



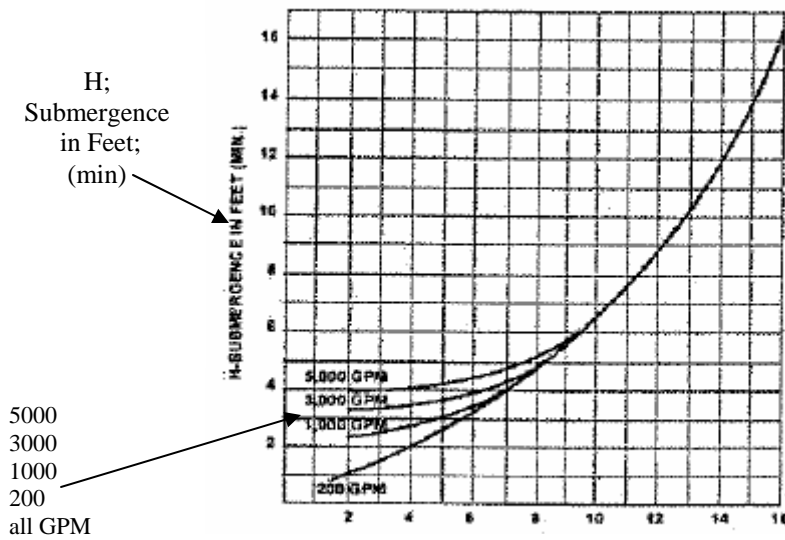
PUMPS THAT EXPERTS SELECT.

Importance of Proper Suction Pipe Submergence

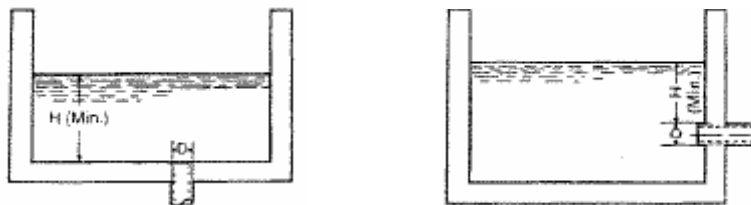
If velocity of the water at the suction pipe entrance is too high, a vortex (commonly referred to as a whirlpool) is created, through which air flows downward to the end of the suction pipe and into the pump casing. Air in the pump casing causes rough and noisy operation and severe vibration that in the course of a short time can result in a broken shaft as well as other damage. If sufficient air reaches the pump to completely air bind it, dry operation will cause metal seizure at the impeller hub and wearing ring. Unless corrective action is taken, the rotating parts will be damaged beyond repair. The difficulties can be avoided by selecting and installing a suction pipe through which the fluid handled enters at a velocity not exceeding that shown on the graph. A lower velocity and more submergence are good insurance against this type of air trouble. Sump design for large double suction pumps can become more complex, and appropriate sources such as the "Hydraulic Institute Standards" should be consulted.

In many cases, centrifugal pumps function improperly because air gets into the pump due to:

1. The installation of a suction pipe that is too small in diameter.
2. The end of the suction pipe is not being submerged deeply enough.
3. Both of the above undesirable conditions.



$$\text{Velocity in feet per second} = \frac{\text{Quan.}(GPM) \times .321}{\text{AREA}(\text{inches})^2} \text{ OR } \frac{GPM \times .4085}{O^2}$$



Waterfall Effect

Liquid falling directly onto the foot valve in Figure 14 would carry air into the suction line and could result in the pump losing its prime and seizing while running dry. This can also happen when a pump has a flooded suction as in Figure 15. In either case, the pump would be noisy.

The free fall shown in Figures 14 and 15 is serious, but a line discharging vertically downward pressure, such as an office return line to a feed water storage tank, has even more effect, as shown in Figure 16.

If the returned liquid is heavily laden with air, or the sump is small, baffles may also be required as shown in Figure 14 to allow air to separate before entering the pump suction.

The continued presence of entrained air and vapor in any liquid being pumped is extremely serious and should be corrected immediately. Any return line should be extended far enough away from the pump suction to prevent trouble, and below the surface of the water to minimize air entrainment. Check your installation today and make sure your pump is not suffering from entrained air.

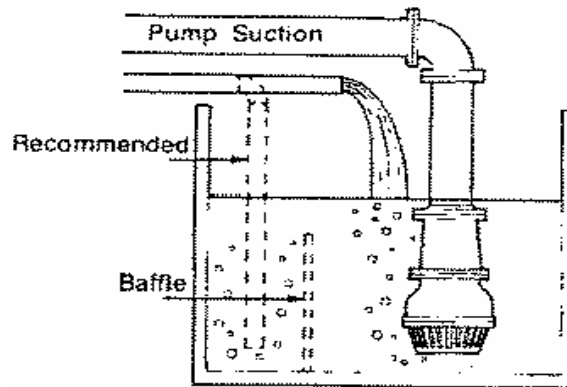


Figure 14

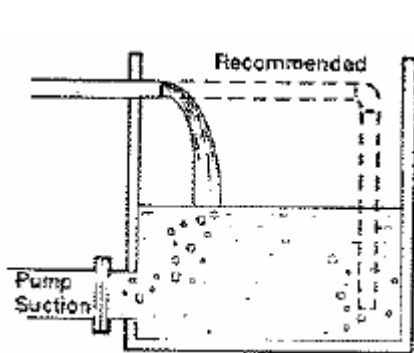


Figure 15

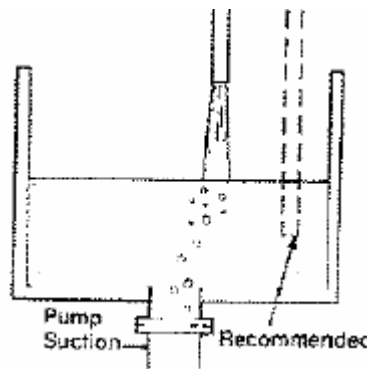


Figure 16

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