LaBour Taber

PUMPS THAT EXPERTS SELECT.

Piping

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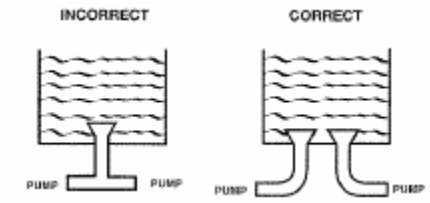
Introduction:

We all know that piping is integral to the pump system. Because it is connected to the suction and discharge, the piping affects the health and well being of the pump. Incorrect pipe installation prejudices the pump's useful life. Presented here is graphic information on inadequate and correct piping arrangements.

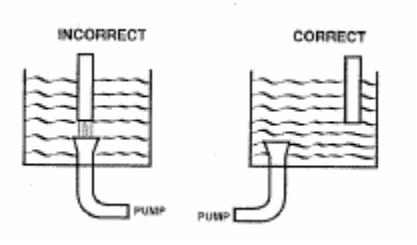
Piping Design to Drain Tanks and Sumps:

When draining a tank with two pumps, you should use a "T" with two connections. The dominant pump may asphyxiate the other pump. Each pump needs its own supply pipe (Figure 17-1).



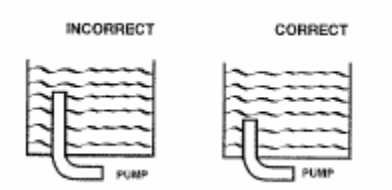
17.1

The in-flow should not cause interference with the drain pipe (Figure 17-2).



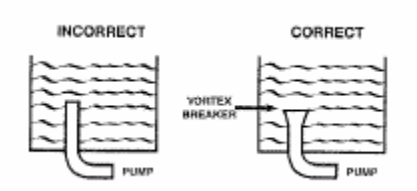
17.2

Drain pipe design must respect proper submergence (Figure 17-3). The submergence laws appear later.



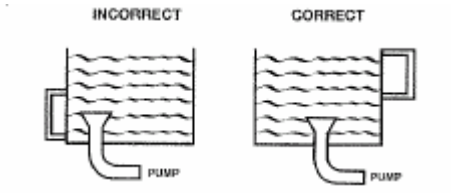
17.3

Use vortex breakers (Figure 17-4).



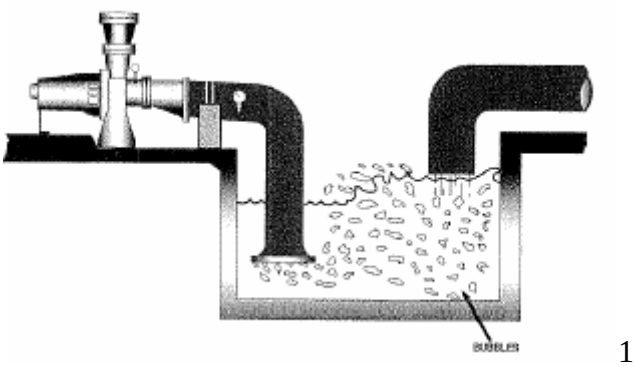
17.4

Design the level indicators to respect to proper submergence (17-5).



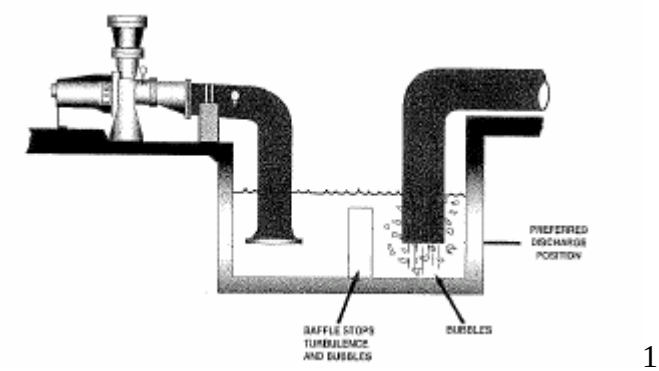
17.5

Inadequate sump design leads to entrained air bubbles and turbulence. This will damage the pump (Figure 17-6).



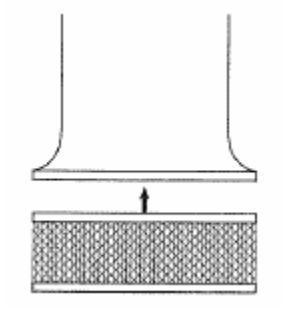
17.6

A submerged in-flow pipe and tank baffles prevent turbulence and bubbles from entering the suction piping (Figure 17-7).



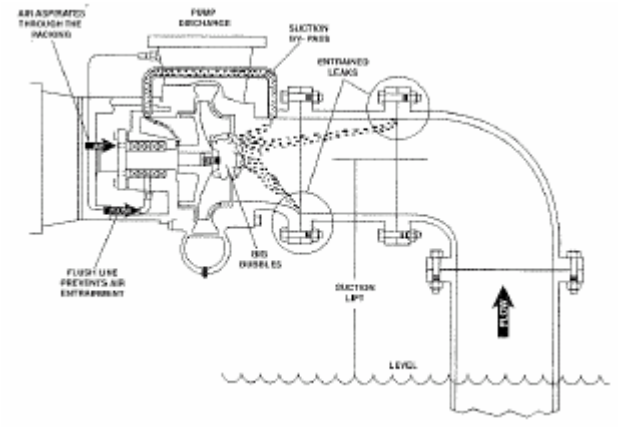
17.7

The suction bell reduces entrance losses and helps to prevent vortices. If you use a basket strainer, the screen area should be four times the area of the entrance pipe. Avoid tight mesh screens because they clog quickly (Figure 17-8).



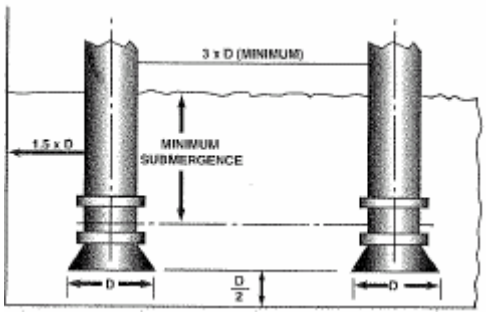
17.8

Avoid high-speed suction flow (Figure 17-9). This causes air entrainment. Also, a high suction lift produces the same effect.



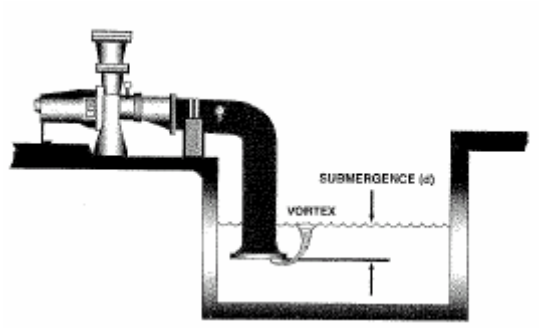
17.9

These are the dimensions to respect for proper sump design (Figure 17-10). The submergence laws are independent of the pumps NPSHr. The submergence laws are presented later.



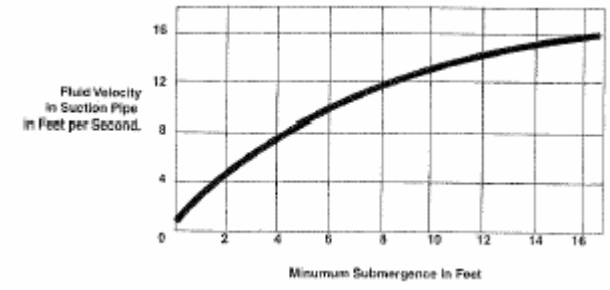
17.10

This aspirated air vortex is the result of not respecting adequate submergence (Figure 17-11). The submergence laws follow:

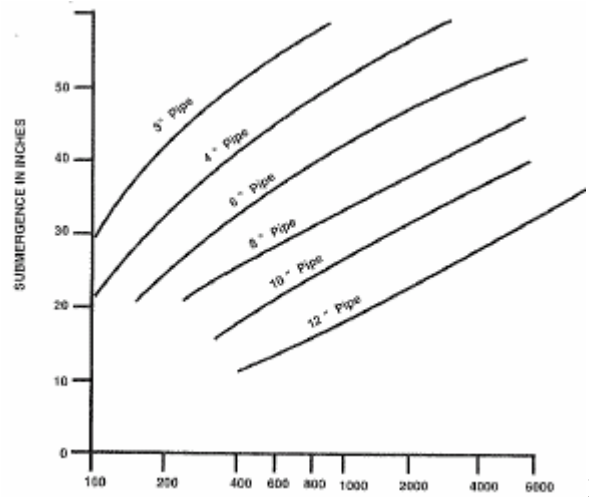


17.11

The Submergence Laws:

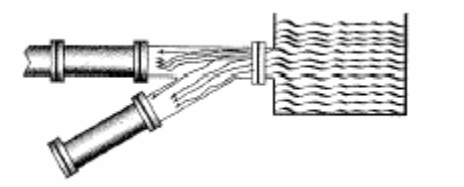


17.12



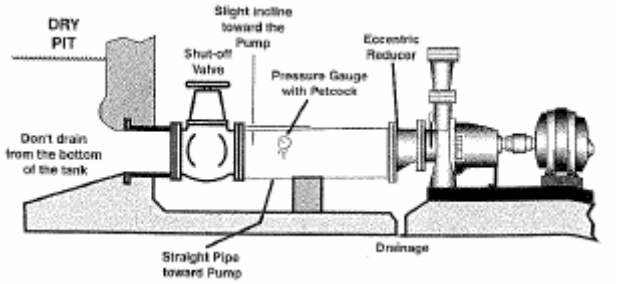
17.13

Use a “Y” branch and not a “T” branch. This will reduce turbulence.



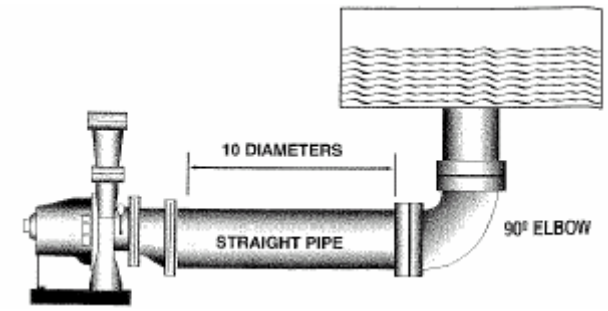
17.14

Correct suction piping leading to the pump (Figure 17-15)



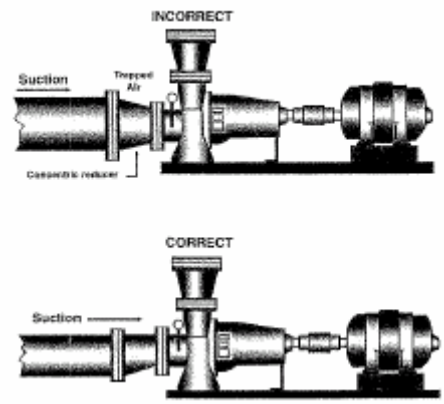
17.15

You should respect 10 pipe diameters before the first elbow in the suction piping (Figure 17-16). Example, if the pump has a 6 inch suction nozzle, you should have 60 inches of straight pipe before the first elbow.



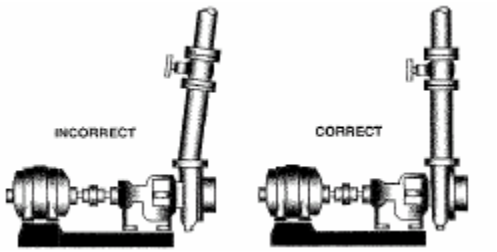
17.16

Use an eccentric pipe reducer to the pump suction nozzle (Figure 17-17).



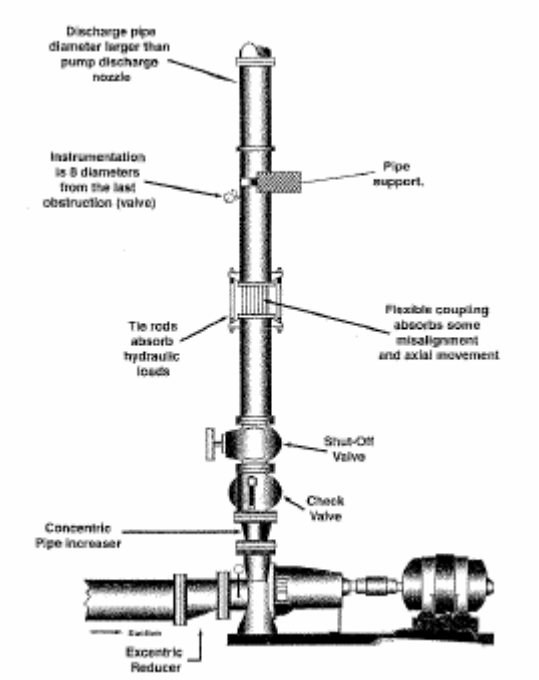
17.17

Don’t use flange bolts to unite misaligned piping to the pump. This damages the flange faces and stresses the pump casing (Figure 17-18).



17.18

Correct Piping Discharge



17.19

Taken from Bachus, Larry
“Know and Understand Centrifugal Pumps” ISBN: 1856174093 (2003)
“Troubleshooting Centrifugal Pumps and Their Systems” ISBN: 1856173917 (2003)