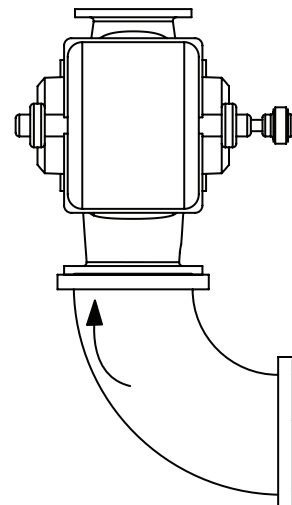
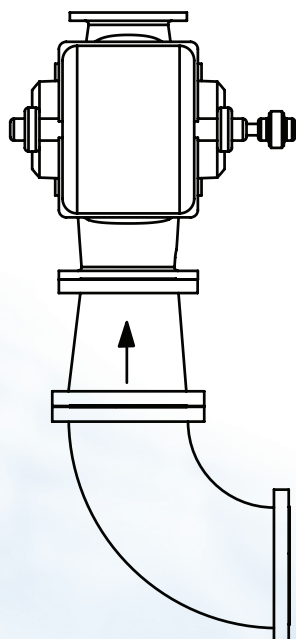
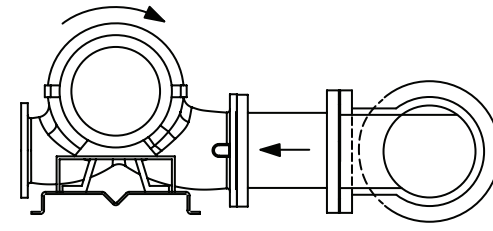
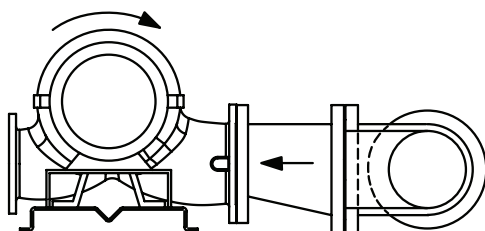
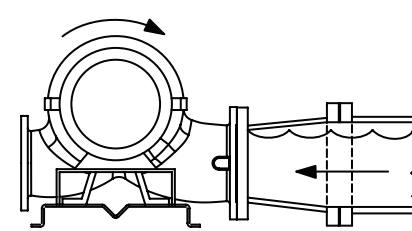
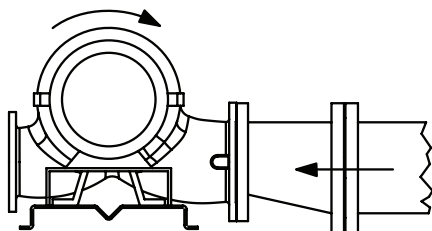
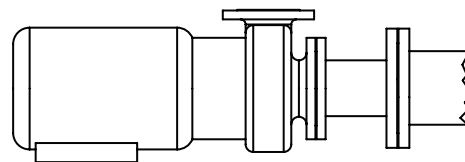
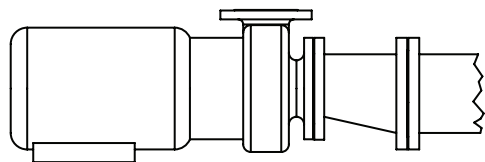


1. The pipe should not be pulled into position by tightening the piping joints. The pipe should meet the pump.
2. All piping should be supported independently of the pump. Pumps are not designed for carrying loads imposed by piping and its contents.
3. Installations, which will be subjected to considerable temperature variation, should be provided with some means for compensating for expansion and contraction. A 50°F temperature change means an expansion or contraction of approximately 3/8" in a pipeline of 100ft. length. This will result in distortion and misalignment of pump, and sometimes breakage.

**RIGHT**

**WRONG**

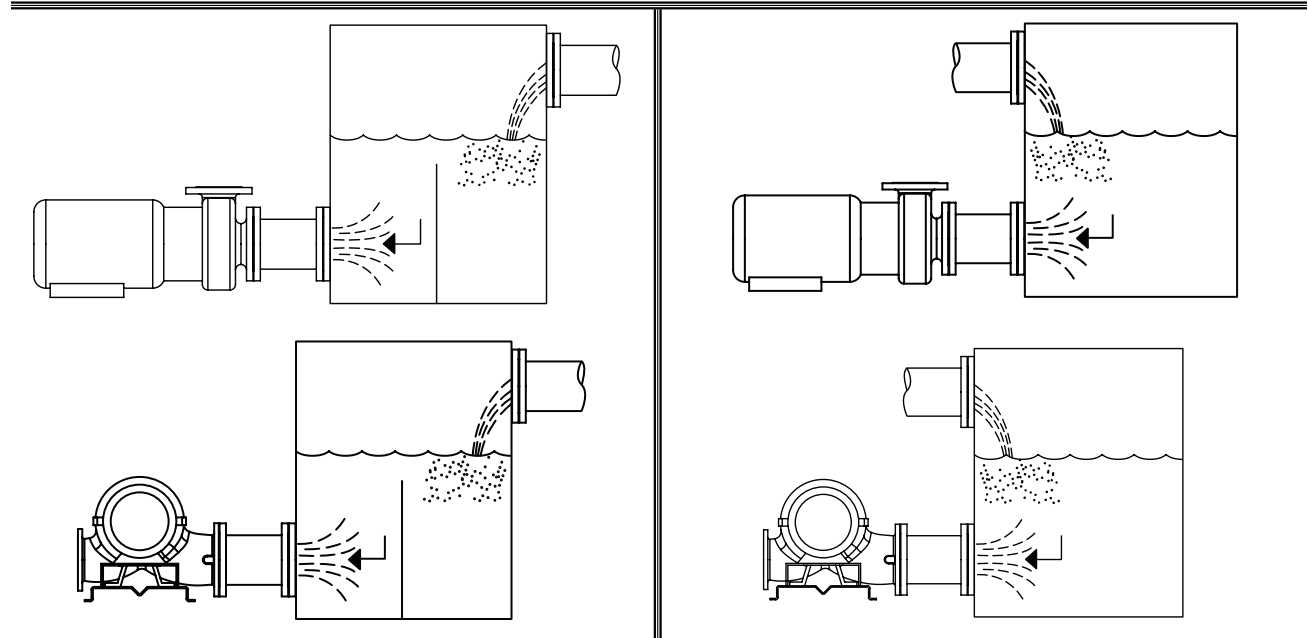


**SECTION 15**

4. Size and install suction piping to keep pressure loss at a minimum and to provide correct NPSH.
5. Use 45-degree or long-sweep 90-degree elbows.
6. A suction valve should be installed for maintenance purposes. Valve must be fully open before start-up. Do not use valve to throttle pump. This may cause loss of prime, excessive temperatures, damage to pump, and warranty will be voided.

**RIGHT**

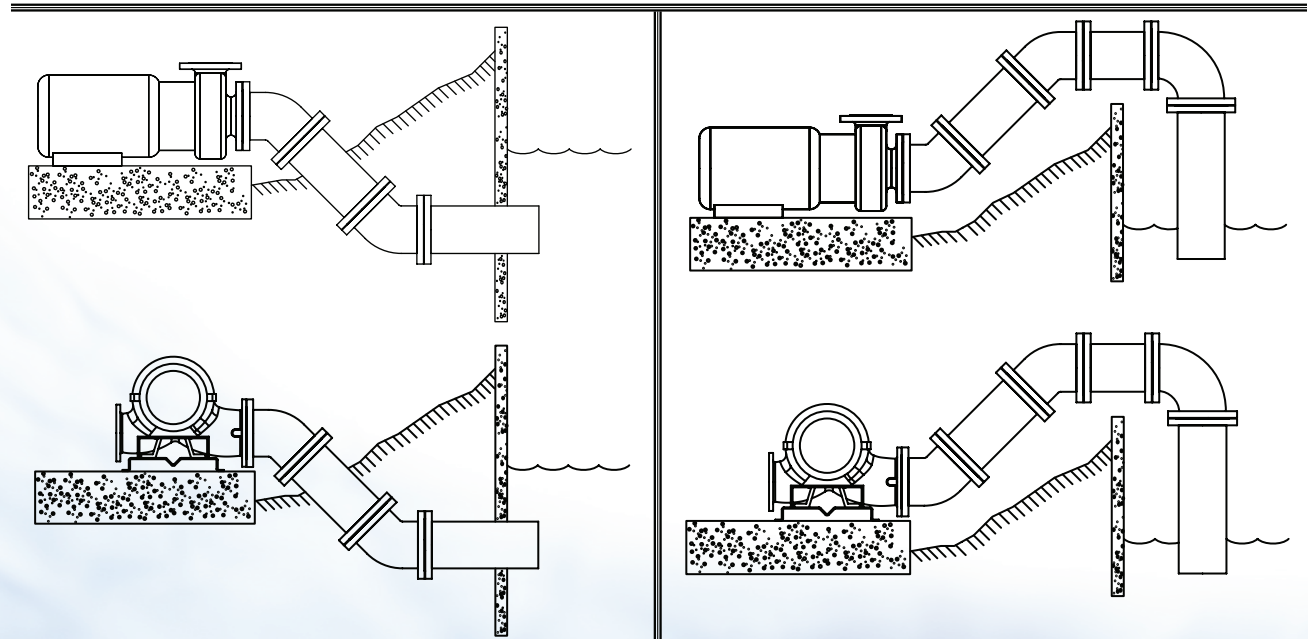
**WRONG**



7. If a basket strainer is used, then it should have a free-opening area equal to 3 to 4 times the area of suction pipe. Otherwise, excessive frictional loss will result.

**RIGHT**

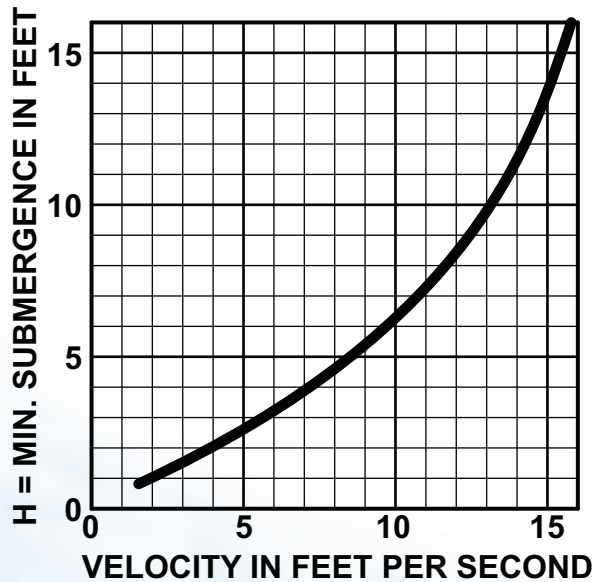
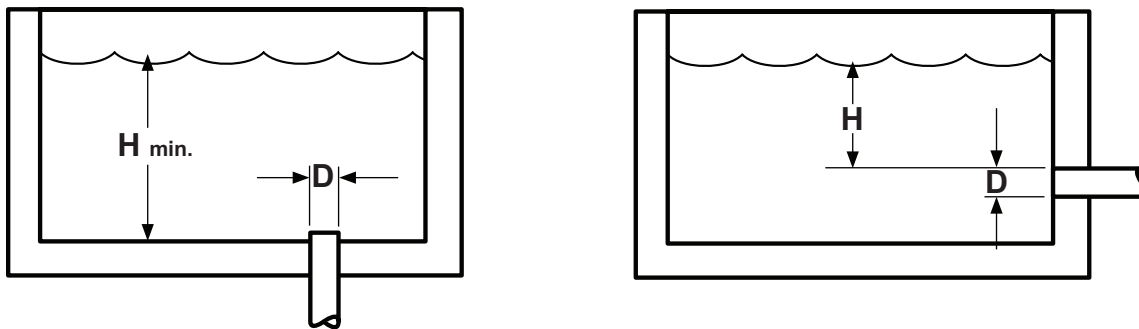
**WRONG**



**SECTION 15**

8.
  - A. Never use pipe of a smaller size than the suction connection of the pump. The suction pipe should be equal in size or, preferably, one size larger than the suction connection of the pump in order to avoid excessive frictional loss with the resultant low NPSH available. If the pipe is larger than the pump suction, an eccentric pipe reducer should be used at the pump. Select the size pipe necessary so that NPSHA exceeds NPSHR by 3-5 feet. When centrifugal pumps are operated with insufficient NPSHA, cavitation will occur, resulting in noisy operation and damage to the pump.
  - B. When the suction supply is taken from a tank or sump, incoming water should never be allowed to fall into the water near the end of suction pipe. This will carry air down into the suction pipe.
  - C. Pipe should slope upward to the pump, even for horizontal run. The suction pipe should be laid with a gradual incline from the source of water supply, with the highest point in the line at the pump suction connection. If the pipe is level and if there are any high points in the line that will form air pockets the pump will not operate properly.

Insure that the size and minimum submergence over suction inlet is sufficient to prevent air from entering pump through a suction vortex.



$$\frac{\text{GPM} \times 0.321}{\text{Area}}$$

OR

$$\frac{\text{GPM} \times 0.4085}{D^2}$$

SECTION 15