

SUCTION PIPING

- > The suction pipe should employ the flooded suction method if possible. The shortest pipe possible, with a minimum number of bends, should be designed. Arrange a proper support along the suction pipe so that the load and thermal stress of the pipe itself are not applied to the pump.
- > Attach the coupling on the suction pipe carefully so that no air enters the line. Air in the suction pipe may prevent priming of the pump.
- > If the suction conditioning is not good (e.g. the suction tank is a vacuum, the suction head is large, or the suction pipe is long), NPSHA should always be at least 2 feet greater than NSPHR.
- > When a bend is used on the suction side, install a straight pipe which is more than 20 inches long or 10 times as long as the suction port diameter before the suction port of the pump. Use the largest possible radius of curvature for the bend.
- > Do not allow any projection where air may be trapped along the suction pipe. The suction pipe should have an ascending gradient toward the pump.
- > If the diameters of the pump suction port and suction pipe are different, use an eccentric reducer pipe. Connect the eccentric reducer pipe such that the upper part of it is level. Never use a suction pipe with a diameter smaller than that of the pump suction port.
- > When using the flooded suction method, the suction pipe should be given a slight ascending gradient toward the pump so that no air pocket is created on the suction side.
- > The end of the suction pipe should be located 24 inches or more below the surface of the liquid.
- > A screen should be provided at the inlet in the suction tank to prevent the entry of foreign matter into the suction pipe. Foreign matter may cause malfunctioning of the pump. The end of the suction pipe should be 1-1.5D or more away from the bottom of the suction tank. (D: diameter of suction pipe).
- > When using the suction lift method, install a foot valve on the suction pipe, unless the pump is designed as self priming.
- > When using the flooded suction method, it is recommended that a gate valve be installed on the suction pipe to enable easier overhaul inspection of the pump. Since this valve is used only in the overhaul inspection of the pump, keep it fully opened during normal pump operation.
- > Pay close attention to the lowest level of the liquid in the suction tank so that air entrainment to the suction piping will not occur.

The inflow pipe into the suction tank should be distanced from the suction pipe and positioned below the liquid surface level as a means of preventing air entrainment to the suction pipe. If air bubbles are generated in the suction tank, install a baffle.

- > It is recommended to install a vacuum/pressure gauge on the suction piping approximately 6 diameters from the pump suction flange.

DISCHARGE PIPING

- > Use proper pipe supports so that the weight of the piping does not load the pump nozzle.
- > If a method other than flooded suction is used, install a special pipe for priming.
- > If the piping is very long, its diameter should be determined by calculating the piping resistance. Otherwise, the specified performance may not be obtained due to increased piping resistance.
- > A check valve should be installed if any of the following conditions exists in the piping:
 1. The discharge piping is very long.
 2. The discharge head is 50 feet or more.
 3. The end of the discharge pipe is 30 feet higher than the surface of the suction tank.
 4. Several pumps are connected in parallel with the same piping.
- > The installation of a gate valve on the discharge pipe is recommended for the adjustment of discharge quantity and for the prevention of motor overload. When installing both a check and a gate valve, the check valve should be positioned between the pump and the gate valve.
- > A pressure gauge should be installed on the discharge piping.
- > An air bleeding valve should be installed if the discharge pipe is very long in the horizontal direction.
- > A drain valve should be installed for the drainage of liquid if there is a chance that the liquid in the discharge pipe will freeze.

