damage to the following organs: upper respiratory tract.

12 . Ecological information

Environmental effects : Water polluting material. May be harmful to the environment if released in large quantities.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
1,2,4-trimethylbenzene	Acute LC50 7720 to 8280 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	1263	PAINT			
IMDG	1263	PAINT. Marine pollutant (Epoxy resin (MW < 700), Solvent naphtha (petroleum), light arom.)			
DOT	1263	PAINT			Remarks USA Only: Can be reclassified as Combustible Liquid. Non Bulk highway

15 . Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.
Australia inventory (AICS) : All components are listed or exempted.
Canada inventory (DSL) : All components are listed or exempted.
China inventory (IECSC) : All components are listed or exempted.
Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS) : All components are listed or exempted.

15 . Regulatory information

Korea inventory (KECI) : All components are listed or exempted.

New Zealand (NZIoC) : Substance Use Restricted

Philippines inventory (PICCS) : All components are listed or exempted.

United States

U.S. Federal regulations :

SARA 302/304/311/312 extremely hazardous substances: No products were found.

SARA 302/304 emergency planning and notification: No products were found.

SARA 302/304/311/312 hazardous chemicals: Talc , not containing asbestiform fibres

CERCLA: Hazardous substances.: n-butyl acetate: 5000 lbs. (2270 kg);

SARA 311/312 MSDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure
Epoxy resin (MW < 700)	25068-38-6	Y	N	N	N	N
Talc , not containing asbestiform fibres	14807-96-6	Y	N	N	N	N
1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich	68515-49-1	N	N	N	N	N
Product as-supplied :		Y	N	Y	N	N

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 2 Health : 2 Reactivity : 0

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 2 Flammability : 2 Physical hazards : 0

(*) - Chronic effects

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 2 Flammability : 2 Instability : 0

Date of previous issue : 1/18/2011.

Organization that prepared the MSDS : EHS

/ Indicates information that has changed from previously issued version.

Disclaimer

16 . Other information

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

Material Safety Data Sheet

Date of issue 5 August 2010
Version 2

1. Product and company identification

Product name : AMERCOAT 68HS POWDER
Code : AT68HS-P/05
Supplier : PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272
Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)
Technical Phone Number : (412) 492-5200 (ALLISON PARK, PA) 8:00 a.m. - 5:00 p.m. EST

2. Hazards identification

Emergency overview : DANGER!

MAY FORM EXPLOSIVE DUST-AIR MIXTURES. MAY BE HARMFUL IF INHALED OR SWALLOWED. SANDING AND GRINDING DUSTS MAY BE HARMFUL IF INHALED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Keep away from heat, sparks and flame. Prevent dust accumulation. Do not breathe dust. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.
Ingestion : May be harmful if swallowed.
Skin : No known significant effects or critical hazards.
Eyes : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
Ingestion : No specific data.
Skin : No specific data.
Eyes : Adverse symptoms may include the following:
irritation
redness

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (section 11)

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3. Composition/information on ingredients

Name	CAS number	%
Zinc powder - zinc dust (stabilized)	7440-66-6	60 - 100

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Fine dust clouds may form explosive mixtures with air. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

Use approved Class D extinguisher or smother with dry sand, dry clay or dry ground limestone. Do not use water.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous combustion products : Decomposition products may include the following materials: metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

6 . Accidental release measures

Large spill : Move containers from spill area. Approach release from upwind. Use spark-proof tools and explosion-proof equipment. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Do not swallow. Avoid breathing dust. Avoid contact with eyes, skin and clothing. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses with side shields.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Respiratory : If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

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8 . Exposure controls/personal protection

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Solid.
Flash point : Closed cup: Not applicable.
Color : Not available.
Odor : Not available.
pH : Not available.
Boiling/condensation point : Not available.
Melting/freezing point : Not available.
Specific gravity : 7.13
Density (lbs / gal) : 59.5
Vapor pressure : 0 kPa (0 mm Hg)
Vapor density : Not available.
Volatility : 0% (v/v), 0% (w/w)
Odor threshold : Not available.
Evaporation rate : 0 (butyl acetate = 1)
Octanol/water partition coefficient : Not available.
% Solid. (w/w) : 100

10 . Stability and reactivity

Stability : The product may not be stable under certain conditions of storage or use.
Conditions to avoid : Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Avoid increased storage temperature. Pressure hazard
Materials to avoid : Reactive or incompatible with the following materials:,water,acids,oxidizing materials,strong alkalis
Hazardous decomposition products : Evolves hydrogen on contact with water.
Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity
Conclusion/Summary : Not available.
Chronic toxicity
Conclusion/Summary : Not available.

Target organs : Contains material which may cause damage to the following organs: skin.
Carcinogenicity

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11 . Toxicological information

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity

Teratogenicity : No known significant effects or critical hazards.

Reproductive toxicity

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

12 . Ecological information

Environmental effects : Water polluting material. May be harmful to the environment if released in large quantities.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Zinc powder - zinc dust (stabilized)	Acute LC50 0.24 mg/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	Acute LC50 68 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	3077	Environmentally hazardous substance, solid, n.o.s.	9	III	-
IMDG	3077	Environmentally hazardous substance, solid, n.o.s.. Marine pollutant (Zinc powder - zinc dust (stabilized))	9	III	Marine pollutant
DOT	3077	Environmentally hazardous substance, solid, n.o.s.	9	III	Marine pollutant

PG* : Packing group

Reportable quantity RQ : CERCLA: Hazardous substances.: Zinc powder - zinc dust (stabilized): 1000 lbs. (454 kg);

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15 . Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.
Australia inventory (AICS) : All components are listed or exempted.
Canada inventory (DSL) : All components are listed or exempted.
China inventory (IECSC) : All components are listed or exempted.
Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS) : All components are listed or exempted.
Korea inventory (KECI) : All components are listed or exempted.
New Zealand (NZIoC) : All components are listed or exempted.
Philippines inventory (PICCS) : All components are listed or exempted.

United States

U.S. Federal regulations : **TSCA 12(b) annual export notification**: No products were found.
TSCA 12(b) one-time export: No products were found.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Zinc powder - zinc dust (stabilized)
CERCLA: Hazardous substances.: Zinc powder - zinc dust (stabilized): 1000 lbs. (454 kg);

SARA 311/312 MSDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure
Zinc powder - zinc dust (stabilized)	7440-66-6	N	N	N	Y	N
Product as-supplied :		N	N	N	Y	N

SARA 313

Supplier notification	Chemical name	CAS number	Concentration
:	Zinc powder - zinc dust (stabilized)	7440-66-6	60 - 100

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

Canada

WHMIS (Canada) : Class B-6: Reactive flammable material

Mexico

Classification

Flammability : 0 **Health** : 1 **Reactivity** : 1

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 1 **Flammability** : 0 **Physical hazards** : 1
(*) - Chronic effects

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 1 **Flammability** : 0 **Instability** : 1

Date of previous issue : **2/25/2010.**

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16 . Other information

Organization that prepared the MSDS : EHS

Indicates information that has changed from previously issued version.

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

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Chemical Safety Data Sheet

Date of issue 7 August 2010
Version 4

Section 1. Chemical product and company identification

Code : AT65/20L-C1

Product name : AMERCOAT 65 THINNER

Product use : Coating. Paint. Painting-related materials.

Manufacturer : PPG Coatings (Tianjin) Co., Ltd
Tianjin Economic Technological Development Area (TEDA)
192 Huanghai Road, Tianjin 300457, P.R. China
Tel: 8622 2532 3470
Fax: 022-25325183

National Emergency Phone Number : 0532-83889090

Section 2. Composition, information on ingredients

Substance/preparation : Preparation

Chemical name	Concentration	CAS No.
xylene	50 - 100	1330-20-7
ethylbenzene	12.5 - 15	100-41-4

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Section 3. Hazards identification

Health hazards : Harmful by inhalation and in contact with skin.
Irritating to skin.

Physical/chemical hazards : Flammable.

Section 4. First aid measures

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Section 5. Fire-fighting measures

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

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Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous combustion products : Decomposition products may include the following materials:
carbon oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

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Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Chemical name	Exposure limits
xylene	**GBZ-2 (China, 4/2007).** PC-STEL: 100 mg/m³, 0 times per shift, 15 minute(s). PC-TWA: 50 mg/m³, 0 times per shift, 8 hour(s).
ethylbenzene	**GBZ-2 (China, 4/2007).** PC-STEL: 150 mg/m³, 0 times per shift, 15 minute(s). PC-TWA: 100 mg/m³, 0 times per shift, 8 hour(s).

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances.

Exposure controls

Occupational exposure controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye protection : Safety glasses with side shields.

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Gloves : For prolonged or repeated handling, use the following type of gloves:

Recommended: foil, fluor rubber

Respiratory protection : If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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Environmental exposure controls	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Section 9. Physical and chemical properties

Physical state	: Liquid.
Boiling point	: >37.78°C (>100°F)
Relative density	: 0.86
Flash point	: Closed cup: 25°C (77°F)
Volatility	: 100% (w/w)
Material supports combustion.	: Yes.

Section 10. Stability and reactivity

Stability	: Stable under recommended storage and handling conditions (see section 7).
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
Materials to avoid	: Reactive or incompatible with the following materials: oxidizing materials
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Potential acute health effects

Inhalation	: Harmful by inhalation.
Ingestion	: Irritating to mouth, throat and stomach.
Skin contact	: Harmful in contact with skin. Irritating to skin.
Eye contact	: May cause eye irritation.

Potential chronic health effects

Over-exposure signs/symptoms

Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness and nausea and may lead to unconsciousness or death. Inhalation of high concentrations of vapor may affect the central nervous system.

Target organs	: Contains material which causes damage to the following organs: brain. Contains material which may cause damage to the following organs: blood, kidneys, liver, gastrointestinal tract, upper respiratory tract, skin, eyes, central nervous system (CNS).

Section 12. Ecological information

Environmental effects	: No known significant effects or critical hazards.
Mobility	: Not available.
Other adverse effects	: No known significant effects or critical hazards. Do not allow to enter drains or watercourses.

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Section 13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

The classification of the product may meet the criteria for a hazardous waste.Disposal should be in accordance with applicable regional, national and local laws and regulations.
Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

Section 14. Transport information

UN number	:1263
Proper shipping name	:Paint.
Package mark	:3
Packing group	:III

Section 15. Regulatory information

China inventory (IECSC)	: All components are listed or exempted.
Australia inventory (AICS)	: All components are listed or exempted.
Canada inventory (DSL)	: All components are listed or exempted.
Europe inventory (REACH)	: Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS)	: All components are listed or exempted.
Korea inventory (KECI)	: All components are listed or exempted.
Philippines inventory (PICCS)	: All components are listed or exempted.
United States inventory (TSCA 8b)	: All components are listed or exempted.

Authored with regard to:
- "Classification and Mark for commonly used dangerous chemicals" (GB13690-1992)
- "General rules for preparation of a Chemical Safety Data Sheet" (GB16483-2000)
- "The principle of classification of transport packaging groups of dangerous goods" (GB/T15098-94)
- "Classification and code of dangerous goods" (GB6944-2005)

Section 16. Other information

Date of printing : **8/7/2010.**
Prepared by EHS
Verified by EHS
▼ Indicates information that has changed from previously issued version.

Notice to reader
The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

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Material Safety Data Sheet

Date of issue 18 May 2011
Version 6

1. Product and company identification

Product name : AMERCOAT 65 THINNER
Code : AT765/05
Supplier : PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272

Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)

Technical Phone Number : (412) 492-5200 (ALLISON PARK, PA) 8:00 a.m. - 5:00 p.m. EST

2. Hazards identification

Emergency overview : DANGER!

FLAMMABLE LIQUID AND VAPOR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF INHALED, ABSORBED THROUGH SKIN OR SWALLOWED. ASPIRATION HAZARD. CAN ENTER LUNGS AND CAUSE DAMAGE. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

Keep away from flames, such as a pilot light, and any object that sparks, such as an electric motor. Keep away from heat. Do not smoke. Do not swallow. Avoid breathing vapor or mist. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled. Irritating to respiratory system. Can irritate eyes, nose, mouth and throat.

Ingestion : May be harmful if swallowed. Aspiration hazard if swallowed. Can enter lungs and cause damage.

Skin : Harmful in contact with skin. Irritating to skin.

Eyes : Irritating to eyes.

Over-exposure signs/symptoms

Repeated exposure to high vapor concentrations may cause irritation of the respiratory system and permanent brain and nervous system damage. Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness and nausea and may lead to unconsciousness or death. There is some evidence that repeated exposure to organic solvent vapors in combination with constant loud noise can cause greater hearing loss than expected from exposure to noise alone.

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Xylene	1330-20-7	60 - 100
ethylbenzene	100-41-4	10 - 30
Toluene	108-88-3	0.1 - 1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

Flammability of the product : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous combustion products : Decomposition products may include the following materials:
carbon oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Powered by

6 . Accidental release measures

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Use spark-proof tools and explosion-proof equipment. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Do not swallow. Do not get in eyes or on skin or clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. Vapors are heavier than air and may spread along floors. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. If this material is part of a multiple component system, read the Material Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Do not store above the following temperature: 120F / 49C.

8 . Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	PPG
Xylene	TWA	100 ppm	100 ppm	100 ppm	100 ppm	Not established
	STEL	150 ppm	Not established	150 ppm	150 ppm	Not established
ethylbenzene	TWA	100 ppm	100 ppm	100 ppm	100 ppm	Not established
	STEL	125 ppm	Not established	125 ppm	125 ppm	Not established
Toluene	TWA	20 ppm	200 ppm Z	20 ppm	50 ppm S	Not established
	STEL	Not established	500 ppm Z A 300 ppm Z C	Not established	Not established	Not established

Key to abbreviations

A Acceptable Maximum Peak

S Potential skin absorption

8 . Exposure controls/personal protection

ACGIH	= American Conference of Governmental Industrial Hygienists.	SR	= Respiratory sensitization
C	= Ceiling Limit	SS	= Skin sensitization
F	= Fume	STEL	= Short term Exposure limit values
IPEL	= Internal Permissible Exposure Limit	TD	= Total dust
OSHA	= Occupational Safety and Health Administration.	TLV	= Threshold Limit Value
R	= Respirable	TWA	= Time Weighted Average
Z	= OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances		

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses with side shields.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Gloves : For prolonged or repeated handling, use the following type of gloves:

Recommended: foil, fluor rubber

Respiratory : If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Liquid.

Flash point : Closed cup: 27.22°C (81°F) [Product does not sustain combustion.]

Explosion limits : Lower: 1%

Color : Not available.

Odor : Not available.

pH : Not available.

Boiling/condensation point : >37.78°C (>100°F)

Melting/freezing point : Not available.

Specific gravity : 0.87

Density (lbs / gal) : 7.26

Vapor pressure : 0.65 kPa (4.9 mm Hg) [20°C]

Vapor density : Not available.

Volatility : 100% (v/v), 100% (w/w)

9 . Physical and chemical properties

Evaporation rate : 63 (butyl acetate = 1)

Partition coefficient: n-octanol/water : Not available.

% Solid. (w/w) : 0

10 . Stability and reactivity

Stability : Stable under recommended storage and handling conditions (see section 7).

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Materials to avoid : Reactive or incompatible with the following materials:,oxidizing materials,strong acids,strong alkalis

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Xylene	LD50 Oral	Rat	4.3 g/kg	-
	LD50 Dermal	Rabbit	>1.7 g/kg	-
	LC50 Inhalation Vapor	Rat	5000 ppm	4 hours
ethylbenzene	LD50 Oral	Rat	3.5 g/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LC50 Inhalation Vapor	Rat	4000 ppm	4 hours
Toluene	LD50 Oral	Rat	636 mg/kg	-
	LD50 Dermal	Rabbit	8.39 g/kg	-
	LC50 Inhalation	Rat	49 g/m3	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Defatting irritant : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

Target organs : Contains material which causes damage to the following organs: brain.
Contains material which may cause damage to the following organs: blood, kidneys, liver, gastrointestinal tract, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

Carcinogenicity

Carcinogenicity : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Xylene	A4	3	-	-	-	-
ethylbenzene	A3	2B	-	-	-	-
Toluene	A4	3	-	-	-	-

Developmental effects : Contains material which may cause developmental abnormalities, based on animal data.

Fertility effects : Contains material which may impair female fertility, based on animal data.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Xylene	Acute LC50 3300 to 4093 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
ethylbenzene	Acute LC50 4200 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	Acute LC50 5100 to 5700 ug/L Marine water	Fish - Atlantic silverside - Menidia menidia	96 hours
	Acute EC50 2930 to 4400 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC 3300 ug/L Marine water	Fish - Atlantic silverside - Menidia menidia	96 hours
	Chronic NOEC 6800 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
Toluene	Acute LC50 5800 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	Acute EC50 6000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC 28000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	1307	XYLENES	3	III	-
IMDG	1307	XYLENES	3	III	-
DOT	1307	XYLENES	3	III	-

PG* : Packing group

14 . Transport information

Reportable quantity RQ : CERCLA: Hazardous substances.: Toluene: 1000 lbs. (454 kg); ethylbenzene: 1000 lbs. (454 kg); xylene: 100 lbs. (45.4 kg);

15 . Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.
Australia inventory (AICS) : All components are listed or exempted.
Canada inventory (DSL) : All components are listed or exempted.
China inventory (IECSC) : All components are listed or exempted.
Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS) : All components are listed or exempted.
Korea inventory (KECI) : All components are listed or exempted.
New Zealand (NZIoC) : All components are listed or exempted.
Philippines inventory (PICCS) : All components are listed or exempted.

United States

U.S. Federal regulations :

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: ethylbenzene; xylene
CERCLA: Hazardous substances.: Toluene: 1000 lbs. (454 kg); ethylbenzene: 1000 lbs. (454 kg); xylene: 100 lbs. (45.4 kg);

SARA 311/312 MSDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure
Xylene	1330-20-7	Y	N	Y	N	N
ethylbenzene	100-41-4	Y	Y	Y	N	N
Toluene	108-88-3	Y	Y	Y	N	N
Product as-supplied :		Y	Y	Y	N	N

SARA 313 Supplier notification :

Chemical name	CAS number	Concentration
Xylene	1330-20-7	60 - 100
ethylbenzene	100-41-4	10 - 30

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Canada

WHMIS (Canada) : Class B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 3 Health : 2 Reactivity : 0

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 2 * Flammability : 3 Physical hazards : 0
(*) - Chronic effects

16 . Other information

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 2 Flammability : 3 Instability : 0

Date of previous issue : 3/2/2011.

Organization that prepared the MSDS : EHS

☑ Indicates information that has changed from previously issued version.

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet conforms to the requirements of ANSI Z400.1.
THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (HAZARD COMMUNICATION STANDARD)
IMPORTANT: Read this MSDS before handling & disposing of this product.
Pass this information on to employees, customers, & users of this product.

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

PRODUCT IDENTITY: **CROWN XYLOL (XYLENE)**
COMPANY IDENTITY: PACKAGING SERVICE CO., INC.
COMPANY ADDRESS: 1904 MYKAWA ROAD / P O Box 875
COMPANY CITY: PEARLAND, TX 77581
COMPANY PHONE: 1-281-485-1458
CHEMTREC PHONE: 1-800-424-9300

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

CONTAINS: 75-85% MIXED XYLENES (1330-20-7) [215-535-7],
15-25% ETHYLBENZENE (100-41-4) [202-849-4]
Number in parentheses is CAS #, number in brackets is European EC #.

SECTION 3. HAZARDS IDENTIFICATION

RISK STATEMENTS:
Flammable Liquid
R36/37/38 Irritating to eyes, respiratory system and skin.
R20/65 Harmful by inhalation may cause lung damage if swallowed.

SAFETY STATEMENTS:
S16 Keep away from sources of ignition. No smoking.
S29 Do not empty into drains.
S24/25 Avoid contact with skin and eyes.

SECTION 4. FIRST AID MEASURES

EYE CONTACT:
For eyes, flush with plenty of water for 15 minutes & get medical attention.

SKIN CONTACT:
In case of contact with skin immediately remove contaminated clothing.
Wash thoroughly with soap & water. Wash contaminated clothing before reuse.

INHALATION:
After high vapor exposure, remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped give artificial respiration.

SWALLOWING:
If swallowed, CALL A PHYSICIAN IMMEDIATELY! Do NOT induce vomiting. Have patient lie down & keep warm. Vomiting may lead to pneumonitis, which may be fatal.

XYL001

SECTION 5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA:
NFPA Class B extinguishers (Carbon Dioxide or foam) for Class I C liquid fires.

SPECIAL FIRE FIGHTING PROCEDURES:
Water spray may be ineffective on fire but can protect fire fighters & cool closed containers. Use fog nozzles if water is used.
Do not enter confined fire-space without full bunker gear.
(Helmet with face shield, bunker coats, gloves & rubber boots).
Use NIOSH approved positive-pressure self-contained breathing apparatus.

UNUSUAL EXPLOSION AND FIRE PROCEDURES
FLAMMABLE!! VAPORS CAN CAUSE FLASH FIRE
Keep container tightly closed.
Isolate from oxidizers, heat, sparks, electric equipment & open flame.
Closed containers may explode if exposed to extreme heat.
Applying to hot surfaces requires special precautions.
Empty container very hazardous! Continue all label precautions!

SECTION 6. ACCIDENTAL RELEASE MEASURES

CONTAINMENT TECHNIQUES:
Stop spill at source. Dike area & contain.

CLEAN-UP PROCEDURES:
Clean up remainder with absorbent materials. Mop up & dispose of. Persons without proper protection should be kept from area until cleaned up.

SECTION 7. HANDLING AND STORAGE

HANDLING:
Isolate from oxidizers, heat, sparks, electric equipment & open flame.
Use only with adequate ventilation. Avoid breathing of vapor or spray mist.
Avoid prolonged or repeated contact with skin.
Wear OSHA Standard goggles or face shield. Consult Safety Equipment Supplier.
Wear gloves, apron & footwear impervious to this material. Wash clothing before reuse.
Avoid free fall of liquid. Ground containers when transferring. Do not flame cut, saw, drill, braze, or weld. Empty container very hazardous! Continue all label precautions!

STORAGE:
Do not store above 49 C/120 F. Store large amounts in structures made for OSHA Class I C liquids Keep container tightly closed & upright when not in use to prevent leakage.
OSHA Class I C liquids

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

EXPOSURE CONTROLS
Ventilate to keep vapors of this material below 50 ppm.
If over TLV, in accordance with 29 CFR 1910.134, use NIOSH approved positive-pressure self-contained breathing apparatus.
Consult Safety Equipment Supplier. Use explosion-proof equipment.

VENTILATION:

LOCAL EXHAUST	: Necessary
MECHANICAL (GENERAL)	: Acceptable
SPECIAL	: None
OTHER	: None

PERSONAL PROTECTIONS:
Wear OSHA Standard goggles or face shield. Consult Safety Equipment Supplier.
Wear gloves, apron & footwear impervious to this material. Wash clothing before reuse.

WORK & HYGIENIC PRACTICES:
Provide readily accessible eye wash stations & safety showers.
Wash at end of each workshift & before eating, smoking or using the toilet.
Promptly remove clothing that becomes contaminated. Destroy contaminated leather articles. Launder or discard contaminated clothing.

SECTION 9. PHYSICAL DATA

APPEARANCE:		Liquid, Water-White
ODOR:		Aromatic
BOILING RANGE:	136 140 142 C /	278 284 288 F
AUTO IGNITION TEMPERATURE:	510 C /	950 F (Lowest Component)
LOWER FLAMMABLE LIMIT IN AIR (% by vol):	1.1	
FLASH POINT (TEST METHOD):	27 C /	81 F (TCC)
FLAMMABILITY CLASSIFICATION: Class I C		
GRAVITY @ 60 F:		
API:		31.1
SPECIFIC GRAVITY (Water=1):		.870
POUNDS/GALLON:		7.247
VOC'S (>0.44 Lbs/Sq In):	100.1 Vol. % /	871.0 g/L / 7.255 Lbs/Gal
TOTAL VOC'S (TVOC):	100.0 Vol. % /	870.0 g/L / 7.247 Lbs/Gal
NONEXEMPT VOC'S (CVOC):	100.0 Vol. % /	870.0 g/L / 7.247 Lbs/Gal
HAZARDOUS AIR POLLUTANTS (HAPS):	100.0 Wt. % /	870.0 g/L / 7.247 Lbs/Gal
VAPOR PRESSURE (mm of Hg)@20 C		6.4
NONEXEMPT VOC PARTIAL PRESSURE (mm of Hg @ 20 C)		6.4
VAPOR DENSITY (air=1):		3.7
WATER ABSORPTION:		Negligible
REFRACTIVE INDEX:		1.496

SECTION 10. STABILITY & REACTIVITY

STABILITY:
Stable

CONDITIONS TO AVOID:
Isolate from oxidizers, heat, sparks, electric equipment & open flame.

MATERIALS TO AVOID:
Isolate from strong oxidizers such as permanganates, chromates & peroxides.

HAZARDOUS DECOMPOSITION PRODUCTS:
Carbon Monoxide, Carbon Dioxide from burning.

HAZARDOUS POLYMERIZATION:
Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

MATERIAL	CAS #	TWA (OSHA)	TLV (ACGIH)	HAP
Mixed Xylenes	1330-20-7	100 ppm	100 ppm A4	Yes
Ethylbenzene	100-41-4	100 ppm	100 ppm A3	Yes

In addition to EPA Hazardous Air Pollutants showing `Yes' under "HAP" above, using manufacturers' data, based on EPA Method 311, the following EPA Hazardous Air Pollutants may be present in trace amounts (less than 0.1%):
Benzene, Toluene, Cumene

SECTION 11. TOXICOLOGICAL INFORMATION (CONTINUED)

MATERIAL	CAS #	CEILING	STEL (OSHA/ACGIH)
Mixed Xylenes	1330-20-7	None Known	150 ppm
Ethylbenzene	100-41-4	None Known	125 ppm

ACUTE HAZARDS

EYE & SKIN CONTACT:
Primary irritation to skin, defatting, dermatitis.
Absorption thru skin increases exposure.
Primary irritation to eyes, redness, tearing, blurred vision.
Liquid can cause eye irritation. Wash thoroughly after handling.

INHALATION:
Anesthetic. Irritates respiratory tract. Acute overexposure can cause serious nervous system depression. Vapor harmful.
Acute overexposure can cause damage to kidneys, blood, nerves, liver & lungs.

SWALLOWING:
Harmful or fatal if swallowed.
Swallowing can cause abdominal irritation, nausea, vomiting & diarrhea.

SUBCHRONIC HAZARDS/CONDITIONS AGGREVATED

CONDITIONS AGGREVATED:
Chronic overexposure can cause damage to kidneys, blood, nerves, liver & lungs.
Persons with severe skin, liver or kidney problems should avoid use.

CHRONIC HAZARDS

CANCER, REPRODUCTIVE & OTHER CHRONIC HAZARDS:
Potential Cancer Hazard based on tests with laboratory animals using Ethylbenzene.
Overexposure may create cancer risk.
Leukemia been reported in humans from Benzene.
This product may contain less than 100 ppm of Benzene.
Not considered hazardous in such low concentrations.
Absorption thru skin may be harmful. Studies with laboratory animals indicate this product can cause damage to fetus.

SECTION 12. ECOLOGICAL INFORMATION

MAMMALIAN INFORMATION:

MATERIAL	CAS #	LOWEST KNOWN LETHAL DOSE DATA
		LOWEST KNOWN LD50 (ORAL)
Xylene	1330-20-7	4000.0 mg/kg(Rats)
		LOWEST KNOWN LC50 (VAPORS)
Xylene	1330-20-7	5000 ppm (Mice)

AQUATIC ANIMAL INFORMATION:
The most sensitive known marine group to any component of this product is:
Fish are adversely affected by components of this product.

MOBILITY:
This material is a mobile liquid.

DEGRADABILITY:
This product is non-biodegradable.

ACCUMULATION:
This product does not accumulate or biomagnify in the environment.

SECTION 13. DISPOSAL CONSIDERATIONS

Recycle / dispose of observing national, regional, state, provincial and local health, safety & pollution laws.
If questions exist, contact the appropriate agencies.

SECTION 14. TRANSPORT INFORMATION

DOT SHIPPING NAME: Xylene, 3, UN1307, PG III
DRUM LABEL: (FLAMMABLE LIQUID)
IATA / ICAO: Xylene, 3, UN1307, PG III
IMO / IMDG: Xylene, 3, UN1307, PG III

If >125 pounds of this product is in one container, the RQ is exceeded.

EMERGENCY RESPONSE GUIDEBOOK NUMBER: 130

SECTION 15. REGULATORY INFORMATION

STATE REQULATIONS:
CALIFORNIA PROPOSITION 65: This product contains the following chemical known to the State of California to cause cancer: Ethylbenzene

SECTION 15. REGULATORY INFORMATION (CONTINUED)

EPA REGULATIONS:

SARA SECTION 311/312 HAZARDS: Acute Health, Fire
All components of this product are on the TSCA list.
SARA Title III Section 313 Supplier Notification
This product contains the indicated <*> toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning & Community Right-To-Know Act of 1986 & of 40 CFR 372. This information must be included in all MSDSs that are copied and distributed for this material.

SARA TITLE III INGREDIENTS	CAS#	WT. % (REG. SECTION)	RQ (LBS)
*Mixed Xylenes	1330-20-7	<90 (311,312,313,RCRA)	100
*Ethylbenzene	100-41-4	<30 (311,312,313,RCRA)	None

IF > 125 POUNDS OF THIS PRODUCT IS IN ONE CONTAINER THE "RQ" OF XYLENE IS EXCEEDED.

INTERNATIONAL REGULATIONS:
The components of this product are listed on the chemical inventories of the following countries:
Australia, Canada, Europe (EINECS), Japan, Korea, United Kingdom.

SECTION 16. OTHER INFORMATION

HAZARD RATINGS:
HEALTH (NFPA): 2
HEALTH (HMIS): 2
FLAMMABILITY: 3
REACTIVITY: 0

This information is intended solely for the use of individuals trained in the NFPA & HMIS hazard rating systems.

EMPLOYEE TRAINING:
Employees should be made aware of all hazards of this material (as stated in this MSDS) before handling it.

NOTICE

The supplier disclaims all expressed or implied warranties of merchantability or fitness for a specific use, with respect to the product or the information provided herein, except for conformation to contracted specifications.
All information appearing herein is based upon data obtained from manufacturers and/or recognized technical sources. While the information is believed to be accurate, we make no representations as to its accuracy or sufficiency. Conditions of use are beyond our control, and therefore users are responsible for verifying the data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product. Users also assume all risks in regards to the publication or use of, or reliance upon, information contained herein.
This information relates only to the product designated herein, and does not relate to its use in combination with any other material or process.

MATERIAL SAFETY DATA SHEET

XYLENE/SW
09 00

DATE OF PREPARATION
Nov 19, 2010

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
XYLENE/SW
PRODUCT NAME
Xylene (Xylol)
MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units		Vapor Pressure
15	100-41-4	**Ethylbenzene**			
			ACGIH TLV	100 PPM	7.1 mm
			ACGIH TLV	125 PPM STEL	
			OSHA PEL	100 PPM	
			OSHA PEL	125 PPM STEL	
85	1330-20-7	**Xylene**			
			ACGIH TLV	100 PPM	5.9 mm
			ACGIH TLV	150 PPM STEL	
			OSHA PEL	100 PPM	
			OSHA PEL	150 PPM STEL	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

HMIS Codes

Health	2*
Flammability	3
Reactivity	0

EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.
Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:
- the liver
- the urinary system
- the reproductive system

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.

CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
80 °F PMCC	1.0	7.0	RED LABEL – Flammable, Flash below 100 °F (38 °C)

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode when exposed to extreme heat.
Application to hot surfaces requires special precautions.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY
DOL Storage Class IC
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Contents are FLAMMABLE. Keep away from heat, sparks, and open flame.
During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
Consult NFPA Code. Use approved Bonding and Grounding procedures.
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
PROTECTIVE GLOVES
Wear gloves which are recommended by glove supplier for protection against materials in Section 2.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.
OTHER PRECAUTIONS
Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	7.17 lb/gal	859 g/l
SPECIFIC GRAVITY	0.86	
BOILING POINT	277 - 292 °F	136 - 144 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	100%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

7.17 lb/gal	859 g/l	Less Water and Federally Exempt Solvents
7.17 lb/gal	859 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

Ethylbenzene is classified by IARC as possibly carcinogenic to humans (2B) based on inadequate evidence in humans and sufficient evidence in laboratory animals. Lifetime inhalation exposure of rats and mice to high ethylbenzene concentrations resulted in increases in certain types of cancer, including kidney tumors in rats and lung and liver tumors in mice. These effects were not observed in animals exposed to lower concentrations. There is no evidence that ethylbenzene causes cancer in humans.

TOXICOLOGY DATA

CAS No.	Ingredient Name			
100-41-4	Ethylbenzene			
		LC50 RAT	4HR	Not Available
		LD50 RAT		3500 mg/kg
1330-20-7	Xylene			
		LC50 RAT	4HR	5000 ppm
		LD50 RAT		4300 mg/kg

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

US Ground (DOT)

1 Gallon and Less may be Classed as CONSUMER COMMODITY, ORM-D

Larger Containers are Regulated as:

UN1307, XYLENES, 3, PG III, (ERG#130)

DOT (Dept of Transportation) Hazardous Substances & Reportable Quantities

Ethyl benzene 1000 lb RQ

Xylenes (isomers and mixture) 100 lb RQ

Bulk Containers may be Shipped as (check reportable quantities):
RQ, UN1307, XYLENES, 3, PG III, (XYLENES (ISOMERS AND MIXTURE)), (ERG#130)
Canada (TDG)
UN1307, XYLENES, CLASS 3, PG III, LIMITED QUANTITY, (ERG#130)
IMO
UN1307, XYLENES, CLASS 3, PG III, (27 C c.c.), EmS F-E, S-D, ADR (D/E)

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
100-41-4	Ethylbenzene	15	
1330-20-7	Xylene	85	

CALIFORNIA PROPOSITION 65
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
TSCA CERTIFICATION
All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

MATERIAL SAFETY DATA SHEET

E61A45
32 00

DATE OF PREPARATION
Dec 6, 2012

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
E61A45
PRODUCT NAME
KEM-FLASH® PRIME Metal Primer, Gray
MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	www.oem.sherwin-williams.com
Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
31	64742-89-8	**V. M. & P. Naphtha**		
		ACGIH TLV	300 PPM	12 mm
		OSHA PEL	300 PPM	
		OSHA PEL	400 PPM STEL	
6	64742-88-7	**Mineral Spirits**		
		ACGIH TLV	100 PPM	2 mm
		OSHA PEL	100 PPM	
0.2	100-41-4	**Ethylbenzene**		
		ACGIH TLV	20 PPM	7.1 mm
		OSHA PEL	100 PPM	
		OSHA PEL	125 PPM STEL	
1	1330-20-7	**Xylene**		
		ACGIH TLV	100 PPM	5.9 mm
		ACGIH TLV	150 PPM STEL	
		OSHA PEL	100 PPM	
		OSHA PEL	150 PPM STEL	
0.1	14808-60-7	**Quartz**		
		ACGIH TLV	0.025 mg/m3 as Resp. Dust	
		OSHA PEL	0.1 mg/m3 as Resp. Dust	
10	14807-96-6	**Talc**		
		ACGIH TLV	2 mg/m3 as Resp. Dust	
		OSHA PEL	2 mg/m3 as Resp. Dust	
18	7727-43-7	**Barium Sulfate**		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	
8	13463-67-7	**Titanium Dioxide**		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	

% by Weight	Ingredient
0.89	Barium (as Ba; total)

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.

EYE or SKIN contact with the product, vapor or spray mist.

HMIS Codes	
Health	2*
Flammability	3
Reactivity	0

EFFECTS OF OVEREXPOSURE

EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.
Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the liver
- the urinary system
- the reproductive system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
50 °F PMCC	0.9	7.0	RED LABEL -- Flammable, Flash below 100 °F (38 °C)

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode when exposed to extreme heat.
Application to hot surfaces requires special precautions.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

DOL Storage Class IB

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Contents are FLAMMABLE. Keep away from heat, sparks, and open flame.
During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
Consult NFPA Code. Use approved Bonding and Grounding procedures.
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding, wirebrushing, abrading, burning or welding the dried film, wear a particulate respirator approved by NIOSH/MSHA for protection against non-volatile materials in Section 2.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PRECAUTIONS

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	10.24 lb/gal	1227 g/l
SPECIFIC GRAVITY	1.23	
BOILING POINT	240 - 395 °F	115 - 201 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	62%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	Not Available	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

3.93 lb/gal	471 g/l	Less Water and Federally Exempt Solvents
3.93 lb/gal	471 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide , Oxides of Metals in Section 2

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

Ethylbenzene is classified by IARC as possibly carcinogenic to humans (2B) based on inadequate evidence in humans and sufficient evidence in laboratory animals. Lifetime inhalation exposure of rats and mice to high ethylbenzene concentrations resulted in increases in certain types of cancer, including kidney tumors in rats and lung and liver tumors in mice. These effects were not observed in animals exposed to lower concentrations. There is no evidence that ethylbenzene causes cancer in humans.

Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to high levels of silica dust, which can occur only when sanding or abrading the dry film, may cause lung damage (silicosis) and possibly cancer.

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
64742-89-8	V. M. & P. Naphtha			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
64742-88-7	Mineral Spirits			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
100-41-4	Ethylbenzene			
		LC50 RAT	4HR	Not Available
		LD50 RAT		3500 mg/kg
1330-20-7	Xylene			
		LC50 RAT	4HR	5000 ppm
		LD50 RAT		4300 mg/kg
14808-60-7	Quartz			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
14807-96-6	Talc			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
7727-43-7	Barium Sulfate			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
13463-67-7	Titanium Dioxide			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Waste must be tested for ignitability and extractability to determine the applicable EPA hazardous waste numbers.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

5 Liters (1.3 Gallons) and Less may be Classed as LTD. QTY. OR ORM-D
Larger Containers are Regulated as:
UN1263, PAINT, 3, PG II, (ERG#128)

DOT (Dept of Transportation) Hazardous Substances & Reportable Quantities

Xylenes (isomers and mixture) 100 lb RQ

Bulk Containers may be Shipped as (check reportable quantities):

UN1263, PAINT, 3, PG II, (ERG#128)

Canada (TDG)

UN1263, PAINT, CLASS 3, PG II, (ERG#128)

IMO

5 Liters (1.3 Gallons) and Less may be Shipped as Limited Quantity.
UN1263, PAINT, CLASS 3, PG II, (10 C c.c.), EmS F-E, S-E, ADR (D/E)

IATA/ICAO

UN1263, PAINT, 3, PG II

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
100-41-4	Ethylbenzene	0.2	
1330-20-7	Xylene	1	
	Zinc Compound	2	1.2
	Barium Compound	2	0.8

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Univar USA Inc Material Safety Data Sheet

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052
(425) 889 3400

Emergency Assistance

For emergency assistance involving chemicals call
Chemtrec - (800) 424-9300

The Version Date and Number for this MSDS is : 05/28/2008 - #001

PRODUCT NAME: LACQUER THINNER T-6

MSDS NUMBER: CDS0690

DATE ISSUED: 05/15/2008

SUPERCEDES: NEW

ISSUED BY: 000099

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MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet conforms to the requirements of ANSI Z400.1, using the International Chemical Safety Cards of the Global Harmonizing System
THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (HAZARD COMMUNICATION STANDARD)
IMPORTANT: Read this MSDS before handling & disposing of this product.
Pass this information on to employees, customers, & users of this product.

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

PRODUCT IDENTITY: LACQUER THINNER T-6
COMPANY IDENTITY: UNIVAR USA INC.
COMPANY ADDRESS: 17425 NE UNION HILL
COMPANY CITY: REDMOND, WA 98052
COMPANY PHONE: 1-425-889-3400
CHEMTREC PHONE: 1-800-424-9300

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

CONTAINS:
40-50% TOLUENE (108-88-3)(203-625-9),
30-40% ACETONE (67-64-1)(200-662-2),
5-15% METHYL ISOBUTYL KETONE (108-10-1)(203-550-1),
0-10% METHANOL (67-56-1)(200-659-6)
Number in parentheses is CAS #, number in second parentheses is European EC #.

SECTION 3. HAZARDS IDENTIFICATION

EXPOSURE PREVENTION: STRICT HYGIENE!
PREVENT DISPERSION OF MISTS OR DUST!
AVOID EXPOSURE OF (PREGNANT) WOMEN, ADOLESCENTS, CHILDREN!

RISK STATEMENTS:
R36/37/38 Irritating to eyes, respiratory system and skin.

R39/23/24/25 Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

R48 Harmful: danger of serious damage to health by prolonged exposure.

R20/65 Harmful by inhalation, may cause lung damage if swallowed.

R12 Extremely Flammable.

R41 Risk of serious damage to eyes.

R63 Possible risk of harm to the unborn child.

R66 Repeated exposure may cause skin dryness or cracking.

R67 Vapors may cause drowsiness and dizziness.

SAFETY STATEMENTS:

S36/37 Wear suitable protective clothing and gloves.

S7/9 Keep container tightly closed, in a well-ventilated place.

S16 Keep away from sources of ignition. No smoking.

S24 Avoid contact with skin.

S29 Do not empty into drains.

S45 In case of accident, or if you feel unwell, seek medical advice immediately. (Show the label where possible).

S46 If swallowed, seek medical advice immediately, and show this container or label.

SECTION 4. FIRST AID MEASURES

EYE CONTACT:

For eyes, flush with plenty of water for 15 minutes & get medical attention.

SKIN CONTACT:

In case of contact with skin immediately remove contaminated clothing. Wash thoroughly with soap & water. Wash contaminated clothing before reuse.

INHALATION:

After high vapor exposure, remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, trained personnel should immediately begin artificial respiration. If the heart has stopped, trained personnel should immediately begin cardiopulmonary resuscitation (CPR).

SWALLOWING:

Induce vomiting. GET MEDICAL ATTENTION IMMEDIATELY.
If no medical personnel are available & patient is conscious, ingestion of an alcoholic beverage may prevent blindness, death.
Do NOT induce vomiting to an unconscious or convulsing person.

SECTION 5. FIRE FIGHTING MEASURES

FIRE & EXPLOSION PREVENTIVE MEASURES

NO open flames, NO sparks, & NO smoking. Use a closed system, ventilation, explosion-proof electrical equipment, lighting.
Do NOT use compressed air for filling, discharging, or handling.

EXTINGUISHING MEDIA

Use dry powder, AFFF, alcohol-resistant foam, water in large amounts, carbon dioxide.

SPECIAL FIRE FIGHTING PROCEDURES
Water spray may be ineffective on fire but can protect fire-fighters & cool closed containers. Use fog nozzles if water is used.
Do not enter confined fire-space without full bunker gear.
(Helmet with face shield, bunker coats, gloves & rubber boots).
Use NIOSH approved positive-pressure self-contained breathing apparatus.

UNUSUAL EXPLOSION AND FIRE PROCEDURES
EXTREMELY FLAMMABLE!! VAPORS CAN CAUSE FLASH FIRE
Keep container tightly closed.
Isolate from oxidizers, heat, sparks, electric equipment & open flame.
Closed containers may explode if exposed to extreme heat.
Applying to hot surfaces requires special precautions.
Empty container very hazardous! Continue all label precautions!

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PROTECTIVE MEASURES:
EVACUATE DANGER AREA! Consult an expert!
Vapors may ignite explosively & spread long distances. Prevent vapor buildup. Keep unprotected personnel away. Ventilate spill area. Remove all ignition sources. Use complete chemical protective suit with self-contained breathing apparatus.

CONTAINMENT AND CLEAN-UP MEASURES:
Stop spill at source. Dike and contain. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent. Remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment.

SECTION 7. HANDLING AND STORAGE

HANDLING
Isolate from oxidizers, heat, sparks, electric equipment & open flame.
Use only with adequate ventilation. Avoid breathing of vapor or spray mist.
Avoid contact with skin & eyes. Wear OSHA Standard goggles or face shield.
Consult Safety Equipment Supplier. Wear gloves, apron & footwear impervious to this material. Wash clothing before reuse. Avoid free fall of liquid.
Ground containers when transferring. Do not flame cut, saw, drill, braze, or weld. Empty container very hazardous! Continue all label precautions!

STORAGE
Vapors may ignite explosively & spread long distances. Prevent vapor buildup.
Put out pilot lights & turn off heaters, electric equipment & other ignition sources during use & until all vapors are gone.
Keep in fireproof surroundings. Keep separated from strong oxidants, food & feedstuffs. Keep cool. Do not store above 49 C/120 F. Keep container tightly closed & upright when not in use to prevent leakage.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

RESPIRATORY EXPOSURE CONTROLS
A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z86.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

VENTILATION

LOCAL EXHAUST	: Necessary
MECHANICAL (GENERAL)	: Acceptable
SPECIAL	: None
OTHER	: None

Please refer to ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

PERSONAL PROTECTIONS:
Wear OSHA Standard goggles or face shield. Consult Safety Equipment Supplier. Wear gloves, apron & footwear impervious to this material. Wash clothing before reuse.

WORK & HYGIENIC PRACTICES:
Provide readily accessible eye wash stations & safety showers.
Wash at end of each workshift & before eating, smoking or using the toilet.
Promptly remove clothing that becomes contaminated. Destroy contaminated leather articles. Launder or discard contaminated clothing.

SECTION 9. PHYSICAL DATA

APPEARANCE :	Liquid, Water-White
ODOR :	Ketone
BOILING RANGE :	56 91 117 C / 133 196 243 F
AUTO IGNITION TEMPERATURE :	458 C / 858 F (Lowest Component)
LOWER FLAMMABLE LIMIT IN AIR (% by vol):	2.2
FLASH POINT (TEST METHOD):	-16 C / 2 F (TCC) (Lowest Component)
FLAMMABILITY CLASSIFICATION:	Class I B
GRAVITY @ 68/68 F / 20/20 C :	
API :	39.4
SPECIFIC GRAVITY (Water=1) :	0.828
POUNDS/GALLON :	6.898
VOC'S (>0.44 Lbs/Sq In) :	100.0 Vol. % / 828.1 g/L / 6.898 Lbs/Gal
TOTAL VOC'S (TVOC) :	100.0 Vol. % / 828.1 g/L / 6.898 Lbs/Gal
NONEXEMPT VOC'S (CVOC) :	62.4 Vol. % / 530.0 g/L / 4.414 Lbs/Gal
HAZARDOUS AIR POLLUTANTS (HAPS) :	64.0 Wt. % / 530.0 g/L / 4.414 Lbs/Gal
VAPOR PRESSURE (mm of Hg)@20 C	102.9
NONEXEMPT VOC PARTIAL PRESSURE (mm of Hg @ 20 C)	22.0
VAPOR DENSITY (air=1) :	2.4
WATER ABSORPTION :	Appreciable
REFRACTIVE INDEX :	1.421
MIXED ANILINE POINT (Acid Insol):	8 C / 48 F

SECTION 10. STABILITY & REACTIVITY

STABILITY
Stable under normal conditions.

CONDITIONS TO AVOID
Isolate from oxidizers, heat, sparks, electric equipment & open flame.

MATERIALS TO AVOID
The substance can presumably form explosive peroxides
under the influence of light and air.
Check for peroxide prior to distillation, eliminate if found.
Reacts violently with strong oxidants, strong reducing agents,
causing fire & explosion hazard. Attacks many plastics, coatings.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon Monoxide, Carbon Dioxide from burning.

HAZARDOUS POLYMERIZATION
Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

MATERIAL	CAS #	TWA (OSHA)	TLV (ACGIH)	HAP
Toluene	108-88-3	200 ppm	50 ppm A4	Yes
Acetone	67-64-1	1000 ppm	500 ppm A4	No
Methyl Isobutyl Ketone	108-10-1	100 ppm	50 ppm	Yes
Methanol	67-56-1	200 ppm S	200 ppm S	Yes

In addition to EPA Hazardous Air Pollutants showing Yes under "HAP" above, using manufacturers' data, based on EPA Method 311, the following EPA Hazardous Air Pollutants may be present in trace amounts (less than 0.1%):
Benzene, Mixed Xylenes, Ethylbenzene

MATERIAL	CAS #	CEILING	STEL(OSHA/ACGIH)
Acetone	67-64-1	None Known	750 ppm
Methyl Isobutyl Ketone	108-10-1	None Known	75 ppm
Methanol	67-56-1	None Known	250 ppm

ACUTE HAZARDS

EYE & SKIN CONTACT:
Primary irritation to skin, defatting, dermatitis.
Absorption thru skin increases exposure.
Primary irritation to eyes, redness, tearing, blurred vision.
Liquid can cause eye irritation. Wash thoroughly after handling.

INHALATION:
Anesthetic. Irritates respiratory tract. Acute overexposure
can cause serious nervous system depression. Vapor harmful.
Breathing vapor can cause irritation.

Acute overexposure can cause harm to kidneys, blood, nerves, liver, lungs.
Repeated exposure over TLV can cause blindness.
Use of alcoholic beverages enhances the harmful effect.

SWALLOWING:
Can be fatal or cause blindness if swallowed. Cannot be made non-poisonous.
POISON ! Can cause irreversible nervous system damage & death.
Harmful or fatal if swallowed.
Swallowing can cause abdominal irritation, nausea, vomiting & diarrhea.
The symptoms of chemical pneumonitis may not show up for a few days.

SUBCHRONIC HAZARDS/CONDITIONS AGGRAVATED

CONDITIONS AGGRAVATED
Chronic overexposure can cause harm to kidneys, blood, nerves, liver, lungs.
Persons with severe skin, liver or kidney problems should avoid use.

CHRONIC HAZARDS

CANCER, REPRODUCTIVE & OTHER CHRONIC HAZARDS:
Pregnant women should avoid use. May cause birth defects.
Leukemia been reported in humans from Benzene.
This product contains less than 138 ppm of Benzene.
Not considered hazardous in such low concentrations.
Absorption thru skin may be harmful. Studies with laboratory animals
indicate this product can cause damage to fetus.
Depending on degree of exposure, periodic medical examination is indicated.

SECTION 12. ECOLOGICAL INFORMATION

MAMMALIAN INFORMATION:

MATERIAL	CAS #	LOWEST KNOWN LETHAL DOSE DATA
		LOWEST KNOWN LD50 (ORAL)
Methanol	67-56-1	1000.0 mg/kg(Man)
		LOWEST KNOWN LC50 (VAPORS)
Methyl Isobutyl Ketone	108-10-1	4000 ppm (Rats)
		LOWEST KNOWN LD50 (SKIN)
Toluene	108-88-3	4000.0 mg/kg (Rabbits)

AQUATIC ANIMAL INFORMATION:
The most sensitive known aquatic group to any component of this product is:
Goldfish 250 ppm or mg/L (24 hour exposure).
Keep out of sewers and natural water supplies.
The substance is toxic to aquatic organisms.

MOBILITY
This material is a mobile liquid.

DEGRADABILITY
This product is partially biodegradable.

ACCUMULATION
This product does not accumulate or bio-magnify in the environment.

SECTION 13. DISPOSAL CONSIDERATIONS

Processing, use or contamination may change the waste management options. Recycle/dispose of observing national, regional, state, provincial and local health, safety & pollution laws. If in doubt, contact appropriate agencies.

SECTION 14. TRANSPORT INFORMATION

IF CONTAINER HAS > PRODUCT RQ (SEE SECTION 15) PUT "RQ," BEFORE SHIPPING NAME.
DOT SHIPPING NAME: UN1263, Paint Related Material, 3, PG-II
DRUM LABEL: (FLAMMABLE LIQUID)
IATA / ICAO: UN1992, Flammable Liquids, Toxic, n.o.s. (Toluene, Acetone), 3, (6.1), PG-II
IMO / IMDG: UN1992, Flammable Liquids, Toxic, n.o.s. (Toluene, Acetone), 3, (6.1), PG-II
EMERGENCY RESPONSE GUIDEBOOK NUMBER: 131

SECTION 15. REGULATORY INFORMATION

EPA REGULATION:
SARA SECTION 311/312 HAZARDS: Acute Health, Fire

All components of this product are on the TSCA list.
SARA Title III Section 313 Supplier Notification
This product contains the indicated <*> toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning & Community Right-To-Know Act of 1986 & of 40 CFR 372. This information must be included in all MSDSs that are copied and distributed for this material.

SARA TITLE III INGREDIENTS	CAS#	WT %	(REG. SECTION)	RQ(LBS)
*Toluene	108-88-3	46	(311,312,313,RCRA)	1000
Acetone	67-64-1	36	(311,312)	5000
*Methyl Isobutyl Ketone	108-10-1	12	(311,312,313,RCRA)	5000
*Methanol	67-56-1	6	(311,312,313,RCRA)	5000

> 2173 LB / 987 KG OF THIS PRODUCT IN 1 CONTAINER EXCEEDS THE "RQ" OF TOLUENE.
Any release equal to or exceeding the RQ must be reported to the National Response Center (800-424-8802) and appropriate state and local regulatory agencies as described in 40 CFR 302.6 and 40 CFR 355.40 respectively. Failure to report may result in substantial civil and criminal penalties. State & local regulations may be more restrictive than federal regulations.

STATE REGULATIONS:
CALIFORNIA PROPOSITION 65: This product contains the following chemical known to the State of California to cause reproductive toxicity: Toluene

INTERNATIONAL REGULATIONS
The components of this product are listed on the chemical

inventories of the following countries:
Australia, Canada, China, Europe (EINECS), Japan, Korea, United Kingdom.

SECTION 16. OTHER INFORMATION

HAZARD RATINGS:
HEALTH (NFPA): 1, HEALTH (HMIS): 3, FLAMMABILITY: 3, REACTIVITY: 0
(Personal Protection Rating to be supplied by user based on use conditions.)
This information is intended solely for the use of individuals
trained in the NFPA & HMIS hazard rating systems.

EMPLOYEE TRAINING
See Section 3 for Risk & Safety Statements. Employees should be made aware of all hazards of this material (as stated in this MSDS) before handling it.

Univar USA Inc Material Safety Data Sheet

For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

Notice

Univar USA Inc. ("Univar") expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process

Material Safety Data Sheet

CHEMTREC Transportation Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center Health Emergency No.: 412-681-6669

NOTE: The CHEMTREC Transportation Emergency Phone is to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: THINNER #26

Identification Number: PLMSDS 0526S1NL

Product Use/Class: FOR INDUSTRIAL USE ONLY

Revision Date: 10/06/2009

Supercedes : 07/28/2008

Preparer: Regulatory, Department

Manufacturer: **Carboline Company**
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2	55.0	100 PPM	150 PPM	360 MGM3	N/E
2-BUTOXYETHANOL	111-76-2	50.0	25 PPM	N/E	120 MG/M3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: Direct skin contact may cause irritation.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 90F (32C) (TCC)

Lower Explosive Limit, %: 1.5
Upper Explosive Limit, %: 12.7

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an aborbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates

to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	265 F (129 C) - 336 F (169 C)	**Vapor Density:**	Heavier than Air
Odor:	Solvent	**Odor Threshold:**	N/D
Appearance:	Clear Liquid	**Evaporation Rate:**	Slower Than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	**Specific Gravity:**	0.91
Vapor Pressure:	4.8 mmHg @20C	**PH:**	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2	>5180 MG/KG, ORAL, RAT	10000 PPM/4HRS RAT,INHALATION
2-BUTOXYETHANOL	111-76-2	1746 MG/KG, RAT, ORAL	700PPM/7HRS MOUSE, INHALATION

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Paint Related Material **Packing Group:** III

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS Number
2-BUTOXYETHANOL	111-76-2

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

No California Proposition 65 Carcinogens exist

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

No California Proposition 65 Reproductive Toxins exist

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2B

Section 16 - Other Information

HMIS Ratings
Health: 2 **Flammability:** 3 **Reactivity:** 0 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 909

REASON FOR REVISION: Changes made in Section(s) 1, 5, and 9

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

Material Safety Data Sheet

CHEMTREC Transportation Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC Transportation Emergency Phone is to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: THINNER #33

Identification Number: PLMSDS 0533S1NL

Product Use/Class: FOR INDUSTRIAL USE ONLY

Manufacturer: **Carboline Company**
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Revision Date: 10/07/2009

Supercedes : 08/18/2008

Preparer: Regulatory, Department

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2	30.0	100 PPM	150 PPM	360 MGM3	N/E
2-BUTOXYETHANOL	111-76-2	30.0	25 PPM	N/E	120 MG/M3	N/E
AROMATIC HYDROCARBON	64742-95-6	25.0	N/E	N/E	N/E	N/E
1,2,4 TRIMETHYLBENZENE	95-63-6	25.0	25 PPM	N/E	125 MGM3	N/E
CUMENE	98-82-8	5.0	50 PPM	N/E	245 MG/M3	N/E
ETHYL BENZENE	100-41-4	0.6	100 PPM	125 PPM	435 MGM3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: Direct skin contact may cause irritation.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 90F (32C) (TCC)

Lower Explosive Limit, %: 1.3
Upper Explosive Limit, %: 12.7

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an aborbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no

exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	265 F (129C) - 336 F (169 C)	**Vapor Density:**	Heavier than Air
Odor:	Solvent	**Odor Threshold:**	N/D
Appearance:	Clear Liquid	**Evaporation Rate:**	Slower Than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	**Specific Gravity:**	0.89
Vapor Pressure:	4.2 mmHg @ 20C	**PH:**	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2	>5180 MG/KG, ORAL, RAT	10000 PPM/4HRS RAT,INHALATION
2-BUTOXYETHANOL	111-76-2	1746 MG/KG, RAT, ORAL	700PPM/7HRS MOUSE, INHALATION
AROMATIC HYDROCARBON	64742-95-6	4700 MG/KG, ORAL, RAT	3670 PPM/8 HOURS, RAT, INHALATION
1,2,4 TRIMETHYLBENZENE	95-63-6	5 GM/KG, ORAL, RAT	18 GM/M3/4HOURS
CUMENE	98-82-8	1400 MG/KG, ORAL, RAT	8000 PPM / 4 HOURS
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Paint Related Material	**Packing Group:**	III
DOT Technical Name:	N/A	**Hazard Subclass:**	N/A
DOT Hazard Class:	3	**Resp. Guide Page:**	128
DOT UN/NA Number:	UN 1263		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS Number
2-BUTOXYETHANOL	111-76-2
1,2,4 TRIMETHYLBENZENE	95-63-6
CUMENE	98-82-8
ETHYL BENZENE	100-41-4

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name	CAS Number
ETHYL BENZENE	100-41-4

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

Chemical Name	CAS Number
TOLUENE	108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2B

Section 16 - Other Information

HMIS Ratings
Health: 2 **Flammability:** 3 **Reactivity:** 0 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 888

REASON FOR REVISION: Changes made in Section(s): 1, 5, and 9

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

Material Safety Data Sheet

Date of issue 1 January 2011
Version 17

1. Product and company identification

Product name : AMERLOCK 2/400 SAFETY YELLOW 1979 R

Code : AK2-81

Supplier : PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272

Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)

Technical Phone Number : (412) 492-5200 (ALLISON PARK, PA) 8:00 a.m. - 5:00 p.m. EST

2. Hazards identification

Emergency overview : WARNING!

COMBUSTIBLE LIQUID AND VAPOR. CAUSES RESPIRATORY TRACT IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF INHALED OR SWALLOWED. MAY CAUSE EYE IRRITATION. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

Keep away from heat, sparks and flame. Do not breathe vapor or mist. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled. Severely irritating to the respiratory system. Can irritate eyes, nose, mouth and throat. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Ingestion : May be harmful if swallowed.

Skin : Moderately irritating to the skin. May cause an allergic skin reaction.

Eyes : Moderately irritating to eyes.

Over-exposure signs/symptoms

Repeated exposure to high vapor concentrations may cause irritation of the respiratory system and permanent brain and nervous system damage. Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness and nausea and may lead to unconsciousness or death. There is some evidence that repeated exposure to organic solvent vapors in combination with constant loud noise can cause greater hearing loss than expected from exposure to noise alone.

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (Section 11)

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3. Composition/information on ingredients

Name	CAS number	%
Epoxy Resin (MW<=700)	25068-38-6	30 - 60
Talc , not containing asbestiform fibres	14807-96-6	10 - 30
Titanium dioxide	13463-67-7	3 - 7
1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich	68515-49-1	1 - 5
Solvent naphtha (petroleum), light arom.	64742-95-6	1 - 5
1,2,4-trimethylbenzene	95-63-6	1 - 5
xylene	1330-20-7	0.1 - 1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting.

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5. Fire-fighting measures

Flammability of the product : Combustible liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous combustion products : Decomposition products may include the following materials:
carbon oxides
nitrogen oxides
halogenated compounds
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

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6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Use spark-proof tools and explosion-proof equipment. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not breathe vapor or mist. Do not swallow. Do not get in eyes or on skin or clothing. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. Vapors are heavier than air and may spread along floors. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. If this material is part of a multiple component system, read the Material Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Do not store above the following temperature: 120F / 49C.

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8 . Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	PPG
Talc , not containing asbestiform fibres	TWA	2 mg/m³ R	20 mppcf Z	2 mg/m³ R	2 mg/m³ R	Not established
Titanium dioxide	TWA	10 mg/m³	15 mg/m³ TD	10 mg/m³ TD	10 mg/m³ (as Ti)	Not established
	STEL	Not established	Not established	Not established	20 mg/m³ (as Ti)	Not established
1,2,4-trimethylbenzene	TWA	25 ppm	Not established	25 ppm	25 ppm	Not established
	STEL	Not established	Not established	Not established	35 ppm	Not established
xylene	TWA	100 ppm	100 ppm	100 ppm	100 ppm	Not established
	STEL	150 ppm	Not established	150 ppm	150 ppm	Not established

Key to abbreviations

A = Acceptable Maximum Peak
ACGIH = American Conference of Governmental Industrial Hygienists.
C = Ceiling Limit
F = Fume
IPEL = Internal Permissible Exposure Limit
OSHA = Occupational Safety and Health Administration.
R = Respirable
Z = OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances
S = Potential skin absorption
SR = Respiratory sensitization
SS = Skin sensitization
STEL = Short term Exposure limit values
TD = Total dust
TLV = Threshold Limit Value
TWA = Time Weighted Average

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses with side shields.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Gloves : butyl rubber

Respiratory : If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

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8 . Exposure controls/personal protection

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	: Liquid.
Flash point	: Closed cup: 55°C (131°F)
Explosion limits	: Lower: 1%
Color	: Not available.
Odor	: Not available.
pH	: Not available.
Boiling/condensation point	: >37.78°C (>100°F)
Melting/freezing point	: Not available.
Specific gravity	: 1.33
Density (lbs / gal)	: 11.1
Vapor pressure	: 0.67 kPa (5 mm Hg) [20°C]
Vapor density	: Not available.
Volatility	: 11% (v/v), 7.52% (w/w)
Odor threshold	: Not available.
Evaporation rate	: 32 (butyl acetate = 1)
Partition coefficient: n-octanol/water	: Not available.
% Solid. (w/w)	: 92.48

10 . Stability and reactivity

Stability : Stable under recommended storage and handling conditions (see section 7).

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Materials to avoid : Reactive or incompatible with the following materials:,acids,oxidizing materials,strong alkalis

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure

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11 . Toxicological information

Epoxy Resin (MW<=700)	LD50 Oral	Rat	>2 g/kg	-
	LD50 Dermal	Rabbit	>2 g/kg	-
Titanium dioxide	LD50 Oral	Rat	>10 g/kg	-
1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich	LD50 Oral	Rat	>60000 mg/kg	-
	LD50 Dermal	Rabbit	16000 mg/kg	-
Solvent naphtha (petroleum), light arom.	LD50 Oral	Rat	8400 mg/kg	-
	LD50 Dermal	Rabbit	3.48 g/kg	-
1,2,4-trimethylbenzene	LD50 Oral	Rat	5 g/kg	-
	LC50 Inhalation	Rat	18000 mg/m3	4 hours
xylene	LD50 Oral	Rat	4.3 g/kg	-
	LD50 Dermal	Rabbit	>1.7 g/kg	-
	LC50 Inhalation Vapor	Rat	5000 ppm	4 hours

Chronic toxicity

Conclusion/Summary : Not available.

Defatting irritant? : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

Target organs : Contains material which causes damage to the following organs: brain, central nervous system (CNS).
Contains material which may cause damage to the following organs: blood, lungs, cardiovascular system, upper respiratory tract, skin, eyes.

Carcinogenicity

Carcinogenicity : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Talc , not containing asbestiform fibres	A4	3	-	-	-	-
Titanium dioxide	A4	2B	-	-	-	-

Mutagenicity

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity

Teratogenicity : No known significant effects or critical hazards.

Reproductive toxicity

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

12 . Ecological information

Environmental effects : Water polluting material. May be harmful to the environment if released in large quantities.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Titanium dioxide	Acute LC50 5.5 ppm Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC 1 ppm Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
1,2,4-trimethylbenzene	Acute LC50 7720 to 8280 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
xylene	Acute LC50 3300 to 4093 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours

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13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	1263	Paint.	3	III	-
IMDG	1263	Paint.. Marine pollutant (Epoxy Resin (MW<=700), Solvent naphtha (petroleum), light arom.)	3	III	-
DOT	1263	Paint. (1,2,4-trimethylbenzene)	3	III	Remarks USA Only: Can be reclassified as Combustible Liquid. Non-Bulk highway shipments (Less than or Equal to 450Liters) can be shipped as non-regulated.

PG* : Packing group

Reportable quantity RQ : CERCLA: Hazardous substances.: n-Butyl acetate: 5000 lbs. (2270 kg); xylene: 100 lbs. (45.4 kg);

15 . Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.
Australia inventory (AICS) : All components are listed or exempted.
Canada inventory (DSL) : All components are listed or exempted.
China inventory (IECSC) : All components are listed or exempted.
Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS) : At least one component is not listed.
Korea inventory (KECI) : All components are listed or exempted.
New Zealand (NZIoC) : Substance Use Restricted
Philippines inventory (PICCS) : At least one component is not listed.

United States

U.S. Federal regulations :

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Talc , not containing asbestiform fibres; Titanium dioxide; 1,2,4-trimethylbenzene

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15 . Regulatory information

CERCLA: Hazardous substances.: n-Butyl acetate: 5000 lbs. (2270 kg); xylene: 100 lbs. (45.4 kg);

SARA 311/312 MSDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure
Epoxy Resin (MW<=700)	25068-38-6	Y	N	N	N	N
Talc , not containing asbestiform fibres	14807-96-6	Y	N	N	N	N
Titanium dioxide	13463-67-7	N	Y	N	N	N
1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich	68515-49-1	N	N	N	N	N
Solvent naphtha (petroleum), light arom.	64742-95-6	Y	N	N	N	N
1,2,4-trimethylbenzene	95-63-6	Y	N	Y	N	N
Product as-supplied :		Y	Y	Y	N	N

SARA 313	Chemical name	CAS number	Concentration
Supplier notification :	1,2,4-trimethylbenzene	95-63-6	1 - 5

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 2 Health : 2 Reactivity : 0

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 2 * Flammability : 2 Physical hazards : 0

(*) - Chronic effects

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 2 Flammability : 2 Instability : 0

Date of previous issue : 8/31/2010.

Organization that prepared the MSDS : EHS

Indicates information that has changed from previously issued version.

Disclaimer

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16 . Other information

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

Material Safety Data Sheet

Date of issue 13 January 2011
Version 5

1 . Product and company identification

Product name : PSX 700 DEEP TINT RESIN

Code : PX700T1/05

Supplier : PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272

Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)

Technical Phone Number : (412) 492-5200 (ALLISON PARK, PA) 8:00 a.m. - 5:00 p.m. EST

2 . Hazards identification

Emergency overview : WARNING!

CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF INHALED OR SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

Do not swallow. Do not get in eyes or on skin or clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled. Irritating to respiratory system. Can irritate eyes, nose, mouth and throat. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Ingestion : May be harmful if swallowed.

Skin : Severely irritating to the skin. May cause an allergic skin reaction.

Eyes : Severely irritating to eyes. Risk of serious damage to eyes.

Over-exposure signs/symptoms

Trimethoxysilanes are capable of forming methanol if hydrolyzed or ingested. If swallowed, methanol may be harmful or fatal or cause blindness.

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Proprietary silicone	68957-04-0	15 - 40
Epoxy	Not available.	15 - 40
Wollastonite (Ca(SiO3))	13983-17-0	10 - 30
Titanium dioxide	13463-67-7	5 - 10
bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate	41556-26-7	1 - 5
Poly(oxy-1,2-ethanediyl), α-(nonylphenyl)-ω-hydroxy-, branched, phosphates	68412-53-3	1 - 5

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3 . Composition/information on ingredients

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting.

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5 . Fire-fighting measures

Flammability of the product : In a fire or if heated, a pressure increase will occur and the container may burst. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous combustion products : Decomposition products may include the following materials:
carbon oxides
nitrogen oxides
halogenated compounds
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Powered by ATRION

6 . Accidental release measures

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not swallow. Do not get in eyes or on skin or clothing. Avoid breathing vapor or mist. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Vapors are heavier than air and may spread along floors. Empty containers retain product residue and can be hazardous. Do not reuse container. If this material is part of a multiple component system, read the Material Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Do not store above the following temperature: 120F / 49C.

8 . Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	PPG
Titanium dioxide	TWA	10 mg/m³	15 mg/m³ TD	10 mg/m³ TD	10 mg/m³ (as Ti)	Not established
	STEL	Not established	Not established	Not established	20 mg/m³ (as Ti)	Not established

Key to abbreviations

A = Acceptable Maximum Peak
ACGIH = American Conference of Governmental Industrial Hygienists.
C = Ceiling Limit
F = Fume
IPEL = Internal Permissible Exposure Limit
OSHA = Occupational Safety and Health Administration.
R = Respirable
Z = OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances
S = Potential skin absorption
SR = Respiratory sensitization
SS = Skin sensitization
STEL = Short term Exposure limit values
TD = Total dust
TLV = Threshold Limit Value
TWA = Time Weighted Average

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

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8 . Exposure controls/personal protection

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Chemical splash goggles.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Gloves : nitrile, neoprene

Respiratory : If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Liquid.

Flash point : Closed cup: 97.22°C (207°F)

Explosion limits : Lower: 1.5%

Color : Not available.

Odor : Not available.

pH : Not available.

Boiling/condensation point : >37.78°C (>100°F)

Melting/freezing point : Not available.

Specific gravity : 1.32

Density (lbs / gal) : 11.02

Vapor pressure : 1.6 kPa (11.8 mm Hg) [20°C]

Vapor density : Not available.

Volatility : 1% (v/v), 0.480003% (w/w)

Odor threshold : Not available.

Evaporation rate : 70 (butyl acetate = 1)

Partition coefficient: n-octanol/water : Not available.

% Solid. (w/w) : 99.52

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10 . Stability and reactivity

Stability : The product may not be stable under certain conditions of storage or use.

Conditions to avoid : Avoid increased storage temperature. Pressure hazard

Materials to avoid : Reactive or incompatible with the following materials:,acids,oxidizing materials;strong alkalis

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Titanium dioxide	LD50 Oral	Rat	>10 g/kg	-
bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate	LD50 Oral	Rat	3.125 g/kg	-

Chronic toxicity

Conclusion/Summary : Not available.

Target organs : Contains material which causes damage to the following organs: upper respiratory tract, skin, eyes.
Contains material which may cause damage to the following organs: lungs.

Carcinogenicity

Carcinogenicity : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Titanium dioxide	A4	2B	-	-	-	-

Mutagenicity

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity

Teratogenicity : No known significant effects or critical hazards.

Reproductive toxicity

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

12 . Ecological information

Environmental effects : Water polluting material. May be harmful to the environment if released in large quantities.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Titanium dioxide	Acute LC50 5.5 ppm Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC 1 ppm Fresh water	Daphnia - Water flea - Daphnia magna	48 hours

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13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate)	9	III	-
IMDG	3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate). Marine pollutant (bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate)	9	III	-
DOT	Not regulated.	-	-	-	-

PG* : Packing group

Reportable quantity RQ : CERCLA: Hazardous substances.: No products were found.

15 . Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.
Australia inventory (AICS) : All components are listed or exempted.
Canada inventory (DSL) : All components are listed or exempted.
China inventory (IECSC) : All components are listed or exempted.
Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS) : All components are listed or exempted.
Korea inventory (KECI) : All components are listed or exempted.
New Zealand (NZIoC) : Not determined.
Philippines inventory (PICCS) : All components are listed or exempted.

United States

U.S. Federal regulations :

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Titanium dioxide
CERCLA: Hazardous substances.: No products were found.

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15 . Regulatory information

SARA 311/312 MSDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure
Proprietary silicone	68957-04-0	Y	N	N	Y	N
Epoxy	Not available.	Y	N	N	Y	N
Titanium dioxide	13463-67-7	N	Y	N	N	N
bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate	41556-26-7	Y	N	N	N	N
Poly(oxy-1,2-ethanediyl), α-(nonylphenyl)-ω-hydroxy-, branched, phosphates	68412-53-3	Y	N	N	N	N
Product as-supplied :		Y	Y	N	Y	N

:

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 1 Health : 3 Reactivity : 1

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 3 * Flammability : 1 Physical hazards : 1
(*) - Chronic effects

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 3 Flammability : 1 Instability : 1

Date of previous issue : 12/22/2010.

Organization that prepared the MSDS : EHS

Indicates information that has changed from previously issued version.

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

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Material Safety Data Sheet

Date of issue 8 February 2011
Version 2

1 . Product and company identification

Product name : PSX 700FD CURE
Code : PX700FD-B/01
Supplier : PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272
Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)
Technical Phone Number : (412) 492-5200 (ALLISON PARK, PA) 8:00 a.m. - 5:00 p.m. EST

2 . Hazards identification

Emergency overview : DANGER!

COMBUSTIBLE LIQUID AND VAPOR. CAUSES EYE BURNS. CAUSES RESPIRATORY TRACT AND SKIN IRRITATION. MAY BE HARMFUL IF INHALED, ABSORBED THROUGH SKIN OR SWALLOWED.

Keep away from heat, sparks and flame. Do not swallow. Do not get in eyes or on skin or clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled. Irritating to respiratory system. Can irritate eyes, nose, mouth and throat. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Ingestion : May be harmful if swallowed. May cause burns to mouth, throat and stomach.

Skin : Harmful in contact with skin. Severely irritating to the skin.

Eyes : Corrosive to eyes. Causes burns.

Over-exposure signs/symptoms

Trimethoxysilanes are capable of forming methanol if hydrolyzed or ingested. If swallowed, methanol may be harmful or fatal or cause blindness.

Medical conditions aggravated by over-exposure : None known.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Proprietary silane	919-30-2	40 - 70
Proprietary silane	13822-56-5	10 - 30
dibutylbis(pentane-2,4-dionato-O,O')tin	22673-19-4	3 - 7
Methanol	67-56-1	0.1 - 1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

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4 . First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting.

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5 . Fire-fighting measures

Flammability of the product : Combustible liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous combustion products : Decomposition products may include the following materials:
carbon oxides
nitrogen oxides
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Use spark-proof tools and explosion-proof equipment. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

6 . Accidental release measures

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Do not swallow. Do not get in eyes or on skin or clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. Vapors are heavier than air and may spread along floors. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. If this material is part of a multiple component system, read the Material Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Do not store above the following temperature: 120F / 49C.

8 . Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	PPG
dibutylbis(pentane-2,4-dionato-O,O')tin	TWA	0.1 mg/m³ (as Sn)	0.1 mg/m3 (as Sn) TD 0.1 mg/m3 (as Sn)	Not established	Not established	Not established
	STEL	0.2 MG/M3 S	Not established	Not established	Not established	Not established
Methanol	TWA	200 ppm S	200 ppm	200 ppm S	200 ppm S	Not established
	STEL	250 ppm S	Not established	250 ppm S	250 ppm S	Not established

Key to abbreviations

A	= Acceptable Maximum Peak	S	= Potential skin absorption
ACGIH	= American Conference of Governmental Industrial Hygienists.	SR	= Respiratory sensitization
C	= Ceiling Limit	SS	= Skin sensitization
F	= Fume	STEL	= Short term Exposure limit values
IPEL	= Internal Permissible Exposure Limit	TD	= Total dust
OSHA	= Occupational Safety and Health Administration.	TLV	= Threshold Limit Value
R	= Respirable	TWA	= Time Weighted Average
Z	= OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances		

Consult local authorities for acceptable exposure limits.

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8 . Exposure controls/personal protection

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Chemical splash goggles and face shield.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Gloves : nitrile, neoprene

Respiratory : If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Liquid.

Flash point : Closed cup: 82.22°C (180°F)

Color : Not available.

Odor : Not available.

pH : Not available.

Boiling/condensation point : >37.78°C (>100°F)

Melting/freezing point : Not available.

Specific gravity : 0.95

Density (lbs / gal) : 7.93

Vapor pressure : 0 kPa (0 mm Hg) [20°C]

Vapor density : Not available.

Volatility : 0% (v/v), 0% (w/w)

Odor threshold : Not available.

Evaporation rate : 0 (butyl acetate = 1)

Partition coefficient: n-octanol/water : Not available.

% Solid. (w/w) : 100

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9 . Physical and chemical properties

10 . Stability and reactivity

Stability : The product may not be stable under certain conditions of storage or use.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Avoid increased storage temperature. Pressure hazard

Materials to avoid : Reactive or incompatible with the following materials:,acids,oxidizing materials,strong alkalis

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Proprietary silane	LD50 Oral	Rat	1.57 g/kg	-
	LD50 Dermal	Rabbit	4 mL/kg	-
dibutylbis(pentane-2,4-dionato-O,O')tin	LD50 Oral	Rat	>2 g/kg	-
Methanol	LD50 Oral	Rat	5600 mg/kg	-
	LD50 Dermal	Rabbit	15800 mg/kg	-
	LC50 Inhalation Vapor	Rat	64000 ppm	4 hours
	LC50 Inhalation	Rat	145000 ppm	1 hours

Chronic toxicity

Conclusion/Summary : Not available.

Carcinogenicity

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity

Teratogenicity : Contains material which may cause birth defects, based on animal data.

Reproductive toxicity

Developmental effects : Contains material which may cause developmental abnormalities, based on animal data.

Fertility effects : No known significant effects or critical hazards.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Methanol	Acute LC50 >100000 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	Acute LC50 3289 to 4395 mg/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NEL 320 mg/L Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours

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13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	3066	PAINT	8	III	-
IMDG	3066	PAINT	8	III	-
DOT	3066	PAINT	8	III	-

PG* : Packing group

Reportable quantity RQ : CERCLA: Hazardous substances.: Methanol: 5000 lbs. (2270 kg);

15 . Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.
Australia inventory (AICS) : All components are listed or exempted.
Canada inventory (DSL) : All components are listed or exempted.
China inventory (IECSC) : All components are listed or exempted.
Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS) : All components are listed or exempted.
Korea inventory (KECI) : All components are listed or exempted.
New Zealand (NZIoC) : Not determined.
Philippines inventory (PICCS) : All components are listed or exempted.

United States

U.S. Federal regulations :
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Proprietary silane
CERCLA: Hazardous substances.: Methanol: 5000 lbs. (2270 kg);

SARA 311/312 MSDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure

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15 . Regulatory information

Proprietary silane	919-30-2	Y	N	N	Y	N
dibutylbis(pentane-2,4-dionato-O,O')tin	22673-19-4	Y	N	N	Y	N
Methanol	67-56-1	Y	Y	Y	N	N
Product as-supplied :		Y	Y	Y	Y	N

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

Canada

WHMIS (Canada) : Class E: Corrosive liquid. Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 2 **Health** : 3 **Reactivity** : 1

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 3 * **Flammability** : 2 **Physical hazards** : 1

(*) - Chronic effects

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 3 **Flammability** : 2 **Instability** : 1

Date of previous issue : **No previous validation.**

Organization that prepared the MSDS : EHS

Indicates information that has changed from previously issued version.

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

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Material Safety Data Sheet

Date of issue 26 May 2012
Version 11.01

1 . Product and company identification

Product name : AMERLOCK 2 CURE
Code : AK2-B/03
Supplier : PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272
Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)
Technical Phone Number : (412) 492-5200 (ALLISON PARK, PA) 8:00 a.m. - 5:00 p.m. EST

2 . Hazards identification

Emergency overview : DANGER!

FLAMMABLE LIQUID AND VAPOR. HARMFUL OR FATAL IF SWALLOWED. CAUSES RESPIRATORY TRACT, DIGESTIVE TRACT, EYE AND SKIN BURNS. HARMFUL IF ABSORBED THROUGH SKIN. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF INHALED. SANDING AND GRINDING DUSTS MAY BE HARMFUL IF INHALED. ASPIRATION HAZARD. CAN ENTER LUNGS AND CAUSE DAMAGE. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

Keep away from flames, such as a pilot light, and any object that sparks, such as an electric motor. Keep away from heat. Do not smoke. Do not breathe vapor or mist. Do not swallow. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled. Corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Ingestion : Harmful or fatal if swallowed. Corrosive to the digestive tract. Causes burns. Aspiration hazard if swallowed. Can enter lungs and cause damage.
Skin : Corrosive to the skin. Causes burns. Toxic in contact with skin. May cause an allergic skin reaction.
Eyes : Corrosive to eyes. Causes burns.

Over-exposure signs/symptoms

Repeated exposure to high vapor concentrations may cause irritation of the respiratory system and permanent brain and nervous system damage. Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness and nausea and may lead to unconsciousness or death. There is some evidence that repeated exposure to organic solvent vapors in combination with constant loud noise can cause greater hearing loss than expected from exposure to noise alone.

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
barium sulfate	7727-43-7	10 - 30
Talc , not containing asbestiform fibres	14807-96-6	10 - 30
xylene	1330-20-7	7 - 13
4-nonylphenol, branched	84852-15-3	5 - 10
NJTS 80100337-5132	Proprietary	3 - 7
1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich	68515-49-1	1 - 5
Alkylphenol	Not available.	1 - 5
Aliphatic Amine	Not available.	1 - 5
benzyl alcohol	100-51-6	1 - 5
Poly(oxy(methyl-1,2-ethanediyl)), alpha-(2-aminomethylethyl)-omega-(2-aminomethylethoxy)-	9046-10-0	1 - 5
ethylbenzene	100-41-4	1 - 5
Fatty Amine Carbohydrate Complex	Not available.	0.5 - 1.5
Phenol, 2-nonyl-, branched	91672-41-2	0.1 - 1
ethanol	64-17-5	0.1 - 1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting.

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5 . Fire-fighting measures

Flammability of the product : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous combustion products : Decomposition products may include the following materials:
carbon oxides
nitrogen oxides
sulfur oxides
metal oxide/oxides

5 . Fire-fighting measures

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Use spark-proof tools and explosion-proof equipment. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not breathe vapor or mist. Do not swallow. Do not get in eyes or on skin or clothing. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. Vapors are heavier than air and may spread along floors. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. If this material is part of a multiple component system, read the Material Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Do not store above the following temperature: 120F / 49C.

8 . Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	PPG
barium sulfate	TWA	10 mg/m³	5 mg/m³ R 15 mg/m³ TD	10 mg/m³ TD	Not established	Not established
Talc , not containing asbestiform fibres	TWA	2 mg/m³ R	20 mppcf Z	2 mg/m³ R	2 mg/m³ R	Not established
xylene	TWA	100 ppm	100 ppm	100 ppm	100 ppm	Not established
	STEL	150 ppm	Not established	150 ppm	150 ppm	Not established
benzyl alcohol	TWA	Not established	Not established	Not established	Not established	10 ppm
ethylbenzene	TWA	20 ppm	100 ppm	100 ppm	100 ppm	Not established
	STEL	Not established	Not established	125 ppm	125 ppm	Not established
ethanol	TWA	Not established	1000 ppm	Not established	1000 ppm	Not established
	STEL	1000 ppm	Not established	1000 ppm	Not established	Not established

Key to abbreviations

A = Acceptable Maximum Peak
ACGIH = American Conference of Governmental Industrial Hygienists.
C = Ceiling Limit
F = Fume
IPEL = Internal Permissible Exposure Limit
OSHA = Occupational Safety and Health Administration.
R = Respirable
Z = OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances
S = Potential skin absorption
SR = Respiratory sensitization
SS = Skin sensitization
STEL = Short term Exposure limit values
TD = Total dust
TLV = Threshold Limit Value
TWA = Time Weighted Average

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Chemical splash goggles and face shield.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Gloves : nitrile, neoprene

Respiratory : If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

8 . Exposure controls/personal protection

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Liquid.
Flash point : Closed cup: 33.33°C (92°F)
Explosion limits : Lower: 1.1%
Material supports combustion. : Yes.
Color : Not available.
Odor : Not available.
pH : Not available.
Boiling/condensation point : >37.78°C (>100°F)
Melting/freezing point : Not available.
Specific gravity : 1.4
Density (lbs / gal) : 11.68
Vapor pressure : 1.1 kPa (8.5 mm Hg) [20°C]
Vapor density : Not available.
Volatility : 30% (v/v), 19.33% (w/w)
Evaporation rate : 0.6 (butyl acetate = 1)
Partition coefficient: n-octanol/water : Not available.
% Solid. (w/w) : 80.67

10 . Stability and reactivity

Stability : Stable under recommended storage and handling conditions (see section 7).
Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
Materials to avoid : Reactive or incompatible with the following materials:,acids,oxidizing materials,strong alkalis
Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
xylene	LD50 Oral	Rat	4.3 g/kg	-
	LD50 Dermal	Rabbit	>1.7 g/kg	-
	LC50 Inhalation Vapor	Rat	5000 ppm	4 hours
4-nonylphenol, branched	LD50 Oral	Rat	0.58 g/kg	-
	LD50 Dermal	Rabbit	2.14 g/kg	-
1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich	LD50 Oral	Rat	>60000 mg/kg	-
	LD50 Dermal	Rabbit	16000 mg/kg	-
Alkylphenol	LD50 Dermal	Rabbit	2.288 g/kg	-

11 . Toxicological information

benzyl alcohol	LD50 Oral	Rat	1.23 g/kg	-
	LD50 Dermal	Rabbit	2000 mg/kg	-
Poly(oxy(methyl-1,2-ethanediyl)), alpha-(2-aminomethylethyl)-omega-(2-aminomethylethoxy)-	LD50 Oral	Rat	242 mg/kg	-
	LD50 Dermal	Rabbit	360 mg/kg	-
ethylbenzene	LD50 Oral	Rat	3.5 g/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LC50 Inhalation Vapor	Rat	4000 ppm	4 hours
ethanol	LD50 Oral	Rat	7 g/kg	-
	LC50 Inhalation	Rat	124700 mg/m3	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Defatting irritant : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

Target organs : Contains material which causes damage to the following organs: blood, kidneys, liver, heart, brain, upper respiratory tract, skin, central nervous system (CNS).
Contains material which may cause damage to the following organs: lungs, the nervous system, the reproductive system, gastrointestinal tract, cardiovascular system, ears, eye, lens or cornea.

Carcinogenicity

Carcinogenicity : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	NTP	OSHA
xylene	A4	3	-	-
ethylbenzene	A3	2B	-	-

Carcinogen Classification code: ACGIH: A1, A2, A3, A4, A5
IARC: 1, 2A, 2B, 3, 4
NTP: Proven, Possible
OSHA: +
Not listed or regulated as a carcinogen: -

Teratogenicity

Reproductive toxicity

Developmental effects : Contains material which may cause developmental abnormalities, based on animal data.

Fertility effects : Contains material which may impair male fertility, based on animal data. Contains material which may impair female fertility, based on animal data.

12 . Ecological information

Environmental effects : Water polluting material. May be harmful to the environment if released in large quantities.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
barium sulfate	Acute EC50 32000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
xylene	Acute LC50 3300 to 4093 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
4-nonylphenol, branched	Acute LC50 135.1 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours
	Acute LC50 142 ug/L Marine water	Fish - Sheepshead minnow - Cyprinodon variegatus	96 hours

12 . Ecological information

	Chronic NOEC 23 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	4 days
	Chronic NOEC 0.24 to 0.26 mg/L Marine water	Fish - Sheepshead minnow - Cyprinodon variegatus	96 hours
benzyl alcohol	Acute LC50 10000 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours
ethylbenzene	Acute LC50 4200 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	Acute LC50 5100 to 5700 ug/L Marine water	Fish - Atlantic silverside - Menidia menidia	96 hours
	Acute EC50 2930 to 4400 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC 3300 ug/L Marine water	Fish - Atlantic silverside - Menidia menidia	96 hours
	Chronic NOEC 6800 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
Phenol, 2-nonyl-, branched	Acute LC50 0.1383 mg/l	Fish - Pimephales promelas	96 hours
ethanol	Acute LC50 42000 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	4 days
	Acute EC50 2000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC <6.3 g/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	3469	PAINT, FLAMMABLE, CORROSIVE	3 (8)	III	-
IMDG	3469	PAINT, FLAMMABLE, CORROSIVE. Marine pollutant (4-nonylphenol, branched)	3 (8)	III	-
DOT	3469	PAINT, FLAMMABLE, CORROSIVE	3 (8)	III	-

PG* : Packing group

Reportable quantity RQ : CERCLA: Hazardous substances.: ethylbenzene: 1000 lbs. (454 kg); xylene: 100 lbs. (45.4 kg); phenol: 1000 lbs. (454 kg);

15 . Regulatory information

United States Inventory (TSCA 8b) : All components are listed or exempted.
Australia inventory (AICS) : At least one component is not listed.
Canada inventory (DSL) : At least one component is not listed.
China inventory (IECSC) : All components are listed or exempted.
Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS) : At least one component is not listed.
Korea inventory (KECI) : At least one component is not listed.
New Zealand (NZIoC) : Substance Use Restricted
Philippines inventory (PICCS) : At least one component is not listed.

United States

U.S. Federal regulations :

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: ethylbenzene; xylene; barium sulfate; Talc , not containing asbestiform fibres; benzyl alcohol
CERCLA: Hazardous substances.: ethylbenzene: 1000 lbs. (454 kg); xylene: 100 lbs. (45.4 kg); phenol: 1000 lbs. (454 kg);

SARA 311/312 MSDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure
barium sulfate	7727-43-7	N	N	N	N	N
Talc , not containing asbestiform fibres	14807-96-6	Y	N	N	N	N
xylene	1330-20-7	Y	N	Y	N	N
4-nonylphenol, branched	84852-15-3	Y	Y	N	N	N
NJTS 80100337-5132	Proprietary	Y	N	N	N	N
1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich	68515-49-1	N	N	N	N	N
Aliphatic Amine	Not available.	Y	N	N	N	N
Alkylphenol	Not available.	Y	N	N	N	N
benzyl alcohol	100-51-6	Y	N	N	N	N
Poly(oxy(methyl-1,2-ethanediyl)), alpha-(2-aminomethylethyl)-omega-(2-aminomethylethoxy)-	9046-10-0	Y	N	N	N	N
ethylbenzene	100-41-4	Y	Y	Y	N	N
Fatty Amine Carbohydrate Complex	Not available.	N	N	N	N	N
Phenol, 2-nonyl-, branched	91672-41-2	Y	Y	N	N	N
Product as-supplied :		Y	Y	Y	N	N

SARA 313 Chemical name CAS number Concentration

15 . Regulatory information

Supplier notification	: xylene	1330-20-7	7 - 13
	ethylbenzene	100-41-4	1 - 5

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Canada

WHMIS (Canada) : Class B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). Class E: Corrosive liquid. Class D-1B: Material causing immediate and serious toxic effects (Toxic). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 3 Health : 3 Reactivity : 0

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 3 * Flammability : 3 Physical hazards : 0
(*) - Chronic effects

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 3 Flammability : 3 Instability : 0

Date of previous issue : 5/2/2012.

Organization that prepared the MSDS : EHS

☑ **Indicates information that has changed from previously issued version.**

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

Powered by

Material Safety Data Sheet

Date of issue 22 December 2010
Version 23

1. Product and company identification

Product name : AMERCOAT 68HS CURE
Code : AT68D-B
Supplier : PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272
Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)
Technical Phone Number : (412) 492-5200 (ALLISON PARK, PA) 8:00 a.m. - 5:00 p.m. EST

2. Hazards identification

Emergency overview : DANGER!

COMBUSTIBLE LIQUID AND VAPOR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF INHALED, ABSORBED THROUGH SKIN OR SWALLOWED. ASPIRATION HAZARD. CAN ENTER LUNGS AND CAUSE DAMAGE. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

Keep away from heat, sparks and flame. Do not swallow. Do not get in eyes or on skin or clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled. Irritating to respiratory system. Can irritate eyes, nose, mouth and throat.

Ingestion : May be harmful if swallowed. Aspiration hazard if swallowed. Can enter lungs and cause damage.

Skin : Harmful in contact with skin. Irritating to skin. May cause an allergic skin reaction.

Eyes : Severely irritating to eyes. Risk of serious damage to eyes.

Over-exposure signs/symptoms

Repeated exposure to high vapor concentrations may cause irritation of the respiratory system and permanent brain and nervous system damage. Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness and nausea and may lead to unconsciousness or death. There is some evidence that repeated exposure to organic solvent vapors in combination with constant loud noise can cause greater hearing loss than expected from exposure to noise alone.

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (Section 11)

3. Composition/information on ingredients

Name	CAS number	%
NJTS 80100337-5132	68410-23-1	30 - 60
Solvent naphtha (petroleum), light arom.	64742-95-6	10 - 30
1,2,4-trimethylbenzene	95-63-6	10 - 30
xylene	1330-20-7	5 - 10
Ethylbenzene	100-41-4	0.5 - 1.5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Combustible liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous combustion products : Decomposition products may include the following materials:
carbon oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

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6 . Accidental release measures

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Use spark-proof tools and explosion-proof equipment. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not swallow. Do not get in eyes or on skin or clothing. Avoid breathing vapor or mist. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. Vapors are heavier than air and may spread along floors. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. If this material is part of a multiple component system, read the Material Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Do not store above the following temperature: 120F / 49C.

8 . Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	PPG
1,2,4-trimethylbenzene	TWA	25 ppm	Not established	25 ppm	25 ppm	Not established
	STEL	Not established	Not established	Not established	35 ppm	Not established
xylene	TWA	100 ppm	100 ppm	100 ppm	100 ppm	Not established
	STEL	150 ppm	Not established	150 ppm	150 ppm	Not established

8 . Exposure controls/personal protection

Ethylbenzene	TWA	100 ppm	100 ppm	100 ppm	100 ppm	Not established
	STEL	125 ppm	Not established	125 ppm	125 ppm	Not established

Key to abbreviations

A = Acceptable Maximum Peak
ACGIH = American Conference of Governmental Industrial Hygienists.
C = Ceiling Limit
F = Fume
IPEL = Internal Permissible Exposure Limit
OSHA = Occupational Safety and Health Administration.
R = Respirable
Z = OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances
S = Potential skin absorption
SR = Respiratory sensitization
SS = Skin sensitization
STEL = Short term Exposure limit values
TD = Total dust
TLV = Threshold Limit Value
TWA = Time Weighted Average

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Chemical splash goggles.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Gloves : butyl rubber

Respiratory : If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Liquid.

Flash point : Closed cup: 43.33°C (110°F)

Explosion limits : Lower: 0.9%

Color : Not available.

Odor : Not available.

pH : Not available.

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9 . Physical and chemical properties

Boiling/condensation point : >37.78°C (>100°F)
Melting/freezing point : Not available.
Specific gravity : 0.92
Density (lbs / gal) : 7.68
Vapor pressure : 0.6 kPa (4.5 mm Hg) [20°C]
Vapor density : Not available.
Volatility : 53% (v/v), 50.21% (w/w)
Odor threshold : Not available.
Evaporation rate : 32 (butyl acetate = 1)
Partition coefficient: n-octanol/water : Not available.
% Solid. (w/w) : 49.79

10 . Stability and reactivity

Stability : Stable under recommended storage and handling conditions (see section 7).
Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
Materials to avoid : Reactive or incompatible with the following materials:,oxidizing materials,strong acids,strong alkalis
Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Solvent naphtha (petroleum), light arom.	LD50 Oral	Rat	8400 mg/kg	-
	LD50 Dermal	Rabbit	3.48 g/kg	-
1,2,4-trimethylbenzene	LD50 Oral	Rat	5 g/kg	-
	LC50 Inhalation	Rat	18000 mg/m3	4 hours
xylene	LD50 Oral	Rat	4.3 g/kg	-
	LD50 Dermal	Rabbit	>1.7 g/kg	-
	LC50 Inhalation Vapor	Rat	5000 ppm	4 hours
Ethylbenzene	LD50 Oral	Rat	3.5 g/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LC50 Inhalation Vapor	Rat	4000 ppm	4 hours

Chronic toxicity

Conclusion/Summary : Not available.
Defatting irritant? : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.
Target organs : Contains material which causes damage to the following organs: brain, central nervous system (CNS).
Contains material which may cause damage to the following organs: blood, kidneys, liver, gastrointestinal tract, upper respiratory tract, skin, eyes.

Carcinogenicity

Carcinogenicity : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.

Classification

11 . Toxicological information

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
xylene	A4	3	-	-	-	-
Ethylbenzene	A3	2B	-	-	-	-

Mutagenicity

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity

Teratogenicity : No known significant effects or critical hazards.

Reproductive toxicity

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

12 . Ecological information

Environmental effects : Water polluting material. May be harmful to the environment if released in large quantities.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
1,2,4-trimethylbenzene	Acute LC50 7720 to 8280 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
xylene	Acute LC50 3300 to 4093 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
Ethylbenzene	Acute LC50 4200 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	Acute LC50 5100 to 5700 ug/L Marine water	Fish - Atlantic silverside - Menidia menidia	96 hours
	Acute EC50 2930 to 4400 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC 3300 ug/L Marine water	Fish - Atlantic silverside - Menidia menidia	96 hours
	Chronic NOEC 6800 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	1263	PAINT	3	III	-
IMDG	1263	PAINT. Marine pollutant (1,2,4-trimethylbenzene, Solvent naphtha (petroleum), light arom.)	3	III	-
DOT	1263	PAINT	3	III	Remarks USA Only: Can be reclassified as Combustible Liquid. Non-Bulk highway shipments (Less than or Equal to 450Liters) can be shipped as non-regulated.

PG* : Packing group

Reportable quantity RQ : CERCLA: Hazardous substances.: Cumene: 5000 lbs. (2270 kg); xylene: 100 lbs. (45.4 kg); Ethylbenzene: 1000 lbs. (454 kg);

15 . Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.
Australia inventory (AICS) : All components are listed or exempted.
Canada inventory (DSL) : All components are listed or exempted.
China inventory (IECSC) : All components are listed or exempted.
Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS) : All components are listed or exempted.
orea inventory (KECI) : All components are listed or exempted.
New Zealand (NZIoC) : All components are listed or exempted.
Philippines inventory (PICCS) : All components are listed or exempted.

United States

U.S. Federal regulations :
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: xylene; 1,2,4-trimethylbenzene; Ethylbenzene
CERCLA: Hazardous substances.: Cumene: 5000 lbs. (2270 kg); xylene: 100 lbs. (45.4 kg); Ethylbenzene: 1000 lbs. (454 kg);

SARA 311/312 MSDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure
NJTS 80100337-5132	68410-23-1	Y	N	N	N	N
Solvent naphtha (petroleum), light arom.	64742-95-6	Y	N	N	N	N
1,2,4-trimethylbenzene	95-63-6	Y	N	Y	N	N
xylene	1330-20-7	Y	N	Y	N	N
Ethylbenzene	100-41-4	Y	Y	Y	N	N
Product as-supplied :		Y	Y	Y	N	N

SARA 313
Supplier notification :

Chemical name	CAS number	Concentration
1,2,4-trimethylbenzene	95-63-6	10 - 30
xylene	1330-20-7	5 - 10
Ethylbenzene	100-41-4	0.5 - 1.5

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

15 . Regulatory information

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 2 **Health** : 3 **Reactivity** : 0

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 3 * **Flammability** : 2 **Physical hazards** : 0

(*) - Chronic effects

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 3 **Flammability** : 2 **Instability** : 0

Date of previous issue : **10/16/2010.**

Organization that prepared the MSDS : EHS

Indicates information that has changed from previously issued version.

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

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MATERIAL SAFETY DATA SHEET

F78W100
12 00

DATE OF PREPARATION
May 1, 2011

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
F78W100
PRODUCT NAME
Fast Dry Acrylic Enamel, Blending White
MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
17	108-88-3	**Toluene**		
		ACGIH TLV	20 PPM	22 mm
		OSHA PEL	100 ppm (Skin)	
		OSHA PEL	150 ppm (Skin) STEL	
5	100-41-4	**Ethylbenzene**		
		ACGIH TLV	100 PPM	7.1 mm
		ACGIH TLV	125 PPM STEL	
		OSHA PEL	100 PPM	
		OSHA PEL	125 PPM STEL	
26	1330-20-7	**Xylene**		
		ACGIH TLV	100 PPM	5.9 mm
		ACGIH TLV	150 PPM STEL	
		OSHA PEL	100 PPM	
		OSHA PEL	150 PPM STEL	
23	13463-67-7	**Titanium Dioxide**		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

HMIS Codes

Health	2*
Flammability	3
Reactivity	0

EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.
Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:
- the liver
- the urinary system
- the cardiovascular system
- the reproductive system

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.

CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
45 °F PMCC	1.0	7.0	RED LABEL -- Flammable, Flash below 100 °F (38 °C)

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode when exposed to extreme heat.
Application to hot surfaces requires special precautions.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY
DOL Storage Class IB
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Contents are FLAMMABLE. Keep away from heat, sparks, and open flame.
During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
Consult NFPA Code. Use approved Bonding and Grounding procedures.
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.
PROTECTIVE GLOVES
Wear gloves which are recommended by glove supplier for protection against materials in Section 2.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.
OTHER PRECAUTIONS
Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	9.44 lb/gal	1130 g/l
SPECIFIC GRAVITY	1.14	
BOILING POINT	222 - 292 °F	105 - 144 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	63%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

4.55 lb/gal	546 g/l	Less Water and Federally Exempt Solvents
4.55 lb/gal	546 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

Ethylbenzene is classified by IARC as possibly carcinogenic to humans (2B) based on inadequate evidence in humans and sufficient evidence in laboratory animals. Lifetime inhalation exposure of rats and mice to high ethylbenzene concentrations resulted in increases in certain types of cancer, including kidney tumors in rats and lung and liver tumors in mice. These effects were not observed in animals exposed to lower concentrations. There is no evidence that ethylbenzene causes cancer in humans.

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
108-88-3	**Toluene**			
		LC50 RAT	4HR	4000 ppm
		LD50 RAT		5000 mg/kg
100-41-4	**Ethylbenzene**			
		LC50 RAT	4HR	Not Available
		LD50 RAT		3500 mg/kg
1330-20-7	**Xylene**			
		LC50 RAT	4HR	5000 ppm
		LD50 RAT		4300 mg/kg
13463-67-7	**Titanium Dioxide**			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole

Toluene 1000 lb RQ
Xylenes (isomers and mixture) 100 lb RQ

Bulk Containers may be Shipped as (check reportable quantities):
RQ, UN1263, PAINT, 3, PG II, (XYLENES (ISOMERS AND MIXTURE)), (ERG#128)

Canada (TDG)
UN1263, PAINT, CLASS 3, PG II, (ERG#128)

IMO
5 Liters (1.3 Gallons) and Less may be Shipped as Limited Quantity.
UN1263, PAINT, CLASS 3, PG II, (7 C c.c.), EmS F-E, S-E, ADR (D/E)

IATA/ICAO
UN1263, PAINT, 3, PG II

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
108-88-3	Toluene	17	
100-41-4	Ethylbenzene	5	
1330-20-7	Xylene	26	

CALIFORNIA PROPOSITION 65
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION
All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Clear Gloss Brown
Red
Blue

Valley Paint 1643-037 - 1643-038

MATERIAL SAFETY DATA SHEET

Emergency # 1-800-424-9300
Information# (801)-298-4581

Valley Paint Mfg.
727 South 950 West
Woods Cross, Utah 84087

Latest Revision Date...07/11/07
Print Date.....07/11/07

CLEAR SEMI GLOSS BASE ENAMEL

SECTION 1 PRODUCT IDENTIFICATION

PRODUCT NAME OR NUMBER..... 2037
TRADE NAME OR CHEMICAL NAME... CLEAR SEMI GLOSS BASE ENAMEL
CHEMICAL FAMILY..... SOLVENT REDUCED ALKYD
NFPA..... FIRE HAZARD 3 HEALTH HAZARD 2 REACTIVITY 0 SPECIFIC HAZARD
HMIS RATING..... HEALTH 2 FLAMMABILITY 3 REACTIVITY 0

SECTION 2 HAZARDOUS INGREDIENTS / HAZARD DATA

CHEMICAL NAME(S)	CAS NUMBER	% wt.	TLV-TWA	PEL	SEC.313	CAR.	HAZ.	NTP	IARC
XYLENE	1330 -20-7	17.5	100 ppm	100 ppm	Yes	YES	FLAM.	YES	YES

Information for mixtures is based on constituent MSDS which are available-- upon request. (Minus Proprietary Trade Names).

SECTION 3 PHYSICAL DATA

BOILING/MELTING POINT @760 mm Hg... 244-287 F
PERCENT VOLATILE BY VOLUME..... 50.3
SOLUBILITY IN WATER..... NA
EVAPORATION RATE (BuAc = 1)..... .45
APPEARANCE..... WHITE LIQUID
ODOR..... COMMON TO SOLVENT REDUCED PAINTS
AVERAGE WRIGHT PER GALLON..... 8.865 LBS
V.O.C.'s [volatile organic comp]... 3.6 lbs/gal 427.6 grams/liter

SECTION 4 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT °F (Test Method)..... 52 F TAG C.C.
AUTOIGNITION TEMPERATURE..... NA
EXTINGUISING MEDIA..... FOAM, DRY CHEMICAL, WATER
SPECIAL FIRE FIGHTING PROCEDURES... EXCLUDE AIR, KEEP NEARBY CONTAINERS COOLED
UNUSUAL FIRE & EXPLOSION HAZARDS... CLOSED CONTAINERS MAY RUPTURE WHEN EXPOSED TO EXCESSIVE HEAT. FIRE MAY PRODUCE CARBON MONOXIDE.

SECTION 5 HEALTH HAZARD DATA * EFFECTS OF OVEREXPOSURE

SKIN CONTACT.....Prolonged or repeated contact of product with skin may cause irritation, and could result in dermatitis. Skin absorption may lead to central nervous system depression.
EYE CONTACT.....Direct contact of product with eyes can cause irritation, and may result in irreversable damage.
INHALATION.....The Xylene component of this material is irritating to the respiratory system.
INGESTION.....The major hazard associated with ingestion of o-xylen is that of aspiration into the lungs. Aspiration may result in chemical pneumonitis, pulmonary edema & hemorrhage. Ingestion may lead to CNS depression.
CHRONIC EFFECTS OF OVEREXPOSURE....The chronic effects of overexposure include possible liver and kidney damage. A mixture of o, m, and p-xylenes was teratogenic and embryotoxic to mice by the oral route; however, these effects were accompanied by maternal toxicity.
TOXICOLOGICAL TEST DATA.....No results available.
PRIMARY ROUTE OF ENTRY...BREATHING OF VAPORS, SKIN CONTACT

SECTION 313 NOTIFICATION--- This product may contain toxic chemicals subject to the reporting requirements of section 313 of the emergency planning and community right-to-know act of 1986(40 CFR 372): Refer to hazardous ingredients, section 2, of this M.S.D.S.

SECTION 6 EMERGENCY AND FIRST AID PROCEDURES

SKIN.....Wash affected areas with water while removing contaminated clothing. Get immediate medical attention. Launder contaminated clothing before reuse.

EYES.....Flush eyes with generous amounts of water for at least 15 minutes. Get immediate medical attention.

INGESTION....If swallowed, DO NOT INDUCE VOMITING. Dilute with water or milk and call a physician immediately. Never give fluids or induce vomiting if the victim is unconscious or having convulsions.

INHALATION...Move to fresh air. Aid in breathing, if necessay, and get immediate medical attention.

CLEAR SEMI GLOSS BASE ENAMEL

SECTION 7 REACTIVITY DATA

PRODUCT STABILITY..... STABLE
CONDITIONS TO AVOID..... OPEN FLAMES. SPARKS. VAPOR CONCENTRATION. DO NOT STORE WHERE TEMP. MAY EXCEED 140F.
CHEMICAL INCOMPATIBILITY..... NA
HAZARDOUS DECOMPOSITION PRODUCTS CARBON MONOXIDE AND/OR CARBON DIOXIDE
HAZARDOUS POLYMERIZATION..... WILL NOT OCCUR
CONDITIONS TO AVOID..... NA
CORROSIVE TO METAL..... NA
OXIDIZER..... NA

SECTION 8 SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION.....NIOSH/MSHA- approved organic vapor respirator when vapors are generated above the permissable limit.
VENTILATION.....Local exhaust to control to recommended P.E.L.
PROTECTIVE CLOTHING.....Gloves, coveralls, aprons, boots - as necessay to prevent skin contact.
EYE PROTECTION.....Chemical goggles.
OTHER PRECAUTIONS.....Shower after handling this product. Clean clothing should be worn daily. Eyewash fountains should be easily accessible.

SECTION 9 ENVIRONMENTAL DATA

SPILL AND LEAK PROCEDURES..... WIPE UP WITH ABSORBANT MATERIALS. FOR LARGE SPILLS, CONTACT LOCAL HAZ. MAT. TEAM.
WASTE DISPOSAL METHOD..... PLACE IN AIR TITE CONTAINER AND/OR COVER WITH WATER. DISPOSE OF IN APPROVED SITE. SPONTANIOUS COMBUSTION MAY OCCUR IF PROPER METHODS ARE NOT FOLLOWED.
CONTAINER DISPOSAL..... EMPTY CONTAINERS WITH LESS THAN ONE INCH OF RESIDUE MAY BE LAND FILLED AT A LICENSED FACILITY.

SECTION 10 SHIPPING DATA

D.O.T. PROPER SHIPPING NAME..... SOLVENT THINNED PAINT
D.O.T. HAZARD CLASS..... FLAMMABLE LIQUID
D.O.T. LABELS REQUIRED..... FLAMMABLE LIQUID
D.O.T. PLACARDS REQUIRED..... YES FLAMMABLE
BILL OF LADING DESCRIPTION..... PAINT, FLAMMABLE LIQUID
UN/NA CODE..... UN1263

SECTION 11 SUPPLIER INFORMATION

We believe the information contained in this material safety data sheet to be an accurate presentation of the hazardous contents of this product.

This M.S.D.S. has been prepared, using as refferences, information contained in m.s.d.s supplied to us by the raw material manufacturers and/or distributors. copies of these sheets, on individual items, are available on request.

White Speed Dry Enamel
Aesco Ivory

Valley Paint 1643-025 - 1643-026

MATERIAL SAFETY DATA SHEET

Emergency # 1-800-424-9300
Information# (801)-298-4581

Valley Paint Mfg.
727 South 950 West
Woods Cross, Utah 84087

Latest Revision Date...03/20/06
Print Date.....04/03/06

WHITE SPEED DRY ENAMEL

SECTION 1 PRODUCT IDENTIFICATION

PRODUCT NAME OR NUMBER..... 2106
TRADE NAME OR CHEMICAL NAME... WHITE SPEED DRY ENAMEL
CHEMICAL FAMILY..... SOLVENT THINNED ALKYD
NFPA..... FIRE HAZARD 3 HEALTH HAZARD 2 REACTIVITY 0
HMIS RATING..... HEALTH 2 FLAMMABILITY 3 REACTIVITY 0

SECTION 2 HAZARDOUS INGREDIENTS / HAZARD DATA

CHEMICAL NAME(S)	CAS NUMBER	% wt.	TLV-TWA	PEL	SEC.313	CAR.	HAZ.	NTP	IARC
XYLENE	1330 -20-7	39.85	100 ppm	100 ppm	Yes	YES	PLAM.	YES	YES
VM &P Naptha	64742 -89-8	9.94	300 ppm	300 ppm	No	NA		NA	NA
?	?		?	?	?	?	?	?	?

Information for mixtures is based on constituent MSDS which are available upon request. (Minus Proprietary Trade Names).

SECTION 3 PHYSICAL DATA

BOILING/MELTING POINT @760 mm Hg... 244-287 F
PERCENT VOLATILE BY VOLUME..... 62.8%
SOLUBILITY IN WATER..... NA
EVAPORATION RATE (BuAc = 1)..... .45
APPEARANCE..... WHITE LIQUID
ODOR..... COMMON TO SOLVENT PAINTS
AVERAGE WEIGHT PER GALLON..... 9.36
V.O.C.'s [volatile organic comp]... 4.71 LBS/GAL 587 GRAMS LITER

SECTION 4 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT °F (Test Method)..... 52 F TAG CC
AUTOIGNITION TEMPERATURE..... NA
EXTINGUISING MEDIA..... FOAM, DRY CHEMICAL,, WATER
SPECIAL FIRE FIGHTING PROCEDURES... EXCLUDE AIR, KEEP NEARBY CONTAINERS COOLED
UNUSUAL FIRE & EXPLOSION HAZARDS... CLOSED CONTAINERS MAY RUPTURE WHEN EXPOSED TO EXCESSIVE HEAT. FIRE MAY PRODUCE CARBO N DIOXIDE

SECTION 5 HEALTH HAZARD DATA * EFFECTS OF OVEREXPOSURE

SKIN CONTACT.....Prolonged or repeated contact of product with skin may cause irritation, and could result in dermatitis. Skin absorption may lead to central nervous system depression.
EYE CONTACT.....Direct contact of product with eyes can cause irritation, and may result in irreversable damage.
INHALATION.....The Xylene component of this material is irritating to the respiratory system.
INGESTION.....The major hazard associated with ingestion of o-xylen is that of aspiration into the lungs. Aspiration may result in chemical pneumonitis, pulmonary edema & hemorrhage. Ingestion may lead to CNS depression.
CHRONIC EFFECTS OF OVEREXPOSURE....The chronic effects of overexposure include possible liver and kidney damage. A mixture of o, m, and p-xylenes was teratogenic and embryotoxic to mice by the oral route; however, these effects were accompanied by maternal toxicity.

TOXICOLOGICAL

TEST DATA.....No results available.
PRIMARY ROUTE OF ENTRY...BREATHING OF VAPORS, SKIN CONTACT

SECTION 313 NOTIFICATION--- This product may contain toxic chemicals subject to the reporting requirements of section 313 of the emergency planning and community right-to-know act of 1986(40 CFR 372): Refer to hazardous ingredients, section 2, of this M.S.D.S.

SECTION 6 EMERGENCY AND FIRST AID PROCEDURES

SKIN.....Wash affected areas with water while removing contaminated clothing. Get immediate medical attention. Launder contaminated clothing before reuse.
EYES.....Flush eyes with generous amounts of water for at least 15 minutes. Get immediate medical attention.
INGESTION....If swallowed, DO NOT INDUCE VOMITING. Dilute with water or milk and call a physician immediately. Never give fluids or induce vomiting if the victim is unconscious or having convulsions.
INHALATION...Move to fresh air. Aid in breathing, if necessay, and get immediate medical attention.

WHITE SPEED DRY ENAMEL

SECTION 7 REACTIVITY DATA

PRODUCT STABILITY..... STABLE
CONDITIONS TO AVOID..... OPEN FLAMES. SPARKS. VAPOR CONCENTRATION. DO NOT STORE WHERE TEMP. MAY EXCEED 140F.
CHEMICAL INCOMPATIBILITY..... NA
HAZARDOUS DECOMPOSITION PRODUCTS CARBON MONOXIDE AND/OR CARBON DIOXIDE
HAZARDOUS POLYMERIZATION..... WILL NOT OCCUR
CONDITIONS TO AVOID..... NA
CORROSIVE TO METAL..... NA
OXIDIZER..... NA

SECTION 8 SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION.....NIOSH/MSHA- approved organic vapor respirator when vapors are generated above the permissable limit.
VENTILATION.....Local exhaust to control to rcommended P.E.L.
PROTECTIVE CLOTHING.....Gloves, coveralls, aprons, boots - as necessay to prevent skin contact.
EYE PROTECTION.....Chemical goggles.
OTHER PRECAUTIONS.....Shower after handling this product. Clean clothing should be worn daily. Eyewash fountains should be easily accessible.

SECTION 9 ENVIRONMENTAL DATA

SPILL AND LEAK PROCEDURES..... WIPE UP WITH ABSORBANT MATERIALS. FOR LARGE SPILLS, CONTACT LOCAL HAZ. MAT. TEAM.
WASTE DISPOSAL METHOD..... PLACE IN AIR TITE CONTAINER AND/OR COVER WITH WATER. DISPOSE OF IN APPROVED SITE. SPONTANIOUS COMBUSTION MAY OCCUR IF PROPER METHODS ARE NOT FOLLOWED.
CONTAINER DISPOSAL..... EMPTY CONTAINERS WITH LESS THAN ONE INCH OF RESIDUE MAY BE LAND FILLED AT A LICENSED FACILITY.

SECTION 10 SHIPPING DATA

D.O.T. PROPER SHIPPING NAME..... SOLVENT THINNED PAINT
D.O.T. HAZARD CLASS..... FLAMMABLE LIQUID
D.O.T. LABELS REQUIRED..... FLAMMABLE LIQUID
D.O.T. PLACARDS REQUIRED..... YES FLAMMABLE
BILL OF LADING DESCRIPTION..... PAINT, FLAMMABLE LIQUID
UN/NA CODE..... UN1263

SECTION 11 SUPPLIER INFORMATION

We believe the information contained in this material safety data sheet to be an accurate presentation of the hazardous contents of this product.

This M.S.D.S. has been prepared, using as refferences, information contained in m.s.d.s supplied to us by the raw material manufacturers and/or distributors. copies of these sheets, on individual items, are available on request.

Valley Paint 1643-021 - 1643-022

MATERIAL SAFETY DATA SHEET

Valley Paint Mfg.
727 South 950 West
Woods Cross, Utah 84087

Emergency # 1-800-424-9300
Information# (801)-298-4581

Latest Revision Date...03/20/06
Print Date.....04/03/06

CLEAR SPEED DRY ENAMEL

SECTION 1 PRODUCT IDENTIFICATION

PRODUCT NAME OR NUMBER..... 2014 Blue
TRADE NAME OR CHEMICAL NAME... CLEAR SPEED DRY ENAMEL
CHEMICAL FAMILY..... SOLVENT THINNED ALKYD
NFPA..... FIRE HAZARD 3 HEALTH HAZARD 2 REACTIVITY 0
HMIS RATING..... HEALTH 2 FLAMMABILITY 3 REACTIVITY 0

SECTION 2 HAZARDOUS INGREDIENTS / HAZARD DATA

CHEMICAL NAME(S)	CAS NUMBER	% wt.	TLV-TWA	PEL	SEC.313	CAR.	HAZ.	NTP	IARC
XYLENE	1330 -20-7	39.85	100 ppm	100 ppm	Yes	YES	FLAM.	YES	YES
VM &P Naptha	64742 -89-8	9.94	300 ppm	300 ppm	No	NA		NA	NA

Information for mixtures is based on constituent MSDS which are available upon request. (Minus Proprietary Trade Names).

SECTION 3 PHYSICAL DATA

BOILING/MELTING POINT @760 mm Hg... 244-287 F
PERCENT VOLATILE BY VOLUME..... 62.8%
SOLUBILITY IN WATER..... NA
EVAPORATION RATE (BuAc = 1)..... .45
APPEARANCE..... CLEAR LIQUID
ODOR..... COMMON TO SOLVENT PAINTS
AVERAGE WEIGHT PER GALLON..... 8.54
V.O.C.'s [volatile organic comp]... 4.71 LBS/GAL 587 GRAMS LITER

SECTION 4 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT °F (Test Method)..... 52 F TAG CC
AUTOIGNITION TEMPERATURE..... NA
EXTINGUISING MEDIA..... FOAM, DRY CHEMICAL,, WATER
SPECIAL FIRE FIGHTING PROCEDURES... EXCLUDE AIR, KEEP NEARBY CONTAINERS COOLED
UNUSUAL FIRE & EXPLOSION HAZARDS... CLOSED CONTAINERS MAY RUPTURE WHEN EXPOSED TO EXCESSIVE HEAT. FIRE MAY PRODUCE CARBO N DIOXIDE

SECTION 5 HEALTH HAZARD DATA * EFFECTS OF OVEREXPOSURE

SKIN CONTACT.....Prolonged or repeated contact of product with skin may cause irritation, and could result in dermatitis. Skin absorption may lead to central nervous system depression.
EYE CONTACT.....Direct contact of product with eyes can cause irritation, and may result in irreversable damage.
INHALATION.....The Xylene component of this material is irritating to the respiratory system.
INGESTION.....The major hazard associated with ingestion of o-xylen is that of aspiration into the lungs. Aspiration may result in chemical pneumonitis, pulmonary edema & hemorrhage. Ingestion may lead to CNS depression.

CHRONIC EFFECTS OF OVEREXPOSURE....The chronic effects of overexposure include possible liver and kidney damage. A mixture of o, m, and p-xylenes was teratogenic and embryotoxic to mice by the oral route; however, these effects were accompanied by maternal toxicity.

PRIMARY ROUTE OF ENTRY...BREATHING OF VAPORS, SKIN CONTACT

SECTION 313 NOTIFICATION--- This product may contain toxic chemicals subject to the reporting requirements of section 313 of the emergency planning and community right-to-know act of 1986(40 CFR 372): Refer to hazardous ingredients, section 2, of this M.S.D.S.

SECTION 6 EMERGENCY AND FIRST AID PROCEDURES

SKIN.....Wash affected areas with water while removing contaminated clothing. Get immediate medical attention. Launder contaminated clothing before reuse.

EYES.....Flush eyes with generous amounts of water for at least 15 minutes. Get immediate medical attention.

INGESTION....If swalloved, DO NOT INDUCE VOMITING. Dilute with water or milk and call a physician immediately. Never give fluids or induce vomiting if the victim is unconscious or having convulsions.

INHALATION...Move to fresh air. Aid in breathing, if necessay, and get immediate medical attention.

CLEAR SPEED DRY ENAMEL

SECTION 7 REACTIVITY DATA

PRODUCT STABILITY..... STABLE
CONDITIONS TO AVOID..... OPEN FLAMES. SPARKS. VAPOR CONCENTRATION. DO NOT STORE WHERE TEMP. MAY EXCEED 140F.
CHEMICAL INCOMPATIBILITY..... NA
HAZARDOUS DECOMPOSITION PRODUCTS CARBON MONOXIDE AND/OR CARBON DIOXIDE
HAZARDOUS POLYMERIZATION..... WILL NOT OCCUR
CONDITIONS TO AVOID..... NA
CORROSIVE TO METAL..... NA
OXIDIZER..... NA

SECTION 8 SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION.....NIOSH/MSHA- approved organic vapor respirator when vapors are generated above the permissable limit.
VENTILATION.....Local exhaust to control to recommended P.E.L.
PROTECTIVE CLOTHING.....Gloves, coveralls, aprons, boots - as necessay to prevent skin contact.
EYE PROTECTION.....Chemical goggles.
OTHER PRECAUTIONS.....Shower after handling this product. Clean clothing should be worn daily. Eyewash fountains should be easily accessible.

SECTION 9 ENVIRONMENTAL DATA

SPILL AND LEAK PROCEDURES..... WIPE UP WITH ABSORBANT MATERIALS. FOR LARGE SPILLS, CONTACT LOCAL HAZ. MAT. TEAM.
WASTE DISPOSAL METHOD..... PLACE IN AIR TITE CONTAINER AND/OR COVER WITH WATER. DISPOSE OF IN APPROVED SITE. SPONTANIOUS COMBUSTION MAY OCCUR IF PROPER METHODS ARE NOT FOLLOWED.
CONTAINER DISPOSAL..... EMPTY CONTAINERS WITH LESS THAN ONE INCH OF RESIDUE MAY BE LAND FILLED AT A LICENSED FACILITY.

SECTION 10 SHIPPING DATA

D.O.T. PROPER SHIPPING NAME..... SOLVENT THINNED PAINT
D.O.T. HAZARD CLASS..... FLAMMABLE LIQUID
D.O.T. LABELS REQUIRED..... FLAMMABLE LIQUID
D.O.T. PLACARDS REQUIRED..... YES FLAMMABLE
BILL OF LADING DESCRIPTION..... PAINT, FLAMMABLE LIQUID
UN/NA CODE..... UN1263

SECTION 11 SUPPLIER INFORMATION

We believe the information contained in this material safety data sheet to be an accurate presentation of the hazardous contents of this product.

This M.S.D.S. has been prepared, using as refferences, information contained in m.s.d.s supplied to us by the raw material manufacturers and/or distributors. copies of these sheets, on individual items, are available on request.

VALLEY PAINT MANUFACTURING
727 South 950 West • Woods Cross, Utah 84087

MATERIAL SAFETY DATA SHEET

003 GRAY PRIMER

1/17/2011

PRODUCT NAME: 003 GRAY PRIMER
PRODUCT CODE: 003 GRAY PRIMER

HMIS CODES: H F R P
2 3 1 Bopt

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: VALLEY PAINT MANUFACTURING
ADDRESS : 727 SOUTH 950 WEST
WOODS CROSS, UTAH 84087

EMERGENCY PHONE : 801-298-4581
INFORMATION PHONE : 800-424-9300

REVISION DATE : 11/05/08
NAME OF PREPARER : RALPH GRIDER

SECTION II - HAZARDOUS INGREDIENTS / SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	VAPOR PRESSURE mm Hg @ TEMP		WEIGHT PERCENT
* XYLENE	1330-20-7	2.4	68 DEG	23
OSHA VPEL 100 PPM TWA				
OSHA VPEL 150 PPM STEL				
ACGIH TLV 100 PPM TWA				
ACGIH TLV 150 PPM STEL				
A&P NAPHTHA	64742-89-8	10.2	68 DEG	12.68
OSHA VPEL 300 PPM TWA				
OSHA VPEL 400 PPM STEL				
ACGIH TLV 300 PPM TWA				

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

N = N.T.P. Carcinogen I = I.A.R.C. Carcinogen

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: 240 DEG F - 279 DEG F
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C.: 3.88 lb/gl
MATERIAL V.O.C.: 3.88 lb/gl
SOLUBILITY IN WATER: Non Soluble
APPEARANCE AND ODOR: COMMON TO SOLVENT REDUCED PAINT

DENSITY (H2O=8.33): 10.1988 lb/gl
EVAPORATION RATE: SLOWER THAN ETHER
464 g/l
464 g/l

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 50 DEG F **METHOD USED: SETAFLASH**
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 0.9%(V) **UPPER: 7.0%(V)**

EXTINGUISHING MEDIA:
FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL, WATER FOG, OTHER

SPECIAL FIREFIGHTING PROCEDURES
Respiratory equipment should be worn to avoid inhalation of concentrated vapors. Water should not be used except as fog to keep nearby containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Handle as flammable liquid. Vapors form an explosive mixture in air between the upper and lower explosive limits which can be ignited by many sources such as pilot lights, open flames, electrical motors and switches.

SECTION V - REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID
Excessive heat, poor ventilation, corrosive atmospheres, excessive aging.

INCOMPATIBILITY (MATERIALS TO AVOID)
Alkaline materials, strong acids and oxidizing materials.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
Carbon monoxide, carbon dioxide, oxides of nitrogen, and possibly acrolein.

HAZARDOUS POLYMERIZATION: WILL OCCUR

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Inhalation: Dizziness, breathing difficulty, headaches & loss of coordination.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Eye contact: Severe irritation, tearing, redness and blurred vision.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Skin contact: Can dry and defat skin causing cracks, irritation, and dermatitis.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Ingestion: Can cause gastrointestinal irritation, vomiting, nausea, and diarrhea.

HEALTH HAZARDS (ACUTE AND CHRONIC)
Inhalation-Dizziness, breathing difficulty, headaches, & loss of coordination. Eye contact-Severe irritation, tearing, redness, and blurred vision. Skin contact-Can dry and defat skin causing cracks, irritation, and dermatitis. Ingestion-Can cause gastrointestinal irritation, vomiting, nausea, & diarrhea. No chronic health effects.

CARCINOGENICITY: NTP CARCINOGEN: No IARC MONOGRAPHS: No OSHA REGULATED: No

INFORMATION NOT AVAILABLE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
Anesthesia, respiratory tract irritation, dermatitis, nausea, vomiting.

EMERGENCY AND FIRST AID PROCEDURES
Inhalation overexposure-Move person to fresh air. If breathing stops, apply artificial respiration and seek immediate medical attention. Eye contact-flush with large quantities of water for 15 minutes. Skin contact-Wash thoroughly with soap and water and see a doctor. Ingestion-Do not induce vomiting, can cause chemical pneumonitis and pulmonary edema. Contact physician immediately.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Eliminate ignition sources, provide good ventilation, dike spill area and add absorbent earth or sawdust to spilled liquid. Thoroughly wet with water and mix.

WASTE DISPOSAL METHOD
Collect absorbent/water/spilled liquid mixture into metal containers and add enough water to cover. Consult local,state & federal hazardous waste regulations before disposing into approved hazardous waste landfills. Obey relevant laws.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Use non-sparking utensils when handling this material. Avoid hot metal surface. Use in cool, well-ventilated areas. Keep containers closed when not in use. Keep away from excessive heat and open flames.

ER PRECAUTIONS
oking in area where this material is used should be strictly prohibited. Tools used with this material should be made from aluminum, brass or copper. Plastic utensils should not be used. NOTE: This information is accurate to the best knowledge of this company, but is furnished without any expressed or implied warranties.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION
When spraying this material use a NIOSH approved cartridge respirator or gas mask suitable to keep airborne mists and vapor concentrations below the time weighted threshold limit values. When using in poorly ventilated and confined spaces, use a fresh-air supplying respirator or a self-contained breathing apparatus.

VENTILATION
General mechanical ventilation or local exhaust should be suitable to keep vapor concentrations below TLV. Ventilation equip. must be explosion proof.

PROTECTIVE GLOVES
Impermeable chemical handling gloves for skin protection.

EYE PROTECTION
Use chemical safety glasses, goggles, and faceshields for eye protection.

HER PROTECTIVE CLOTHING OR EQUIPMENT
impermeable aprons and protective clothing whenever possible to prevent skin contact. The use of head caps whenever

possible is strongly recommended.

WORK/HYGIENIC PRACTICES
Eye washes and safety showers in the workplace are recommended.

SECTION IX - SHIPPING DATA

D.O.T. PROPER SHIPPING NAME.....PAINT, FLAMMABLE LIQUID
D.O.T. HAZARD CLASS.....FLAMMABLE LIQUID
D.O.T. LABELS REQUIRED.....FLAMMABLE LIQUID
D.O.T. PLACARDS REQUIRED.....YES FLAMMABLE
BILL OF LADING DESCRIPTION.....PAINT, FLAMMABLE LIQUID
UN/NA CODE.....UN1263

SECTION X - DISCLAIMER

To the best of our knowledge, the information contained herein is accurate, obtained from sources believed by this company to be accurate.

Genco Gray

VALLEY PAINT MANUFACTURING
727 South 950 West • Woods Cross, Utah 84087

MATERIAL SAFETY DATA SHEET

2154 DEEP BASE GLOSS SS

2/2/2011

PRODUCT NAME: 2154 DEEP BASE GLOSS SS **HMIS CODES: H F R P**
PRODUCT CODE: 2154 DEEP BASE GLOSS SS **2 3 1 Bop**

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: VALLEY PAINT MANUFACTURING
ADDRESS : 727 SOUTH 950 WEST
WOODS CROSS, UTAH 84087

EMERGENCY PHONE : 801-298-4581 **REVISION DATE : 06/10/10**
INFORMATION PHONE : 800-424-9300 **NAME OF PREPARER : RALPH GRIDER**

SECTION II - HAZARDOUS INGREDIENTS / SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	VAPOR PRESSURE mm Hg @ TEMP		WEIGHT PERCENT
* XYLENE	1330-20-7	2.4	68 DEG	46
OSHA VPEL 100 PPM TWA				
OSHA VPEL 150 PPM STEL				
ACGIH TLV 100 PPM TWA				
ACGIH TLV 150 PPM STEL				
P NAPHTHA	64742-89-8	10.2	68 DEG	8.54
OSHA VPEL 300 PPM TWA				
OSHA VPEL 400 PPM STEL				
ACGIH TLV 300 PPM TWA				

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

N = N.T.P. Carcinogen I = I.A.R.C. Carcinogen

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: 240 DEG F - 279 DEG F **DENSITY (H2O=8.33): 8.66556 lb/gl**
VAPOR DENSITY: HEAVIER THAN AIR **EVAPORATION RATE: SLOWER THAN ETHER**
COATING V.O.C.: 4.71 lb/gl **565 g/l**
MATERIAL V.O.C.: 4.71 lb/gl **565 g/l**
SOLUBILITY IN WATER: Non Soluble
APPEARANCE AND ODOR: COMMON TO SOLVENT REDUCED PAINT

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 50 DEG F **METHOD USED: SETAFLASH**
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 0.9%(V) **UPPER: 7.0%(V)**

EXTINGUISHING MEDIA:
FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL, WATER FOG, OTHER

SPECIAL FIREFIGHTING PROCEDURES
Respiratory equipment should be worn to avoid inhalation of concentrated vapors. Water should not be used except as fog to keep nearby containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Handle as flammable liquid. Vapors form an explosive mixture in air between the upper and lower explosive limits which can be ignited by many sources such as pilot lights, open flames, electrical motors and switches.

SECTION V - REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID
Excessive heat, poor ventilation, corrosive atmospheres, excessive aging.

INCOMPATIBILITY (MATERIALS TO AVOID)
Alkaline materials, strong acids and oxidizing materials.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
Carbon monoxide, carbon dioxide, oxides of nitrogen, and possibly acrolein.

HAZARDOUS POLYMERIZATION: WILL OCCUR

CTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Inhalation: Dizziness, breathing difficulty, headaches & loss of coordination.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Eye contact: Severe irritation, tearing, redness and blurred vision.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Skin contact: Can dry and defat skin causing cracks, irritation, and dermatitis.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Ingestion: Can cause gastrointestinal irritation, vomiting, nausea, and diarrhea.

HEALTH HAZARDS (ACUTE AND CHRONIC)
Inhalation-Dizziness, breathing difficulty, headaches, & loss of coordination. Eye contact-Severe irritation, tearing, redness, and blurred vision. Skin contact-Can dry and defat skin causing cracks, irritation, and dermatitis. Ingestion-Can cause gastrointestinal irritation, vomiting, nausea, & diarrhea. No chronic health effects.

CARCINOGENICITY: NTP CARCINOGEN: No IARC MONOGRAPHS: No OSHA REGULATED: No

INFORMATION NOT AVAILABLE.

)ICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
sthesia, respiratory tract irritation, dermatitis, nausea, vomiting.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation overexposure-Move person to fresh air. If breathing stops, apply artificial respiration and seek immediate medical attention. Eye contact-flush with large quantities of water for 15 minutes. Skin contact-Wash thoroughly with soap and water and see a doctor. Ingestion-Do not induce vomiting, can cause chemical pneumonitis and pulmonary edema. Contact physician immediately.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Eliminate ignition sources, provide good ventilation, dike spill area and add absorbent earth or sawdust to spilled liquid. Thoroughly wet with water and mix.

WASTE DISPOSAL METHOD

Collect absorbent/water/spilled liquid mixture into metal containers and add enough water to cover. Consult local,state & federal hazardous waste regulations before disposing into approved hazardous waste landfills. Obey relevant laws.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Use non-sparking utensils when handling this material. Avoid hot metal surface. Use in cool, well-ventilated areas. Keep containers closed when not in use. Keep away from excessive heat and open flames.

ER PRECAUTIONS

Smoking in area where this material is used should be strictly prohibited. Tools used with this material should be made from aluminum, brass or copper. Plastic utensils should not be used. NOTE: This information is accurate to the best knowledge of this company, but is furnished without any expressed or implied warranties.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION

When spraying this material use a NIOSH approved cartridge respirator or gas mask suitable to keep airborne mists and vapor concentrations below the time weighted threshold limit values. When using in poorly ventilated and confined spaces, use a fresh-air supplying respirator or a self-contained breathing apparatus.

VENTILATION

General mechanical ventilation or local exhaust should be suitable to keep vapor concentrations below TLV. Ventilation equip. must be explosion proof.

PROTECTIVE GLOVES

Impermeable chemical handling gloves for skin protection.

EYE PROTECTION

Use chemical safety glasses, goggles, and faceshields for eye protection.

ER PROTECTIVE CLOTHING OR EQUIPMENT

impermeable aprons and protective clothing whenever possible to prevent skin contact. The use of head caps whenever

ible is strongly recommended.

WORK/HYGIENIC PRACTICES
Eye washes and safety showers in the workplace are recommended.

SECTION IX - SHIPPING DATA

D.O.T. PROPER SHIPPING NAME.....PAINT, FLAMMABLE LIQUID
D.O.T. HAZARD CLASS.....FLAMMABLE LIQUID
D.O.T. LABELS REQUIRED.....FLAMMABLE LIQUID
D.O.T. PLACARDS REQUIRED.....YES FLAMMABLE
BILL OF LADING DESCRIPTION.....PAINT, FLAMMABLE LIQUID
UN/NA CODE.....UN1263

SECTION X - DISCLAIMER

To the best of our knowledge, the information contained herein is accurate, obtained from sources believed by this company to be accurate.

PRODUCT NAME: 2397 YANKEE SAFETY YELLOW EN
PRODUCT CODE: 2397 YANKEE SAFETY YELLOW EN

HMIS CODES: H F R P
2 3 1 Bop

CTION I - MANUFACTURER IDENTIFICATION

FACTURER'S NAME: VALLEY PAINT MANUFACTURING
ESS : 727 SOUTH 950 WEST
WOODS CROSS, UTAH 84087

GENCY PHONE : 801-298-4581
ORMATION PHONE : 800-424-9300

REVISION DATE : 07/26/10
NAME OF PREPARER : RALPH GRIDER

CTION II - HAZARDOUS INGREDIENTS / SARA III INFORMATION

TABLE COMPONENTS	CAS NUMBER	VAPOR PRESSURE mm Hg @ TEMP		WEIGHT PERCENT
LENE	1330-20-7	2.4	68 DEG	37
OSHA VPEL 100 PPM TWA				
OSHA VPEL 150 PPM STEL				
ACGIH TLV 100 PPM TWA				
ACGIH TLV 150 PPM STEL				
YSTALLINE SILICA	14808-60-7	NA	NA	13.76
NAPHTHA	64742-89-8	10.2	68 DEG	4.18
OSHA VPEL 300 PPM TWA				
OSHA VPEL 400 PPM STEL				
ACGIH TLV 300 PPM TWA				

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

N = N.T.P. Carcinogen I = I.A.R.C. Carcinogen

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: 240 DEG F - 279 DEG F
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C.: 3.73 lb/gl
MATERIAL V.O.C.: 3.73 lb/gl
SOLUBILITY IN WATER: Non Soluble
APPEARANCE AND ODOR: COMMON TO SOLVENT REDUCED PAINT

DENSITY (H2O=8.33): 9.08205 lb/gl
EVAPORATION RATE: SLOWER THAN ETHER
447 g/l
447 g/l

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 50 DEG F METHOD USED: SETAFLASH
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 0.9%(V) UPPER: 7.0%(V)

XTINGUISHING MEDIA:

FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL, WATER FOG, OTHER

SPECIAL FIREFIGHTING PROCEDURES
Respiratory equipment should be worn to avoid inhalation of concentrated vapors. Water should not be used except as fog to keep nearby containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Handle as flammable liquid. Vapors form an explosive mixture in air between the upper and lower explosive limits which can be ignited by many sources such as pilot lights, open flames, electrical motors and switches.

SECTION V - REACTIVITY DATA

STABILITY: STABLE
CONDITIONS TO AVOID
Excessive heat, poor ventilation, corrosive atmospheres, excessive aging.

INCOMPATIBILITY (MATERIALS TO AVOID)
Alkaline materials, strong acids and oxidizing materials.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
Carbon monoxide, carbon dioxide, oxides of nitrogen, and possibly acrolein.

HAZARDOUS POLYMERIZATION: WILL OCCUR

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Inhalation: Dizziness, breathing difficulty, headaches & loss of coordination.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Eye contact: Severe irritation, tearing, redness and blurred vision.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Skin contact: Can dry and defat skin causing cracks, irritation, and dermatitis.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Ingestion: Can cause gastrointestinal irritation, vomiting, nausea, and diarrhea.

HEALTH HAZARDS (ACUTE AND CHRONIC)
Inhalation-Dizziness, breathing difficulty, headaches, & loss of coordination. Eye contact-Severe irritation, tearing, redness, and blurred vision. Skin contact-Can dry and defat skin causing cracks, irritation, and dermatitis. Ingestion-Can cause gastrointestinal irritation, vomiting, nausea, & diarrhea. No chronic health effects.

CARCINOGENICITY: NTP CARCINOGEN: No IARC MONOGRAPHS: No OSHA REGULATED: No

INFORMATION NOT AVAILABLE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Anesthesia, respiratory tract irritation, dermatitis, nausea, vomiting.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation overexposure-Move person to fresh air. If breathing stops, apply artificial respiration and seek immediate medical attention. Eye contact-flush with large quantities of water for 15 minutes. Skin contact-Wash thoroughly with soap and water and see a doctor. Ingestion-Do not induce vomiting, can cause chemical pneumonitis and pulmonary edema. Contact physician immediately.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Eliminate ignition sources, provide good ventilation, dike spill area and add absorbent earth or sawdust to spilled liquid. Thoroughly wet with water and mix.

WASTE DISPOSAL METHOD

Collect absorbent/water/spilled liquid mixture into metal containers and add enough water to cover. Consult local,state & federal hazardous waste regulations before disposing into approved hazardous waste landfills. Obey relevant laws.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Use non-sparking utensils when handling this material. Avoid hot metal surface. Use in cool, well-ventilated areas. Keep containers closed when not in use. Keep away from excessive heat and open flames.

OTHER PRECAUTIONS

Smoking in area where this material is used should be strictly prohibited. Tools used with this material should be made from aluminum, brass or copper. Plastic utensils should not be used. NOTE: This information is accurate to the best knowledge of this company, but is furnished without any expressed or implied warranties.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION

When spraying this material use a NIOSH approved cartridge respirator or gas mask suitable to keep airborne mists and vapor concentrations below the time weighted threshold limit values. When using in poorly ventilated and confined spaces, use a fresh-air supplying respirator or a self-contained breathing apparatus.

VENTILATION

General mechanical ventilation or local exhaust should be suitable to keep vapor concentrations below TLV. Ventilation equip. must be explosion proof.

PROTECTIVE GLOVES

Impermeable chemical handling gloves for skin protection.

EYE PROTECTION

Use chemical safety glasses, goggles, and faceshields for eye protection.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT

Use impermeable aprons and protective clothing whenever possible to prevent skin contact. The use of head caps whenever possible is strongly recommended.

WORK/HYGIENIC PRACTICES
Eye washes and safety showers in the workplace are recommended.

SECTION IX - SHIPPING DATA

D.O.T. PROPER SHIPPING NAME.....PAINT, FLAMMABLE LIQUID
D.O.T. HAZARD CLASS.....FLAMMABLE LIQUID
D.O.T. LABELS REQUIRED.....FLAMMABLE LIQUID
D.O.T. PLACARDS REQUIRED.....YES FLAMMABLE
BILL OF LADING DESCRIPTION.....PAINT, FLAMMABLE LIQUID
UN/NA CODE.....UN1263

SECTION X - DISCLAIMER

To the best of our knowledge, the information contained herein is accurate, obtained from sources believed by this company to be accurate.

PRODUCT NAME: 2820 YANKEES BATTLESHIP GRAY
PRODUCT CODE: 2820 YANKEES BATTLESHIP GRAY

HMIS CODES: H F R P
2 3 1 Bop

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: VALLEY PAINT MANUFACTURING
ADDRESS : 727 SOUTH 950 WEST
WOODS CROSS, UTAH 84087

EMERGENCY PHONE : 801-298-4581
INFORMATION PHONE : 800-424-9300

REVISION DATE : 01/31/11
NAME OF PREPARER : RALPH GRIDER

SECTION II - HAZARDOUS INGREDIENTS / SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	VAPOR PRESSURE mm Hg @ TEMP		WEIGHT PERCENT
* XYLENE	1330-20-7	2.4	68 DEG	45
OSHA VPEL 100 PPM TWA				
OSHA VPEL 150 PPM STEL				
ACGIH TLV 100 PPM TWA				
ACGIH TLV 150 PPM STEL				
M&P NAPHTHA	64742-89-8	10.2	68 DEG	7.79
OSHA VPEL 300 PPM TWA				
OSHA VPEL 400 PPM STEL				
ACGIH TLV 300 PPM TWA				

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

N = N.T.P. Carcinogen I = I.A.R.C. Carcinogen

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: 240 DEG F - 279 DEG F
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C.: 4.59 lb/gl
MATERIAL V.O.C.: 4.59 lb/gl
SOLUBILITY IN WATER: Non Soluble
APPEARANCE AND ODOR: COMMON TO SOLVENT REDUCED PAINT

DENSITY (H2O=8.33): 8.71184 lb/gl
EVAPORATION RATE: SLOWER THAN ETHER
551 g/l
551 g/l

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 50 DEG F
METHOD USED: SETAFLASH
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 0.9%(V) UPPER: 7.0%(V)

EXTINGUISHING MEDIA:
FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL, WATER FOG, OTHER

SPECIAL FIREFIGHTING PROCEDURES
Respiratory equipment should be worn to avoid inhalation of concentrated vapors. Water should not be used except as foc to keep nearby containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Handle as flammable liquid. Vapors form an explosive mixture in air between the upper and lower explosive limits which can be ignited by many sources such as pilot lights, open flames, electrical motors and switches.

SECTION V - REACTIVITY DATA

STABILITY: STABLE
CONDITIONS TO AVOID
Excessive heat, poor ventilation, corrosive atmospheres, excessive aging.

INCOMPATIBILITY (MATERIALS TO AVOID)
Alkaline materials, strong acids and oxidizing materials.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
Carbon monoxide, carbon dicxide, oxides of nitrogen, and possibly acrolein.

HAZARDOUS POLYMERIZATION: WILL OCCUR

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Inhalation: Dizziness, breathing difficulty, headaches & loss of coordination.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Eye contact: Severe irritation, tearing, redness and blurred vision.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Skin contact: Can dry and defat skin causing cracks, irritation, and dermatitis.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Ingestion: Can cause gastrcintestinal irritation, vomiting, nausea, and diarrhea.

HEALTH HAZARDS (ACUTE AND CHRONIC)
Inhalation-Dizziness, breathing difficulty, headaches, & loss of coordination. Eye contact-Severe irritation, tearing, redness, and blurred vision. Skin contact-Can dry and defat skin causing cracks, irritation, and dermatitis. Ingestion-Can cause gastrointestinal irritation, vomiting, nausea, & diarrhea. No chronic health effects.

CARCINOGENICITY: NTP CARCINOGEN: No IARC MONOGRAPHS: No OSHA REGULATED: No

INFORMATION NOT AVAILABLE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
\nesthesia, respiratory tract irritation, dermatitis, nausea, vomiting.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation overexposure-Move person to fresh air. If breathing stops, apply artificial respiration and seek immediate medical attention. Eye contact-flush with large quantities of water for 15 minutes. Skin contact-Wash thoroughly with soap and water and see a doctor. Ingestion-Do not induce vomiting, can cause chemical pneumonitis and pulmonary edema. Contact physician immediately.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Eliminate ignition sources, provide good ventilation, dike spill area and add absorbent earth or sawdust to spilled liquid. Thoroughly wet with water and mix.

WASTE DISPOSAL METHOD

Collect absorbent/water/spilled liquid mixture into metal containers and add enough water to cover. Consult local,state & federal hazardous waste regulations before disposing into approved hazardous waste landfills. Obey relevant laws.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Use non-sparking utensils when handling this material. Avoid hot metal surface. Use in cool, well-ventilated areas. Keep containers closed when not in use. Keep away from excessive heat and open flames.

OTHER PRECAUTIONS

Smoking in area where this material is used should be strictly prohibited. Tools used with this material should be made from aluminum, brass or copper. Plastic utensils should not be used. NOTE: This information is accurate to the best knowledge of this company, but is furnished without any expressed or implied warranties.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION

When spraying this material use a NIOSH approved cartridge respirator or gas mask suitable to keep airborne mists and vapor concentrations below the time weighted threshold limit values. When using in poorly ventilated and confined spaces, use a fresh-air supplying respirator or a self-contained breathing apparatus.

VENTILATION

General mechanical ventilation or local exhaust should be suitable to keep vapor concentrations below TLV. Ventilation equip. must be explosion proof.

PROTECTIVE GLOVES

Impermeable chemical handling gloves for skin protection.

EYE PROTECTION

Use chemical safety glasses, goggles, and faceshields for eye protection.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT

Use impermeable aprons and protective clothing whenever possible to prevent skin contact. The use of head caps whenever

possible is strongly recommanded.

WORK/HYGIENIC PRACTICES
Eye washes and safety showers in the workplace are recommended.

SECTION IX - SHIPPING DATA

D.O.T. PROPER SHIPPING NAME.....PAINT, FLAMMABLE LIQUID
D.O.T. HAZARD CLASS.....FLAMMABLE LIQUID
D.O.T. LABELS REQUIRED.....FLAMMABLE LIQUID
D.O.T. PLACARDS REQUIRED.....YES FLAMMABLE
BILL OF LADING DESCRIPTION.....PAINT, FLAMMABLE LIQUID
UN/NA CODE.....UN1263

SECTION X - DISCLAIMER

To the best of our knowledge, the information contained herein is accurate, obtained from sources believed by this company to be accurate.

PRODUCT NAME: 001 RED OXIDE COPOLYMER PRIMER **HMIS CODES: H F R P**
PRODUCT CODE: 001 RED OXIDE PRIMER **2 3 1 Bopt**

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: VALLEY PAINT MANUFACTURING
ADDRESS : 727 SOUTH 950 WEST
WOODS CROSS, UTAH 84087

EMERGENCY PHONE : 801-298-4581 **REVISION DATE : 08/23/07**
INFORMATION PHONE : 800-424-9300 **NAME OF PREPARER : RALPH GRIDER**

SECTION II - HAZARDOUS INGREDIENTS / SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	VAPOR PRESSURE mm Hg @ TEMP		WEIGHT PERCENT
* XYLENE	1330-20-7	2.4	68 DEG	23
OSHA VPEL 100 PPM TWA				
OSHA VPEL 150 PPM STEL				
ACGIH TLV 100 PPM TWA				
ACGIH TLV 150 PPM STEL				
&P NAPHTHA	64742-89-8	10.2	68 DEG	12.65
OSHA VPEL 300 PPM TWA				
OSHA VPEL 400 PPM STEL				
ACGIH TLV 300 PPM TWA				

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

N = N.T.P. Carcinogen I = I.A.R.C. Carcinogen

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: 240 DEG F - 279 DEG F **DENSITY (H2O=8.33): 10.2818 lb/gl**
VAPOR DENSITY: HEAVIER THAN AIR **EVAPORATION RATE: SLOWER THAN ETHER**
COATING V.O.C.: 3.9 lb/gl **467 g/l**
MATERIAL V.O.C.: 3.9 lb/gl **467 g/l**
SOLUBILITY IN WATER: Non Soluble
APPEARANCE AND ODOR: COMMON TO SOLVENT REDUCED PAINT

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 50 DEG F **METHOD USED: SETAFLASH**
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 0.9%(V) **UPPER: 7.0%(V)**

EXTINGUISHING MEDIA:
FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL, WATER FOG, OTHER

SPECIAL FIREFIGHTING PROCEDURES
Respiratory equipment should be worn to avoid inhalation of concentrated vapors. Water should not be used except as fog to keep nearby containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Handle as flammable liquid. Vapors form an explosive mixture in air between the upper and lower explosive limits which can be ignited by many sources such as pilot lights, open flames, electrical motors and switches.

SECTION V - REACTIVITY DATA

STABILITY: STABLE
CONDITIONS TO AVOID
Excessive heat, poor ventilation, corrosive atmospheres, excessive aging.

INCOMPATIBILITY (MATERIALS TO AVOID)
Alkaline materials, strong acids and oxidizing materials.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
Carbon monoxide, carbon dioxide, oxides of nitrogen, and possibly acrolein.

HAZARDOUS POLYMERIZATION: WILL OCCUR

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Inhalation: Dizziness, breathing difficulty, headaches & loss of coordination.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Eye contact: Severe irritation, tearing, redness and blurred vision.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Skin contact: Can dry and defat skin causing cracks, irritation, and dermatitis.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Ingestion: Can cause gastrointestinal irritation, vomiting, nausea, and diarrhea.

HEALTH HAZARDS (ACUTE AND CHRONIC)
Inhalation-Dizziness, breathing difficulty, headaches, & loss of coordination. Eye contact-Severe irritation, tearing, redness, and blurred vision. Skin contact-Can dry and defat skin causing cracks, irritation, and dermatitis. Ingestion-Can cause gastrointestinal irritation, vomiting, nausea, & diarrhea. No chronic health effects.

CARCINOGENICITY: NTP CARCINOGEN: No IARC MONOGRAPHS: No OSHA REGULATED: No

INFORMATION NOT AVAILABLE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
Anesthesia, respiratory tract irritation, dermatitis, nausea, vomiting.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation overexposure-Move person to fresh air. If breathing stops, apply artificial respiration and seek immediate medical attention. Eye contact-flush with large quantities of water for 15 minutes. Skin contact-Wash thoroughly with soap and water and see a doctor. Ingestion-Do not induce vomiting, can cause chemical pneumonitis and pulmonary edema. Contact physician immediately.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Eliminate ignition sources, provide good ventilation, dike spill area and add absorbent earth or sawdust to spilled liquid. Thoroughly wet with water and mix.

WASTE DISPOSAL METHOD

Collect absorbent/water/spilled liquid mixture into metal containers and add enough water to cover. Consult local,state & federal hazardous waste regulations before disposing into approved hazardous waste landfills. Obey relevant laws.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Use non-sparking utensils when handling this material. Avoid hot metal surface. Use in cool, well-ventilated areas. Keep containers closed when not in use. Keep away from excessive heat and open flames.

ER PRECAUTIONS

moking in area where this material is used should be strictly prohibited. Tools used with this material should be made from aluminum, brass or copper. Plastic utensils should not be used. NOTE: This information is accurate to the best knowledge of this company, but is furnished without any expressed or implied warranties.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION

When spraying this material use a NIOSH approved cartridge respirator or gas mask suitable to keep airborne mists and vapor concentrations below the time weighted threshold limit values. When using in poorly ventilated and confined spaces, use a fresh-air supplying respirator or a self-contained breathing apparatus.

VENTILATION

General mechanical ventilation or local exhaust should be suitable to keep vapor concentrations below TLV. Ventilation equip. must be explosion proof.

PROTECTIVE GLOVES

Impermeable chemical handling gloves for skin protection.

EYE PROTECTION

e chemical safety glasses, goggles, and faceshields for eye protection.

HER PROTECTIVE CLOTHING OR EQUIPMENT

impermeable aprons and protective clothing whenever possible to prevent skin contact. The use of head caps whenever

possible is strongly recommended.

WORK/HYGIENIC PRACTICES
Eye washes and safety showers in the workplace are recommended.

SECTION IX - SHIPPING DATA

D.O.T. PROPER SHIPPING NAME.....PAINT, FLAMMABLE LIQUID
D.O.T. HAZARD CLASS.....FLAMMABLE LIQUID
D.O.T. LABELS REQUIRED.....FLAMMABLE LIQUID
D.O.T. PLACARDS REQUIRED.....YES FLAMMABLE
BILL OF LADING DESCRIPTION.....PAINT, FLAMMABLE LIQUID
UN/NA CODE.....UN1263

SECTION X - DISCLAIMER

To the best of our knowledge, the information contained herein is accurate, obtained from sources believed by this company to be accurate.

Material Safety Data Sheet

CHEMTREC Transportation Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC Transportation Emergency Phone is to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOGUARD 890 PART A

Identification Number: PLMSDS 0986A1NL

Product Use/Class: Cycloaliphatic Amine Epoxy - FOR INDUSTRIAL USE ONLY

Revision Date: 05/25/2011

Supercedes : 03/16/2009

Preparer: Regulatory, Department

Manufacturer:
Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
EPOXY RESIN	25036-25-3	45.0	N/E	N/E	N/E	N/E
TITANIUM DIOXIDE	13463-67-7	35.0	10 MGM3	N/E	10 MGM3	N/E
EPOXY RESIN	25068-38-6	30.0	NE	NE	NE	NE
MICROCRYSTALLINE SILICA	14808-60-7	25.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E
1,2-BENZENEDICARBOXIOLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5	20.0	N/E	N/E	N/E	N/E
META-XYLENE	108-38-3	5.0	100 PPM	150 PPM	435 MG/M3	N/E
CARBON BLACK	1333-86-4	5.0	3.0 MG/M3	N/E	3.5 MG/M3	N/E
TOLUENE	108-88-3	5.0	20 PPM	N/E	375 MGM3	NE
SILICA AMORPHOUS	67762-90-7	5.0	10 MG/M3, INHALABLE	N/E	6 MG/M3	N/E
PARA-XYLENE	106-42-3	5.0	100 PPM	150 PPM	435 MGM3	N/E
ETHYL BENZENE	100-41-4	5.0	20 PPM	N/E	435 MGM3	N/E
METHYL ETHYL KETONE	78-93-3	5.0	200 PPM	300 PPM	590 MGM3	N/E
ORTHO-XYLENE	95-47-6	5.0	100 PPM	150 PPM	435 MG/M3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Warning! May cause allergic skin reactions. May cause irritation. Contains SILICA which can cause cancer. Risk of Cancer depends on duration and level of exposure.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: May cause skin sensitization. Direct skin contact may cause irritation. May cause allergic skin reaction.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Crystalline silica is known to cause silicosis. Crystalline silica (Quartz) is classified as a known human carcinogen (Group 1) by IARC. Exposure is by route of inhalation. If material is in a liquid matrix it is unlikely to be inhaled. However, when sanding or grinding the finished product, there may be potential for crystalline silica to become airborne. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists. If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 89F (31C)
(Setaflash)

Lower Explosive Limit, %: 0.2
Upper Explosive Limit, %: 7.0

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an aborbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	175 F (79 C) - 465 F (241 C)	**Vapor Density:**	Heavier than Air
Odor:	Epoxy	**Odor Threshold:**	N/D
Appearance:	Viscous liquid, Various colors	**Evaporation Rate:**	Slower than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	**Specific Gravity:**	app. 1.40
Vapor Pressure:	N/D	**PH:**	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
EPOXY RESIN	25036-25-3	NOT AVAILABLE	NOT AVAILABLE
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
EPOXY RESIN	25068-38-6	11.4G/KG RAT,ORAL	>20ML/KG SKIN,SENSITIZER
MICROCRYSTALLINE SILICA	14808-60-7	NOT AVAILABLE	NOT AVAILABLE
1,2-BENZENEDICARBOXIOLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5	>5000 MG/KG, ORAL, RAT	NOT AVAILABLE
META-XYLENE	108-38-3	NOT AVAILABLE	NOT AVAILABLE
CARBON BLACK	1333-86-4	NOT AVAILABLE	>8000 MG/KG, ORAL, RAT
TOLUENE	108-88-3	5.0 G/KG RAT ORAL, 14G/KG RABBIT DERMAL	8000 PPM/4HRS, RAT, INHALATION
SILICA AMORPHOUS	67762-90-7	> 5000 MG/KG, ORAL , RAT	NOT AVAILABLE
PARA-XYLENE	106-42-3	NOT AVAILABLE	NOT AVAILABLE
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	NOT AVAILABLE
METHYL ETHYL KETONE	78-93-3	2737MG/KG RAT,ORAL	> 5000 PPM/1 HOUR RAT,INHALATION
ORTHO-XYLENE	95-47-6	NOT AVAILABLE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name: Paint

DOT Technical Name: N/A

DOT Hazard Class: 3

DOT UN/NA Number: 1263

Packing Group: III

Hazard Subclass: N/A

Resp. Guide Page: 128

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS Number
META-XYLENE	108-38-3
TOLUENE	108-88-3
PARA-XYLENE	106-42-3
ETHYL BENZENE	100-41-4
ORTHO-XYLENE	95-47-6

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name	CAS Number
ORGANIC PIGMENT	31837-42-0
AZO PIGMENT	2786-76-7
IRON OXIDE	1332-37-2
ORGANIC PIGMENT	5567-15-7

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name	CAS Number
MICROCRYSTALLINE SILICA	14808-60-7
CARBON BLACK	1333-86-4
ETHYL BENZENE	100-41-4
CUMENE	98-82-8

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

Chemical Name	CAS Number
TOLUENE	108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

Section 16 - Other Information

HMIS Ratings
Health: 2 **Flammability:** 3 **Reactivity:** 0 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): Mixed with 890 Part B: 214 ; mixed with 890LT Part B: 180

REASON FOR REVISION: Changes made in Section(s): 1, 2, 3, 5, 9, 11, and 15

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

Material Safety Data Sheet

CHEMTREC Transportation Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC Transportation Emergency Phone is to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOGUARD 890 PART B

Identification Number: PLMSDS 0986B1NL

Product Use/Class: Cycloaliphatic Amine Epoxy - FOR INDUSTRIAL USE ONLY

Revision Date: 05/25/2011

Supercedes : 09/18/2008

Preparer: Regulatory, Department

Manufacturer:
Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
MICROCRYSTALLINE SILICA	14808-60-7	70.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E
BENZYL ALCOHOL	100-51-6	10.0	N/E	N/E	N/E	N/E
META-XYLENE	108-38-3	5.0	100 PPM	150 PPM	435 MG/M3	N/E
ISOPHORONEDIAMINE	2855-13-2	5.0	N/E	N/E	N/E	N/E
TOLUENE	108-88-3	5.0	20 PPM	N/E	375 MGM3	NE
ISOPROPANOL	67-63-0	5.0	200 PPM	400 PPM	980 MGM3	N/E
AMINE COMPOUND	TRADE SECRET	5.0	N/E	N/E	N/E	N/E
POLYOXYPROPYLENEDIAMINE	9046-10-0	5.0	N/E	N/E	N/E	N/E
PARA-XYLENE	106-42-3	5.0	100 PPM	150 PPM	435 MGM3	N/E
AMINE ADDUCT	TRADE SECRET	5.0	N/E	N/E	N/E	N/E
ETHYL BENZENE	100-41-4	5.0	20 PPM	N/E	435 MGM3	N/E
ORTHO-XYLENE	95-47-6	5.0	100 PPM	150 PPM	435 MG/M3	N/E
AROMATIC HYDROCARBON	64742-95-6	5.0	N/E	N/E	N/E	N/E
1,2,4 TRIMETHYLBENZENE	95-63-6	5.0	25 PPM	N/E	125 MGM3	N/E
DIAMINOCYCLOHEXANE	694-83-7	5.0	N/E	N/E	N/E	N/E
N-BUTANOL	71-36-3	5.0	20 PPM	50 PPM	100 PPM	150 MGM3

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Contains SILICA which can cause cancer. Risk of Cancer depends on duration and level of exposure. Skin and eye irritant.

Effects Of Overexposure - Eye Contact: Can cause eye burns.

Effects Of Overexposure - Skin Contact: May be harmful if absorbed through the skin. Can cause skin burns.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation. May cause lung irritation. May cause allergic respiratory reaction, effects may be permanent.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Crystalline silica is known to cause silicosis. Crystalline silica (Quartz) is classified as a known human carcinogen (Group 1) by IARC. Exposure is by route of inhalation. If material is in a liquid matrix it is unlikely to be inhaled. However, when sanding or grinding the finished product, there may be potential for crystalline silica to become airborne. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists. If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 71F (21C)
(Setaflash)

Lower Explosive Limit, %: 0.5
Upper Explosive Limit, %: 12.0

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure. Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an aborbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	176 F (80 C) - 554 F (290 C)	**Vapor Density:**	Heavier than Air
Odor:	Solvent	**Odor Threshold:**	N/D
Appearance:	Viscous liquid	**Evaporation Rate:**	Slower than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	**Specific Gravity:**	1.6
Vapor Pressure:	N/D	**PH:**	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
MICROCRYSTALLINE SILICA	14808-60-7	NOT AVAILABLE	NOT AVAILABLE
BENZYL ALCOHOL	100-51-6	1230MG/KG RAT,ORAL	1000PPM/8HRS RAT,INHALATION
META-XYLENE	108-38-3	NOT AVAILABLE	NOT AVAILABLE
ISOPHORONEDIAMINE	2855-13-2	>0.5 G/KG ORAL	NOT AVAILABLE
TOLUENE	108-88-3	5.0 G/KG RAT ORAL, 14G/KG RABBIT DERMAL	8000 PPM/4HRS, RAT, INHALATION
ISOPROPANOL	67-63-0	4720MG/KG RAT,ORAL	22500 PPM/8HRS RAT,INHALATION
AMINE COMPOUND	TRADE SECRET	NOT AVAILABLE	NOT AVAILABLE
POLYOXYPROPYLENEDIAMINE	9046-10-0	.48 G/KG, ORAL, RAT	NOT AVAILABLE
PARA-XYLENE	106-42-3	NOT AVAILABLE	NOT AVAILABLE
AMINE ADDUCT	TRADE SECRET	>0.5 G/KG ORAL, RAT	NOT AVAILABLE
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	NOT AVAILABLE
ORTHO-XYLENE	95-47-6	NOT AVAILABLE	NOT AVAILABLE
AROMATIC HYDROCARBON	64742-95-6	4700 MG/KG, ORAL, RAT	3670 PPM/8 HOURS, RAT, INHALATION
1,2,4 TRIMETHYLBENZENE	95-63-6	5 GM/KG, ORAL, RAT	18 GM/M3/4HOURS
DIAMINOCYCLOHEXANE	694-83-7	1752 MG/KG,RAT,ORAL	NOT AVAILABLE
N-BUTANOL	71-36-3	2500MG/KG RAT,ORAL	>800PPM/4HRS RAT,INHALATION

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name: Paint

DOT Technical Name: N/A

DOT Hazard Class: 3

DOT UN/NA Number: 1263

Packing Group: II

Hazard Subclass: N/A

Resp. Guide Page: 128

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS Number
META-XYLENE	108-38-3
TOLUENE	108-88-3
PARA-XYLENE	106-42-3
ETHYL BENZENE	100-41-4
ORTHO-XYLENE	95-47-6
1,2,4 TRIMETHYLBENZENE	95-63-6
N-BUTANOL	71-36-3

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name	CAS Number
MICROCRYSTALLINE SILICA	14808-60-7
ETHYL BENZENE	100-41-4
CUMENE	98-82-8
FORMALDEHYDE	50-00-0

Warning: The following ingredients present in the product are known to the state of California to cause

birth defects, or other reproductive hazards:

Chemical Name	CAS Number
TOLUENE	108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2A D2B

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 214

REASON FOR REVISION: Changes made in Section(s): 1, 2, 5, 9, 11, and 15

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

MATERIAL SAFETY DATA SHEET

6304 FLAT BLACK - STOVE BRIGHT HIGH TEMP

SECTION I - MANUFACTURER IDENTIFICATION

PRODUCT CODE: 51H200
PRODUCT NAME: 6304 FLAT BLACK - STOVE BRIGHT HIGH TEMP
HMIS CODES: H F R P
2*3 0 J
MANUFACTURER'S NAME: FORREST PAINT CO.
ADDRESS : 1011 MCKINLEY ST.
EUGENE, OR 97402

EMERGENCY PHONE : 1(800)424-9300
INFORMATION PHONE : 1(541)342-1821
DATE ISSUED : 2/4/2010
INFORMATION CONTACT: T. BOLLENBAUGH

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

REPORTABLE COMPONENTS	CAS NUMBER	mm Hg @	TEMP	WEIGHT PERCENT
TOLUENE PEL-TWA: 100 ppm, PEL-STEL: 150 ppm, ACGIH-TLV: 20 ppm - skin	000108-88-3	25	68	30 - 40
XYLENE PEL-TWA: 100 ppm, PEL-STEL: 150 ppm, ACGIH-TLV: 100 ppm	001330-20-7	5.1	68	20 - 30
n-BUTYL ALCOHOL PEL-TWA: 100 ppm, ACGIH-TLV: 50ppm ceil	000071-36-3	7	68	10 - 20
IRON OXIDE PEL-TWA/ACGIH-TLV: 10 mg/m3 total dust, 5 mg/m3 (fume)	001309-37-1			1 - 10
ETHYL BENZENE PEL-TWA/ACGIH-TLV: 100 ppm; STEL: 150 ppm	000100-41-4	7	68	1 - 10
PETROLEUM DISTILLATE PEL-TWA: NOT ESTAB; ACGIH-TLV: 100 ppm; TLV-STEL: 200 ppm; CEILING: 500 ppm	064742-47-8	3	75	1 - 10
MANGANESE DIOXIDE PEL-TWA: 5 mg/m3, ACGIH-TLV: 5 mg/m3	001313-13-9			1 - 10
2-BUTOXYETHANOL PEL-TWA: 25 ppm (skin), ACGIH-TLV: 25 ppm (skin)	000111-76-2	.6	68	1 - 10

SEE SECTION 15 FOR SARA AND HAPS INFORMATION.

SECTION 3 - HAZARD IDENTIFICATION

Note: This product is a blend of materials which has not been tested as a mixture. The health effect data is based on the individual components.

INHALATION:
2-BUTOXYETHANOL: High exposures can cause you to become dizzy, lightheaded and to pass out. Breathing the vapor can irritate the lungs and cause a build up of fluid (pulmonary edema). This can cause death.
n-, sec- BUTYL ALCOHOLS: Irritation of the nose and throat may occur. Higher levels may cause you to become dizzy and pass out.
NAPHTHAS/ALIPHATIC SOLVENTS: Vapors or aerosol mists are central nervous system (CNS) depressant and a mild irritation of the eye and upper respiratory tract. Narcotic in high concentration. High concentrations can cause unconsciousness which may go to coma, difficult breathing and bluish tint to the skin.
MANGANESE COMPOUNDS: There has been found an association between manganese exposure and pulmonary effects including pneumonia,

chronic bronchitis and airway disability.
TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Vapors or aerosol mists are central nervous system (CNS) depressant and a mild irritant of the eyes and upper respiratory tract. Narcotic in high concentration. High concentrations can cause unconsciousness which may go to coma, difficult breathing, tremors and nausea, excitation and hyperactivity, impairment of coordination and reaction time.
XYLENE/ETHYL BENZENE: Vapors are irritating to the eyes, mucous membranes and skin; at high concentrations it causes narcosis or unconsciousness. Giddiness, anorexia, vomiting, headache, vertigo (dizziness), gastric (stomach) discomfort, dryness of the throat and signs of slight drunkenness.

EYE CONTACT:
2-BUTOXYETHANOL: Contact causes pain, eye membrane irritation and temporary corneal injury. Prolonged contact can burn the eyes.
n-, sec-, ISO-BUTYL ALCOHOLS: Exposure can cause eye irritation and headaches. n-Butyl causes severe eye symptoms including burning sensation, blurring of vision, tearing and light phobia.
NAPHTHAS/ALIPHATIC SOLVENTS: Contact could cause eye irritation.
TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Toluene is a strong irritant to the eyes.
XYLENE/ETHYL BENZENE: Eye contact with liquid is irritating and may cause conjunctivitis, redness, tearing and blurred vision.

SKIN CONTACT:
TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Minor skin contact causes some irritation. Prolonged contact will cause drying of the skin and cracking.
XYLENE/ETHYL BENZENE: Skin contact may result in immediate irritation characterized by redness (erythema and hyperemia) and will remove fat from the skin resulting in dermatitis. Painful burning sensation and blisters formed on exposed areas.
2-BUTOXYETHANOL: Prolonged or repeated exposure may cause skin irritation.

SKIN ABSORPTION:
2-BUTOXYETHANOL: This material can pass through the skin. High or repeated exposure can break down red blood cells, and cause anemia. It can also damage the liver and kidneys.
n-, sec- BUTYL ALCOHOLS: n-Butyl has skin notation rapid entry through the skin, the other alcohols are a lesser extent. May damage the liver, kidneys, hearing and the sense of balance.
TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Can be absorbed and cause systemic poisoning.
XYLENE/ETHYL BENZENE: Can be slowly absorbed through the skin and cause systemic poisoning.

INGESTION:
***If vomiting occurs do not allow vomitus to be breathed into the lungs. Even small quantities may cause chemical pneumonia and fluid in the lungs (pulmonary edema) which may result in

hemorrhage (bleeding) and may be fatal.***
2-BUTOXYETHANOL: May be orally toxic but there is insufficient data to assess human toxicity.
n-, sec- BUTYL ALCOHOLS: Can be absorbed orally showing signs of general solvent toxicity.
NAPHTHAS/ALIPHATIC SOLVENTS: These solvents are not particularly toxic by ingesting, but will cause gastrointestinal disturbance and there is a risk of aspiration of the liquid into the lungs if vomiting takes place.
TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Ingestion produces similar effects to vapor inhalation. The liquid causes damage to stomach and intestinal linings.
XYLENE/ETHYL BENZENE: Ingestion produces similar effects to vapor inhalation. The liquid causes damage to stomach and intestinal linings.

CHRONIC HEALTH RISKS
2-BUTOXYETHANOL: Long term exposure can cause the breakdown of red blood cells, resulting in anemia. It may also damage the liver and kidneys.
n-, sec- BUTYL ALCOHOLS: Repeated contact may cause drying and cracking of the skin. n-Butyl alcohol can damage the hearing and sense of balance. Exposure may damage the liver and kidneys.
MANGANESE COMPOUNDS: None known at this time, however, manganese can cause a neurological disorder known as manganism. This disease begins with headaches, irritability and occasionally, psychotic behavior.
TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Prolonged contact will cause drying of the skin and cracking. Muscular weakness syndromes, gastrointestinal syndromes or neuropsychiatric syndromes are common symptoms in toluene sniffers. Encephalophathy (toxic brain disease), progressive memory loss, fatigue, impaired concentration, irritability, persistent headaches and brain dysfunction has been reported.
XYLENE/ETHYL BENZENE: Can interfere with motor functions in exposed workers, loss of appetite, nausea, headache, dizziness, sleeplessness, indigestion, nose bleeds, liver and kidney damage, toxic brain disease (encephalopathy), dementia (loss of memory), and other neurological disorders. Experimental animals experienced teratogenic and reproductive effects. Temporary blood disorders and kidney damage has been observed in male rats.
Prolonged or repeated exposure to solvents may cause permanent brain and nervous system damage, including memory loss and impairment of coordination and reaction time. May cause toxic brain disease (encephalopathy), associated with brain tissue death. May cause liver and kidney damage. Inhaling concentrated vapors is harmful and may be fatal.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
Exposure for employees with a history of certain medical conditions such as skin, liver, kidney, eye, chronic respiratory, central and peripheral nervous system disease may have an increased risk from exposure to this material.

SECTION 4 - FIRST AID MEASURES

EYE AND SKIN CONTACT: In case of contact, immediately flush eyes (lifting eyelids occasionally) or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse.
INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
INGESTION: If swallowed, do not induce vomiting. Get medical attention immediately.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: 52 deg F
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: .8 UPPER: 12.7
EXTINGUISHING MEDIA: Foam, Alcohol foam, CO2, Dry chemical, Water fog.

SPECIAL FIREFIGHTING PROCEDURES: Hazardous decomposition products may form from incomplete combustion. Wear full protection gear with self-contained positive pressure breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: FLAMMABLE LIQUID AND VAPORS!! Closed container can build pressure from heat and rupture violently. Volatile vapors can burn in the open or explode if confined. Vapor is heavier than air and can travel long distances to source of ignition.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Evacuate all nonessential personnel. Remove all source of ignition. Ventilate area if possible. Avoid breathing vapors. Spill clean up beyond the scope of normal maintenance activities should be performed by trained response personnel.
In the event of a large transportation related spill or emergency call CHEMTREC at 1(800)424-9300.

SECTION 7 - HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: FLAMMABLE LIQUID AND VAPORS. Store only in areas approved for flammable liquids. Keep clear of all sources of ignition. Ground and bond all holding and transfer containers and equipment to prevent buildup of static electricity. Storage temperature must be below 120 deg. F. Freezing temperatures may effect product stability. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE. DO NOT TRANSFER TO UNLABELED CONTAINER.

OTHER PRECAUTIONS: Ignition temperatures of this product will decrease with increased vapor volume and vapor/air contact time and are influenced by pressure changes. Any proposed use of this product in elevated-temperature processes should be evaluated to assure that safe operating conditions are established.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

RESPIRATORY PROTECTION: If ventilation is not adequate to reduce vapors below regulatory limits, use a self-contained (air supplied) positive pressure breathing apparatus, or a NIOSH approved air purifying respirator (APR) equipped with organic vapor cartridges (black striped cartridge). Failure to use proper respiratory protection may be harmful or fatal.
User must be properly trained and fitted to assure effective protection. Follow all manufacturers recommendations for use of filter.
WARNING: Do not use an APR if oxygen level is below 19.5% by volume.

VENTILATION: Sufficient ventilation, in volume and pattern should be provided to keep the air contaminants below the TLV/PEL levels. Remove vapors from low areas of stagnant air (e.g., corners near floor where vapors may collect).

PROTECTIVE GLOVES: Use gloves impervious to solvent. Follow glove manufacturer's recommendation for selecting gloves according to the solvents in this product.

EYE PROTECTION: Wear splash goggles or use face shield with safety glasses for splash protection. If vapor concentration causes eye irritation wear full-face respirator. Do not wear contact lenses when working with chemicals. Contact lenses can trap chemical next to eye which may increase eye damage.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: A protective apron should be used for splash protection. When spraying this product a spray hood is recommended to cover hair and face. Skin should be covered as much as possible to protect from overspray or mist.
A continuous 15 minute eye wash station and a chemical spill shower should be available in case of emergency.

WORK/HYGIENIC PRACTICES: In handling any chemicals, personal hygiene is extremely important. Always wash your hands and face before eating or when done handling or using this product. Keep food and drink out of work areas. Some items such as cigarettes or gum readily absorb solvent vapors and may increase your overall exposure to this product.

SECTION 9 - PHYSICAL / CHEMICAL PROPERTIES

BOILING RANGE: 232 deg F - 405 deg F
DENSITY: 8.08 lb/gl
SPECIFIC GRAVITY (H20=1): .97
VAPOR DENSITY : Heavier than air.
EVAPORATION RATE: Slower than ether.
SOLUBILITY IN WATER: Insoluble.
APPEARANCE AND ODOR: Liquid with strong solvent odor.

VOC EMISSIONS: 6.19 lb/gl 742 g/l
VOC EXCLUDING EPA EXEMPT SOLVENTS/WATER: 6.19 lb/gl 742 g/l
NOTE: Check with your state/local Air Quality regulatory agency to determine which VOC calculation you should use.

SECTION 10 - STABILITY AND REACTIVITY

STABILITY: Stable.
CONDITIONS TO AVOID: High temperatures, sources of ignition. Do not use in areas with poor ventilation.

INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidizing agents.
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Carbon monoxide, carbon dioxide.
HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

CARCINOGENICITY:
NTP CARCINOGEN: No IARC MONOGRAPHS: Yes OSHA REGULATED: No
ETHYL BENZENE: Classified by IARC (International Agency for Research on Cancer) as possibly carcinogenic to humans (group 2B). Risk of cancer depends on duration and level of exposure.

SECTION 12 - ECOLOGICAL INFORMATION

This product has not been tested for environmental effects.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Waste material is a RCRA hazardous waste. Dispose of in accordance to Federal, state and local waste disposal regulations. Do not discharge into public water ways or water treatment facilities. Do not bury.

SECTION 14 - TRANSPORT INFORMATION

DOT SHIPPING INFORMATION (GROUND): UN1263, Paint, 3, PGII. ERG # 128
DOT SHIPPING INFORMATION (LIMITED QUANTITIES/GROUND): Inner packaging 1.3 gallons (5 L) or less each net capacity in strong outer packaging and total package weight not exceeding 66 pounds (30 kg): Consumer Commodity, ORM-D

IATA SHIPPING DESCRIPTION (AIR SHIPMENTS): UN1263, Paint, Class 3, PG II.
IMDG SHIPPING DESCRIPTION (WATERWAYS SHIPMENTS): UN1263, Paint, Flammable Liquid, Class 3, PG II. Flashpoint 11 C.

SECTION 15 - REGULATORY INFORMATION

SARA 313 / 40 CFR 372:		% / WT
TOLUENE	000108-88-3	33
XYLENE	001330-20-7	25
n-BUTYL ALCOHOL	000071-36-3	10
ETHYL BENZENE	000100-41-4	2.7
MANGANESE DIOXIDE	001313-13-9	2
2-BUTOXYETHANOL	000111-76-2	2

CLEAN AIR ACT AMENDMENT SECTION 112 (HAPS):		% / WT
+ TOLUENE	000108-88-3	33
+ XYLENE	001330-20-7	25
+ ETHYL BENZENE	000100-41-4	2.7
x MANGANESE DIOXIDE	001313-13-9	2

+ Indicates volatile Hazardous Air Pollutant chemicals at or above the reporting requirements of the Clean Air Act Amendments Section 112.

x Indicates non-volatile Hazardous Air Pollutant chemicals at or above the reporting requirements of the Clean Air Act Amendments Section 112.

OSHA CLASSIFICATION: Flammable Liquid - Class IB.

CLEAN AIR ACT - OZONE DEPLETING CHEMICALS: Not known to contain or be manufactured with Class 1 or Class 2 Ozone Depleting Chemicals (ODC's).

RoHS DIRECTIVE: This product complies with the RoHS (Regulation of Hazardous Substances) Directive.

TSCA: All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

SECTION 16 - OTHER INFORMATION

The above information is based on current information available to Forrest Paint Co. and is believed to be accurate but is not warranted.

MATERIAL SAFETY DATA SHEET

1520 RED OXIDE - SHOPCOAT PRIMER

SECTION I - MANUFACTURER IDENTIFICATION

PRODUCT CODE: 16P300X
PRODUCT NAME: 1520 RED OXIDE - SHOPCOAT PRIMER
MANUFACTURER'S NAME: FORREST PAINT CO.
ADDRESS : 1011 MCKINLEY ST.
EUGENE, OR 97402

HMIS CODES: H F R P
2*3 0 J

EMERGENCY PHONE : 1(800)424-9300
INFORMATION PHONE : 1(541)342-1821
DATE ISSUED : 2/1/2010
INFORMATION CONTACT: T. BOLLENBAUGH

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

REPORTABLE COMPONENTS	CAS NUMBER	mm Hg @ TEMP		WEIGHT PERCENT
XYLENE PEL-TWA: 100 ppm, PEL-STEL: 150 ppm, ACGIH-TLV: 100 ppm	001330-20-7	5.1	68	25 - 35
SOLVENT NAPHTHA PEL-TWA/ACGIH-TLV: 300 ppm, PEL-STEL: 400 ppm	064742-89-8	7.7	68	5 - 15
NEPHELINE SYENITE (NUISANCE DUST) PEL-TWA/ACGIH-TLV: 10mg/m3 (Total dust), 5 mg/m3 (Respirable dust)	037244-96-5			5 - 15
ETHYL BENZENE PEL-TWA/ACGIH-TLV: 100 ppm; STEL: 150 ppm	000100-41-4	7	68	1 - 10
ZINC PHOSPHATE PEL-TWA: 10 mg/m3 Total dust, 5 mg/m3 Respirable dust; ACGIH-TLV: 10 mg/m3 Total dust	007779-90-0			1 - 10
TOLUENE PEL-TWA: 100 ppm, PEL-STEL: 150 ppm, ACGIH-TLV: 20 ppm - skin	000108-88-3	25	68	1 - 10
IRON OXIDE PEL-TWA/ACGIH-TLV: 10 mg/m3 total dust, 5 mg/m3 (fume)	001309-37-1			1 - 10
RED IRON OXIDE PEL-TWA: 15mg/m3 Total dust, 5 mg/m3 Respirable dust; ACGIH-TLV: 10 mg/m3 Total dust	001332-37-2			1 - 10
ZINC OXIDE ACGIH-TLV: 10 mg/m3	001314-13-2			1 - 10
CRYSTALLINE QUARTZ SILICA PEL-TWA: .01 mg/m3, ACGIH-TLV: .01 mg/m3 - Respirable dust.	014808-60-7			<1

SEE SECTION 15 FOR SARA AND HAPS INFORMATION.

SECTION 3 - HAZARD IDENTIFICATION

Note: This product is a blend of materials which has not been tested as a mixture. The health effect data is based on the individual components.

INHALATION:
NAPHTHAS/ALIPHATIC SOLVENTS: Vapors or aerosol mists are central nervous system (CNS) depressant and a mild irritation of the eye and upper respiratory tract. Narcotic in high concentration. High concentrations can cause unconsciousness which may go to coma, difficult breathing and bluish tint to the skin.

TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Vapors or aerosol mists are central nervous system (CNS) depressant and a mild irritant of the eyes and upper respiratory tract. Narcotic in high concentration. High concentrations can cause unconsciousness which may go to coma, difficult breathing, tremors and nausea, excitation and hyperactivity, impairment of coordination and reaction time.
XYLENE/ETHYL BENZENE: Vapors are irritating to the eyes, mucous membranes and skin; at high concentrations it causes narcosis or unconsciousness. Giddiness, anorexia, vomiting, headache, vertigo (dizziness), gastric (stomach) discomfort, dryness of the throat and signs of slight drunkenness.

EYE CONTACT:
NAPHTHAS/ALIPHATIC SOLVENTS: Contact could cause eye irritation.
TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Toluene is a strong irritant to the eyes.
XYLENE/ETHYL BENZENE: Eye contact with liquid is irritating and may cause conjunctivitis, redness, tearing and blurred vision.

SKIN CONTACT:
TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Minor skin contact causes some irritation. Prolonged contact will cause drying of the skin and cracking.
XYLENE/ETHYL BENZENE: Skin contact may result in immediate irritation characterized by redness (erythema and hyperemia) and will remove fat from the skin resulting in dermatitis. Painful burning sensation and blisters formed on exposed areas.

SKIN ABSORPTION:
TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Can be absorbed and cause systemic poisoning.
XYLENE/ETHYL BENZENE: Can be slowly absorbed through the skin and cause systemic poisoning.

INGESTION:
If vomiting occurs do not allow vomitus to be breathed into the lungs. Even small quantities may cause chemical pneumonia and fluid in the lungs (pulmonary edema) which may result in hemorrhage (bleeding) and may be fatal.
NAPHTHAS/ALIPHATIC SOLVENTS: These solvents are not particularly toxic by ingesting, but will cause gastrointestinal disturbance and there is a risk of aspiration of the liquid into the lungs if vomiting takes place.
TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Ingestion produces similar effects to vapor inhalation. The liquid causes damage to stomach and intestinal linings.
XYLENE/ETHYL BENZENE: Ingestion produces similar effects to vapor inhalation. The liquid causes damage to stomach and intestinal linings.

CHRONIC HEALTH RISKS

TOLUENE/VM&P NAPHTHA/PETROLEUM NAPHTHA: Prolonged contact will cause drying of the skin and cracking. Muscular weakness syndromes, gastrointestinal syndromes or neuropsychiatric syndromes are common symptoms in toluene sniffers. Encephalophathy (toxic brain disease), progressive memory loss, fatigue, impaired concentration, irritability, persistent headaches and brain dysfunction has been reported.
XYLENE/ETHYL BENZENE: Can interfere with motor functions in exposed workers, loss of appetite, nausea, headache, dizziness, sleeplessness, indigestion, nose bleeds, liver and kidney damage, toxic brain disease (encephalopathy), dementia (loss of memory), and other neurological disorders. Experimental animals experienced teratogenic and reproductive effects. Temporary blood disorders and kidney damage has been observed in male rats.
Prolonged or repeated exposure to solvents may cause permanent brain and nervous system damage, including memory loss and impairment of coordination and reaction time. May cause toxic brain disease (encephalopathy), associated with brain tissue death. May cause liver and kidney damage. Inhaling concentrated vapors is harmful and may be fatal.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Exposure for employees with a history of certain medical conditions such as skin, liver, kidney, eye, chronic respiratory, central and peripheral nervous system disease may have an increased risk from exposure to this material.

SECTION 4 - FIRST AID MEASURES

EYE AND SKIN CONTACT: In case of contact, immediately flush eyes (lifting eyelids occasionally) or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse.
INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
INGESTION: If swallowed, do not induce vomiting. Get medical attention immediately.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: 23 deg F
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: .8 UPPER: 7.6
EXTINGUISHING MEDIA: Foam, Alcohol foam, CO2, Dry chemical, Water fog.

SPECIAL FIREFIGHTING PROCEDURES: Hazardous decomposition products may form from incomplete combustion. Wear full protection gear with self-contained positive pressure breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: FLAMMABLE LIQUID AND VAPORS!!

Closed container can build pressure from heat and rupture violently. Volatile vapors can burn in the open or explode if confined. Vapor is heavier than air and can travel long distances to source of ignition.
Dried paint residue may spontaneously combust. Sweepings, rags, etc., should be wet down and put in a closed container.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Evacuate all nonessential personnel. Remove all source of ignition. Ventilate area if possible. Avoid breathing vapors. Spill clean up beyond the scope of normal maintenance activities should be performed by trained response personnel.
In the event of a large transportation related spill or emergency call CHEMTREC at 1(800)424-9300.

SECTION 7 - HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: FLAMMABLE LIQUID AND VAPORS. Store only in areas approved for flammable liquids. Keep clear of all sources of ignition. Ground and bond all holding and transfer containers and equipment to prevent buildup of static electricity. Storage temperature must be below 120 deg. F. Freezing temperatures may effect product stability. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE. DO NOT TRANSFER TO UNLABELED CONTAINER.

OTHER PRECAUTIONS: Ignition temperatures of this product will decrease with increased vapor volume and vapor/air contact time and are influenced by pressure changes. Any proposed use of this product in elevated-temperature processes should be evaluated to assure that safe operating conditions are established.
To avoid spontaneous combustion during temporary storage, soak soiled rags and waste immediately after use in a water-filled, closed metal container.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

RESPIRATORY PROTECTION: If ventilation is not adequate to reduce vapors below regulatory limits, use a self-contained (air supplied) positive pressure breathing apparatus, or a NIOSH approved air purifying respirator (APR) equipped with organic vapor cartridges (black striped cartridge). Failure to use proper respiratory protection may be harmful or fatal.
User must be properly trained and fitted to assure effective protection. Follow all manufacturers recommendations for use of filter.
WARNING: Do not use an APR if oxygen level is below 19.5% by volume.

VENTILATION: Sufficient ventilation, in volume and pattern should be provided to keep the air contaminants below the TLV/PEL levels. Remove vapors from low areas of stagnant air (e.g., corners near floor where vapors may collect).

PROTECTIVE GLOVES: Use gloves impervious to solvent. Follow glove

manufacturer's recommendation for selecting gloves according to the solvents in this product.

EYE PROTECTION: Wear splash goggles or use face shield with safety glasses for splash protection. If vapor concentration causes eye irritation wear full-face respirator. Do not wear contact lenses when working with chemicals. Contact lenses can trap chemical next to eye which may increase eye damage.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: A protective apron should be used for splash protection. When spraying this product a spray hood is recommended to cover hair and face. Skin should be covered as much as possible to protect from overspray or mist. A continuous 15 minute eye wash station and a chemical spill shower should be available in case of emergency.

WORK/HYGIENIC PRACTICES: In handling any chemicals, personal hygiene is extremely important. Always wash your hands and face before eating or when done handling or using this product. Keep food and drink out of work areas. Some items such as cigarettes or gum readily absorb solvent vapors and may increase your overall exposure to this product.

SECTION 9 - PHYSICAL / CHEMICAL PROPERTIES

BOILING RANGE: 232 deg F - 279 deg F
DENSITY: 9.82 lb/gl
SPECIFIC GRAVITY (H20=1): 1.18
VAPOR DENSITY : Heavier than air.
EVAPORATION RATE: Slower than ether.
SOLUBILITY IN WATER: Insoluble.
APPEARANCE AND ODOR: Liquid with strong solvent odor.

VOC EMISSIONS: 4.73 lb/gl 567 g/l
VOC EXCLUDING EPA EXEMPT SOLVENTS/WATER: 4.73 lb/gl 567 g/l
NOTE: Check with your state/local Air Quality regulatory agency to determine which VOC calculation you should use.

SECTION 10 - STABILITY AND REACTIVITY

STABILITY: Stable.
CONDITIONS TO AVOID: High temperatures, sources of ignition. Do not use in areas with poor ventilation.

INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidizing agents.
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Carbon monoxide, carbon dioxide.
HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

CARCINOGENICITY:
NTP CARCINOGEN: No IARC MONOGRAPHS: Yes OSHA REGULATED: No
ETHYL BENZENE: Classified by IARC (International Agency for Research on Cancer) as possibly carcinogenic to humans (group 2B). Risk of cancer depends on duration and level of exposure.

CRYSTALLINE SILICA: IARC found limited evidence for carcinogenicity in humans and sufficient evidence in experimental animals. A respirator (NIOSH approved) capable of filtering out silica particles should be worn when sanding surfaces or spraying this product. Listing: IARC-Group 2A (Probable in humans); NTP-Group 2 (Reasonably anticipated in humans); NIOSH-carcinogen.

SECTION 12 - ECOLOGICAL INFORMATION

This product has not been tested for environmental effects.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Waste material is a RCRA hazardous waste. Dispose of in accordance to Federal, state and local waste disposal regulations. Do not discharge into public water ways or water treatment facilities. Do not bury.

SECTION 14 - TRANSPORT INFORMATION

DOT SHIPPING INFORMATION (GROUND): UN1263, Paint, 3, PGII. ERG # 128
DOT SHIPPING INFORMATION (LIMITED QUANTITIES/GROUND): Inner packaging 1.3 gallons (5 L) or less each net capacity in strong outer packaging and total package weight not exceeding 66 pounds (30 kg): Consumer Commodity, ORM-D

IATA SHIPPING DESCRIPTION (AIR SHIPMENTS): UN1263, Paint, Class 3, PG II.
IMDG SHIPPING DESCRIPTION (WATERWAYS SHIPMENTS): UN1263, Paint, Flammable Liquid, Class 3, PG II. Flashpoint -5 C.

SECTION 15 - REGULATORY INFORMATION

SARA 313 / 40 CFR 372:		% / WT
XYLENE	001330-20-7	28
ETHYL BENZENE	000100-41-4	4.7
ZINC PHOSPHATE	007779-90-0	4
TOLUENE	000108-88-3	4
ZINC OXIDE	001314-13-2	1
CRYSTALLINE QUARTZ SILICA	014808-60-7	.1

CLEAN AIR ACT AMENDMENT SECTION 112 (HAPS):		% / WT
+ XYLENE	001330-20-7	28
+ ETHYL BENZENE	000100-41-4	4.7
+ TOLUENE	000108-88-3	4

+ Indicates volatile Hazardous Air Pollutant chemicals at or above the reporting requirements of the Clean Air Act Amendments Section 112.

OSHA CLASSIFICATION: Flammable Liquid - Class IB.

CLEAN AIR ACT - OZONE DEPLETING CHEMICALS: Not known to contain or be manufactured with Class 1 or Class 2 Ozone Depleting Chemicals (ODC's).

RoHS DIRECTIVE: This product complies with the RoHS (Regulation of Hazardous

Substances) Directive.

TSCA: All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

SECTION 16 - OTHER INFORMATION

The above information is based on current information available to Forrest Paint Co. and is believed to be accurate but is not warranted.

Material Safety Data Sheet

Date of issue 25 September 2010
Version 3

1. Product and company identification

Product name : AMERCOAT 68HS LIGHT GRAY RESIN
Code : AT68HS-264/05
Supplier : PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272
Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)
Technical Phone Number : (412) 492-5200 (ALLISON PARK, PA) 8:00 a.m. - 5:00 p.m. EST

2. Hazards identification

Emergency overview : WARNING!

FLAMMABLE LIQUID AND VAPOR. HARMFUL IF INHALED. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. SANDING AND GRINDING DUSTS MAY BE HARMFUL IF INHALED. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.

Keep away from flames, such as a pilot light, and any object that sparks, such as an electric motor. Keep away from heat. Do not smoke. Do not breathe vapor or mist. Do not swallow. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : Harmful if inhaled. Severely irritating to the respiratory system. Can irritate eyes, nose, mouth and throat.
Ingestion : May be harmful if swallowed.
Skin : Harmful in contact with skin. Irritating to skin. May cause an allergic skin reaction.
Eyes : Irritating to eyes.

Over-exposure signs/symptoms

Repeated exposure to high vapor concentrations may cause irritation of the respiratory system and permanent brain and nervous system damage. Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness and nausea and may lead to unconsciousness or death. There is some evidence that repeated exposure to organic solvent vapors in combination with constant loud noise can cause greater hearing loss than expected from exposure to noise alone. This product contains crystalline silica which can cause lung cancer or silicosis. The risk of cancer depends on the duration and level of exposure to dust from sanding surfaces or mist from spray applications. Trimethoxysilanes are capable of forming methanol if hydrolyzed or ingested. If swallowed, methanol may be harmful or fatal or cause blindness.

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (section 11)

3. Composition/information on ingredients

Name	CAS number	%
Quartz (SiO2) (<10 microns)	14808-60-7	10 - 30
reaction product: bisphenol-A-(epichlorhydrin) and epoxy resin (number average molecular weight <= 700)	25068-38-6	10 - 30
Phenol, 4-(1,1-dimethylethyl)-, polymer with 2-(chloromethyl)oxirane and 4,4'-(1-methylethylidene)bis[phenol] Average Molecular Weight > 700 to <=1000	67924-34-9	10 - 30
heptan-2-one	110-43-0	7 - 13
4-methylpentan-2-one	108-10-1	5 - 10
xylene	1330-20-7	1 - 5
Titanium dioxide	13463-67-7	1 - 5
Cashew, nutshell liq., oligomeric reaction products with 1-chloro-2,3-epoxypropane	68413-24-1	1 - 5
Solvent naphtha (petroleum), light arom.	64742-95-6	1 - 5
tetraethyl silicate	78-10-4	1 - 5
[3-(2,3-epoxypropoxy)propyl]trimethoxysilane	2530-83-8	1 - 5
1,2,4-trimethylbenzene	95-63-6	1 - 5
n-Butyl acetate	123-86-4	0.5 - 1.5
Ethylbenzene	100-41-4	0.1 - 1
Cyclohexanol	108-93-0	0.1 - 1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.

Skin contact : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.

Inhalation : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Ingestion : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous combustion products : Decomposition products may include the following materials:
carbon oxides
halogenated compounds
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

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6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Use spark-proof tools and explosion-proof equipment. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not breathe vapor or mist. Do not swallow. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	PPG
Quartz (SiO2) (<10 microns)	TWA	0.025 mg/m³ R	10 mg/m³ R Z 30 mg/m³ TD Z 250 mppcf R Z	0.1 mg/m³ R	0.1 mg/m³ R	Not established
heptan-2-one	TWA	50 ppm	100 ppm	25 ppm	50 ppm	Not established

8 . Exposure controls/personal protection

	STEL	Not established	Not established	Not established	100 ppm	Not established
4-methylpentan-2-one	TWA	20 ppm	100 ppm	50 ppm	50 ppm	Not established
	STEL	75 ppm	Not established	75 ppm	75 ppm	Not established
xylene	TWA	100 ppm	100 ppm	100 ppm	100 ppm	Not established
	STEL	150 ppm	Not established	150 ppm	150 ppm	Not established
Titanium dioxide	TWA	10 mg/m³	15 mg/m³ TD	10 mg/m³ TD	10 mg/m³ (as Ti)	Not established
	STEL	Not established	Not established	Not established	20 mg/m³ (as Ti)	Not established
tetraethyl silicate	TWA	10 ppm	100 ppm	10 ppm	10 ppm	Not established
	STEL	Not established	Not established	Not established	30 ppm	Not established
1,2,4-trimethylbenzene	TWA	25 ppm	Not established	25 ppm	25 ppm	Not established
	STEL	Not established	Not established	Not established	35 ppm	Not established
n-Butyl acetate	TWA	150 ppm	150 ppm	150 ppm	150 ppm	Not established
	STEL	200 ppm	Not established	200 ppm	200 ppm	Not established
Ethylbenzene	TWA	100 ppm	100 ppm	100 ppm	100 ppm	Not established
	STEL	125 ppm	Not established	125 ppm	125 ppm	Not established
Cyclohexanol	TWA	50 ppm S	50 ppm	50 ppm S	50 ppm S	Not established

Key to abbreviations

A = Acceptable Maximum Peak
ACGIH = American Conference of Governmental Industrial Hygienists.
C = Ceiling Limit
F = Fume
IPEL = Internal Permissible Exposure Limit
OSHA = Occupational Safety and Health Administration.
R = Respirable
Z = OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances
S = Potential skin absorption
SR = Respiratory sensitization
SS = Skin sensitization
STEL = Short term Exposure limit values
TD = Total dust
TLV = Threshold Limit Value
TWA = Time Weighted Average

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

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8 . Exposure controls/personal protection

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses with side shields.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Gloves : butyl rubber

Respiratory : If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	: Liquid.
Flash point	: Closed cup: 27.78°C (82°F)
Explosion limits	: Lower: 1.1%
Color	: Not available.
Odor	: Not available.
pH	: Not available.
Boiling/condensation point	: >37.78°C (>100°F)
Melting/freezing point	: Not available.
Specific gravity	: 1.17
Density (lbs / gal)	: 9.76
Vapor pressure	: 1 kPa (7.8 mm Hg) [20°C]
Vapor density	: Not available.
Volatility	: 47% (v/v), 33.19% (w/w)
Odor threshold	: Not available.
Evaporation rate	: 82 (butyl acetate = 1)
Partition coefficient: n-octanol/water	: Not available.
% Solid. (w/w)	: 66.81

10 . Stability and reactivity

Stability : Stable under recommended storage and handling conditions (see section 7).

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Materials to avoid : Reactive or incompatible with the following materials:,acids,oxidizing materials,strong alkalis

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
reaction product: bisphenol-A-(epichlorhydrin) and epoxy resin (number average molecular weight <= 700)	LD50 Oral	Rat	>2 g/kg	-
	LD50 Dermal	Rabbit	>2 g/kg	-
heptan-2-one	LD50 Oral	Rat	1.6 g/kg	-
	LD50 Dermal	Rabbit	10.206 g/kg	-
4-methylpentan-2-one	LD50 Oral	Rat	2.08 g/kg	-
	LC50 Inhalation Vapor	Rat	32772 mg/m3	4 hours
xylene	LD50 Oral	Rat	4.3 g/kg	-
	LD50 Dermal	Rabbit	>1.7 g/kg	-
	LC50 Inhalation Vapor	Rat	5000 ppm	4 hours
Titanium dioxide	LD50 Oral	Rat	>10 g/kg	-
Cashew, nutshell liq., oligomeric reaction products with 1-chloro-2,3-epoxypropane	LD50 Oral	Rat	5 g/kg	-
	LD50 Dermal	Rabbit	>2 g/kg	-
Solvent naphtha (petroleum), light arom.	LD50 Oral	Rat	8400 mg/kg	-
	LD50 Dermal	Rabbit	3.48 g/kg	-
tetraethyl silicate	LD50 Oral	Rat	6.27 g/kg	-
	LD50 Dermal	Rabbit	5.878 g/kg	-
[3-(2,3-epoxypropoxy)propyl]trimethoxysilane	LD50 Oral	Rat	24.2 g/kg	-
	LD50 Dermal	Rabbit	4.3 g/kg	-
1,2,4-trimethylbenzene	LD50 Oral	Rat	5 g/kg	-
	LC50 Inhalation	Rat	18000 mg/m3	4 hours
n-Butyl acetate	LD50 Oral	Rat	10.768 g/kg	-
	LD50 Dermal	Rabbit	>17600 mg/kg	-
	LC50 Inhalation	Rat	>21.1 mg/l	4 hours
Ethylbenzene	LD50 Oral	Rat	3.5 g/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LC50 Inhalation Vapor	Rat	4000 ppm	4 hours
Cyclohexanol	LD50 Oral	Rat	1400 mg/kg	-

Chronic toxicity

Conclusion/Summary : Not available.

Defatting irritant? : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

Target organs : Contains material which causes damage to the following organs: kidneys, liver, spleen, brain, skin, eyes, bone marrow, central nervous system (CNS).
Contains material which may cause damage to the following organs: blood, lungs, peripheral nervous system, gastrointestinal tract, upper respiratory tract, nose/sinuses, throat.

Carcinogenicity

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11 . Toxicological information

Carcinogenicity : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Quartz (SiO2) (<10 microns)	A2	1	-	+	Proven.	-
4-methylpentan-2-one	A3	-	-	-	-	-
xylene	A4	3	-	-	-	-
Titanium dioxide	A4	2B	-	-	-	-
Ethylbenzene	A3	2B	-	-	-	-

Mutagenicity

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity

Teratogenicity : No known significant effects or critical hazards.

Reproductive toxicity

Developmental effects : Contains material which may cause developmental abnormalities, based on animal data.

Fertility effects : Contains material which may impair male fertility, based on animal data.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
heptan-2-one	Acute LC50 131000 to 137000 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
4-methylpentan-2-one	Acute LC50 505000 to 514000 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
xylene	Acute LC50 3300 to 4093 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
Titanium dioxide	Acute LC50 5.5 ppm Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC 1 ppm Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
1,2,4-trimethylbenzene	Acute LC50 7720 to 8280 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
n-Butyl acetate	Acute LC50 18000 to 19000 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
Ethylbenzene	Acute LC50 4200 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	Acute LC50 5100 to 5700 ug/L Marine water	Fish - Atlantic silverside - Menidia menidia	96 hours
	Acute EC50 2930 to 4400 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC 3300 ug/L Marine water	Fish - Atlantic silverside - Menidia menidia	96 hours
	Chronic NOEC 6800 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
Cyclohexanol	Acute LC50 704000 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours

12 . Ecological information

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	1263	Paint.	3	III	-
IMDG	1263	Paint.	3	III	-
DOT	1263	Paint.	3	III	-

PG* : Packing group

Reportable quantity RQ : CERCLA: Hazardous substances.: butan-1-ol: 5000 lbs. (2270 kg); n-Butyl acetate: 5000 lbs. (2270 kg); Ethylbenzene: 1000 lbs. (454 kg); xylene: 100 lbs. (45.4 kg); 4-methylpentan-2-one: 5000 lbs. (2270 kg);

15 . Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.
Australia inventory (AICS) : At least one component is not listed.
Canada inventory (DSL) : At least one component is not listed.
China inventory (IECSC) : At least one component is not listed.
Europe inventory (REACH) : Please contact your supplier for information on the inventory status of this material.
Japan inventory (ENCS) : At least one component is not listed.
Korea inventory (KECI) : Not determined.
New Zealand (NZIoC) : Not determined.
Philippines inventory (PICCS) : At least one component is not listed.

United States

U.S. Federal regulations :

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: n-Butyl acetate; Quartz (SiO2) (<10 microns); 1,2,4-trimethylbenzene; tetraethyl silicate; Titanium dioxide; xylene; 4-methylpentan-2-one; heptan-2-one
CERCLA: Hazardous substances.: butan-1-ol: 5000 lbs. (2270 kg); n-Butyl acetate: 5000 lbs. (2270 kg); Ethylbenzene: 1000 lbs. (454 kg); xylene: 100 lbs. (45.4 kg); 4-methylpentan-2-one: 5000 lbs. (2270 kg);

SARA 311/312 MSDS Distribution - Chemical Inventory - Hazard Identification:

Chemical name	CAS #	Acute	Chronic	Fire	Reactive	Pressure

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15 . Regulatory information

Quartz (SiO2) (<10 microns)	14808-60-7	N	Y	N	N	N
reaction product: bisphenol-A-(epichlorhydrin) and epoxy resin (number average molecular weight <= 700)	25068-38-6	Y	N	N	N	N
Phenol, 4-(1,1-dimethylethyl)-, polymer with 2-(chloromethyl)oxirane and 4,4'-(1-methylethylidene)bis[phenol] Average Molecular Weight > 700 to <=1000	67924-34-9	Y	N	N	N	N
heptan-2-one	110-43-0	Y	N	Y	N	N
4-methylpentan-2-one	108-10-1	Y	N	Y	N	N
xylene	1330-20-7	Y	N	Y	N	N
Titanium dioxide	13463-67-7	N	Y	N	N	N
Cashew, nutshell liq., oligomeric reaction products with 1-chloro-2,3-epoxypropane	68413-24-1	Y	N	N	N	N
Solvent naphtha (petroleum), light arom.	64742-95-6	Y	N	N	N	N
tetraethyl silicate	78-10-4	Y	N	Y	Y	N
[3-(2,3-epoxypropoxy)propyl]trimethoxysilane	2530-83-8	Y	N	N	Y	N
1,2,4-trimethylbenzene	95-63-6	Y	N	Y	N	N
n-Butyl acetate	123-86-4	Y	N	Y	N	N
Ethylbenzene	100-41-4	Y	Y	Y	N	N
Cyclohexanol	108-93-0	Y	Y	N	Y	N
Product as-supplied :		Y	Y	Y	N	N

SARA 313

Supplier notification	Chemical name	CAS number	Concentration
:	4-methylpentan-2-one	108-10-1	5 - 10
	xylene	1330-20-7	1 - 5
	1,2,4-trimethylbenzene	95-63-6	1 - 5
	Ethylbenzene	100-41-4	0.1 - 1

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Canada

WHMIS (Canada) : Class B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). Class D-1B: Material causing immediate and serious toxic effects (Toxic). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 3 **Health** : 3 **Reactivity** : 0

16 . Other information

Hazardous Material Information System (U.S.A.)

Health : 3 * **Flammability** : 3 **Physical hazards** : 0

(*) - Chronic effects

16 . Other information

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 3 **Flammability** : 3 **Instability** : 0

Date of previous issue : **No previous validation.**

Organization that prepared the MSDS : EHS

▼ Indicates information that has changed from previously issued version.

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

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Material Safety Data Sheet

CHEMTREC Transportation Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC Transportation Emergency Phone is to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals

Section 1 - Chemical Product / Company Information

Product Name:	CARBOZINC 11 / CARBOZINC 11 FG BASE	**Revision Date:**	08/25/2010
Identification Number:	PLMSDS 0250A1NL	**Supercedes :**	08/28/2007
Product Use/Class:	Solvent Based Inorganic Zinc - FOR INDUSTRIAL USE ONLY		
		Preparer:	Regulatory, Department
Manufacturer:	**Carboline Company 2150 Schuetz Road St. Louis, MO 63146 (800) 848-4645**		

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
ETHYL ALCOHOL	64-17-5	25.0	1000 PPM	1000 PPM	1900 MGM3	N/E
MICROCRYSTALLINE SILICA	14808-60-7	20.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E
ISOPROPANOL	67-63-0	15.0	200 PPM	400 PPM	980 MGM3	N/E
ETHYL POLYSILICATE	11099-06-2	15.0	N/E	N/E	N/E	N/E
2-BUTOXYETHANOL	111-76-2	15.0	25 PPM	N/E	120 MG/M3	N/E
METHYL ALCOHOL	67-56-1	10.0	200 PPM	250 PPM	260 MGM3	N/E
ALUMINUM SILICATE	1332-58-7	10.0	2 MGM3	N/E	5 MGM3	NE
TITANIUM DIOXIDE	13463-67-7	5.0	10 MGM3	N/E	10 MGM3	N/E
MICA	12001-26-2	5.0	3 MGM3	N/E	3 MGM3	N/E
CARBON BLACK	1333-86-4	5.0	3.5 MG/M3	N/E	3.5 MG/M3	N/E
ETHYL BENZENE	100-41-4	0.3	100 PPM	125 PPM	435 MGM3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Contains SILICA which can cause cancer. Risk of Cancer depends on duration and level of exposure.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: Direct skin contact may cause irritation. May be harmful if absorbed through the skin.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Crystalline silica is known to cause silicosis. Crystalline silica (Quartz) is classified as a known human carcinogen (Group 1) by IARC. Exposure is by route of inhalation. If material is in a liquid matrix it is unlikely to be inhaled. However, when sanding or grinding

the finished product, there may be potential for crystalline silica to become airborne. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 56F (13C) (Setaflash)

Lower Explosive Limit, %: 1.0
Upper Explosive Limit, %: 36.0

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an aborbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Avoid breathing vapors or spray mist. Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	149 F (65 C) - 336 F (169 C)	**Vapor Density:**	Heavier than Air
Odor:	Solvent	**Odor Threshold:**	N/D
Appearance:	Viscous Green, Grey, Red or Black Liquid	**Evaporation Rate:**	Slower Than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	**Specific Gravity:**	1.07
Vapor Pressure:	N/D	**PH:**	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
ETHYL ALCOHOL	64-17-5	7060 MG/KG, ORAL, RAT	20000 PPM/10 HRS, RAT, INHALATION
MICROCRYSTALLINE SILICA	14808-60-7	NOT AVAILABLE	NOT AVAILABLE
ISOPROPANOL	67-63-0	4720MG/KG RAT.ORAL	22500 PPM/8HRS RAT,INHALATION
ETHYL POLYSILICATE	11099-06-2	NOT AVAILABLE	NOT AVAILABLE
2-BUTOXYETHANOL	111-76-2	1746 MG/KG, RAT, ORAL	700PPM/7HRS MOUSE, INHALATION

METHYL ALCOHOL	67-56-1	2080MG/KG RAT ORAL	NOT AVAILABLE
ALUMINUM SILICATE	1332-58-7	NOT AVAILABLE	NOT AVAILABLE
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
MICA	12001-26-2	NOT AVAILABLE	NOT AVAILABLE
CARBON BLACK	1333-86-4	NOT AVAILABLE	>8000 MG/KG, ORAL, RAT
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name: Flammable Liquid NOS **Packing Group:** II

DOT Technical Name: Ethanol Isopropanol **Hazard** N/A

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS Number
2-BUTOXYETHANOL	111-76-2
METHYL ALCOHOL	67-56-1
ETHYL BENZENE	100-41-4

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name	CAS Number
WATER	7732-18-5

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name	CAS Number
MICROCRYSTALLINE SILICA	14808-60-7
CARBON BLACK	1333-86-4
ETHYL BENZENE	100-41-4

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

Chemical Name	CAS Number
TOLUENE	108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2A D2B

Section 16 - Other Information

HMIS Ratings
Health: 3 **Flammability: 3** **Reactivity:** 0 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): CZ11: 479; CZ11 FG: 539 (Shop Use Only)

REASON FOR REVISION: Changes made in Section(s) 1, 2, 3, 8, 11, and 15.

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

APPENDIX I

NATURAL GAS HEATER DATA

MODINE
APPLIED THERMAL INNOVATION™

6-189.6
August, 2011

Gas-Fired Power Vented Unit Heaters
Propeller & Blower Models

MODEL HD

MODEL HDB

MODEL PDP

MODEL BDP

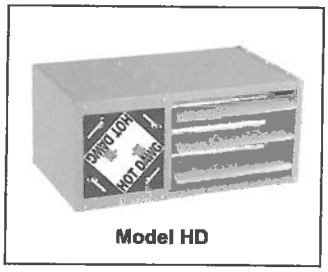
INDOOR AIR SOLUTIONS

MODINE INDOOR AIR SOLUTIONS

Tubular Heat Exchanger Power Vented Unit Heaters, 30-125MBH

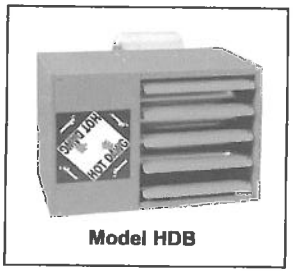
For residential, commercial or industrial applications that require a low profile unit, Modine offers the Hot Dawg®. Capable of being installed just one inch below the ceiling, the superior quality of the Hot Dawg makes it a preferred choice for a variety of applications, including garages and workshops.

Figure 2.1 - Hot Dawg Propeller Unit Heater



Model HD

Figure 2.2 - Hot Dawg Blower Unit Heater

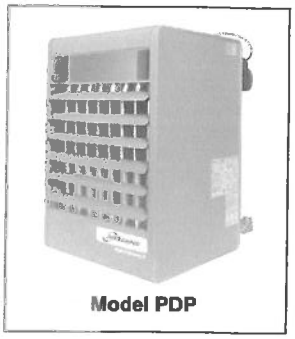


Model HDB

Power Vented Unit Heater, 150-400MBH

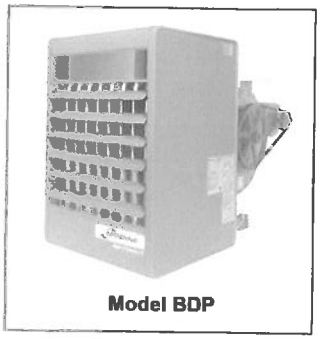
For commercial or industrial applications that require higher input ratings, the PDP/BDP is available in ratings that range from 150,000 to 400,000 Btu/Hr in either natural or propane gas.

Figure 2.3 - Propeller Unit Heater



Model PDP

Figure 2.4 - Blower Unit Heater



Model BDP

Table 3.1 - Standard Features and Factory Options ①

	Feature	Model			
		HD	HDB	PDP	BDP
Cabinet and Air Mover	Aluminized steel cabinet (gauge indicated)	22 ga.	22 ga.	20 ga.	20 ga.
	Low profile casing design	•	•		
	Baked-on polyester powder paint for durability and corrosion resistence	•	•	•	•
	Adjustable air-deflector blades	•	•	•	•
	Fans engineered for quiet operation	•	•	•	•
	Totally enclosed fan/blower motors (model sizes 100 and above)	•		•	•
	Fingerproof fan guard (optional on PDP units)	•	•	•	
	Two L-shaped mounting brackets (optional on sizes 100/125)	•	•		
	Adjustable mounting brackets for level hanging			•	•
	Hinged tool-less bottom pan entry			•	•
	Multi-tap 3-speed motors, certified to 0.8" W.C. external static pressure		•		
	Adjustable motor sheaves, certified to 0.5" W.C. external static pressure				•
Heat Exchanger and Burner	80% thermally efficient	•	•	•	•
	Aluminized steel heat exchanger (409 stainless steel optional)	•	•	•	•
	Tubular heat exchanger	•	•		
	In-shot burner on each heat exchanger tube for reliable performance, ease of serviceability and low sound level on flame ignition/extinction	•	•		
	Aluminized steel burner (409 stainless steel optional)			•	•
Controls	CSA certification for commericial and industrial use in the US and Canada	•	•	•	•
	CSA certification for residential use in the US and Canada	•	•		
	Factory-installed power exhauster	•	•	•	•
	Controls for natural gas (propane optional)	•	•	•	•
	Single stage gas controls (two stage optional)	•	•	•	•
	High limit safety control	•	•	•	•
	Differential pressure switch for proof of venting	•	•	•	•
	Flame roll-out safety switch	•	•		
	Direct spark ignition with continuous retry control system	•	•		
	Intermittent pilot ignition with continuous retry control system			•	•
	Control terminal board and low voltage terminal connections	•	•	•	•
	Gas control step down transformer with 24V gas controls	•	•	•	•
	Fan delay timer	•	•	•	•

① See page 13 for Field Installed Accessories

Table 6.1 - Propeller Unit Model HD and PDP General Performance Data

	Model HD Sizes						Model PDP Sizes						
	30	45	60	75	100	125	150	175	200	250	300	350	400
Btu/Hr Input ①	30,000	45,000	60,000	75,000	100,000	125,000	150,000	175,000	200,000	250,000	300,000	350,000	400,000
Btu/Hr Ouput ①	24,000	36,000	48,000	60,000	80,000	100,000	120,000	140,000	160,000	200,000	240,000	280,000	320,000
Entering Airflow (CFM) @ 70°F	505	720	990	1160	1490	1980	2180	2550	2870	3700	4460	4870	5440
Outlet Velocity (FPM)	523	725	653	769	565	747	931	959	819	1053	1123	1068	1016
Air Temp. Rise (°F)	44	46	45	48	50	47	51	51	52	50	50	53	54
Max. Mounting Height (Ft.) ②	10	10	12	14	12	16	16	17	15	19	21	20	19
Heat Throw (Ft.) @ Max Mtg Ht ②	25	27	36	38	42	56	55	59	51	67	74	70	69
Motor Type ③	SP	SP	PSC	PSC	SP	PSC	PSC	PSC	PSC	PSC	PSC	PSC	PSC
Motor HP	1/15	1/15	1/12	1/12	1/12	1/8	1/8	1/6	1/6	1/3	1/2	3/4	3/4
Motor RPM	1550	1550	1625	1625	1050	1625	1625	1075	1075	1075	1075	1125	1125

Table 6.2 - Propeller Unit Model HD and PDP Operating Electrical Data

Supply Voltage	Power Code		Model HD Sizes						Model PDP Sizes						
			30	45	60	75	100	125	150	175	200	250	300	350	400
115V 1 Phase	01 (115V)	Motor Amps	2.4	2.4	1.2	1.2	2.7	2.2	2.3	2.7	2.7	5.4	7.5	8.8	8.8
		Total Amps	3.7	3.7	2.5	2.5	4.7	4.2	4.0	5.1	5.1	7.7	9.8	11.1	11.1
		Transformer kVA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
208V 1 Phase	01 (115V) with Transformer	Transformer kVA	0.5	0.5	0.5	0.5	1.0	1.0	0.5	1.0	1.0	1.0	1.5	1.5	1.5
		208V Total Amps	2.05	2.05	1.38	1.38	2.60	2.32	2.21	2.82	2.82	4.26	5.42	6.14	6.14
	03 (208V)	Motor Amps	n/a	n/a	n/a	n/a	n/a	n/a	1.0	1.5	1.5	n/a	n/a	n/a	n/a
		Total Amps							1.9	2.8	2.8				
230V 1 Phase	01 (115V) with Transformer	Transformer kVA	0.5	0.5	0.5	0.5	0.75	0.75	0.5	0.75	0.75	1.0	1.5	1.5	1.5
		230V Total Amps	1.85	1.85	1.25	1.25	2.35	2.10	2.00	2.55	2.55	3.85	4.90	5.55	5.55
	02 (230V)	Motor Amps	n/a	n/a	n/a	n/a	n/a	n/a	1.0	1.5	1.5	2.5	3.5	4.4	4.4
		Total Amps							1.9	2.8	2.8	3.7	4.7	5.5	5.5
208V 3 Phase	01 (115V) with Transformer	Transformer kVA	0.5	0.5	0.5	0.5	1.0	1.0	0.5	1.0	1.0	1.0	1.5	1.5	1.5
		208V Total Amps	2.05	2.05	1.38	1.38	2.60	2.32	2.21	2.82	2.82	4.26	5.42	6.14	6.14
230V 3 Phase	01 (115V) with Transformer	Transformer kVA	0.5	0.5	0.5	0.5	0.75	0.75	0.5	0.75	0.75	1.0	1.5	1.5	1.5
		230V Total Amps	1.85	1.85	1.25	1.25	2.35	2.10	2.00	2.55	2.55	3.85	4.90	5.55	5.55
460V 3 Phase	01 (115V) with Transformer	Transformer kVA	0.5	0.5	0.5	0.5	0.75	0.75	0.5	0.75	0.75	1.0	1.5	1.5	1.5
		460V Total Amps	0.93	0.93	0.63	0.63	1.18	1.05	1.00	1.28	1.28	1.93	2.45	2.78	2.78
575V 3 Phase	01 (115V) with Transformer	Transformer kVA	0.5	0.5	0.5	0.5	0.75	0.75	0.5	0.75	0.75	1.0	1.5	1.5	1.5
		575V Total Amps	0.74	0.74	0.50	0.50	0.94	0.84	0.80	1.02	1.02	1.54	1.96	2.22	2.22

① Ratings shown are for elevations up to 2,000 ft. For elevations above 2,000 feet, ratings should be reduced at the rate of 4% for each 1,000 feet above sea level. (In Canada see rating plate.) Reduction of ratings requires use of a high altitude kit.

② Data taken at 55°F air temperature rise. At 65°F ambient and unit fired at full-rated input. Mounting height as measured from bottom of unit, and without deflector hoods.

③ All motors used are produced, rated and tested by reputable manufacturers in accordance with NEMA standards and carry the standard warranty of both the motor manufacturer and Modine. Motors on model sizes 100 and above are totally enclosed (model size 75 and below are open drip proof) and all single phase motors have built in thermal overload protection.

APPENDIX J

METALIZING MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheet

SULZER

Metco 442

Sulzer Metco

1. Product and company identification

Product name	:	Metco 442
Material uses	:	Metal industry: Used by spraying
Supplier	:	Sulzer Metco (US) Inc. 1101 Prospect Avenue Westbury, NY 11590
Telephone no.	:	(516) 334 - 1300 (7:30AM - 4:00PM)
In case of emergency	:	CHEMTREC 800-424-9300
Calls Outside the United States	:	**+1 703-527-3887 (USA) 24 hour Chemtrec International Emergency Response Service**
Product type	:	Powder.

2. Hazards identification

Emergency overview

Physical state	:	Solid. [Metallic powder.]
Color	:	Gray.
Odor	:	Odorless.
Signal word	:	WARNING!
Hazard statements	:	CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. DURING THERMAL SPRAY A PORTION OF CHROMIUM AND NICKEL MAY BE CONVERTED TO HEXAVALENT CHROMIUM AND NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.
Precautionary measures	:	Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Do not breathe dust. Do not ingest. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Keep container tightly closed. Use personal protective equipment as required. Wash thoroughly after handling.
OSHA/HCS status	:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry	:	Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation	:	Irritating to respiratory system.
Ingestion	:	Harmful if swallowed.
Skin	:	Irritating to skin. May cause sensitization by skin contact.
Eyes	:	Irritating to eyes.

Potential chronic health effects

Chronic effects	:	Contains material that can cause target organ damage. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	:	Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	:	No known significant effects or critical hazards.
Teratogenicity	:	No known significant effects or critical hazards.
Developmental effects	:	No known significant effects or critical hazards.
Fertility effects	:	No known significant effects or critical hazards.

2. Hazards identification

Target organs : Contains material which causes damage to the following organs: eye, lens or cornea. Contains material which may cause damage to the following organs: blood, kidneys, lungs, the nervous system, liver, upper respiratory tract, skin, nose/sinuses.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : No specific data.

Skin : Adverse symptoms may include the following:
irritation
redness

Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
Nickel	7440-02-0	68
chromium	7440-47-3	8.5
Aluminium	7429-90-5	7
molybdenum	7439-98-7	5
Aluminium oxide	1344-28-1	3
Organic binder	-	2.5
iron	7439-89-6	2
boron	7440-42-8	2
silicon	7440-21-3	2

Canada

Name	CAS number	%
Nickel	7440-02-0	68
chromium	7440-47-3	8.5
Aluminium	7429-90-5	7
molybdenum	7439-98-7	5
Aluminium oxide	1344-28-1	3
Organic binder	-	2.5
iron	7439-89-6	2
boron	7440-42-8	2
silicon	7440-21-3	2

Mexico

					Classification			
Name	CAS number	UN number	%	IDLH	H	F	R	Special
Nickel	7440-02-0	Not regulated	68	10 mg/m³	2	0	0	-
chromium	7440-47-3	Not regulated	8.5	250 mg/m³	0	0	0	-
Aluminium	7429-90-5	Not regulated	7	-	4	1	0	-
molybdenum	7439-98-7	Not regulated	5	5000 mg/m³	2	0	0	-

3. Composition/information on ingredients

Aluminium oxide	1344-28-1	Not regulated	3	-	0	0	0	-
Organic binder	-	Not regulated	2.5	-	0	0	0	-
iron	7439-89-6	Not regulated	2	-	2	0	0	-
boron	7440-42-8	Not regulated	2	-	2	0	0	-
silicon	7440-21-3	Not regulated	2	-	2	0	0	-

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Fine dust clouds may form explosive mixtures with air.

Extinguishing media

Suitable : Use approved Class D extinguisher or smother with dry sand, dry clay or dry ground limestone.

Not suitable : Do not use water. Do not use dry chemical, CO_2 or halon.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate container to avoid environmental contamination.

8. Exposure controls/personal protection

United States

Ingredient	Exposure limits
Nickel	**ACGIH TLV (United States, 2/2010).** TWA: 1.5 mg/m³ 8 hour(s). Form: Inhalable fraction **OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³, (as Ni) 8 hour(s).
chromium	**ACGIH TLV (United States, 2/2010).** TWA: 0.5 mg/m³, (measured as Cr) 8 hour(s). Form: Inorganic **OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³, (as Cr) 8 hour(s).
Aluminium	**OSHA PEL (United States, 6/2010).** TWA: 5 mg/m³, (as Al) 8 hour(s). Form: Respirable fraction

8. Exposure controls/personal protection

	TWA: 15 mg/m³, (as Al) 8 hour(s). Form: Total dust
	ACGIH TLV (United States, 2/2010).
	TWA: 1 mg/m³ 8 hour(s). Form: Respirable fraction
molybdenum	**ACGIH TLV (United States, 2/2010).**
	TWA: 10 mg/m³, (as Mo) 8 hour(s). Form: Inhalable fraction
	TWA: 3 mg/m³, (as Mo) 8 hour(s). Form: Respirable fraction
Aluminium oxide	**OSHA PEL (United States, 6/2010).**
	TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction
	TWA: 15 mg/m³ 8 hour(s). Form: Total dust
silicon	**OSHA PEL (United States, 6/2010).**
	TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction
	TWA: 15 mg/m³ 8 hour(s). Form: Total dust

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
Nickel	US ACGIH 2/2010	-	1.5	-	-	-	-	-	-	-	[a]
	AB 4/2009	-	1.5	-	-	-	-	-	-	-	
Nickel, as Ni	BC 9/2010	-	0.05	-	-	-	-	-	-	-	
Nickel	ON 7/2010	-	1	-	-	-	-	-	-	-	[b]
	QC 6/2008	-	1	-	-	-	-	-	-	-	
chromium, measured as Cr	US ACGIH 2/2010	-	0.5	-	-	-	-	-	-	-	[c]
chromium, as Cr	AB 4/2009	-	0.5	-	-	-	-	-	-	-	[3]
chromium	BC 9/2010	-	0.5	-	-	-	-	-	-	-	
chromium, as Cr	ON 7/2010	-	0.5	-	-	-	-	-	-	-	[c]
chromium	QC 6/2008	-	0.5	-	-	-	-	-	-	-	
Aluminium	US ACGIH 2/2010	-	1	-	-	-	-	-	-	-	[d]
	AB 4/2009	-	10	-	-	-	-	-	-	-	[3] [e]
	BC 9/2010	-	1	-	-	-	-	-	-	-	[f]
	ON 7/2010	-	1	-	-	-	-	-	-	-	[d]
Aluminium , as Al	QC 6/2008	-	10	-	-	-	-	-	-	-	
molybdenum, as Mo	US ACGIH 2/2010	-	10	-	-	-	-	-	-	-	[a]
		-	3	-	-	-	-	-	-	-	[d]
	AB 4/2009	-	3	-	-	-	-	-	-	-	[f]
		-	10	-	-	-	-	-	-	-	
molybdenum	BC 9/2010	-	10	-	-	-	-	-	-	-	[g]
		-	3	-	-	-	-	-	-	-	[f]
molybdenum, as Mo	ON 7/2010	-	10	-	-	-	-	-	-	-	[a]
		-	3	-	-	-	-	-	-	-	[d]
Aluminium oxide	AB 4/2009	-	10	-	-	-	-	-	-	-	
Aluminium oxide, as Al	QC 6/2008	-	10	-	-	-	-	-	-	-	[h]
silicon	BC 9/2010	-	3	-	-	-	-	-	-	-	[i]
		-	10	-	-	-	-	-	-	-	[j]
	ON 7/2010	-	10	-	-	-	-	-	-	-	[j]
	QC 6/2008	-	10	-	-	-	-	-	-	-	[h]

Mexico

Occupational exposure limits

Ingredient	Exposure limits
Nickel	**NOM-010-STPS (Mexico, 9/2000).**
	LMPE-PPT: 1 mg/m³ 8 hour(s).
chromium	**NOM-010-STPS (Mexico, 9/2000).**
	LMPE-PPT: 0.5 mg/m³ 8 hour(s).
Aluminium	**NOM-010-STPS (Mexico, 9/2000).**
	LMPE-PPT: 5 mg/m³ 8 hour(s).
	LMPE-PPT: 5 mg/m³ 8 hour(s). Form: powder
molybdenum	**ACGIH TLV (United States, 2/2010).**
	TWA: 10 mg/m³, (as Mo) 8 hour(s). Form: Inhalable fraction
	TWA: 3 mg/m³, (as Mo) 8 hour(s). Form: Respirable fraction
Aluminium oxide	**NOM-010-STPS (Mexico, 9/2000).**
	LMPE-PPT: 10 mg/m³ 8 hour(s).
silicon	**NOM-010-STPS (Mexico, 9/2000).**
	LMPE-CT: 20 mg/m³ 15 minute(s).

8. Exposure controls/personal protection

	LMPE-PPT: 10 mg/m³ 8 hour(s).

Consult local authorities for acceptable exposure limits.

Additional information : A portion of nickel may be converted during the thermal spray process to nickel compounds which are classified as an IARC Group 1 Carcinogen. NTP classifies nickel compounds as Known to be Carcinogenic.

A portion of metallic chromium may be converted during the thermal spray process to hexavalent chromium. Hexavalent chromium is classified as an IARC group 1 carcinogen. NTP classifies hexavalent chromium as Known to be Carcinogenic.
OSHA PEL (United States, 5/2006)
PEL: 0.005 mg/m³ 8 hours.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses or goggles are recommended when handling this material. During the thermal spray process, safety goggles and dark lenses must be worn.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Rubber or other appropriate gloves should be worn to minimize contact. For hygienic reasons rubber gloves should not be worn for more than 2 hours. During the thermal spray process, heat insulated gloves are recommended.

Hearing Protection : Hearing protection that meets local standards should be used.

Protective Clothing (Pictograms) :

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Physical state : Solid. [Metallic powder.]
Flash point : Not applicable.
Color : Gray.
Odor : Odorless.
Explosive properties : Fine dust clouds may form explosive mixtures with air.
Solubility : Insoluble in the following materials: cold water.
Physical/chemical properties comments : Insoluble.

10. Stability and reactivity

Chemical stability : The product is stable under normal storage conditions.
Conditions to avoid : Store and use away from heat, sparks, open flame or any other ignition source.
Incompatible materials : Avoid contact with combustible materials, acids, oxidizing agents, halogenated hydrocarbons.
Hazardous decomposition products : Ozone and nitric oxide are formed by plasma flame. This action is independent of material. Some metallic oxides. These products are carbon oxides (CO, CO_2).
Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

United States Canada Mexico

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
boron	LD50 Oral	Rat	650 mg/kg	-
silicon	LD50 Oral	Rat	3160 mg/kg	-

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
silicon	Eyes - Mild irritant	Rabbit	-	3 milligrams	-

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Nickel	A5	2B	-	+	Possible	-
chromium	A4	3	-	None.	-	-
Aluminium	A4	-	-	None.	-	-
molybdenum	-	-	-	None.	-	-
Aluminium oxide	A4	-	-	None.	-	-
iron	-	-	-	None.	-	-
boron	-	-	-	None.	-	-
silicon	-	-	-	None.	-	-

Mutagenicity

11. Toxicological information

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

United States

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Nickel	Acute LC50 2.3 ppm Fresh water	Fish - Cyprinus carpio - Juvenile (Fledgling, Hatchling, Weanling) - 6 cm	96 hours
	Chronic NOEC 3.5 ug/L Fresh water	Fish - Cyprinus carpio - 13 months - 10.5 cm - 27.8 g	4 weeks
chromium	Acute LC50 13.9 ppm Fresh water	Fish - Anguilla rostrata	96 hours
	Chronic NOEC 0.19 ug/L Fresh water	Fish - Cyprinus carpio - 13 months - 10.5 cm - 27.8 g	4 weeks
molybdenum	Acute LC50 800 mg/L Fresh water	Fish - Oncorhynchus mykiss - 20 mm	96 hours
iron	Acute EC50 3700 ug/L Fresh water	Aquatic plants - Lemna minor	4 days
boron	Acute EC50 >60000 ug/L Fresh water	Aquatic plants - Lemna minor	4 days

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	Not regulated	-	-	-		-
TDG Classification	Not regulated	-	-	-		-
Mexico Classification	Not regulated	-	-	-		-
ADR/RID Class	Not regulated	-	-	-		-
IMDG Class	Not regulated	-	-	-		-
IATA-DGR Class	Not regulated	-	-	-		-

PG* : Packing group

15. Regulatory information

United States

HCS Classification : Irritating material
Sensitizing material
Carcinogen
Target organ effects

U.S. Federal regulations : **TSCA 8(a) IUR**: Partial exemption

United States inventory (TSCA 8b): All components are listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Nickel; Aluminium ; molybdenum; Aluminium oxide; silicon
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Nickel: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; Aluminium : Fire hazard, reactive; molybdenum: Immediate (acute) health hazard, Delayed (chronic) health hazard; Aluminium oxide: Immediate (acute) health hazard; iron: Fire hazard; silicon: Fire hazard, Immediate (acute) health hazard

Clean Water Act (CWA) 307: Nickel; chromium

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

15. Regulatory information

	Product name	CAS number	Concentration
Form R - Reporting requirements	Nickel chromium Aluminium Aluminium oxide	7440-02-0 7440-47-3 7429-90-5 1344-28-1	68 8.5 7 3
Supplier notification	Nickel chromium Aluminium Aluminium oxide	7440-02-0 7440-47-3 7429-90-5 1344-28-1	68 8.5 7 3

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: NICKEL; CHROMIUM; ALUMINUM; MOLYBDENUM; ALUMINUM OXIDE; SILICON DUST

New York : The following components are listed: Nickel; Chromium

New Jersey : The following components are listed: NICKEL; CHROMIUM; ALUMINUM; MOLYBDENUM; ALUMINUM OXIDE; alpha-ALUMINA; BORON; SILICON

Pennsylvania : The following components are listed: NICKEL; CHROMIUM; ALUMINUM; MOLYBDENUM; ALUMINUM OXIDE (AL2O3); SILICON

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Nickel	Yes.	No.	No.	No.

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI : The following components are listed: Nickel; Chromium; Aluminum; Aluminum oxide

CEPA Toxic substances : None of the components are listed.

Canada inventory : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Mexico

Classification :

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

15. Regulatory information

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16. Other information

Label requirements : WARNING!
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
DURING THERMAL SPRAY A PORTION OF CHROMIUM AND NICKEL MAY BE CONVERTED TO HEXAVALENT CHROMIUM AND NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.

National Fire Protection Association (U.S.A.) :

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Date of issue : 6/11/2012.

Version : 1.5

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet

SULZER

METCO MASKING COMPOUND

Sulzer Metco

1. Product and company identification

Product name	:	METCO MASKING COMPOUND
Material uses	:	To prevent adherence of coating materials during thermal spray processing.
Supplier	:	Sulzer Metco (US) Inc. 1101 Prospect Avenue Westbury, NY 11590
Telephone no.	:	(516) 334 - 1300 (7:30AM - 4:00PM)
In case of emergency	:	CHEMTREC 800-424-9300
Calls Outside the United States	:	**+1 703-527-3887 (USA) 24 hour Chemtrec International Emergency Response Service**
Product type	:	Liquid.

2. Hazards identification

Emergency overview

Physical state	:	Liquid.
Signal word	:	CAUTION!
Hazard statements		NOT EXPECTED TO PRODUCE SIGNIFICANT ADVERSE HEALTH EFFECTS WHEN THE RECOMMENDED INSTRUCTIONS FOR USE ARE FOLLOWED.
OSHA/HCS status	:	While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Potential acute health effects

Inhalation	:	No known significant effects or critical hazards.
Ingestion	:	No known significant effects or critical hazards.
Skin	:	No known significant effects or critical hazards.
Eyes	:	This product may irritate eyes upon contact.

Potential chronic health effects

Chronic effects	:	No known significant effects or critical hazards.
Carcinogenicity	:	No known significant effects or critical hazards.
Mutagenicity	:	No known significant effects or critical hazards.
Teratogenicity	:	No known significant effects or critical hazards.
Developmental effects	:	No known significant effects or critical hazards.
Fertility effects	:	No known significant effects or critical hazards.
Target organs	:	Not available.

Over-exposure signs/symptoms

Inhalation	:	No specific data.
Ingestion	:	No specific data.
Skin	:	No specific data.
Eyes	:	No specific data.
Medical conditions aggravated by over-exposure	:	None known.

See toxicological information (Section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
This product has been evaluated and does not require any hazard warning on the label under established regulatory criteria.		

Canada

Name	CAS number	%
This product has been evaluated and does not require any hazard warning on the label under established regulatory criteria.	-	100

Mexico

Name	CAS number	UN number	%	IDLH	Classification H	F	R	Special
This product has been evaluated and does not require any hazard warning on the label under established regulatory criteria.	-	Not available.	100	-	0	0	0	-

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention if symptoms occur.

Skin contact : No known effect after skin contact. Rinse with water for a few minutes.

Inhalation : Remove to fresh air. Get medical attention if symptoms appear.

Ingestion : Wash out mouth with water. Get medical attention if symptoms appear.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : None known.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products : No specific data.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate container to avoid environmental contamination.

8. Exposure controls/personal protection

United States

No exposure limit value known.

Canada

Occupational exposure limits

No exposure limit value known.

Mexico

Occupational exposure limits

No exposure limit value known.

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

8. Exposure controls/personal protection

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : None required. However, use of adequate ventilation is good industrial practice.

Hands : Rubber or other appropriate gloves should be worn to minimize contact.

Protective Clothing (Pictograms) :

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Physical state : Liquid.

Flash point : Not applicable.

Color : Green.

Odor : Typical soap odor.

Explosive properties : No specific hazard.

Relative density : 1.008

Solubility : Easily soluble in the following materials: cold water.

Physical/chemical properties comments : Soluble.

10. Stability and reactivity

Chemical stability : The product is stable under normal storage conditions.

Conditions to avoid : Not applicable.

Incompatible materials : Not applicable.

Hazardous decomposition products : No specific data.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

United States Canada Mexico

Acute toxicity

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

11. Toxicological information

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : No known significant effects or critical hazards.

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

United States

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	Not regulated	-	-	-		-
TDG Classification	Not regulated	-	-	-		-
Mexico Classification	Not regulated	-	-	-		-
ADR/RID Class	Not regulated	-	-	-		-
IMDG Class	Not regulated	-	-	-		-
IATA-DGR Class	Not regulated	-	-	-		-

14. Transport information

PG* : Packing group

15. Regulatory information

United States

HCS Classification : Not regulated

U.S. Federal regulations : **TSCA 8(a) IUR**: Partial exemption

United States inventory (TSCA 8b): Not determined.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: No products were found.
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: No products were found.

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

State regulations

Massachusetts : None of the components are listed.

New York : None of the components are listed.

New Jersey : None of the components are listed.

Pennsylvania : None of the components are listed.

Canada

WHMIS (Canada) : Not controlled under WHMIS (Canada).

Canadian lists

Canadian NPRI : None of the components are listed.

CEPA Toxic substances : None of the components are listed.

Canada inventory : Not determined.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Mexico

Classification :

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

15. Regulatory information

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16. Other information

Label requirements : CAUTION!
NOT EXPECTED TO PRODUCE SIGNIFICANT ADVERSE HEALTH EFFECTS WHEN THE RECOMMENDED INSTRUCTIONS FOR USE ARE FOLLOWED.

National Fire Protection Association (U.S.A.) :

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Date of issue : 4/10/2012.
Version : 2.4

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet

SULZER

Metco 444

Sulzer Metco

1. Product and company identification

Product name	: Metco 444
Material uses	: Metal industry: Used by spraying
Supplier	: Sulzer Metco (US) Inc. 1101 Prospect Avenue Westbury, NY 11590
Telephone no.	: (516) 334 - 1300 (7:30AM - 4:00PM)
In case of emergency	: CHEMTREC 800-424-9300
Calls Outside the United States	: **+1 703-527-3887 (USA) 24 hour Chemtrec International Emergency Response Service**
Product type	: Powder.

2. Hazards identification

Emergency overview

Physical state	: Solid. [Metallic powder.]
Color	: Gray.
Odor	: Odorless.
Signal word	: WARNING!
Hazard statements	: CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. DURING THERMAL SPRAY A PORTION OF CHROMIUM AND NICKEL MAY BE CONVERTED TO HEXAVALENT CHROMIUM AND NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.
Precautionary measures	: Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Do not breathe dust. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Keep container tightly closed. Use personal protective equipment as required. Wash thoroughly after handling.
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation	: Irritating to respiratory system.
Ingestion	: No known significant effects or critical hazards.
Skin	: Irritating to skin. May cause sensitization by skin contact.
Eyes	: Irritating to eyes.

Potential chronic health effects

Chronic effects	: Contains material that can cause target organ damage. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	: Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.

2. Hazards identification

Target organs : Contains material which causes damage to the following organs: eye, lens or cornea. Contains material which may cause damage to the following organs: blood, kidneys, lungs, the nervous system, liver, upper respiratory tract, skin, nose/sinuses.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : No specific data.

Skin : Adverse symptoms may include the following:
irritation
redness

Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
Nickel	7440-02-0	72
chromium	7440-47-3	9
Aluminium	7429-90-5	7
molybdenum	7439-98-7	5.5
iron	7439-89-6	5
Organic binder	-	1.5

Canada

Name	CAS number	%
Nickel	7440-02-0	72
chromium	7440-47-3	9
Aluminium	7429-90-5	7
molybdenum	7439-98-7	5.5
iron	7439-89-6	5
Organic binder	-	1.5

Mexico

				Classification				
Name	**CAS number**	**UN number**	**%**	**IDLH**	**H**	**F**	**R**	**Special**
Nickel	7440-02-0	Not regulated	72	10 mg/m³	2	0	0	-
chromium	7440-47-3	Not regulated	9	250 mg/m³	0	0	0	-
Aluminium	7429-90-5	Not regulated	7	-	4	1	0	-
molybdenum	7439-98-7	Not regulated	5.5	5000 mg/m³	2	0	0	-
iron	7439-89-6	Not regulated	5	-	2	0	0	-
Organic binder	-	Not regulated	1.5	-	0	0	0	-

3. Composition/information on ingredients

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Fine dust clouds may form explosive mixtures with air.

Extinguishing media

Suitable : Use approved Class D extinguisher or smother with dry sand, dry clay or dry ground limestone.

Not suitable : Do not use water. Do not use dry chemical, CO_2 or halon.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

6. Accidental release measures

Large spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate container to avoid environmental contamination.

8. Exposure controls/personal protection

United States

Ingredient	Exposure limits
Nickel	**ACGIH TLV (United States, 2/2010).** TWA: 1.5 mg/m³ 8 hour(s). Form: Inhalable fraction **OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³, (as Ni) 8 hour(s).
chromium	**ACGIH TLV (United States, 2/2010).** TWA: 0.5 mg/m³, (measured as Cr) 8 hour(s). Form: Inorganic **OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³, (as Cr) 8 hour(s).
Aluminium	**OSHA PEL (United States, 6/2010).** TWA: 5 mg/m³, (as Al) 8 hour(s). Form: Respirable fraction TWA: 15 mg/m³, (as Al) 8 hour(s). Form: Total dust **ACGIH TLV (United States, 2/2010).** TWA: 1 mg/m³ 8 hour(s). Form: Respirable fraction
molybdenum	**ACGIH TLV (United States, 2/2010).** TWA: 10 mg/m³, (as Mo) 8 hour(s). Form: Inhalable fraction TWA: 3 mg/m³, (as Mo) 8 hour(s). Form: Respirable fraction

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations

8. Exposure controls/personal protection

Nickel	US ACGIH 2/2010	-	1.5	-	-	-	-	-	-	-	[a]
	AB 4/2009	-	1.5	-	-	-	-	-	-	-	
Nickel, as Ni	BC 9/2010	-	0.05	-	-	-	-	-	-	-	
Nickel	ON 7/2010	-	1	-	-	-	-	-	-	-	[b]
	QC 6/2008	-	1	-	-	-	-	-	-	-	
chromium, measured as Cr	US ACGIH 2/2010	-	0.5	-	-	-	-	-	-	-	[c]
chromium, as Cr	AB 4/2009	-	0.5	-	-	-	-	-	-	-	[3]
chromium	BC 9/2010	-	0.5	-	-	-	-	-	-	-	
chromium, as Cr	ON 7/2010	-	0.5	-	-	-	-	-	-	-	[c]
chromium	QC 6/2008	-	0.5	-	-	-	-	-	-	-	
Aluminium	US ACGIH 2/2010	-	1	-	-	-	-	-	-	-	[d]
	AB 4/2009	-	10	-	-	-	-	-	-	-	[3] [e]
	BC 9/2010	-	1	-	-	-	-	-	-	-	[f]
	ON 7/2010	-	1	-	-	-	-	-	-	-	[d]
Aluminium , as Al	QC 6/2008	-	10	-	-	-	-	-	-	-	
molybdenum, as Mo	US ACGIH 2/2010	-	10	-	-	-	-	-	-	-	[a]
		-	3	-	-	-	-	-	-	-	[d]
	AB 4/2009	-	3	-	-	-	-	-	-	-	[f]
		-	10	-	-	-	-	-	-	-	
molybdenum	BC 9/2010	-	10	-	-	-	-	-	-	-	[g]
		-	3	-	-	-	-	-	-	-	[f]
molybdenum, as Mo	ON 7/2010	-	10	-	-	-	-	-	-	-	[a]
		-	3	-	-	-	-	-	-	-	[d]

Mexico

Occupational exposure limits

Ingredient	Exposure limits
Nickel	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 1 mg/m³ 8 hour(s).
chromium	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 0.5 mg/m³ 8 hour(s).
Aluminium	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 5 mg/m³ 8 hour(s). LMPE-PPT: 5 mg/m³ 8 hour(s). Form: powder
molybdenum	**ACGIH TLV (United States, 2/2010).** TWA: 10 mg/m³, (as Mo) 8 hour(s). Form: Inhalable fraction TWA: 3 mg/m³, (as Mo) 8 hour(s). Form: Respirable fraction

Consult local authorities for acceptable exposure limits.

Additional information : A portion of nickel may be converted during the thermal spray process to nickel compounds which are classified as an IARC Group 1 Carcinogen. NTP classifies nickel compounds as Known to be Carcinogenic.

A portion of metallic chromium may be converted during the thermal spray process to hexavalent chromium. Hexavalent chromium is classified as an IARC group 1 carcinogen. NTP classifies hexavalent chromium as Known to be Carcinogenic.
OSHA PEL (United States, 5/2006)
PEL: 0.005 mg/m³ 8 hours.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits.

8. Exposure controls/personal protection

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses or goggles are recommended when handling this material. During the thermal spray process, safety goggles and dark lenses must be worn.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Rubber or other appropriate gloves should be worn to minimize contact. For hygienic reasons rubber gloves should not be worn for more than 2 hours. During the thermal spray process, heat insulated gloves are recommended.

Hearing Protection : Hearing protection that meets local standards should be used.

Protective Clothing (Pictograms) :

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Physical state : Solid. [Metallic powder.]

Flash point : Not applicable.

Color : Gray.

Odor : Odorless.

Explosive properties : Fine dust clouds may form explosive mixtures with air.

Relative density : 3.3

Solubility : Insoluble in the following materials: cold water.

Physical/chemical properties comments : Insoluble.

10. Stability and reactivity

Chemical stability : The product is stable under normal storage conditions.

Conditions to avoid : Store and use away from heat, sparks, open flame or any other ignition source.

Incompatible materials : Avoid contact with combustible materials, acids, oxidizing agents, halogenated hydrocarbons.

Hazardous decomposition products : Ozone and nitric oxide are formed by plasma flame. This action is independent of material. Some metallic oxides. These products are carbon oxides (CO, CO_2).

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

United States Canada Mexico

Acute toxicity

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Nickel	A5	2B	-	+	Possible	-
chromium	A4	3	-	None.	-	-
Aluminium	A4	-	-	None.	-	-
molybdenum	-	-	-	None.	-	-
iron	-	-	-	None.	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

United States

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Nickel	Acute LC50 2.3 ppm Fresh water	Fish - Cyprinus carpio - Juvenile (Fledgling, Hatchling, Weanling) - 6 cm	96 hours
	Chronic NOEC 3.5 ug/L Fresh water	Fish - Cyprinus carpio - 13 months - 10.5 cm - 27.8 g	4 weeks
chromium	Acute LC50 13.9 ppm Fresh water	Fish - Anguilla rostrata	96 hours
	Chronic NOEC 0.19 ug/L Fresh water	Fish - Cyprinus carpio - 13 months - 10.5 cm - 27.8 g	4 weeks
molybdenum	Acute LC50 800 mg/L Fresh water	Fish - Oncorhynchus mykiss - 20 mm	96 hours
iron	Acute EC50 3700 ug/L Fresh water	Aquatic plants - Lemna minor	4 days

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	Not regulated	-	-	-		-
TDG Classification	Not regulated	-	-	-		-
Mexico Classification	Not regulated	-	-	-		-
ADR/RID Class	Not regulated	-	-	-		-
IMDG Class	Not regulated	-	-	-		-
IATA-DGR Class	Not regulated	-	-	-		-

PG* : Packing group

15. Regulatory information

United States

HCS Classification : Irritating material
Sensitizing material
Carcinogen
Target organ effects

U.S. Federal regulations : **TSCA 8(a) IUR**: Partial exemption

United States inventory (TSCA 8b): All components are listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Nickel; Aluminium ; molybdenum
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Nickel: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; Aluminium : Fire hazard, reactive; molybdenum: Immediate (acute) health hazard, Delayed (chronic) health hazard; iron: Fire hazard

Clean Water Act (CWA) 307: Nickel; chromium

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Not listed

15. Regulatory information

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	Nickel chromium Aluminium	7440-02-0 7440-47-3 7429-90-5	72 9 7
Supplier notification	Nickel chromium Aluminium	7440-02-0 7440-47-3 7429-90-5	72 9 7

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: NICKEL; CHROMIUM; ALUMINUM; MOLYBDENUM

New York : The following components are listed: Nickel; Chromium

New Jersey : The following components are listed: NICKEL; CHROMIUM; ALUMINUM; MOLYBDENUM

Pennsylvania : The following components are listed: NICKEL; CHROMIUM; ALUMINUM; MOLYBDENUM

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Nickel	Yes.	No.	No.	No.

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI : The following components are listed: Nickel; Chromium; Aluminum

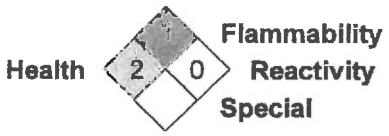
CEPA Toxic substances : None of the components are listed.

Canada inventory : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Mexico

Classification :



15. Regulatory information

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16. Other information

Label requirements : WARNING!
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
DURING THERMAL SPRAY A PORTION OF CHROMIUM AND NICKEL MAY BE CONVERTED TO HEXAVALENT CHROMIUM AND NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.

National Fire Protection Association (U.S.A.) :

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Date of issue : 6/11/2012.

Version : 1.5

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet

SULZER

Metco 447, Metco 447NS, AMDRY 387

Sulzer Metco

1. Product and company identification

Product name : Metco 447, Metco 447NS, AMDRY 387

Material uses : Metal industry: Used by spraying

Supplier : Sulzer Metco (US) Inc.
1101 Prospect Avenue
Westbury, NY 11590

Telephone no. : (516) 334 - 1300 (7:30AM - 4:00PM)

In case of emergency : CHEMTREC 800-424-9300

Calls Outside the United States : **+1 703-527-3887 (USA) 24 hour Chemtrec International Emergency Response Service**

Product type : Powder.

2. Hazards identification

Emergency overview

Physical state : Solid. [Metallic powder.]

Color : Gray.

Odor : Odorless.

Signal word : WARNING!

Hazard statements : CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
DURING THERMAL SPRAY A PORTION OF NICKEL MAY BE CONVERTED TO NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.

Precautionary measures : Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Do not breathe dust. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Keep container tightly closed. Use personal protective equipment as required. Wash thoroughly after handling.

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : Exposure to high concentrations may result in health complaints. Irritating to respiratory system. Exposure may result in depressed respiration, coughing, nausea and sore throat. Prolonged or repeated exposure to large amounts may cause damage to lungs (lung edema). May cause sensitization by inhalation (fever, pain). In oversensitive people even exposure to very small amounts causes allergic reactions.

Ingestion : No known significant effects or critical hazards.

Skin : Exposure to high concentrations may result in health complaints. Prolonged or repeated exposure may be irritating (redness, pain). May cause sensitization by skin contact (sweating, fever, pain). In oversensitive people even exposure to very small amounts causes allergic reactions.

Eyes : Irritating to eyes. Exposure may result in impaired vision, tears, redness and pain.

Potential chronic health effects

Chronic effects : Contains material that can cause target organ damage. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

2. Hazards identification

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Target organs : Contains material which causes damage to the following organs: eye, lens or cornea. Contains material which may cause damage to the following organs: blood, kidneys, lungs, the nervous system, liver, upper respiratory tract, skin, nose/sinuses.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : No specific data.

Skin : Adverse symptoms may include the following:
irritation
redness

Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
Nickel	7440-02-0	86
molybdenum	7439-98-7	6
Aluminium	7429-90-5	6
Organic binder	-	2

Canada

Name	CAS number	%
Nickel	7440-02-0	86
molybdenum	7439-98-7	6
Aluminium	7429-90-5	6
Organic binder	-	2

Mexico

Name	CAS number	UN number	%	IDLH	Classification H	F	R	Special
Nickel	7440-02-0	Not regulated	86	10 mg/m³	2	0	0	-
molybdenum	7439-98-7	Not regulated	6	5000 mg/m³	2	0	0	-
Aluminium	7429-90-5	Not regulated	6	-	4	1	0	-
Organic binder	-	Not regulated	2	-	0	0	0	-

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Fine dust clouds may form explosive mixtures with air.

Extinguishing media

Suitable : Use approved Class D extinguisher or smother with dry sand, dry clay or dry ground limestone.

Not suitable : Do not use water. Do not use dry chemical, CO_2 or halon.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

6. Accidental release measures

Large spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate container to avoid environmental contamination.

8. Exposure controls/personal protection

United States

Ingredient	Exposure limits
Nickel	**ACGIH TLV (United States, 2/2010).** TWA: 1.5 mg/m³ 8 hour(s). Form: Inhalable fraction **OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³, (as Ni) 8 hour(s).
molybdenum	**ACGIH TLV (United States, 2/2010).** TWA: 10 mg/m³, (as Mo) 8 hour(s). Form: Inhalable fraction TWA: 3 mg/m³, (as Mo) 8 hour(s). Form: Respirable fraction
Aluminium	**OSHA PEL (United States, 6/2010).** TWA: 5 mg/m³, (as Al) 8 hour(s). Form: Respirable fraction TWA: 15 mg/m³, (as Al) 8 hour(s). Form: Total dust **ACGIH TLV (United States, 2/2010).** TWA: 1 mg/m³ 8 hour(s). Form: Respirable fraction

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
Nickel	US ACGIH 2/2010	-	1.5	-	-	-	-	-	-	-	[a]
	AB 4/2009	-	1.5	-	-	-	-	-	-	-	
Nickel, as Ni	BC 9/2010	-	0.05	-	-	-	-	-	-	-	
Nickel	ON 7/2010	-	1	-	-	-	-	-	-	-	[b]
	QC 6/2008	-	1	-	-	-	-	-	-	-	
molybdenum, as Mo	US ACGIH 2/2010	-	10	-	-	-	-	-	-	-	[a]
		-	3	-	-	-	-	-	-	-	[c]
	AB 4/2009	-	3	-	-	-	-	-	-	-	[d]
		-	10	-	-	-	-	-	-	-	
molybdenum	BC 9/2010	-	10	-	-	-	-	-	-	-	[e]

8. Exposure controls/personal protection

molybdenum, as Mo	ON 7/2010	-	3	-	-	-	-	-	-	-	[d]
		-	10	-	-	-	-	-	-	-	[a]
		-	3	-	-	-	-	-	-	-	[c]
Aluminium	US ACGIH 2/2010	-	1	-	-	-	-	-	-	-	[c]
	AB 4/2009	-	10	-	-	-	-	-	-	-	[3] [f]
	BC 9/2010	-	1	-	-	-	-	-	-	-	[d]
	ON 7/2010	-	1	-	-	-	-	-	-	-	[c]
Aluminium , as Al	QC 6/2008	-	10	-	-	-	-	-	-	-	

Mexico

Occupational exposure limits

Ingredient	Exposure limits
Nickel	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 1 mg/m³ 8 hour(s).
molybdenum	**ACGIH TLV (United States, 2/2010).** TWA: 10 mg/m³, (as Mo) 8 hour(s). Form: Inhalable fraction TWA: 3 mg/m³, (as Mo) 8 hour(s). Form: Respirable fraction
Aluminium	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 5 mg/m³ 8 hour(s). LMPE-PPT: 5 mg/m³ 8 hour(s). Form: powder

Consult local authorities for acceptable exposure limits.

Additional information : A portion of nickel may be converted during the thermal spray process to nickel compounds which are classified as an IARC Group 1 Carcinogen. NTP classifies nickel compounds as Known to be Carcinogenic.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses or goggles are recommended when handling this material. During the thermal spray process, safety goggles and dark lenses must be worn.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Rubber or other appropriate gloves should be worn to minimize contact. For hygienic reasons rubber gloves should not be worn for more than 2 hours. During the thermal spray process, heat insulated gloves are recommended.

Hearing Protection : Hearing protection that meets local standards should be used.

Protective Clothing (Pictograms) :

8. Exposure controls/personal protection

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Physical state : Solid. [Metallic powder.]

Flash point : Not applicable.

Color : Gray.

Odor : Odorless.

Explosive properties : Fine dust clouds may form explosive mixtures with air.

Relative density : 2

Solubility : Insoluble in the following materials: cold water.

Physical/chemical properties comments : Insoluble.

10. Stability and reactivity

Chemical stability : The product is stable under normal storage conditions.

Conditions to avoid : Store and use away from heat, sparks, open flame or any other ignition source.

Incompatible materials : Avoid contact with combustible materials, acids, oxidizing agents, halogenated hydrocarbons.

Hazardous decomposition products : Ozone and nitric oxide are formed by plasma flame. This action is independent of material. Some metallic oxides. These products are carbon oxides (CO, CO_2).

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

United States Canada Mexico

Acute toxicity

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Classification

Product/Ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Nickel	A5	2B	-	+	Possible	-
molybdenum	-	-	-	None.	-	-
Aluminium	A4	-	-	None.	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

11. Toxicological information

Conclusion/Summary : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

United States

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Nickel	Acute LC50 2.3 ppm Fresh water	Fish - Cyprinus carpio - Juvenile (Fledgling, Hatchling, Weanling) - 6 cm	96 hours
	Chronic NOEC 3.5 ug/L Fresh water	Fish - Cyprinus carpio - 13 months - 10.5 cm - 27.8 g	4 weeks
molybdenum	Acute LC50 800 mg/L Fresh water	Fish - Oncorhynchus mykiss - 20 mm	96 hours

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	Not regulated	-	-	-		-
TDG Classification	Not regulated	-	-	-		-
Mexico Classification	Not regulated	-	-	-		-
ADR/RID Class	Not regulated	-	-	-		-
IMDG Class	Not regulated	-	-	-		-
IATA-DGR Class	Not regulated	-	-	-		-

14. Transport information

PG* : Packing group

15. Regulatory information

United States

HCS Classification : Irritating material
Sensitizing material
Carcinogen
Target organ effects

U.S. Federal regulations : **TSCA 8(a) IUR**: Partial exemption

United States inventory (TSCA 8b): All components are listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Nickel; molybdenum; Aluminium
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Nickel: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; molybdenum: Immediate (acute) health hazard, Delayed (chronic) health hazard; Aluminium : Fire hazard, reactive

Clean Water Act (CWA) 307: Nickel

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	Nickel Aluminium	7440-02-0 7429-90-5	86 6
Supplier notification	Nickel Aluminium	7440-02-0 7429-90-5	86 6

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: NICKEL; MOLYBDENUM; ALUMINUM

New York : The following components are listed: Nickel

New Jersey : The following components are listed: NICKEL; MOLYBDENUM; ALUMINUM

Pennsylvania : The following components are listed: NICKEL; MOLYBDENUM; ALUMINUM

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Nickel	Yes.	No.	No.	No.

15. Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI : The following components are listed: Nickel; Aluminum

CEPA Toxic substances : None of the components are listed.

Canada inventory : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Mexico

Classification :

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16. Other information

Label requirements : WARNING!
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
DURING THERMAL SPRAY A PORTION OF NICKEL MAY BE CONVERTED TO NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.

National Fire Protection Association (U.S.A.) :

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Date of issue : 6/11/2012.

16. Other information

Version : 1.5

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet

SULZER

Metco 16C, Metco 16C-NS, XPT-D 604, Diacont, Diamalloy 4016

Sulzer Metco

1. Product and company identification

Product name	: Metco 16C, Metco 16C-NS, XPT-D 604, Diacont, Diamalloy 4016
Material uses	: Metal industry: Used by spraying
Supplier	: Sulzer Metco (US) Inc. 1101 Prospect Avenue Westbury, NY 11590
Telephone no.	: (516) 334 - 1300 (7:30AM - 4:00PM)
In case of emergency	: CHEMTREC 800-424-9300
Calls Outside the United States	: **+1 703-527-3887 (USA) 24 hour Chemtrec International Emergency Response Service**
Product type	: Powder.

2. Hazards identification

Emergency overview

Physical state	: Solid. [Metallic powder.]
Color	: Gray.
Odor	: Odorless.
Signal word	: WARNING!
Hazard statements	: CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC RESPIRATORY AND SKIN REACTION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. DURING THERMAL SPRAY A PORTION OF CHROMIUM AND NICKEL MAY BE CONVERTED TO HEXAVALENT CHROMIUM AND NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.
Precautionary measures	: Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Do not breathe dust. Do not ingest. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Keep container tightly closed. Use personal protective equipment as required. Wash thoroughly after handling.
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation	: Irritating to respiratory system. May cause sensitization by inhalation.
Ingestion	: Harmful if swallowed.
Skin	: Irritating to skin. May cause sensitization by skin contact.
Eyes	: Irritating to eyes.

Potential chronic health effects

Chronic effects	: Contains material that can cause target organ damage. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	: Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.

2. Hazards identification

Target organs : Contains material which may cause damage to the following organs: blood, kidneys, lungs, liver, gastrointestinal tract, upper respiratory tract, skin, eye, lens or cornea, nose/sinuses.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma

Ingestion : No specific data.

Skin : Adverse symptoms may include the following:
irritation
redness

Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by over-exposure : Pre-existing respiratory and skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
Nickel	7440-02-0	69
chromium	7440-47-3	16
silicon	7440-21-3	4
boron	7440-42-8	3.5
iron	7439-89-6	2.5
molybdenum	7439-98-7	2
copper	7440-50-8	2
Cobalt	7440-48-4	0.5

Canada

Name	CAS number	%
Nickel	7440-02-0	69
chromium	7440-47-3	16
silicon	7440-21-3	4
boron	7440-42-8	3.5
iron	7439-89-6	2.5
molybdenum	7439-98-7	2
copper	7440-50-8	2
Cobalt	7440-48-4	0.5

Mexico

Name	CAS number	UN number	%	IDLH	Classification H	F	R	Special
Nickel	7440-02-0	Not regulated	69	10 mg/m³	2	0	0	-
chromium	7440-47-3	Not regulated	16	250 mg/m³	0	0	0	-
silicon	7440-21-3	Not regulated	4	-	2	0	0	-
boron	7440-42-8	Not regulated	3.5	-	2	0	0	-

3. Composition/information on ingredients

iron	7439-89-6	Not regulated	2.5	-	2	0	0	-
molybdenum	7439-98-7	Not regulated	2	5000 mg/m³	2	0	0	-
copper	7440-50-8	Not regulated	2	100 mg/m³	0	0	0	-
Cobalt	7440-48-4	Not regulated	0.5	20 mg/m³	2	0	0	-

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Fine dust clouds may form explosive mixtures with air.

Extinguishing media

Suitable : Use approved Class D extinguisher or smother with dry sand, dry clay or dry ground limestone.

Not suitable : Do not use water. Do not use dry chemical, CO_2 or halon.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Persons with a history of skin sensitization problems or asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate container to avoid environmental contamination.

8. Exposure controls/personal protection

United States

Ingredient	Exposure limits
Nickel	**ACGIH TLV (United States, 2/2010).** TWA: 1.5 mg/m³ 8 hour(s). Form: Inhalable fraction **OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³, (as Ni) 8 hour(s).
chromium	**ACGIH TLV (United States, 2/2010).** TWA: 0.5 mg/m³, (measured as Cr) 8 hour(s). Form: Inorganic **OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³, (as Cr) 8 hour(s).
silicon	**OSHA PEL (United States, 6/2010).**

8. Exposure controls/personal protection

molybdenum	TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction TWA: 15 mg/m³ 8 hour(s). Form: Total dust **ACGIH TLV (United States, 2/2010).** TWA: 10 mg/m³, (as Mo) 8 hour(s). Form: Inhalable fraction TWA: 3 mg/m³, (as Mo) 8 hour(s). Form: Respirable fraction
copper	**OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³ 8 hour(s). Form: Dusts and Mists TWA: 0.1 mg/m³ 8 hour(s). Form: Fume **ACGIH TLV (United States, 2/2010).** TWA: 0.2 mg/m³ 8 hour(s). Form: Fume TWA: 1 mg/m³, (as Cu) 8 hour(s).
Cobalt	**ACGIH TLV (United States, 2/2010).** TWA: 0.02 mg/m³, (as Co) 8 hour(s). Form: Inorganic **OSHA PEL (United States, 6/2010).** TWA: 0.1 mg/m³, (as Co) 8 hour(s).

Canada

Occupational exposure limits

Ingredient	List name	TWA (8 hours) ppm	TWA (8 hours) mg/m³	TWA (8 hours) Other	STEL (15 mins) ppm	STEL (15 mins) mg/m³	STEL (15 mins) Other	Ceiling ppm	Ceiling mg/m³	Ceiling Other	Notations
Nickel	US ACGIH 2/2010	-	1.5	-	-	-	-	-	-	-	[a]
	AB 4/2009	-	1.5	-	-	-	-	-	-	-	
Nickel, as Ni	BC 9/2010	-	0.05	-	-	-	-	-	-	-	
Nickel	ON 7/2010	-	1	-	-	-	-	-	-	-	[b]
	QC 6/2008	-	1	-	-	-	-	-	-	-	
chromium, measured as Cr	US ACGIH 2/2010	-	0.5	-	-	-	-	-	-	-	[c]
chromium, as Cr	AB 4/2009	-	0.5	-	-	-	-	-	-	-	[3]
chromium	BC 9/2010	-	0.5	-	-	-	-	-	-	-	
chromium, as Cr	ON 7/2010	-	0.5	-	-	-	-	-	-	-	[c]
chromium	QC 6/2008	-	0.5	-	-	-	-	-	-	-	
silicon	BC 9/2010	-	3	-	-	-	-	-	-	-	[d]
		-	10	-	-	-	-	-	-	-	[e]
	ON 7/2010	-	10	-	-	-	-	-	-	-	[e]
	QC 6/2008	-	10	-	-	-	-	-	-	-	[f]
molybdenum, as Mo	US ACGIH 2/2010	-	10	-	-	-	-	-	-	-	[a]
		-	3	-	-	-	-	-	-	-	[g]
	AB 4/2009	-	3	-	-	-	-	-	-	-	[h]
		-	10	-	-	-	-	-	-	-	
molybdenum	BC 9/2010	-	10	-	-	-	-	-	-	-	[i]
		-	3	-	-	-	-	-	-	-	[h]
molybdenum, as Mo	ON 7/2010	-	10	-	-	-	-	-	-	-	[a]
		-	3	-	-	-	-	-	-	-	[g]
copper	US ACGIH 2/2010	-	0.2	-	-	-	-	-	-	-	[j]
		-	1	-	-	-	-	-	-	-	
copper, as Cu	AB 4/2009	-	1	-	-	-	-	-	-	-	[k]
		-	0.2	-	-	-	-	-	-	-	[j]
	BC 9/2010	-	1	-	-	-	-	-	-	-	[l]
		-	0.2	-	-	-	-	-	-	-	[j]
copper	ON 7/2010	-	0.2	-	-	-	-	-	-	-	[j]
		-	1	-	-	-	-	-	-	-	[m]
copper, as Cu	QC 6/2008	-	1	-	-	-	-	-	-	-	[n]
		-	0.2	-	-	-	-	-	-	-	[o]
Cobalt, as Co	US ACGIH 2/2010	-	0.02	-	-	-	-	-	-	-	[c]
	AB 4/2009	-	0.02	-	-	-	-	-	-	-	
	BC 9/2010	-	0.02	-	-	-	-	-	-	-	
	ON 7/2010	-	0.02	-	-	-	-	-	-	-	[c]
	QC 6/2008	-	0.02	-	-	-	-	-	-	-	

Mexico

Occupational exposure limits

Ingredient	Exposure limits

8. Exposure controls/personal protection

Nickel	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 1 mg/m³ 8 hour(s).
chromium	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 0.5 mg/m³ 8 hour(s).
silicon	**NOM-010-STPS (Mexico, 9/2000).** LMPE-CT: 20 mg/m³ 15 minute(s). LMPE-PPT: 10 mg/m³ 8 hour(s).
molybdenum	**ACGIH TLV (United States, 2/2010).** TWA: 10 mg/m³, (as Mo) 8 hour(s). Form: Inhalable fraction TWA: 3 mg/m³, (as Mo) 8 hour(s). Form: Respirable fraction
copper	**NOM-010-STPS (Mexico, 9/2000).** LMPE-CT: 2 mg/m³, (as Cu) 15 minute(s). Form: powder and fog LMPE-PPT: 1 mg/m³, (as Cu) 8 hour(s). Form: powder and fog LMPE-CT: 2 mg/m³, (as Cu) 15 minute(s). Form: smoke LMPE-PPT: 0.2 mg/m³, (as Cu) 8 hour(s). Form: smoke

Consult local authorities for acceptable exposure limits.

Additional Information : A portion of nickel may be converted during the thermal spray process to nickel compounds which are classified as an IARC Group 1 Carcinogen. NTP classifies nickel compounds as Known to be Carcinogenic.

A portion of metallic chromium may be converted during the thermal spray process to hexavalent chromium. Hexavalent chromium is classified as an IARC group 1 carcinogen. NTP classifies hexavalent chromium as Known to be Carcinogenic.
OSHA PEL (United States, 5/2006)
PEL: 0.005 mg/m³ 8 hours.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses or goggles are recommended when handling this material. During the thermal spray process, safety goggles and dark lenses must be worn.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Rubber or other appropriate gloves should be worn to minimize contact. For hygienic reasons rubber gloves should not be worn for more than 2 hours. During the thermal spray process, heat insulated gloves are recommended.

Hearing Protection : Hearing protection that meets local standards should be used.

Protective Clothing (Pictograms) :

8. Exposure controls/personal protection

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Physical state : Solid. [Metallic powder.]

Flash point : Not applicable.

Color : Gray.

Odor : Odorless.

Explosive properties : Fine dust clouds may form explosive mixtures with air.

Relative density : 4.3

Solubility : Insoluble in the following materials: cold water.

Physical/chemical properties comments : Insoluble.

10. Stability and reactivity

Chemical stability : The product is stable under normal storage conditions.

Conditions to avoid : Store and use away from heat, sparks, open flame or any other ignition source.

Incompatible materials : Avoid contact with combustible materials, acids, oxidizing agents, halogenated hydrocarbons.

Hazardous decomposition products : Ozone and nitric oxide are formed by plasma flame. This action is independent of material. Some metallic oxides.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

United States Canada Mexico

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
silicon	LD50 Oral	Rat	3160 mg/kg	-
boron	LD50 Oral	Rat	650 mg/kg	-

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
silicon	Eyes - Mild irritant	Rabbit	-	3 milligrams	-

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA

11. Toxicological information

Nickel	A5	2B	-	+	Possible	-
chromium	A4	3	-	None.	-	-
silicon	-	-	-	None.	-	-
boron	-	-	-	None.	-	-
iron	-	-	-	None.	-	-
molybdenum	-	-	-	None.	-	-
copper	-	-	-	None.	-	-
Cobalt	A3	2B	-	None.	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

United States

Aquatic ecotoxicity

Product/Ingredient name	Result	Species	Exposure
Nickel	Acute LC50 2.3 ppm Fresh water	Fish - Cyprinus carpio - Juvenile (Fledgling, Hatchling, Weanling) - 6 cm	96 hours
	Chronic NOEC 3.5 ug/L Fresh water	Fish - Cyprinus carpio - 13 months - 10.5 cm - 27.8 g	4 weeks
chromium	Acute LC50 13.9 ppm Fresh water	Fish - Anguilla rostrata	96 hours
	Chronic NOEC 0.19 ug/L Fresh water	Fish - Cyprinus carpio - 13 months - 10.5 cm - 27.8 g	4 weeks
boron	Acute EC50 >60000 ug/L Fresh water	Aquatic plants - Lemna minor	4 days
iron	Acute EC50 3700 ug/L Fresh water	Aquatic plants - Lemna minor	4 days
molybdenum	Acute LC50 800 mg/L Fresh water	Fish - Oncorhynchus mykiss - 20 mm	96 hours
copper	Acute EC50 1100 ug/L Fresh water	Aquatic plants - Lemna minor	4 days
	Acute EC50 2.1 ug/L Fresh water	Daphnia - Daphnia longispina - Juvenile (Fledgling, Hatchling, Weanling) - <48 hours	48 hours
	Acute IC50 13 ug/L Fresh water	Algae - Pseudokirchneriella subcapitata - Exponential growth phase	72 hours
	Acute IC50 5.4 mg/L Marine water	Aquatic plants - Plantae - Exponential growth phase	72 hours
	Acute LC50 0.072 ug/L Marine water	Crustaceans - Amphipoda - Adult - 9 mm	48 hours
	Acute LC50 7.56 ug/L Marine water	Fish - Periophthalmus waltoni - Adult	96 hours
	Chronic NOEC 0.02 mg/L Fresh water	Crustaceans - Cambarus bartonii - Mature - 22.6 mm	21 days
	Chronic NOEC 2 ug/L Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 0.8 ug/L Fresh water	Fish - Oreochromis niloticus - Juvenile (Fledgling, Hatchling, Weanling) - 8.3 g	6 weeks

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	Not regulated	-	-	-		-
TDG Classification	Not regulated	-	-	-		-
Mexico Classification	Not regulated	-	-	-		-
ADR/RID Class	Not regulated	-	-	-		-
IMDG Class	Not regulated	-	-	-		-
IATA-DGR Class	Not regulated	-	-	-		-

PG* : Packing group

15. Regulatory information

United States

HCS Classification : Irritating material
Sensitizing material
Carcinogen
Target organ effects

U.S. Federal regulations : **TSCA 8(a) IUR**: Partial exemption

United States inventory (TSCA 8b): All components are listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Nickel; silicon; molybdenum; copper
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Nickel: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; silicon: Fire hazard, Immediate (acute) health hazard; iron: Fire hazard; molybdenum: Immediate (acute) health hazard, Delayed (chronic) health hazard; copper: Immediate (acute) health hazard

Clean Water Act (CWA) 307: Nickel; chromium; copper

15. Regulatory information

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	Nickel chromium copper Cobalt	7440-02-0 7440-47-3 7440-50-8 7440-48-4	69 16 2 0.5
Supplier notification	Nickel chromium copper Cobalt	7440-02-0 7440-47-3 7440-50-8 7440-48-4	69 16 2 0.5

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: NICKEL; CHROMIUM; SILICON DUST; MOLYBDENUM; COPPER

New York : The following components are listed: Nickel; Chromium; Copper

New Jersey : The following components are listed: NICKEL; CHROMIUM; SILICON; BORON; MOLYBDENUM; COPPER; COBALT

Pennsylvania : The following components are listed: NICKEL; CHROMIUM; SILICON; MOLYBDENUM; COPPER FUME; COBALT FUME

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Nickel Cobalt	Yes. Yes.	No. No.	No. No.	No. No.

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI : The following components are listed: Nickel; Chromium; Copper

CEPA Toxic substances : None of the components are listed.

Canada inventory : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Mexico

15. Regulatory information

Classification :

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16. Other information

Label requirements : WARNING!
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC RESPIRATORY AND SKIN REACTION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
DURING THERMAL SPRAY A PORTION OF CHROMIUM AND NICKEL MAY BE CONVERTED TO HEXAVALENT CHROMIUM AND NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.

National Fire Protection Association (U.S.A.) :

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Date of issue : 6/8/2012.

Version : 1.5

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet

SULZER

Metcoloy 5, OSU 085

Sulzer Metco

1. Product and company identification

Product name	: Metcoloy 5, OSU 085
Material uses	: Metal industry: Used by spraying
Supplier	: Sulzer Metco (US) Inc. 1101 Prospect Avenue Westbury, NY 11590
Telephone no.	: (516) 334 - 1300 (7:30AM - 4:00PM)
In case of emergency	: CHEMTREC 800-424-9300
Calls Outside the United States	: **+1 703-527-3887 (USA) 24 hour Chemtrec International Emergency Response Service**
Product type	: Solid.

2. Hazards identification

Emergency overview

Physical state	: Solid. [Wire]
Signal word	: WARNING!
Hazard statements	THESE WARNINGS PERTAIN PRIMARILY TO THE BYPRODUCTS PRODUCED DURING THERMAL SPRAY. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. DURING THERMAL SPRAY A PORTION OF CHROMIUM AND NICKEL MAY BE CONVERTED TO HEXAVALENT CHROMIUM AND NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.
Precautionary measures	: Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Keep container tightly closed. Use personal protective equipment as required. Wash thoroughly after handling.
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). Byproducts generated during the thermal spray process are also considered hazardous by the OSHA Hazard Communication Standard. The health hazards described in this section pertain to the byproducts generated during thermal spray.

Potential acute health effects

Inhalation	: Irritating to respiratory system.
Ingestion	: No known significant effects or critical hazards.
Skin	: Irritating to skin.
Eyes	: Irritating to eyes.

Potential chronic health effects

Chronic effects	: Contains material that may cause target organ damage, based on animal data.
Carcinogenicity	: Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Target organs	: Contains material which may cause damage to the following organs: upper respiratory tract, skin, eye, lens or cornea.

2. Hazards identification

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : No specific data.

Skin : Adverse symptoms may include the following:
irritation
redness

Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

This section covers the hazardous materials from which this wire is manufactured.

United States

Name	CAS number	%
iron	7439-89-6	85
chromium	7440-47-3	13
manganese	7439-96-5	0.5
Nickel	7440-02-0	0.5

Canada

Name	CAS number	%
iron	7439-89-6	85
chromium	7440-47-3	13
manganese	7439-96-5	0.5
Nickel	7440-02-0	0.5

Mexico

Name	CAS number	UN number	%	IDLH	Classification H	F	R	Special
iron	7439-89-6	Not regulated	85	-	2	0	0	-
chromium	7440-47-3	Not regulated	13	250 mg/m³	0	0	0	-
manganese	7439-96-5	Not regulated	0.5	500 mg/m³	2	0	0	-
Nickel	7440-02-0	Not regulated	0.5	10 mg/m³	2	0	0	-

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

These measures apply primarily to the byproducts produced during thermal spray.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

This section applies primarily to the wire as supplied.

Flammability of the product : No specific fire or explosion hazard.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products : Decomposition products may include the following materials: metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

These measures apply to the wire as supplied and the byproducts produced during thermal spray.

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

6. Accidental release measures

Large spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

This section applies primarily to the wire as supplied.

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate container to avoid environmental contamination.

8. Exposure controls/personal protection

This section contains information which applies during the thermal spray process.

United States

Ingredient	Exposure limits
chromium	**ACGIH TLV (United States, 2/2010).** TWA: 0.5 mg/m³, (measured as Cr) 8 hour(s). Form: Inorganic **OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³, (as Cr) 8 hour(s).
Nickel	**ACGIH TLV (United States, 2/2010).** TWA: 1.5 mg/m³ 8 hour(s). Form: Inhalable fraction **OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³, (as Ni) 8 hour(s).

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
chromium, measured as Cr	US ACGIH 2/2010	-	0.5	-	-	-	-	-	-	-	[a]
chromium, as Cr	AB 4/2009	-	0.5	-	-	-	-	-	-	-	[3]
chromium	BC 9/2010	-	0.5	-	-	-	-	-	-	-	
chromium, as Cr	ON 7/2010	-	0.5	-	-	-	-	-	-	-	[a]
chromium	QC 6/2008	-	0.5	-	-	-	-	-	-	-	
Nickel	US ACGIH 2/2010	-	1.5	-	-	-	-	-	-	-	[b]
	AB 4/2009	-	1.5	-	-	-	-	-	-	-	
Nickel, as Ni	BC 9/2010	-	0.05	-	-	-	-	-	-	-	
Nickel	ON 7/2010	-	1	-	-	-	-	-	-	-	[c]
	QC 6/2008	-	1	-	-	-	-	-	-	-	

Mexico

Occupational exposure limits

Ingredient	Exposure limits
chromium	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 0.5 mg/m³ 8 hour(s).

8. Exposure controls/personal protection

Consult local authorities for acceptable exposure limits.

Additional information : A portion of nickel may be converted during the thermal spray process to nickel compounds which are classified as an IARC Group 1 Carcinogen. NTP classifies nickel compounds as Known to be Carcinogenic.

A portion of metallic chromium may be converted during the thermal spray process to hexavalent chromium. Hexavalent chromium is classified as an IARC group 1 carcinogen. NTP classifies hexavalent chromium as Known to be Carcinogenic.
OSHA PEL (United States, 5/2006)
PEL: 0.005 mg/m³ 8 hours.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses or goggles are recommended when handling this material. During the thermal spray process, safety goggles and dark lenses must be worn.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Rubber or other appropriate gloves should be worn to minimize contact. For hygienic reasons rubber gloves should not be worn for more than 2 hours. During the thermal spray process, heat insulated gloves are recommended.

Hearing Protection : Hearing protection that meets local standards should be used.

Protective Clothing (Pictograms) :

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

This section applies primarily to the wire as supplied.

Physical state : Solid. [Wire]

Flash point : Not available.

Color : Gray.

Odor : Odorless.

Explosive properties : Thermal spray products: Fine dust clouds may form explosive mixtures with air.

Viscosity : -

9. Physical and chemical properties

Solubility : Insoluble in the following materials: cold water and hot water.

Physical/chemical properties comments : Insoluble.

10. Stability and reactivity

This section applies primarily to the wire as supplied.

Chemical stability : The product is stable under normal storage conditions.

Conditions to avoid : Store in a cool dry place away from incompatible materials.

Incompatible materials : Strong acids.

Hazardous decomposition products : During the thermal spray process, gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by radiation from the arc.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

This information applies to the wire as supplied and the byproducts produced during thermal spray.

United States Canada Mexico

Acute toxicity

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
iron	-	-	-	None.	-	-
chromium	A4	3	-	None.	-	-
Nickel	A5	2B	-	+	Possible	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12. Ecological information

This information applies to the wire as supplied.

Ecotoxicity : No known significant effects or critical hazards.

United States

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
iron	Acute EC50 3700 ug/L Fresh water	Aquatic plants - Lemna minor	4 days
chromium	Acute LC50 13.9 ppm Fresh water	Fish - Anguilla rostrata	96 hours
	Chronic NOEC 0.19 ug/L Fresh water	Fish - Cyprinus carpio - 13 months - 10.5 cm - 27.8 g	4 weeks
Nickel	Acute EC50 2 ppm Marine water	Algae - Macrocystis pyrifera - Young	4 days
	Acute LC50 2.3 ppm Fresh water	Fish - Cyprinus carpio - Juvenile (Fledgling, Hatchling, Weanling) - 6 cm	96 hours
	Chronic NOEC 3.5 ug/L Fresh water	Fish - Cyprinus carpio - 13 months - 10.5 cm - 27.8 g	4 weeks

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

13. Disposal considerations

This information applies to the wire as supplied and the byproducts produced during thermal spray.

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

This information applies to the wire as supplied.

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	Not regulated	-	-	-		-
TDG Classification	Not regulated	-	-	-		-
Mexico Classification	Not regulated	-	-	-		-
ADR/RID Class	Not regulated	-	-	-		-

14. Transport information

IMDG Class	Not regulated	-	-	-		-
IATA-DGR Class	Not regulated	-	-	-		-

PG* : Packing group

15. Regulatory information

United States

HCS Classification : Irritating material
Carcinogen
Target organ effects

Byproducts generated during the thermal spray process are also considered hazardous by the OSHA Hazard Communication Standard. The health hazards described in this section pertain to the byproducts generated during thermal spray.

U.S. Federal regulations : **TSCA 8(a) IUR**: Partial exemption

United States inventory (TSCA 8b): All components are listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: No products were found.
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: iron: Fire hazard

Clean Water Act (CWA) 307: chromium; Nickel

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	chromium Nickel	7440-47-3 7440-02-0	13 0.5
Supplier notification	chromium Nickel	7440-47-3 7440-02-0	13 0.5

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: CHROMIUM

New York : The following components are listed: Chromium; Nickel

New Jersey : The following components are listed: CHROMIUM; NICKEL

Pennsylvania : The following components are listed: CHROMIUM; NICKEL

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

15. Regulatory information

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Nickel	Yes.	No.	No.	No.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).

Canadian lists

Canadian NPRI : The following components are listed: Chromium

CEPA Toxic substances : None of the components are listed.

Canada inventory : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Mexico

Classification :

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16. Other information

Label requirements : WARNING!
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. THESE WARNINGS PERTAIN PRIMARILY TO THE BYPRODUCTS PRODUCED DURING THERMAL SPRAY.
DURING THERMAL SPRAY A PORTION OF CHROMIUM AND NICKEL MAY BE CONVERTED TO HEXAVALENT CHROMIUM AND NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.

National Fire Protection Association (U.S.A.) :

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

16. Other information

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Date of issue : 6/11/2012.

Version : 1.5

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet

SULZER

Metco 405, Metco 405NS, Metco 405-1, Metco 8405

Sulzer Metco

1. Product and company identification

Product name	:	Metco 405, Metco 405NS, Metco 405-1, Metco 8405
Material uses	:	Metal industry: Used by spraying
Supplier	:	Sulzer Metco (US) Inc. 1101 Prospect Avenue Westbury, NY 11590
Telephone no.	:	(516) 334 - 1300 (7:30AM - 4:00PM)
In case of emergency	:	CHEMTREC 800-424-9300
Calls Outside the United States	:	**+1 703-527-3887 (USA) 24 hour Chemtrec International Emergency Response Service**
Product type	:	Solid.

2. Hazards identification

Emergency overview

Physical state	:	Solid. [Wire]
Signal word	:	WARNING!
Hazard statements		THESE WARNINGS PERTAIN PRIMARILY TO THE BYPRODUCTS PRODUCED DURING THERMAL SPRAY. CAUSES RESPIRATORY TRACT AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. DURING THERMAL SPRAY A PORTION OF NICKEL MAY BE CONVERTED TO NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.
Precautionary measures	:	Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with skin and clothing. Keep container tightly closed. Use personal protective equipment as required. Wash thoroughly after handling.
OSHA/HCS status	:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). Byproducts generated during the thermal spray process are also considered hazardous by the OSHA Hazard Communication Standard. The health hazards described in this section pertain to the byproducts generated during thermal spray.

Potential acute health effects

Inhalation	:	Irritating to respiratory system.
Ingestion	:	No known significant effects or critical hazards.
Skin	:	Irritating to skin. May cause sensitization by skin contact.
Eyes	:	No known significant effects or critical hazards.

Potential chronic health effects

Chronic effects	:	Contains material that can cause target organ damage. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	:	Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	:	No known significant effects or critical hazards.
Teratogenicity	:	No known significant effects or critical hazards.
Developmental effects	:	No known significant effects or critical hazards.
Fertility effects	:	No known significant effects or critical hazards.

2. Hazards identification

Target organs : Contains material which causes damage to the following organs: eye, lens or cornea. Contains material which may cause damage to the following organs: kidneys, lungs, the nervous system, upper respiratory tract, skin, nose/sinuses.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : No specific data.

Skin : Adverse symptoms may include the following:
irritation
redness

Eyes : No specific data.

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

This section covers the hazardous materials from which this wire is manufactured.

United States

Name	CAS number	%
Nickel	7440-02-0	80
Aluminium	7429-90-5	20

Canada

Name	CAS number	%
Nickel	7440-02-0	80
Aluminium	7429-90-5	20

Mexico

					Classification			
Name	**CAS number**	**UN number**	**%**	**IDLH**	**H**	**F**	**R**	**Special**
Nickel	7440-02-0	Not regulated	80	10 mg/m³	2	0	0	-
Aluminium	7429-90-5	Not regulated	20	-	4	1	0	-

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

These measures apply primarily to the byproducts produced during thermal spray.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

4. First aid measures

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

This section applies primarily to the wire as supplied.

Flammability of the product : No specific fire or explosion hazard.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products : Decomposition products may include the following materials: metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

These measures apply to the wire as supplied and the byproducts produced during thermal spray.

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Large spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

This section applies primarily to the wire as supplied.

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep

7. Handling and storage

in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate container to avoid environmental contamination.

8. Exposure controls/personal protection

This section contains information which applies during the thermal spray process.

United States

Ingredient	Exposure limits
Nickel	**ACGIH TLV (United States, 2/2010).** TWA: 1.5 mg/m³ 8 hour(s). Form: Inhalable fraction **OSHA PEL (United States, 6/2010).** TWA: 1 mg/m³, (as Ni) 8 hour(s).
Aluminium	**OSHA PEL (United States, 6/2010).** TWA: 5 mg/m³, (as Al) 8 hour(s). Form: Respirable fraction TWA: 15 mg/m³, (as Al) 8 hour(s). Form: Total dust **ACGIH TLV (United States, 2/2010).** TWA: 1 mg/m³ 8 hour(s). Form: Respirable fraction

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
Nickel	US ACGIH 2/2010	-	1.5	-	-	-	-	-	-	-	[a]
	AB 4/2009	-	1.5	-	-	-	-	-	-	-	
Nickel, as Ni	BC 9/2010	-	0.05	-	-	-	-	-	-	-	
Nickel	ON 7/2010	-	1	-	-	-	-	-	-	-	[b]
	QC 6/2008	-	1	-	-	-	-	-	-	-	
Aluminium	US ACGIH 2/2010	-	1	-	-	-	-	-	-	-	[c]
	AB 4/2009	-	10	-	-	-	-	-	-	-	[3] [d]
	BC 9/2010	-	1	-	-	-	-	-	-	-	[e]
	ON 7/2010	-	1	-	-	-	-	-	-	-	[c]
Aluminium , as Al	QC 6/2008	-	10	-	-	-	-	-	-	-	

Mexico

Occupational exposure limits

Ingredient	Exposure limits
Nickel	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 1 mg/m³ 8 hour(s).
Aluminium	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 5 mg/m³ 8 hour(s). LMPE-PPT: 5 mg/m³ 8 hour(s). Form: powder

Consult local authorities for acceptable exposure limits.

Additional information : A portion of nickel may be converted during the thermal spray process to nickel compounds which are classified as an IARC Group 1 Carcinogen. NTP classifies nickel compounds as Known to be Carcinogenic.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

8. Exposure controls/personal protection

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses or goggles are recommended when handling this material. During the thermal spray process, safety goggles and dark lenses must be worn.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Rubber or other appropriate gloves should be worn to minimize contact. For hygienic reasons rubber gloves should not be worn for more than 2 hours. During the thermal spray process, heat insulated gloves are recommended.

Hearing Protection : Hearing protection that meets local standards should be used.

Protective Clothing (Pictograms) :

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

This section applies primarily to the wire as supplied.

Physical state : Solid. [Wire]

Flash point : Lowest known value: Closed cup: 644.85°C (1192.7°F). (Aluminium)

Color : Gray.

Odor : Odorless.

Explosive properties : Thermal spray products: Fine dust clouds may form explosive mixtures with air.

Solubility : Insoluble in the following materials: cold water and hot water.

Physical/chemical properties comments : Insoluble.

10. Stability and reactivity

This section applies primarily to the wire as supplied.

Chemical stability : The product is stable under normal storage conditions.

Conditions to avoid : Store in a cool dry place away from incompatible materials.

Incompatible materials : Strong acids.

10. Stability and reactivity

Hazardous decomposition products : During the thermal spray process, gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by radiation from the arc.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

This information applies to the wire as supplied and the byproducts produced during thermal spray.

United States Canada Mexico

Acute toxicity

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Nickel	A5	2B	-	+	Possible	-
Aluminium	A4	-	-	None.	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12. Ecological information

This information applies to the wire as supplied.

Ecotoxicity : No known significant effects or critical hazards.

United States

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Nickel	Acute EC50 2 ppm Marine water	Algae - Macrocystis pyrifera - Young	4 days
	Acute LC50 2.3 ppm Fresh water	Fish - Cyprinus carpio - Juvenile (Fledgling, Hatchling, Weanling) - 6 cm	96 hours
	Chronic NOEC 3.5 ug/L Fresh water	Fish - Cyprinus carpio - 13 months - 10.5 cm - 27.8 g	4 weeks

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

13. Disposal considerations

This information applies to the wire as supplied and the byproducts produced during thermal spray.

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

This information applies to the wire as supplied.

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	Not regulated	-	-	-		-
TDG Classification	Not regulated	-	-	-		-
Mexico Classification	Not regulated	-	-	-		-
ADR/RID Class	Not regulated	-	-	-		-
IMDG Class	Not regulated	-	-	-		-
IATA-DGR Class	Not regulated	-	-	-		-

PG* : Packing group

15. Regulatory information

United States

HCS Classification : Irritating material
Sensitizing material
Carcinogen
Target organ effects

Byproducts generated during the thermal spray process are also considered hazardous by the OSHA Hazard Communication Standard. The health hazards described in this section pertain to the byproducts generated during thermal spray.

U.S. Federal regulations : **TSCA 8(a) IUR**: Partial exemption

United States inventory (TSCA 8b): All components are listed or exempted.

15. Regulatory information

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Nickel; Aluminium
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Nickel: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; Aluminium : Fire hazard, reactive

Clean Water Act (CWA) 307: Nickel

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	Nickel Aluminium	7440-02-0 7429-90-5	80 20
Supplier notification	Nickel Aluminium	7440-02-0 7429-90-5	80 20

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: NICKEL; ALUMINUM

New York : The following components are listed: Nickel

New Jersey : The following components are listed: NICKEL; ALUMINUM

Pennsylvania : The following components are listed: NICKEL; ALUMINUM

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Nickel	Yes.	No.	No.	No.

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI : The following components are listed: Nickel; Aluminum

CEPA Toxic substances : None of the components are listed.

Canada inventory : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Mexico

Classification :

15. Regulatory information

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16. Other information

Label requirements : WARNING!
CAUSES RESPIRATORY TRACT AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
THESE WARNINGS PERTAIN PRIMARILY TO THE BYPRODUCTS PRODUCED DURING THERMAL SPRAY.
DURING THERMAL SPRAY A PORTION OF NICKEL MAY BE CONVERTED TO NICKEL COMPOUNDS WHICH ARE KNOWN TO CAUSE CANCER.

National Fire Protection Association (U.S.A.) :

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Date of issue : 6/8/2012.

Version : 1.5

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

APPENDIX K

METALIZING SULZER METCO GUN

SULZER

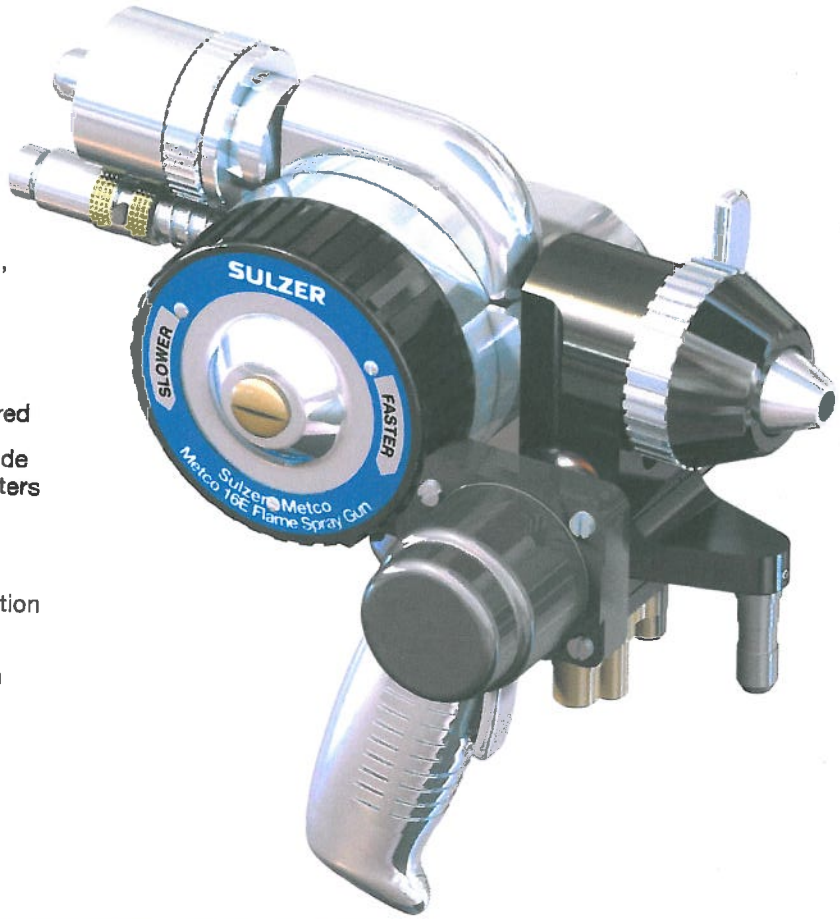
Sulzer Metco

Metco 16E Wire Combustion Gun

Classic Dependability... Unrivaled Quality... Now Safer Than Ever!

The world's most popular thermal spray gun just got better with our new built-in safety feature! Today, all companies know that good safety practices and a good safety record are good for their employee's health and well being, and also good for their bottom line. With the new 16E Combustion Wire Gun, you get peace of mind by knowing you have the safest wire combustion gun available and still have the rugged, reliable gun you've come to depend on.

- Reduces risk of injury and damage to components and facilities
- Release mechanism stops gas flow and wire feed
- Complies with the most stringent standards, including the latest CE requirements
- Lightweight and comfortable to grip, even for extended periods of time
- Simple to light and easy to operate
- Steady, consistent wire feed of any type of wire with no electricity required
- Your choice of configuration for a wide variety of fuel gases and wire diameters
- Uses the same parameters as the 14E spray gun
- Integrates into existing wire combustion systems with no additional changes
- Saves money on process gases with instant shut off on handle release
- Retrofit kit available for current 14E owners



Free Training DVD Included!

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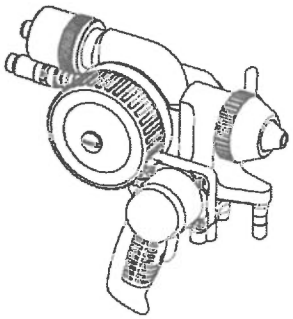


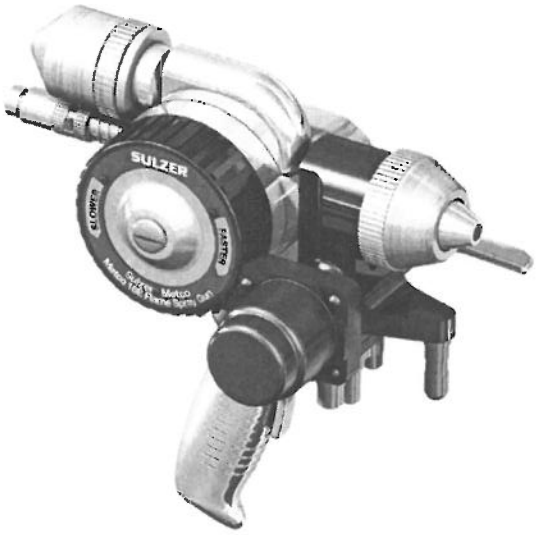
SULZER

Sulzer Metco

Product Data Sheet
16E Series Wire Combustion Guns

The Metco 16E-Series Combustion Wire Spray Gun combines trouble-free operation with highly reliable coating results. With built-in flexibility and options, the 16E-Series can be used in a wide number of spray applications. This is a proven product, used by thousands of customers worldwide, and well-known for its rugged dependability.

The Sulzer Metco 16E-series are all-purpose combustion wire flame spray guns that are durable and built to provide years of daily use with low maintenance.



16E / 16E-H / 16E-P / 16E-HT
Wire Combustion Gun

Incorporating decades of Sulzer Metco experience and know-how in combustion wire spray gun design, the 16E is lightweight and balanced, with a comfortable grip for hand-held operations, yet it is rugged in construction and easily maintained and serviced.

The standard 16E gun is configured for use with hard wires, such as nickel, molybdenum, harder aluminum alloys and iron based wires.

Combustion wire spray systems using the 16E gun are an excellent choice for machine element applications, non-critical surface restoration, corrosion coatings, bond coats, sliding wear applications requiring self-lubricating coatings and on-site work such as bridges, water towers and marine applications.

For coating applications employing softer wires, such as babbitt, tin and zinc based materials, the 16E-H is available. A 16E can be readily converted into a 16E-H for spraying softer wires, using the optionally available high speed turbine shaft, countershaft gear, nozzles and air caps. For on-site applications requiring the spraying of Aluminum, Zinc and Zinc-Aluminum coatings at high spray rates/high throughput, the 16E-HT gun is configured for operation with propylene and propane fuel gases and long hoses.

The 16E is equipped with a safety trigger that safely shuts off the gun should it slip from the operator's hand making the 16E the safest wire combustion gun available in the market.

1 General Description

Operation of the 16E is simple and starts by pushing the metallizing wire through the gun, igniting the fuel gas and activating the quick-action wire grip to feed the wire into the flame. It stops by simply pushing the wire grip control.

The unique siphon plug and universal gas head design allows the 16E to produce high spray rates with minimal gas consumption. The design is also very resistant to backfire.

The 16E gun is supplied with standard drive rolls and gears, which are suitable for use with "hard" wires. The 16E-H and 16E-HT guns, configured to spray soft wires, come equipped with a special non-load air cap as well as high speed turbine shaft and countershaft gears.

All 16E and 16E-H guns are factory-configured for acetylene as the fuel gas, while the 16E-P gun is configured for use with propane and the 16E-HT for propylene and propane fuel gases. However, using optional hardware, the 16E universal gas head design can be adapted to use other fuel gases, such as acetylene, hydrogen, propane, natural gas, MAPP or MPS.

The 16E series guns are shipped equipped to use 3.175 mm (1/8") diameter wires. Using optional hardware, the 16E gun can be configured to feed all standard wires diameters, from as small as 0.813 mm (20 gauge) up to 4.76 mm (3/16").

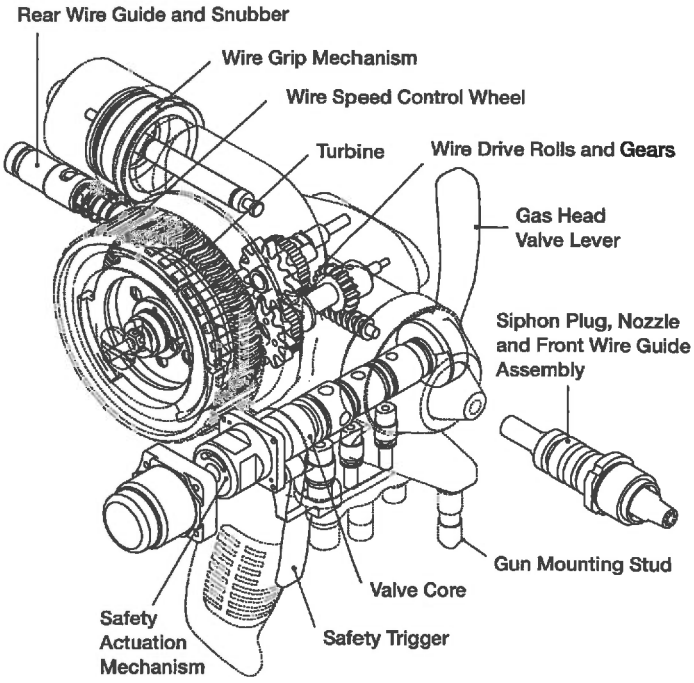
Sulzer Metco 16E guns should always be used with Sulzer Metco gas and air control equipment.

Sulzer Metco offers a large portfolio of wire materials optimized for the combustion wire spray process. Use of these materials will provide the best results.

1.1 Available Models

Model	Fuel Gas[1]	Speed	Wire Type
16E	Acetylene	Standard	Hard wires
16E-H	Acetylene	High	Soft wires
16E-HT	Propylene/ Propane	High	Al, Zn, Zn-Al
16E-P	Propane	Standard	Hard wires

[1] As equipped at factory.
Optional hardware available for different gases.



16E Series Wire Combustion Gun • Main Components

2 Features and Benefits

Effective
- Mounting stud – for machine mounted operation.
- Rugged, built-in wire snubber – prevents wire from accidentally being pulled out of the gun.
- Flexible hardware choices that allow the gun to be configured for use with hard and soft wires in a variety of diameters.
- Choice of fuel gases to suit plant operational requirements and economics.
- Thumb-operated wire feed control provides simple wire feed start and stop.
- Wire drive feeds wire reliably, consistently and uniformly, regardless of fluctuations in air pressure..
- Metric threading – all standard nuts, screws and mating parts are supplied with metric threads, facilitating replacement where metric is used as the standard system of measurement.

Efficient
- Rugged design is built for long service life with limited maintenance.
- Gas head valve handle allows simple and quick set up of spray gas pressures and flows prior to gun ignition.
- O-ring seals between nozzle and siphon plug ensure safe and reliable operation and simplify gun maintenance.
- Simple maintenance and hardware changeover – the nozzle, siphon plug and front wire guide assemblies can be easily removed and replaced as a complete unit.
- Simple operation requires minimal operator training.

Environmental
- Light weight design for hand-held operation at approximately 2.5 kg (5.5 lbs).
- Safety handle reduces risk of injuries.

Economical
- Low maintenance design reduces operating costs
- Long gear life – designed with large, rugged gears coupled with circulating gear lubricant pump.
- Unique universal gas head produces high spray rates with low gas consumption and is resistant to backfire.

3 Options and Accessories

Sulzer Metco offers a variety of options to configure the 16E gun for use in a wide number of coating applications and to suit specific production requirements. These include drive rolls, gears, hoses, nozzles, siphon plugs and wire guides. Air caps are available to achieve various spray patterns and angles. A complete list of optional parts and spare parts can be found in the parts lists section of the reference manual.

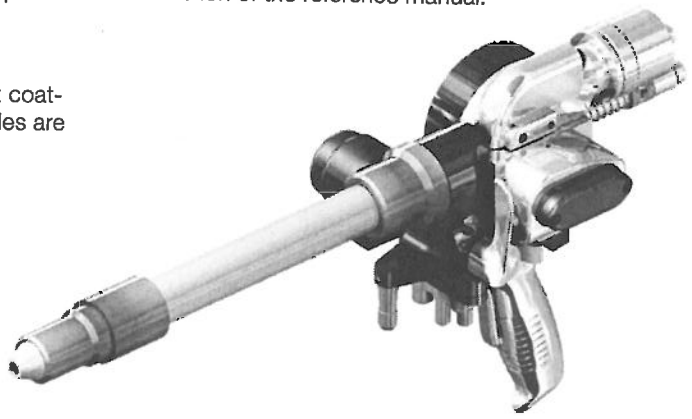
Extension Modules

Extension modules for the 16E series guns permit coating of interior bore diameters and surfaces. Modules are available in 0° and 45° spray configurations.

They are available in four lengths:

5XT-6[1]	152.5 mm	6 in
3XT-1	305 mm	1 ft
3XT-2	610 mm	2 ft
3XT-3	915 mm	3 ft

[1] used with acetylene only



16E shown with 3XT-1 Extension Module in 0° configuration

Please refer to the 5XT / 3XT Extension Module Product Data Sheet for additional information.

14EWGM Wire Grip Mechanism

Converts wire grip from pneumatic to a lever action mechanical grip. This is often preferred for very soft wires.

Hose Packages

Hose packages are available for acetylene or propane gas use, various lengths, and color-coded as illustrated for CE and non-CE use. A hose package should be ordered with the 16E gun; please refer to the illustration below.

Hose Package	Supply to Flowmeter						Flowmeter to 16E Gun				Additional Hose Extension for 16E-HT Gun				
	8H	9H	9HEX	9HEX	2AF5	HA	6H	7H	6HEX	7HEX	DJF 10CTO	DJF 20CTO	PB 30CTO	11HEX 51292CTO	11HEX 51287CTO
Air					●	●	●	●	●	●			●		
Fuel	●	●	● ●	● ●			▮	▮	● ●	● ●	●			●	
Oxygen	●	●	●	●					●	●		●			●
Length											Length to be specified by customer up to 38 m (125 ft)				
m	1.2	4.6	1.2	4.6	1.2	7.6	4.6	10.7	4.6	10.7					
ft	4	15	4	15	4	25	15	35	15	35					
CE			◆	◆	◆	◆			◆	◆				◆	◆

Packages contain 1 each of the specified hoses. 2AF5 and HA air hoses can be used with CE or non-CE systems.

- ● air hose
- ● oxygen hose
- ● fuel hose: acetylene (only)
- ● fuel hose: acetylene, propane or propylene
- ● fuel hose: propane or propylene (only)
- ▮ twin oxygen and fuel hose (hoses are joined)

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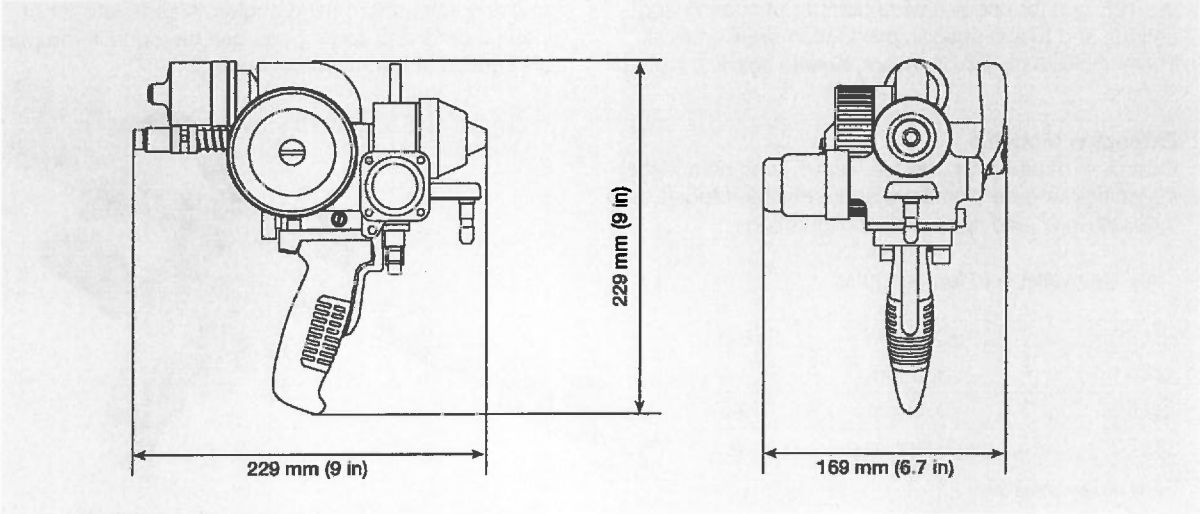
4 Technical Data

4.1 Dimensions



4.2 Specifications

Coating Materials		
Wire Sizes	0.813 - 4.73 mm (standard: 3.2 mm)	20 gauge - 3/16 in (standard: 1/8 in)
Wire Composition	Any Sulzer Metco hard or soft wire	
Weight		
Approximate	2.5 kg	5.5 lbs
Process Gases		
Fuel gas	Acetylene, Propane, Propylene, Hydrogen, MPS, MAPP or Methane (Natural Gas)	
Oxygen		
Compressed Air	0.85 m^3/min at 4.5 bar	30 ft^3/min at 65 psi
Noise Levels[1]		
Acetylene	114 dBA	
Propane, MPS	118 dBA	
Acetylene, non-load	125 dBA	

[1] Proper ear protection should be worn at all times

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APPENDIX L

EMISSION INVENTORY
(PROVIDED ON CD)

APPENDIX M

MODELING PROTOCOL AND IDEQ APPROVAL LETTER

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 NORTH HILTON, BOISE, ID 83706 · (208) 373-0502

C. L. "BUTCH" OTTER, GOVERNOR
CURT FRANSEN, DIRECTOR

April 22, 2013

VIA EMAIL

Mr. John Alverson, Operations Manager
Yanke Machine Shop
4414 S Gekeler Ln
Boise, Idaho, 83716

RE: Facility ID No. 001-00297, Yanke Machine Shop, Inc., Boise
Modeling Protocol Approval, Initial PTC for Existing Facility at 4414 South Gekeler Lane

Dear Mr. Alverson:

On March 20, 2013 the Department of Environmental Quality (DEQ) received a dispersion modeling protocol developed on your behalf by Hildebrand & Associates, Inc. (Hildebrand) for Yanke Machine Shop's existing unpermitted metal fabrication and machining facility located at 4414 South Gekeler Lane in Boise. Modeling is proposed to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) for emissions of PM_{10}, $PM_{2.5}$, NO_2, and Idaho standards for state-regulated Toxic Air Pollutants (TAPs).

The modeling protocol has been reviewed and DEQ has the following comments:

Comment 1. Yanke Machine Shop, Inc., and Yanke Energy, Inc., apparently share the same business address at 4414 South Gekeler Lane. The modeling protocol does not address whether these two business entities should be considered a single facility or as separate facilities for the purposes of air quality permitting. If these business entities are considered separate facilities for the purpose of air quality permitting, "ambient air" for Yanke Machine Shop must include all areas where Yanke Energy personnel have access.

A *facility* is defined as all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same Major Group (same first two digits of the SIC code).[1]

Please contact Mike Simon, Stationary Source Program Manager, at mike.simon@deq.idaho.gov or (208) 373-0212 with any questions regarding whether Yanke Machine Shop and Yanke Energy should be treated as a single facility or as two separate facilities.

Comment 2. Provide a detailed plot plan with the application, clearly describing the ambient air boundary. If the ambient air boundary is not defined by a fence, describe how members of the public will be excluded from the area.

Comment 3. Because of the relatively low stack heights and the close proximity of some release points to the ambient air boundary, project emissions should be compared to DEQ's Level II modeling thresholds, which are correctly shown in Table 3-3 of the modeling protocol.

[1] U.S. EPA, *New Source Review Workshop Manual, Draft 1990.* New Source PSD Applicability Determinations, Definition of Source, pg. A.3. Accessible at http://www.epa.gov/NSR/ttnnsr01/gen/wkshpman.pdf

Comment 4. Estimates provided in the modeling protocol show that the requirement to obtain a PTC for this facility is triggered by emissions of PM_{10} and $PM_{2.5}$, as shown in Table P2. But for particulate emissions (and perhaps TAPs emissions), criteria pollutant emissions would be less than Below Regulatory Concern (BRC) levels specified in Section 220.02 of the Idaho Air Rules, and Yanke Machine Shop would meet the criteria for a Category I Exemption from PTC requirements. **Modeling is therefore not required for facility-wide emissions of CO, NOx, or SO_2.**

Table P2. YANKE MACHINE SHOP PTE COMPARED TO BRC LEVELS

Criteria Pollutant	Significant Emission Rate (T/yr)	Emission Rate: Below Regulatory Concern (BRC) (T/yr)	Facility Potential to Emit (T/yr)	Is PTE Greater than BRC?
PM_{10}	15	1.5	5.6	YES
$PM_{2.5}$	10, direct	1.0	5.6	YES
CO	100	10	2.6	No
NOx	40	4.0	3.8	No
SO_2	40	4.0	0.2	No

Comment 5. The applicable significant impact levels (SILs)/significant contribution levels (SCLs, the term used in Idaho Air Rules) and NAAQS shown in Tables 3 and 4 of the protocol were not reviewed in detail. For simplicity, however, a DEQ table showing those values along with the "design" values to be used for full impact analyses is included below as Table P1. Please note that the maximum 1st high modeled value is always used for significant impact analyses.

Recent EPA guidance allows for a case-by-case determination of the appropriate modeled "design value" used for $PM_{2.5}$ full impact analyses. If $PM_{2.5}$ ambient impacts are greater than significant, initial full- impact modeling for $PM_{2.5}$ should use the average of the 1st high values reported over the 5-year meteorological period plus background, to demonstrate compliance with the 24-hr $PM_{2.5}$ NAAQS. If compliance cannot be demonstrated using this conservative approach, please contact DEQ to request a qualitative case-by-case evaluation to see if using a different modeled design value may be appropriate.

Table P1. APPLICABLE REGULATORY LIMITS FOR CRITERIA POLLUTANT DISPERSION MODELING

Pollutant	Averaging Period	Significant Contribution Levels ($\mu g/m^3$)	NAAQS ($\mu g/m$)	Modeled Value for Full Impact/Cumulative NAAQS Analyses
PM_{10}	24-hour	5.0	150	Maximum 6th highest
$PM_{2.5}$	Annual	0.3	15 (12)[a]	$PM_{2.5}$ –Maximum 1st high
	24-hour	1.2	35	$PM_{2.5}$ –Maximum 1st high (Maximum 8th high may be used with prior DEQ approval)

[a] The newest $PM_{2.5}$ annual standard will not be effective in Idaho until the legislature adjourns *sine die* in early 2014.

DEQ recommends using the following background values for PM_{10} and $PM_{2.5}$ full-impact analyses:

Table P3. RECOMMENDED BACKGROUND CONCENTRATIONS

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)	Reference
PM_{10}	24-hr	73	Historical airshed modeling for the Boise area.
$PM_{2.5}$	24-hr	19.3	St. Luke's Meridian $PM_{2.5}$ monitor, 2008, 2009, and 2010 finalized data from the U.S. EPA AirData website. The 24-hr concentration is the 3-year average of each year's 98th percentile value.
	Annual	6.3	St. Luke's Meridian $PM_{2.5}$ monitor, 2008, 2009, and 2010 finalized data from the U.S. EPA AirData website. The annual concentration is the 3-year average of the weighted mean value for each year.

Comment 6. Pound-per-hour emission values used in the toxic air pollutant (TAP) dispersion modeling should be double-checked to ensure that they reflect the appropriate averaging period, e.g., noncarcinogenic TAP emissions should reflect a 24-hour average, and carcinogenic TAP emissions should reflect an annual average.

Although listed as a noncarcinogen in the Rules, DEQ has determined that naphthalene is a possible/probable carcinogen. Compliance for naphthalene emissions should be based on the EL or AACC listed in Section 586 for PAH. Please note that the PAH EL and AACC should be applied to each PAH, not total PAHs. To simplify the demonstration, however, if total PAH emissions are below the EL, that is sufficient to show compliance.

Comment 7. In the modeling protocol, Hildebrand requested a list of TAPs that are exempt from modeling under Section 210.20 of the Idaho Air Rules because the TAPs are regulated under an applicable New Source Performance Standard (NSPS) or National Emission Standard for Hazardous Air Pollutants (NESHAP), specifically under 40 CFR 63, Subpart (6X).

40 CFR 63, Subpart XXXXXX, Area Source Standards for Nine Metal Fabrication and Finishing Source Categories, regulates emissions of compounds of cadmium, chromium, lead, manganese, or nickel from metal fabrication or finishing operations from nine source categories.

Comment 8. The application should provide documentation and justification for all exhaust parameters used in the modeling analyses, clearly showing how stack gas temperatures and flow rates were estimated. In most instances, applicants should use typical parameters, not maximum temperatures and flow rates. Please include the documentation provided by equipment vendors if this is used as the basis for exhaust parameters. Please note that DEQ requires additional justification for exhaust velocities greater than about 50 m/sec.

Comment 9. Assumptions and calculations for area and volume source exhaust parameters must also be clearly shown. The determination shown in the protocol for the initial lateral and vertical dimensions for the bay door volume sources appears to be appropriate. Please include a discussion of the factors used to determine the release height in the application.

Comment 10. Capped or Horizontal Emissions Sources. The modeling protocol proposes using an exhaust velocity of 0.001 m/sec for exhaust stacks fitted with rain caps (natural gas-fired shop space heaters). For minor sources, DEQ has determined that using the beta options within AERMOD for capped and horizontal sources would also be appropriate and perhaps more representative of near-field ambient impacts, especially for stack emissions subject to building downwash. Modeling for this project may use either approach. If beta options are used, however, in addition to assumptions, calculations, and manufacturer data used to determine exhaust temperatures, information supporting the modeled exhaust flow rates for capped or horizontal stacks must also be included in the application.

Comment 11. DEQ recently reprocessed surface and upper air meteorological data collected at the Boise Airport for the five-year period 2008 through 2012. These data were processed using AERMET v. 12345, AERMINUTE v. 11325, and AERSURFACE v. 13016 into a format compatible with the current AERMOD v. 12345. A zipped electronic copy of this AERMOD-ready data set was emailed to Hildebrand today.

Comment 12. The modeling protocol states that UTM coordinates used for the analyses will be based on UTM Zone 12. The Yanke facility in Boise is located in UTM Zone 11.

Comment 13. The proposed receptor grid appears to be reasonable. However, it is the applicant's responsibility to ensure that the extent and spacing of the receptor network assures that the maximum modeled concentration is reasonably resolved. If DEQ conducts verification modeling analyses with a larger or tighter receptor grid and compliance with standards is no longer demonstrated, the permit will be denied.

DEQ's modeling staff considers the submitted dispersion modeling protocol, with resolution of the additional items noted above, to be approved. It should be noted, however, that the approval of this modeling protocol is not meant to imply approval of a completed dispersion modeling analysis. Please refer to the State of Idaho Air Quality Modeling Guideline, which is available on the Internet at http://www.deq.idaho.gov/media/355037-modeling-guideline.pdf, for further guidance.

To ensure a complete and timely review of the final analysis, our modeling staff requests an analysis report be submitted along with electronic copies of all modeling input and output files, including BPIP and AERMAP input and output files. If you have used a graphical user interface (GUI) such as BEEST, BREEZE, or Lakes AERMOD View, please submit the modeling files in the GUI format. If you have any further questions or comments, please contact me at (208) 373-0220 or cheryl.robinson@deq.idaho.gov.

Sincerely,

Cheryl Robinson

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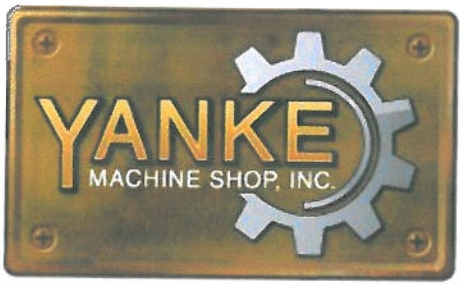
Air Dispersion Modeling Protocol

Prepared for:



Yanke Machine Shop, Inc.

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1.0 INTRODUCTION

In a support of a Permit to Construct (PTC) application for the Yanke Machine Shop, Inc. (Yanke), Hildebrand & Associates, LLC (Hildebrand) is submitting an air dispersion modeling protocol to the Idaho Department of Environmental Quality (IDEQ), on behalf of Yanke. This protocol describes the methodologies that will be used in the air dispersion modeling analysis to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) for particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$), particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}), and nitrogen dioxide (NO_2).

This air dispersion modeling analysis will also demonstrate compliance with the Acceptable Ambient Concentrations (ACC) for formaldehyde, quartz, cadmium, chromium, copper, manganese, and nickel. The results of this analysis will be provided in a PTC application to be submitted in the near future.

2.0 FACILITY INFORMATION

Yanke operates a metal fabrication and an industrial machining facility located at 4414 South Gekeler Lane in Boise, Idaho, Ada County, Idaho. The facility is generally located at Universal Transverse Mercator (UTM) coordinates 565,979.11 meters (m) east and 4,823,529.40 (m) north [North American Datum (NAD) 83)], Zone 11. Figures 2-1 through 2-2 provides an aerial view of Yanke's abrasive blasting both and Yanke's fabrication building and machine shop-repair building. Yanke's fabrication and industrial machining operates 9 hour per day, 5 days a week, for 52 weeks per year (2,340 hours). Yanke's painting and coating operations operate 1,300 hours a year.

Yanke provides metal fabrication and industrial machining services to the mining, agricultural, food processing, and power industries. The fabrication and industrial machining process involves equipment assembly, metal forming, welding and grinding, abrasive blasting and painting. The primary source of emissions is from the combustion of natural gas. Combustion sources include nineteen (19) natural gas- fired space heaters. Secondary sources of emissions come from abrasive blasting, painting, welding, and metalizing.

The criteria pollutants expected as a result of this project include $PM_{2.5}$, PM_{10}, NO_2, sulfur dioxide (SO_2), volatile organic compounds (VOCs), carbon monoxide (CO) and lead (Pb). Emissions of metals, Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs) are also expected from the combustion of natural gas, painting, metalizing and from welding and grinding. A summary of Yanke's regulated emission units are presented below in Table 2-1.

Figure 2-1

Yanke Machine Shop, Inc. Abrasive Blasting Booth

Figure 2-2

Yanke Fabrication and Machine Shop Buildings

Table 2-1

Yanke's Regulated Emission Units

Source ID	Source Description
BB 1	Blasting Booth Exhaust
PB 1	Paint Booth Exhaust
PBH 1	East Paint Booth Heater (100,000 Btu/hr)
PBH 2	West Paint Booth Heater (100,000 Btu/hr)
Fab 1	Fabrication Shop (361,000 Btu/hr)
Fab 2	Fabrication Shop (361,000 Btu/hr)
Fab 3	Fabrication Shop (361,000 Btu/hr)
Fab 4	Fabrication Shop (361,000 Btu/hr)
Fab 5	Fabrication Shop (361,000 Btu/hr)
Fab 6	Fabrication Shop (361,000 Btu/hr)
Fab 7	Fabrication Shop (361,000 Btu/hr)
Fab 8	Fabrication Shop (361,000 Btu/hr)
Fab 9	Fabrication Shop (361,000 Btu/hr)
Fab 10	Fabrication Shop (361,000 Btu/hr)
MS 1	Machine Shop (361,010 Btu/hr)
MS 2	Machine Shop (226,000 Btu/hr)
MS 3	Machine Shop (226,000 Btu/hr)
MS 4	Machine Shop (226,000 Btu/hr)
MS 5	Machine Shop (226,000 Btu/hr)
WH 1	Warehouse Heater (125,000 Btu/hr)
WH 2	Warehouse Heater (226,000 Btu/hr)
Lathe 1	Machine Shop Fume Hood/Metalizing
PW 1	Diesel Power Washer (540,000 Btu/hr)

3.0 AIR QUALITY REGULATORY FRAMEWORK

3.1 YANKE MACHINE SHOP'S AIR QUALITY CLASSIFICATION

EPA classifies air quality regions as "nonattainment" for a given pollutant if ambient air concentrations exceed the NAAQS. NAAQS are established separately for each of the "criteria" pollutants and these NAAQS have been promulgated under Title 40 of the Code of Federal Regulations (40 CFR) Part 50. Areas that are not nonattainment are either "attainment" if the NAAQS have not been exceeded, or the area is deemed unclassifiable/attainment if insufficient data exists to make a determination. Yanke is located in Boise, Idaho which is classified as attainment or unclassifiable/attainment for PM_{10} and $PM_{2.5}$ as well as CO, SO_2, NO_2 and Ozone.

3.2 SOURCE DESIGNATION

Yanke is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), Prevention of Significant Deterioration (PSD) requirements are not applicable to Yanke. Yanke is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 tons per year (tpy).

Facility wide emissions from Yanke do not have the potential to emit (PTE) greater than 100 tpy for PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2, or VOC, therefore Yanke will be categorized as a minor stationary source. Emissions of Hazardous Air Pollutants (HAPs) will not exceed the major source thresholds of 10 tpy for a single HAP or 25 tpy for all HAPs combined. Therefore Yanke will also be a minor source of HAP emissions. Since the PTE for all criteria pollutants will be below 100 tpy and the facility will not be a major source of HAPs, Yanke will not be subject to Tier I or Title V permitting in accordance with IDAPA 58.01.01.006.113. Consequently, Yanke will operate under a PTC issued by the IDEQ.

3.3 PROCESS DESCRIPTION

Yanke operates a metal fabrication and an industrial machining facility. The fabrication and industrial machining process involves equipment assembly, metal forming, powder coating, welding and grinding of base material and the use of abrasive media to prepare equipment for painting. A more detailed process description for Yanke is provided below.

Shop Space Heaters

Yanke is comprised of three main buildings: the abrasive blasting building, the machine and repair shop building and the office/fabrication building. The fabrication building also contains a parts warehouse and paint booth. Yanke utilizes a total of nineteen (19) natural gas-fired space heaters for comfort heating. The fabrication building contains twelve (12) heaters, the warehouse contains two (2) heaters and the machine/repair building contains five (5) heaters. The natural gas-fired heaters are rated at 361,000 Btu's, 226,000 Btu's, 100,000 Btu's and 125,000 Btu's respectively. The total rated heat capacity from these heaters is 5,426,000 Btu's (5.426 MMBtu). All space heater emissions are vented from roof-top exhaust vents. Space heater exhaust vents are fitted with rain-caps; therefore initial modeling will assume an exit velocity of 0.001 m/s.

Abrasive Blasting and Spray Painting

Yanke preps and paints some manufactured equipment. Painting preparation is accomplished using an abrasive blaster. The abrasive blasting booth is located inside the abrasive blasting building. Abrasive media is comprised of a non-toxic mixture of crushed glass and copper slag. Abrasive media is fed into a hopper and delivered through compressed air guns. Abrasive blasting is conducted in a three-quarter enclosed booth with a single horizontal exhaust stack. Particulate from abrasive blasting is controlled by two exhaust vents located inside the blast booth. The two exhaust vents capture particulates and route the particulates to an Aseco-Madsen bag house and filter which achieves 99.9 percent control.

Painting is conducted in an enclosed paint booth which is located in an existing room inside and adjacent to the fabrication building. The paint booth is an updraft paint booth; particulates are vented from the paint booth through a series of filtered wall vents. From the wall vents, particulates are than exhausted to an outside exhaust where particulates pass through another set of filters and are eventually exhausted to the atmosphere. The paint booth wall vents and the set of filters inside the outside exhaust are comprised of Flanders Pre-Pleated-40 Low Pressure Drop Filters. Paint booth filters have a MERV 8 rating and have a rated filter capture efficiency of 70 percent. Yanke also utilizes a Conventional Binks Model 2100 spray gun and an Airless Graco Contractor G40AA spray gun.

Welding and Grinding

Yanke uses a variety welding rods to fabricate and repair equipment. Yanke welds base material inside the fabrication building and inside the machine shop and repair shop building. Welding activities generate fugitive emissions. Welding emissions are not captured through filtration nor are fugitive emissions vented out of any exhaust stacks. Instead, welding emissions are vented through 11 bay doors located in the fabrication building and in the machine shop and repair shop. Each bay contains two (2) roll-up or sliding doors where welding emissions may escape. For this modeling analysis welding emissions will be divided between the twenty-two (22) bay doors and will be modeled as a volume source.

Yanke also uses pedestal and hand-held grinders to fabricate and repair equipment. Grinding is conducted in the same bays as welding. The particles from the grinding process are larger than PM_{10} and settle on the floor near the grinding machines. Once grinding has stopped, particles are vacuumed and disposed of. Yanke has visually inspected the grinding process and has concluded that no grinding particles leave the building. Therefore grinding particulate emissions are considered insignificant and will not be included in

this modeling analysis. However, facility-wide grinding TAPs and HAPs were calculated and are included in the overall TAPs analysis.

Metalizing Treatment

Some of the metal structures produced at Yanke are given a "metalizing" treatment. Yanke utilizes a Sulzer Metco 16E Series wire combustion gun to thermally spray hard wire and composite powders. The metalizing treatment consists of a procedure in which the surface of a metal structure is plasma coated with a chromium, nickel, molybdenum, and manganese mixture. The entire process is performed underneath a dust collection fume hood which is vented to a single exhaust stack. Metalizing is conducted infrequently and annual usage is approximately 20 hours per year. For the metalizing process we are conservatively assuming a transfer efficiency of 95 percent.

Power Washing

Yanke utilizes a diesel burning Alkota 518X4 high pressure power washer to clean equipment. The power washer has a rated capacity of 540,000 Btu (0.54 MMBtu). The power washer has an electric motor driven pump with an atomizing burner. The atomizing burner burns diesel fuel which in-turn heats the water for power washing. The power washer is located in an enclosed room behind the repair shop building with a single exhaust stack.

3.4 MODELED EMISSION RATES

Pre-project Potential to Emit (PTE) is used to establish the change in emissions at a facility. This project is for an initial PTC. However, since this is the first time Yanke is receiving a permit, pre-project emissions are considered zero. Post project emissions are used to establish the change in emissions at a facility and will be compared against the modeling thresholds for criteria pollutants and against emission screening levels (ELs) for TAPs. Post-project PTE for criteria pollutants are provided below in Table 3-1. Facility-wide TAP ELs are provided in Table 3-5.

All processes at Yanke will be initially modeled at maximum operating capacity (8,760 hours/year). After receiving approved meteorological data and background concentrations from IDEQ, Yanke will perform air dispersion modeling analysis and may modify the stack parameters, hours of operation and locations of the sources to ensure compliance with required ambient air quality standards.

Emissions of criteria pollutants, VOCs, HAPs and TAPs are expected to occur from the flowing sources:

- 19 natural gas heater stacks;
- One abrasive blasting bag house stack;
- One diesel burning high pressure power washer stack;
- One paint booth stack;
- One metalizing stack; and
- Twenty-two welding bay doors. (There are 11 welding bays and each bay has two doors)

Combustion stacks, abrasive blasting, power washer, paint booth, and metalizing stack will be modeled as point sources in this modeling analysis. The welding bay doors are the only volume source that will be modeled in this analysis. Welding emissions are considered fugitive sources and will be characterized as a volume source based on the dimensions of the welding bay doors.

Modeling thresholds for criteria pollutants are shown in Table 3-2. Based on comparisons between the modeling thresholds in Table 3-2 and facility-wide emissions in Table 3-3, PM_{10}, $PM_{2.5}$, NO_2 are the only criteria pollutants that need to be modeled. Yanke's emissions of all other criteria pollutants are predicted to be less than modeling thresholds.

Volume Source Assumptions

Welding bay doors will be modeled as a volume source.

Length of side = Bay door length = 22 ft

Initial lateral dimension = σ_y = Length of side/4.3 = 22 ft/4.3 = 5.12 ft

For sources that are on or adjacent to a building the initial vertical dimension is calculated by dividing the building height 2.15:

Initial Vertical dimension = σ_z = Building height/2.15 = 22 ft/2.15 = 10.23 ft

Table 3-1

Post-Project Potential to Emit For Regulated Air Pollutants

	PM_{10}		$PM_{2.5}$		SO_2		NO_x	
Source	Lb/hr	T/yr	Lb/hr	T/yr	Lb/hr	T/yr	Lb/hr	T/yr
Welding [1]	2.96E-01	5.19E-01	2.96E-01	5.19E-01	----	----	----	----
Metalizing [2]	1.87E-04	2.18E-04	1.87E-04	2.18E-04	----	----	----	----
Painting [3]	4.81E+00	4.69E+00	4.81E+00	4.69E+00	----	----	----	----
Abrasive Blasting [4]	2.33E-02	4.08E-02	2.33E-03	4.08E-03	----	----	----	----
Diesel Power Washer [5]	1.70E-01	2.00E-01	1.70E-01	2.00E-01	1.60E-01	1.80E-01	2.38E+00	2.79E+00
(19) Gas Heaters [6]	4.04E-02	1.77E-01	4.04E-02	1.77E-01	3.19E-02	1.40E-02	5.23E-01	2.33E+00
Total Emissions	**5.34**	**5.63**	**5.32**	**5.59**	**0.19**	**0.19**	**2.90**	**5.12**

1 Welding PTE based 3,510 hours/year

2 Metalizing PTE based on 2,340 hours/year

3 Paint PTE based on increasing production 50 %

4 Abrasive blasting PTE based on 3,510 hours/year

5 Diesel power washer PTE based on 2,340 hours/year

6 Natural gas combustion based on 8,760 hours/year

Table 3-1(continued)

Post-Project Potential to Emit For Regulated Air Pollutants

	CO		VOC		CO_2 [e]		Lead		Lead	
Source	Lb/hr	T/yr	Lb/hr	T/yr	Lb/hr	T/yr	Lb/hr	T/yr	Lb/mo	
Welding	----	----	----	----	----	----	8.04E-06	1.41E-05	1.76E-02	
Metalizing	----	----	----	----	----	----	----	----	----	
Painting	----	----	2.38E+01	2.32E+01	----	----	6.84E-04	6.67E-04	1.50E+00	
Abrasive Blasting	----	----	----	----	----	----	----	----	----	
Diesel Power Washer	5.10E-01	6.00E-01	1.90E-01	2.30E-01	----	2.77E+02	----	----	----	
(19) Gas Heaters	4.47E-01	1.96E+00	2.93E-02	1.28E-01	----	2.79E+03	2.66E-06	1.66E-05	5.83E-03	
Total Emissions	**0.957**	**2.56**	**24.06**	**23.60**	**----**	**3065**	**6.95E-04**	**6.98E-04**	**1.52E+00**	

Table 3-2

Modeling Thresholds for Criteria Pollutants

Pollutant	Potential Emission Rate from a New Source	
	Level I Thresholds	Level II Thresholds[a]
CO	15 lbs/hr [b]	175 lbs/hr
NOx	1.2 ton per year[b] and 0.2 lbs/hr [b]	(14 ton per year)[c] and (2.4 lbs/hr)[c]
SO_2	1.2 ton per year[b] and 0.21 lbs/hr[b]	(14 ton per year)[c] and (2.5 lbs/hr)[c]
PM_{10}	0.22 lbs/hr[b]	(2.6 lbs/hr)[c]
$PM_{2.5}$	0.35 ton per year[b] and 0.054 lbs/hr[b]	(0.41 ton per year)[c] (0.63 lbs/hr)[c]
Pb	14 lbs/month	

a. Modeling may be required for emissions below Level II threshold for the following:

1. Sources where a substantial portion of the new or modified emissions have poor dispersion characteristics (e.g., rain caps, horizontal stacks, fugitive releases, or building downwash) in close proximity to ambient air.
2. Sources located in complex terrain (e.g. there is terrain above stack height that is in close proximity to the source).
3. Sources located in areas with poor existing air quality.
4. Modifications at existing major stationary sources, including grandfathered sources that have never been modeled before.

b. Level I thresholds are emission rates below which modeling will not be required in most instances. Thorough justification for using Level I thresholds is not generally required. These thresholds are based on the following methods and assumptions:

AERSCREEN with MAKEMET program run separately for land use of grassland, conifer forest, and desert shrub land, using the maximum impact of the tree. The highest value was taken and compared to the significant contribution levels. Stack height = 10 m, exit temperature =150°F, diameter = 0.3 m, exit velocity = 10 meter per second, ambient air is 100 meters from stack in all direction, building of 4 m(W) by 4 m (L) by 5 m (H).

c. The Level II thresholds, in parentheses, are applicable on a case-by-case conditional basis. They are based on the following analyses/assumptions: AERSCREEN with MAKEMET program run for land use grassland, conifer forest, and desert shrub land, using the maximum impact of the tree. The highest value was taken and compared to the significant contribution levels. Stack height = 15 m, exit temperature =260°F, diameter = 1 m, exit velocity = 20 meter per second, ambient air is 100 meters from stack in all direction, there is a 10 m(W) by 10 m (L) by 5 m (H) building present at the stack location.

Table 3-3

Facility Wide Emissions and Modeling Thresholds

Criteria Air Pollutants	Combustion Emissions		Level I Modeling Threshold		Modeling Required	Level II Modeling Threshold		Modeling Required
	lb/hr	T/yr	2011 Guidance			Case-by-Case		
PM10 24-hour	5.34		0.22	lb/hr	YES	2.6	lb/hr	YES
PM2.5 24-hour	5.32		0.054	lb/hr	YES	0.63	lb/hr	YES
PM2.5 annual		5.59	0.35	T/yr	YES	4.1	T/yr	YES
CO 1-hr, 8-hr	0.96	2.56	15	lb/hr	No	175	lb/hr	No
NOx 1-hr x 80%	2.32		0.20	lb/hr	YES	2.4	lb/hr	No
NOx annual x 75%		3.84	1.2	T/Yr	YES	14	T/yr	No
SO2 1hr, 3-hr, 24-hr	0.19		0.21	lb/hr	No	2.5	lb/hr	No
SO2 annual		0.19	1.2	T/yr	No	14	T/yr	No
VOC		23.60	40	T/yr	No			
Lead rolling 3-month	6.95E-04	1.52E+00 (lb/mo)	14	lb/mo	No			

IDEQ recommends that a preliminary analysis (PA) first be conducted when dispersion modeling is warranted. Facility-wide emissions are modeled for the PA to evaluate whether a significant impact exists. Model results are compared to the Class II Significant Contribution Levels (SCLs). Table 3-4 displays the SCLs, which are used to assess whether or not a facility has a significant impact at downwind receptors. When modeling results do not exceed SCLs for a pollutant, no further analysis for that pollutant is required. For Yanke PM_{10}, $PM_{2.5}$, and NO_2 emissions will need to be modeled to evaluate whether a significant impact exists.

If any of the model results exceed the SCLs, a full impact analysis (FIA) will be performed which typically requires adding facility-wide emissions to a background concentration to estimate a total concentration. Background concentrations and, if necessary neighboring source contributions will be provided by IDEQ for the cumulative impact analysis. The total concentration for a pollutant must demonstrate compliance with the NAAQS. Table 3-4 shows the Significant Impact Levels and NAAQS concentrations with which Yanke must comply. A Prevention of Signification Deterioration (PSD) increment compliance demonstration is not required because Yanke will be a minor source of air pollution.

Table 3-4

Class II Significant Contribution Levels and Ambient Air Quality Standards

Pollutant	Averaging Period	Significant Contribution Level ($\mu g/m^3$)[a]	National AAQS ($\mu g/m^3$)[a]
NO_2	Annual 1-hour	1 4 ppb [b,c] 7.5$\mu g/m^3$ [d]	100 [d] 100 ppb [c] 188 $\mu g/m^3$ [d]
SO_2	Annual 24-hour 3-hour	1 5 25	80 365 [b] 1,300 [b]
SO_2	1-hour	3 ppb [c] 7.9 $\mu g/m^3$ [d]	75 ppb [e] 196 5$\mu g/m^3$
CO	8-hour 1-hour	500 2,000	10,000[b] 40,000[b]
PM_{10}	Annual 24-hour	1 5	50 [g] 150[b]
Pb	Quarterly	N/A	1.5 [j]
Pb	3-month	N/A	0.15 [k]
$PM_{2.5}$	24-hour	1.2	35 [h]
	Annual	0.3	15 [i]

For Footnotes See Table 3 and 4, page 14 and 15 of the State of Idaho Guidelines for Performing Air Quality Impact Analysis

In the state of Idaho, all new and modified sources of TAP emissions are compared their respective (ELs. Modeling is required for those TAPs with emissions that are equal to or greater than the ELs. Applicable ELs are provided in IDAPA 58.01.01.585 and 586.

Facility wide TAPs emitted from the combustion of natural gas, diesel fuel, welding, grinding, painting and metalizing are presented in Table 3-5. Emissions of formaldehyde, quartz, cadmium, chromium, copper, manganese, and nickel exceeded their respective ELs. For this modeling analysis, the method described in subsection 210.6 of comparing the uncontrolled ambient concentration to the applicable AAC will be used to demonstrate preconstruction compliance.

NOTE: TAPs lb/hr emissions are 24-hour averages unless shown in bold. Bold emissions are annual averages for carcinogens.

Table 3-5
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
PAH HAPs	**lb/hr**	**EL (lb/hr)**	
2-Methylnaphthalene	**1.28E-07**	9.10E-05	No
3-Methylchloranthrene	**9.58E-09**	2.50E-06	No
Acenaphthene	**2.15E-07**	9.10E-05	No
Acenaphthylene	**7.40E-07**	9.10E-05	No
Anthracene	**2.83E-07**	9.10E-05	No
Benzo(a)anthracene	**9.58E-09**	9.10E-05	See POM
Benzo(a)pyrene	**6.38E-09**	2.00E-06	See POM
Benzo(b)fluoranthene	**9.58E-09**		See POM
Benzo(g,h,i)perylene	**7.69E-08**	9.10E-05	No
Benzo(k)fluoranthene	**9.58E-09**		See POM
Chrysene	**9.58E-09**		See POM
Dibenzo(a,h)anthracene	**6.38E-09**		See POM
Dichlorobenzene	**6.38E-06**	9.10E-05	No
Fluoranthene	**1.12E-06**	9.10E-05	No
Fluorene	**4.22E-06**	9.10E-05	No
Indeno(1,2,3-cd)pyrene	**9.58E-09**		See POM
Naphthalene	4.90E-05	3.33	No
Naphthalene (as carcinogen)	**1.54E-05**	9.10E-05	No
Phenanathrene	**1.19E-06**	9.10E-05	No
Pyrene	**9.71E-08**	9.10E-05	No
Polycyclic Organic Matter (POM) 7-PAH Group	**5.56E-07**	2.00E-06	No
Non-PAH HAPs			
Benzene	**1.46E-04**	8.00E-04	No
1,3-Butadiene	**5.46E-06**	2.40E-05	No
Acetaldehyde	**1.10E-04**	3.00E-03	No
Formaldehyde	**5.69E-04**	5.10E-04	YES
Hexane	9.58E-03	12	No

Table 3-5 (Continue) Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)			
Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			**Exceeds EL/ Modeling Required?**
Non PAH HAPs	**lb/hr**	**EL (lb/hr)**	
Acrolein	5.00E-05	1.70E-02	No
Toluene	4.42E+00	25	No
Ethylbenzene	3.27E+00	2.90E+01	No
Cumene	4.28E-03	1.63E+01	No
Trimethylbenzene (mixed & individual isomers) [1]	2.88E-01	8.20E+00	No
Methanol	6.73E-01	1.73E+01	No
Acetone	2.57E+00	1.19E+02	No
Non-HAP Organic Compounds			
7,12-Dimethylbenz(a)anthracene	8.51E-08	NA	No
Butane	1.12E-02	NA	No
Ethane	1.65E-02	NA	No
Pentane	1.38E-02	118	No
Propylene	1.39E-03	NA	No
Propane	8.51E-03	NA	No
Methyl Isobutyl Ketone	9.98E-01	1.37E+01	No
n-Butyl Acetate	5.20E-03	4.73E+01	No
Zinc Oxide	6.42E-02	3.33E-01	No
Zinc Compound (Fumes)	3.64E-02	3.33E-01	No
Carbon Black	1.10E-02	2.30E-01	No
Carbon	2.28E-02	NA	No
Isopropanol	5.51E-02	6.53E+01	No
Ethyl Alcohol	5.37E-02	1.25E+02	No
Ethyl Poly Silicate	3.22E-02	NA	No
Wallastonite	1.56E+00	NA	No
Ethanol	8.81E-03	NA	No
Amine Adduct (Trade Secret)	2.31E-02	NA	No
Amine Compound	2.31E-02	NA	No
Isophoronediamine [2]	2.31E-02	1.87E+00	No

Table 3-5 (Continue)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Non-HAP Organic Compounds	**lb/hr**	**EL (lb/hr)**	
Polyoxpropylenediamine	2.31E-02	NA	No
Aromatic Hydrocarbons	4.45E-02	NA	No
Methyl n-Amyl Ketone	4.50E-02	1.57E+01	No
Bisphenol-A	2.08E-01	NA	No
Nepheline Syenite (Nuisance dust)	2.25E-01	NA	No
Mica	1.07E-02	2.00E-01	No
Barium Sulfate	2.65E+00	NA	No
NJTS (Proprietary)	1.32E-01	NA	No
Aluminum Silicate	2.15E-02	NA	No
Proprietary Silane	9.46E-01	NA	No
n-Butanol	2.31E-02	NA	No
Propylene Glycol Monomethyl Ether	5.78E-02	2.40E+01	No
2-Butoxyethanol	3.51E+00	8.00E+00	No
Diaminocyclohhexane	2.31E-02	NA	No
Cobalt 2-ethylhexanoate [3]	1.21E-03	NA	No
Benzyl Alcohol	4.62E-02	NA	No
Polyamide Resin	7.73E-02	NA	No
Ethyl Silicate	1.73E-02	5.67	No
N-Butyl Alcohol	6.84E-02	NA	No
Cyclohexanol	3.46E-03	1.33E+01	No
3-Trimethoxysilane	1.73E-02	NA	No
Petroleum Distillate	3.42E-02	NA	No
Manganese Dioxide	3.42E-02	6.70E-02	No
Quartz [4]	9.25E-01	6.70E-03	YES
VM&P Naphtha	9.74E-01	9.13E+01	No
Poly(oxy)methyl-1-2-ethanediyl	4.41E-01	NA	No
Xylene [5]	7.23E+00	2.90E+01	No
Zinc Phosphate	6.42E-02	NA	No
Iron Oxide [6]	2.22E-01	3.33E-01	No
Aliphatic Amine	4.41E-01	NA	No

Table 3-5 (Continue)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Non-HAP Organic Compounds	**lb/hr**	**EL (lb/hr)**	
Phenol,2-Nonyl Branched	8.81E-03	NA	No
Fatty Amine Carbohydrate	1.32E-02	NA	No
Proprietary Silicone	2.09E+00	NA	No
Talc (non-Asbestos)	5.98E+00	NA	No
Magnesium (fume)	1.14E-01	0.667	No
Silicon	2.17E-01	0.667	No
Silicon Oxide	5.69E-02	NA	No
Silicon Dioxide	1.81E-01	NA	No
Aluminum Oxide	7.40E-02	0.667	No
Carbon Steel	1.76E+00	NA	No
Cellulose	7.91E-02	NA	No
Organic Binder	2.52E-06	NA	No
Garnet	3.08E-03	NA	No
Sulfur	8.54E-06	NA	No
Limestone	4.27E-06	NA	No
Pyrites	4.27E-06	NA	No
Lanthanum Oxide	1.92E-05	NA	No
Neodymium Oxide	9.20E-06	NA	No
Phenol Formaldehyde Polymer	6.15E-03	NA	No
White Mineral Oil	4.27E-06	NA	No
Wollastonite	1.71E-05	NA	No
Cured Resin	3.42E-05	NA	No
Kyanite	4.27E-06	NA	No
Kaolin	5.30E-04	0.133	No
Paraffin Wax	8.54E-06	0.133	No
Furfural	4.27E-06	0.533	No
Magnesium Oxide	1.92E-05	0.667	No
Fluoride Compounds	6.42E-02	0.167	No
Tungsten	4.27E-04	0.067	No
Boron	7.40E-03	NA	No

Table 3-5 (Continue)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Non-HAP Organic Compounds	**lb/hr**	**EL (lb/hr)**	
Magnesite	7.05E-03	0.667	No
Graphite	1.26E-03	NA	No
Alkali Silicate	1.21E-02	NA	No
Alkali Carbonate	3.59E-03	NA	No
Alakli Fluoride	6.28E-04	NA	No
Alkali Aluminum Fluoride	1.15E-02	NA	No
Lithium	1.82E-03	NA	No
Zirconium	6.56E-04	0.333	No
Zirconium Dioxide	5.53E-03	NA	No
Potassium Oxide	7.94E-02	NA	No
Calcium Carbonate	8.71E-03	0.667	No
Magnesium Carbonate	6.95E-02	NA	No
Strontium Carbonate	2.22E-02	NA	No
Columbium (Nuisance dust)	8.55E-04	NA	No
Sodium Oxide	2.28E-02	NA	No
Calcium Fluoride	2.14E-04	NA	No
Amphorous Silica (includes silicates and mineral silicates)	1.17E-01	6.67E-01	No
Silicon Carbide	6.38E-03	0.667	No
Zirconium Oxide	3.34E-03	0.333	No
Calcium Oxide	4.27E-06	0.133	No
Calcium Stearate	1.03E-03	NA	No
Calcium Sulfate	5.34E-04	0.667	No
Zinc Stearate	1.03E-04	NA	No
Potassium Fluoroborate	5.13E-04	NA	No
Cured Phenolic /Urea Formaldehyde	4.10E-03	NA	No
Titanium Oxide	1.27E+00	NA	No
Titanium	8.13E-03	NA	No
Fibrous Glass	2.14E-05	0.667	No
Potassium Aluminum Fluoride	4.27E-05	NA	No

Table 3-5 (continued)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Non-HAP Organic Compounds	**lb/hr**	**EL (lb/hr)**	
Yttrium Oxide	1.92E-05	0.067	No
Epoxy Resin	8.01E+00	NA	No
1,2-Benzene Dicarboxlic Acid	8.70E-01	NA	No
Petroleum Solvent Naphtha	1.07E-01	NA	No
Lead [7]	6.92E-04	NA	No
Bis-Sebacate	2.61E-02	NA	No
Poly(oxy-1-2,ethanediyl)	4.86E-01	NA	No
1-Chloro-2-3-Epoxpropane	1.73E-02	NA	No
(Pentane-2-4-Dionato-O,O)Tin	6.60E-02	NA	No
Titanium Dioxide	1.01E+00	N/A	No
Mineral Spirits	2.84E-03	N/A	No
Alkyl Phenol	4.41E-01	NA	No
Metals (HAPs)			
Arsenic	**1.06E-06**	1.50E-06	No
Barium	2.34E-05	0.033	No
Beryllium	**8.43E-08**	2.80E-05	No
Cadmium	**5.85E-06**	3.70E-06	YES
Chromium	7.60E-02	3.30E-02	YES
Cobalt (includes cobalt oxide)	1.34E-05	0.0033	No
Copper	4.25E-02	0.013	YES
Manganese	5.90E-01	0.067	YES
Mercury	1.38E-06	0.003	No
Molybdenum	5.15E-03	0.333	No
Nickel	**1.44E-02**	2.70E-05	YES
Selenium	1.28E-07	0.013	No
Vanadium	1.22E-05	0.003	No
Zinc	5.78E-01	6.67E-01	No
Aluminum	7.15E-02	0.667	No
Iron	1.10E+01	NA	No
Chromium III	4.27E-05	3.30E-02	No

Table 3-5 (continued)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Metals (HAPs)	**lb/hr**	**EL (lb/hr)**	
Chromium IV	3.42E-07	5.60E-07	No
Tin	1.45E-04	0.133	No

[1] Includes 1,2,4-Trimethyl Benzene

[2] Conservatively assumes equal to Isophorone

[3] Considered a HAP and Cobalt Compound

[4] Includes Microcrystalline Silica

[5] Includes M,P & O Xylenes

[6] Includes Red Iron Oxide

[7] To be included in Criteria Pollutants and HAPs

NOTE: TAPs lb/hr emissions are 24-hour averages unless shown in bold. Bold emissions are annual averages for carcinogens.

4.0 MODELING METHODOLOGY

This section describes the technical approach for the air dispersion modeling analysis that will be performed to estimate ambient air impacts due to formaldehyde, quartz, cadmium, copper, manganese, and nickel, PM_{10}, $PM_{2.5}$ and NO_2. Air dispersion modeling will address the impacts from all combustion and fugitive sources. Air dispersion modeling will follow the guidance and protocols outlined in the *Revised State of Idaho Air Quality Modeling Guideline* (IDEQ Modeling Guideline; IDEQ, July, 2, 2011) and the U.S. Environmental Protection Agency (EPA) *Guideline on Air Quality Models (Revised)* (EPA 2005). After receiving approved meteorological data and background concentrations from IDEQ, Yanke will perform air dispersion modeling analysis and may modify the stack parameters, hours of operation and locations of the sources to ensure compliance with required ambient air quality standards.

4.1 DISPERSION MODEL

The American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC) modeling system, the AERMOD dispersion model, version 12345 (release date December 2012) will be used to predict maximum criteria pollutant concentrations in ambient air from Yanke. AERMOD will also be used to predict impacts of formaldehyde, quartz, cadmium, chromium, copper, manganese, and nickel.

AERMOD is recommended by EPA for evaluating Class II impacts within 50 kilometers (km) of the facility being assessed. AERMOD will be run using all the regulatory default options including use of stack-tip downwash, buoyancy-induced dispersion, and calms processing routines, upper-bound downwash concentrations for super-squat buildings, default wind speed profile exponents, vertical potential temperature gradients, and no use of gradual plume rise. Only pollutant dispersion will be modeled for this analysis; particle deposition will not be considered.

4.2 BUILDING WAKE EFFECTS

Emissions from Yanke will be evaluated in terms of its proximity to nearby structures. Building downwash effects are included to determine if emission discharges become caught in the turbulent wakes of nearby structures. Wind blowing around a building creates zones of turbulence that are greater than if the buildings were absent. The potential for downwash effects on stack emissions from nearby structures will be assessed in using AERMOD. The AERMOD model inputs will include building dimensions to assess the potential for downwash effects. Building dimensions for Yanke will be used to build the Building Profile Input Program (BPIP) with Prime Enhancement (BPIP-Prime) input file. Table 4-1

provides the lists of buildings that will be included in this modeling analysis.

Table 4.1

Building Description and Dimensions

Building ID	Description	Length (ft)	Length (m)	Width (ft)	Width (m)	Height (ft)	Height (m)
Bld1	Blasting Building	179	54.56	93	28.35	44	13.41
Bld2	Machine Shop	170	51.82	153	46.63	22	6.71
Bld3	Fabrication Building	304	92.66	160	48.77	25	7.62
Bld4	Power Washer Building	18	5.49	15	4.57	10	3.05
Bld5	Utility/ Storage Building	116	35.36	103	31.39	22	6.71

4.3 TERRAIN DESCRIPTION

For modeling purposes, the rural/urban classification of an area is determined by either the dominance of a specific land use or by population data in the study area. Generally, if the sum of heavy industrial, light-moderate industrial, commercial, and compact residential (single and multiple family) land uses within a three kilometer radius from the facility are greater than 50%, the area is classified as urban. Conversely, if the sum of common residential, estate residential, metropolitan natural, agricultural rural, undeveloped (grasses), undeveloped (heavily wooded) and water surfaces land uses within a three kilometer radius from the facility are greater than 50%, the area is classified as rural.

Yanke is located in Boise, Idaho, Ada County, Idaho, at an elevation of approximately 2,866 feet (874 meters) above mean sea level. Yanke is situated within a light-moderate industrial and commercial land use area. The closest residential area near Yanke is approximately 0.14 miles (219 meters) north of the fabrication building. Rural dispersion will be assumed for this modeling analysis.

4.4 METEOROLOGICAL DATA AND NESHAP SOURCES

This air dispersion modeling analysis will be performed using five years of representative meteorological data. **Hildebrand is requesting representative surface and upper-air meteorological data to be used in AERMOD.**

If the owner or operator demonstrates that the toxic air pollutant from the source or modification is regulated by the Department or by EPA at the time of permit issuance under 40 CFR Part 60, 40 CFR Part 61 or 40 CFR Part 63, no further procedures for demonstrating preconstruction compliance will be required under Section 210 for that toxic air pollutant as part of the application process. Yanke may be may be regulated by 40 CFR Part 63 Subpart XXXXXX. **Hildebrand is requesting a list of TAPs that are excluded from modeling under 40 CFR Part 63 Subpart XXXXXX.**

4.5 COORDINATE SYSTEM

The location of emission sources, structures, and receptors will be represented in the UTM coordinate system using North American Datum 1983 (NAD83). UTM coordinates for this analysis will be based on UTM Zone 12.

4.6 RECEPTOR GRIDS

Receptors will be placed in all areas directly surrounding the facility considered to be ambient air. Air dispersion modeling will be performed using a model receptor grid that ensures that maximum estimated impacts from the facility are identified. Following IDEQ and EPA guidelines, receptor locations will be identified with sufficient density and spatial coverage to isolate the area with the highest impacts. All combustion sources proposed in this analysis have short stack heights and their maximum emissions impact will be close to the property boundary. The following receptor grid locations (see Figure 4-1) will be used for the analysis to accomplish this coverage:

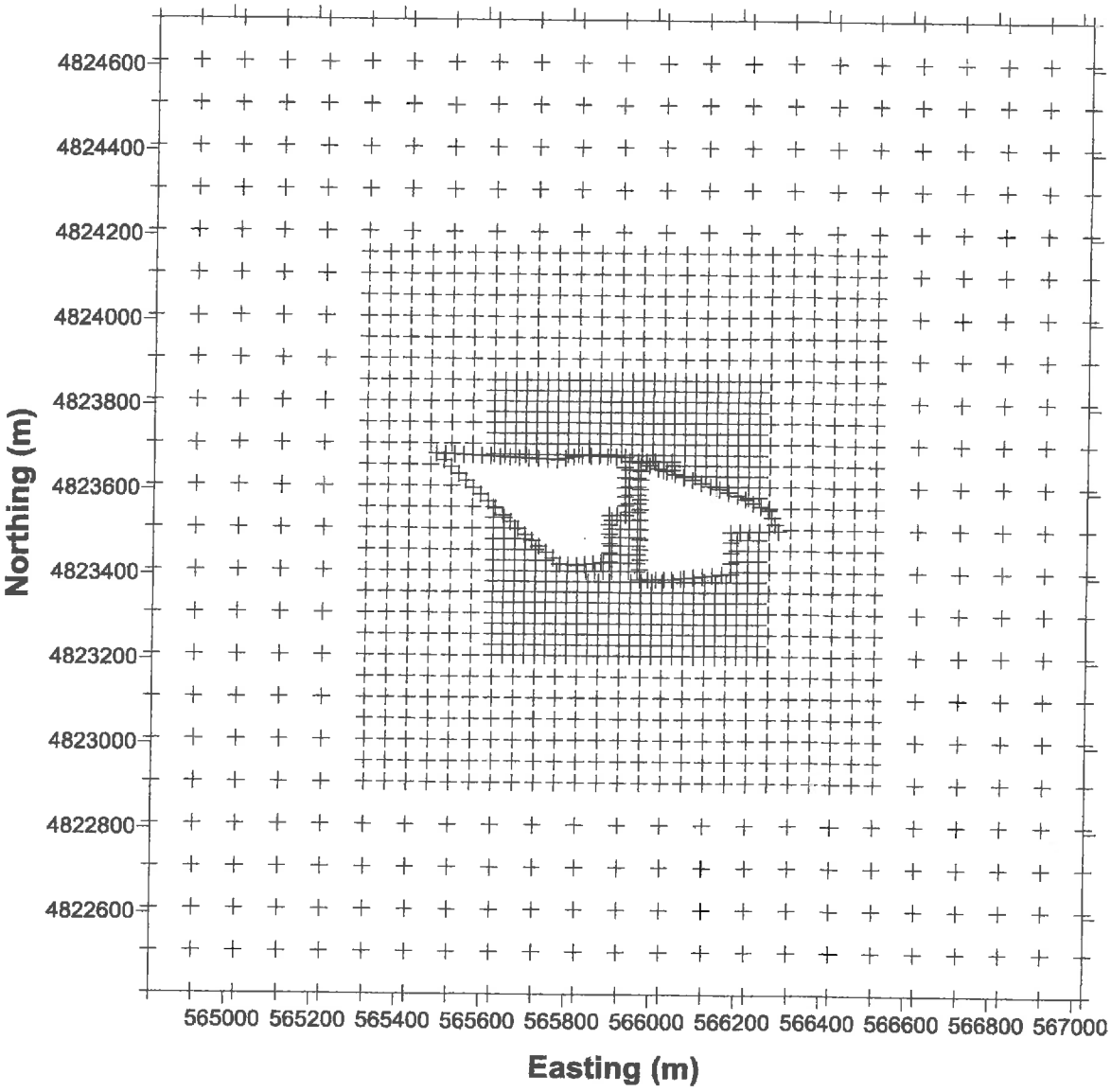
- 25-m receptor spacing on the property boundary;
- 50-m receptor spacing out to 200 m in all directions from the property boundary;
- 100-m receptor spacing out to 1000 m in all directions from the property boundary

The ambient air boundary at Yanke is determined pursuant to the requirements of Section 6.5 of the "State of Idaho Guideline for Performing Air Quality Impact Analyses". The ambient air boundary is established in part by the facility's capability and responsibility for restricting public access for the sake of public safety. Yanke's ambient air boundary is the fence-line of the property. Yanke can be accessed from south Gekeler Lane from the south and from the east by east Amity Road. Access to the fabrication building and machine shop is delineated by be a chain-link fence and private parking lot. Access to the blasting booth is delineated by a chain-link fence to the east, Interstate 84 to the west, and railroad tracks to the north. The general public is not invited to Yanke as part of normal business.

Receptor locations will be presented in UTM coordinates (NAD 83). Terrain elevations will be assigned to all receptors using U.S. Geological Survey 30 meter National Elevation Database (NED) in the AERMAP program.

Figure 4-1

FACILITY RECEPTORS and BOUNDARY



4.7 BACKGROUND CONCENTRATIONS

The IDEQ has established significant impact levels (SILs) to determine whether or not a proposed project would have a significant impact on the air quality in the area. If the resulting ambient concentrations exceed these levels the project is considered a significant impact. To evaluate the potential impacts of emissions from Yanke on the public, the dispersion modeling evaluation will consider the existing background concentrations of pollutants in Boise, Idaho area. The background concentration of a given pollutant is added to the modeled impact and the result is compared to the NAAQS for that pollutant. **Hildebrand is requesting representative ambient air background concentrations for Boise, Idaho.** Criteria pollutants directly emitted by Yanke under evaluation for dispersion modeling purposes are PM_{10}, $PM_{2.5}$, and NO_2. It will be assumed that background concentrations for TAPs are insignificant.

4.8 MODEL PARAMETERS

Modeled emission sources at Yanke are point and volume sources. Model parameters are shown in Table 4-2. Source locations are presented in UTM coordinates (NAD 83).

Table 4.2 Model Parameters and Source Locations

Source ID	Description	X Coord. (m)	Y Coord (m)	Base Elevation (m)	Release Height (m)	Exit Temperature (K)	Exit Velocity (m/s)	Inside Diameter (m)
STCK1	Blasting Booth Horizontal Exhaust	565824	4823669	869.00	6.1	Ambient	0.01	0.86
STCK2	Paint Booth Exhaust	565999	4823631	868.81	5.18	Ambient	50	0.3444
STCK3	East Paint Booth Heater (100,000 BTU/hr)	565997	4823620	869.24	8.53	322.04	50	0.0762
STCK4	West Paint Booth Heater (100,000 BTU/hr)	566016	4823621	868.58	8.53	322.04	50	0.0762
STCK5	Fabrication Shop Heater #1 (361,000 BTU/hr)	566032	4823618	868.49	8.23	338.71	0.001	0.2032
STCK6	Fabrication Shop Heater #2 (361,000 BTU/hr)	566032	4823607	868.86	8.23	338.71	0.001	0.2032
STCK7	Fabrication Shop Heater #3 (361,000 BTU/hr)	566032	4823595	869.26	8.23	338.71	0.001	0.2032
STCK8	Fabrication Shop Heater #4 (361,000 BTU/hr)	566032	4823582	869.69	8.23	338.71	0.001	0.2032
STCK9	Fabrication Shop Heater #5 (361,000 BTU/hr)	566033	4823569	870.12	8.23	338.71	0.001	0.2032
STCK10	Fabrication Shop Heater #6 (361,000 BTU/hr)	565985	4823618	869.49	8.23	338.71	0.001	0.2032
STCK11	Fabrication Shop Heater #7 (361,000 BTU/hr)	565985	4823605	869.92	8.23	338.71	0.001	0.2032
STCK12	Fabrication Shop Heater #8 (361,000 BTU/hr)	565986	4823594	870.29	8.23	338.71	0.001	0.2032
STCK13	Fabrication Shop Heater #9 (361,000 BTU/hr)	565987	4823570	871.10	8.23	338.71	0.001	0.2032
STCK14	Fabrication Shop Heater #10 (361,000 BTU/hr)	565986	4823558	871.58	8.23	338.71	0.001	0.2032
STCK15	Machine Shop Heater #1 (361,000 BTU/hr)	565986	4823558	871.58	7.32	338.71	0.001	0.2032
STCK16	Machine Shop Heater #2 (226,000 BTU/hr)	566018	4823441	877.39	7.32	333.15	0.001	0.2032
STCK17	Machine Shop Heater #3 (226,000 BTU/hr)	566020	4823441	877.39	7.32	333.15	0.001	0.2032
STCK18	Machine Shop Heater #4 (226,000 BTU/hr)	566021	4823441	877.39	7.32	333.15	0.001	0.1016
STCK19	Machine Shop Heater #5 (226,000 BTU/hr)	566021	4823441	877.39	7.32	333.15	0.001	0.1016
STCK20	Warehouse heater #1 (125,000 BTU/hr)	566033	4823556	870.56	8.23	322.04	0.001	0.0762
STCK21	Warehouse heater #2 (226,000 BTU/hr)	566034	4823545	870.92	8.23	333.15	0.001	0.101
STCK22	Machine Shop Fume Hood - Metalizing	566039	4823486	876.35	9.14	Ambient	6.947	1.06
STCK23	Diesel Power Washer (540,000 BTU/hr)	566042	4823472	876.77	3.96	338.71	0.001	0.2

Table 4.2 Model Parameters and Source Locations (Volume Sources) - Continued

Source ID	Description	Base Elevation	Height	Sigma Y	Sigma Z	Length X	Easting	Northing
		[m]	[m]	[m]	[m]	[m]	[m]	[m]
VOL1	Welding Bay #1 Emissions from Bay Door	878.43	4.877	1.13	3.12	4.88	565983.34	4823416.24
VOL2	Welding Bay #2 Emissions from Bay Door	877.89	4.877	1.13	3.12	4.88	565983.61	4823427.05
VOL3	Welding Bay #3 Emissions from Bay Door	877.61	4.877	1.13	3.12	4.88	565983.54	4823438.87
VOL4	Welding Bay #4 Emissions from Bay Door	877.40	4.877	1.13	3.12	4.88	565983.95	4823461.68
VOL5	Welding Bay #5 Emissions from Bay Door	877.67	4.877	1.13	3.12	4.88	565983.35	4823479.05
VOL6	Welding Bay #6 Emissions from Bay Door	876.51	4.877	1.13	3.12	4.88	565983.40	4823492.46
VOL7	Welding Bay #7 Emissions from Bay Door	878.22	4.877	1.13	3.12	4.88	566039.31	4823417.99
VOL8	Welding Bay #8 Emissions from Bay Door	877.85	4.877	1.13	3.12	4.88	566040.22	4823427.15
VOL9	Welding Bay #9 Emissions from Bay Door	877.44	4.877	1.13	3.12	4.88	566039.31	4823439.52
VOL10	Welding Bay #10 Emissions from Bay Door	876.93	4.877	1.13	3.12	4.88	566040.68	4823460.59
VOL11	Welding Bay #11 Emissions from Bay Door	876.79	4.877	1.13	3.12	4.88	566040.22	4823478.92
VOL12	Welding Bay #12 Emissions from Bay Door	874.70	4.877	1.13	3.12	4.88	566040.22	4823496.79
VOL13	Welding Bay #13 Emissions from Bay Door	871.75	6.706	1.56	3.12	6.71	565978.83	4823556.81
VOL14	Welding Bay #14 Emissions from Bay Door	871.12	6.706	1.56	3.12	6.71	565978.37	4823570.10
VOL15	Welding Bay #15 Emissions from Bay Door	870.25	6.706	1.56	3.12	6.71	565977.91	4823595.29
VOL16	Welding Bay #16 Emissions from Bay Door	869.88	6.706	1.56	3.12	6.71	565976.03	4823606.34
VOL17	Welding Bay #17 Emissions from Bay Door	869.41	6.706	1.56	3.12	6.71	565977.98	4823620.36
VOL18	Welding Bay #18 Emissions from Bay Door	868.42	6.706	1.56	3.12	6.71	566037.93	4823619.94
VOL19	Welding Bay #19 Emissions from Bay Door	868.89	6.706	1.56	3.12	6.71	566039.00	4823605.92
VOL20	Welding Bay #20 Emissions from Bay Door	869.32	6.706	1.56	3.12	6.71	566037.93	4823592.98
VOL21	Welding Bay #21 Emissions from Bay Door	870.10	6.706	1.56	3.12	6.71	566040.08	4823569.81
VOL22	Welding Bay #22 Emissions from Bay Door	870.63	6.706	1.56	3.12	6.71	566040.08	4823553.63

5.0 REFERENCES

Idaho Department of Environmental Quality (IDEQ). 2011. *State of Idaho Air Quality Modeling Guideline.* Stationary Source Program, Air Quality Division. July, 2011.

U.S. Environmental Protection Agency (EPA). 2005. *Guideline on Air Quality Models (Revised).* 40 Code of Federal Regulations, Part 51, Appendix W. Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina.

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APPENDIX N

DISPERSION MODELING REPORT AND FILES

Air Dispersion Modeling Analysis

Prepared for:

Yanke Machine Shop, Inc.

4414 S. Gekeler Lane
Boise, Idaho, 83716

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May 2th, 2013

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A	Yanke Machine Shop, Inc. Plot Plan
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1.0 INTRODUCTION

In support of a Permit to Construct (PTC) application for the Yanke Machine Shop, Inc. (YMS), Hildebrand & Associates, LLC (Hildebrand) is submitting this air dispersion modeling analysis to the Idaho Department of Environmental Quality (IDEQ), on behalf of Yanke. This report describes the methodologies that were used in the air dispersion modeling analysis to demonstrate compliance with Acceptable Ambient Concentration (AAC) for quartz and copper. Emissions of other pollutants are less than Below Regulatory Concern (BRC) levels specified in Section 220.02 of the Idaho Air rules or IDEQ Level II Modeling Thresholds.

2.0 FACILITY INFORMATION

YMS operates a metal fabrication and an industrial machining facility located at 4414 South Gekeler Lane in Boise, Idaho, Ada County, Idaho. Yanke (SIC Code 3441) provides metal fabrication and industrial machining services to the mining, agricultural and food processing industries. YMS is generally located at Universal Transverse Mercator (UTM) coordinates 565,979.11 meters (m) east and 4,823,529.40 (m) north [North American Datum (NAD) 83)], Zone 11. A plot plan for YMS is provide in Appendix A. Figures 2-1 through 2-2 provides an aerial view of Yanke's abrasive blasting both and Yanke's fabrication building and machine shop-repair building. Yanke's fabrication and industrial machining operates 9 hour per day, 5 days a week, for 52 weeks per year (2,340 hours). Yanke's painting and coating operations operate 1,300 hours a year.

Yanke Energy, Inc. (Yanke Energy) (SIC Code 3441) is located on and within the Yanke Machine/Fabrication Shop complex located at 4414 South Gekeler Lane in Boise, Idaho, Ada County, Idaho. Yanke Energy and YMS share the same industrial grouping, are located on and within the same property and share the same building. Therefore, these businesses are considered a single facility. Yanke Energy provides fabrication, drafting, mechanical and electrical engineering consulting services to energy projects utilizing wood waste, agricultural waste, and urban wood waste. Metal fabrication is completed in the Yanke Machine Shop, Inc.

The criteria pollutants expected as a result of this project include $PM_{2.5}$, PM_{10}, NO_2, sulfur dioxide (SO_2), volatile organic compounds (VOCs), carbon monoxide (CO) and lead (Pb). Emissions of metals, Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs) are also expected from the combustion of natural gas, painting, metalizing and from welding and grinding. A summary of Yanke's emission units are presented in Table 2-1.

Figure 2-1

Yanke Machine Shop, Inc. Abrasive Blasting Booth

Figure 2-2

Yanke Fabrication and Machine Shop Buildings

Table 2-1

Yanke Machine Shop's, Inc. Regulated Emission Units

Source ID	Source Description
BB 1	Blasting Booth Exhaust
PB 1	Paint Booth Exhaust
PBH 1	East Paint Booth Heater (100,000 Btu/hr)
PBH 2	West Paint Booth Heater (100,000 Btu/hr)
Fab 1	Fabrication Shop (361,000 Btu/hr)
Fab 2	Fabrication Shop (361,000 Btu/hr)
Fab 3	Fabrication Shop (361,000 Btu/hr)
Fab 4	Fabrication Shop (361,000 Btu/hr)
Fab 5	Fabrication Shop (361,000 Btu/hr)
Fab 6	Fabrication Shop (361,000 Btu/hr)
Fab 7	Fabrication Shop (361,000 Btu/hr)
Fab 8	Fabrication Shop (361,000 Btu/hr)
Fab 9	Fabrication Shop (361,000 Btu/hr)
Fab 10	Fabrication Shop (361,000 Btu/hr)
MS 1	Machine Shop (361,010 Btu/hr)
MS 2	Machine Shop (226,000 Btu/hr)
MS 3	Machine Shop (226,000 Btu/hr)
MS 4	Machine Shop (226,000 Btu/hr)
MS 5	Machine Shop (226,000 Btu/hr)
WH 1	Warehouse Heater (125,000 Btu/hr)
WH 2	Warehouse Heater (226,000 Btu/hr)
Lathe 1	Machine Shop Fume Hood/Metalizing
Weld 1	Welding

2.1 PROCESS DESCRIPTION

A description of YMS processes is provided in Section 2.1 of the PTC Application.

2.2 MODELED EMISSION RATES

The IDEQ Modeling Guideline indicates that "a modeling analysis is generally required with each permit application for new construction or a modification that results in an increase in emissions of pollutants for sources permitted by IDEQ. The types of permits that require a facility to demonstrate compliance with the NAAQS are permits to construct and Tier II operating permits. A modeling analysis may also be required to demonstrate compliance with the TAP increments."

IDEQ developed two levels (Level I and Level II) of modeling thresholds for criteria pollutants. If the facility-wide emissions for a given pollutant are less than Level I modeling thresholds, dispersion

modeling for that pollutant is not required. If the facility-wide emissions for a given pollutant are greater than Level I thresholds but less than Level II modeling thresholds, dispersion modeling for that pollutant may not be required and are assessed on a case-by-case basis. Criteria pollutants that were assessed include PM_{10}, $PM_{2.5}$, and NO_x as NO_2, CO, SO_2, and lead (Pb). As outlined in the IDEQ modeling approval letter, due to relatively low stack heights and the close proximity of some of the release points to the ambient air boundary, facility-wide emissions will be compared to IDEQs Level II modeling thresholds. Modeling thresholds for criteria pollutants are shown in Table 2-2, along with a summary of projected YMS emissions. Based on comparisons shown in Table 2-2 all criteria pollutants are predicted to be less than modeling thresholds.

TABLE 2-2

MODELING THRESHOLDS AND TOTAL PROJECTED CRITERIA POLLUTANT EMISSIONS

Criteria Air Pollutants	Combustion Emissions		Level I Modeling Threshold		Modeling Required	Level II Modeling Threshold		Modeling Required
	lb/hr	T/yr	2011 Guidance			Case-by-Case		
PM10 24-hour	0.52	0.90	0.22	lb/hr	YES	2.6	lb/hr	NO
PM2.5 24-hour	0.50		0.054	lb/hr	YES	0.63	lb/hr	NO
PM2.5 annual		0.86	0.35	T/yr	YES	4.1	T/yr	NO
CO 1-hr, 8-hr	0.447	1.96	15	lb/hr	No	175	lb/hr	NO
NOx 1-hr x 80%	0.426		0.20	lb/hr	YES	2.4	lb/hr	NO
NOx annual x 75%		1.75	1.2	T/Yr	YES	14	T/yr	NO
SO2 1hr, 3-hr, 24-hr	3.19E-03		0.21	lb/hr	No	2.5	lb/hr	NO
SO2 annual	3.19E-03		1.2	T/yr	No	14	T/yr	NO
VOC		23.48	40	T/yr	No			
Lead rolling 3-month	6.95E-04	1.52E+00 (lb/mo)	14	lb/mo	No			

Additionally, for TAPs, the facility-wide emissions are compared to screening emission levels (ELs). Modeling may be required for those TAPs with emissions that are equal to or greater than the ELs. ELs for TAPs emitted at YMS are shown in Table 2-3, along with a summary of projected YMS hourly emissions. Emissions of copper, quartz, cadmium, chromium, nickel, and manganese exceed their respective ELs. Emissions of copper and quartz were modeled per IDAPA 58.01.01.585 and 586 to demonstrate compliance with the Acceptable Ambient Concentrations (AACs). In accordance with IDAPA 58.01.01.210 no further procedures for demonstrating compliance will be required for cadmium,

chromium, nickel and manganese, because YMS is subject to 40 CFR Part 63 Subpart XXXXXX National Emission Standards for Hazardous Air Pollutants for Area Source Standards for Metal Fabrication Source Categories.

There is one modeled source of quartz: the paint booth stack: the paint booth stack is modeled as a point source. There are three modeled sources of copper: one metalizing stack, 19 natural gas combustion stacks, and 22 welding bay doors. The metalizing stack and natural gas combustion stacks are modeled as point sources. The welding bay doors are modeled as a volume source. The welding bay doors are the only volume sources that were modeled in this analysis. Welding fume emissions are considered fugitive sources. The welding bay doors were characterized as a volume source based on the dimensions of each door. It was assumed that release heights for volume sources are at the top of each bay door where fumes leave the building. The modeling input parameters used for point and volume sources are presented in Table 3.2.

Table 2-3
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
PAH HAPs	**lb/hr**	**EL (lb/hr)**	
2-Methylnaphthalene	**1.28E-07**	9.10E-05	No
3-Methylchloranthrene	**9.58E-09**	2.50E-06	No
Acenaphthene	**9.58E-09**	9.10E-05	No
Acenaphthylene	**9.58E-09**	9.10E-05	No
Anthracene	**2.70E-07**	9.10E-05	No
Benzo(a)anthracene	**9.58E-09**	9.10E-05	See POM
Benzo(a)pyrene	**6.38E-09**	2.00E-06	See POM
Benzo(b)fluoranthene	**9.58E-09**		See POM
Benzo(g,h,i)perylene	**6.38E-09**	9.10E-05	No
Benzo(k)fluoranthene	**9.58E-09**		See POM
Chrysene	**9.58E-09**		See POM
Dibenzo(a,h)anthracene	**6.38E-09**		See POM
Dichlorobenzene	**6.38E-06**	9.10E-05	No
Fluoranthene	**1.60E-08**	9.10E-05	No
Fluorene	**1.49E-08**	9.10E-05	No
Indeno(1,2,3-cd)pyrene	**9.58E-09**		See POM
Naphthalene	3.24E-06	3.33	No
Naphthalene (as carcinogen)	**3.24E-06**	9.10E-05	No
Phenanathrene	**9.04E-08**	9.10E-05	No
Pyrene	**2.66E-08**	9.10E-05	No
Polycyclic Organic Matter (POM) 7-PAH Group	**5.56E-07**	2.00E-06	No
Non-PAH HAPs			
Benzene	**1.12E-05**	8.00E-04	No
Formaldehyde	**3.99E-04**	5.10E-04	No
Hexane	9.58E-03	12	No
Toluene	3.46E+00	25	No
Ethylbenzene	3.27E+00	2.90E+01	No

Table 2-3 (Continue)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Non PAH HAPs	**lb/hr**	**EL (lb/hr)**	
Cumene	4.28E-03	1.63E+01	No
Trimethylbenzene (mixed & individual isomers) [1]	2.88E-01	8.20E+00	No
Methanol	6.73E-01	1.73E+01	No
Acetone	2.57E+00	1.19E+02	No
Non-HAP Organic Compounds			
7,12-Dimethylbenz(a)anthracene	8.51E-08	NA	No
Butane	1.12E-02	NA	No
Ethane	1.65E-02	NA	No
Pentane	1.38E-02	118	No
Propane	8.51E-03	NA	No
Methyl Isobutyl Ketone	9.98E-01	1.37E+01	No
n-Butyl Acetate	5.20E-03	4.73E+01	No
Zinc Oxide	6.42E-02	3.33E-01	No
Zinc Compound (Fumes)	3.64E-02	3.33E-01	No
Carbon Black	1.10E-02	2.30E-01	No
Carbon	2.28E-02	NA	No
Isopropanol	5.51E-02	6.53E+01	No
Ethyl Alcohol	5.37E-02	1.25E+02	No
Ethyl Poly Silicate	3.22E-02	NA	No
Wallastonite	1.56E+00	NA	No
Ethanol	8.81E-03	NA	No
Amine Adduct (Trade Secret)	2.31E-02	NA	No
Amine Compound	2.31E-02	NA	No
Isophoronediamine [2]	2.31E-02	1.87E+00	No
Polyoxpropylenediamine	2.31E-02	NA	No
Aromatic Hydrocarbons	4.45E-02	NA	No
Methyl n-Amyl Ketone	4.50E-02	1.57E+01	No
Bisphenol-A	2.08E-01	NA	No

Table 2-3 (Continue)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Non-HAP Organic Compounds	**lb/hr**	**EL (lb/hr)**	
Nepheline Syenite (Nusiance dust)	2.25E-01	NA	No
Mica	1.07E-02	2.00E-01	No
Barium Sulfate	2.65E+00	NA	No
NJTS (Proprietary)	1.32E-01	NA	No
Aluminum Silcate	2.15E-02	NA	No
Proprietary Silane	9.46E-01	NA	No
n-Butanol	2.31E-02	NA	No
Propylene Glycol Monomethyl Ether	5.78E-02	2.40E+01	No
2-Butoxyethanol	3.51E+00	8.00E+00	No
Diaminocyclohhexane	2.31E-02	NA	No
Cobalt 2-ethylhexanoate [3]	1.21E-03	NA	No
Benzyl Alcohol	4.62E-02	NA	No
Polyamide Resin	7.73E-02	NA	No
Ethyl Silicate	1.73E-02	5.67	No
N-Butyl Alcohol	6.84E-02	NA	No
Cyclohexanol	3.46E-03	1.33E+01	No
3-Trimethoxysilane	1.73E-02	NA	No
Petroleum Distillate	3.42E-02	NA	No
Manganese Dioxide	3.42E-02	6.70E-02	No
Quartz [4]	9.25E-01	6.70E-03	YES
VM&P Naphtha	9.74E-01	9.13E+01	No
Poly(oxy)methyl-1-2-ethanediyl	4.41E-01	NA	No
Xylene [5]	7.23E+00	2.90E+01	No
Zinc Phosphate	6.42E-02	NA	No
Iron Oxide [6]	2.22E-01	3.33E-01	No
Aliphatic Amine	4.41E-01	NA	No
Phenol,2-Nonyl Branched	8.81E-03	NA	No
Fatty Amine Carbohydrate	1.32E-02	NA	No
Proprietary Silicone	2.09E+00	NA	No
Talc (non-Asbestos)	5.98E+00	NA	No

Table 2-3 (Continue)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Non-HAP Organic Compounds	**lb/hr**	**EL (lb/hr)**	
Magnesium (fume)	1.14E-01	0.667	No
Silicon	2.17E-01	0.667	No
Silicon Oxide	5.69E-02	NA	No
Silicon Dioxide	1.81E-01	NA	No
Aluminum Oxide	7.40E-02	0.667	No
Carbon Steel	1.76E+00	NA	No
Cellulose	7.91E-02	NA	No
Organic Binder	2.52E-06	NA	No
Garnet	3.08E-03	NA	No
Sulfur	8.54E-06	NA	No
Limestone	4.27E-06	NA	No
Pyrites	4.27E-06	NA	No
Lanthanum Oxide	1.92E-05	NA	No
Neodymium Oxide	9.20E-06	NA	No
Phenol Formaldehyde Polymer	6.15E-03	NA	No
White Mineral Oil	4.27E-06	NA	No
Wollastonite	1.71E-05	NA	No
Cured Resin	3.42E-05	NA	No
Kyanite	4.27E-06	NA	No
Kaolin	5.30E-04	0.133	No
Paraffin Wax	8.54E-06	0.133	No
Furfural	4.27E-06	0.533	No
Magnesium Oxide	1.92E-05	0.667	No
Fluoride Compounds	6.42E-02	0.167	No
Tungsten	4.27E-04	0.067	No
Boron	7.40E-03	NA	No
Magnesite	7.05E-03	0.667	No
Graphite	1.26E-03	NA	No
Alkali Silicate	1.21E-02	NA	No
Alkali Carbonate	3.59E-03	NA	No

Table 2-3 (Continue)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Non-HAP Organic Compounds	**lb/hr**	**EL (lb/hr)**	
Alakli Fluoride	6.28E-04	NA	No
Alkali Aluminum Fluoride	1.15E-02	NA	No
Lithium	1.82E-03	NA	No
Zirconium	6.56E-04	0.333	No
Zirconium Dioxide	5.53E-03	NA	No
Potassium Oxide	7.94E-02	NA	No
Calcium Carbonate	8.71E-03	0.667	No
Magnesium Carbonate	6.95E-02	NA	No
Strontium Carbonate	2.22E-02	NA	No
Columbium (Nuisance dust)	8.55E-04	NA	No
Sodium Oxide	2.28E-02	NA	No
Calcium Fluoride	2.14E-04	NA	No
Amphorous Silica (includes silicates and mineral silicates)	1.17E-01	6.67E-01	No
Silicon Carbide	6.38E-03	0.667	No
Zirconium Oxide	3.34E-03	0.333	No
Calcium Oxide	4.27E-06	0.133	No
Calcium Stearate	1.03E-03	NA	No
Calcium Sulfate	5.34E-04	0.667	No
Zinc Stearate	1.03E-04	NA	No
Potassium Fluoroborate	5.13E-04	NA	No
Cured Phenolic /Urea Formaldehyde	4.10E-03	NA	No
Titanium Oxide	1.27E+00	NA	No
Titanium	8.13E-03	NA	No
Fibrous Glass	2.14E-05	0.667	No
Potassium Aluminum Fluoride	4.27E-05	NA	No
Yttrium Oxide	1.92E-05	0.067	No
Epoxy Resin	8.01E+00	NA	No
1,2-Benzene dicarboxlic Acid	8.70E-01	NA	No
Petroleum Solvent Naphtha	1.07E-01	NA	No

Table 2-3 (continued)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Non-HAP Organic Compounds	**lb/hr**	**EL (lb/hr)**	
Bis Sebacate	2.61E-02	NA	No
Poly(oxy-1-2,ethanediyl)	4.86E-01	NA	No
1-Chloro-2-3-Epoxpropane	1.73E-02	NA	No
Bibutulbis(Pentane-2-4-Dionato-O,O)Tin	6.60E-02	NA	No
Titanium Dioxide	1.01E+00	N/A	No
Mineral Spirits	2.84E-03	N/A	No
Alkyl Phenol	4.41E-01	NA	No
Metals (HAPs)			
Arsenic	**1.06E-06**	1.50E-06	No
Barium	2.34E-05	0.033	No
Beryllium	**8.43E-08**	2.80E-05	No
Cadmium	**5.85E-06**	3.70E-06	YES
Chromium	7.60E-02	3.30E-02	YES
Cobalt (includes cobalt oxide)	1.34E-05	0.0033	No
Copper	4.25E-02	0.013	YES
Manganese	5.90E-01	0.067	YES
Mercury	1.38E-06	0.003	No
Molybdenum	5.15E-03	0.333	No
Nickel	**1.44E-02**	2.70E-05	YES
Selenium	1.28E-07	0.013	No
Vanadium	1.22E-05	0.003	No
Zinc	5.78E-01	6.67E-01	No
Aluminum	7.15E-02	0.667	No
Iron	1.10E+01	NA	No
Chromium III	4.27E-05	3.30E-02	No

Table 2-3 (continued)
Screening Emission Levels and Total Projected TAP Emissions (lbs/hr)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)			Exceeds EL/ Modeling Required?
Metals (HAPs)	**lb/hr**	**EL (lb/hr)**	
Chromium IV	3.42E-07	5.60E-07	No
Tin	1.45E-04	0.133	No

[1] Includes 1,2,4-Trimethyl Benzene

[2] Conservatively assumes equal to Isophorone

[3] Considered a HAP and Cobalt Compound

[4] Includes Microcrystalline Silica

[5] Includes M,P & O Xylenes

[6] Includes Red Iron Oxide

NOTE: TAPs lb/hr emissions are 24-hour averages unless shown in bold. Bold emissions are annual averages for carcinogens.

3.0 MODELING METHODOLOGY

This section describes the technical approach for the air dispersion modeling analysis that was used to estimate ambient air impacts due to quartz and copper. Air dispersion modeling addresses the impacts from all natural gas combustion, painting, and fugitive welding sources. Air dispersion modeling followed the guidance and protocols outlined in the *Revised State of Idaho Air Quality Modeling Guideline* (IDEQ Modeling Guideline; IDEQ, July, 2, 2011) and the U.S. Environmental Protection Agency (EPA) *Guideline on Air Quality Models (Revised)* (EPA 2005).

3.1 DISPERSION MODEL

The American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC) modeling system, the AERMOD dispersion model, version 12345 (release date December 2012) was used to predict concentrations of copper and quartz in ambient air from Yanke. To perform modeling Lakes Environmental AERMOD View Version 8.2 was used.

AERMOD is recommended by EPA for evaluating Class II impacts within 50 kilometers (km) of the facility being assessed. AERMOD will be run using all the regulatory default options including use of stack-tip downwash, buoyancy-induced dispersion, and calms processing routines, upper-bound downwash concentrations for super-squat buildings, default wind speed profile exponents, vertical potential temperature gradients, and no use of gradual plume rise. Only pollutant dispersion will be modeled for this analysis; particle deposition will not be considered.

3.2 VOLUME AND POINT SOURCE ASSUMPTIONS

Total Copper emission rate from welding is 4.25×10^{-2} pounds per hour. Each of the 22 bay doors is assumed to emit:

$(4.25 \times 10^{-2})/22 = 1.93 \times 10^{-3}$ lbs/hr from each bay door

Welding bay doors were modeled as volume source.

It is assumed that welding fumes are released from top of the bay door.

Length of side = Bay door length = 22 ft

Initial lateral dimension = σ_y = Length of side/4.3 = 22 ft/4.3 = 5.12 ft

For sources that are on or adjacent to a building the initial vertical dimension is calculated by dividing the building height 2.15:

Initial Vertical dimension = σ_z = Building height/2.15 = 22 ft/2.15 = 10.23 ft

Copper is also emitted from point sources - the combustion sources and the machine shop lathe/fume hood (metalizing operation). Following copper emission rates were used for modeling analysis:

Emission source	Copper Emission Rate (lbs/hr)
East Paint Booth Heater (100,000 Btu)	8.35E-08
West Paint Booth Heater (100,000 Btu)	8.35E-08
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Machine Shop (361,000 Btu)	3.01E-07
Machine Shop (226,000 Btu)	1.89E-07
Machine Shop (226,000 Btu)	1.89E-07
Machine Shop (226,000 Btu)	1.89E-07
Machine Shop (226,000 Btu)	1.89E-07
Warehouse Heater (125,000 Btu)	1.04E-07
Warehouse Heater (226,000 Btu)	1.89E-07
Machine Shop Lathe/Fume Hood	6.41E-07

Quartz is emitted from the paint booth (Point Source). Emission rate of quartz is 0.822 pounds per hour.

3.3 BUILDING WAKE EFFECTS

Emissions from YMS were evaluated in terms of its proximity to nearby structures. Building downwash effects are included to determine if emission discharges become caught in the turbulent wakes of nearby structures. Wind blowing around a building creates zones of turbulence that are greater than if the buildings were absent. The potential for downwash effects on stack emissions from nearby structures will be assessed in using AERMOD. The AERMOD model inputs include building dimensions to assess the potential for downwash effects. Building dimensions for Yanke were used to build the Building Profile Input Program (BPIP) with Prime Enhancement (BPIP-Prime) input file. Table 4-1 provides the lists of buildings that were included in this modeling analysis.

Table 3.1

Building Description and Dimensions

Building ID	Description	Length (ft)	Length (m)	Width (ft)	Width (m)	Height (ft)	Height (m)
Bld1	Blasting Building	179	54.56	93	28.35	44	13.41
Bld2	Machine Shop	170	51.82	153	46.63	22	6.71
Bld3	Fabrication Building	304	92.66	160	48.77	25	7.62
Bld4	Power Washer Building	18	5.49	15	4.57	10	3.05
Bld5	Utility/ Storage Building	116	35.36	103	31.39	22	6.71

3.4 TERRAIN DESCRIPTION

For modeling purposes, the rural/urban classification of an area is determined by either the dominance of a specific land use or by population data in the study area. Generally, if the sum of heavy industrial, light-moderate industrial, commercial, and compact residential (single and multiple family) land uses within a three kilometer radius from the facility are greater than 50%, the area is classified as urban. Conversely, if the sum of common residential, estate residential, metropolitan natural, agricultural rural, undeveloped (grasses), undeveloped (heavily wooded) and water surfaces land uses within a three kilometer radius from the facility are greater than 50%, the area is classified as rural.

YMS is located in Boise, Idaho, Ada County, Idaho, at an elevation of approximately 2,866 feet (874 meters) above mean sea level. Yanke is situated within a light-moderate industrial and commercial land use area. The closest residential area near YMS is approximately 0.14 miles (219 meters) north of the fabrication building. Rural dispersion was assumed for this modeling analysis.

3.5 METEOROLOGICAL DATA

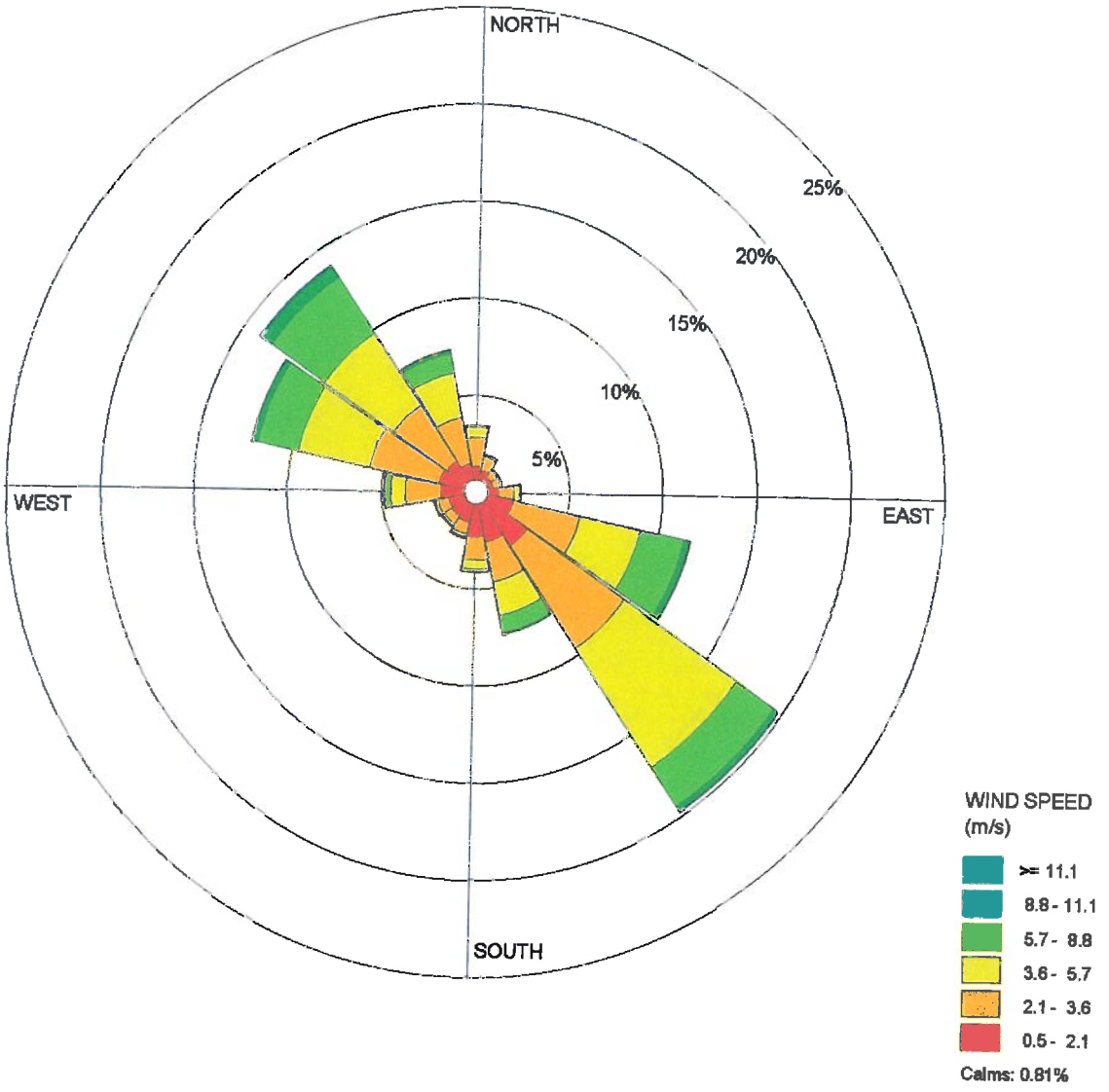
Dispersion modeling was conducted using surface and upper air meteorological data from the Boise, Idaho area from a meteorological tower located at the Boise, Idaho Airport. The station is approximately 20 miles from the YMS. Data for the period January 8, 2008, through December 31, 2012 was used. These data were selected because they are the most representative available for site conditions at the YMS and were recommended by IDEQ. Figure 3-1 shows a wind rose diagram for referenced meteorological data.

Figure 3-1 Wind Rose

Station #24131 - BOISE/AIR TERMINAL, ID

Start Date 1/1/2008

End Date 12/31/2012



3.6 COORDINATE SYSTEM

The location of emission sources, structures, and receptors will be represented in the UTM coordinate system using North American Datum 1983 (NAD83). UTM coordinates for this analysis will be based on UTM Zone 11.

3.7 RECEPTOR GRIDS

Receptors were placed in all areas directly surrounding the facility considered to be ambient air. A total of 1,513 receptors were used. Air dispersion modeling was performed using a model receptor grid that ensures that maximum estimated impacts from the facility are identified. Following IDEQ and EPA guidelines, receptor locations were identified with sufficient density and spatial coverage to isolate the area with the highest impacts. All combustion sources proposed in this analysis have short stack heights and their maximum emission impacts were close to the property boundary. The following receptor grid locations (see Figure 4-1) were used for the analysis to accomplish this coverage:

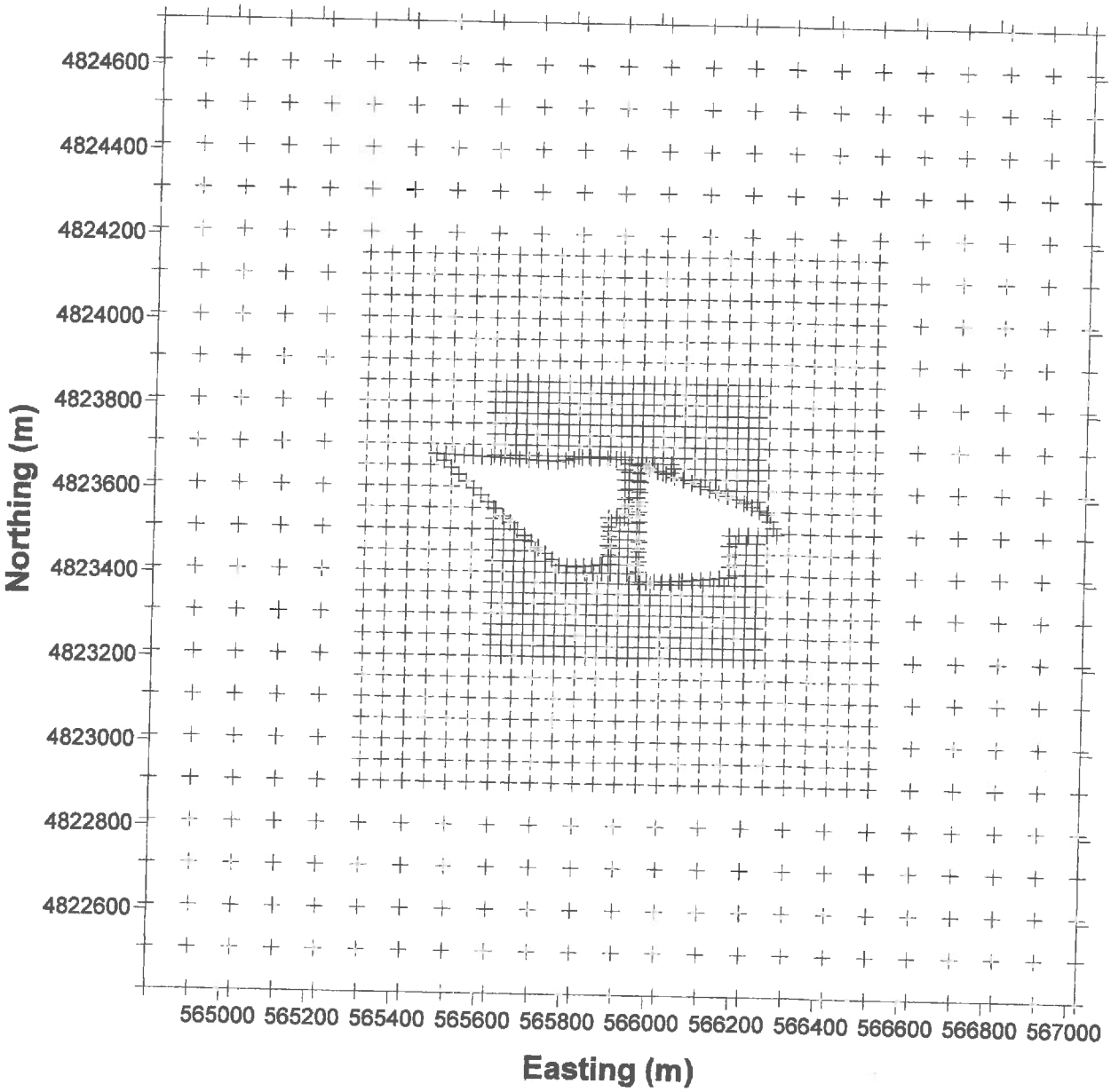
- 25-m receptor spacing on the property boundary and up to 200 meter;
- 50-m receptor spacing out to 500 m in all directions from the property boundary;
- 100-m receptor spacing out to 1000 m in all directions from the property boundary

The ambient air boundary at YMS was determined pursuant to the requirements of Section 6.5 of the "State of Idaho Guideline for Performing Air Quality Impact Analyses". The ambient air boundary is established in part by the facility's capability and responsibility for restricting public access for the sake of public safety. YMS's ambient air boundary is the fence-line of the property. YMS can be accessed from south Gekeler Lane from the south and from the east by east Amity Road. Access to the fabrication building and machine shop is delineated by be a chain-link fence and private parking lot. Access to the blasting booth is delineated by a chain-link fence to the east, Interstate 84 to the west, and railroad tracks to the north. The general public is not invited to YMS as part of normal business conducted at the facility.

Receptor locations are presented in UTM coordinates (NAD 83). Figure 3-2 shows the receptor grid relative to YMS. Terrain elevations will be assigned to all receptors using U.S. Geological Survey 30 meter National Elevation Database (NED) in the AERMAP program.

Figure 3-2

FACILITY RECEPTORS and BOUNDARY



3.8 BACKGROUND CONCENTRATIONS

Background concentrations are not available for TAP emissions. Therefore, it is assumed that background concentrations for TAPs are insignificant.

3.9 MODEL PARAMETERS

Modeled emission sources at YMS are point and volume sources. Model parameters are shown in Table 3-2. Source locations are presented in UTM coordinates (NAD 83).

Table 3.2 Model Parameters and Source Locations

Source ID	Description	X Coord. (m)	Y Coord (m)	Base Elevation (m)	Release Height (m)	Exit Temperature (K)	Exit Velocity (m/s)	Inside Diamete (m)
STCK1	Blasting Booth	565824	4823669	869.00	6.1	Ambient	0.01	0.86
STCK2	Paint Booth Exhaust	565999	4823631	868.81	9.75	Ambient	52.93	0.3444
STCK3	East Paint Booth Heater (100,000 BTU/hr)	565997	4823620	869.24	8.53	322.04	50	0.0762
STCK4	West Paint Booth Heater (100,000 BTU/hr)	566016	4823621	868.58	8.53	322.04	50	0.0762
STCK5	Fabrication Shop Heater #1 (360,000 BTU/hr)	566032	4823618	868.49	8.23	338.71	0.001	0.2032
STCK6	Fabrication Shop Heater #2 (360,000 BTU/hr)	566032	4823607	868.86	8.23	338.71	0.001	0.2032
STCK7	Fabrication Shop Heater #3 (360,000 BTU/hr)	566032	4823595	869.26	8.23	338.71	0.001	0.2032
STCK8	Fabrication Shop Heater #4 (360,000 BTU/hr)	566032	4823582	869.69	8.23	338.71	0.001	0.2032
STCK9	Fabrication Shop Heater #5 (360,000 BTU/hr)	566033	4823569	870.12	8.23	338.71	0.001	0.2032
STCK10	Fabrication Shop Heater #6 (360,000 BTU/hr)	565985	4823618	869.49	8.23	338.71	0.001	0.2032
STCK11	Fabrication Shop Heater #7 (360,000 BTU/hr)	565985	4823605	869.92	8.23	338.71	0.001	0.2032
STCK12	Fabrication Shop Heater #8 (360,000 BTU/hr)	565986	4823594	870.29	8.23	338.71	0.001	0.2032
STCK13	Fabrication Shop Heater #9 (360,000 BTU/hr)	565987	4823570	871.10	8.23	338.71	0.001	0.2032
STCK14	Fabrication Shop Heater #10 (360,000 BTU/hr)	565986	4823558	871.58	8.23	338.71	0.001	0.2032
STCK15	Machine Shop Heater #1 (360,000 BTU/hr)	565986	4823558	871.58	7.32	338.71	0.001	0.2032
STCK16	Machine Shop Heater #2 (226,000 BTU/hr)	566018	4823441	877.39	7.32	333.15	0.001	0.2032
STCK17	Machine Shop Heater #3 (226,000 BTU/hr)	566020	4823441	877.39	7.32	333.15	0.001	0.2032
STCK18	Machine Shop Heater #4 (226,000 BTU/hr)	566021	4823441	877.39	7.32	333.15	0.001	0.1016
STCK19	Machine Shop Heater #5 (226,000 BTU/hr)	566021	4823441	877.39	7.32	333.15	0.001	0.1016
STCK20	Warehouse heater #1 (125,000 BTU/hr)	566033	4823556	870.56	8.23	322.04	0.001	0.0762
STCK21	Warehouse heater #2 (226,000 BTU/hr)	566034	4823545	870.92	8.23	333.15	0.001	0.101
STCK22	Machine Shop Fume Hood - Metalizing	566039	4823486	876.35	9.14	Ambient	6.947	1.06

Table 3.2 Model Parameters and Source Locations (Volume Sources) - Continued

Source ID	Description	Base Elevation	Height	Sigma Y	Sigma Z	Length X	Easting	Northing
		[m]	[m]	[m]	[m]	[m]	[m]	[m]
VOL1	Welding Bay #1 Emissions from Bay Door	878.43	4.877	1.13	3.12	4.88	565983.34	4823416.24
VOL2	Welding Bay #2 Emissions from Bay Door	877.89	4.877	1.13	3.12	4.88	565983.61	4823427.05
VOL3	Welding Bay #3 Emissions from Bay Door	877.61	4.877	1.13	3.12	4.88	565983.54	4823438.87
VOL4	Welding Bay #4 Emissions from Bay Door	877.40	4.877	1.13	3.12	4.88	565983.95	4823461.68
VOL5	Welding Bay #5 Emissions from Bay Door	877.67	4.877	1.13	3.12	4.88	565983.35	4823479.05
VOL6	Welding Bay #6 Emissions from Bay Door	876.51	4.877	1.13	3.12	4.88	565983.40	4823492.46
VOL7	Welding Bay #7 Emissions from Bay Door	878.22	4.877	1.13	3.12	4.88	566039.31	4823417.99
VOL8	Welding Bay #8 Emissions from Bay Door	877.85	4.877	1.13	3.12	4.88	566040.22	4823427.15
VOL9	Welding Bay #9 Emissions from Bay Door	877.44	4.877	1.13	3.12	4.88	566039.31	4823439.52
VOL10	Welding Bay #10 Emissions from Bay Door	876.93	4.877	1.13	3.12	4.88	566040.68	4823460.59
VOL11	Welding Bay #11 Emissions from Bay Door	876.79	4.877	1.13	3.12	4.88	566040.22	4823478.92
VOL12	Welding Bay #12 Emissions from Bay Door	874.70	4.877	1.13	3.12	4.88	566040.22	4823496.79
VOL13	Welding Bay #13 Emissions from Bay Door	871.75	6.706	1.56	3.12	6.71	565978.83	4823556.81
VOL14	Welding Bay #14 Emissions from Bay Door	871.12	6.706	1.56	3.12	6.71	565978.37	4823570.10
VOL15	Welding Bay #15 Emissions from Bay Door	870.25	6.706	1.56	3.12	6.71	565977.91	4823595.29
VOL16	Welding Bay #16 Emissions from Bay Door	869.88	6.706	1.56	3.12	6.71	565976.03	4823606.34
VOL17	Welding Bay #17 Emissions from Bay Door	869.41	6.706	1.56	3.12	6.71	565977.98	4823620.36
VOL18	Welding Bay #18 Emissions from Bay Door	868.42	6.706	1.56	3.12	6.71	566037.93	4823619.94
VOL19	Welding Bay #19 Emissions from Bay Door	868.89	6.706	1.56	3.12	6.71	566039.00	4823605.92
VOL20	Welding Bay #20 Emissions from Bay Door	869.32	6.706	1.56	3.12	6.71	566037.93	4823592.98
VOL21	Welding Bay #21 Emissions from Bay Door	870.10	6.706	1.56	3.12	6.71	566040.08	4823569.81
VOL22	Welding Bay #22 Emissions from Bay Door	870.63	6.706	1.56	3.12	6.71	566040.08	4823553.63

4.0 MODELING RESULTS

AERMOD dispersion modeling was completed to demonstrate compliance with Idaho TAPs standard for copper and quartz as codified in IDAPA 58.01.01.585. Ambient air concentrations of copper are based on AERMOD modeling results using the emission rates for copper presented in Table 4-1, assuming 8,760 hours of operation. Quartz emissions are from the spray booth stack at 0.822 pounds per hour. The spray booth's operation will be limited to 11 hours per day, 7 days a week, and 52 weeks per year (4,004 hours/year).

Copper and quartz modeling results are summarized in Table 4-2. As demonstrated in Table 4-2, the maximum ambient air concentration of copper and quartz is below the respective ACC; therefore, the project impacts are not expected to cause or contribute to a violation of the Idaho TAP standard for copper and quartz. Modeling files are provided electronically in Appendix A. Air dispersion modeling results are presented in Table 4-2. The cumulative highest modeled concentration for quartz and copper are 0.0048 mg/m^3 and 0.0027 mg/m^3 respectively. Figure 4-1 and 4-2 present the modeled concentration isopleths for quartz and copper. The toxic air pollutants impact from YMS is below the AACs listed in Idaho Administrative Code (IDAPA 58.01.01).

Table 4-1 Emission Rates for Copper	
Emission source	**Copper Emission Rate (lbs/hr)**
East Paint Booth Heater (100,000 Btu)	8.35E-08
West Paint Booth Heater (100,000 Btu)	8.35E-08
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Fabrication Shop (361,000 Btu)	3.01E-07
Machine Shop (361,000 Btu)	3.01E-07
Machine Shop (226,000 Btu)	1.89E-07
Machine Shop (226,000 Btu)	1.89E-07
Machine Shop (226,000 Btu)	1.89E-07
Machine Shop (226,000 Btu)	1.89E-07
Warehouse Heater (125,000 Btu)	1.04E-07
Warehouse Heater (226,000 Btu)	1.89E-07
Machine Shop Lathe/Fume Hood	6.41E-07

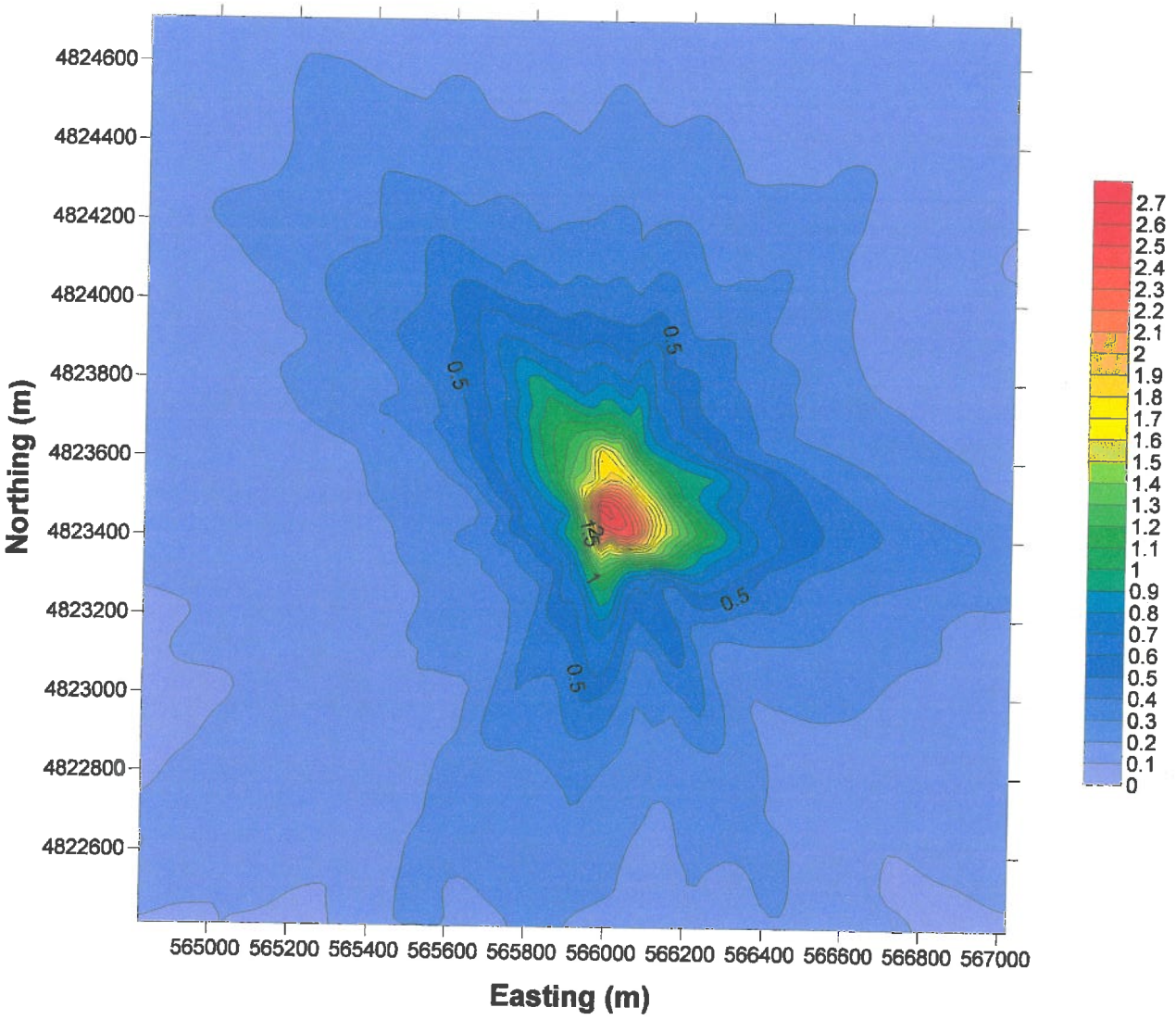
TABLE 4-2
DISPERSION MODELING RESULTS
Acceptable Ambient Concentrations

Pollutant	Averaging Period	Easting (m)	Northing (m)	Date	Cumulative Highest Modeled Concentration (mg/m^3)	AAC [a] (mg/m^3)
Quartz	24-Hour	565872.40	4823682.81	02/07/2010	0.0048	0.005
Copper	24-Hour	565969.97	4823486.62	12/07/2012	0.0027	0.01

a From IDAPA 58.01.01
b mg/m3 – milligrams per cubic meter
c Yanke's painting and coating operations will be restricted to 1,950 hrs/yr and 11 hours per day. Stack height for the paint booth will be raised to 32.0 feet from the ground.

Figure 4-2

Cumulative Modeled 24-hr Averaging Copper Concentrations (µg/m^3)



5.0 REFERENCES

Idaho Department of Environmental Quality (IDEQ). 2011. *State of Idaho Air Quality Modeling Guideline.* Stationary Source Program, Air Quality Division. July, 2011.

U.S. Environmental Protection Agency (EPA). 2005. *Guideline on Air Quality Models (Revised).* 40 Code of Federal Regulations, Part 51, Appendix W. Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina.

APPENDIX A

PLOT PLAN

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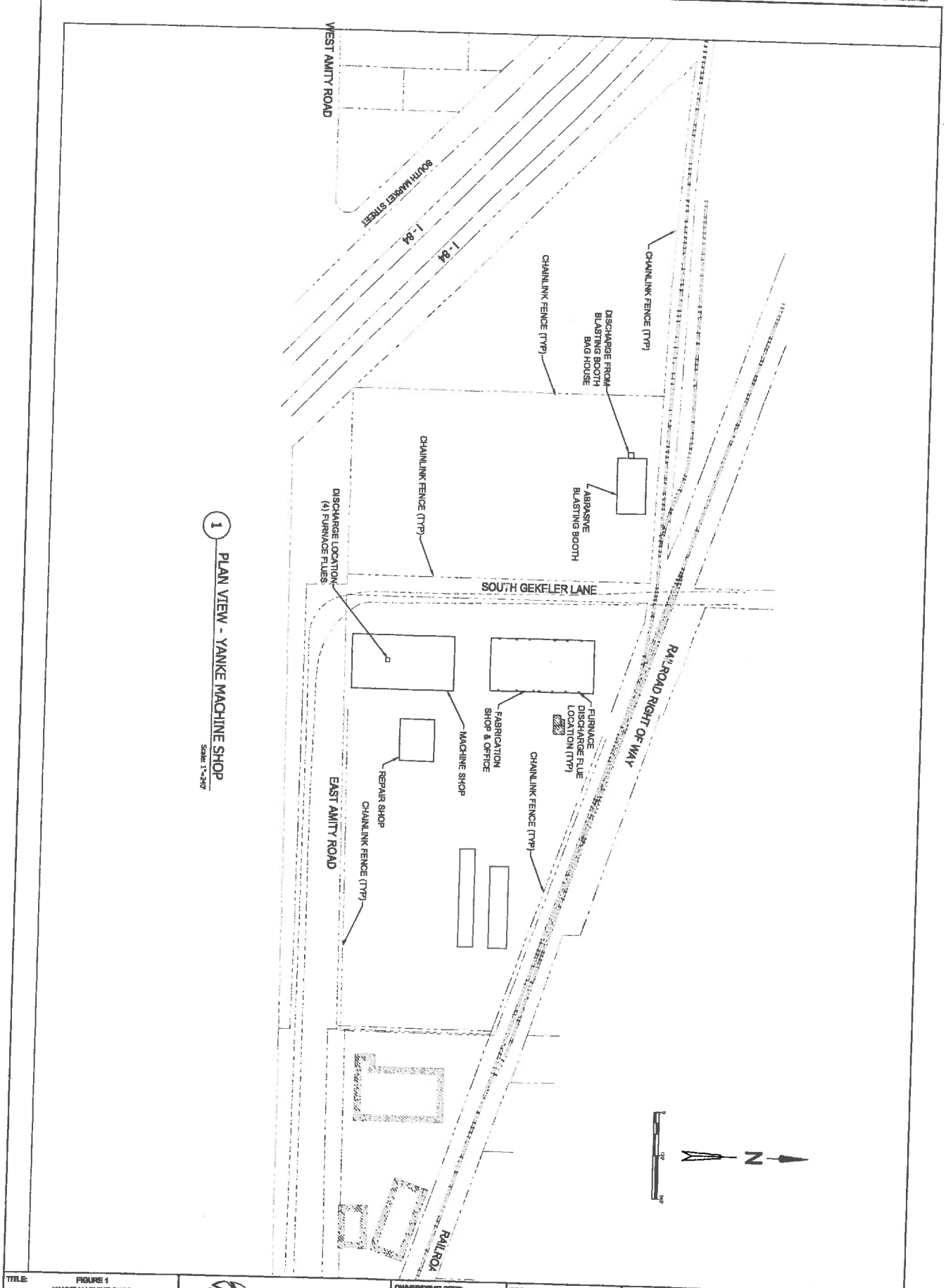

1 PLAN VIEW - YANKE MACHINE SHOP
Scale: 1"=240'

TITLE: FIGURE 1
YANKE MACHINE SHOP
SITE PLAN

CENTRA CONSULTING INC

OWNER/DEVELOPER:
YANKE MACHINE SHOP
444 S. GEKELER LANE
BOISE, IDAHO 83709

PROJECT LOCATION:
BOISE, IDAHO

PROJECT CONTACT:

No.	BY	DATE	DESCRIPTION
A	CBA	08/28/2020	ISSUE FOR APPROVAL

SHEET NO.

APPENDIX B

Modeling Files