The flow velocity, which must first be determined, is dependent on the viscosity of the fluid and the permissible flow resistance in the piping. Lower velocities are for higher viscosity fluids and/or lower pressure drops; higher velocities are for less viscous fluids and cases where higher pressure drops can be tolerated. In all cases, allowable suction velocities are much lower and the lowest velocities should be used for the more viscous fluids and/or higher suction lifts.

Suction velocities are much more critical than discharge velocities. Too high a discharge velocity may only result in excessive power loss but an excessive suction velocity may make the system inoperative or cause damage to the pump and system.

After the velocity has been selected, the nomograph chart is used to determine the inside diameter of the pipe at a given flow rate. For example, assume a flow of 17 gpm and a velocity of 12 fps for the discharge pipe is required. Draw a line from the 12 fps point on the velocity scale through the 17 gpm point on the flow rate scale and the extended line intersects the pipe inside diameter scale at 0.76 inches. This inside diameter applies to either pipe or tubing.

The correct pipe or tube size also depends on the pressure it must carry. The conversion chart for pipe sizes and schedules facilitates this section.

Note the different weights or piping are grouped under various schedule numbers. Approximate pressure for each schedule number may be computed from the formula:

$$\text{Pressure} = \frac{S}{1000} \times \text{schedule number}$$

$S$ is the permissible stress to which the pipe is subjected. Thus, for a stress of 10,000 psi, the allowable pressure is equal to ten times the schedule number. Higher pressures may be carried if higher stresses are allowed.

In the example, a schedule 40 pipe is more than adequate for 250 psi. Twice the wall thickness of a 3/4” schedule 40 pipe of 0.228 or 0.976”. Since the actual outside diameter of a 3/4” schedule 40 pipe is 1.05”, the selection of a 3/4” pipe is adequate.

A 3/4” Fulflo relief valve should be selected. Operational characteristics of this valve, that is cracking pressure and overpressure, may be determined from the performance chart precisely in the manner explained in the example. The maximum discharge pressure of 265 psi is still well below the safe carrying capacity of the pipe. The design of the Fulflo valves is such that if used within their rating and with properly selected springs, the overpressure is not sufficient to endanger system or system components.