CH2MHILL TRANSMITTAL

To: Bill Rogers
1410 N. Hilton
Boise, ID 83706

From: Rick McCormick
322 East Front St.
Suite 200
Boise, ID 83702

Attn: Mr. Bill Rogers

Date: December 23, 2013

Re: Air Quality PTC Mod
Cives Steel Company\
] Idaho Falls, ID

We Are Sending You:

Method of shipment: Fed-Ex

☑ Attached

Under separate cover via

Shop Drawings ☑ Documents Tracings

Prints Specifications Catalogs

Copy of letter Other:

Quantity	Description
1	Air Quality PTC Application including CD (modeling files and emission estimates)

If the material received is not as listed, please notify us at once.

Remarks: Copy included.

Permit-To-Construction (PTC) Application

Cives Steel Company, Idaho Falls, Idaho

Prepared for
Cives Steel Company

Submitted to
Idaho Department of Environmental Quality

December 2013

Prepared by
CH2MHILL

ES112213082513BOI

Contents

1.0 Project Background

The Cives Steel Company (Cives) began operating a new structural steel fabrication plant in July 2013 located at 10059 North Yellowstone Highway, Idaho Falls, Idaho 83401 (facility). On August 22, 2013, an Idaho Department of Environmental Quality (IDEQ) representative inspected the Cives facility and upon a record search found no records pertaining to IDAPA 58.01.01.220.02 which govern a general exemption for a Permit-to-Construct (PTC). On October 23, 2013, Cives was issued a Notice to Comply (NTC) letter for failure to comply with IDAPA 58.01.01.220.02. According to the letter, the NTC states that Cives must take the following corrective actions:

> *"Provide all exemption documentation and related supporting information (e.g. MSDSs, etc)"*

The NTC also provided Cives with 45 calendar days from the date the letter was issued (October 23, 2013) to comply or Cives could possibly be issued a Notice of Violation.

As a result, Cives contacted CH2M HILL in Boise, Idaho to assist with an air permit evaluation of the Idaho Falls facility.

On October 29, 2013, Ben Merkling, General Manager of Cives, along with representatives from CH2M HILL, Rick McCormick and Mike Wirtz, met with IDEQ at the State office located in Boise, Idaho to discuss the NTC and path forward for Cives to comply. At this meeting, Cives decided that it was in their company's best interest to prepare an air quality PTC application to allow for operational flexibility based on future expansion of the facility. Therefore, this meeting served as a pre-application meeting for moving forward to obtain an air quality PTC.

On November 14, 2013, CH2M HILL submitted a letter to IDEQ on behalf of Cives that we were preparing a PTC application and requested an extension beyond the 45 calendar days issued in the NTC letter. On November 18, 2013, the Idaho Falls Regional Office granted the extension. However, in this letter, we did not completely address the categorical exemption evaluation. Therefore, on November 22, 2013, CH2M HILL prepared an exemption evaluation for Cives current operations which indicated that Cives' abrasive blasting emissions for the steel shot use alone exceed the $PM_{2.5}$ levels to qualify for a Categorical Exemption under IDAPA 58.01.01. A copy of the IDEQ enforcement action notification letter is included in Appendix A.

Cives has taken corrective action measures by meeting with the IDEQ State air permitting office in Boise, Idaho on October 29, 2013. At this meeting, Cives decided to move forward with preparing an air quality PTC application and established a PTC application delivery date on or before December 31, 2013.

The Cives facility will consist of 4 separate air emission sources which will include:

- Area heaters burning natural gas to provide heat to the facility
- Abrasive blasting inside an enclosed vessel with a dust filter for particulate matter collection. Throughput is anticipated to be up to 72,000 pounds of steel per year.
- Painting inside a building (uncontrolled). Anticipated throughput will be up to 24,084 gallons of paint per year.
- Welding inside a building (uncontrolled) with an anticipated throughput of 56,794 pounds welding wire and 3,399 pounds welding wire annually.

The facility will operate at up to 5,200 hours per year (two 10-hour shifts, 5 days a week, 52 weeks a year).

An air quality impact analysis will be performed in support of this PTC application required under IDAPA 58.01.01.200. Idaho regulations require a facility applying for a PTC to demonstrate compliance with the NAAQS. The applicable IDEQ forms are provided in Appendix B.

2.0 Project Description

Cives currently owns and operates structural steel fabrication facility 7 miles northeast of downtown Idaho Falls (Figure 1). The plan is to construct out the fabrication facility through the first three phases (Figure 2). The following sources are identified through the first three phases of construction. Source locations can be found on Figures 3 and 4.

- 25 natural gas space heaters located through the facility
  - MAU-01A through MAU-01E (6 units)
    - Greenheck
    - Model DGX-120-H32
    - Direct fired; exhausts out vent fans
    - 1.1067 MMBtu/hr
  - MAU-02A and MAU-02B (2 units)
    - Greenheck
    - Model DGX-118-H32
    - Direct fired; exhaust out vent fans
    - 0.7378 MMBtu/hr
  - RTU-01
    - Carrier WeatherMaster
    - Model 48HCDD12E2M6-6U5M0
    - Low gas heat
    - 0.12 MMBtu/hr
  - RTU-02
    - Carrier WeatherMaster
    - Model 48HCDA06E2M6-0B5F0
    - Low gas heat
    - 0.05 MMBtu/hr
  - RTU-03 and RTU-04 (2 units)
    - Carrier WeatherMaster
    - Model 48HCED08E2M6-6U5M0
    - Medium gas heat
    - 0.12 MMBtu/hr
  - Out-Building Heaters
    - Model PH-34
    - 0.034 MMBtu/hr
    - Detroit Radiant (4 units)
      - Saw Building
      - Drill Building
      - Peddiwriter Building
      - Copper Building
    - Vent through Greenheck CSP-A1410 fans (one per building)
      - Up to 1,584 scfm exhaust flow
  - RAD_HEAT_01 through 04, 07 and 08 (6 units)
    - CoRayVac
    - Model B-10

  - Natural gas
  - 0.10 MMBtu/hr
- RAD_HEAT_05 and 06 (2 units)
  - CoRayVac
  - Model B-09
  - Radiant heat flow split between to equal exhausts
    - U-shaped layout
  - Natural gas
  - 0.9 MMBtu/hr
- UH-01
  - Modine
  - Model PDP300AE0130
  - Natural gas
  - 50 degree rise
  - 0.3 MMBtu/hr

- Abrasive blasting
  - Enclosed unit with a Donaldson dust collector that vents outside the building
  - DFO-3-18
  - Ultra-Web Downflo Oval Dust Collector
  - 18 air filters
  - Equipped with Donaldson Ultra Web ® filters with 99.999% control efficiency to 0.5 microns
- Fabrication Building Exhaust Fans
  - Greenheck
  - SBC-3H54-20 (four identical fans through Phase III)
  - Vents entire fabrication building including painting, welding, and plasma cutting (FDB) operations
  - 24,701 scfm Air flow/horizontal exhaust
  - Equipped with pre filters with 95% efficiency rating
- Plasma Cutting
  - Controlled exhaust
    - Donaldson DFO-S-12 filter dust collector
    - Up to 5,200 hours of operation per year
    - 12 air filters
    - Equipped with Donaldson Ultra Web ® filters with 99.999% control efficiency to 0.5 microns
- Vented within fabrication building (exhaust through fabrication building fans)Painting
  - 24,219 gallons a year of paint
  - Up to 5,200 hours of operation per year
  - Painting work stations are located throughout the building and will change as plant expands through the three Phases
  - Vented within fabrication building (exhaust through fabrication building fans)
- Welding
  - 56,794 pounds of welding wire used annually
  - 3,399 pounds of welding rod used annually
  - Up to 5,200 hours of operation per year
  - Vented within fabrication building (exhaust through fabrication building fans 95% efficiency rating)

Manufacturer specification data sheets are provided in Appendix C. Painting material safety data sheet (MSDS) reference sheets are also provided in Appendix C.

3.0 Emissions

3.1 Source Information

The emissions proposed for this PTC will include all planned sources through the first three phases of construction including; painting operations, abrasive blasting and welding throughputs, and plasma cutting operations. The abrasive blasting unit vents outside the fabrication building and utilizes a dust collector as described in Section 2.0. Painting, welding, and plasma cutting operations all emit within the fabrication building and vent to the outside through the four fans located on the east side of the third phase of construction.

3.2 Potential to Emit Criteria Emission Estimates

IDAPA 58.01.01 defines Potential to Emit (PTE) as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable.

Currently, Cives operates the abrasive blasting unit with a dust filtration at 72,000 pounds of steel shot per year through Phase III production. Additional dust filters are associated with the FDB (plasma cutting) operations within the fabrication building, painting operations and welding operations. The dust filters emit within the buildings, which vent to the outside of the building. Uncontrolled potential-to-emit (PTE) emission will be the same as controlled PTE emission except for particulate matter passing through the abrasive blasting filtration. Table 1 provides a summary of uncontrolled PTE emissions for the facility. Table 2 provides a summary of controlled PTE emissions for the facility. Uncontrolled and controlled PTE emission calculations are presented in Appendix D.

Using this definition of PTE, an emissions inventory was developed for Cives steel fabrication plant. The following sections provide a summary of the basis of the PTE emission estimates.

3.2.1 Potential to Emit

The facility will operate at up to 5,200 hours per year (two 10-hour shifts, 5 days a week, 52 weeks a year).

Criteria pollutant, hazardous air pollutant (HAP), and toxic air pollutant (TAP) emission estimates for the natural gas space heaters are calculated based on emission factors provided by available manufacturer data and from the U.S. Environmental Protection Agency (EPA) *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume 1(AP-42): Chapter 1 External Combustion Sources, Section 1.4 Natural Gas.* Emission estimates for criteria pollutants, HAPs, and TAPs for the heaters are also calculated using emission factors stated in *AP-42 Chapter 1 External Combustion Sources, Section 1.4 Natural* Gas. The Tier 1 Methodology and equation C-8 outlined in 40 Code of Federal Regulations (CFR) Part 98 Supbart C is used to calculate the greenhouse gas (GHG)pollutants of carbon dioxide (CO_2) nitrogen oxide (N_2O), and methane (CH_4). In addition, Carbon dioxide equivalents (CO_2e) were calculated as described in 40 CFR Part 98.

Particulate matter emissions (PM10 and PM2.5) from abrasive blasting are based on a steel shot consumption of 72,000 lb/yr and a conservative control efficiency of the dust collector of 99.9% compared to 99.999% at 0.5 micron filters as supplied by the manufacturer (Donaldson Torit). Emission estimates for TAPs for abrasive blasting are calculated using percentages supplied by the client.

Volatile organic carbon (VOC) and PM emissions from the paint booth are based on a paint throughput of 24,084 gal/yr. VOC and PM emissions are based on 3 paint coatings from MSDSs provided by the client (Appendix C). A Graco high volume low pressure spray gun is used for painting with a transfer efficiency of 60% and a particulate control efficiency of the dust collector of 95%. Emission estimates for TAPs for painting emissions are calculated using percentages supplied by the client.

PM emissions from welding emissions are based on a throughput of weld wire of 56,794 lbs/yr and a throughput of weld rod of 3,399 lb/yr. This is multiplied by the emission factor associated with weld wire and weld rod from the U.S. Environmental Protection Agency (EPA) *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume 1(AP-42): Chapter 12 Metallurgical Industry, Section 12.19 Electric Arc Welding.* The dust collector controls the particulate emissions by 95%. TAP emissions are based on each electrode type and percentages supplied by the client. In addition, nickel emissions are assumed to have the same control efficiency as PM of 95%.

Plasma cutting occurs up to 5,200 hours per year (20 hour days, 5 days a week, 52 weeks a year) on material up to 25.4 millimeters thick. Plasma cutting takes place within a fully enclosed booth and the emissions pass through a Donaldson Torit filter assembly with a 99.999% control efficiency at 0.5 microns. The plasma cutting emissions exhaust through the fans on the east end of the building. For conservative purposes, a control efficiency of 99.9% was applied to the emission calculations for PM10 and PM2.5 as well as nickel. PM and NO_2 emission estimates are based on the example emission estimates provided by the manufacturer which are based on the AP 42 Volume 1 Chapter 12 for metallurgical industry. A manufacturer data sheet is included with the emission estimates in Appendix D (after plama cutting spreadsheet). The plasma cutting manufacturer data sheet summarizes the calculation methodology for estimating PM and NO_2 emissions.

Table 2 provides the controlled potential to emit summary.

TABLE 1
CIVES UNCONTROLLED CRITERIA POLLUTANTS PTE

	PM10		PM2.5		CO		NOx		SOx		VOC		Lead	CO2e
Source	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/month)	(Ton/yr)
Heaters	0.07	0.32	0.07	0.32	0.80	3.51	0.96	4.18	0.01	0.03	0.05	0.23	3.49E-03	4,529
Abrasive Blasting	13.85	36	13.85	36										
Painting	7.36	19.15	7.36	19.15							1.64	4.27		
Welding	0.32	0.84	0.32	0.84										
FDB	0.01	0.04	0.004	0.01			0.01	0.02						
Total	**21.62**	**56.34**	**21.61**	**56.31**	**0.80**	**3.51**	**0.96**	**4.20**	**0.01**	**0.03**	**1.69**	**4.50**	**3.49E-03**	**4,529**

TABLE 2
CIVES CONTROLLED CRITERIA POLLUTANTS PTE

	PM10		PM2.5		CO		NOX		SOx		VOC		Lead	CO2e
Source	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(Ton/yr)	(Ton/yr)
Heaters	0.07	0.32	0.07	0.32	0.80	3.51	0.96	4.18	0.01	0.03	0.05	0.23	3.49E-03	4,529
Abrasive Blasting	0.01	0.04	0.01	0.04										
Painting	0.37	0.96	0.37	0.96							1.64	4.27		
Welding	1.61E-02	4.20E-2	1.61E-02	4.20E-2										
FDB	1.49E-05	3.88E-05	3.84E-06	9.99E-06			0.01	0.02						
Total	**0.47**	**1.35**	**0.47**	**1.35**	**0.80**	**3.51**	**0.96**	**4.20**	**0.01**	**0.03**	**1.69**	**4.50**	**3.49E-03**	**4,529**

3.2.2 Project HAP Emissions

Table 3 presents the post project PTE for hazardous air pollutants (HAPs) from all emission units at the facility. A complete inventory of HAPs and toxic air pollutants (TAPs) emission estimates are provided in Appendix D.

TABLE 3
PROJECT CONTROLLED PTE FOR HAZARDOUS AIR POLLUTANTS SUMMARY

HAP Pollutants	CAS No.	PTE (ton/year)
Benzene	71-43-2	8.78E-05
Dichlorobenzene	25321-22-6	5.02E-05
Ethyl benzene		0.00E+00
Formaldehyde	50-00-0	3.14E-03
Hexane	110-54-3	7.53E-02
Methyl alcohol		9.77E-01
Naphthalene	91-20-3	2.55E-05
Phenol		0.00E+00
Toluene	108-88-3	1.42E-04
Xylene	1330-20-7	0.00E+00
Arsenic	7440-38-2	8.37E-06
Beryllium	7440-41-7	5.02E-07
Cadmium	7440-43-9	4.60E-05
Chromium	7440-47-3	1.05E-01
Cobalt	7440-48-4	1.68E-03
Manganese	7439-96-5	5.75E-02
Mercury	7439-97-6	1.09E-05
Nickel	7440-02-0	1.35E-03
Selenium	7782-49-2	1.00E-06
Lead	71-43-2	2.09E-05
Total		**1.25**

As shown by Table 5, the Cives steel fabrication plant will be a minor source of HAPs, as no single HAP PTE exceeds 10 ton/year and the combined total facility HAP PTE = is less than 25 tons/year.

3.3 Facility Classification

The Cives steel fabrication plant will be a minor source facility, as defined in IDAPA 58.01.01.008.10. In addition, the proposed Cives steel fabrication plant is not a designated facility as defined in IDAPA 58.01.01.006.30. A steel fabrication plant is the building of metal structures by cutting, bending, and assembling processes compared to a steel mill that is an industrial plant for the manufacture of steel.

The primary Standard Industrial Classification (SIC) code for the facility is 3441, *Fabricated Structural Metal.* The facility will emit less than 100 tons per year of any regulated pollutant and less than 100,000 tons per

year of CO_2e. The site will be a minor source for HAPs with total potential aggregate HAP emissions of less than 25 tons per year and emissions of any single HAP of less than 10 tons per year.

The Cives steel fabrication plant is located in the city of Idaho Falls, Bonneville County, Idaho. Bonneville County is located in an attainment area for CO, PM_{10}, $PM_{2.5}$, SO_2, NO_x, O_3, and Pb. There are no Class I areas within 10 kilometers of the facility

4.0 Ambient Impact Analysis

For this permit modification, Cives used the EPA air dispersion model, AERMOD version 12345, to demonstrate compliance with the applicable regulated air pollutants.

An air dispersion modeling protocol was submitted to the IDEQ on behalf of SLHS on November 22, 2013 (Appendix E). SLHS received an air dispersion modeling protocol approval letter from IDEQ on December 6, 2013 also included in Appendix E.

Dispersion modeling was based on facility-wide emission rates from 32 individual point sources which included 23 natural gas heaters (infrared heaters and rooftop air handling units), 4 outbuilding natural gas heaters, a fully enclosed abrasive blasting unit that exhausts through a filtration system, and four vent fans that vent the uncontrolled painting and welding operations as well as the plasma cutting which exhausts through a filtration system within the main building. Stack parameters for all the sources are provided in Table 4.

TABLE 1
Stack Parameters

Point Source	Stack ID	Easting	Northing	Stack Height (m)	Diameter (m)	Velocity (m/sec)	Flowrate (acfm)	Temperature[c] (K)	Notes
MAU-01A (Phase I)	MAU-01A	421,801.4	4,826,303.3					344.26[e]	Direct fired, vents through fans
MAU-01B (Phase I)	MAU-01B	421,870	4,826,303.3					344.26[e]	Direct fired, vents through fans
MAU-01C (Phase II)	MAU-01C	421,801.4	4,826,324.9					344.26[e]	Direct fired, vents through fans
MAU-01D (Phase II)	MAU-01D	421,870	4,826,324.9					344.26[e]	Direct fired, vents through fans
MAU-01E (Phase III)	MAU-01E	421,948.7	4,826,281.6					344.26[e]	Direct fired, vents through fans
MAU-01F (Phase III)	MAU-01F	421,948.7	4,826,342.7					344.26[e]	Direct fired, vents through fans
MAU-02A (Phase I)	MAU-02A	421,908	4,826,303.3					344.26[e]	Direct fired, vents through fans
MAU-02B (Phase II)	MAU-02B	421,908	4,826,324.9					344.26[e]	Direct fired, vents through fans
RTU-01 (0.12 MMBtu)	RTU-01	421835.7	4,826,289.8	5.03	0.04	175.8	480	330.37	Horizontal
RTU-02 (0.05 MMBtu)	RTU-02	421865.8	4,826,291	5.03	0.04	73.24	200	324.82	Horizontal
RTU-03 (0.12 MMBtu)	RTU-03	421,889.6	4,826,293.1	5.03	0.04	175.8	480	330.37	Horizontal
RTU-04 (0.12 MMBtu)	RTU-04	421,926.5	4,826,293.1	5.03	0.04	175.8	480	330.37	Horizontal
Radiant Heater 01 (Phase II)	RAD_HEAT_01	421,900.7	4,826,333.5	10.82	0.10	12.25	210	344.26[e]	Vertical, rain cap
Radiant Heater 02 (Phase II)	RAD_HEAT_02	421,900.7	4,826,321.8	10.82	0.10	12.25	210	344.26[e]	Vertical, rain cap
Radiant Heater 03 (Phase I)	RAD_HEAT_03	421,900.7	4,826,313.9	10.82	0.10	12.25	210	344.26[e]	Vertical, rain cap
Radiant Heater 04 (Phase I)	RAD_HEAT_04	421,900.7	4,826,299	10.82	0.10	12.25	210	344.26[e]	Vertical, rain cap
Radiant Heater 05A (Phase II)[a]	RAD_HEAT_05A	421,936	4,826,333.5	10.82	0.10	6.12	105[d]	344.26[e]	Vertical, rain cap
Radiant Heater 05B (Phase II)[a]	RAD_HEAT_05B	421,936	4,826,321.8	10.82	0.10	6.12	105[d]	344.26[e]	Vertical, rain cap
Radiant Heater 06A (Phase I)[b]	RAD_HEAT_06A	421,936	4,826,313.9	10.82	0.10	6.12	105[d]	344.26[e]	Vertical, rain cap
Radiant Heater 06B (Phase I)[b]	RAD_HEAT_06B	421,936	4,826,299	10.82	0.10	6.12	105[d]	344.26[e]	Vertical, rain cap
Radiant Heater 07 (Phase III)	RAD_HEAT_07	421,949	4,826,361	10.82	0.10	12.25	210	344.26[e]	Vertical, rain cap

TABLE 1
Stack Parameters

Point Source	Stack ID	Easting	Northing	Stack Height (m)	Diameter (m)	Velocity (m/sec)	Flowrate (acfm)	Temperature[c] (K)	Notes
Radiant Heater 08 (Phase III)	RAD_HEAT_08	421,949	4,826,276	10.82	0.10	12.25	210	344.26[e]	Vertical, rain cap
Unit Heater (Phase I)	UH-01	421,795	4,826,280	9.144	0.15	0.001		322.04	Horizontal
Saw Building Heater	SAW_BLDG_HEA	421,683	4,826,320	3.6576	0.35[h]	0.001		294.26[f]	Horizontal
Drill Building Heater	DRILL_BLD_HE	421,717	4,826,313	3.6576	0.35[h]	0.001		294.26[f]	Horizontal
Peddiwriter Building Heater	PEDDI_BLD_HE	421,750	4,826,320.1	3.6576	0.35[h]	0.001		294.26[f]	Horizontal
Copper Building Heater	COPPER_BLD_H	421,683	4,826,301	3.6576	0.35[h]	0.001		294.26[f]	Horizontal
Abrasive Blasting (dust collector)	BEAD_BLAST	421,791.3	4,826,293.12	1.905	1.03	0.001		294.26[f]	Horizontal
Exhaust Fan #1 (Phase III)[x]	FAN_01	421,960	4,826,330.5	12.65[g]	1.37	7.9	24,701	294.26[f]	Vertical
Exhaust Fan #2 (Phase III)[x]	FAN_02	421,960	4,826,320	12.65[g]	1.37	7.9	24,701	294.26[f]	Vertical
Exhaust Fan #3 (Phase III)[x]	FAN_03	421,960	4,826,310	12.65[g]	1.37	7.9	24,701	294.26[f]	Vertical
Exhaust Fan #4 (Phase III)[x]	FAN_04	421,960	4,826,299.5	12.65[g]	1.37	7.9	24,701	294.26[f]	Vertical

Notes:

[c] For temperatures provided as "an increase in temperature" assumed the background temperature of 70°F (294.26 K) and added increase temperature to estimate the exhaust temperature

[x] Fans exhaust air from entire building which includes the plasma cutter baghouse (FDB), painting, and welding. Emissions are divided equally between the 4 fans.

[a] Heater splits exhaust flow down two paths (U-shaped) with each path exhaust through a separate stack (shown as stack 05A and 05B)

[b] Heater splits exhaust flow down two paths (U-shaped) with each path exhaust through a separate stack (shown as stack 06A and 06B)

[d] Since exhaust is split between to exhaust vents, flow is assumed to be split between the two as well resulting in a flow of 105 acfm (210 acfm total)

[e] Spec sheet does not include an exhaust temperature or a temperature rise for the unit so assumed a maximum 90°F temperature rise and a exhaust temperature of 160°F

[f] Assumed that the exhaust from the building (air temperature within building) is set at 70°F

[g] Have all four fans venting out of 41 foot stacks with no rain caps

[h] fan exhaust dimension of approximately 18.75-inches by 8-inches based on manufacturer specs.

The results of the modeling are provided in Table 5. Modeling assumptions and results are summarized in Appendix F. A CD containing modeling files and emission calculations are attached with this application.

Table 5
Modeling Results

Criteria Modeling

Pollutant	Averaging Period	Modeled Concentration ($\mu g/m^3$)	Background[1] ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	NAAQS[2] ($\mu g/m^3$)	Exceeds NAAQS
NO_2	1-hour[3]	128.98	58.3	187.28	188	Below
	Annual[4]	25.75	32	57.75	100	Below
PM_{10}	24-hour[5]	9.08	81	90.08	150	Below
$PM_{2.5}$	24-hour	9.09	22.6	31.69	35	Below
	Annual	2.63	6.5	9.13	12	Below

Hazardous Air Pollutants

Pollutant	CAS	Averaging Period[6]	Modeled Concentration ($\mu g/m^3$)	IDAPA 58.01.01.585/586 AAC[7] ($\mu g/m^3$)	IDAPA 58.01.01.585/586 AACC[8] ($\mu g/m^3$)	Exceeds IDAPA 585/586
Formaldehyde	50-00-0	Annual	1.42E-02		7.70E-02	Below
Arsenic	7440-38-2	Annual	4.00E-05		2.30E-04	Below
Calcium	7440-43-9	Annual	1.40E-04		5.60E-04	Below
Nickel	7440-02-0	Annual	1.54E-03		4.20E-03	Below
Chromium	7440-47-3	24-hour	0.16	25		Below

[1] Background concentration provided by IDEQ in Protocol Approval Letter included in Appendix E
[2] NAAQS = National Ambient Air Quality Standards; *State of Idaho Guideline for Performing Air Quality Impact Analyses*. July 2011. Table 4
[3] 80-percent of 8th high modeled concentration
[4] 75-percent of first high concentration
[5] 6th high value
[6] Averaging period based on IDAPA 58.01.01.585/586
[7] AAC = Acceptable Ambient Concentration. IDAPA 58.01.01.585
[8] AACC = Acceptable Ambient Concentration for Carcinogens. IDAPA 58.01.01.586

5.0 Applicable Requirements

A regulatory analysis was performed for the Cives steel fabrication plant to determine the applicability of state and federal air quality regulations. The regulatory applicability determinations are included in this section.

The following sections address air quality regulatory compliance requirements for a steel fabrication plant. As detailed below, the source will comply with all applicable Idaho air quality regulations codified in IDAPA 58.01.01, as well as applicable EPA Code of Federal Regulations (CFR).

5.1.1 Federal Regulations

5.1.1.1 New Source Review and Prevention of Significant Deterioration Applicability—40 CFR Parts 51 and 52

In accordance with EPA and IDAPA 58.01.01 205 rules, the Cives steel fabrication plant will not be required to submit a construction permit application subject to the requirements of New Source Review (NSR) as it is not a major source. The requirements of NSR vary, depending on whether the proposed facility will be located in a non-attainment or attainment area for NAAQS.

New Source Review for Non-Attainment Areas

Non-Attainment Area NSR is the portion of NSR that applies to areas that are not in attainment of NAAQS. Bonneville County is classified as attainment or unclassifiable for all NAAQS. Therefore, Non-Attainment Area NSR is not required for the Cives steel fabrication plant.

New Source Review for Attainment or Unclassifiable Areas

Prevention of Significant Deterioration (PSD) is the portion of NSR that applies to pollutants that are in attainment of NAAQS, or are unclassifiable. Bonneville County is classified as attainment or unclassifiable for the criteria pollutants NO_X, CO, SO_2, ozone, lead, PM_{10}, and $PM_{2.5}$. Therefore, new or modified air emission sources are potentially subject to PSD review for these pollutants, depending on the facility's major source status and on the emission rates of NO_X, CO, SO_2, VOC, PM_{10}, and $PM_{2.5}$.

A PSD review is required if the proposed facility is a major PSD source. A source is considered to be major if:

- It is included in a list of 28 specific source categories and its potential to emit (PTE) any of the NSR-regulated pollutants exceeds 100 tons per year, or
- Its PTE exceeds 250 tons per year for any other source category.

The list of 28 specific source categories with the 100 tons per year threshold does not include steel fabrication plants; therefore, the proposed facility is not subject to a 100 tons per year major source threshold for PSD review.

5.1.1.2 Greenhouse Gas Tailoring Rule

On May 13, 2010, the U.S. Environmental Protection Agency (EPA) issued a final rule that establishes an approach to addressing greenhouse gas emissions from stationary sources under the Clean Air Act (CAA) permitting programs. This final rule sets thresholds for GHG emissions that define when permits under the NSR, PSD, and Title V Operating Permit programs are required for new and existing facilities. This rule "tailors" the requirements of these CAA permitting programs to limit which facilities will be required to obtain PSD and Title V permits.

Beginning July 1, 2011, the PSD major source threshold of 100,000 tons per year CO_2e became effective. A new source with potential GHG emissions above 100,000 tons per year CO_2e is now subject to PSD permitting requirements for GHGs, regardless of whether PSD is also triggered for non-GHG pollutants. Modifications to existing major sources (defined relative to the new 100,000 tons per year threshold for

CO_2e or the 100/250 tons per year threshold for traditional NSR regulated pollutants) that result in an increase of GHG emissions by 75,000 tons per year CO_2e or more are subject to PSD permitting requirements for GHGs. Therefore, beginning July 1, 2011, PSD for GHG pollutants can be triggered regardless of whether PSD is also triggered for non-GHG pollutants. In addition, beginning July 1, 2011, facilities with potential CO_2e emissions of 100,000 tons per year or more are subject to Title V permitting requirements.

For determining PSD (or Title V) major source or major modification applicability, the quantity of GHGs emitted must not only equal or exceed 100,000 tons per year (75,000 tons per year for modifications) thresholds on a CO_2e basis, but the sum of emissions of each GHG pollutant not adjusted for its global warming potential must also exceed the applicable threshold for non-GHG regulated pollutants (i.e., 100 tons per year for Title V or 100 tons per year/250 tons per year for PSD, depending on whether the source is on the list of 28 PSD categories or a designated facility as defined in IDAPA 58.01.01.006.26v).

As the project total facility CO_2e is 4,529 tons per year, the Cives steel fabrication plant is not subject to PSD or Title V operating permit programs with respect to the GHG Tailoring Rule at this time.

5.1.1.3 National Emission Standards for Hazardous Air Pollutants - 40 CFR Part 63

Section 112 of the Clean Air Act (CAA) Amendments relates to the release of air toxic contaminants. The requirements of CAA Section 112(g) or (j) are not applicable because the Cives steel fabrication plant is not a major source of HAPs (40 CFR 63.40(b)).

Part 63 National Emission Standards for Hazardous Air Pollutants (NESHAPS) apply to both major sources of HAPs, defined as PTE equal to or greater than 10 tons per year for any single HAP or PTE equal to or greater than 25 tons per year for total HAP, and area sources of HAPs as defined as any stationary source of HAPs that is not a major source. As HAP emissions are below major source thresholds, the Cives steel fabrication plant is not a major source of HAPs. However the facility is an area source of HAPs.

5.1.1.4 Acid Rain Deposition Control Program—40 CFR Part 72, 73, 74, and 75

The acid rain deposition control program applies to electric utility steam-generating units. The Cives steel fabrication plant is not a utility steam generating unit and not subject to the acid rain deposition control program based on the definition of an affected unit.

5.1.1.5 Compliance Assurance Monitoring —40 CFR Part 64

The Compliance Assurance Monitoring (CAM) rule (40 CFR 64) applies to each Pollutant Specific Emissions Unit (PSEU) when it is located at a major source that is required to obtain Title V, Part 70 or 71 permit and it meets all of the following criteria:

The PSEU must:

- be subject to an emission limitation or standard
- use a control device to achieve compliance
- have potential pre-control emissions that exceed or are equivalent to the major source threshold

The Cives steel fabrication plant is not a major source nor will any control devices be used. Therefore, the CAM rule is not applicable to the Cives steel fabrication plant.

5.1.2 IDAPA Regulations

IDAPA 58.01.01.123
CERTIFICATION OF DOCUMENTS

> "All documents, including but not limited to, application forms for permits to construct, application forms for operating permits, progress reports, records, monitoring data, supporting information, requests for confidential treatment, testing reports or compliance certifications submitted to the Department shall contain a certification by a responsible official. The certification shall state that, based

on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete."

Cives will comply with the regulation outlined in this section.

IDAPA 58.01.01.124
TRUTH, ACCURACY AND COMPLETENESS OF DOCUMENTS

"All documents submitted to the Department shall be truthful, accurate and complete."

Cives will comply with the regulation outlined in this section.

IDAPA 58.01.01.125
FALSE STATEMENTS

"No person shall knowingly make any false statement, representation, or certification in any form, notice, or report required under any permit, or any applicable rule or order in force pursuant thereto."

Cives will comply with the regulation outlined in this section.

IDAPA 58.01.01.156
TOTAL COMPLIANCE

"Where more than one (1) section of these rules applies to a particular situation, all such rules must be met for total compliance, unless otherwise provided for in these rules."

Cives will comply with the regulations outlined in this section.

IDAPA 58.01.01.161
TOXIC SUBSTANCES

1. Abrasive Blasting
2. Paint Booth
3. Welding

"Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation."

See emission calculations in Appendix D and modeling results in Appendix F.

IDAPA 58.01.01.200
PROCEDURES AND REQUIREMENTS FOR PERMITS TO CONSTRUCT

1. Abrasive Blasting
2. Paint Booth
3. Heaters
4. Welding

Upon approval of the PTC by IDEQ, Cives will follow the procedures and requirements outlined under IDAPA 58.01.01.200 for obtaining a PTC.

IDAPA 58.01.01.210
DEMONSTRATION OF PRECONSTRUCTION COMPLIANCE WITH TOXIC STANDARDS

1. Abrasive Blasting

2. Paint Booth
3. Heaters
4. Welding

"In accordance with Subsection 203.03, the applicant shall demonstrate preconstruction compliance with Section 161 to the satisfaction of the Department. The accuracy, completeness, execution and results of the demonstration are all subject to review and approval by the Department."

See emission calculations in Appendix D and modeling results in Appendix F.

IDAPA 58.01.01.220
GENERAL EXEMPTION CRITERIA FOR PERMIT TO CONSTRUCT EXEMPTIONS

1. Abrasive Blasting
2. Paint Booth
3. Heaters
4. Welding

IDAPA 58.01.01.220a **Major Source or Major Modification**

"The maximum capacity of a source to emit an air pollutant under its physical and operational design without consideration of limitations on emission such as air pollution control equipment, restrictions on hours of operation and restrictions on the type and amount of material combusted, stored or processed would not:

i. Equal or exceed one hundred (100) tons per year of any regulated air pollutant.
ii. Cause an increase in the emissions of a major facility that equals or exceeds the significant emissions rates set out in the definition of significant at Section 006."

IDAPA 58.01.01.220b **Combination**

The source is not part of a proposed new major facility or part of a proposed major modification.

The Cives steel fabrication plant will not have the PTE equal to or exceeding 100 tons per year for any regulated air pollutant and will not be a major facility or part of a proposed new major facility or part of a proposed major modification.

IDAPA 58.01.01.221 **Category I Exemption**

"No permit to construct is required for a source that satisfies the criteria set forth in Section 220 and the following:"

IDAPA 58.01.01.221.01 **Below Regulatory Concern.**

"The maximum capacity of a source to emit an air pollutant under its physical and operational design considering limitations on emissions such as air pollution control equipment, restrictions on hours of operation and restrictions on the type and amount of material combusted, stored or processed shall be less than ten percent (10%) of the significant emission rates set out in the definition of significant at Section 006."

The Cives steel fabrication plant does not meet the BRC criteria of a Category I exemption outlined in IDAPA 58.01.01.221.01 (Below Regulatory Concern).

IDAPA 58.01.01.300
PROCEDURES AND REQUIREMENTS FOR TIER I OPERATING PERMITS

"The purposes of Sections 300 through 399 are to establish requirements and procedures for the issuance of Tier I operating permits."

The Cives steel fabrication plant does not contain any Tier I sources and is therefore not subject to the applicable requirements in Section 300 through 399.

IDAPA 58.01.01.577
AMBIENT AIR QUALITY STANDARDS FOR SPECIFIC AIR POLLUTANTS
(PM-10, SOx, NOx, CO, Pb)

1. Abrasive Blasting
2. Paint Booth
3. Heaters
4. Welding

IDAPA 58.01.01.577.01 PM-10 Standards

IDAPA 58.01.01.577.01.a Primary and Secondary Standards

IDAPA 58.01.01.577.01.a.i Annual Standard

"Fifty (50) micrograms per cubic meter, as an annual arithmetic mean -- never expected to be exceeded in any calendar year."

IDAPA 58.01.01.577.01.a.ii 24-hr Standard

"One hundred fifty (150) micrograms per cubic meter as a maximum twenty-four (24) hour concentration -- never expected to be exceeded more than once in any calendar year."

IDAPA 58.01.01.577.02 Sulfur Oxides (Sulfur Dioxide)

IDAPA 58.01.01.577.02.a Primary Standards

IDAPA 58.01.01.577.02.a.i Annual Standard

"Eighty (80) micrograms per cubic meter (0.03 ppm), as an annual arithmetic mean–not to be exceeded in any calendar year."

IDAPA 58.01.01.577.02.a.ii 24-hr Standard

"Three hundred sixty-five (365) micrograms per cubic meter (0.14 ppm), as a maximum twenty-four (24) hour concentration–not to be exceeded more than once in any calendar year."

IDAPA 58.01.01.577.02.b Secondary Standard

"Secondary air quality standards are one thousand three hundred (1,300) micrograms per cubic meter (0.50 ppm), as a maximum three (3) hour concentration–not to be exceeded more than once in any calendar year."

IDAPA 58.01.01.577.04 Nitrogen Dioxide

"Primary and secondary air quality standards are one hundred (100) micrograms per cubic meter (0.05 ppm) – annual arithmetic mean."

IDAPA 58.01.01.577.05 Carbon Monoxide Primary and Secondary Standards
IDAPA 58.01.01.577.05.a 8-hr Standard

"Eight (8) Hour Standard. Ten (10) milligrams per cubic meter (9 ppm) – maximum eight (8) hour concentration not to be exceeded more than once per year."

IDAPA 58.01.01.577.05.b 1-hr Standard

"One (1) Hour Standard. Forty (40) milligrams per cubic meter (35 ppm) – maximum one (1) hour concentration not to be exceeded more than once per year."

IDAPA 58.01.01.577.7 Lead

"Primary and secondary standards for lead and its compounds, measured as elemental lead, are one and one-half (1.5) micrograms per cubic meter (1.5 ug/m3), as a quarterly arithmetic mean -- not to be exceeded in any quarter of any calendar year."

Cives will comply with the regulations outlined in this section.

IDAPA 58.01.01.578
DESIGNATION OF ATTAINMENT, UNCLASSIFIABLE, AND NONATTAINMENT AREAS

The site of the Cives steel fabrication plant, Bonneville County, is in an attainment or unclassifiable area for NO_x, CO, SO_2, ozone, lead, PM_{10}, and $PM_{2.5}$; the appropriate modeling parameters reflect this designation.

IDAPA 58.01.01.590
NEW SOURCE PERFORMANCE STANDARDS

Please see compliance review in the federal summary.

IDAPA 58.01.01.591
NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Please see compliance review in the federal summary

IDAPA 58.01.01.625
VISIBLE EMISSIONS

1. Abrasive Blasting
2. Paint Booth
3. Heaters
4. Welding

"A person shall not discharge any air pollutant into the atmosphere from any point of emission for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period which is greater than twenty percent (20%) opacity as determined by this section."

IDAPA 58.01.01.650
RULES FOR CONTROL OF FUGITIVE DUST

Cives will take all reasonable precautions to prevent the generation of fugitive dust as outlined under IDAPA 58.01.01.650-651.

IDAPA 58.01.01.651
GENERAL RULES

"All reasonable precautions shall be taken to prevent particulate matter from becoming airborne. In determining what is reasonable, consideration will be given to factors such as the proximity of dust emitting operations to human habitations and/or activities and atmospheric conditions which might affect the movement of particulate matter. Some of the reasonable precautions may include, but are not limited to, the following:"

IDAPA 58.01.01.651.01 Use Of Water or Chemicals

"Use, where practical, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land."

IDAPA 58.01.01.651.02 Application Of Dust Suppressants

"Application, where practical, of asphalt, oil, water or suitable chemicals to, or covering of dirt roads, material stockpiles, and other surfaces which can create dust."

IDAPA 58.01.01.651.04 Covering Of Trucks

"Covering, when practical, open bodied trucks transporting materials likely to give rise to airborne dusts."

IDAPA 58.01.01.651.05 Paving

"Paving of roadways and their maintenance in a clean condition, where practical."

IDAPA 58.01.01.651.06 Removal Of Materials

"Prompt removal of earth or other stored material from streets, where practical."

IDAPA 58.01.01.675
FUEL BURNING EQUIPMENT -- PARTICULATE MATTER

1. Heaters

Cives will adhere to guidelines under IDAPA 58.01.01.675 through IDAPA 58.01.01.681 with regards to particulate emissions for fuel burning equipment.

IDAPA 58.01.01.676
STANDARDS FOR NEW SOURCES

"A person shall not discharge into the atmosphere from any fuel burning equipment with a maximum rated input of ten (10) million BTUs per hour or more, and commencing operation on or after October 1, 1979, particulate matter in excess of the concentrations shown in the following table:"

Fuel Type	Allowable Particulate gr/dscf	Emissions, @Oxygen
Gas	0.015	3%

The heaters are rated less than 10 MMBtu/hr. Therefore; the heaters are not applicable to this regulation.

IDAPA 58.01.01.775
RULES FOR CONTROL OF ODORS

Cives will follow the guidelines set under IDAPA 58.01.01.775 through IDAPA 58.01.01.776 to control odorous emissions from all sources for which no gaseous emission control rules apply.

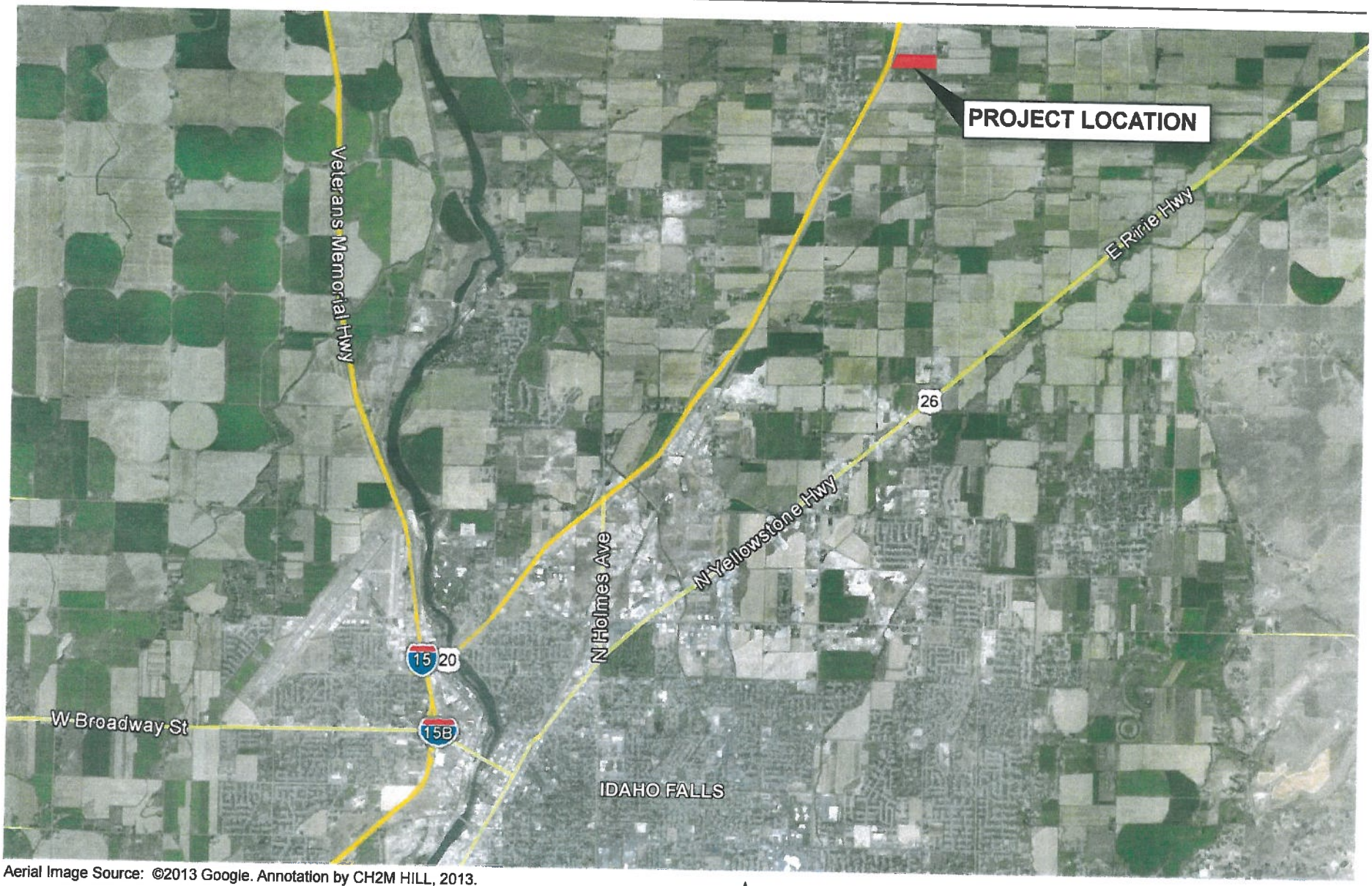
IDAPA 58.01.01.776
GENERAL RULES

IDAPA 58.01.01.776.01 General Restrictions

"No person shall allow, suffer, cause or permit the emission of odorous gases, liquids or solids into the atmosphere in such quantities as to cause air pollution."

Cives will follow the guidelines set under IDAPA 58.01.01.775 through IDAPA 58.01.01.776 to control odorous emissions from all sources for which no gaseous emission control rules apply.

Figures



Aerial Image Source: ©2013 Google. Annotation by CH2M HILL, 2013.

North

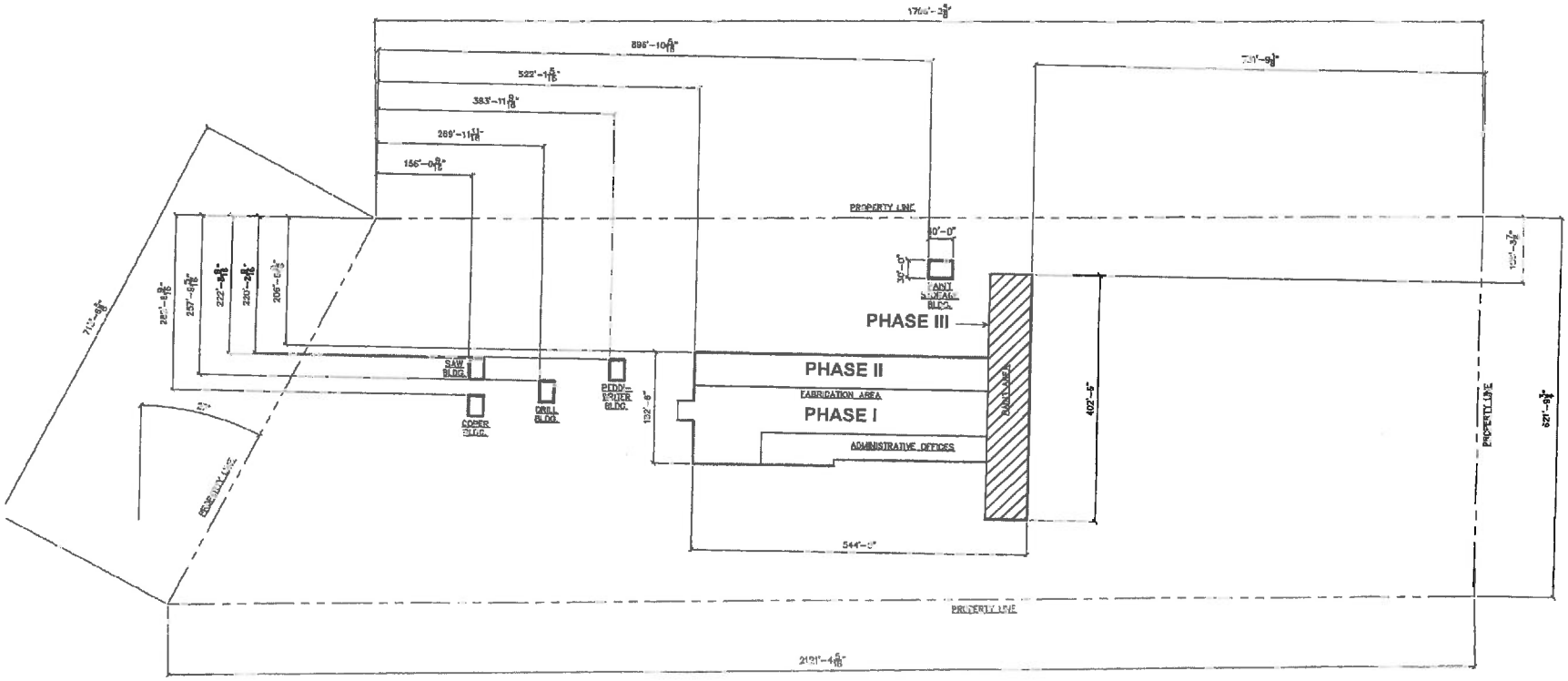
0 1 2

Approximate scale in miles

FIGURE 1
SITE LOCATION
Cives Steel Company
Idaho Falls, Idaho

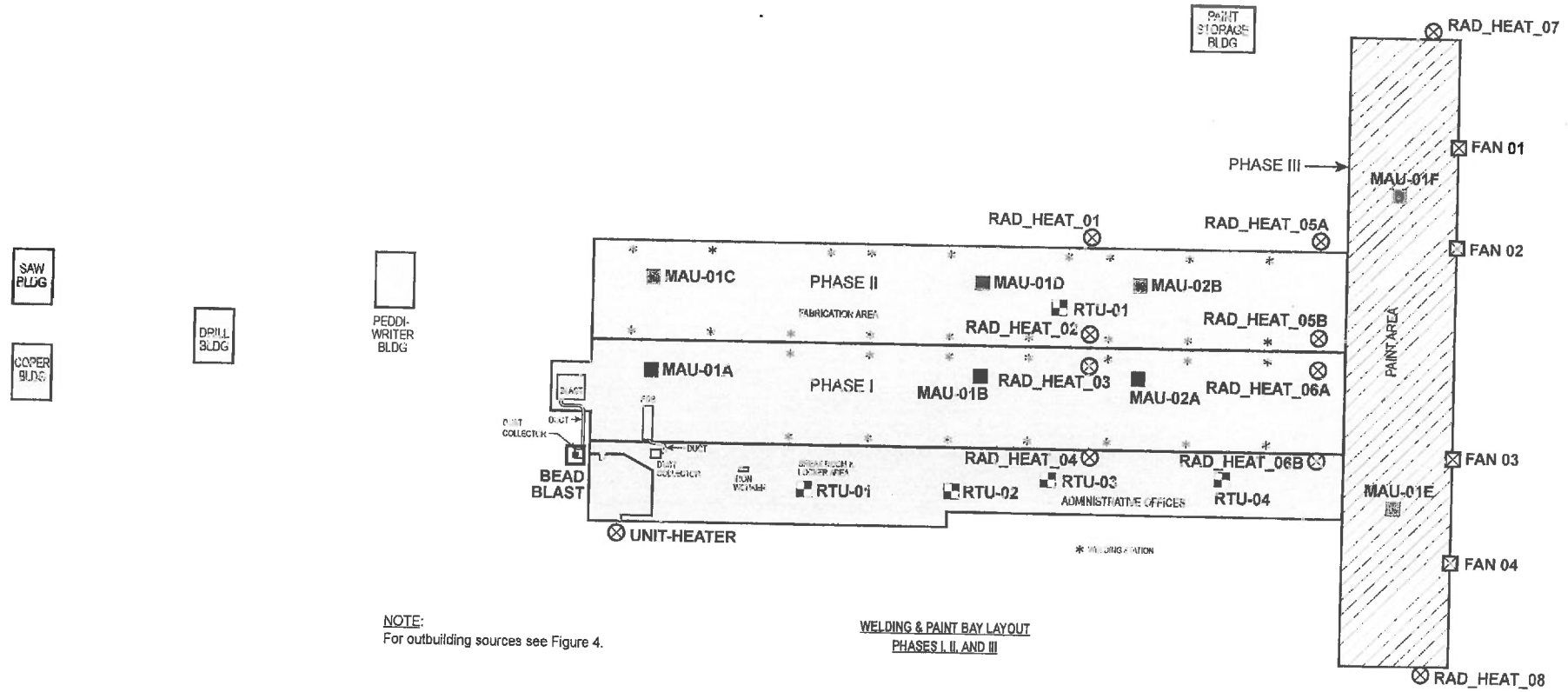
ES112013062404BOI

CH2MHILL.



FACILITY LOCATION PLAN

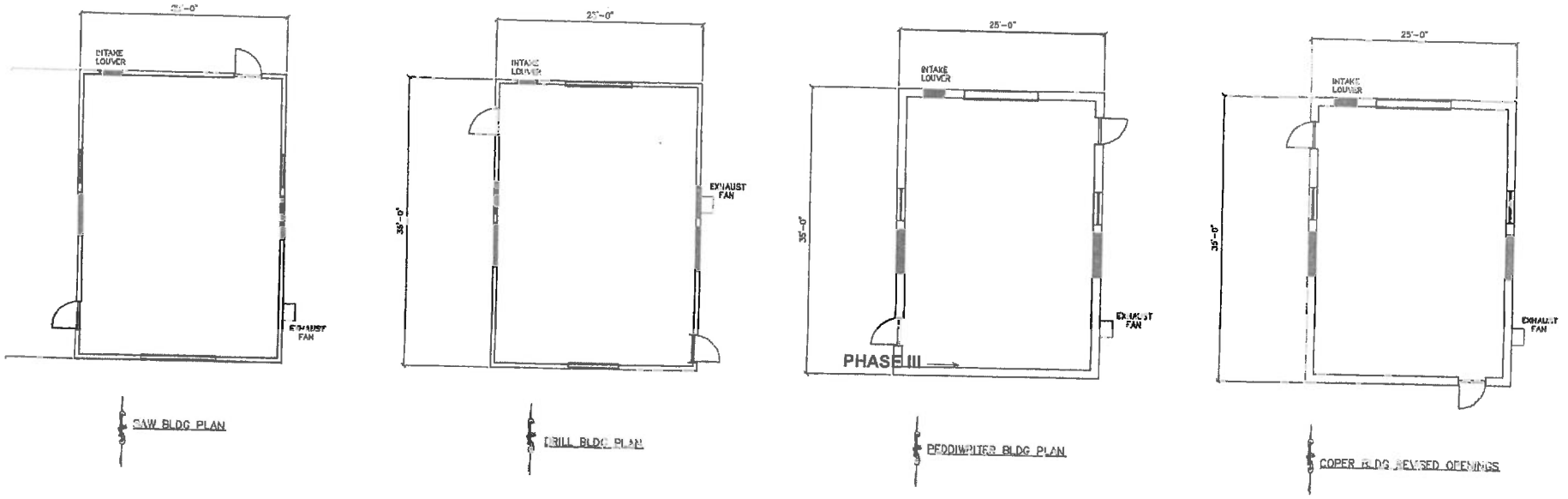
FIGURE 2
SITE LAYOUT
Cives Steel Company
Idaho Falls, Idaho



NOTE:
For outbuilding sources see Figure 4.

WELDING & PAINT BAY LAYOUT
PHASES I, II, AND III

FIGURE 3
SOURCE LOCATIONS
Cives Steel Company
Idaho Falls, Idaho



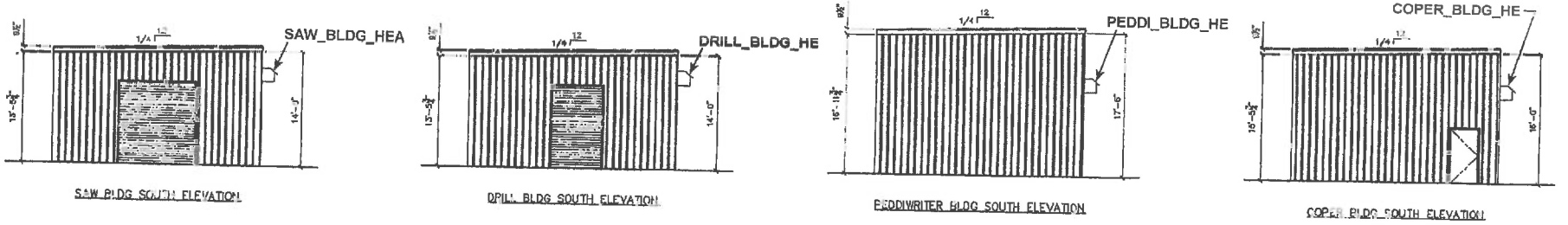


FIGURE 4
OUTBUILDING SOURCES
Cives Steel Company
Idaho Falls, Idaho

ES1130130624040CI

CH2MHILL

Appendix A
IDEQ Enforcement Action Notification Letter

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

900 North Skyline Drive, Suite B • Idaho Falls, ID 83402 • (208) 528-2650

C. L. "Butch" Otter, Governor
Curt A. Fransen, Director

November 27, 2013

Via Certified Mail

Ben Merkling, General Manager
Cives Steel Company
10059 North Yellowstone Hwy.
Idaho Falls, ID 83401

RE: Enforcement Action Notification, Cives Steel Company, Idaho Falls, ID, Facility ID No. 019-00097

Dear Mr. Merkling:

On August 22, 2013, the Department of Environmental Quality (DEQ) visited Cives Steel Company located in Idaho Falls, Idaho to discuss state air quality permit guidelines for sandblasting and painting operations. DEQ explained that the nature of the business activity being conducted at Cives required them to file for either a permit to construct (PTC), or a request for exemption with the Department of Environmental Quality (DEQ).

On October 23, 2013, a Notice to Comply (NTC) was mailed to Cives citing IDAPA 58.01.01.220.02, Rules for the Control of Air Pollution in Idaho, General Exemption Criteria for PTC Exemptions, Record Retention: No documentation on Cives site to "identify the exemption determined to apply to the source and verify that the source qualifies for the identified exemption." DEQ requested that Cives "provide all exemption documentation and related supporting information (e.g. MSDSs, etc.).

On November 18, 2013 DEQ received correspondence from Cives' consultant, CH2M Hill, in response to NTC No. 00209. In the letter CH2M Hill indicated that it is working on application materials with Cives and requested an extension to submit this documentation to DEQ. The Idaho Falls Regional Office (IFRO) granted the extension on November 18, 2013.

On November 19, 2013, CH2M Hill indicated that the facility should have obtained a PTC all along and that it will be preparing and submitting documentation to DEQ explaining this determination.

On November 22, 2013, DEQ received an email including a response (letter and attachments) to the Cives NTC that presented an exemption evaluation which indicated that Cives' abrasive blasting emissions for the steel shot use alone exceed the $PM_{2.5}$ levels to qualify for a Categorical Exemption

under IDAPA 58.01.01.220, 221, or 222 and that on October 29, 2013, Cives met with DEQ for a pre-application meeting to begin the process of obtaining an air quality PTC with a targeted delivery date to submit the air quality PTC application on or before December 31, 2013.

Based on the results of the compliance assistance visit and information otherwise available to DEQ, the DEQ Idaho Falls Regional Office has initiated a formal enforcement action. The purpose of this letter is to inform you that this process has started and that it may result in the issuance of a written Notice of Violation (NOV) from the DEQ detailing the alleged violations, the claimed civil penalties, and providing you with an opportunity for a compliance conference concerning the alleged violations. If an NOV is issued, it will arrive by USPS certified mail. If you have any further questions or concerns, please contact the following:

Steve Bacom
Compliance & Enforcement Coordinator
Air Quality Division
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, Idaho 83706-1255

Phone: (208) 373-0590
Fax: (208) 373-0340
Email: Steve.Bacom@deq.idaho.gov

Thank you in advance for your prompt attention to this matter. DEQ is confident that we can work cooperatively to resolve this issue.

Sincerely,

Teri Tyler, PE
Air Quality Analyst
Idaho Falls Regional Office
(208) 528-2650

TLT

ec: Rensay Owen, IFRO Regional Air Quality Manager
Steve Bacom, Compliance & Enforcement Coordinator
Marilyn Seymore, DEQ State Office

Appendix B
IDEQ Application Forms

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

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	Cives Steel Company		
2. Facility Name	Cives Steel Company	3. Facility ID No.	019-00097
4. Brief Project Description - One sentence or less	New permit to construct application for existing facility		

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		☐
☐	☒	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 (Appendix D)		☐
☒	☐	PP – Plot Plan (Figures 1-4)		☐
☒	☐	Forms MI1 – MI4 – Modeling (MI1 MI4) & (App F)	(Excel workbook, all 4 worksheets)	☐
☒	☐	Form FRA – Federal Regulation Applicability		☐

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
6/29/12

Please see instructions on back page before filling out the form. All information is required. If information is missing, the application will not be processed.

Identification

1. Facility name: Cives Steel Company

2. Existing facility identification number: 019-00097

☐ **Check if new facility (not yet operating)**

3. Brief project description: new permit to construct application for existing facility

Facility Information

4. Primary facility permitting contact name: Ben Merkling
Contact type: Responsible official
Telephone number: 208.881.5166
E-mail: bmerkling@cives.com

5. Alternate facility permitting contact name: Suzette Bollinger
Alternate contact type: Responsible official
Telephone number: 208-881-5166
E-mail: sbollinger@cives.com

6. Mailing address where permit will be sent (street/city/county/state/zip code): 10059 North Yellowstone Highway, Idaho Falls, ID, 83401

7. Physical address of permitted facility (if different than mailing address) (street/city/county/state/zip code): 10059 North Yellowstone Highway, Idaho Falls, ID, 83401

8. Is the equipment portable? ☐ **Yes*** ☒ **No** ***If yes, complete and attach PERF; see instructions.**

9. NAICS codes: **Primary NAICS**: 331400 **Secondary NAICS**: 3312

10. Brief business description and principal product produced: Steel manufacturing

11. Identify any adjacent or contiguous facility this company owns and/or operates: NA

12. Specify type of application ☒ **Permit to construct (PTC); application fee of $1,000 required. See instructions.**

☐ **Tier I permit** ☐ **Tier II permit** ☐ **Tier II/Permit to construct**

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.

☐ **Co-process Tier I modification and PTC** ☐ **Incorporate PTC at the time of Tier I renewal** ☐ **Administratively amend the Tier I permit to incorporate the PTC upon applicant's request (IDAPA 58.01.01.209.05.a, b, or c)**

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.

13. Responsible official's name: Ben Merkling
Official's title: General Manager
Official's address: 10059 North Yellowstone Highway, Idaho Falls, ID, 83401
Telephone number: 208.881.5166
E-mail: bmerkling@cives.com
Official's signature:
Date: 12/2/13

☒ **14. Check here to indicate that you want to review the draft permit before final issuance.**

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:
Clves Steel COmpany	Cives Steel Company	019-00097

4. Brief Project Description: New permit to construct application for existing facility

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	PROPELLER FAN (EXHAUST FANS)
6.	EU ID Number:	FAN 01 THROUGH 04 (4 UNITS)
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	GREENHECK
9.	Model:	SBC-3H54-20
10..	Maximum Capacity:	2 HORSEPOWER
11.	Date of Construction:	JULY 2013
12.	Date of Modification (if any):	
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:	8760 HOURS/YEAR
23.	Maximum Operation:	8760 HOURS/YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☒ Yes ☐ No (If Yes, indicate all that apply below)
	☒ Operation Hour Limit(s):	5200 (based on plasma, paint, welding)
	☐ 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:
Clves Steel COmpany	Cives Steel Company	019-00097

4. Brief Project Description: New permit to construct application for existing facility

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	GREENHECK MAU-01
6.	EU ID Number:	MAU-01A THROUGH MAU-01E (6 UNITS)
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	GREENHECK
9.	Model:	DGX-120-H32
10.	Maximum Capacity:	1.1067 MMBTU
11.	Date of Construction:	JULY 2013
12.	Date of Modification (if any):	
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:	8760 HOURS/YEAR
23.	Maximum Operation:	8760 HOURS/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:
Clves Steel COmpany	Cives Steel Company	019-00097

4. Brief Project Description: New permit to construct application for existing facility

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	GREENHECK MAU-02
6.	EU ID Number:	MAU-02A THROUGH MAU-02B (2 UNITS)
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	GREENHECK
9.	Model:	DGX-118-H32
10..	Maximum Capacity:	0.7378 MMBTU
11.	Date of Construction:	JULY 2013
12.	Date of Modification (if any):	
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:	8760 HOURS/YEAR
23.	Maximum Operation:	8760 HOURS/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:
Clves Steel COmpany	Cives Steel Company	019-00097

4. Brief Project Description: New permit to construct application for existing facility

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	GREENHECK RADIANT HEATERS (OUT BUILDINGS)
6.	EU ID Number:	Saw, Drill, Peddi, Copper Building Heat (4 UNITS)
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source -- Previous Permit #: Date Issued:
8.	Manufacturer:	GREENHECK
9.	Model:	CSP-A1410
10..	Maximum Capacity:	0.034 MMBTU
11.	Date of Construction:	JULY 2013
12.	Date of Modification (if any):	
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:	8760 HOURS/YEAR
23.	Maximum Operation:	8760 HOURS/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:
Clves Steel COmpany	Cives Steel Company	019-00097
4. Brief Project Description:	New permit to construct application for existing facility	

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	CORAYVAC RADIANT HEATERS
6.	EU ID Number:	RAD_HEAT_01 THROUGH 04, 07, AND 08 (6 UNITS)
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	CORAYVAC
9.	Model:	CRV-B-10
10..	Maximum Capacity:	0.1 MMBTU
11.	Date of Construction:	JULY 2013
12.	Date of Modification (if any):	
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:	8760 HOURS/YEAR
23.	Maximum Operation:	8760 HOURS/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:
Clves Steel COmpany	Cives Steel Company	019-00097
4. Brief Project Description:	New permit to construct application for existing facility	

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	CORAYVAC RADIANT HEATERS
6.	EU ID Number:	RAD_HEAT_05 AND 06 (2 UNITS)
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	CORAYVAC
9.	Model:	CRV-B-9
10..	Maximum Capacity:	0.09 MMBTU
11.	Date of Construction:	JULY 2013
12.	Date of Modification (if any):	
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:	8760 HOURS/YEAR
23.	Maximum Operation:	8760 HOURS/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:
Clves Steel COmpany	Cives Steel Company	019-00097

4. Brief Project Description: New permit to construct application for existing facility

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	WeatherMaster RTU-01
6.	EU ID Number:	RTU-01
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	CARRIER WEATHERMASTER
9.	Model:	48HC -11
10..	Maximum Capacity:	0.12 MMBTU
11.	Date of Construction:	JULY 2013
12.	Date of Modification (if any):	
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:	8760 HOURS/YEAR
23.	Maximum Operation:	8760 HOURS/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:
Clves Steel COmpany	Cives Steel Company	019-00097

4. Brief Project Description: New permit to construct application for existing facility

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	WEATHERMASTER RTU-02
6.	EU ID Number:	RTU-02
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	CARRIER WEATHERMASTER
9.	Model:	48HC -04
10..	Maximum Capacity:	0.05 MMBTU
11.	Date of Construction:	JULY 2013
12.	Date of Modification (if any):	
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:	8760 HOURS/YEAR
23.	Maximum Operation:	8760 HOURS/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:
Clves Steel COmpany	Cives Steel Company	019-00097

4. Brief Project Description: New permit to construct application for existing facility

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	WEATHERMASTER RTU-03
6.	EU ID Number:	RTU-03 AND RTU-04
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	CARRIER WEATHERMASTER
9.	Model:	48HC -09
10..	Maximum Capacity:	0.12 MMBTU
11.	Date of Construction:	JULY 2013
12.	Date of Modification (if any):	
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:	8760 HOURS/YEAR
23.	Maximum Operation:	8760 HOURS/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:
Clves Steel COmpany	Cives Steel Company	019-00097

4. Brief Project Description: New permit to construct application for existing facility

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	Modine Unit Heater
6.	EU ID Number:	UH-01
7.	EU Type:	☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source – Previous Permit #: Date Issued:
8.	Manufacturer:	MODINE`
9.	Model:	PDP
10..	Maximum Capacity:	0.3 MMBTU
11.	Date of Construction:	JULY 2013
12.	Date of Modification (if any):	
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:	8760 HOURS/YEAR
23.	Maximum Operation:	8760 HOURS/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 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:
Cives Steel Company	Cives Steel Company	019-00097

4. Brief Project Description: New permit to construct application for existing facility

BOOTH INFORMATION

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

6. Construction Date: July 2013

SPRAY GUN DESCRIPTION AND SPECIFICATIONS

Gun No.	7. Manufacturer	8. Model	9. Type	10. Transfer Eff. %	11. Rated Capacity (gal/hr)
1	Graco	XTR 7			
2					
3					
4					

Number of guns to be used simultaneously:

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 (Y/N)
paint (see MSDS)	Steel	93		13.96	Y

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: 5200 hours per year
☐ Production Limits:
☐ Material Usage Limits:
☐ Other:

19. Rationale for Requesting the Limit(s):

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	NA - open spraying inside building			
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:

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

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
Cives Steel Company	Cives Steel Company

3. Brief Project Description: New permit to construct application for existing facility

BAGHOUSE INFORMATION

4. Baghouse Manufacturer: Donaldson	5. Baghouse Model: DFO 3-12	6. Baghouse Equipment ID: Plasma

7 (a). Baghouse particulate matter emission concentration. **Note: Provide information in 7(a)-(c) or answer question #8 below.**	See Spec Sheet rated at 99.999% on 0.5 micron particles 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	99.9 (consevative) % _____ 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	9,580 acfm 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.**	99.9 % 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.*

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

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
Cives Steel Company	Cives Steel Company

3. Brief Project Description: New permit to construct application for existing facility

BAGHOUSE INFORMATION

4. Baghouse Manufacturer: Donaldson	5. Baghouse Model: DFO 3-18	6. Baghouse Equipment ID: BEAD_BLAST

7 (a). Baghouse particulate matter emission concentration. **Note: Provide information in 7(a)-(c) or answer question #8 below.**	See Spec Sheet rated at 99.999% on 0.5 micron particles 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	99.9 (conservative) % _____ 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	14,370 acfm 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.**	99.9 % 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.*

Instructions for Form BCE

1 – 3. Provide the same company name, facility name, and brief project description as on the application cover sheet Form CS**. This is useful if application pages are separated.

USE ATTACHMENT IF ADDITIONAL SPACE IS REQUIRED.

Baghouse Information:

4-5. Provide the baghouse manufacturer name and the model number.

6. Provide an identification number for the baghouse stack. This number is assigned by the applicant and must be provided on any other application materials which are submitted that include baghouse information.

7-9. Follow the instructions in the form. All documentation provided must be sufficient so that DEQ can verify the validity of the information provided. Provide the Baghouse Equipment ID number on all submitted documentation. If documentation is not provided the application is incomplete.

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
3/27/2007

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

Company Name:	Cives Steel Company
Facility Name:	Cives Steel Company
Facility ID No.:	019-00097
Brief Project Description:	New PTC for existing facility

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)										
MAU-01A (Phase I)	MAU-01A	421,801.40	4,826,303.30	1,390.65			344.26			exhaust through fans
MAU-01B (Phase I)	MAU-01B	421,870.00	4,826,303.30	1,390.65			344.26			exhaust through fans
MAU-01C (Phase II)	MAU-01C	421,801.40	4,826,324.90	1,390.65			344.26			exhaust through fans
MAU-01D (Phase II)	MAU-01D	421,870.00	4,826,324.90	1,390.65			344.26			exhaust through fans
MAU-01E (Phase III)	MAU-01E	421,948.70	4,826,281.60	1,390.65			344.26			exhaust through fans
MAU-01F (Phase III)	MAU-01F	421,948.70	4,826,342.70	1,390.65			344.26			exhaust through fans
MAU-02A (Phase I)	MAU-02A	421,908.00	4,826,303.30	1,390.65			344.26			exhaust through fans
MAU-02B (Phase II)	MAU-02B	421,908.00	4,826,324.90	1,390.65			344.26			exhaust through fans
RTU-01 (0.12 MMBtu)	RTU-01	421,835.70	4,826,289.80	1,390.65	5.03	0.04	330.37	480.00	175.80	Horizontal
RTU-02 (0.05 MMBtu)	RTU-02	421,865.80	4,826,291.00	1,390.65	5.03	0.04	324.82	200.00	73.24	Horizontal
RTU-03 (0.12 MMBtu)	RTU-03	421,889.60	4,826,293.10	1,390.65	5.03	0.04	330.37	480.00	175.80	Horizontal
RTU-04 (0.12 MMBtu)	RTU-04	421,926.50	4,826,293.10	1,390.65	5.03	0.04	330.37	480.00	175.80	Horizontal
Radiant Heater 01 (Phase II)	RAD_HEAT_0	421,900.70	4,826,333.50	1,390.65	10.82	0.10	344.26	210.00	12.25	Vertical, rain cap
Radiant Heater 02 (Phase II)	RAD_HEAT_0	421,900.70	4,826,321.80	1,390.65	10.82	0.10	344.26	210.00	12.25	Vertical, rain cap
Radiant Heater 03 (Phase I)	RAD_HEAT_0	421,900.70	4,826,313.90	1,390.65	10.82	0.10	344.26	210.00	12.25	Vertical, rain cap
Radiant Heater 04 (Phase I)	RAD_HEAT_0	421,900.70	4,826,299.00	1,390.65	10.82	0.10	344.26	210.00	12.25	Vertical, rain cap
Radiant Heater 05A (Phase II)	RAD_HEAT_0	421,900.70	4,826,333.50	1,390.65	10.82	0.10	344.26	105.00	6.12	Vertical, rain cap
Radiant Heater 05B (Phase II)	RAD_HEAT_0	421,936.00	4,826,321.80	1,390.65	10.82	0.10	344.26	105.00	6.12	Vertical, rain cap
Radiant Heater 06A (Phase I)	RAD_HEAT_0	421,936.00	4,826,313.90	1,390.65	10.82	0.10	344.26	105.00	6.12	Vertical, rain cap
Radiant Heater 06B (Phase I)	RAD_HEAT_0	421,936.00	4,826,299.00	1,390.65	10.82	0.10	344.26	105.00	6.12	Vertical, rain cap
Radiant Heater 07 (Phase III)	RAD_HEAT_0	421,949.00	4,826,361.00	1,390.65	10.82	0.10	344.26	210.00	12.25	Vertical, rain cap
Radiant Heater 08 (Phase III)	RAD_HEAT_0	421,949.00	4,826,276.00	1,390.65	10.82	0.10	344.26	210.00	12.25	Vertical, rain cap
Unit Heater (Phase I)	UH-01	421,795.00	4,826,280.00	1,390.65	9.14	0.15	322.04		0.00	Horizontal
Saw Building Heater	SAW_BLDG_H	421,683.00	4,826,320.00	1,395.34	3.66	0.35	294.26		0.00	Horizontal
Drill Building Heater	DRILL_BLD_H	421,717.00	4,826,313.00	1,396.31	3.66	0.35	294.26		0.00	Horizontal

Peddiwriter Building Heater	PEDDI_BLD_H	421,750.00	4,826,320.10	1,394.89	3.66	0.35	294.26		0.00	Horizontal
Copper Building Heater	COPPER_BLD	421,683.00	4,826,301.00	1,399.75	3.66	0.35	294.26		0.00	Horizontal
Abrassive Blasting (Dust collector)	BEAD_BLAST	421,791.30	4,826,293.12	1,390.65	1.91	1.03	294.26		0.00	Horizontal
Exhaust Fan 01	FAN_01	421,960.00	4,826,330.50	1,390.65	12.65	1.37	294.26	24,701.00	7.90	Vertical, no rain cap
Exhaust Fan 02	FAN_02	421,960.00	4,826,320.00	1,390.65	12.65	1.37	294.26	24,701.00	7.90	Vertical, no rain cap
Exhaust Fan 03	FAN_03	421,960.00	4,826,310.00	1,390.65	12.65	1.37	294.26	24,701.00	7.90	Vertical, no rain cap
Exhaust Fant 04	FAN_04	421,960.00	4,826,299.50	1,390.65	12.65	1.37	294.26	24,701.00	7.90	Vertical, no rain cap

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:	Cives Steel Company
Facility Name:	Cives Steel Company
Facility ID No.:	019-00097
Brief Project Description:	New PTC for existing facility

BUILDING AND STRUCTURE INFORMATION

1. Building ID Number	2. Length (ft)	3. Width (ft)	4. Base Elevation (m)	5. Building Height (m)	6. Number of Tiers	7. Description/Comments
Fabrication Building	544.00	402.50		10.21	2	main fabrication building containing paint and welding activities
Paint Storage Building	30.00	40.00		10.67	1	Connected to fabrication building
Peddiwriter Building	25.00	35.00		5.56	1	
Drill Building	25.00	35.00		4.50	1	
Saw Building	25.00	35.00		4.50	1	
Copper Building	25.00	35.00		5.11	1	

This form is designed to provide the air quality modeler with information on the buildings and structures located at the facility. This information may be used by the IDEQ to perform an air quality analysis or to review an air quality analysis submitted with the permit application or requested by the IDEQ.

Please fill in the same company name, facility name, facility ID number, and brief project description in the boxes provided. This is useful in case any pages of the application get separated.

1. Provide the building ID number.
2. Provide the length of the building.
3. Provide the width of the building.
4. Provide the base elevation of the building. This elevation must be calculated by the same method as the sources and receptor elevation.
5. Provide the height of the building, from the ground.
6. Provide the number of tiers on the building. Refer to the State of Idaho Modeling Guideline for guidance on this topic.
7. Provide a description of the building.

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

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: Cives Steel Company	2. Facility Name: Cives Steel Company
3. Brief Project Description: New permit to construct application for existing facility	

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): NA ☑ 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): NA ☑ 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.

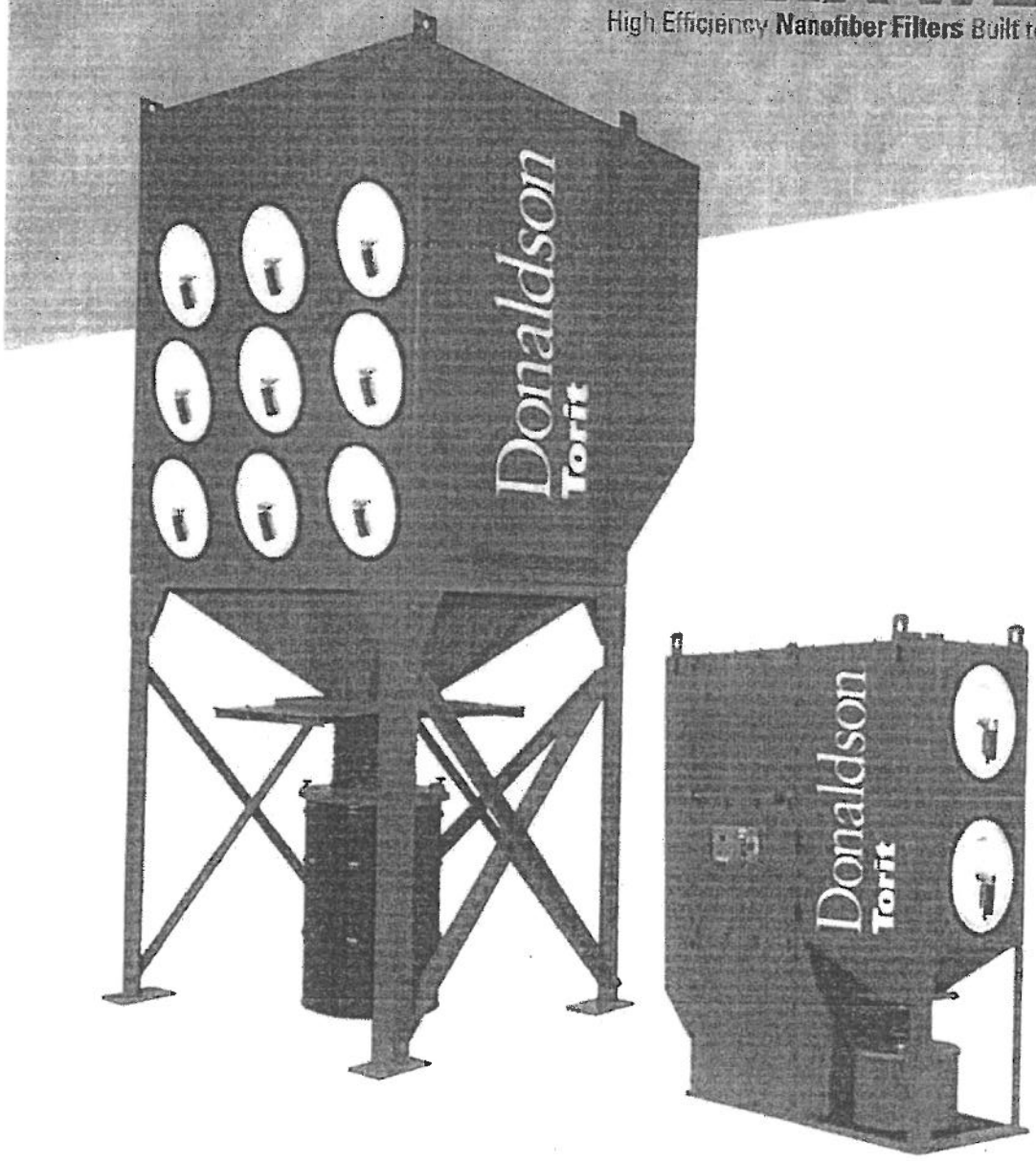
Appendix C
Manufacturer Data and MSDS

ABRASIVE BLASTING
DUST COLLECTOR

Donaldson
Torit

DOWNFLO® OVAL DUST COLLECTORS

ULTRA-WEB®
High Efficiency Nanofiber Filters Built to Last



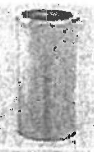
DFO Model*	Nominal Airflow Range** cfm	m³/h	Ultra-Web Filter Area No. of Filters	ft²	m²	No. of Valves	Approx. Shipping Weight*** lb	kg	Dimensions A in	mm	B in	mm	C in	mm
1-1	100-800	169.9-1,358.9	1	190	17.7	1	800	362.9	30.0	762.0	52.0	1320.8	65.0	1651.0
2-2	200-1,600	339.7-2,717.8	2	380	35.3	2	1,000	453.6	30.0	762.0	74.0	1879.6	65.0	1651.0
3-3	300-2,400	509.6-4,076.8	3	570	53.0	3	1,300	589.7	30.0	762.0	96.0	2438.4	65.0	1651.0
2-4	380-3,190	645.5-5,418.7	4	760	70.6	4	1,100	499.0	45.0	1143.0	118.8	3017.5	62.0	1574.8
2-8	760-6,380	1,291.0-10,837.4	8	1,520	141.2	4	1,600	725.7	45.0	1143.0	127.8	3246.1	84.0	2133.6
2-12	1,140-9,580	1,936.5-16,273.1	12	2,280	211.8	6	2,100	952.5	65.0	1651.0	127.8	3246.1	84.0	2133.6
2-16	1,520-12,770	2,581.9-21,691.8	16	3,040	282.4	8	3,100	1,406.1	85.0	2159.0	127.8	3246.1	84.0	2133.6
2-24	2,290-19,150	3,872.9-32,529.1	24	4,560	423.6	12	4,200	1,905.1	125.0	3175.0	127.8	3246.1	84.0	2133.6
2-36	3,420-28,730	5,809.4-48,802.2	36	6,840	635.4	18	6,300	2,857.6	185.0	4699.0	127.8	3246.1	84.0	2133.6
3-6	570-4,790	968.2-8,136.5	6	1,140	105.9	6	1,400	635.0	45.0	1143.0	137.4	3490.0	62.0	1574.8
3-10	950-7,980	1,613.7-13,555.2	10	1,900	176.5	5	1,900	861.8	45.0	1143.0	146.5	3721.1	85.3	2166.6
3-12	1,140-9,580	1,936.5-16,273.1	12	2,280	211.8	6	2,000	907.2	45.0	1143.0	146.5	3721.1	85.3	2166.6
3-18	1,710-14,370	2,904.7-24,409.6	18	3,420	317.7	9	2,800	1,270.1	65.0	1651.0	146.5	3721.1	85.3	2166.6
3-24	2,280-19,150	3,872.9-32,529.1	24	4,560	423.6	12	3,300	1,496.9	85.0	2159.0	146.5	3721.1	85.3	2166.6
3-36	3,420-28,730	5,809.4-48,802.2	36	6,840	635.4	18	6,100	2,766.9	125.0	3175.0	146.5	3721.1	85.3	2166.6
3-48	4,560-38,300	7,745.8-65,058.3	48	9,120	847.2	24	8,100	3,674.1	165.0	4191.0	146.5	3721.1	85.3	2166.6
3-60	5,700-47,880	9,682.3-81,331.4	60	11,400	1,059.1	30	10,100	4,581.3	205.0	5207.0	146.5	3721.1	85.3	2166.6
3-72	6,840-57,460	11,618.8-97,604.4	72	13,680	1,270.9	36	12,100	5,488.5	245.0	6223.0	146.5	3721.1	85.3	2166.6
4-16	1,520-12,770	2,581.9-21,691.8	16	3,040	282.4	8	2,400	1,088.6	45.0	1143.0	165.1	4193.5	85.3	2166.6
4-32	3,040-25,540	5,163.9-43,383.5	32	6,080	564.8	16	4,200	1,905.1	85.0	2159.0	165.1	4193.5	85.3	2166.6
4-48	4,560-38,300	7,745.8-65,058.3	48	9,120	847.2	24	7,400	3,356.6	125.0	3175.0	165.1	4193.5	85.3	2166.6
4-64	6,080-51,070	10,327.8-86,750.1	64	12,160	1,129.7	32	9,100	4,127.7	165.0	4191.0	165.1	4193.5	85.3	2166.6
4-80	7,600-63,840	12,909.7-108,441.8	80	15,200	1,412.1	40	11,000	4,989.5	205.0	5207.0	165.1	4193.5	85.3	2166.6
4-96	9,120-76,600	15,491.7-130,116.6	96	18,240	1,694.5	48	12,600	5,715.3	245.0	6223.0	165.1	4193.5	85.3	2166.6
4-112	10,640-89,380	18,073.6-151,825.3	112	21,280	1,976.9	56	14,500	6,577.1	285.0	7239.0	165.1	4193.5	85.3	2166.6
4-128	12,160-102,150	20,655.6-173,517.1	128	24,320	2,259.3	64	16,100	7,302.8	325.0	8255.0	165.1	4193.5	85.3	2166.6

* The first number indicates number of filter rows, and the second number indicates number of cartridges.
** Based on clean filters.
*** Without accessories or optional equipment.

Cartridge Features

Feature	Ultra-Web II*	Ultra-Web II NL	EZ Ultra-Web II	Fibra-Web
Proprietary Composition of Media	• Eon Synthetic fibers w/avg. dia. of 0.2 microns • Cellulose substrate	• Eon Synthetic fibers w/avg. dia. of 0.2 microns • Cellulose substrate	• Eon Synthetic fibers w/avg. dia. of 0.2 microns • Cellulose substrate	• Eon Synthetic fibers w/avg. dia. of 0.2 microns • Synthetic fibers substrate w/avg. dia. of 12 microns
Fractional Efficiency	99.999% on 0.5 micron particles	99.999% on 0.5 micron particles	99.999% on 0.5 micron particles	99.999% on 1.0 micron particles
Availability on Products	AAT DF/DFT/SDF/DFO+ ECB ProBooth TBV TD (Both) Trunkline™	DF/DFT/DFO+ ECB ProBooth™ TBV TD (Both)	DF/DFT	DF*/DFT*/SDF/DFO+ ECB* ProBooth* TBV* TD - Small TD* - Large
Construction	• Galvanized steel liners & end caps • Urethane gasket	• Galvanized steel • Urethane gasket	• Galvanized steel liners • Urethane gasket	• Galvanized steel liners & end caps • Urethane gasket
Optional Construction	304 stainless steel liners & end caps +not available DFO	304 stainless steel end caps +not available DFO	None	304 stainless steel liners & end caps (asterisk units only)
Other Medias Available	Flame-retardant	Flame-retardant	Flame-retardant	Flame-retardant
Pleat Spacing	8 pleats/inch	8 pleats/inch	8 pleats/inch	4 pleats/inch
Maximum Operating Temperature	150°F (65°C)	150°F (65°C)	150°F (65°C)	150°F (65°C)
Abrasion Resistance	Good	Good	Good	Excellent
Washability	1 Time	1 Time	1 Time	Up to 6 times

FILTER OPTIONS

	Ultra-Web® 	Ultra-Web SB 	Fibra-Web® 	Torit-Tex™ 
Base Media	Cellulose with Nanofiber[1]	Spunbond polyester with Nanofiber[1]	Synthetic with Nanofiber[1]	Calendered, Spunbond polyester with Tetratex® PTFE membrane[2]
U.S. Efficiency Rating (MERV)[3]	13	15	14	16
European Efficiency Rating[4]	BIA L, M EN 779-F7	BIA L, M EN 779-F8	BIA L, M EN 779-F8	BIA L, M EN 779-F9
Maximum Operating Temperature	180°F (82°C)	200°F (93°C)	180°F (82°C)	200°F (93°C)
Abrasion Resistance	Good	Excellent	Good	Excellent
Chemical Tolerance	Fair	Excellent	Good	Excellent
Optional Flame Retardant Media (FR)	Yes	No	Yes	No
Special Characteristics	Nanofiber media provides excellent surface loading and dust release capabilities	Highest efficiency similar to membrane products at a much lower price.	Wide pleat spacing provides thorough pulse cleaning of fibrous and agglomerative particles	Wide pleat spacing and smooth, hydrophobic, state-of-the-art PTFE membrane provides excellent particle release
Markets	Metalizing, Pharmaceutical, General industrial, Paint pigments, Carbon black, Thermal spray, Welding	Chemical processing, General industrial, Surface blasting, Grinding, Polishing, Powder coating, Pharmaceutical, Food	Composite Grinding, Food processing, Grain handling, Metal buffing, Pharmaceutical, Textiles, Woodworking	Chemical processing, Food processing, General industrial
Applications	Premium performance on ambient, extremely fine and non-fibrous dust and some abrasive dust. High filtration efficiency on very fine particulate of <1 micron	Chemical processing, General industrial, Surface blasting, Grinding, Polishing, Powder coating	Excellent performance on combination fibrous and non-fibrous dust, and/or agglomerative dust	Highly recommended for chemical, food, and industrial processing when product contamination must be minimized. Excellent performance on moist, hygroscopic, or agglomerative dust.
Dust Types	Fumed silica, Metallic fume, Metallurgical powders, Oily weld fume, Pharmaceutical compounds	Ceramics, Cotton, Fiberglass, Tobacco, Metal grinding, Powder coating, Shot blast, Gypsum, Lime, Cement	Ceramics, Cotton, Fiberglass, Tobacco	Dextrose, Flour, Starch, Sugar, Whey
Available for Collectors (see key at far right)	AAT, AER, AT, AT-3000, CF, CX, DB, DCS, DFO, DF, DFT, DWS, ECB, ET, MTD, PB, PT, SDF, T-2000, TBV, TD, WB	AER, AT, CF, CX, DB, DF, DFT, ECB, MTD, PB, SDF, TBV, TD, TBV	AER, AT, CF, CX, DB, DCS, DF, DFO, DFT, DWS, ECB, MTD, PB, SDF, TBV, TD	AER, AT, CF, CX, DB, DCS, DF, DFO, DFT, DWS, ECB, MTD, PB, SDF, TBV, TD
Available for Competitors Collectors	AAF, Airflow® Systems, Clemco, CP Environmental, Environmental Systems Design, Farr, MAC, Micro Air®, Nordson, Pneumafil, Polaris, Robovent, Steelcraft, Steelcraft / Filtrex, Trion, UAS, Wheelabrator, Wiedenmann	AAF, Airflow® Systems, Clemco, CP Environmental, Environmental Systems Design, Farr, MAC, Micro Air®, Nordson, Pneumafil, Polaris, Robovent, Steelcraft, Steelcraft / Filtrex, Trion, UAS, Wheelabrator, Wiedenmann	AAF, Airflow® Systems, Clemco, CP Environmental, Environmental Systems Design, Farr, MAC, Micro Air®, Nordson, Pneumafil, Polaris, Robovent, Steelcraft, Steelcraft / Filtrex, Trion, UAS, Wheelabrator, Wiedenmann	AAF, Airflow® Systems, Clemco, CP Environmental, Environmental Systems Design, Farr, MAC, Micro Air®, Nordson, Pneumafil, Polaris, Robovent, Steelcraft, Steelcraft / Filtrex, Trion, UAS, Wheelabrator, Wiedenmann

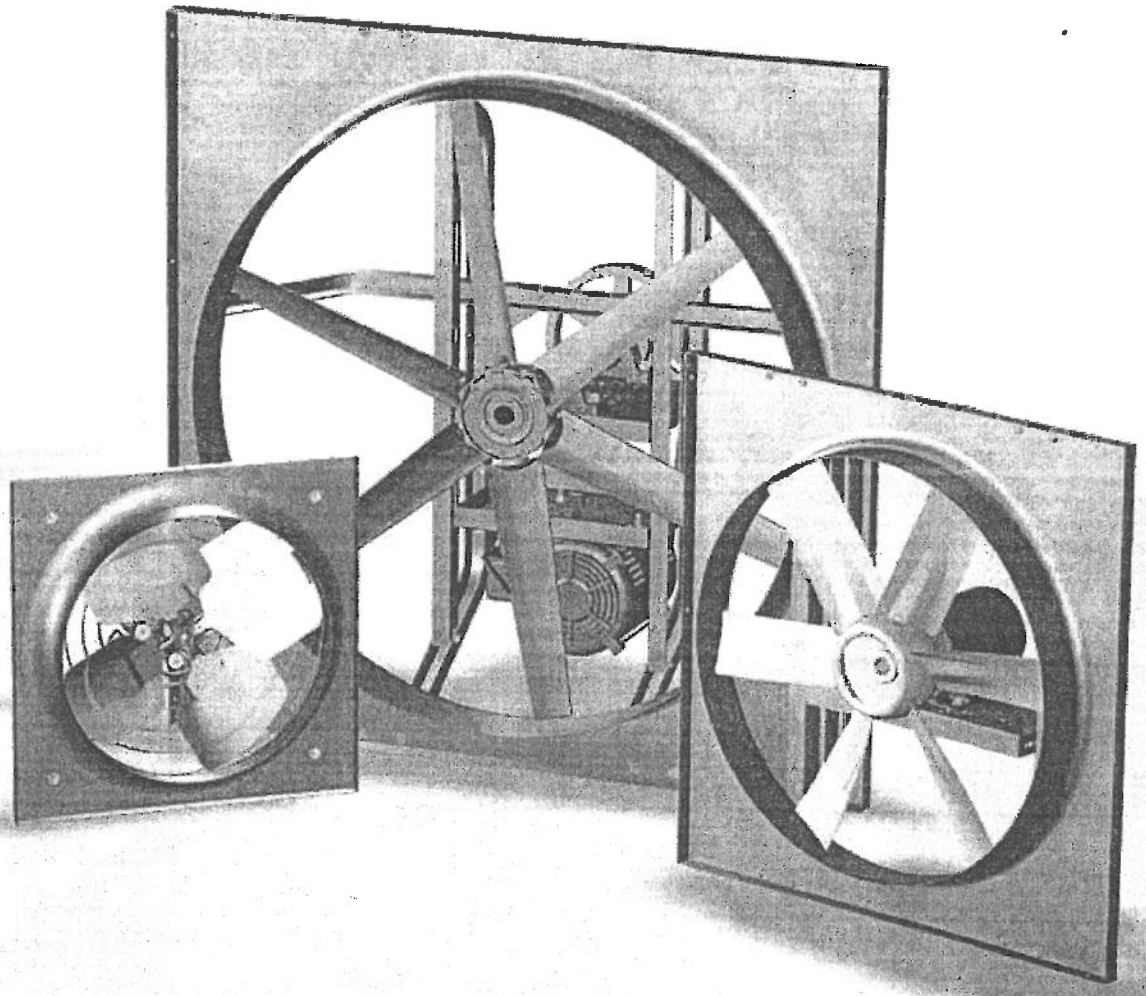
Color Chart

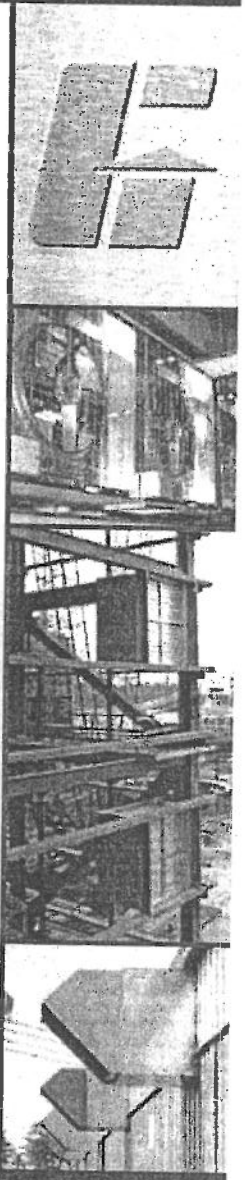
Nanofiber Filters	Speciality Filters	Standard Filters

Sidewall Propeller Fans

Belt and Direct Drive

Exhaust, Supply and Reversible





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Building Value in Air.

July
2009

Exhaust Fans

SBC-48-54 Belt Drive
Cast Aluminum

Model Number	Motor HP	Fan RPM	Max BHP	*Sones	CFM / Static Pressure in Inches WG 0.00	0.10	0.125	0.15	0.20	0.25	0.30	0.375	0.50	0.625	0.75	1.00
48 Performance		Max RPM L - 908			H - 1182			Max Motor Frame Size - 215T					TS = RPM x 12.566			
		435	0.99	18.5	21897	17413	15801									
SBC-3L48-15	1½	500	1.51	23	25169	21295	20354	19165								
		531	1.80	24	26730	23117	22183	21212								
		566	0.99	23	[illegible]	18533	17717	17010	15233	13144	9229					
SBC-3H48-15	1½	650	1.50	28	[illegible]	21973	21464	20750	19481	17983	16242	12200				
		691	1.80	31	[illegible]	23608	23130	22600	21313	20083	18535	15959				
SBC-3L48-20	2	550	2.00	25	27686	24227	23288	22434								
		585	2.41	27	29448	26249	25335	24494	22640							
SBC-3H48-20	2	716	2.01	33	[illegible]	24598	24136	23675	22413	21279	19918	17513				
		761	2.41	35	[illegible]	[illegible]	25935	25501	24434	23316	22195	20084	15370			
SBC-3L48-30	3	630	3.01	30	31713	28809	27962	27113	25587	23623						
		669	3.61	32	33676	30972	30203	29404	27904	26301						
SBC-3H48-30	3	819	3.00	39	[illegible]	[illegible]	28231	27827	27020	25867	24889	23274	19744	13540		
		871	3.61	43	[illegible]	[illegible]	[illegible]	29892	29133	28230	27191	25779	22761	19268		
SBC-3L48-50	5	746	5.00	38	37552	35186	34519	33635	32401	31082	29675					
		793	6.01	41	39918	37729	37102	36474	35144	33810	32626	30464				
SBC-3H48-50	5	971	5.00	53	[illegible]	[illegible]	[illegible]	[illegible]	33140	32459	31682	30277	28102	25291	22178	
		1032	6.00	59	[illegible]	[illegible]	[illegible]	[illegible]	35553	34913	34272	33002	30995	28669	25923	16703
SBC-3L48-75	7½	854	7.50	45	42989	41003	40421	39838	38648	37395	36190	34476				
		908	9.02	50	45707	43860	43334	42786	41690	40528	39350	37736	34664			
SBC-3H48-75	7½	1112	7.51	67	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	38098	37504	36601	34556	32687	30384	25026
		1182	9.01	75	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	40859	40300	39461	37668	35918	34068	29382
54 Performance		Max RPM L - 727			H - 856			Max Motor Frame Size - 254T					TS = RPM x 14.135			
		364	1.51	18.0	25482	21713	20664	19377								
SBC-3L54-20	2	400	2.01	20	28002	24618	23706	22752	19950							
		425	2.41	22	29752	26685	25741	24882	22822							
		429	1.51	21	[illegible]	22604	21870	21035	19310	17043	13521					
SBC-3H54-20	2	471	2.00	23	[illegible]	[illegible]	[illegible]	24701	24032	22511	20907	18781				
		501	2.41	26	[illegible]	[illegible]	26674	26066	24696	23254	21708	18049				
SBC-3L54-30	3	458	3.01	25	32062	29480	28382	27585	25914	23719						
		487	3.62	28	34092	31897	30843	29919	28420	26637	24050					
SBC-3H54-30	3	539	3.00	29	[illegible]	[illegible]	[illegible]	28577	27407	26078	24712	22298				
		573	3.61	31	[illegible]	[illegible]	[illegible]	[illegible]	29731	28536	27286	25299	20153			
SBC-3L54-50	5	543	5.02	33	38013	36203	35539	34594	32996	31652	30072	26691				
		577	6.02	38	40393	38690	38264	37449	35716	34451	33186	30778				
SBC-3H54-50	5	639	5.00	37	[illegible]	[illegible]	[illegible]	[illegible]	34086	33131	32068	30386	27398	22327		
		680	6.02	41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	35851	34954	33382	30664	27125	21725	
SBC-3L54-75	7½	621	7.51	44	43473	41891	41495	41090	39437	38008	36833	34916	30021			
		660	9.01	49	46203	44715	44342	43970	42720	41165	40006	38347	34940			
SBC-3H54-75	7½	732	7.52	47	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	38421	37100	34654	32044	28344	
		778	9.03	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	41445	40269	38025	35671	33163	23604
SBC-3L54-100	10	684	10.03	53	47883	46447	46088	45729	44718	43217	41935	40334	37224	30947		
		727	12.00	61	50894	49542	49204	48866	48191	46850	45438	43846	41235	37872		
SBC-3H54-100	10	805	10.02	55	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	42068	39973	37748	35353	27829
		856	12.03	61	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	45432	43599	41507	39367	33873

CFM values shown in black are the most efficient selections. Values shown in gray are not recommended.

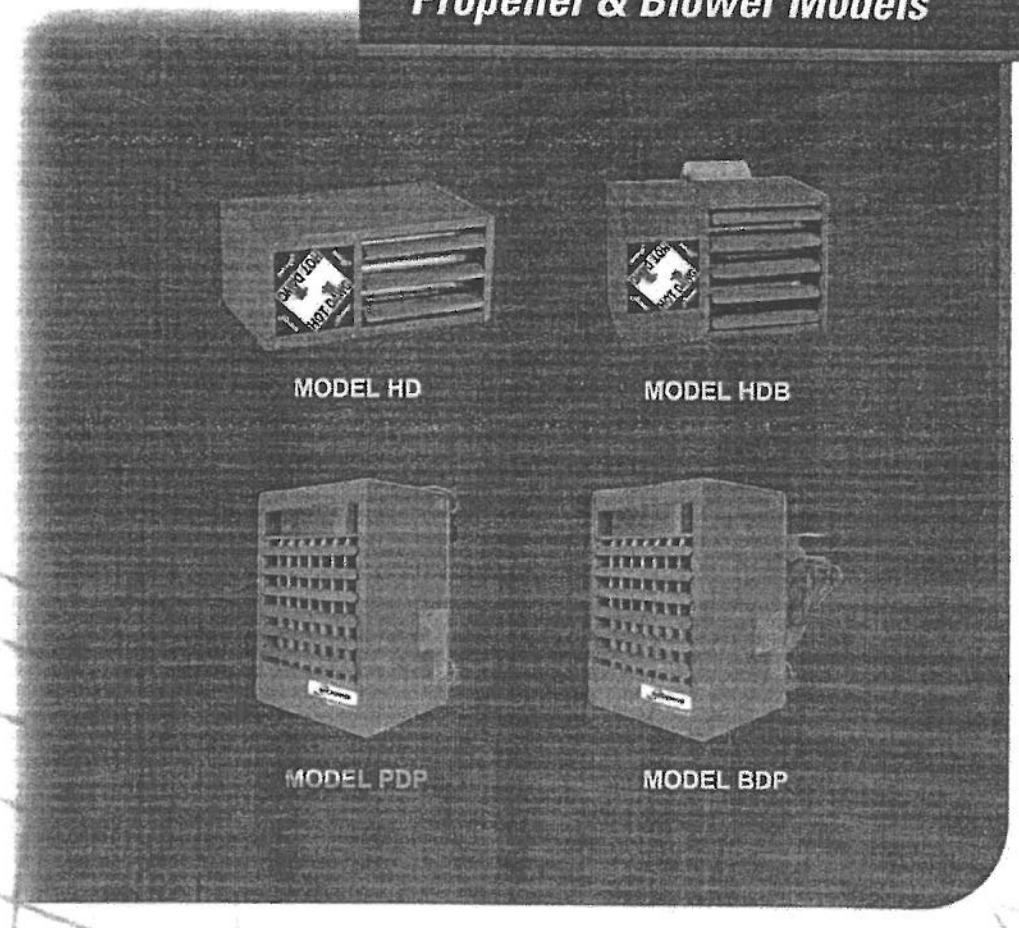
Performance certified is for Model SBC for installation type A: free inlet, free outlet. Power rating (Bhp) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). *Speed (RPM) shown is nominal. Performance is based on actual speed of test. The sound ratings shown are loudness values in fan sones at 5 ft (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values are for installation type A: free inlet hemispherical sone levels.*Sones shown apply to the highest catalogued CFM in black type at each fan RPM. For selections at other CFM and static pressure points,refer to CAPS, the Computer Aided Product Selection Program.

UNIT HEATER

MODINE
APPLIED THERMAL INNOVATION™

6-189.6
August, 2011

Gas-Fired Power Vented Unit Heaters
Propeller & Blower Models



INDOOR AIR SOLUTIONS

MODINE INDOOR AIR SOLUTIONS

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.

19. In cold ambient conditions, such as Canada, the following items are recommended for proper operation and equipment life:
    - The vent pipe must not pass through an unheated space or interior part of an open chimney unless the vent pipe is insulated.
    - Where the vent pipe may be exposed to extreme cold, or come into contact with snow or ice, the entire vent must be insulated or double wall (includes outdoors). It is preferred that the double wall vent is one continuous piece but a joint is allowed outside the building.
    - The vent terminal must extend 12 inches beyond the exterior surface of an exterior wall and be supported as shown in Figure 6.1.
    - The heater system shall be checked at least once a year by a qualified service technician.
20. If left hand (facing front of heater with air blowing in face) power exhauster discharge is desired, the power exhauster may be rotated 180°. To do this, remove screws in vent collar, rotate power exhauster, replace screws.

Additional Requirements for Horizontally Vented Category III units.

1. Seal the joints with a metallic tape or silastic suitable for temperatures up to 350°F. (3M tapes 433 or 363 are acceptable.) Wrap the tape two full turns around the vent pipe.
2. Refer to Table 6.1 for total minimum and maximum vent lengths making the vent system as straight as possible. The equivalent length of a 90° elbow is 6 feet for 5" diameter and 7 feet for 6" diameter.

Table 6.1 - Vent Pipe Diameters, Transitions, and Total Equivalent Vent Pipe Lengths for Horizontal Vent Systems

Model Size	Vent Transition Included	Vent Pipe Diameter	Minimum Eqv Length	Maximum Eqv Length
150, 175	4" to 5"	5"	2'	60'
200	6" to 5"	5"	2'	60'
250- 400	Not Required	6"	2'	70'

3. The vent terminal must be a Gary Steel 1092, Tjernlund VH1, Starkap, Selkirk, or Constant Air -Flo 2433 style terminal or equivalent.
4. If a Gary Steel 1092 vent terminal or equivalent is used, the vent can extend 6 inches beyond the exterior surface of an exterior wall rather than 12 inches as shown in Figure 6.2. Precautions must be taken to prevent degradation of building materials by flue products.
5. If a Tjernlund VH1 or equivalent vent terminal is used the vent may be flush with the exterior surface of an exterior wall. Precautions must be taken to prevent degradation of building materials by flue products. Where the terminal is not available in the appropriate size for the unit to be installed, use a transition and the next larger size terminal.
6. If a Constant Air-Flo, Starkap, Selkirk, or equivalent vent terminal is used the vent must extend 12 inches beyond the exterior surface of an exterior wall. Precautions must be taken to prevent degradation of building materials by flue products.
7. The vent system shall terminate at least 3 feet above any forced air inlet (except direct vent units) located within 10 feet, and at least 4 feet below, 4 feet horizontally from, or 1 foot above any door, window, or gravity air inlet into any building. The bottom of the vent terminal shall be located above the snow line or at least 1 foot above grade; whichever is greater. When located adjacent to public walkways the vent system shall terminate not less than 7 feet above grade.

Figure 6.1 - Vent Construction Through Combustible Walls

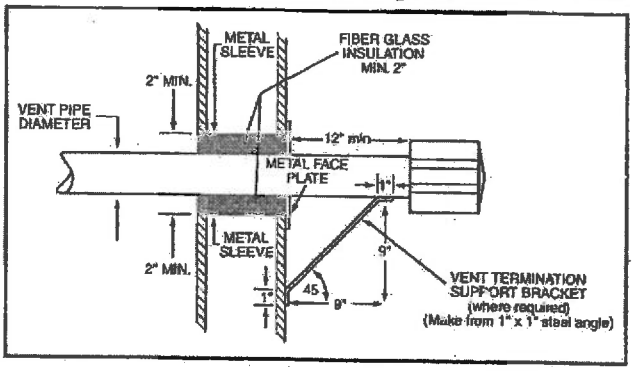
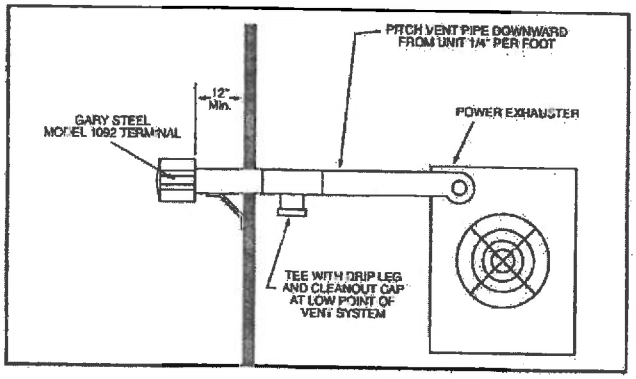
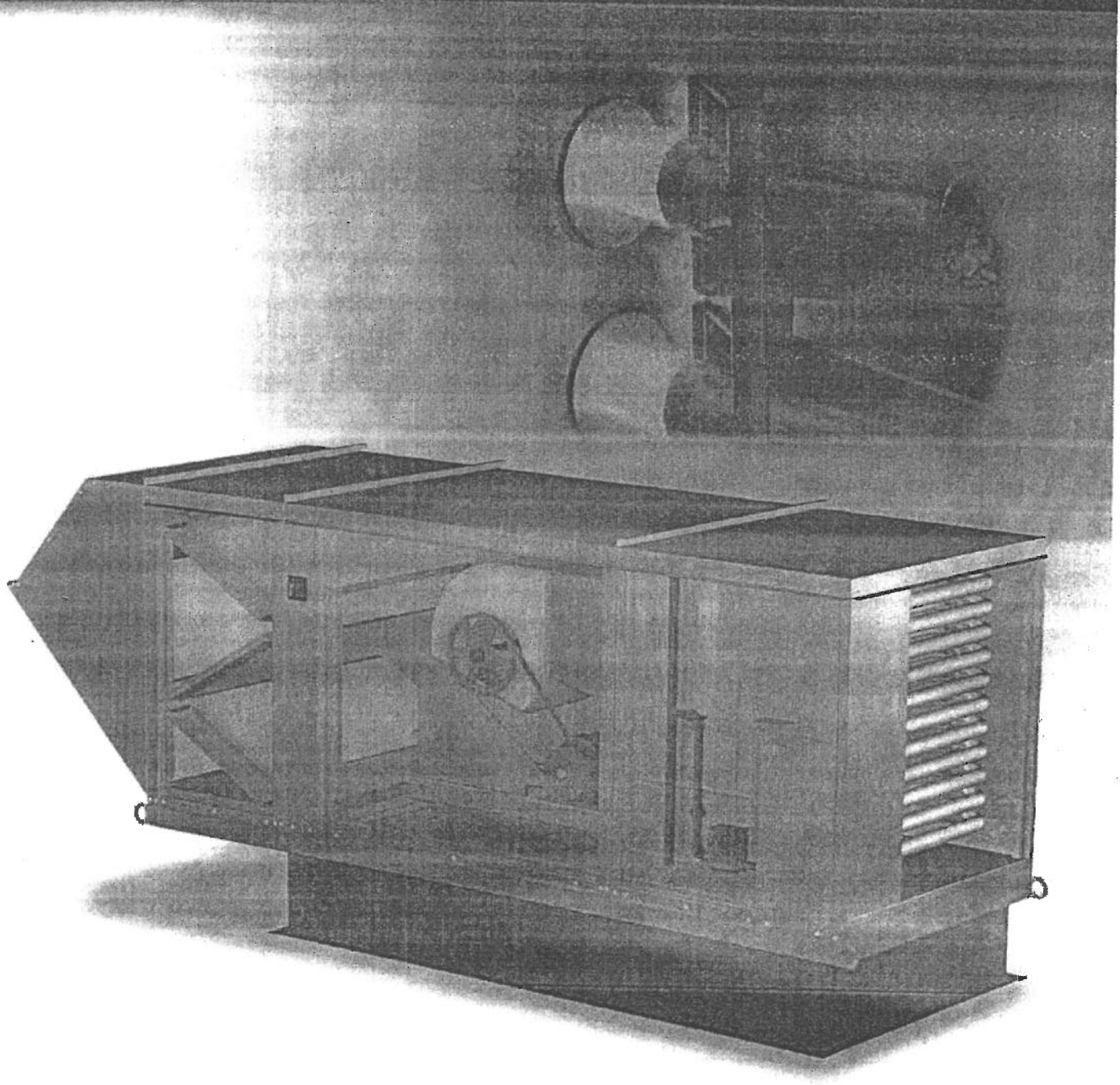


Figure 6.2 - Horizontal Venting - Breidert or Gary Steel Vent Terminal



8. The venting system must be exclusive to a single unit, and no other unit is allowed to be vented into it.
9. Horizontally vented units must use single wall vent pipe although one continuous section of double wall vent pipe may be used with the vent system. Under no circumstances should two sections of double wall vent pipe be joined together within one vent system due to the inability to verify complete seal of inner pipes.

Indirect Gas-Fired
Technical Guide



GREENHECK
Building Value in Air.

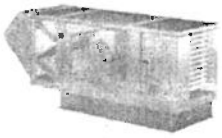
April
2012

Make-Up Air Product Selection Guide

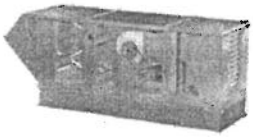
GREENHECK
Building Value in Air.

Heating Type	Model	Airflow Range (CFM)	Max Heater Size (MBH)		Airflow Options		Max Cooling Volume (CFM)		
			Natural Gas	LP	VAV/2-Speed	Recirculation	Evaporative	DX	Chilled Water
Direct Gas	DG	800 - 15,000	1,600	1,400			12,000		
	DGK	1,000 - 8,500	800	700					
	DGX	800 - 45,000	4,800	4,200	■	■	46,000	11,000	11,000
	TSU	30,000 - 64,000	7,000	6,000	■	■	60,000		
	VSU	800 - 64,000	7,000	6,000	■	■			
Indirect Gas	IG	800 - 7,000	400 (input)			■	7,000		
	IGK	1,500 - 5,000	400 (input)						
	IGX	800 - 15,000	1,200 (input)		■	■	19,000	11,000	11,000
	IG-HV	800 - 7,000	400 (input)			■			
	IGX-HV	800 - 15,000	1,200 (input)			■	14,000	11,000	11,000
Steam	MSX	800 - 48,000	1,900 MBH		■	■	46,000	11,000	11,000
Hot Water	MSX	800 - 48,000	1,600 MBH		■	■	46,000	11,000	11,000
Electric	MSX	800 - 48,000	180 kW		■	■	46,000	11,000	11,000
Untempered	KSFD	400 - 2,100							
	KSFB	1,000 - 10,500			■				
	KSF	800 - 12,000			■				
	MSX	800 - 48,000			■	■			
	TSF	30,000 - 64,000			■				

Model IG

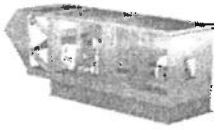


Model IGX



Model IGX-HV

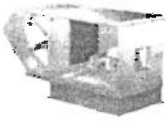
Model DG



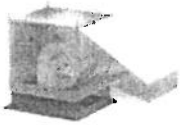
Model DGX

Model KSFD

Model TSU



Model MSX



Model KSF

Model VSU

Our Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

Prepared to Support Green Building Efforts

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

P.O. Box 410 • Schofield, WI 54476-0410 • Phone (715) 359-6171 • greenheck.com

00.TAP.1028 R2 4-2012 RG

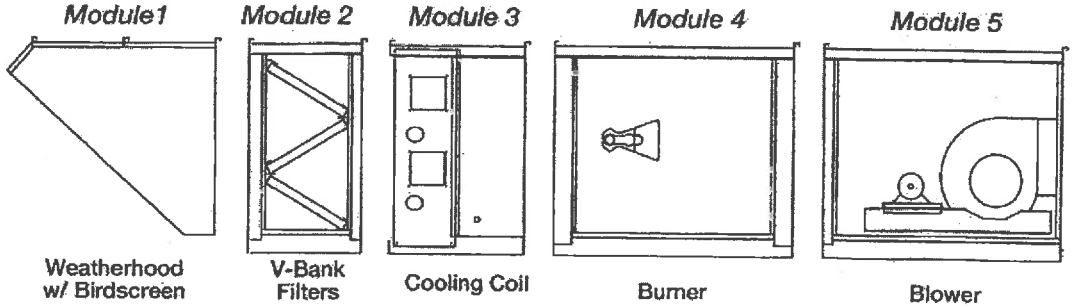
Dimensional Data & Weights

GREENHECK
Building Value in Air.

	Model	DGX-H12	DGX-H22	DGX-H32	DGX-H35	DGX-H38	DGX-H42
Unit	Airflow Range (cfm)	800-3,000	2,600-6,500	6,500-15,000	15,000-23,000	24,000-34,000	32,000-48,000
Unit	Approximate Weight* (lbs)	700	1,100	1,500	2,300	3,000	4,000
Unit	Height (in.)	39	44.9	48.7	54.6	63.9	67.9
Unit	Width (in.)	33.7	44.1	53.1	78.5	95.5	100.3
Unit	Overall Width with Evaporative Cooling (in.)	-	>4,800 cfm = 60.6	≤9,000 cfm = 66.5 >9,000 cfm = 96.5	120.5	-	-
	Lengths (in.)						
Module 1	Birdscreen Weatherhood	29.9	45.6	47.3	47.1	60.9	70.0
Module 1	Aluminum Mesh Filtered Weatherhood	31.5	47.1	48.7	47.8	65.3	68.9
Module 1	Louvered Weatherhood	13.8	16.9	16.9	-	-	-
Module 1	Thru-Wall	69.9	82.3	104.7	120.6	-	-
Module 1	Evaporative Cooling	30.2	30.2	≤9,000 cfm = 34.7 >9,000 cfm = 38.1	38.1	98.5	116.5
Module 2	V-Bank Filter Section	21.5	24.1	25.8	27.7	30.8	31.1
Module 2	80/20 Filter Section	-	44.1	50.2	51.3	50	55
Module 3	Cooling Coil (standard)	30	30	-	-	-	-
Module 3	Cooling Coil (high capacity)	50.4	69.4	98.1	-	-	-
Module 4	Burner	37.6	52.3	52.5	54.9	58.1	58.1
Module 5	Blower	42.5	52.2	65.9	62	71.5	75.5

Weight based on DGX with optional birdscreen weatherhood, V-bank filter section and downblast fan discharge.

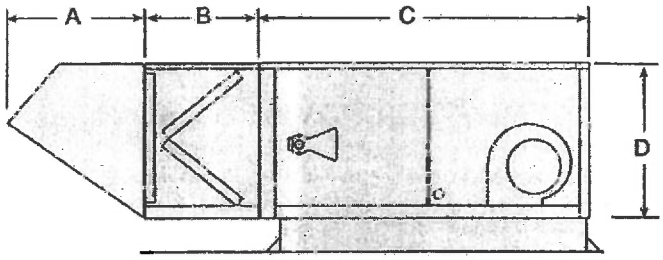
Typical DGX Configuration



Dimensional Data & Weights

GREENHECK
Building Value in Air.

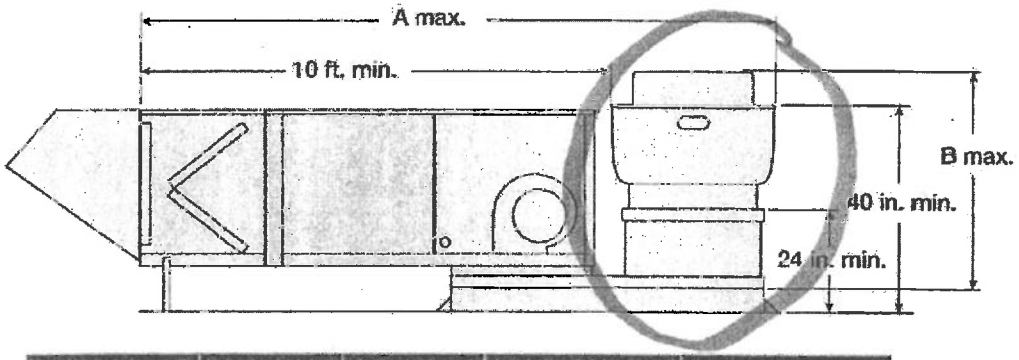
DG Stand Alone



Model	A			B	C	D	Width	Approximate Weight	Airflow Range (CFM)
	Filtered	Louvered	Birdscreen						
DG-H10	31.8	27.5	26.3	27.8	78.3	33.8	28	600	800 - 3000
DG-H20	34.8	30.3	32.3	30.3	86.3	33.8	37	700	2,600 - 6,500
DG-H30	65.3	33.3	28.3	33	101.8	42.5	48	1,100	6,500 - 15,000

All dimensions are shown in inches. All weights are shown in pounds and includes birdscreen weatherhood and 2-inch filter section.

DG with Combination Package



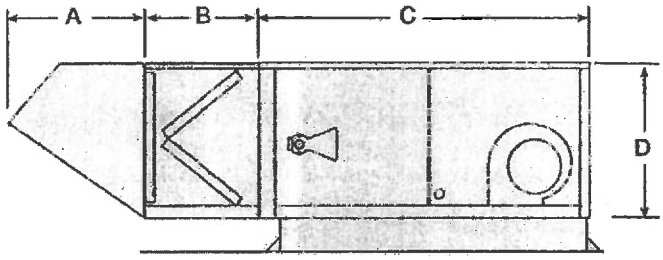
Model	A*	B*	Width	Approximate Weight*
DG-H10	159.5	47	35.5	900
DG-H20	172.8	57.8	50	1,200
DG-H30	199	63.3	58.8	1,700

All dimensions are shown in inches. All weights are shown in pounds and includes birdscreen weatherhood, 2-inch filter section, curb, fan pack extension and equipment support.
*Based on largest available CUBE exhaust fan.

Dimensional Data & Weights

GREENHECK
Building Value in Air.

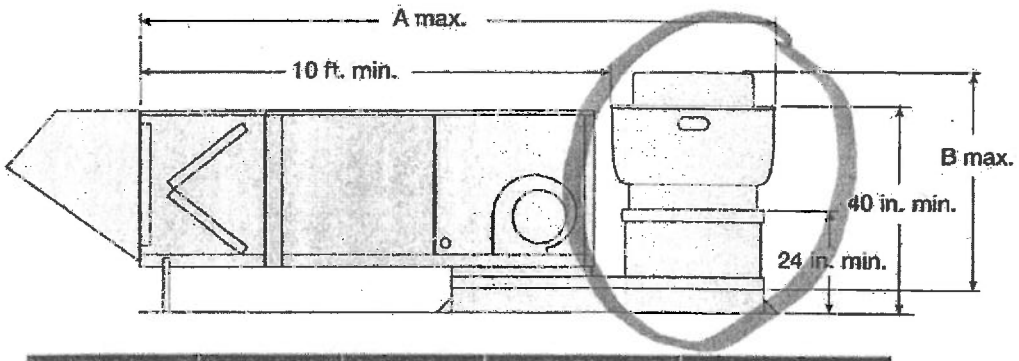
DG Stand Alone



Model	A			B	C	D	Width	Approximate Weight	Airflow Range (CFM)
	Filtered	Louvered	Birdscreen						
DG-H10	31.8	27.5	26.3	27.8	78.3	33.8	28	600	800 - 3000
DG-H20	34.8	30.3	32.3	30.3	86.3	33.8	37	700	2,600 - 6,500
DG-H30	65.3	33.3	28.3	33	101.8	42.5	48	1,100	6,500 - 15,000

All dimensions are shown in inches. All weights are shown in pounds and includes birdscreen weatherhood and 2-inch filter section.

DG with Combination Package



Model	A*	B*	Width	Approximate Weight*
DG-H10	159.5	47	35.5	900
DG-H20	172.8	57.8	50	1,200
DG-H30	199	63.3	58.8	1,700

All dimensions are shown in inches. All weights are shown in pounds and includes birdscreen weatherhood, 2-inch filter section, curb, fan pack extension and equipment support.
*Based on largest available CUBE exhaust fan.

RADIANT HEATERS (B-9 & B-10)

FOR YOUR SAFETY
If you smell gas:

1. Open windows.
2. DO NOT try to light any appliance.
3. DO NOT use electrical switches.
4. DO NOT use any telephone in your building.
5. Leave the building.
6. Immediately call your local gas supplier after leaving the building. Follow the gas supplier's instructions.
7. If you cannot reach your gas supplier, call the Fire Department.

⚠ WARNING

Fire Hazard

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

Failure to follow these instructions can result in death, injury or property damage.

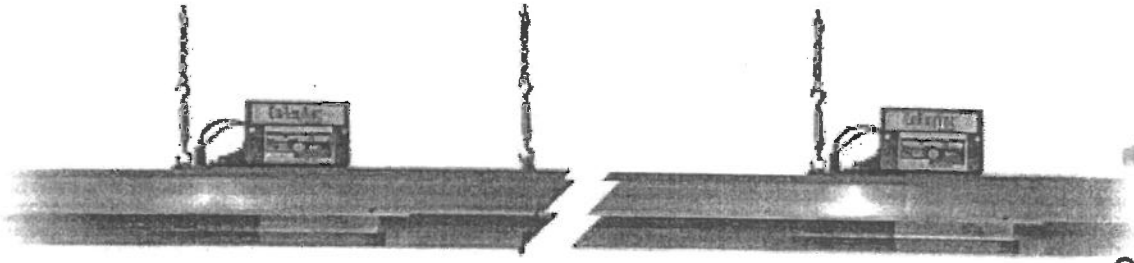
ROBERTS GORDON

CoRayVac®

Custom-Engineered, Low-Intensity Infrared Heating Systems

Installation, Operation & Service Manual

CRV-B-2
CRV-B-4
CRV-B-6
CRV-B-8
CRV-B-9
CRV-B-10
CRV-B-12
CRV-B-12A



⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can result in death, injury or property damage. Read the installation, operation and service manual thoroughly before installing or servicing this equipment.

Installation must be done by a contractor qualified in the installation and service of gas-fired heating equipment or your gas supplier.

Installer

Please take the time to read and understand these instructions prior to any installation. Installer must give a copy of this manual to the owner.

Owner

Keep this manual in a safe place to provide your serviceman with information should it become necessary.

DESIGN CERTIFIED®

CERTIFIED®

Quality in Any Language™

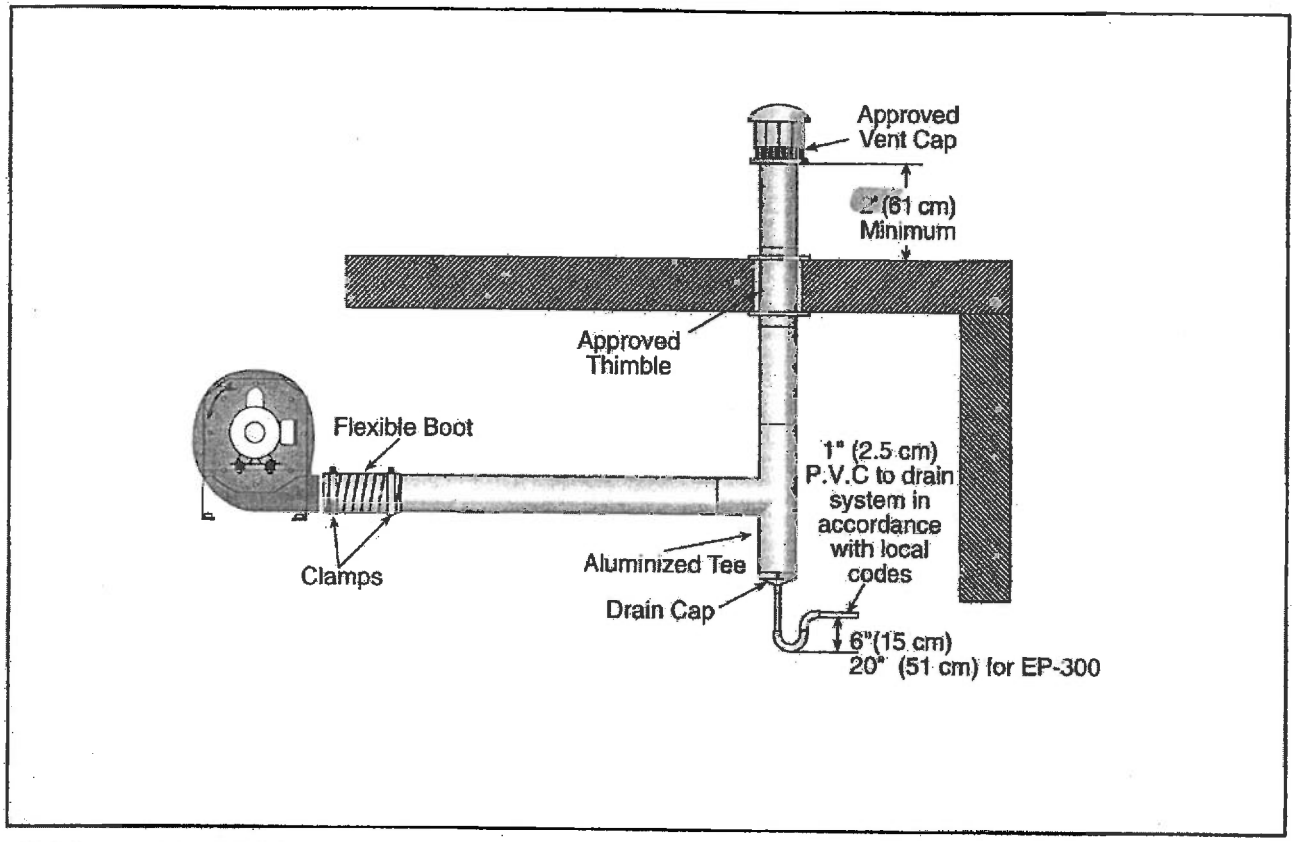
Roberts-Gordon
1250 William Street
P.O. Box 44
Buffalo, New York 14240-0044
Telephone: 716.852.4400
Fax: 716.852.0854
Toll Free: 800.828.7450

Roberts-Gordon Canada Inc.
76 Main Street West, Unit 10
Grimsby, Ontario L3M 1R6 Canada
Telephone: 905.945.5403
Fax: 905.945.0511

www.rg-inc.com

P/N 127102NA Rev. C 04/02

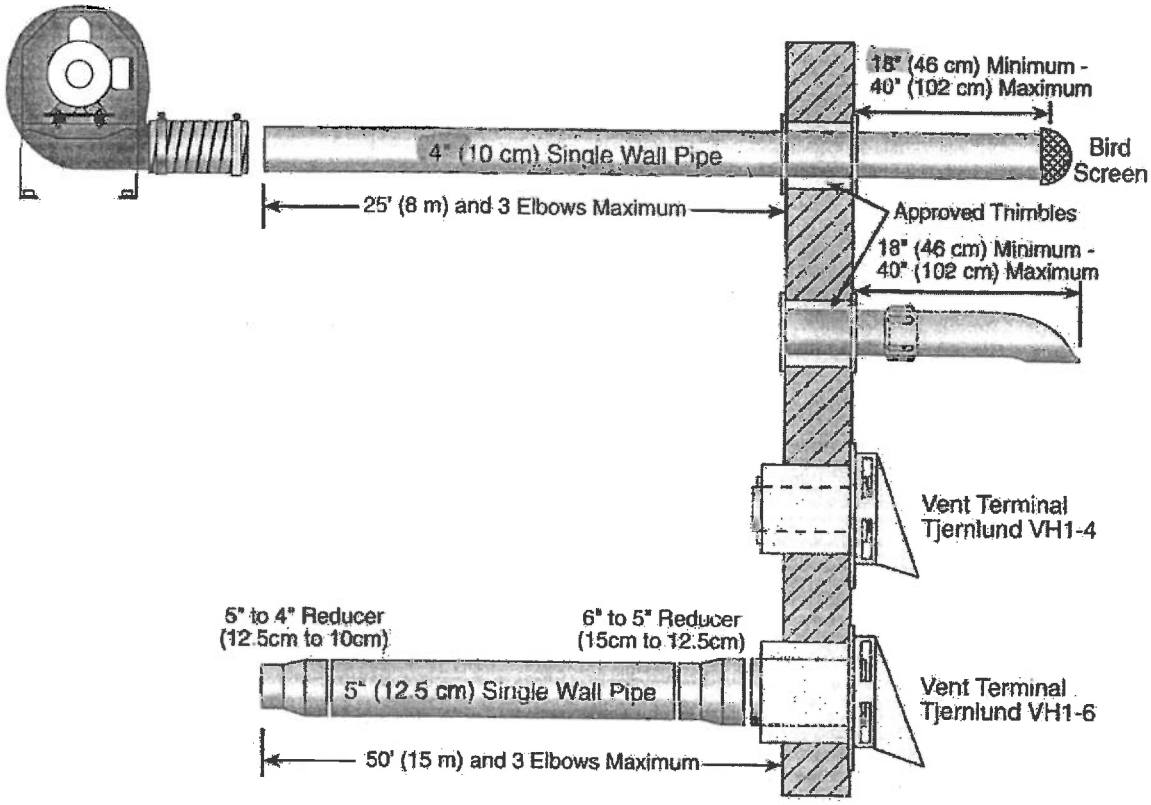
9.2 Vertical Venting Configuration



Part No.	Description
91412800	3" Flexible Boot
91412801	4 - 1/2" Flexible Boot
91412802	6" Flexible Boot
91901300	4" Boot Clamp
91913703	6" Boot Clamp
90505600	4" Wall Thimble
01331900	4" Damper Coupling
E0009356	6" Damper Coupling
01330203	4" Aluminized Tee
01330204	6" Aluminized Tee
01335801	4" Aluminized 90° Elbow
T0100320	6" Aluminized 90° Elbow
91409403	16 Ga. Aluminized 4" dia. 10' Tube
91409420	16 Ga. Aluminized 6" dia. 10' Tube
90502300	4" Metalbestos Vent Cap
90502302	6" Metalbestos Vent Cap
02718851	4" Drain Cap
02718852	6" Drain Cap Assembly
91418200	6" dia. x 4" dia. Aluminized Tube Adapter

9.3 Horizontal Venting Configurations

FIGURE 15 – EP-100 Horizontal Venting Configurations



Part No.	Description
91412800	4" Flexible Boot
91901300	4" Boot Clamp
90502101	6" Vent Terminal (Combustible Wall)
90502100	4" Vent Terminal (Combustible Wall)
02537801-1P	Vent Terminal (Non-Combustible Wall)
90505600	4" Wall Thimble
01331900	4" Damper Coupling
01330203	4" Aluminized Tee
01335801	4" Aluminized 90° Elbow
91409403	16 Ga. Aluminized 4" dia. 10' Tube
02718851	4" Drain Cap
01365400	4" Bird Screen

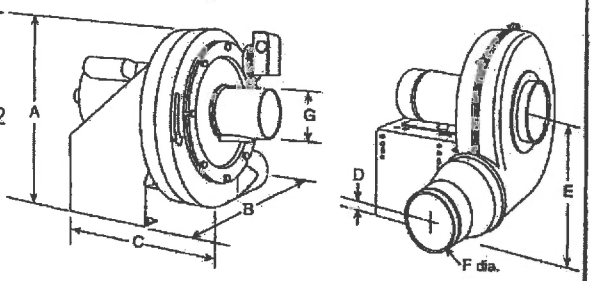
Part No.	Description
Not Supplied	16 Ga. Aluminized 5" dia. 10' Tube
Not Supplied	5" dia. x 4" dia. Tube Adapter
Not Supplied	6" dia. x 5" dia. Tube Adapter

General Specifications for CORAYVAC® pumps are as follows:

Pump Dimensional Data (in.)

Model	A	B	C	D	E	F	G
EP 100	17	14-1/2	21	3-3/4	10	4	4
EP 201/203	17-3/4	17	18-3/4	3-1/4	10	4-1/2	4-1/2
EP 301/303	25-1/2	21-3/4	27-1/2*	7-1/8	15	6**	6*

* with 8"x6" inlet adapter installed
** with 8"x6" outlet adapter installed



Pump Specifications

Model	EP 100	EP 201	EP 203	EP 301	EP 303
Horsepower (Hp)	1/3	3/4	3/4	1-1/2	1-1/2
Phase	1	1	3	1	3
Hertz (Hz)	60	60	60	60	60
Voltage (V)	115/230	115/230	230	115/230	230
Full Load Amp (Amps)	4.8/2.4	6.6/3.3	3.0	16.0/8.0	4.2
R.P.M.	3450	3450	3450	3450	3450
Motor Frame	56	56	56	56	56
Motor Enclosure	TENV	TENV	TEFC	TEFC	TEFC
Noise Level @ 5' (DBA)	-	70	70	74	74
Inlet/Outlet (In.)	4/4	4/4	4/4	6/6	6/6
Weight (lbs.)	62	112	112	108	108

Air Supply Blower Specifications	
Capacity	210 CFM @ 0.75" w.c.
Power (W)	173
Phase	1
Hertz (Hz)	60
Voltage (V)	115
Full Load Amp (Amps)	1.5
R.P.M.	3300
Motor Enclosure	OPEN FC
Noise Level @ 5' (DBA)	-
Inlet/Outlet (In.)	6/6
Weight (lbs.)	10

OUT BUILDING HEATERS

DETROIT RADIANT

RE-VERBER-RAY

RADIANT GAS HEATERS®

PRODUCTS COMPANY

HIGH INTENSITY

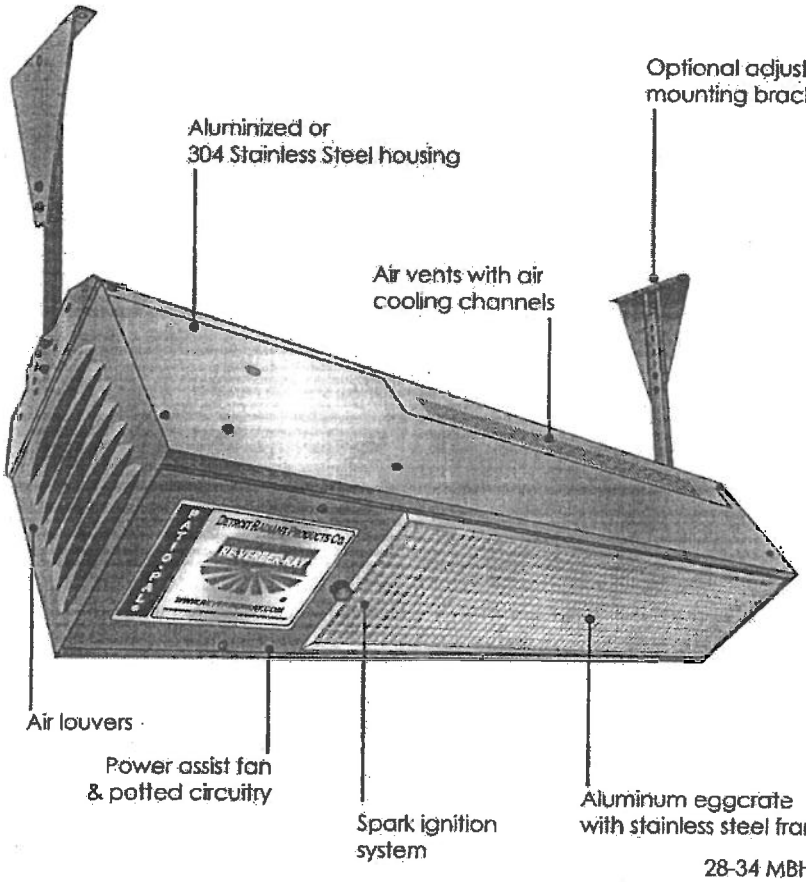
SERIES ○ DR ● PH ○ PT ○ BAH

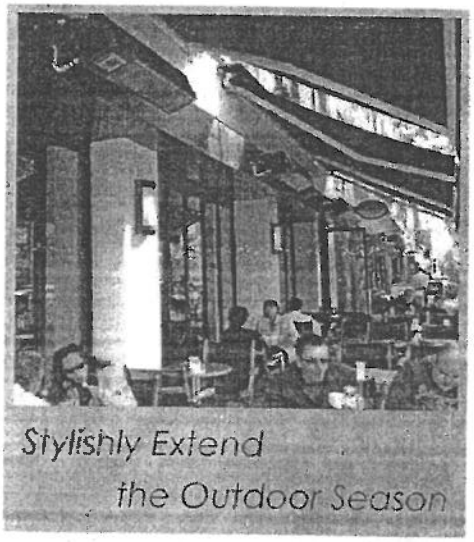
PH SERIES

GAS-FIRED HIGH INTENSITY INFRA-RED PATIO HEATER

Designed to add warmth to outdoor patio applications, the Patio-Pal® infra-red heater is the perfect solution to stylishly extend the outdoor season to many commercial and residential applications.

The Patio-Pal® easily mounts out of the way and without the hassle of refilling costly propane tanks. Specifically designed for comfort, reliability and ease of installation, the Patio-Pal® is sure to deliver the desired amount of warmth for dining, entertainment or work areas.





TYPICAL APPLICATIONS

- Restaurant Patios
- Entrance Ways
- Outdoor Living Spaces
- Vestibules
- Valet Waiting Areas
- Smoking Areas

PRODUCT FEATURES

- CSA Design Certified for Indoor & Outdoor Use.
- Decorative Aluminum Grill with Stainless Steel Frame.
- Wind and Rain Protected Design.
- 28,000 to 34,000 BTU Inputs. Natural or Propane Gas.
- Power Assist Fan and Reliable Direct Spark Ignition.
- Power Cord Connection with Potted Circuitry.
- Housing Available in Powder-Coated Aluminized Steel or Brushed 304 Series Stainless Steel.

DETROIT RADIANT PRODUCTS CO.

21400 Hoover Rd.
Warren, MI 48089-3162

Phone: (586) 756-0950
Toll Free: 1-800-222-1100
Fax: (586) 756-2626
Email: sales@drp-co.com
Website: www.reverberray.com

VISIT OUR WEBSITE FOR:

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- Parts Support
- Dealer Locator
- Applications
- C.A.D. Library
- Design Guidelines
- Theory of Infra-red
- and More!

PH SERIES

RE-VERBER-RAY RADIANT GAS HEATERS®

SPECIFICATIONS

PRODUCT SPECIFICATIONS

BTU Range:	28, 31, & 34 MBH
Gas Type:	Natural or Propane
Certification:	CSA Indoor/Outdoor
Limited Warranty:	1 year controls, 3 years burner
Gas Connections:	3/8" NPT
Manifold:	5" Natural or 10" Propane
Minimum:	6" Natural or 11" Propane
Maximum:	14" Natural or 14" Propane
Volts:	120V primary required (3-prong cord)
Amps:	.25 starting, .24 running
Control Voltage:	120V standard

Operational Costs: On average, operating a gas-fired heater with a 20-lb. LP cylinder costs upwards of 4 to 5 times more than operating on Natural Gas. Consult your local utility provider for a fuel cost analysis.

OPTIONAL EQUIPMENT:

Mounting Brackets:	PH-BKT or PH-BKT-SS
Clearance Safety Sign:	PLQ
Chain Mounting Set:	THCS
24V Control Voltage:	PH-24VAO

⚠ WARNING

To Prevent Serious Injury or Death:

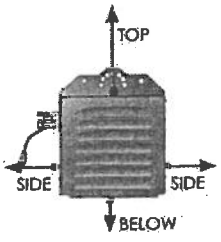
INDOOR/OUTDOOR COMMERCIAL USE AND OUTDOOR RESIDENTIAL USE ONLY!

This heater is **NOT** for home or recreational use. **DO NOT USE** in the home, mobile home, RV's, campers, tents, etc. Use only in a well ventilated area. Consult the Installation, Operation and Maintenance manual for further information.

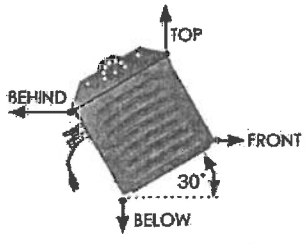
AVAILABLE **PH** MODELS

MODEL	GAS*	BTU/H	APPROX COVERAGE	DIMENSIONS A	B	C	WEIGHT	MOUNTING HEIGHTS**	CLEARANCE TO COMBUSTIBLES*** MTG. ANGLE	SIDES(S)	ENDS	BELOW	TOP	BEHIND	FRONT
PH-28(-SS)	N/LP	28,000	7' x 7'	8.5"	9.0"	45.25"	^54 lbs.	8'-0" to 8'-6"	0°	14"	22"	46"	13"	N/A	N/A
									30°	N/A	22"	46"	17"	8"	46"
PH-31(-SS)	N/LP	31,000	8' x 8'	8.5"	9.0"	45.25"	^54 lbs.	8'-0" to 9'-6"	0°	14"	22"	46"	13"	N/A	N/A
									30°	N/A	22"	46"	17"	8"	46"
PH-34(-SS)	N/LP	34,000	9' x 9'	8.5"	9.0"	45.25"	^54 lbs.	8'-6" to 10'-0"	0°	14"	22"	46"	13"	N/A	N/A
									30°	N/A	22"	46"	17"	8"	46"

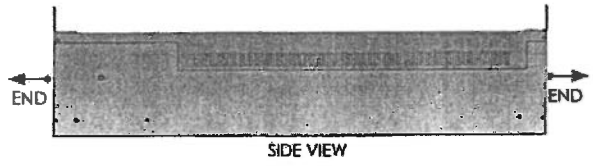
* Specify natural (N) or propane (LP) gas. ** Mounting heights are recommended and provided as a guideline only. Actual conditions may dictate variations from the above data. *** **Always** maintain the published clearances to combustibles. **NOTE**: Certain applications (awnings, fabrics, plastics, sprinklers, insulation) may require the heater to be mounted at a distance in excess of the published clearances to combustibles. Contact the factory. **IMPORTANT**: If the heater is mounted beneath a non-combustible surface, an 8 inch minimum top clearance must be maintained from the top of the heater to prevent overheating the controls. ^ Shipping weight is 57 lbs. (63 lbs. with PH-BKT). Box dimensions 48"x15"x15". Truckline transportation is recommended.



END VIEW
0° MOUNTING ANGLE

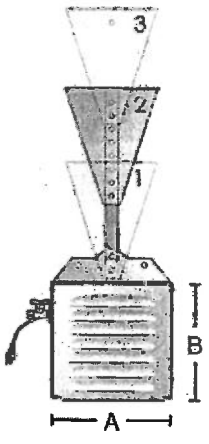


END VIEW
30° MOUNTING ANGLE



SIDE VIEW

PH SERIES & OPTIONAL MOUNTING BRACKET DIMENSIONS

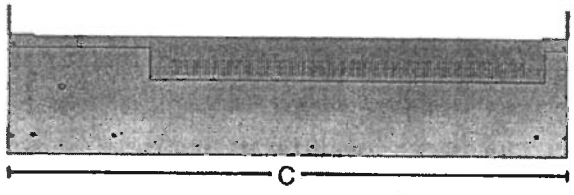


Optional mounting brackets (PH-BKT) are adjustable in one inch intervals.

1. Minimum mounting bracket extension to **non-combustibles only** is 9 in.
2. Minimum **0° mounting** bracket extension to combustibles is 14.5 in.

2a. Minimum **angle mounting** bracket extension (up to 30°) to combustibles is 17.5 in.

3. Maximum mounting bracket extension is 20.5 in.

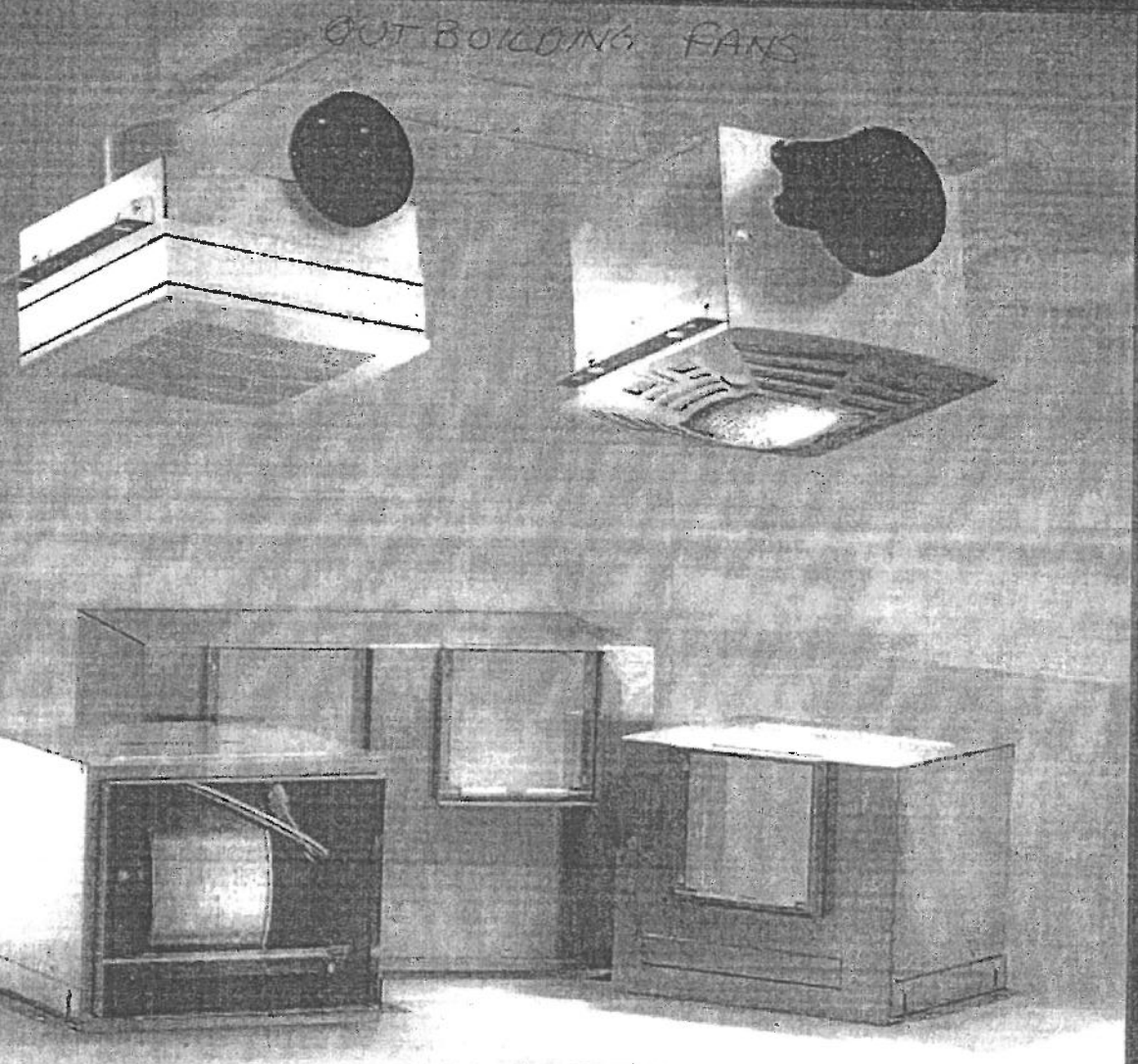


DISTRIBUTED BY:

⚠ **WARNING!** : To avoid serious injury, property damage or death, clearances to combustibles **MUST** be maintained.

Centrifugal Ceiling and Cabinet Exhaust Fans

Models SP and CSP



See ENERGY STAR® Models on Pages 16-17

GREENHECK

Building Value in Air.

BUILDING VALUE IN AIR.

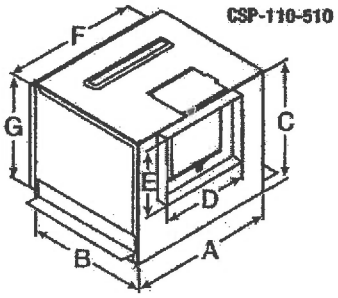
September 2012

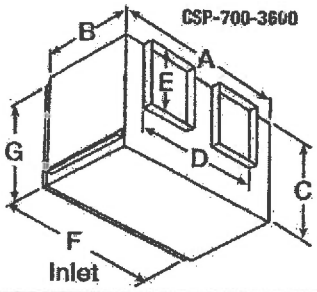
Model CSP-A
Premium Inline Fan

Model CSP-A Dimensions

Model	A	B	C	D	E	F	G	Unit Weight
110, 125, 190	13¼ (337)	10⅝ (270)	9 (229)	8 (203)	6 (152)	12 (305)	9¼ (235)	16 (7)
200, 250, 290, 390	14 (356)	11⅞ (302)	11¼ (286)	8 (203)	8 (203)	12⅞ (327)	10 (254)	23 (10)
410, 510	18 (457)	14⅜ (365)	14½ (368)	8 (203)	8 (203)	16⅞ (429)	13¼ (337)	36 (16)
700	23⅝ (600)	11⅝ (295)	11⅝ (295)	19½ (495)	8 (203)	22⅝ (575)	10½ (267)	34 (15)
710, 780	18 (457)	14⅜ (365)	14½ (368)	10 (254)	8 (203)	16⅞ (429)	13¼ (337)	36 (16)
800, 1050, 1410, 1550	23⅝ (603)	14⅜ (365)	14½ (368)	18¾ (476)	8 (203)	22⅝ (575)	13¼ (337)	59 (27)
1750, 2150	35 (889)	14¾ (375)	14¾ (375)	28 (711)	6 (152)	32¾ (832)	13 (330)	68 (31)
3600	45⅛ (1156)	16½ (419)	16½ (419)	40 (1016)	11 (279)	43⅛ (1099)	14⅝ (371)	122 (55)

All dimensions are in inches (millimeters) and weight in pounds (kilograms). Inlet and outlet connection widths are 1 in. (25 mm) - Mounting bracket width is 1½ in. (38 mm). For complete dimensional information, see CAPS submittal drawings.





c UL US LISTED

*Note: Amp draw is approximate and may vary based on motor manufacturer.

Model	RPM	Amps*	Watts		CFM / Static Pressure in Inches wg									
					0	0.1	0.125	0.25	0.375	0.5	0.625	0.75	0.875	1
CSP-A110 4	950	0.62	48.7	CFM	124	112	110	102	77					
				Sones	0.8	0.8	0.8	0.9	0.9					
CSP-A125 6	1100	0.63	52.5	CFM	138	126	124	114	91					
				Sones	1.1	1.1	1.1	1.0	1.2					
CSP-A190 4, 6	1400	1.10	100	CFM	215	202	198	180	159	121				
				Sones	2.0	1.5	2.0	2.0	2.5	2.5				
CSP-A200	900	0.43	48.2	CFM	254	231	226	203	179	145	109	70		
				Sones	0.6	0.4	0.5	0.9	1.0	1.3	1.5	1.5		
CSP-A250	1000	0.79	82.7	CFM	266	246	241	221	205	187	165	132		
				Sones	0.9	1.0	1.0	2.0	2.5	3.0	2.5	2.5		
CSP-A290	1050	0.71	80.7	CFM	318	299	292	265	248	229	201	144		
				Sones	1.1	1.2	1.3	2.0	2.5	3.5	3.0	3.0		
CSP-A390 4	1350	1.33	140	CFM	412	400	397	382	363	339	324	309		
				Sones	2.0	2.0	2.0	2.5	3.0	4.0	4.5	4.5		
CSP-A410	1000	1.87	135	CFM	447	441	403	364	317	217				
				Sones	1.5	1.5	1.5	2.0	2.0	2.0				
CSP-A510	1070	3.11	217	CFM	545	514	506	464	405	324				
				Sones	2.5	2.0	2.0	2.0	2.0	2.5				
CSP-A700	1100	3.20	350	CFM	766	755	752	739	726	702	678	635	549	418
				Sones	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	4.0
CSP-A710	1080	4.40	325	CFM	737	698	688	635	567	475	334			
				Sones	2.5	2.5	2.5	2.5	2.0	2.0	2.0			
CSP-A780 4	1600	3.77	405	CFM	813	784	777	742	707	672	638	603	567	527
				Sones	3.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0	3.0	3.5
CSP-A900	950	4.87	328	CFM	908	852	841	782	715	631				
				Sones	1.4	1.4	1.4	2.0	2.5	3.0				
CSP-A1050 4	1095	6.66	455	CFM	1182	1110	1093	1013	922	832	743			
				Sones	2.5	2.5	2.5	2.5	2.5	2.5	2.5			
CSP-A1410	1450	7.80	822	CFM	1584	1543	1533	1483	1439	1395	1345	1293	1238	1181
				Sones	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0
CSP-A1550 4	1610	8.32	830	CFM	1672	1618	1604	1543	1484	1427	1367	1307	1240	1172
				Sones	5.0	4.5	4.5	4.5	4.5	4.0	4.0	4.5	4.5	4.5
CSP-A1750	1130	6.60	550	CFM	1842	1768	1749	1619	1464	1284	1032	772	484	
				Sones	5.0	5.0	5.0	4.5	4.0	4.0	3.5	3.0	3.0	
CSP-A2150	1100	7.80	735	CFM	2249	2175	2156	2044	1900	1701	1424	1114		
				Sones	5.0	4.5	4.5	4.0	4.0	4.0	3.0	3.0		
CSP-A3600	1100	7.10	1330	CFM	3778	3653	3622	3460	3280	3091	2844	2551	2232	1750
				Sones	5.0	5.0	5.0	5.0	4.5	4.0	4.0	4.0	3.5	3.5

4 Units also available with 50 Hz motors (See page 21 for performance)

6 Available with 277 volt motor.

Performance certified is for model CSP inline for installation type D: Ducted inlet, Ducted outlet. Performance ratings include the effects of a backdraft damper. Speed (rpm) shown is nominal. Performance is based on actual speed of test. The sound ratings shown are loudness values in spherical fan sones at 5 ft (1.5m) in a spherical free field calculated per Annex B of AMCA 311. Values shown are for installation type D: ducted inlet spherical fan sone levels. Ratings do not include the effect of duct end correction. Ratings are based on 10 ft of insulated duct. The AMCA Certified Ratings Seal applies to air performance ratings only.

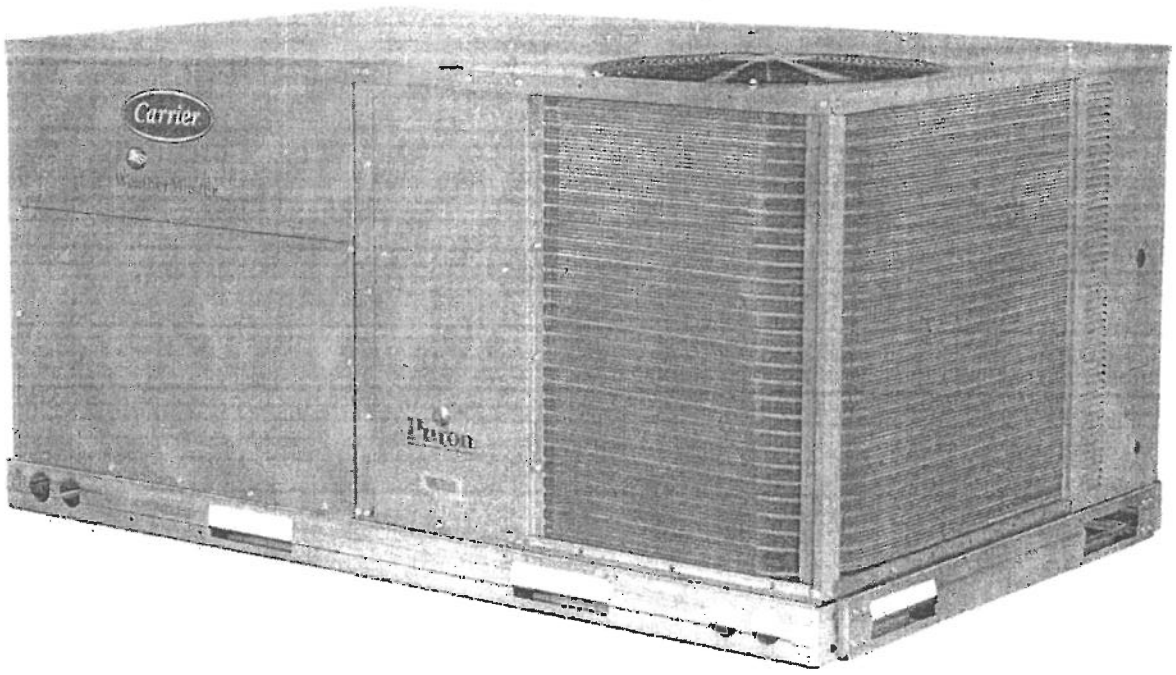
RTU UNITS

48HC
High Efficiency
Gas Heat/Electric Cooling Packaged Rooftop
3 to 12.5 Nominal Tons

Carrier
turn to the experts

Product Data

WeatherMaster®



C10222

Puron
the environmentally sound refrigerant

ENERGY STAR

ASHRAE 90.1 COMPLIANT

Table 4 – HEATING RATING TABLE - NATURAL GAS & PROPANE

UNITS		GAS HEAT	AL/SS HEAT EXCHANGER		TEMP RISE (DEG F)	THERMAL EFFICIENCY (%)	AFUE (%)
			INPUT / OUTPUT STAGE 1 (MBH)	INPUT / OUTPUT STAGE 2 (MBH)			
Single Phase	04	LOW	–	72 / 56	25 – 55	82%	79.1%
		MED	–	115 / 89	55 – 85	80%	78.5%
		HIGH	–	–	–	–	–
	05	LOW	–	72 / 56	25 – 55	82%	79.1%
		MED	–	115 / 90	35 – 65	81%	79%
		HIGH	–	150 / 117	50 – 80	80%	78.8%
	06	LOW	–	72 / 56	20 – 55	82%	79.1%
		MED	–	115 / 90	30 – 65	81%	79%
		HIGH	–	150 / 117	40 – 80	80%	78.8%
Three Phase	04	LOW	50 / 41	72 / 56	25 – 55	82% RTU-2	–
		MED	82 / 66	115 / 89	55 – 85	80%	–
		HIGH	–	–	–	–	–
	05	LOW	50 / 41	72 / 56	25 – 55	82%	–
		MED	82 / 66	115 / 90	35 – 65	81%	–
		HIGH	120 / 96	150 / 117	50 – 80	80%	–
	06	LOW	50 / 41	72 / 56	20 – 55	82%	–
		MED	82 / 66	115 / 90	30 – 65	81%	–
		HIGH	120 / 96	150 / 117	40 – 80	80%	–
	07	LOW	50 / 41	72 / 59	15 – 55	82%	–
		MED	90 / 73	125 / 103	20 – 50	82%	–
		HIGH	105 / 84	150 / 120	30 – 60	81%	–
	08	LOW	90 / 73	125 / 103	20 – 50	82%	–
		MED	120 / 98	180 / 148	35 – 65	82%	–
		HIGH	180 / 147	224 / 184	45 – 75	82%	–
	09	LOW	90 / 73	125 / 103	20 – 50	82%	–
		MED	120 / 98	180 / 148	30 – 65	82% RTU-3,4	–
		HIGH	180 / 147	224 / 184	40 – 75	82%	–
	11	LOW	120 / 98	180 / 148	25 – 65	82% RTU-1	–
		MED	180 / 147	224 / 184	30 – 65	82%	–
		HIGH	200 / 160	250 / 205	35 – 70	80%	–
	12	LOW	120 / 98	180 / 148	25 – 65	82%	–
		MED	180 / 147	224 / 184	30 – 65	82%	–
		HIGH	200 / 160	250 / 205	35 – 70	80%	–
	14	LOW	120 / 96	150 / 120	15 – 60	80%	–
		MED	144 / 118	180 / 146	20 – 55	81%	–
		HIGH	192 / 156	240 / 195	25 – 60	81%	–

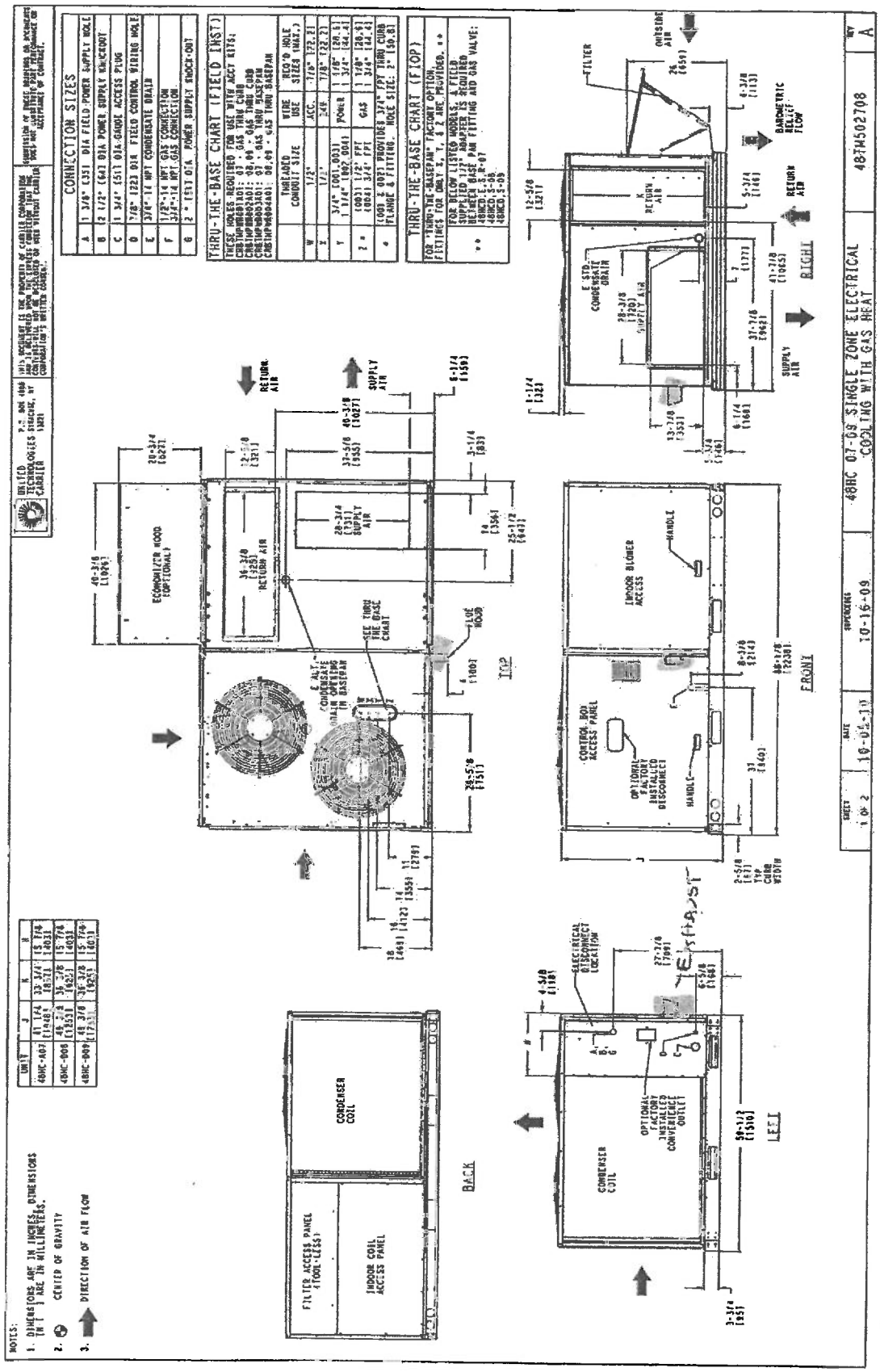
– Not Applicable

NOTES:

Heat ratings are for natural gas heat exchangers operated at or below 2000 ft (610 m). For information on Propane or altitudes above 2000 ft (610 m), see the Application Data section of this book. Accessory Propane/High Altitude kits are also available.

In the USA the input rating for altitudes above 2000 ft (610m) must be derated by 4% for each 1000 ft (305 m) above sea level. In Canada, the input rating must be derated by 10% for altitudes of 2000 ft (610 m) to 4500 ft (1372 m) above sea level.

CURBS & WEIGHTS DIMENSIONS – 48HC 07-09



C11322

Fig. 5 – Dimensions 48HC 07-09

Flanders®
FOREMOST IN AIR FILTRATION

Super-Flow® V

Extended Surface Minipleat Filter

Bulletin PB1000-0511

General

Super-Flow® V extended surface area and low pressure drop minipleat filters are designed for use in most commercial and industrial HVAC systems where medium to high efficiency filtration is required. Super-Flow®V filters are available in average efficiency ranges: 65%, 85%, 95% and 98% per ASHRAE Standard 52.1 test methods and 95% DOP. They may be operated at face velocities from 0 to 750 fpm. Super-Flow®V filters are UL 900 Class 2 listed.

Construction

Super-Flow® V filters are constructed of multiple minipleat panels bonded to flame-retardant plastic panels on top and bottom to make an unusually strong assembly that is both corrosion and moisture resistant. Aerodynamic extruded vertical supports minimize air entry turbulence. Super-Flow® V filters are totally rigid making them ideal for variable air volume (VAV) systems, as well as applications downstream of supply fans.

Low Pressure Drop

Super-Flow® V minipleat filters have an exceptionally low clean pressure drop unmatched by most any filter of the same efficiency. This affords low fan energy costs during much of the life of the filter system. In addition, they are the filters of choice for packaged air conditioning systems that do not have the fan capacity of larger central systems.

Longer service life means material and labor cost savings and less disruption of systems caused by filter change-out shutdowns. High dust holding capacity is a key benefit of a filter with increased media area.

Physical Data

Media: Moisture-resistant microfine fiberglass

Filter Pack: Minipleat panels

Media Support: Adhesive

Top and Bottom Panels: Flame-retardant plastic

Vertical Supports: Aerodynamic extruded vertical supports

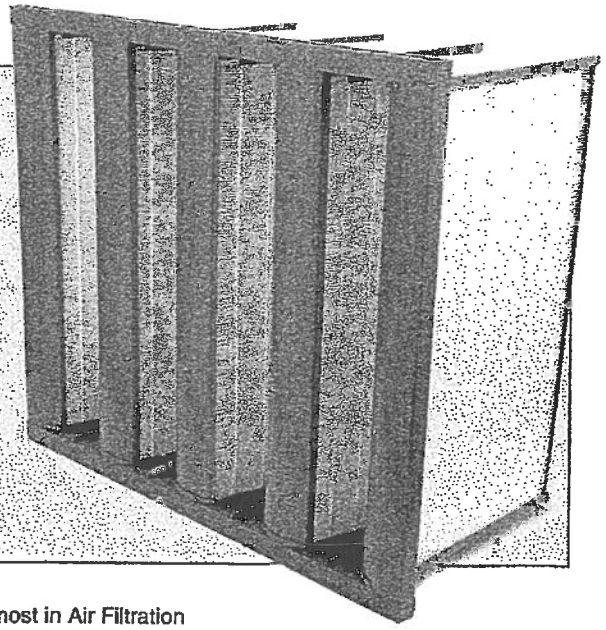
Operating limits: 160°F and 100% RH continuous duty

Actual Header Size: Nominal size less 5/8" (e.g. a nominal 24" x 24" filter is actually 23-3/8" x 23-3/8")

Actual Depth: 11-1/2"

Important Features

- Lowest clean pressure drop for energy savings and applicability to small fan systems
- Longer service life because of a very high ratio of media to nominal face area
- Aerodynamic vertical supports minimize air entry turbulence
- Minipleat panels provide rigidity for VAV systems and resistance to turbulent air flow
- May be operated from 0 to 750 fpm face velocity in either air flow direction
- Moisture resistant for humid air applications
- MERV 11-16



Efficiency %	Model Number	Nominal Size HxWxD Inches	250 FPM		375 FPM		500 FPM		625 FPM		750 FPM		Media Area (Sq Ft)	Wt. Each (Lbs.)
			CFM	PD	CFM	PD	CFM	PD	CFM	PD	CFM	PD		
95% DOP	SFVD-95A12	24 x 24 x 12	1000	0.28	1500	0.55	2000	0.75	2500	1.0	*	*	196	18
95% DOP	SFVD-95B12	20 x 24 x 12	800	0.28	1200	0.55	1600	0.75	2000	1.0	*	*	162	14
95% DOP	SFVD-95C12	12 x 24 x 12	500	0.28	750	0.55	1000	0.75	1250	1.0	*	*	98	9
98%	SFV-98A12	24 x 24 x 12	1000	0.25	1500	0.45	2000	0.60	2500	.08	*	*	19	17
98%	SFV-98B12	20 x 24 x 12	800	0.25	1200	0.45	1600	0.60	2000	.08	*	*	162	13
98%	SFV-98C12	12 x 24 x 12	500	0.25	750	0.45	1000	0.60	1250	.08	*	*	98	8
95%	SFV-95A12	24 x 24 x 12	1000	0.14	1500	0.25	2000	0.36	2500	0.51	3000	0.67	196	17
95%	SFV-95B12	20 x 24 x 12	800	0.14	1200	0.25	1600	0.36	2000	0.51	2400	0.67	162	13
95%	SFV-95C12	12 x 24 x 12	500	0.14	750	0.25	1000	0.36	1250	0.51	1500	0.67	98	8
85%	SFV-85A12	24 x 24 x 12	1000	0.07	1500	0.18	2000	0.27	2500	0.40	3000	0.58	196	17
85%	SFV-85B12	20 x 24 x 12	800	0.07	1200	0.18	1600	0.27	2000	0.40	2400	0.58	162	13
85%	SFV-85C12	12 x 24 x 12	500	0.07	750	0.18	1000	0.27	1250	0.40	1500	0.58	98	8
65%	SFV-65A12	24 x 24 x 12	1000	0.05	1500	0.15	2000	0.25	2500	0.38	3000	0.50	196	17
65%	SFV-65B12	20 x 24 x 12	800	0.05	1200	0.15	1600	0.25	2000	0.38	2400	0.50	162	13
65%	SFV-65C12	12 x 24 x12	500	0.05	750	0.15	1000	0.25	1250	0.38	1500	0.50	98	8

Performance Data Notes:

1. PD represents clean pressure drop in inches w.g. The recommended final pressure drop for all models is 2.0 inch w.g.
2. Operation down to zero air flow is satisfactory for all models
3. Efficiency is average and is based on ASHRAE Standard 52.1 test methods for 65%, 85%, 95% and 98% filters. Performance values stated may be averages typical of the products listed. Contact factory for actual performance test reports on specific products.
4. Performance tolerances conform to section 7.4 of ARI Standard 850.
5. Actual filter header is 5/8 inch under on height an width. Actual depth is 11-1/2 inch
6. Performance values shown in this publication may be averages or estimates intended to generally represent product styles. Always contact factory for latest actual test data on specific Flanders models.

Installation Considerations

Super-Flow®V filters may be installed in Flanders PF-1 Holding Frames, K-Trac Filter Framing Modules, Sureseal Side Access Housings or in similar existing hardware. PF-1 Holding Frames are riveted together to form a filter bank. K-Trac Filter Framing Modules are especially suitable for medium to large built-up filter banks. Smaller systems and systems with minimum upstream access space are best served using Sureseal Side Access Housings.

Super-Flow®V filters are furnished with a peripheral header on the air entering side and with foam gaskets on the "H" dimension for the 24 x 24 model and "W" dimension on the 12 x 24 and 20 x 24 models.

Guide Specifications

1.0 General

1.1 Medium and high efficiency extended surface low pressure drop minipleat filters shall be Super-Flow®V models as manufactured by Flanders.

1.2 Filter sizes, efficiencies and capacities shall be as scheduled on the drawings.

2.0 Filter Construction

2.1 Filters shall consist of multiple minipleat panels bonded to flame-retardant plastic panels on top and bottom and aerodynamic design extruded plastic struts.

3.0 Performance

3.1 Initial and final resistances shall not exceed the scheduled values.

3.2 The average efficiency shall be as determined by ASHRAE Standard 52.1 test methods.

3.3 95% DOP models shall be MERV 16, ASHRAE efficiency 98% models shall be MERV 15, 95% model shall be MERV 14, 85% model shall be MERV 13, 65% model shall be MERV 11 by ASHRAE Standard 52.2.

3.4 Filters shall be UL 900 Class 2 listed.

Material Safety Data Sheet

Date of issue	5 November 2010
Version	18

1. Product and company identification

Product name	: AMERCOAT 68HS RESIN
Code	: AT68HS-A
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
Epoxy Resin (MW<=700)	25068-38-6	10 - 30
Epoxy Resin (700<MW<=1100)	67924-34-9	7 - 13
4-methylpentan-2-one	108-10-1	7 - 13
heptan-2-one	110-43-0	7 - 13
diiron trioxide	1309-37-1	1 - 5
xylene	1330-20-7	1 - 5
Solvent naphtha (petroleum), light arom.	64742-95-6	1 - 5
Cashew, nutshell liq., oligomeric reaction products with 1-chloro-2,3-epoxypropane	68413-24-1	1 - 5
tetraethyl silicate	78-10-4	1 - 5
1,2,4-trimethylbenzene	95-63-6	1 - 5
[3-(2,3-epoxypropoxy)propyl]trimethoxysilane	2530-83-8	1 - 5
Ethylbenzene	100-41-4	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. 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.

8 . Exposure controls/personal protection

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.

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 : 1.21

Density (lbs / gal) : 10.1

Vapor pressure : 7.1 kPa (7.9 mm Hg) [20°C]

Vapor density : Not available.

Volatility : 47% (v/v), 31.94% (w/w)

Odor threshold : Not available.

Evaporation rate : 82 (butyl acetate = 1)

Partition coefficient: n-octanol/water : Not available.

% Solid. (w/w) : 68.06

PPG Protective & Marine Coatings

AMERLOCK® 2

May 2013
Revision of April 2013

DESCRIPTION

Fast Dry, Surface Tolerant, High Solids Epoxy Coating

PRINCIPAL CHARACTERISTICS

- Fast dry
- Low VOC
- High performance general maintenance coating for new or old steel
- Self priming over most existing coatings
- Compatible with prepared damp surfaces
- Compatible with adherent rust remaining on prepared surfaces
- Dry temperature resistance up to 450°F on insulated or uninsulated surfaces when mixed with *Amercoat* 880 glass flake additive
- Suitable for use in many industries including off-shore, water/wastewater, power, steel fabrication and public use facilities.

COLOR AND GLOSS*

Semi-gloss
Standard primer colors, custom colors, and aluminum

* *Epoxy coatings will chalk and fade with exposure to sunlight. Light colors are prone to ambering to some extent. Note that product tinted to custom colors are not recommended for immersion service. Only use factory grind batches for immersion.*

BASIC DATA

Volume solids	85% ± 3%
VOC	1.5 lbs/gal (180 g/L) EPA Method 24 (Use *Amerlock* 2 VOC when <100 g/L formulation is required) 1.4 lbs/gal (163 g/L) Directive 1999/13/EC, SED
Recommended Dry film thickness (per coat)	4 – 6 mils (100 – 200 microns)
Theoretical Spread Rate	@ 1 mils dft 1331 ft²/gal @ 5 mils dft 266 ft²/gal
Components	2
Dry Temperature Resistance*	Continuous — 250°F Intermittent — 350°F (<5% of the time, max 24 hours) * *Color will drift at elevated temperatures.*
Shelf Life	3 years from date of manufacture * *when stored in original sealed containers in dry conditions between 40-100°F*

SURFACE PREPARATION

Coating performance is, in general, proportional to the degree of surface preparation. Abrasive blasting is usually the most effective and economical method. When this is impossible or impractical, *Amerlock* 2 can be applied over mechanically cleaned surfaces. All surfaces must be clean, dry and free of all contaminants, including salt deposits. Contact PPG for maximum allowable salt containment levels.

Mild Steel

- Remove all loose rust, dirt, grease or other contaminants by one of the following depending on the degree of cleanliness required: SSPC-SP2, 3, 6, 7 or 10 (ISO 8501-1 St-2, St-3, Sa 1, Sa 2.5). These minimum surface preparation standards apply to steel that has been previously abrasive blasted. The choice of surface preparation will depend on the system selected and end-use service conditions. For more severe service and immersion, clean to SSPC-SP10 (ISO8501-1 Sa 2.5). Blast to achieve an anchor profile of 1.0-5.0 mils (25-125 microns) as indicted by a Keane-Tator Surface profile Comparator or Testex Tape. Previously blasted steel may be ultra-high pressure water jetted to SSPC SP WJ-2(L) / NACE WJ-2(L). The wet surface can be dried by blowing with dry compressed air giving special attention to horizontal surfaces and recesses.

Concrete

- Prepare / clean surface in accordance with SSPC SP-13 guidelines. Abrade surface per ASTM D-4259 to remove all efflorescence and laitance, to expose sub-surface voids, and to provide a surface roughness equivalent of 60 grit sandpaper or coarser. Test for moisture by conducting a plastic sheet test in accordance with ASTM D4263. Fill voids as necessary with *Amercoat* 114A epoxy filler. For slabs on grade, test for moisture in accordance with ASTM F1869 (calcium chloride test). The maximum allowable moisture transmission is 3 lbs / 1,000 ft²/24 hours. Refer to Information Sheet 1496ACUS for further details regarding moisture measurements.

Material Safety Data Sheet

Date of issue 5 January 2011
Version 28.01

1. Product and company identification

Product name : [redacted] 2 CURE
Code : AK2-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!

FLAMMABLE LIQUID AND VAPOR. HARMFUL OR FATAL IF SWALLOWED. CAUSES EYE AND SKIN BURNS. HARMFUL IF ABSORBED THROUGH SKIN. CAUSES RESPIRATORY TRACT IRRITATION. 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. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.

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 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. 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 : Harmful or fatal if swallowed. May cause burns to mouth, throat and stomach. 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).

2. Hazards identification

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
Nonylphenol	25154-52-3	5 - 10
NJTS 80100337-5132	68410-23-1	3 - 7
Alkylphenol	Not available.	1 - 5
Aliphatic Amine	Not available.	1 - 5
1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich	68515-49-1	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	108-95-2	0.5 - 1.5
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.

Material Safety Data Sheet

Date of issue 18 January 2011
Version 17.02

1. Product and company identification

Product name : AMERLOCK 2/400 LIGHT TINT RESIN
Code : AK2-T2
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.

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)

3. Composition/information on ingredients

Name	CAS number	%

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 : 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: 33.33°C (92°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	: 1.4
Density (lbs / gal)	: 11.68
Vapor pressure	: 0.97 kPa (7.3 mm Hg) [20°C]
Vapor density	: Not available.
Volatility	: 30% (v/v), 19.31% (w/w)
Odor threshold	: Not available.
Evaporation rate	: 60 (butyl acetate = 1)
Partition coefficient: n-octanol/water	: Not available.
% Solid. (w/w)	: 80.69

3 . Composition/information on ingredients

Epoxy Resin (MW<=700)	25068-38-6	30 - 60
Talc , not containing asbestiform fibres	14807-96-6	10 - 30
Titanium dioxide	13463-67-7	10 - 30
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	0.5 - 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 : 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.

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 : 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 : 1.47
Density (lbs / gal) : 12.27
Vapor pressure : 0.72 kPa (5.4 mm Hg) [20°C]
Vapor density : Not available.
Volatility : 9% (v/v), 5.11% (w/w)
Odor threshold : Not available.
Evaporation rate : 36 (butyl acetate = 1)
Partition coefficient: n-octanol/water : Not available.
% Solid. (w/w) : 94.89

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	-
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	-

carboline

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

1. Identification

Product Name:	CARBOZINC 11 / CARBOZINC 11 FG BASE	**Revision Date:**	1/20/2013
Identification Number:	0250A1NL	**Supercedes Date:**	9/7/2011
Product Use/Class:	Solvent Based Inorganic Zinc - FOR INDUSTRIAL USE ONLY		
Manufacturer:	Carboline Company 2150 Schuetz Road St. Louis, MO 63146	**Preparer:**	Regulatory Department

2. Hazard Identification

EMERGENCY OVERVIEW: Contains SILICA which can cause cancer. Risk of Cancer depends on duration and level of exposure. This product may contain titanium dioxide, which is listed by IARC as possibly carcinogenic to humans (Group 2B). This listing is based on inadequate evidence of carcinogenicity in humans and sufficient evidence in experimental animals. This classification is relevant when exposed to titanium dioxide in dust or powder form only, including cured product that is subject to sanding, grinding, cutting, or other surface preparation activities. FLAMMABLE liquid and vapor.

EFFECTS OF OVEREXPOSURE - EYE CONTACT: May cause eye irritation.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: May be harmful if absorbed through the skin. 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.

MEDICAL CONDITIONS PRONE TO AGGRAVATION: If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

3. Composition/Information On Ingredients

Hazardous Ingredients

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
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	20 ppm	50 ppm	50 ppm	N/E
ETHYL 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	N/E
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	3.0 MG/M3	N/E	3.5 MG/M3	N/E

4. First-aid Measures

AFTER EYE CONTACT: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

AFTER SKIN CONTACT: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. If rash or irritation develops, consult a physician. Launder clothing before reuse.

AFTER INHALATION: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

AFTER INGESTION: If swallowed do not induce vomiting. Seek immediate medical attention.

5. Fire-fighting Measures

Flash Point, °F: (Setaflash)	56F (13C)	**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: No Information

6. Accidental Release Measures

PERSONAL SAFETY MEASURES/ENVIRONMENTAL MEASURES/METHOD OF CLEANING/CONTAINMENT: 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.

7. Handling and Storage

INSTRUCTIONS FOR SAFE 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 CONDITIONS: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

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 ate, 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.

PROTECTION AND HYGIENE MEASURES: 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.

9. Physical and Chemical Properties

Boiling Range:	64 F (18 C) - 340 F (171 C)	**Vapor Density:**	HEAVIER THAN AIR
Odor:	SOLVENT	**Odor Threshold:**	N/D
Appearance:	Viscous Green, GREY, Red or	**Evaporation Rate:**	Slower than ether
Solubility in Water:	N/D	**Specific Gravity:**	1.07
Freeze Point:	N/D	**pH:**	N/D
Physical State:	Liquid	**Vapor Pressure:**	No Information

(See section 16 for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Heat, sparks and open flames.

MATERIALS TO AVOID: Keep away from strong oxidizing agents, heat and open flames.

HAZARDOUS COMPOSITION 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.

11. Toxicological Information

Chemical Name	CAS-No.	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	4720 mg/kg rat, oral	22500 ppm/8hrs rat, inhalation
ETHYL POLYSILICATE	11099-06-2		
2-BUTOXYETHANOL	111-76-2	1746 mg/kg, rat, oral	700 ppm/7hrs mouse, inhalation
METHYL ALCOHOL	67-56-1	2080mg/kg rat oral	
ALUMINUM SILICATE	1332-58-7		
TITANIUM DIOXIDE	13463-67-7	10000 mg/m3, oral (rat)	6.82 mg/L, Inh, rat 4H
MICA	12001-26-2		
CARBON BLACK	1333-86-4	8000 mg/kg oral, rat	Not Available

12. Ecological Information

HOBART BROTHERS

C

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 71, 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, 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, 218, 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: ELEMENT 71Ni1C, 71Ni1M, 71T1C, 71T1M, 81K2C, 81K2M, FABCO 70XHP, 81K2-C, 91K2-C, 107G, 110, 110K3-M, 115, 712M, 750M, 803, 812 Ni1M, MIL-101-TM; FABCO XTREME 101, 120, 82, B3, B3V; FABCOR 100F3-S, 209, 1100, CVN, EDGE, EDGE MC, FABSHIELD 3Ni1, 71K6, 71T8, 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, 71SG, 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 86, 89

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[Φ]
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[ΣΣ]	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	---	---	---	---
LITHIUM CARBONATE	554-13-2	209-062-5	F - R14/15; C - R34[T]	3	---	---	---
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	---	---	---	---
SILICA	14808-60-7	238-878-4	Xn - R48/20, R40/20	1[ΨΨ]	K	X	X
(Amorphous Silica Fume)	69012-64-2	273-761-5	None	1[ΨΨ]	K	X	X
SILICON	7440-21-3	231-130-8	None	3	K	---	X
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 Φ – 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 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[3]	---
ALUMINUM OXIDE	1344-28-1	215-691-6	---	---	<3	---
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	---	---	<1[11]	---
BARIUM FLOURIDE	7787-32-8	232-108-0	---	<12[1]	<12[3]	---
CALCIUM CARBONATE	1317-65-3	215-279-6	<2	<2[11]	---	---
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[3,6]	---
COPPER	7440-50-8	231-159-6	<1[3]	---	<2[3]	---
FLUORSPAR	7789-75-5	232-188-7	<5[3]	<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	---	---	<10	---
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[4]	---	---
TITANIUM	7440-32-6	231-142-3	---	<2	<2	<2
TITANIUM DIOXIDE	13463-67-7	236-675-5	<10	<4[5]	<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, 71T8, 81N1, 81N1+, 81N2, XLNT-6, X90; FABSHIELD OFFSHORE 71Ni (4) Present only in FABSHIELD 5S (5) Present only in METALLLOY EM13K-S; SPEED-ALLOY 105D2; TM 5S, 75A1, 95D2, 105D2 (6) Present only in FABCO XTREME 120, B2, B3; FABSHIELD 3Ni1, 71K6, 71T8, 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 71T8, 81N1+, XLNT-6, X90; 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 (Cr II & Cr III Cpnds) 0.005 (Cr VI Cpnds)	0.5 (Metal) (A4) 0.5 (Cr III Cpnds) (A4) 0.05 (Cr VI Sol Cpnds) (A1) 0.01 (Cr VI Insol Cpnds) (A1)	0.1 I* - Switzerland 0.005; 0.01*** - Denmark 0.005 (Total Aerosol); 0.015***(Total Aerosol) - Sweden
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 [illegible]	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

Date:	6/1/2011	MSDS No.:	US-M291
Trade Name:	Excalibur 7018MR		
Sizes:	All		
Supersedes:	6/20/2008		

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 E7018 H4R

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	15	10*	15*
Limestone and/or calcium carbonate	1317-65-3	10	10*	15
Titanium dioxides	13463-67-7	< 5	10	15
Fluorides (as F)	7789-75-5	< 5	2.5	2.5
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	1	5**	5**
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	1	10*	15*
Cellulose and other carbohydrates	65996-61-4	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	60	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)

HOBART BROTHERS

F

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

Product Type: HARDSURFACING ELECTRODES

Trade Name: FROGALLOY, HARDALLOY, SMOOTHARC, CHROME-MANG AND GP HARDSURFACING ELECTRODES
AWS Specification: None

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 B. 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[F]	REGULATORY HAZARD CLASSIFICATION/DESIGNATION 67/548/EEC[Δ]	IARC[E]	NTP[Σ]	OSHA[H]	65[Φ]
ALUMINUM	7429-90-5	231-072-3	F - R10, R15, R17	---	---	---	---
CALCIUM CARBONATE	1317-65-3	215-279-6	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[Ψ1]	1[ΣΣ], 3[Σ]	K[ΣΣ]	X[ΣΣ]	X[ΣΣ]
COLUMBIUM	7440-03-1	231-113-5	None	---	---	---	---
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]	---	---	---	---
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	7681-49-5	215-208-9	None	---	---	---	---
TITANIUM	7440-32-6	231-142-3	None	---	---	---	---
TITANIUM DIOXIDE	13463-67-7	236-675-5	None	2B	---	---	---
TUNGSTEN	7440-33-7	231-143-9	None	---	---	---	---

F – 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) Σ – US National Toxicology Program (K – Known Carcinogen, S – Suspected Carcinogen) H – OSHA Known Carcinogen List Φ – 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:


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 B.

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 and silica. 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	%WEIGHT
ALUMINUM	7429-90-5	231-072-3	0-3
CALCIUM CARBONATE	1317-65-3	215-279-6	0-10
CHROMIUM	7440-47-3	231-157-5	3-35
COLUMBIUM	7440-03-1	231-113-5	0-4
FLUORSPAR	7789-75-5	232-188-7	0-10
IRON	7439-89-6	231-096-4	40-80
MAGNESIUM CARBONATE	546-93-0	208-915-9	0-5
MANGANESE	7439-96-5	231-105-1	0-15
MOLYBDENUM	7439-98-7	231-107-2	0-6
NICKEL	7440-02-0	231-111-4	0-30
POTASSIUM OXIDE	12136-45-7	235-227-6	0-2
SILICA	14808-60-7	238-878-4	1-10
(Amorphous Silica Fume)	69012-64-2	273-761-5	
SILICON	7440-21-3	231-130-8	0-8
SODIUM OXIDE	7681-49-5	215-208-9	0-2
TITANIUM	7440-32-6	231-142-3	0-5
TITANIUM DIOXIDE	13463-67-7	236-675-5	0-17
TUNGSTEN	7440-33-7	231-143-9	0-1

--- 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/m³ – Respirable Fraction, 15 mg/m³ – Total Dust. The ACGIH TLV for Particles – Not Otherwise Specified (PNOS) is 3 mg/m³ – Respirable Particles, 10 mg/m³ – 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/m³).

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
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
CHROMIUM#	7440-47-3	231-157-5	1 (Metal) 0.5 (Cr II & Cr III Cpnds) 0.005 (Cr VI Cpnds)	0.5 (Metal) (A4) 0.5 (Cr III Cpnds) (A4) 0.05 (Cr VI Sol Cpnds) (A1) 0.01 (Cr VI Insol Cpnds) (A1)	0.1 I* (Aerosol) - Switzerland 0.005; 0.01*** - Denmark 0.005 (Total Aerosol); 0.015***(Total Aerosol) - Sweden
COLUMBIUM	7440-03-1	231-113-5	5 R*	3 R*	0.5; 1*** - 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
MAGNESIUM CARBONATE	546-93-0	208-915-9	5 R*	3 R*	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* ♦, ♦♦	3 R* (Aerosol) – Switzerland; 10 I* (Aerosol) – UK 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) 1.5 I* (Ele) (A5) 0.1 I* (Sol Cpnds) (A4) 0.2 I* (Insol Cpnds) (A1)	3 R* - Spain; 4; 10*** - Poland 0.05; 0.1*** - Denmark
NICKEL#	7440-02-0	231-111-4	1 (Metal) 1 (Sol Cpnds) 1 (Insol Cpnds)	3 R* 0.025 R* (A2)	
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*	3 R*	0.1 (Fused, Respirable Dust) - Denmark
(Amorphous Silica Fume)	69012-64-2	273-761-5	0.8	3 R*	0.2*** (Fused, Respirable Dust) - Denmark
SILICON+	7440-21-3	231-130-8	5 R*	3 R*	2 I*; 4 I*** - Denmark
SODIUM OXIDE+	7681-49-5	215-208-9	5 R*	10 (A4)	4 R* (Aerosol); 10 I* (Aerosol) - Denmark
TITANIUM+	7440-32-6	231-142-3	5 R*	5, 10 STEL*** (Insol Cpnds)	1.5 R*(Dust NOS - Aerosol) - Germany
TITANIUM DIOXIDE	13463-67-7	236-675-5	15 (Dust)	1, 3 STEL*** (Sol Cpnds)	1.5 R* (as TiO_2) - Germany
TUNGSTEN	7440-33-7	231-143-9	5 R*		1.5 R* - Germany 1 I* (Aerosol); 2 I*** (Aerosol) - Austria

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 as dust or fume ♦ - NIOSH REL TWA and STEL ♦ - Listed under ACGIH Notice of Intended Changes for Mn in 2010 ♦♦ - Limit of 0.02 mg/m³ 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.

Appendix D
Emission Estimates

Cives Steel Company
Current Emissions Summary

Table 1: Cives Annual Operating Hours

	Hours/day	Days/week	Weeks/year	hours/year
Shift 1	10	5	52	2600
Shift 2	10	5	52	2600

Table 2: Criteria Pollutant Summary

Pollutant		Heaters	Abrasive Blasting		Painting		Welding		FDB		Controlled Total	Uncontrolled Total	Modeling Threshold [1,2]	Exceeds Threshold
			Controlled	Uncontrolled	Controlled	Uncontrolled	Controlled	Uncontrolled	Controlled	Uncontrolled				
NOx	tpy	4.18							0.02	0.02	4.20	4.20	1.20	Exceeds
	lb/hr	0.96							0.01	0.01	0.96	0.96	0.20	Exceeds
CO	tpy	3.51									3.51	3.51		
	lb/hr	0.80									0.80	0.80	15.00	Below
PM10	tpy	0.32	0.04	36.00	0.96	19.15	4.20E-02	0.84	3.88E-05	0.04	1.35	56.34		
	lb/hr	0.07	0.01	13.85	0.37	7.36	1.61E-02	0.32	1.49E-05	0.01	0.47	21.62	0.22	Exceeds
PM2.5	tpy	0.32	0.04	36.00	0.96	19.15	4.20E-02	0.84	9.99E-06	0.01	1.35	56.31	0.35	Exceeds
	lb/hr	0.07	0.01	13.85	0.37	7.36	1.61E-02	0.32	3.84E-06	0.004	0.47	21.61	0.054	Exceeds
SO2	tpy	0.03									0.03	0.03	1.20	Below
	lb/hr	0.01									0.01	0.01	0.21	Below
Lead	lb/month[3]	3.49E-03									3.49E-03	3.49E-03	14.00	Below
VOC	tpy	0.23			4.27	4.27					4.50	4.50		
	lb/hr	0.05			1.64	1.64					1.69	1.69		
HAP	tpy										1.22	1.25		
TAP	tpy	0.12	0.04	0.04	10.26	10.26	1.16	1.19	0.019	0.023	11.60	11.63		
CO2e	tpy	4,529									4529.07	4529.07		

[1] *State of Idaho Guideline for Performing Air Quality Impact Analysis*, Tabel 2: Modeling Thresholds for Criteria Pollutants. July 2, 2011

[2] Compare controlled emission estimates to threshold

[3] Used the annual ton/yr total and divided by 12 to calculate a monthly average

Table 3: Hazardous Air Pollutants (HAPs) Summary

HAPs	NG Heaters		Abrassive Blasting		Painting		Welding		FDB (Plasma Cutting)		Total		EL[1]	Exceeds	AAC[2]	AACC[3]
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	EL	(mg/m^3)	(ug/m^3)
Benzene	2.01E-05	8.78E-05									2.01E-05	8.78E-05	8.00E-04	Below		1.20E-01
Dichlorobenzene	1.15E-05	5.02E-05									1.15E-05	5.02E-05	20	Below	15	
Ethylbenzene					0.00	0.00					0.00E+00	0.00E+00	29	Below	21.75	
Formaldehyde	7.16E-04	3.14E-03									7.16E-04	3.14E-03	5.10E-04	Exceeds		7.70E-02
Hexane	1.72E-02	7.53E-02									1.72E-02	7.53E-02	12	Below	9	
Methyl Alcohol					0.38	0.98					3.76E-01	9.77E-01	17.3	Below	13	
Naphthalene	5.83E-06	2.55E-05									5.83E-06	2.55E-05	3.33	Below	2.5	
Phenol					0.00	0.00					0.00E+00	0.00E+00	1.27	Below	0.95	
Toluene	3.25E-05	1.42E-04			0.00	0.00					3.25E-05	1.42E-04	25	Below	18.75	
xylene					0.00	0.00					0.00E+00	0.00E+00	29	Below	21.75	
Arsenic	1.91E-06	8.37E-06									1.91E-06	8.37E-06	1.50E-06	Exceeds		2.30E-04
Beryllium	1.15E-07	5.02E-07									1.15E-07	5.02E-07	2.80E-05	Below		4.20E-03
Cadmium	1.05E-05	4.60E-05									1.05E-05	4.60E-05	3.70E-06	Exceeds		5.60E-04
Chromium	1.34E-05	5.86E-05					0.037	0.097	3.01E-03	7.84E-03	4.05E-02	1.05E-01	0.033	Exceeds	0.025	
Cobalt	8.02E-07	3.51E-06					0.0006	0.0017			6.47E-04	1.68E-03	0.0033	Below	0.0025	
Manganese	3.63E-06	1.59E-05	1.32E-04	3.42E-04			0.021	0.055	6.57E-04	1.71E-03	2.21E-02	5.75E-02	0.333	Below	0.25	
Mercury	2.48E-06	1.09E-05									2.48E-06	1.09E-05				
Uncontrolled Nickel	2.01E-05	8.78E-05					0.010	0.025	1.54E-03	4.00E-03	1.12E-02	2.93E-02	2.70E-05	Exceeds		4.20E-03
Controlled Nickel	2.01E-05	8.78E-05					4.84E-04	1.26E-03	1.54E-06	4.00E-06	5.06E-04	1.35E-03	2.70E-05	Exceeds		4.20E-03
Selenium	2.29E-07	1.00E-06									2.29E-07	1.00E-06	0.013	Below	0.01	
Lead	4.78E-06	2.09E-05									4.78E-06	2.09E-05				
											Uncontrolled Facility Wide Total HAPs		4.68E-01		1.25E+00	
											Controlled Facility Wide Total HAPs		4.57E-01		1.22E+00	

Note: Mercury is no longer listed in IDAPA 58.01.01.585/586

[1] IDAPA 58.01.01.585/586 Screening Emission Level

[2] IDAPA 58.01.01.585 Acceptable Ambient Concentration (AAC), 24-hour average

[3] IDAPA 58.01.01.586 Acceptable Ambient Concentration for Carcinogens (AACC), annual average

Cives Steel Company

Facility Wide Modeling Input Summary

	Criteria Pollutants						HAP Annual				HAP 24-Hour
Source ID	PM10 (24-hour) (lb/hr)	PM2.5 (24-hour) (lb/hr)	PM2.5 (Annual) (ton/yr)	NOx (1-hour) (lb/hr)	NOx (Annual)[1] (lb/hr)	(ton/yr)	Formaldehyde (ton/yr)	Arsenic (ton/yr)	Cadmium (ton/yr)	Nickel (ton/yr)	Chromium (lb/hr)
MAU-01A[2]	4.95E-02	4.95E-02	2.17E-01	6.51E-01	6.51E-01	2.85E+00	2.14E-03	5.70E-06	3.14E-05	5.99E-05	9.11E-06
MAU-01B[2]	4.95E-02	4.95E-02	2.17E-01	6.51E-01	6.51E-01	2.85E+00	2.14E-03	5.70E-06	3.13652E-05	5.9879E-05	9.11E-06
MAU-01C[2]	4.95E-02	4.95E-02	2.17E-01	6.51E-01	6.51E-01	2.85E+00	2.14E-03	5.70E-06	3.13652E-05	5.9879E-05	9.11E-06
MAU-01D[2]	4.95E-02	4.95E-02	2.17E-01	6.51E-01	6.51E-01	2.85E+00	2.14E-03	5.70E-06	3.13652E-05	5.9879E-05	9.11E-06
MAU-01E[2]	4.95E-02	4.95E-02	2.17E-01	6.51E-01	6.51E-01	2.85E+00	2.14E-03	5.70E-06	3.13652E-05	5.9879E-05	9.11E-06
MAU-01F[2]	4.95E-02	4.95E-02	2.17E-01	6.51E-01	6.51E-01	2.85E+00	2.14E-03	5.70E-06	3.13652E-05	5.9879E-05	9.11E-06
MAU-02A[2]	1.10E-02	1.10E-02	4.82E-02	1.45E-01	1.45E-01	6.34E-01	4.75E-04	1.27E-06	6.97E-06	1.33E-05	2.03E-06
MAU-02B[2]	1.10E-02	1.10E-02	4.82E-02	1.45E-01	1.45E-01	6.34E-01	4.75E-04	1.27E-06	6.97E-06	1.33E-05	2.03E-06
RTU-01[2]	8.94E-04	8.94E-04	3.92E-03	1.18E-02	1.18E-02	5.15E-02	3.86E-05	1.03E-07	5.67E-07	1.08E-06	1.65E-07
RTU-02[2]	3.73E-04	3.73E-04	1.63E-03	4.90E-03	4.90E-03	2.15E-02	1.61E-05	4.29E-08	2.36E-07	4.51E-07	6.86E-08
RTU-03[2]	8.94E-04	8.94E-04	3.92E-03	1.18E-02	1.18E-02	5.15E-02	3.86E-05	1.03E-07	5.67E-07	1.08E-06	1.65E-07
RTU-04[2]	8.94E-04	8.94E-04	3.92E-03	1.18E-02	1.18E-02	5.15E-02	3.86E-05	1.03E-07	5.67E-07	1.08E-06	1.65E-07
RAD_HEAT-01[2]	4.47E-03	4.47E-03	1.96E-02	5.88E-02	5.88E-02	2.58E-01	1.93E-04	5.15E-07	2.83E-06	5.41E-06	8.24E-07
RAD_HEAT-02[2]	4.47E-03	4.47E-03	1.96E-02	5.88E-02	5.88E-02	2.58E-01	1.93E-04	5.15E-07	2.83E-06	5.41E-06	8.24E-07
RAD_HEAT-03[2]	4.47E-03	4.47E-03	1.96E-02	5.88E-02	5.88E-02	2.58E-01	1.93E-04	5.15E-07	2.83E-06	5.41E-06	8.24E-07
RAD_HEAT-04[2]	4.47E-03	4.47E-03	1.96E-02	5.88E-02	5.88E-02	2.58E-01	1.93E-04	5.15E-07	2.83E-06	5.41E-06	8.24E-07
RAD_HEAT-05A[2,3]	6.71E-04	6.71E-04	2.94E-03	8.82E-03	8.82E-03	3.86E-02	2.90E-05	7.73E-08	4.25E-07	8.12E-07	1.24E-07
RAD_HEAT-05B[2,3]	6.71E-04	6.71E-04	2.94E-03	8.82E-03	8.82E-03	3.86E-02	2.90E-05	7.73E-08	4.25E-07	8.12E-07	1.24E-07
RAD_HEAT-06A[2,4]	6.71E-04	6.71E-04	2.94E-03	8.82E-03	8.82E-03	3.86E-02	2.90E-05	7.73E-08	4.25E-07	8.12E-07	1.24E-07
RAD_HEAT-06B[2,4]	6.71E-04	6.71E-04	2.94E-03	8.82E-03	8.82E-03	3.86E-02	2.90E-05	7.73E-08	4.25E-07	8.12E-07	1.24E-07
RAD_HEAT-07[2]	4.47E-03	4.47E-03	1.96E-02	5.88E-02	5.88E-02	2.58E-01	1.93E-04	5.15E-07	2.83E-06	5.41E-06	8.24E-07
RAD_HEAT-08[2]	4.47E-03	4.47E-03	1.96E-02	5.88E-02	5.88E-02	2.58E-01	1.93E-04	5.15E-07	2.83E-06	5.41E-06	8.24E-07
UH-01[2]	2.24E-03	2.24E-03	9.79E-03	2.94E-02	2.94E-02	1.29E-01	9.66E-05	2.58E-07	1.42E-06	2.71E-06	4.12E-07
SAW_BLDG_HEA[2]	1.01E-03	1.01E-03	4.44E-03	1.33E-02	1.33E-02	5.84E-02	4.38E-05	1.17E-07	6.42E-07	1.23E-06	1.87E-07
DRILL_BLD_HE[2]	1.01E-03	1.01E-03	4.44E-03	1.33E-02	1.33E-02	5.84E-02	4.38E-05	1.17E-07	6.42E-07	1.23E-06	1.87E-07
PEDDI_BLD_HE[2]	1.01E-03	1.01E-03	4.44E-03	1.33E-02	1.33E-02	5.84E-02	4.38E-05	1.17E-07	6.42E-07	1.23E-06	1.87E-07
COPPER_BLD_H[2]	1.01E-03	1.01E-03	4.44E-03	1.33E-02	1.33E-02	5.84E-02	4.38E-05	1.17E-07	6.42E-07	1.23E-06	1.87E-07
BEAD_BLAST[5]	0.012	0.012	0.036	NA	NA	NA	NA	NA	NA	NA	NA
FAN_01[5,6]	1.60E-01	1.54E-01	3.52E-01	1.05E+00	1.05E+00	4.60E+00	3.45E-03	9.19E-06	5.05E-05	4.12E-04	0.0025
FAN_02[5,6]	1.60E-01	1.54E-01	3.52E-01	1.05E+00	1.05E+00	4.60E+00	3.45E-03	9.19E-06	5.05E-05	4.12E-04	0.0025
FAN_03[5,6]	1.60E-01	1.54E-01	3.52E-01	1.05E+00	1.05E+00	4.60E+00	3.45E-03	9.19E-06	5.05E-05	4.12E-04	0.0025
FAN_04[5,6]	1.60E-01	1.54E-01	3.52E-01	1.05E+00	1.05E+00	4.60E+00	3.45E-03	9.19E-06	5.05E-05	4.12E-04	0.0025

[1] Annual NO2 modeling is based on an annual average lb/hr value (tons/year x 2000 lb/hr / 8760 hours/yr)

[2] Equipment operates up to 24-hours per day

[3] A single emission unit vents out two stacks. Assumed that flow is divided equally between the two stacks (RAD_HEAT_05A and RAD_HEAT_05B)

[4] A single emission unit vents out two stacks. Assumed that flow is divided equally between the two stacks (RAD_HEAT_06A and RAD_HEAT_06B)

[5] Equipment operates up to 20-hours per day. For PM10, PM2.5, and chromium 24-hour emissions, multiplied emission rate times 20/24.

[6] Assumed that all four fans operate at the same time and vent equally. Emissions include unvented sources inside main bay including painting, welding, and FDB dust collector

NA = Not applicable. Source(s) do not emit pollutant.

Emission units vent through Fans 1 through 4

Cives Steel Company

Natural Gas Heater Emissions

Natural Gas Heating Value (BTU/scf) 1,020

	Emission Factor[1]	MAU-1		MAU-2		RTU-1		RTU-2		RTU-3		RTU-4		Radiant Heat (outbuildings)		CoRayVac Infrared Heat		CoRayVac Infrared Heat		Unit Heater	
	(lb/10^6scf)	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Model		DGX-120-H32		DGX-118-H32		48HCDD12E2M6-6U5M0		48HCDA06E2M6-0B5FO		48HCED08E2M6-6U5MC		48HCED08E2M6-6U5MC		PH-34		B-9		B-10		PDP300AE0130	
Number of Units		6		2		1		1		1		1		4		2		6		1	
Heat Input (MMBTU/hr)		1.1067		0.7378		0.12		0.05		0.12		0.12		0.034		0.09		0.1		0.3	
Natural Gas Usage (scf/hr)		6,510		1,447		118		49		118		118		133		176		588		294	
Natural Gas Usage (10^6scf/hr)		0.0065		0.0014		0.00012		0.00005		0.00012		0.00012		0.00013		0.00018		0.00059		0.0003	
Annual Hours of Operations (hrs/yr)[2]		8,760		8,760		8,760		8,760		8,760		8,760		8,760		8,760		8,760		8,760	
Criteria Pollutants																					
NO_x	100	6.51E-01	2.85E+00	1.45E-01	6.34E-01	1.18E-02	5.15E-02	4.90E-03	2.15E-02	1.18E-02	5.15E-02	1.18E-02	5.15E-02	1.33E-02	5.84E-02	1.76E-02	7.73E-02	5.88E-02	2.58E-01	2.94E-02	1.29E-01
CO	84	5.47E-01	2.40E+00	1.22E-01	5.32E-01	9.88E-03	4.33E-02	4.12E-03	1.80E-02	9.88E-03	4.33E-02	9.88E-03	4.33E-02	1.12E-02	4.91E-02	1.48E-02	6.49E-02	4.94E-02	2.16E-01	2.47E-02	1.08E-01
PM	7.6	4.95E-02	2.17E-01	1.10E-02	4.82E-02	8.94E-04	3.92E-03	3.73E-04	1.63E-03	8.94E-04	3.92E-03	8.94E-04	3.92E-03	1.01E-03	4.44E-03	1.34E-03	5.87E-03	4.47E-03	1.96E-02	2.24E-03	9.79E-03
SO_2	0.6	3.91E-03	1.71E-02	8.68E-04	3.80E-03	7.06E-05	3.09E-04	2.94E-05	1.29E-04	7.06E-05	3.09E-04	7.06E-05	3.09E-04	8.00E-05	3.50E-04	1.06E-04	4.64E-04	3.53E-04	1.55E-03	1.76E-04	7.73E-04
VOC	5.5	3.58E-02	1.57E-01	7.96E-03	3.49E-02	6.47E-04	2.83E-03	2.70E-04	1.18E-03	6.47E-04	2.83E-03	6.47E-04	2.83E-03	7.33E-04	3.21E-03	9.71E-04	4.25E-03	3.24E-03	1.42E-02	1.62E-03	7.09E-03
HAP Emissions																					
2-Methylnaphthalene	2.40E-05	1.56E-07	6.84E-07	3.47E-08	1.52E-07	2.82E-09	1.24E-08	1.18E-09	5.15E-09	2.82E-09	1.24E-08	2.82E-09	1.24E-08	3.20E-09	1.40E-08	4.24E-09	1.86E-08	1.41E-08	6.18E-08	7.06E-09	3.09E-08
3-Methylchloranthene	1.80E-06	1.17E-08	5.13E-08	2.60E-09	1.14E-08	2.12E-10	9.28E-10	8.82E-11	3.86E-10	2.12E-10	9.28E-10	2.12E-10	9.28E-10	2.40E-10	1.05E-09	3.18E-10	1.39E-09	1.06E-09	4.64E-09	5.29E-10	2.32E-09
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.04E-07	4.56E-07	2.31E-08	1.01E-07	1.88E-09	8.24E-09	7.84E-10	3.44E-09	1.88E-09	8.24E-09	1.88E-09	8.24E-09	2.13E-09	9.34E-09	2.82E-09	1.24E-08	9.41E-09	4.12E-08	4.71E-09	2.06E-08
Acenaphthene	1.80E-06	1.17E-08	5.13E-08	2.60E-09	1.14E-08	2.12E-10	9.28E-10	8.82E-11	3.86E-10	2.12E-10	9.28E-10	2.12E-10	9.28E-10	2.40E-10	1.05E-09	3.18E-10	1.39E-09	1.06E-09	4.64E-09	5.29E-10	2.32E-09
Acenaphthylene	1.80E-06	1.17E-08	5.13E-08	2.60E-09	1.14E-08	2.12E-10	9.28E-10	8.82E-11	3.86E-10	2.12E-10	9.28E-10	2.12E-10	9.28E-10	2.40E-10	1.05E-09	3.18E-10	1.39E-09	1.06E-09	4.64E-09	5.29E-10	2.32E-09
Anthracene	2.40E-06	1.56E-08	6.84E-08	3.47E-09	1.52E-08	2.82E-10	1.24E-09	1.18E-10	5.15E-10	2.82E-10	1.24E-09	2.82E-10	1.24E-09	3.20E-10	1.40E-09	4.24E-10	1.86E-09	1.41E-09	6.18E-09	7.06E-10	3.09E-09
Benza(a)anthracene	1.80E-06	1.17E-08	5.13E-08	2.60E-09	1.14E-08	2.12E-10	9.28E-10	8.82E-11	3.86E-10	2.12E-10	9.28E-10	2.12E-10	9.28E-10	2.40E-10	1.05E-09	3.18E-10	1.39E-09	1.06E-09	4.64E-09	5.29E-10	2.32E-09
Benzene	2.10E-03	1.37E-05	5.99E-05	3.04E-06	1.33E-05	2.47E-07	1.08E-06	1.03E-07	4.51E-07	2.47E-07	1.08E-06	2.47E-07	1.08E-06	2.80E-07	1.23E-06	3.71E-07	1.62E-06	1.24E-06	5.41E-06	6.18E-07	2.71E-06
Benzo(a)pyrene	1.20E-06	7.81E-09	3.42E-08	1.74E-09	7.60E-09	1.41E-10	6.18E-10	5.88E-11	2.58E-10	1.41E-10	6.18E-10	1.41E-10	6.18E-10	1.60E-10	7.01E-10	2.12E-10	9.28E-10	7.06E-10	3.09E-09	3.53E-10	1.55E-09
Benzo(b)fluoranthene	1.80E-06	1.17E-08	5.13E-08	2.60E-09	1.14E-08	2.12E-10	9.28E-10	8.82E-11	3.86E-10	2.12E-10	9.28E-10	2.12E-10	9.28E-10	2.40E-10	1.05E-09	3.18E-10	1.39E-09	1.06E-09	4.64E-09	5.29E-10	2.32E-09
Benzo(g,h,i)perylene	1.20E-06	7.81E-09	3.42E-08	1.74E-09	7.60E-09	1.41E-10	6.18E-10	5.88E-11	2.58E-10	1.41E-10	6.18E-10	1.41E-10	6.18E-10	1.60E-10	7.01E-10	2.12E-10	9.28E-10	7.06E-10	3.09E-09	3.53E-10	1.55E-09
Benzo(k)fluoranthene	1.80E-06	1.17E-08	5.13E-08	2.60E-09	1.14E-08	2.12E-10	9.28E-10	8.82E-11	3.86E-10	2.12E-10	9.28E-10	2.12E-10	9.28E-10	2.40E-10	1.05E-09	3.18E-10	1.39E-09	1.06E-09	4.64E-09	5.29E-10	2.32E-09
Butane	2.10E+00	1.37E-02	5.99E-02	3.04E-03	1.33E-02	2.47E-04	1.08E-03	1.03E-04	4.51E-04	2.47E-04	1.08E-03	2.47E-04	1.08E-03	2.80E-04	1.23E-03	3.71E-04	1.62E-03	1.24E-03	5.41E-03	6.18E-04	2.71E-03
Chrysene	1.80E-06	1.17E-08	5.13E-08	2.60E-09	1.14E-08	2.12E-10	9.28E-10	8.82E-11	3.86E-10	2.12E-10	9.28E-10	2.12E-10	9.28E-10	2.40E-10	1.05E-09	3.18E-10	1.39E-09	1.06E-09	4.64E-09	5.29E-10	2.32E-09
Dibenzo(a,h)anthracene	1.20E-06	7.81E-09	3.42E-08	1.74E-09	7.60E-09	1.41E-10	6.18E-10	5.88E-11	2.58E-10	1.41E-10	6.18E-10	1.41E-10	6.18E-10	1.60E-10	7.01E-10	2.12E-10	9.28E-10	7.06E-10	3.09E-09	3.53E-10	1.55E-09
Dichlorobenzene	1.20E-03	7.81E-06	3.42E-05	1.74E-06	7.60E-06	1.41E-07	6.18E-07	5.88E-08	2.58E-07	1.41E-07	6.18E-07	1.41E-07	6.18E-07	1.60E-07	7.01E-07	2.12E-07	9.28E-07	7.06E-07	3.09E-06	3.53E-07	1.55E-06
Ethane	3.10E+00	2.02E-02	8.84E-02	4.48E-03	1.96E-02	3.65E-04	1.60E-03	1.52E-04	6.66E-04	3.65E-04	1.60E-03	3.65E-04	1.60E-03	4.13E-04	1.81E-03	5.47E-04	2.40E-03	1.82E-03	7.99E-03	9.12E-04	3.99E-03
Fluoranthene	3.00E-06	1.95E-08	8.55E-08	4.34E-09	1.90E-08	3.53E-10	1.55E-09	1.47E-10	6.44E-10	3.53E-10	1.55E-09	3.53E-10	1.55E-09	4.00E-10	1.75E-09	5.29E-10	2.32E-09	1.76E-09	7.73E-09	8.82E-10	3.86E-09
Fluorene	2.80E-06	1.82E-08	7.98E-08	4.05E-09	1.77E-08	3.29E-10	1.44E-09	1.37E-10	6.01E-10	3.29E-10	1.44E-09	3.29E-10	1.44E-09	3.73E-10	1.64E-09	4.94E-10	2.16E-09	1.65E-09	7.21E-09	8.24E-10	3.61E-09
Formaldehyde	7.50E-02	4.88E-04	2.14E-03	1.09E-04	4.75E-04	8.82E-06	3.86E-05	3.68E-06	1.61E-05	8.82E-06	3.86E-05	8.82E-06	3.86E-05	1.00E-05	4.38E-05	1.32E-05	5.80E-05	4.41E-05	1.93E-04	2.21E-05	9.66E-05
Hexane	1.80E+00	1.17E-02	5.13E-02	2.60E-03	1.14E-02	2.12E-04	9.28E-04	8.82E-05	3.86E-04	2.12E-04	9.28E-04	2.12E-04	9.28E-04	2.40E-04	1.05E-03	3.18E-04	1.39E-03	1.06E-03	4.64E-03	5.29E-04	2.32E-03
Indeno(1,2,3-cd)pyrene	1.80E-06	1.17E-08	5.13E-08	2.60E-09	1.14E-08	2.12E-10	9.28E-10	8.82E-11	3.86E-10	2.12E-10	9.28E-10	2.12E-10	9.28E-10	2.40E-10	1.05E-09	3.18E-10	1.39E-09	1.06E-09	4.64E-09	5.29E-10	2.32E-09
Naphthalene	6.10E-04	3.97E-06	1.74E-05	8.82E-07	3.87E-06	7.18E-08	3.14E-07	2.99E-08	1.31E-07	7.18E-08	3.14E-07	7.18E-08	3.14E-07	8.13E-08	3.56E-07	1.08E-07	4.71E-07	3.59E-07	1.57E-06	1.79E-07	7.86E-07
Pentane	2.60E+00	1.69E-02	7.41E-02	3.76E-03	1.65E-02	3.06E-04	1.34E-03	1.27E-04	5.58E-04	3.06E-04	1.34E-03	3.06E-04	1.34E-03	3.47E-04	1.52E-03	4.59E-04	2.01E-03	1.53E-03	6.70E-03	7.65E-04	3.35E-03
Phenanathrene	1.70E-05	1.11E-07	4.85E-07	2.46E-08	1.08E-07	2.00E-09	8.76E-09	8.33E-10	3.65E-09	2.00E-09	8.76E-09	2.00E-09	8.76E-09	2.27E-09	9.93E-09	3.00E-09	1.31E-08	1.00E-08	4.38E-08	5.00E-09	2.19E-08
Propane	1.60E+00	1.04E-02	4.56E-02	2.31E-03	1.01E-02	1.88E-04	8.24E-04	7.84E-05	3.44E-04	1.88E-04	8.24E-04	1.88E-04	8.24E-04	2.13E-04	9.34E-04	2.82E-04	1.24E-03	9.41E-04	4.12E-03	4.71E-04	2.06E-03
Pyrene	5.00E-06	3.26E-08	1.43E-07	7.23E-09	3.17E-08	5.88E-10	2.58E-09	2.45E-10	1.07E-09	5.88E-10	2.58E-09	5.88E-10	2.58E-09	6.67E-10	2.92E-09	8.82E-10	3.86E-09	2.94E-09	1.29E-08	1.47E-09	6.44E-09
Toluene	3.40E-03	2.21E-05	9.69E-05	4.92E-06	2.15E-05	4.00E-07	1.75E-06	1.67E-07	7.30E-07	4.00E-07	1.75E-06	4.00E-07	1.75E-06	4.53E-07	1.99E-06	6.00E-07	2.63E-06	2.00E-06	8.76E-06	1.00E-06	4.38E-06
Arsenic	2.00E-04	1.30E-06	5.70E-06	2.89E-07	1.27E-06	2.35E-08	1.03E-07	9.80E-09	4.29E-08	2.35E-08	1.03E-07	2.35E-08	1.03E-07	2.67E-08	1.17E-07	3.53E-08	1.55E-07	1.18E-07	5.15E-07	5.88E-08	2.58E-07
Barium	4.40E-03	2.86E-05	1.25E-04	6.37E-06	2.79E-05	5.18E-07	2.27E-06	2.16E-07	9.45E-07	5.18E-07	2.27E-06	5.18E-07	2.27E-06	5.87E-07	2.57E-06	7.76E-07	3.40E-06	2.59E-06	1.13E-05	1.29E-06	5.67E-06
Beryllium	1.20E-05	7.81E-08	3.42E-07	1.74E-08	7.60E-08	1.41E-09	6.18E-09	5.88E-10	2.58E-09	1.41E-09	6.18E-09	1.41E-09	6.18E-09	1.60E-09	7.01E-09	2.12E-09	9.28E-09	7.06E-09	3.09E-08	3.53E-09	1.55E-08
Cadmium	1.10E-03	7.16E-06	3.14E-05	1.59E-06	6.97E-06	1.29E-07	5.67E-07	5.39E-08	2.36E-07	1.29E-07	5.67E-07	1.29E-07	5.67E-07	1.47E-07	6.42E-07	1.94E-07	8.50E-07	6.47E-07	2.83E-06	3.24E-07	1.42E-06
Chromium	1.40E-03	9.11E-06	3.99E-05	2.03E-06	8.87E-06	1.65E-07	7.21E-07	3.86E-06	3.01E-07	1.65E-07	7.21E-07	1.65E-07	7.21E-07	1.87E-07	8.18E-07	2.47E-07	1.08E-06	8.24E-07	3.61E-06	4.12E-07	1.80E-06
Cobalt	8.40E-05	5.47E-07	2.40E-06	1.22E-07	5.32E-07	9.88E-09	4.33E-08	4.12E-09	1.80E-08	9.88E-09	4.33E-08	9.88E-09	4.33E-08	1.12E-08	4.91E-08	1.48E-08	6.49E-08	4.94E-08	2.16E-07	2.47E-08	1.08E-07
Copper	8.50E-04	5.53E-06	2.42E-05	1.23E-06	5.39E-06	1.00E-07	4.38E-07	4.17E-08	1.83E-07	1.00E-07	4.38E-07	1.00E-07	4.38E-07	1.13E-07	4.96E-07	1.50E-07	6.57E-07	5.00E-07	2.19E-06	2.50E-07	1.10E-06
Manganese	3.80E-04	2.47E-06	1.08E-05	5.50E-07	2.41E-06	4.47E-08	1.96E-07	1.86E-08	8.16E-08	4.47E-08	1.96E-07	4.47E-08	1.96E-07	5.07E-08	2.22E-07	6.71E-08	2.94E-07	2.24E-07	9.79E-07	1.12E-07	4.90E-07
Mercury	2.60E-04	1.69E-06	7.41E-06	3.76E-07	1.65E-06	3.06E-08	1.34E-07	1.27E-08	5.58E-08	3.06E-08	1.34E-07	3.06E-08	1.34E-07	3.47E-08	1.52E-07	4.59E-08	2.01E-07	1.53E-07	6.70E-07	7.65E-08	3.35E-07
Molybdenum	1.10E-03	7.16E-06	3.14E-05	1.59E-06	6.97E-06	1.29E-07	5.67E-07	5.39E-08	2.36E-07	1.29E-07	5.67E-07	1.29E-07	5.67E-07	1.47E-07	6.42E-07	1.94E-07	8.50E-07	6.47E-07	2.83E-06	3.24E-07	1.42E-06
Nickel	2.10E-03	1.37E-05	5.99E-05	3.04E-06	1.33E-05	2.47E-07	1.08E-06	1.03E-07	4.51E-07	2.47E-07	1.08E-06	2.47E-07	1.08E-06	2.80E-07	1.23E-06	3.71E-07	1.62E-06	1.24E-06	5.41E-06	6.18E-07	2.71E-06
Selenium	2.40E-05	1.56E-07	6.84E-07	3.47E-08	1.52E-07	2.82E-09	1.24E-08	1.18E-09	5.15E-09	2.82E-09	1.24E-08	2.82E-09	1.24E-08	3.20E-09	1.40E-08	4.24E-09	1.86E-08	1.41E-08	6.18E-08	7.06E-09	3.09E-08
Vanadium	2.30E-03	1.50E-05	6.56E-05	3.33E-06	1.46E-05	2.71E-07	1.19E-06	1.13E-07	4.94E-07	2.71E-07	1.19E-06	2.71E-07	1.19E-06	3.07E-07	1.34E-06	4.06E-07	1.78E-06	1.35E-06	5.93E-06	6.76E-07	2.96E-06
Zinc	2.90E-02	1.89E-04	8.27E-04	4.20E-05	1.84E-04	3.41E-06	1.49E-05	1.42E-06	6.23E-06	3.41E-06	1.49E-05	3.41E-06	1.49E-05	3.87E-06	1.69E-05	5.12E-06	2.24E-05	1.71E-05	7.47E-05	8.53E-06	3.74E-05
Lead	0.0005	3.26E-06	1.43E-05	7.23E-07	3.17E-06	5.88E-08	2.58E-07	2.45E-08	1.07E-07	5.88E-08	2.58E-07	5.88E-08	2.58E-07	6.67E-08	2.92E-07	8.82E-08	3.86E-07	2.94E-07	1.29E-06	1.47E-07	6.44E-07
TAP Totals	1.13E+01	7.37E-02	3.23E-01	1.64E-02	7.18E-02	1.33E-03	5.84E-03	5.55E-04	2.43E-03	1.33E-03	5.84E-03	1.33E-03	5.84E-03	1.51E-03	6.61E-03	2.00E-03	8.75E-03	6.66E-03	2.92E-02	3.33E-03	1.46E-02
GHG Emissions	kg/MMBtu																				
CO_2	53.02	704	3,084	156	685	13	56	5	23	13	56	13	56	14	63	19	84	64	279	32	139
CH_4	1.00E-03	0.01	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
N_2O	1.00E-04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2e			3,087		686		56		23		56		56		63		84		279		139

Notes

(1) Emission Factors from AP-42, Tables 1.4-1, 1.4-2, 1.4-3 and 1.4-4 (July 1998)

(2) Assume 8,760 hours of operation

Sample Calculation:

Emission rate (tpy) =NG Usage (10^6 scf/hr) * Annual Hours of Operation (hrs) * Emission Factor (lb/10^6 scf) * 1 ton/2000 lb

Emission rate (lb/hr) = Emission rate (tpy) * 2000 lb/1 ton * 1 yr/hours of operation

Cives Steel Company
Abrasive Blasting Emissions

Throughput[1]	72,000 lb of steel shot consumed/yr
Hours of Operation[2]	5,200 hrs
Control Efficiency (PM_{10})[3]	99.9%
Control Efficiency($PM_{2.5}$)[3]	99.9%

Pollutant[4]	Controlled Emissions		Uncontrolled Emissions	
	lb/hr	tpy	lb/hr	tpy
PM_{10}	0.014	0.04	13.85	36
$PM_{2.5}$	0.014	0.04	13.85	36

Notes

(1) Projected based on current 2013 production levels.

(2) Hours of operation assumed to be (2) 10 hour shifts, 5 days a week, 52 weeks a year

(3) Based on Manufacturer Spec (Donaldson Torit) for Dust Collector. Based on Donaldson Torit, Ultra Web II filters rated at 99.999% on 0.5 micron filters. Assume 99.9% for conservatism.
http://allergyclean.com/article-understandingmerv.htm

Sample Calculation:

Emission rate (tpy) = Throughput (lb of steel shot/yr) * (1-control efficiency) * 1 ton/2000 lb

Emission rate (lb/hr) = Emission rate (tpy) * 2000 lb/1 ton * 1 yr/hours of operation

TAPs

Pollutant	CAS	Weight Percent[1]	Controlled Emissions		Idaho TAP Screening Emissions Level	Exceed TAP EL
			lb/hr	tpy	lb/hr	
Iron oxide fume	1309-37-1	96%	0.01	0.03	0.333	No
Carbon black	1333-86-4	1%	0.00	0.00	0.23	No
Manganese dust	7439-96-5	0.95%	0.00	0.00	0.333	No
Silicon	7440-21-3	1.50%	0.00	0.00	0.667	No
Total TAPs	--	--	**0.01**	**0.04**	--	--

Notes

(1) Percentage of each Idaho TAP listed in IDAPA 58.01.01.585 & 586 from MSDSs provided by client

Sample Calculation:

Emission rate (lb/hr) = PM controlled emission rate (lb/hr) * TAP Weight Percent (%)

Emission rate (tpy) = Emission rate (lb/hr) * hours of operation (hrs) * 1 ton/2000 lb

Cives Steel Company
Painting Criteria Emissions

Throughput[1]	24,084 gal
Hours of Operation[2]	5,200 hrs
HEPA filter on fans	95.0% control efficiency for PM

VOCs

Coating[3]	VOC Content (lb/gal)[4]	VOC Emitted (lb/hr)[5]	VOC Emitted (tpy)[5]
AMERLOCK 2	1.5	0.6	1.6
CARBOXINC 11	0	0.0	0.0
AMERCOAT 68HS	2.4	1.0	2.6
Total VOCs	--	**1.6**	**4.3**

Notes

(1) Projected based on current 2013 production levels.

(2) Hours of operation assumed to be (2) 10 hour shifts, 5 days a week, 52 weeks a year

(3) Coatings for the MSDSs provided by client for representative coatings used at the facility

(4) VOC content listed in MSDSs provided by client

(5) Assumed each coating usage was total coating throughput divided by the number of coatings

Sample Calculation:

Emission rate (lb/hr)=Throughput (gal) * VOC Content (lb/gal) / (# of coatings * hours of operation)

Emission rate (tpy) = Emission rate (lb/hr) * hours of operation * 1 ton/2000 lb

PM

Throughput[1]	24,084 gal
Hours of Operation[2]	5,200
Paint Gun Transfer Efficiency[3]	60%

		Uncontrolled	
Coating[4]	Solids Content (lb/gal)[5]	PM Emitted (lb/hr)[6]	PM Emitted (tpy)[6]
AMERLOCK 2	8.5	1.4	3.7
CARBOXINC 11	8.9238	1.5	3.9
AMERCOAT 68HS	26.3	4.4	11.5
Total PM	--	**7.4**	**19.1**

Notes

(1) Projected based on current 2013 production levels.

(2) Hours of operation assumed to be (2) 10 hour shifts, 5 days a week, 52 weeks a year

(3) The Graco XTR Airless Spray Guns have a transfer efficiency ranging from 60-90% according to a Graco Airless Spray Techniques Airless Spray Training Series document

(4) Coatings for the MSDSs provided by client for representative coatings used at the facility

(5) Solids content listed in MSDSs provided by client

(6) Assumed each coating usage was total coating throughput divided by the number of coatings and total PM is assumed to equal PM10 and PM2.5

Sample Calculation:

Emission rate (lb/hr)=Throughput (gal) * Solids Content (lb/gal) / (# of coatings * hours of operation) * (1-transfer efficiency)

Emission rate (tpy) = Emission rate (lb/hr) * hours of operation * 1 ton/2000 lb

Cives Steel Company
Painting Criteria Emissions

Throughput[1]	24,084 gal
Hours of Operation[2]	5,200 hrs
HEPA filter on fans	95.0% control efficiency for PM

VOCs

Coating[3]	VOC Content (lb/gal)[4]	VOC Emitted (lb/hr)[5]	VOC Emitted (tpy)[5]
AMERLOCK 2	1.5	0.6	1.6
CARBOXINC 11	0	0.0	0.0
AMERCOAT 68HS	2.4	1.0	2.6
Total VOCs	--	**1.6**	**4.3**

Notes

(1) Projected based on current 2013 production levels.

(2) Hours of operation assumed to be (2) 10 hour shifts, 5 days a week, 52 weeks a year

(3) Coatings for the MSDSs provided by client for representative coatings used at the facility

(4) VOC content listed in MSDSs provided by client

(5) Assumed each coating usage was total coating throughput divided by the number of coatings

Sample Calculation:

Emission rate (lb/hr)=Throughput (gal) * VOC Content (lb/gal) / (# of coatings * hours of operation)

Emission rate (tpy) = Emission rate (lb/hr) * hours of operation * 1 ton/2000 lb

PM

Throughput[1]	24,084 gal
Hours of Operation[2]	5,200
Paint Gun Transfer Efficiency[3]	60%

		Uncontrolled	
Coating[4]	Solids Content (lb/gal)[5]	PM Emitted (lb/hr)[6]	PM Emitted (tpy)[6]
AMERLOCK 2	8.5	1.4	3.7
CARBOXINC 11	8.9238	1.5	3.9
AMERCOAT 68HS	26.3	4.4	11.5
Total PM	--	**7.4**	**19.1**

Notes

(1) Projected based on current 2013 production levels.

(2) Hours of operation assumed to be (2) 10 hour shifts, 5 days a week, 52 weeks a year

(3) The Graco XTR Airless Spray Guns have a transfer efficiency ranging from 60-90% according to a Graco Airless Spray Techniques Airless Spray Training Series document

(4) Coatings for the MSDSs provided by client for representative coatings used at the facility

(5) Solids content listed in MSDSs provided by client

(6) Assumed each coating usage was total coating throughput divided by the number of coatings and total PM is assumed to equal PM10 and PM2.5

Sample Calculation:

Emission rate (lb/hr)=Throughput (gal) * Solids Content (lb/gal) / (# of coatings * hours of operation) * (1-transfer efficiency)

Emission rate (tpy) = Emission rate (lb/hr) * hours of operation * 1 ton/2000 lb

Cives Steel Company
Painting TAPs Emissions

Throughput[1] 24,084 gal
Hours of Operation[2] 5,200 hrs

TAPs

Pollutant[3]	Density (lb/gal)	Quartz (SiO2)	4-methylpenta n-2-one	heptan-2-one	diiron trioxide	xylene	tetraethyl silicate	Ethylbenz ene	Phenol	Ethanol	Isopropan ol	2-Butaxyeth anol	Methyl Alcohol	Aluminum Silicate	Mica	Zinc	Zinc Oxide	Propylene Glycol Monometh yle ether	Toluene	Carbon Black	Aromatic Hydrocarb on (PAH)
CAS #		14808-60-7	108-10-1	110-43-0	1309-37-1	1330-20-7	78-10-4	100-41-4	108-95-2	64-17-5	67-63-0	111-76-2	67-56-1	1332-58-7	12001-26-2	7440-66-6	1314-13-2	107-98-2	108-88-3	1333-86-4	
Coating[2]		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%		%
AMERLOCK 2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CARBOXINC 11	8.9238	20%	0	0	0	0	0	0	0	25%	15%	15%	10%	10%	5%	0	0	0	0	5%	0
AMERCOAT 68HS	28.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80%	0	0	0	0	0

Pollutant	CAS	Emission Rate lb/hr	Emission Rate tpy	Idaho TAP Screening Emissions Level lb/hr	Exceed TAP EL
Quartz (SiO2)	14808-60-7	7.51E-01	1.95	0.0067	Yes
4-methylpentan-2-one	108-10-1	0.00E+00	0.00	13.7	No
heptan-2-one	110-43-0	0.00E+00	0.00	15.7	No
diiron trioxide	1309-37-1	0.00E+00	0.00	0.333	No
xylene	1330-20-7	0.00E+00	0.00	29	No
tetraethyl silicate	78-10-4	0.00E+00	0.00	5.67	No
Ethylbenzene	100-41-4	0.00E+00	0.00	29	No
Phenol	108-95-2	0.00E+00	0.00	1.27	No
Ethanol	64-17-5	9.39E-01	2.44	125	No
Isopropanol	67-63-0	5.64E-01	1.47	65.3	No
2-Butaxyethanol	111-76-2	5.64E-01	1.47	8	No
Methyl Alcohol	67-56-1	3.76E-01	0.98	17.3	No
Aluminum Silicate	1332-58-7	3.76E-01	0.98	0.133	Yes
Mica	12001-26-2	1.88E-01	0.49	0.2	No
Zinc	7440-66-6	0.00E+00	0.00	0.667	No
Zinc Oxide	1314-13-2	0.00E+00	0.00	0.667	No
Propylene Glycol Monomethyle ether	107-98-2	0.00E+00	0.00	24	No
Toluene	108-88-3	0.00E+00	0.00	25	No
Carbon black	1333-86-4	1.88E-01	0.49	0.23	No
Aromatic Hydrocarbons[4]		0.00E+00	0.00	2.00E-06	No
Total TAPs	--	3.95	10.26	--	--

Notes
(1) TAP percentages provided by client
(2) Coating MSDSs as provided by client
(3) Screening levels from IDAPA 58.01.01.585 & 586
(4) Equivalent to Benzo(a)pyrene - carcinogen (IDAPA 58.01.01.586)

Sample Calculation:
Emission rate (lb/hr)=Sum of [Throughput (gal)/# coatings * Density (lb/gal) * TAP %]
Emission rate (tpy) = Emission rate (lb/hr) * hours of operation * 1 ton/2000 lb

Cives Steel Company
Welding Emissions

Throughput Weld Wire[1]	56,794	lbs
Throughput Weld Rod[1]	3,399	lbs
Hours of Operation[2]	5,200	hrs
HEPA filter on fans	95.0%	control efficiency for PM

PM

		Uncontrolled		Controlled	
Electrode[3]	EF lb/1000 lb of Electrode[4]	PM Emitted (lb/hr)	PM Emitted (tpy)	PM Emitted (lb/hr)	PM Emitted (tpy)
Weld Wire	27.9	0.3	0.8	1.52E-02	3.99E-02
Weld Rod	27.9	0.02	0.05	9.12E-04	2.37E-03
Total PM[5]	--	0.32	0.84	1.61E-02	4.20E-02

Notes

(1) Annual average of 3-year total gathered from another Cives facility that mirrors third-phase production levels

(2) Hours of operation assumed to be (2) 10 hour shifts, 5 days a week, 52 weeks a year

(3) Based on the information provided by the client, the facility uses weld wire and weld rod in welding operations

(4) Emission Factor from AP-42 Table 12.19-1 for Shielded Metal Arc Welding (SMAW) for electrode type ECoCr

(5) Total PM is assumed to equal PM10 and PM2.5

Sample Calculation:

Emission rate (lb/hr)=Throughput (lb)/1000 * EF (lb/1000 lb of electrode)/ (hours of operation)

Emission rate (tpy) = Emission rate (lb/hr) * hours of operation * 1 ton/2000 lb

TAPs

Throughput (for each electrode type)[1]	12,039	lbs
PM Emitted (for each electrode type)	0.06	lb/hr

Pollutant[2]	Aluminum	Calcium Carbonate	Chromium	Cobalt	Copper	Iron	Iron Oxide	Magnesium Oxide	Manganese	Molybdenum	Nickel	Silica	Silicon	Zirconium	Magnesium Carbonate	Tungsten	Limestone and/or calcium carbonate	Mineral Silicates	Quartz	Fluorides
CAS #	7429-90-5	1317-65-3	7440-47-3	7440-48-4	7440-50-8	7439-89-6	1309-37-1	1309-48-4	7439-96-5	7439-98-7	7440-02-0	14808-60-7	7440-21-3	7440-67-7	546-93-0	7440-33-7	1317-65-3	1332-58-7	14808-60-7	NA
Electrode[3]	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	--	0
Tubular Arc Welding (Group A)	2%	2%	3%	0	1%	98%	0	0	5%	1%	0	2%	4%	0	0	0	0	0	0	0
Tubular Arc Welding (Group B)	5%	2%	0	0	0	95%	0	3%	2%	0	0	2%	2%	0	0	0	0	0	0	0
Tubular Arc Welding (Group C)	3%	0	0	1%	2%	98%	12%	2%	4%	2%	4%	2%	4%	1%	0	0	0	0	0	0
Tubular Arc Welding (Group D)	0%	0	20%	0	0	95%	0	0	2%	2%	1%	0	2%	0	0	0	0	0	0	0
Hardsurfacing Electrode	3%	10%	35%	0	0	80%	0	0	15%	6%	10%	10%	8%	0	5%	1%	0	0	0	0
Covered Electrode	0	0	0	0	0	15%	0	0	5%	0	0	0	1%	0	0	0	10%	1%	0.5%	5%

Pollutant	CAS	Emission Rate lb/hr	Emission Rate tpy	Idaho TAP Screening Emissions Level lb/hr	Exceed EL
Aluminum	7429-90-5	0.0084	0.02	0.667	No
Calcium Carbonate	1317-65-3	0.0090	0.02	0.667	No
Chromium	7440-47-3	0.0375	0.10	0.033	Yes
Cobalt	7440-48-4	0.0006	0.00	0.0033	No
Copper	7440-50-8	0.0019	0.01	0.013	No
Iron	7439-89-6	0.3107	0.81	0.067	Yes
Iron Oxide	1309-37-1	0.0078	0.02	0.333	No
Magnesium Oxide	1309-48-4	0.0032	0.01	0.667	No
Manganese	7439-96-5	0.0213	0.06	0.067	No
Molybdenum	7439-98-7	0.0071	0.02	0.333	No
Nickel	7440-02-0	0.0097	0.03	2.70E-05	Yes
Controlled		4.34E-04	1.26E-03		
Silica	14808-60-7	0.0103	0.03	0.0067	Yes
Silicon	7440-21-3	0.0136	0.04	0.667	No
Zirconium	7440-67-7	0.0006	0.00	0.333	No
Magnesium Carbonate	546-93-0	0.0032	0.01	0.667	No
Tungsten	7440-33-7	0.0006	0.00	0.067	No
Limestone and/or calcium carbonate	1317-65-3	0.0065	0.02	0.667	No
Mineral Silicates	1332-58-7	0.0006	0.00	0.133	No
Quartz	14808-60-7	0.0003	0.00	0.0067	No
Fluorides as (F)	NA	0.0032	0.01	0.167	No
Uncontrolled Total TAPs	--	0.456	1.19	--	
Controlled Total TAPs	--	0.447	1.16	--	

Notes

(1) Throughput was based on the sum of weld wire and weld rod divided by the number of electrode types the facility uses

(2) TAP percentages provided by client

(3) Electrode MSDSs as provided by client

Exceeds Idaho TAP Screening Emission Level

Sample Calculation:

Emission rate (lb/hr)=Sum of [PM Emission Rate (lb/hr) * %TAP]

Emission rate (tpy) = Emission rate (lb/hr) * hours of operation * 1 ton/2000 lb

Cives Steel Company

FDB Emissions

See Manufacturer Data Sheet for Plasma Cutter Calculations

Average Place Size[1]	1 in
Average Place Size[1]	25.4 mm
Hours of Operation[2]	5,200 hrs
Control Efficiency (PM_{10})[3]	99.9%
Control Efficiency($PM_{2.5}$)[3]	99.9%

Mild Steel, 8mm, dry cutting: 23 g/min (arithmetic mean per US EPA AP42)[4]

Maximum cutting thickness for HSFDB-2500: 25.4mm
PM emission @ 25.4mm = 25.4mm/8mm x 23 g/min = 73.03 g/min
9.66 lbs/hr
0.005 ton/hr
25.11 tpy

Per M.A. Ebadian, Ph.D. (citation below) particulate size distribution is estimated as [5]

Using Peddinghaus Emissions

PM Emissions

9.66 lbs/hr PM	at 66% PM10	6.38 lbs/hr PM10
0.005 ton/hr PM		0.0032 ton/hr PM10
25.11 tpy PM		16.58 tpy PM10
	at 17% PM2.5	1.64 lbs/hr PM2.5
		0.00082 ton/hr PM2.5
		4.27 tpy PM2.5

From Peddinghaus (6 mm = 1280 ft/hr cutting speed)
Cutting speed difference between 80 mm and 6 mm = 1280-35.43 1244.57 ft/hr
Difference in thickness (80 mm - 6 mm) 74 mm

Speed per thickness = 1244.57 / 74 16.82 (ft/hr)/mm
at 25.4 mm **427.19** ft/hr

PM Uncontrolled Emissions

PM10 emissions = 6.38 lb/hr / 427.19 ft/hr = **0.015** lb/hr (not unit conversion, but based on manufacturer data sheet)
0.0388 ton/yr based on 5200 hours per year operation

PM2.5 emissions = 1.64 lb/hr / 427.19 ft/hr = **0.0038** lb/hr (not unit conversion, but based on manufacturer data sheet)
0.0100 ton/yr based on 5200 hours per year operation

PM Controlled Emissions

PM10 =	**1.49E-05** lb/hr	PM10 =	**3.88E-05** ton/yr
PM2.5 =	**3.84E-06** lb/hr	PM2.5 =	**9.99E-06** ton/yr

Sample Calculation:

Emission rate (tpy) = Maximum cutting thickness (mm)/8mm * 23 g/min * min/hr *(1-control efficiency) * 1 ton/2000 lb * hr/yr
Emission rate (lb/hr) = Emission rate (tpy) * 2000 lb/1 ton * 1 yr/hours of operation

Mild Steel, 8mm, dry cutting: 6.6 g/min (arithmetic mean per US EPA AP42)

Maximum cutting thickness for HSFDB-2500: 25.4mm
NOx emission @ 25.4mm = 25.4mm/8mm x 6.6 g/min = 20.96 g/min
2.77 lbs/hr
0.001 ton/hr
7.21 tpy

Cives Steel Company

FDB Emissions

See Manufacturer Data Sheet for Plasma Cutter Calculations

NO2 Uncontrolled Emissions

NO2 emissions = 2.77 lb/hr / 427.19 ft/hr = **0.0065** lb/hr NO2

0.0169 tpy NO2 based on 5200 hours

Notes

(1) As per client

(2) Hours of operation assumed to be (2) 10 hour shifts, 5 days a week, 52 weeks a year

(3) Based on Manufacturer Spec (Donaldson Torit) for Dust Collector. Based on Donaldson Torit, Ultra Web II filters rated at 99.999% on 0.5 micron filters. Assume 99.9% for conservatism.

http://allergyclean.com/article-understandingmerv.htm

(4) United States Environmental Protection Agency, "AP 42, Fifth Edition, Volume I, Chapter 12: Metallurgical Industry" Industry *Emission of Fume, Nitrogen Oxides and Noise in Plasma Cutting of Stainless and Mild Steel* Cutting" *by* Broman B. et al, The Swedish Institute of Production Engineering

http://www.epa.gov.ttn/chief/ap42/ch12/index.html

(5) M.A. Ebadian, Ph.D. "Size Distribution and Rate of Production of Airborne Particulate Matter Generated During Metal Cutting" Florida International University, January 2001

Sample Calculation:

Emission rate (tpy) = Maximum cutting thickness (mm)/8mm * 6.6 g/min * min/hr * 1 ton/2000 lb * hr/yr

Emission rate (lb/hr) = Emission rate (tpy) * 2000 lb/1 ton * 1 yr/hours of operation

TAPs

PM Emitted 1.49E-02 lb/hr (uncontrolled)

Pollutant[1]	Chromium	Iron	Manganese	Nickel
CAS #	7440-47-3	7439-89-6	7439-96-5	7440-02-0
	%	%	%	%
Fumes from Plasma Cutting	20%	25%	4%	10%

		Emission Rate		Idaho TAP Screening Emissions Level	Exceed EL
Pollutant	CAS	lb/hr	tpy	lb/hr	
Chromium	7440-47-3	3.01E-03	0.01	0.033	No
Iron	7439-89-6	3.79E-03	0.01	0.067	No
Manganese	7439-96-5	6.57E-04	0.00	0.067	No
Nickel	7440-02-0	1.54E-03	0.004	2.70E-05	Yes
Controlled		1.54E-06	4.00E-06	2.70E-05	No
Uncontrolled Total TAPs	--	**0.009**	**0.023**	--	
Controlled Total TAPs	--	**0.007**	**0.019**	--	

Notes

(1) Percentage of each Idaho TAP listed in US EPA Volume I, Chapter 12: Metallurgical Industry http://www.epa.gov/ttn/chief/efdocs/welding.pdf

Exceeds Idaho TAP Screening Emission Level

Sample Calculation:

Emission rate (lb/hr)=PM Emission Rate (lb/hr) * %TAP

Emission rate (tpy) = Emission rate (lb/hr) * hours of operation * 1 ton/2000 lb

Estimation of Potential to Emit, Peddinghaus HSFDB-2500 with Hypertherm HPR400$_{XD}$ Plasma Torch

Calculations:

Particulate Matter

Mild Steel, 8mm, dry cutting: 23 g/min (arithmetic mean per US EPA AP42)

Maximum cutting thickness for HSFDB-2500: 80mm
PM emission @ 80mm = 80mm/8mm x 23 g/min = 230 g/min
230 g/min = 30.42 lbs/hr = 0.01521 ton/hr

Minimum cutting thickness for HSFDB-2500: 6mm
PM emission @ 6mm = 6mm/8mm x 23 g/min = 17.3 g/min
17.3 g/min = 2.3 lbs/hr = 0.00115 tons/hr

PM potential to emit per year (@80mm thickness @8760 hrs/yr): 133.2 tons/year
PM potential to emit per year (@6mm thickness @8760 hrs/yr): 10.1 tons/year

Per M.A. Ebadian, Ph.D. (citation below) particulate size distribution is estimated as

@80mm material thickness
≤ PM10: 66% (87.9 tons/yr)
≤ PM5: 39% (16.2 tons/yr)
≤ PM2.5: 17% (7.1 tons/yr)

@6mm material thickness
≤ PM10: 66% (6.7 tons/yr)
≤ PM5: 39% (3.9 tons/yr)
≤ PM2.5: 17% (1.7 tons/yr)

NO_x (Nitrogen monoxide, Nitrogen dioxide)

Mild Steel, 8mm, dry cutting: 6.6 g/min (arithmetic mean per US EPA AP42)

Maximum cutting thickness for HSFDB-2500: 80mm
NO_x emission @ 80mm = 80mm/8mm x 6.6 g/min = 66 g/min
66 g/min = 8.73 lbs/hr = 0.0044 ton/hr

Minimum cutting thickness for HSFDB-2500: 6mm
NO_x emission @ 6mm = 6mm/8mm x 6.6 g/min = 4.95 g/min
4.95 g/min = 0.65 lbs/hr = 0.0003 tons/hr

NO_x potential to emit per year (@80mm thickness @8760 hrs/yr): 38.5 tons/year
NO_x potential to emit per year (@6mm thickness @8760 hrs/yr): 2.9 tons/year

Peddinghaus Corporation
300 North Washington Avenue
Bradley, IL 60915
815-937-3800

Peddinghaus

Maximum Rated Capacity

For 80mm material, a cutting speed of 180 mm/m (35.43 ft/hr) is recommended
For 6mm material, a cutting speed of 6500 mm/m (1280 ft/hr) is recommended

(Recommended speed determined by torch manufacturer, Hyperthem)

@80mm material thickness:	**30.42 lbs/hr ÷ 35.43 ft/hr = 0.86 lbs/hr PM emissions** **8.73 lbs/hr ÷ 35.43 ft/hr = 0.25 lbs/hr NO_x emissions**
@6mm material thickness:	2.3 lbs/hr ÷ 1280 ft/hr = 0.0018 lbs/hr PM emissions 0.65 lbs/hr ÷ 1280 ft/hr = 0.0005 lbs/hr NO_x emissions

Sources:

United States Environmental Protection Agency, "AP 42, Fifth Edition, Volume I, Chapter 12: Metallurgical Industry" http://www.epa.gov.ttn/chief/ap42/ch12/index.html *Emission of Fume, Nitrogen Oxides and Noise in Plasma Cutting of Stainless and Mild Steel* by Broman B. et al, The Swedish Institute of Production Engineering Research

M.A. Ebadian, Ph.D. "Size Distribution and Rate of Production of Airborne Particulate Matter Generated During Metal Cutting" Florida International University, January 2001

"HyPerformance Plasma $HPR400_{XD}$ Auto gas Instruction Manual" Revision 3 Hypertherm Corporation https://www.hypertherm.com/Xnet/library/library.jsp?file=HYP111454

Peddinghaus Corporation
300 North Washington Avenue
Bradley, IL 60915
815-937-3800

Appendix E
Air Dispersion Modeling Protocol with 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

December 5, 2013

VIA EMAIL

Rick McCormick, P.E.
Project Engineer
CH2M HILL
Boise, Idaho 83702

RE: Modeling Protocol Approval for the Permit to Construct Project for the Cives Steel Company Facility near Idaho Falls, Idaho

Dear Mr. McCormick:

DEQ received a dispersion modeling protocol from you via email, on behalf of Cives Steel Company (Cives), on November 22, 2013.

The modeling protocol proposes methods and data for use in Class II area ambient air impact analyses in support of a Permit to Construct application for the facility. The PTC application will address Phases 1 through 3 planned for the facility. Phase 1 has been constructed. The project's modeling demonstration will reflect the final proposed Phase 3, including future expansion Phase 3 build-out of structures, processing equipment, requested potential emissions of regulated air pollutants, as well as location and physical characteristics of the points of release of potential emissions to the atmosphere.

The modeling protocol has been reviewed and DEQ has the following comments:

- **Comment 1: National Ambient Air Quality Standards.**
  Modeling will not be required to demonstrate compliance with the following NAAQS:

  a) Carbon monoxide, 1-hour average and 8-hour average,
  b) Sulfur dioxide, 1-hour average and annual average, and
  c) Lead, 3-month rolling average.

  Carbon monoxide, sulfur dioxide, and lead increases in potential emissions for this project were below Idaho DEQ's Level I de minimis modeling thresholds.

- **Comment 2: NO_2, 1-Hour Average Tier 3 Analyses.**
The Tier 3 analysis methods are non-regulatory guideline methods and are approved on a case-by-case basis. DEQ approves the use of either the Ozone Limiting Method (OLM) or Plume Volume Molar Ratio Method (PVMRM) for the Cives project.

  The regulatory default NO_2 equilibrium ratio is 0.9. The default in-stack NO_2 to NO_x ratio for NO_x emission sources is 0.5. Non-default in-stack NO_2 to NO_x ratios may be applied for individual emission units where supporting information is available. See the following website for additional information: http://www.epa.gov/ttn/scram/no2_isr_database.htm. Include the technical justification and supporting documentation for non-default ratios. Non-default ratios must be discussed in the modeling report and are subject to DEQ approval.

- **Comment 3: Background Concentrations.**
The following values are the DEQ-recommended background concentrations for the project:

  - PM_{10}, 24-hour average (hr avg): 81 micrograms per cubic meter ($\mu g/m^3$).

    The PM_{10} background value is the default small town/suburban value for Rexburg[1].

  - $PM_{2.5}$, 24-hr avg: 22.6 $\mu g/m^3$.

    This background value is the 98th percentile value, excluding exceptional events, of the 2010, 2011, and 2012 Ballard Road monitoring site data, near Fort Hall.

  - $PM_{2.5}$, annual avg: 6.5 $\mu g/m^3$.

    This background value is the average of the three annual average values for each of the 2010, 2011, and 2012 Ballard Road $PM_{2.5}$ datasets. Exceptional events were excluded.

  For single value Tier I or Tier II NO_2 NAAQS compliance demonstrations the following background values are recommended:

  - NO_2, 1-hr avg: 58.3 $\mu g/m^3$.

    This is the highest 98th percentile single hour value from the 2007 and 2010 ozone season at the Idaho Transportation Department monitoring site in Boise.

  - NO_2, annual average: 32 $\mu g/m^3$.

    This value is the default small town/suburban background value[1]. The value is the maximum value within the Pocatello monitoring data spanning 1996 through 1999.

[1] Hardy, Rick and Schilling, Kevin. Background Concentrations for Use in New Source Review Dispersion Modeling. Memorandum to Mary Anderson, March 14, 2003.

If a Tier III method for complying with the 1-hour NO_2 SIL and/or NAAQS is used, the following hour-of-day background concentrations in Table 1 may be used for ozone and NO_2. The NO_2 data is from the Boise Idaho Transportation Department site and covers the ozone season for 2007 and 2010—specifically July 1, 2007 through September 30, 2007, and May 7, 2010 through September 30, 2010. The individual hour ending values in Table 1 for NO_2 are the 98th percentile values of that particular hour-of-day readings over the two seasons of data collected.

Individual hour ending ozone (O_3) values were obtained from the White Pine monitoring site in Boise. This ozone data was collected during the ozone season for three consecutive years. The data was collected from May 12, 2009 through September 30, 2009; April 1, 2010 through September 30, 2010; and, April 1, 2011 through September 30, 2011. Each individual hourly value listed in Table 1 is the 98th percentile value for that particular hour-of-day readings for all days with valid data over the three seasonal datasets. The data is considered conservative due to the higher population of the data collection site compared to the Cives site and because the 98th percentile values will be higher during the typical ozone season than if monitoring data for the entire calendar years was available.

Table 1. NO_2 Tier III Analysis Ambient Background Values

Hour	NO_2[a] Concentration ($\mu g/m^3$)[b]	O_3[c] Concentration (ppb)[d]
1	43.2	53.0
2	41.4	50.9
3	33.8	51.9
4	32.0	48.0
5	30.1	47.9
6	37.6	46.0
7	43.2	41.0
8	48.9	43.0
9	54.6	48.0
10	43.2	54.3
11	32.0	61.0
12	26.7	66.0
13	17.3	72.9
14	11.3	76.0
15	11.3	80.0
16	11.2	78.4
17	11.2	73.7
18	15.0	70.0
19	30.1	67.0
20	54.4	62.8
21	56.4	55.0
22	58.3	55.0
23	58.3	55.0
24	54.5	53.9

[a] Nitrogen dioxide.
[b] Micrograms per cubic meter.
[c] Ozone.
[d] Parts per billion.

If issues arise with 1-hour NO_2 NAAQS compliance, please contact DEQ to discuss options in revising the O_3 background concentrations, and if necessary the NO_2 background values.

- **Comment 4: Beta Options for Horizontal or Capped Releases for Point Sources.** DEQ approves the use of the AERMOD Beta option for this project if Cives wishes to use this non-regulatory option. Considering the large number of horizontal and capped point source releases that are listed in the modeling protocol this approach may be appropriate. If the Beta option is used, actual stack diameters, velocities, and exit temperatures are used as model inputs. Documentation of assumptions used to develop the release parameters for each of these sources, including whether the release parameter values are maximum or typical values and any calculations performed is requested, as discussed in Comment 6 below.

- **Comment 5: Criteria Air Pollutant and Toxic Air Pollutant Emissions Inventory.** DEQ modeling staff did not review any emissions estimates presented in the modeling protocol. The permit writer assigned to your project will provide review and comments during their review of the permit application. DEQ concurrence on modeling applicability was based on the potential emissions rates listed in the protocol and is subject to alterations in the final potential to emit values established during the development of the project's proposed permit to construct.

- **Comment 6: Justification of Release Parameters.** Documentation and justification of release parameters must be provided in the application. In most instances, typical release parameter values should be used rather than extreme values, and should represent the conditions at the point of release to the atmosphere. Conservative assumed values may be used where supporting documentation is unavailable.

- **Comment 7: Heater Unit Exit Temperature.** Heater unit exit temperatures listed in Table 1 of the protocol were based on the assumptions in the table footnotes "*a*" and "*b*". If a heater unit's background temperature is based on a constant heated internal building air temperature the described approach appears reasonable. If the background temperature is more appropriately based on outdoor ambient air temperature the exit temperature of the point source exhaust should be input as a negative value equal to the magnitude of the temperature rise[2].

- **Comment 8: Receptor Grid.** The receptor grid proposed may be adequate; however, the receptor grid must reasonably resolve the maximum ambient impacts for each of the regulated air pollutants modeled. Additional receptors may need to be added to the grid described in Section 4.4 of the modeling protocol depending on the location of the design impact. If DEQ performs a sensitivity analysis using a denser receptor grid and any applicable ambient standards are exceeded, the permit will be denied.

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[2] U.S. Environmental Protection Agency. *User's Guide for the AMS/EPA Regulatory Model—AERMOD.* EPA-454/B-03-001. September 2004, page 3-18.

- **Comment 9: Ambient Air Boundary.**
  Section 4.7 of the modeling protocol describes the method of control of public access as "a barbed wire fenced perimeter." Please document in the permit application modeling report whether the barbed wire fencing will be placed along the entire Cives Steel property line shown in the Figure 2 of the protocol, or if just a portion of the land owned and controlled by Cives will be fenced. If the entire area that is being claimed as exempt from treatment as ambient air is not fenced additional methods of control to preclude public access may be considered to properly establish the area as exempt from treatment as ambient air, as discussed in Section 6.5 of the Idaho DEQ Air Quality Modeling Guideline. Include the details of the ambient air boundary control methods in the modeling report discussion and on the scaled plot plan.

- **Comment 10: DEQ Application Forms.**
  Please complete all modeling information application forms for this permit application package. Modeling forms include an emission inventory specifically for the modeling demonstration.

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 the modeling protocol is not meant to imply approval of completed dispersion modeling analyses. 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 any analyses submitted to the Idaho Department of Environmental Quality, our modeling staff requests that electronic copies of all modeling input and output files (including BPIP and AERMAP input and output files) be submitted with analyses reports. Also, please include a copy of the protocol and this approval notice with the submitted application. If you have any further questions or comments, please contact me at (208) 373-0536.

Sincerely,

Darrin Mehr

Darrin Mehr
Air Quality Analyst
Monitoring, Modeling, and Emission Inventories
Air Quality Stationary Source Program

Air Dispersion Modeling Protocol Cives Steel Company, Twin Falls, Idaho

Prepared for

Cives Steel Company

Submitted to

Idaho Department of Environmental Quality

November 2013

Prepared by

CH2MHILL

Contents

1.0 Project Background

The Cives Steel Company (Cives) began operating a new structural steel fabrication plant in July 2013 located at 10059 North Yellowstone Highway, Idaho Falls, Idaho 83401 (facility). On August 22, 2013, an Idaho Department of Environmental Quality (IDEQ) representative inspected the Cives facility and upon a record search found no records pertaining to IDAPA 58.01.01.220.02 which govern a general exemption for a Permit-to-Construct (PTC). On October 23, 2013, Cives was issued a Notice to Comply (NTC) letter for failure to comply with IDAPA 58.01.01.220.02. According to the letter, the NTC states that Cives must take the following corrective actions:

> *"Provide all exemption documentation and related supporting information (e.g. MSDSs, etc)"*

The NTC also provided Cives with 45 calendar days from the date the letter was issued (October 23, 2013) to comply or Cives could possibly be issued a Notice of Violation.

As a result, Cives contacted IDEQ CH2M HILL in Boise, Idaho to assist with an air permit evaluation of the Idaho Falls facility.

On October 29, 2013, Ben Merkling, General Manager of Cives, along with representatives from CH2M HILL, Rick McCormick and Mike Wirtz, met with IDEQ at the State office located in Boise, Idaho to discuss the NTC and path forward for Cives to comply. At this meeting, Cives decided that it was in their company's best interest to prepare an air quality PTC application to allow for operational flexibility based on future expansion of the facility. Therefore, this meeting served as a pre-application meeting for moving forward to obtain an air quality PTC.

Based on the preparation and time needed to submit an air quality PTC application to IDEQ, and the fact that Cives has begun the steps necessary to secure an air quality PTC by attending the October 29 pre-application meeting, Cives is requesting an extension beyond the 45 calendar days issued in the NTC letter within which to completely resolve this issue. On behalf of Cives, CH2M HILL has targeted a delivery date to submit the air quality PTC application on or before December 31, 2013 contingent upon approval of the modeling protocol by IDEQ.

The Cives facility will consist of 4 separate air emission sources which will include:

- Area heaters burning natural gas to provide heat to the facility
- Abrasive blasting inside an enclosed vessel with a dust filter for particulate matter collection. Throughput is anticipated to be up to 72,000 pounds of steel per year.
- Painting inside a building (uncontrolled). Anticipated throughput will be up to 24,219 gallons of paint per year.
- Welding inside a building (uncontrolled) with an anticipated throughput of 56,794 pounds welding wire and 3,399 pounds welding wire annually.

The facility will operate at up to 5,200 hours per year (two 10-hour shifts, 5 days a week, 52 weeks a year).

An air quality impact analysis will be performed in support of this PTC application required under IDAPA 58.01.01.200. Idaho regulations require a facility applying for a PTC to demonstrate compliance with the NAAQS.

This air dispersion modeling protocol is being submitted to the IDEQ on behalf of Cives. This document summarizes the modeling methodology that will be used to evaluate the facility's impacts to air quality with respect to criteria and state toxic air pollutant (TAPs) emissions. It has been prepared based on the U.S. Environmental Protection Agency (EPA) *Guidelines on Air Quality Models* (GAQM), and the *State of Idaho Guideline for Performing Air Quality impact Analyses* (ID AQ-011, July 2, 2011).

2.0 Project Description

Cives currently owns and operates structural steel fabrication facility 7 miles northeast of downtown Idaho Falls (Figure 1). The plan is to construct out the fabrication facility through the first three phases (Figure 2). The following sources are total through the first three phases of construction. The location of each exhaust point is shown in Figures 3 and 4.

- 25 natural gas space heaters located through the facility
  - MAU-01A through MAU-01E (6 units)
    - Greenheck
    - Model DGX-120-H32
    - 1.1067 MMBtu/hr
  - MAU-02A and MAU-02B (2 units)
    - Greenheck
    - Model DGX-118-H32
    - 0.7378 MMBtu/hr
  - RTU-01
    - Carrier WeatherMaster
    - Model 48HCDD12E2M6-6U5M0
    - Low gas heat
    - 0.12 MMBtu/hr
  - RTU-02
    - Carrier WeatherMaster
    - Model 48HCDA06E2M6-0B5F0
    - Low gas heat
    - 0.05 MMBtu/hr
  - RTU-03 and RTU-04 (2 units)
    - Carrier WeatherMaster
    - Model 48HCED08E2M6-6U5M0
    - Medium gas heat
    - 0.12 MMBtu/hr
  - Out-Building Heaters
    - Model PH-34
    - 0.034 MMBtu/hr
    - Detroit Radiant (4 units)
      - Saw Building
      - Drill Building
      - Peddiwriter Building
      - Copper Building
    - Vent through Greenheck CSP-A1410 fans (one per building)
      - Up to 1,584 scfm exhaust flow
  - RAD_HEAT_01 through 04, 07 and 08 (6 units)
    - CoRayVac
    - Model B-10
    - Natural gas
    - 0.10 MMBtu/hr

  - RAD_HEAT_05 and 06 (2 units)
    - CoRayVac
    - Model B-09
    - Radiant heat flow split between to equal exhausts
      - U-shaped layout
    - Natural gas
    - 0.9 MMBtu/hr
  - UH-01
    - Modine
    - Model PDP300AE0130
    - Natural gas
    - 50 degree rise
    - 0.3 MMBtu/hr

- Abrasive blasting
  - Enclosed unit with a Donaldson dust collector that vents outside the building
  - DFO-3-18
  - Ultra-Web Downflo Oval Dust Collector
  - MERV-13 efficiency rating based on ASHRAE 52.2-2007 test standards
  - 18 air filters

- Fabrication Building Exhaust Fans
  - Greenheck
  - SBC-3H54-20 (four identical fans through Phase III)
  - Vents entire fabrication building including painting, welding, and plasma cutting (FDB) operations
  - 24,701 scfm Air flow/horizontal exhaust

- Plasma Cutting
  - Controlled exhaust
    - Donaldson DFO-S-12 filter dust collector
    - Up to 5,200 hours of operation per year

- Vented within fabrication building (exhaust through fabrication building fans)Painting
  - 24,219 gallons a year of paint
  - Up to 5,200 hours of operation per year
  - Painting work stations are located throughout the building and will change as plant expands through the three Phases
  - Vented within fabrication building (exhaust through fabrication building fans)

- Welding
  - 56,794 pounds of welding wire used annually
  - 3,399 pounds of welding rod used annually
  - Up to 5,200 hours of operation per year
  - Vented within fabrication building (exhaust through fabrication building fans)

Manufacturer specification data sheets are provided in Appendix A. Painting material safety data sheet (MSDS) reference sheets are provided in Appendix B.

3.0 Emissions

3.1 Source Information

The modeling proposed for this protocol will include all planned sources through the first three phases of construction including; painting operations, abrasive blasting and welding throughputs, and plasma cutting operations. The abrasive blasting unit vents outside the fabrication building and utilizes a dust collector as described in Section 2.0. Painting, welding, and plasma cutting operations all emit within the fabrication building and vent to the outside through the four fans located on the east side of the third phase of construction (see Figures 3 and 4). Table 1 provides stack parameters for these sources.

3.2 Potential to Emit Criteria Emission Estimates

Currently, Cives operates the abrasive blasting unit with a dust filtration at 72,000 pounds of steel shot per year through Phase III production. A second dust filter is associated with the FDB (plasma cutting) operations within the fabrication building. This second dust filter emits within the fabrication building, which vents to the outside through four fans located on the east side of the building. The dust filters attached to the abrasive blaster and FDB are the only control device at the facility and there are currently no plans to add any additional control devices. Uncontrolled potential-to-emit (PTE) emission will be the same as controlled PTE emission except for particulate matter passing through the abrasive blasting filtration. Table 2 provides a summary of uncontrolled PTE emissions for the facility. Table 3 provides a summary of controlled PTE emissions for the facility. Uncontrolled and controlled PTE emission calculations are presented in Appendix C.

TABLE 1
Stack Parameters

Point Source	Stack ID	Easting	Northing	Stack Height (m)	Diameter (m)	Velocity (m/sec)	Flowrate (acfm)	Temperature[a] (K)	Notes
MAU-01A (Phase I)	MAU-01A	421,801.4	4,826,303.3	10.82	0.04	0.001		344.26[b]	Horizontal
MAU-01B (Phase I)	MAU-01B	421,870	4,826,303.3	10.82	0.04	0.001		344.26[b]	Horizontal
MAU-01C (Phase II)	MAU-01C	421,801.4	4,826,324.9	10.82	0.04	0.001		344.26[b]	Horizontal
MAU-01D (Phase II)	MAU-01D	421,870	4,826,324.9	10.82	0.04	0.001		344.26[b]	Horizontal
MAU-01E (Phase III)	MAU-01E	421,948.7	4,826,281.6	11.28	0.04	0.001		344.26[b]	Horizontal
MAU-01F (Phase III)	MAU-01F	421,948.7	4,826,342.7	11.28	0.04	0.001		344.26[b]	Horizontal
MAU-02A (Phase I)	MAU-02A	421,908	4,826,303.3	10.82	0.04	0.001		344.26[b]	Horizontal
MAU-02B (Phase II)	MAU-02B	421,908	4,826,324.9	10.82	0.04	0.001		344.26[b]	Horizontal
RTU-01 (0.12 MMBtu)	RTU-01	421835.7	4,826,289.8	5.03	0.04	0.001		330.37	Horizontal
RTU-02 (0.05 MMBtu)	RTU-02	421865.8	4,826,291	5.03	0.04	0.001		324.82	Horizontal
RTU-03 (0.12 MMBtu)	RTU-03	421,889.6	4,826,293.1	5.03	0.04	0.001		330.37	Horizontal
RTU-04 (0.12 MMBtu)	RTU-04	421,926.5	4,826,293.1	5.03	0.04	0.001		330.37	Horizontal
Radiant Heater 01 (Phase II)	RAD_HEAT_01	421,900.7	4,826,337	9.14	0.10	0.001		344.26[b]	Horizontal
Radiant Heater 02 (Phase II)	RAD_HEAT_02	421,900.7	4,826,321.8	10.82	0.10	40.19	210	344.26[b]	Vertical, rain cap
Radiant Heater 03 (Phase I)	RAD_HEAT_03	421,900.7	4,826,313.9	10.82	0.10	40.19	210	344.26[b]	Vertical, rain cap
Radiant Heater 04 (Phase I)	RAD_HEAT_04	421,900.7	4,826,295.5	9.14	0.10	0.001		344.26[b]	Horizontal
Radiant Heater 05A (Phase II)[c]	RAD_HEAT_05A	421,936	4,826,337	9.14	0.10	0.001		344.26[b]	Horizontal
Radiant Heater 05B (Phase II)[c]	RAD_HEAT_05B	421,936	4,826,321.8	10.82	0.10	20.09	105[d]	344.26[b]	Vertical, rain cap
Radiant Heater 06A (Phase I)[e]	RAD_HEAT_06A	421,936	4,826,313.9	10.82	0.10	20.09	105[d]	344.26[b]	Vertical, rain cap
Radiant Heater 06B (Phase I)[e]	RAD_HEAT_06B	421,936	4,826,295.5	9.14	0.10	0.001		344.26[b]	Horizontal
Radiant Heater 07 (Phase III)	RAD_HEAT_07	421,953	4,826,378	9.75	0.10	0.001		344.26[b]	Horizontal
Radiant Heater 08 (Phase III)	RAD_HEAT_08	421,953	4,826,252	9.75	0.10	0.001		344.26[b]	Horizontal

TABLE 1
Stack Parameters

Point Source	Stack ID	Easting	Northing	Stack Height (m)	Diameter (m)	Velocity (m/sec)	Flowrate (acfm)	Temperature[a] (K)	Notes
Unit Heater (Phase I)	UH-01	421,795	4,826,280	9.144	0.15	0.001		322.04	Horizontal
Saw Building Heater	SAW_BLDG_HEA	421,683	4,826,320	3.6576	0.35[f]	0.001		294.26[g]	Horizontal
Drill Building Heater	DRILL_BLD_HE	421,717	4,826,313	3.6576	0.35[f]	0.001		294.26[g]	Horizontal
Peddlwriter Building Heater	PEDDI_BLD_HE	421,750	4,826,320.1	3.6576	0.35[f]	0.001		294.26[g]	Horizontal
Copper Building Heater	COPPER_BLD_H	421,683	4,826,301	3.6576	0.35[f]	0.001		294.26[g]	Horizontal
Abrasive Blasting (dust collector)	BEAD_BLAST	421,791.3	4,826,293.12	1.905	1.03	0.001		294.26[g]	Horizontal
Exhaust Fan #1 (Phase III)[h]	FAN_01	421,960	4,826,357.9	1.30[i]	1.37	0.001		294.26[g]	Horizontal
Exhaust Fan #2 (Phase III)[h]	FAN_02	421,960	4,826,337.6	1.30[i]	1.37	0.001		294.26[g]	Horizontal
Exhaust Fan #3 (Phase III)[h]	FAN_03	421,960	4,826,296.5	1.30[i]	1.37	0.001		294.26[g]	Horizontal
Exhaust Fan #4 (Phase III)[h]	FAN_04	421,960	4,826,275.8	1.30[i]	1.37	0.001		294.26[g]	Horizontal

Notes:
[a] For temperatures provided as "an increase in temperature" assumed the background temperature of 70°F (294.26 K) and added increase temperature to estimate the exhaust temperature
[b] Spec sheet does not include an exhaust temperature or a temperature rise for the unit so assumed a maximum 90°F temperature rise and an exhaust temperature of 160°F
[c] Heater splits exhaust flow down two paths (U-shaped) with each path exhaust through a separate stack (shown as stack 05A and 05B)
[d] Since exhaust is split between to exhaust vents, flow is assumed to be split between the two as well resulting in a flow of 105 acfm (210 acfm total)
[e] Heater splits exhaust flow down two paths (U-shaped) with each path exhaust through a separate stack (shown as stack 06A and 06B)
[f] fan exhaust dimension of approximately 18.75-inches by 8-inches based on manufacturer specs.
[g] Assumed that the exhaust from the building (air temperature within building) is set at 70°F
[h] Fans exhaust air from entire building which includes the plasma cutter baghouse (FDB), painting, and welding. Emissions are divided equally between the 4 fans.
[i] Top of fan casing is measured at 82 inches above ground. Based on manufacturer specs, casing is 62-inches tall. Middle of fan is at 51 inches (82-62/2 = 51-inches)

TABLE 2
Cives Uncontrolled Criteria Pollutants PTE

	PM10		PM2.5		CO		NOX		SOx		VOC		Lead	CO2e
Source	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/month)	(Ton/yr)
Heaters	0.07	0.32	0.07	0.32	0.80	3.51	0.96	4.18	0.01	0.03	0.05	0.23	3.49E-03	4,529
Abrasive Blasting	13.85	36	13.85	36										
Painting	33.96	88.31	33.96	88.31							8.88	23.08		
Welding	0.32	0.84	0.32	0.84										
FDB	0.97	2.51	0.41	1.07			2.77	7.21						
Total	**49.17**	**127.97**	**48.62**	**126.53**	**0.80**	**3.51**	**3.73**	**11.39**	**0.01**	**0.03**	**8.93**	**23.31**	**3.49E-03**	**4,529**

TABLE 3
Cives Controlled Criteria Pollutants PTE

	PM10		PM2.5		CO		NOX		SOx		VOC		Lead	CO2e
Source	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(lb/hr)	(Ton/yr)	(Ton/yr)	(Ton/yr)
Heaters	0.07	0.32	0.07	0.32	0.80	3.51	0.96	4.18	0.01	0.03	0.05	0.23	3.49E-03	4,529
Abrasive Blasting	1.38	3.60	3.46	9.00										
Painting	33.96	88.31	33.96	88.31							8.88	23.08		
Welding	0.32	0.84	0.32	0.84										
FDB	0.97	2.51	0.41	1.07			2.77	7.21						
Total	**36.71**	**95.57**	**38.23**	**99.53**	**0.80**	**3.51**	**3.73**	**11.39**	**0.01**	**0.03**	**8.93**	**23.31**	**3.49E-03**	**4,529**
Level I Threshold[a]	**0.22**		**0.54**	**0.35**	**15**		**0.20**	**1.20**	**0.21**	**1.20**			**0.007[b]**	
Modeling Required	**YES**		**YES**	**YES**	**No**		**YES**	**YES**	**No**	**No**			**No**	

[a] Source: State of Idaho Guideline for Performing Air Quality Impact Analysis, Table 2: Modeling Thresholds for Criteria Pollutants, July 2, 2011

[b] Level I Threshold is 14 lb/month (0.007 ton/month or 0.084 ton/yr) which is well above the total annual emissions

3.3 Hazardous Air Pollutants

Hazardous air pollutants (HAPs) for the facility are summarized in Table 4. A complete inventory of HAPs and toxic air pollutants (TAPs) emission estimates are provided in Appendix C.

TABLE 4
Facility Wide HAPs PTE

	Facility Wide Total		EL[a]		AAC[b]	AACC[c]
HAP	(lb/hr)	(ton/yr)	(lb/hr)	Exceeds EL	(mg/m3)	(µg/m3)
Benzene	2.01E-05	8.78E-05	8E-04	No		1.20E-01
Dichlorobenzene	1.15E-05	5.02E-05	20	No	15	
Ethyl benzene	1.28E+00	3.33E+00	29	No	21.75	
Formaldehyde	7.16E-04	3.14E-03	5.10E-04	Exceeds		7.70E-02
Hexane	1.72E-02	7.53E-02	12	No	9	
Methyl alcohol	3.78E-01	9.82E-01	17.3	No	13	
Naphthalene	5.83E-06	2.55E-05	3.33	No	2.5	
Phenol	7.42E-02	1.93E-01	1.27	No	0.95	
Toluene	1.22E-01	3.16E-01	25	No	18.75	
Xylene	4.30E+00	1.12E+01	29	No	21.75	
Arsenic	1.91E-06	8.37E-06	1.50E-06	Exceeds		2.30E-04
Beryllium	1.15E-07	5.02E-07	2.80E-05	No		4.20E-03
Cadmium	1.05E-05	4.60E-05	3.70E-06	Exceeds		5.60E-04
Chromium	2.33E-01	6.05E-01	0.033	Exceeds	0.025	
Cobalt	6.47E-04	1.68E-03	0.0033	No	0.0025	
Manganese	7.70E-02	2.00E-01	0.333	No	0.25	
Mercury	2.48E-08	1.09E-05				
Nickel	1.09E-01	2.84E-01	2.70E-05	Exceeds		4.20E-03
Selenium	2.29E-07	1.00E-06	0.13	No	0.01	
Lead	4.78E-06	2.09E-05				
Total HAPs	6.59E+00	1.72E+01				

[a] IDAPA 58.01.01.585/586 screening emission level (EL)

[b] IDAPA 58.01.01.585 Acceptable Ambient Concentration (AAC), 24-hour average

[c] IDAPA 58.01.01.586 Acceptable Ambient Concentration for Carcinogens (AACC), annual average

4.0 Ambient Air Modeling

Based on the estimated PTE, hourly facility-wide modeling for **PM_{10}**, **$PM_{2.5}$**, and **NOx** will be performed for this PTC application. Also, ton per year facility wide modeling for **$PM_{2.5}$** and **NOx** will be performed for this PTC application. Modeling results will determine if any operating limits not previously identified will need to be implemented.

4.1 Dispersion Model

The EPA-approved AERMOD (Version 12345) model will be used. AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short range (< 50 km) dispersion from the source. AERMOD will be run with the following options.

- Regulatory default options,
- Direction-specific building downwash,
- Actual receptor elevations and hill height scales,
- Complex/intermediate terrain algorithms

4.2 Meteorological Data

5 year Idaho Falls, Idaho AERMET meteorological data representing data gathered from 2008 through 2012 was provided by IDEQ on November 1, 2013 and will be used to process the data.

4.3 Ambient Conditions

Rural background concentrations for criteria air pollutants will be provided by IDEQ.

4.4 Receptors

The ambient air boundary will be the facility fenceline. The selection of receptors in AERMOD will be as follows:

- Discrete Receptors 25 meters around the property line.
- A 100-meter grid extended approximately 1 kilometer.
- A 500-meter grid extended approximately 5 kilometers.

U.S. Geological Survey (USGS) National Elevation Dataset (NED) terrain data will be used to determine receptor elevations and terrain maxima.

4.5 Modeling Analysis

Facility wide modeling for the Cives facility for the criteria pollutants that exceed the Level I Threshold shown in Table 3 will be modeled and compared to the National Ambient Air Quality Standards (NAAQS) shown in Table 5.

TABLE 5
National Ambient Air Quality Standards

Pollutant	Averaging Time	Standard ($\mu g/m^3$)
Carbon monoxide (CO)	1-hour	40,000
	8-hour	10,000
Nitrogen dioxide (NO_2)	1-hour	100 ppb (188 $\mu g/m^3$)
	Annual	100
Sulfur dioxide (SO_2)	1-hour	75 ppb (196 $\mu g/m^3$)
	3-hour	1,300
	24-hour	365
	Annual	80
Particulate matter <10 microns (PM_{10})	24-hour	150
	Annual	50
Particulate matter <2.5 microns ($PM_{2.5}$)	24-hour	35
	Annual	15

Note:
ppb = parts per billion

4.6 Refined Modeling Analysis

Additional refined modeling may be required to pass comparison to the NAAQSs, and will be conducted as follows:

- A PTC application for a new facility or previously unpermitted facility require comparison to the NAAQS. This maximum concentration will include contributions from the facility, nearby sources, and ambient background concentrations.
- IDEQ will identify any nearby contributing sources, if any, that need to be included in the analysis.
- If necessary and upon IDEQ's consent, 1-hour NO_2 will be evaluated using the Tier III Plume Volume Molar Ratio Method (PVMRM). This is not a regulatory default method. IDEQ will provide hourly ozone and NO_2 background concentrations.

4.7 Site Security

Cives controls public access into and throughout the facility using a barbed wire fenced perimeter. A primary access gate into the facility property along North Yellowstone Highway controls access in and out of the facility. (Is there a security gate).

Appendix F
Air Dispersion Modeling Results

Modeling Results

Cives Steel Company
Idaho Falls, Idaho

Criteria Modeling Results

Pollutant	Averaging Period	Modeled Concentration (ug/m^3)	Background (ug/m^3)	Total Impact (ug/m^3)	NAAQS[1] (ug/m^3)	Exceeds NAAQS
NO_x	1-hour[2]	128.98	58.3	187.28	188	Below
	Annual[3]	25.75	32	57.75	100	Below
PM_{10}	24-hour[4]	9.08	81	90.08	150	Below
$PM_{2.5}$	24-hour	9.09	22.6	31.69	35	Below
	Annual	2.63	6.5	9.13	12	Below

[1] Source: *State of Idaho Guideline for Performing Air Quality Impact Analyses* , July 2011, Table 4. National Ambient Air Quality Standards (NAAQS)

[2] 8th high modeled concentration, 80% of total modeled impact

[3] 75% of total modeled impact

[4] 6th high value

Hazardous Air Pollutants Modeling Results

Pollutant	CAS	Averaging Period	Modeled Concentration (ug/m^3)	IDAPA 58.01.01 585/586		Exceeds IDAPA 585/586
				AAC (ug/m3)	AACC (ug/m^3)	
Formaldehyde	50-00-0	Annual	1.42E-02		7.70E-02	Below
Arsenic	7440-38-2	Annual	4.00E-05		2.30E-04	Below
Cadmium	7440-43-9	Annual	1.40E-04		5.60E-04	Below
Nickel	7440-02-0	Annual	1.54E-03		4.20E-03	Below
Chromium	7440-47-3	24-hour	0.16	25		Below

AAC = Acceptable ambient concentration; IDAPA 58.01.01.585; listed in mg/m^3 so multiply by 1,000 to convert to ug/m^3

AACC = Acceptable ambient concentration for carcinogens; IDAPA 58.01.01.586