pressures at each manifold are equal. The following design elements for manifolds are recommended:

1. The manifold pipe diameter must accommodate the number, spacing, and discharge rate of the distribution laterals.
2. It is recommended that the outlet to the laterals occur at the crown of the manifold to minimize leakage from the distribution laterals prior to their complete pressurization.
3. The manifold should drain to either the pump chamber or the distribution laterals when the pump shuts off.
4. If the manifold cannot drain, it should be insulated to protect it from freezing.

4.20.3.1.2 Transport Piping

The transport piping, or line, is the piping that connects the pump in the dosing chamber and manifold. The length and diameter of this piping varies based upon pump selection, wastewater flows, transportation distance, and elevation difference between the pump and drainfield. Several design recommendations should be followed for this section of piping:

1. The transport pipe exiting the dosing chamber should have a minimum strength equivalent meeting the specifications in Table 5-10.
2. Transport piping should be sloped to drain back into the dosing chamber when the pump shuts off. A small drain hole (one-quarter inch) may be drilled in the transport pipe inside the dosing chamber to aid in the pipe draining. This drain hole must be taken into account in pressure distribution design and pump selection.
3. If the transport pipe cannot be sloped back to the dosing chamber, the piping should be buried below the site-specific frost line to prevent freezing.
4. Friction loss should be considered when selecting the diameter of the transport piping.
    a. The material and diameter of the transport pipe will influence the friction loss.
    b. The friction increases with increasing flow rates.
    c. Friction losses must be included in the system performance curve to properly select a suitable pump.

4.20.3.2 Pressurization Unit

Pressurization of the piping network occurs through a pressurization unit, which may be an electrically driven pump or a gravity charged siphon. Electrically driven pumps may be used in any pressurized design regardless of the site layout. Siphons are limited to pressurized designs where all of the piping components are located below the siphon discharge invert. A critical component of either pump selection or siphon design is the total head the pressurization unit must operate against. Total head can be calculated using Equation 4-14.

$$H_{total} = E + T + R$$ **Equation 4-14. Total head.**

where:

H_{total} = total head
E = elevation difference between the pump or siphon bell opening and manifold
T = piping network's friction head
R = residual head (5 feet)

4.20.3.2.1 Pumps

Pumps used in the pressure distribution design are either centrifugal effluent pumps or turbine effluent pumps. Centrifugal pumps are typically a high capacity/low-head pump with a relatively flat performance curve. Turbine pumps are typically a low capacity/high-head pump with a relatively steep performance curve. The type of pump that is selected should be based on the point where the pump's performance curve intersects the system's performance curve. A pump is suitable for a particular system if the middle of its performance curve intersects the system performance curve at an acceptable pressure and flow value. Specific pump selection factors are discussed below:

1. Use the pump head discharge rate curves supplied by the manufacturer to select a pump that will perform at the required head.
2. To help maximize pump efficiency, pump selection should also address maximum usable head.
    a. Select pumps where the operating point will be greater than 15% of the maximum discharge rate (maximum gallons per minute rating).
    b. For example, a pump with a maximum discharge rate of 80 GPM should only be used if the operational requirement is greater than 80 GPM x 0.15 or 12 GPM.
3. Other pump considerations:
    a. Pump should be specified for effluent.
    b. Pump should transfer solids as large as orifice diameter.
    c. Pumps must be kept submerged.
    d. Pump should be serviceable from ground level without entering the pump chamber. PVC unions are available to assist in the easy removal of pumps.
    e. Pumps and electrical connections shall conform to the requirements of the Idaho Division of Building Safety, Electrical Division.
        1) Electrical permits are required for installing all pumps, and the applicant, responsible contractor, and/or the responsible charge engineer are responsible for obtaining the proper electrical permits.
        2) Installation of all electrical connections is required to be performed by a licensed electrician. The applicant, responsible contractor, and/or the responsible charge engineer are responsible for ensuring that the installation is performed by a properly licensed individual.
        3) Subsurface sewage disposal installer registration permits are not equivalent to, or substitutes for, a proper electrical license.