FLUIDE DESIGN

PIPE FITTING FRICTION CALCULATION

The friction loss for fittings depends on a K factor which can be found in many sources such as the Cameron Hydraulic data book or the Hydraulic Institute Engineering data book, the charts which I reproduce here in Figures 1 and 2.

The fittings friction ΔH_{FF} can be calculated based on the following formula where K is a factor based on the type of fitting, v is the velocity in feet/second, g is the acceleration due to gravity (32.17 ft/s^2).

$$\Delta H_{FF}(ft\ \ fluid) = K\frac{v^2(ft/s)^2}{2g(ft/s^2)}$$

For example a 2 ½" inch screwed elbow has a K factor of 0.85 according to Figure 1 and using a velocity of 10 ft/s (this is determined from the flow rate). The fittings friction loss will be:

$$\Delta H_{FF}(ft\ \ fluid) = 0.85\frac{10}{2\times 32.17^2} = 1.3$$

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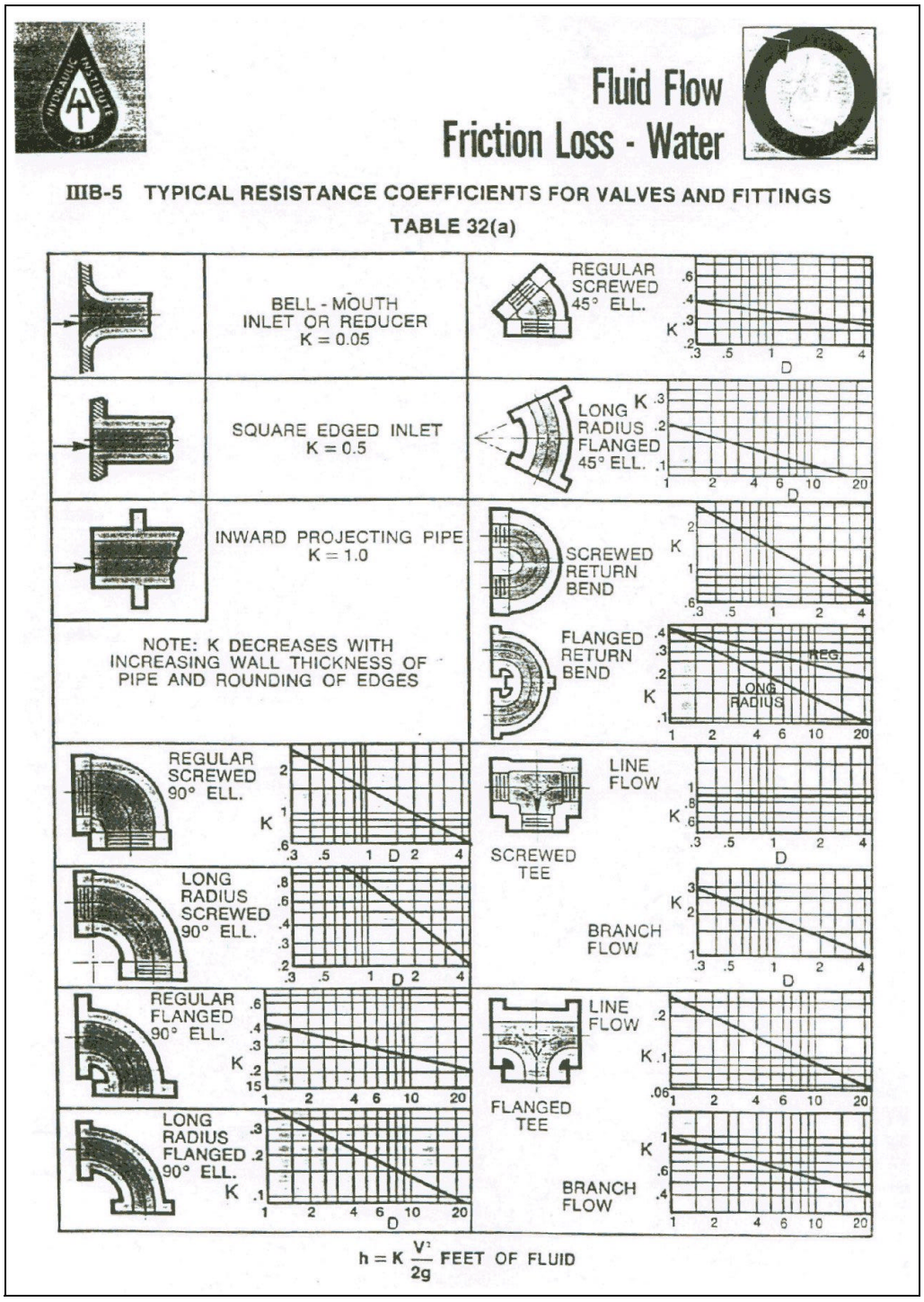

Figure 1 Pressure head loss K coefficients for fittings (source the Hydraulic Institute Standards book www.pumps.org).

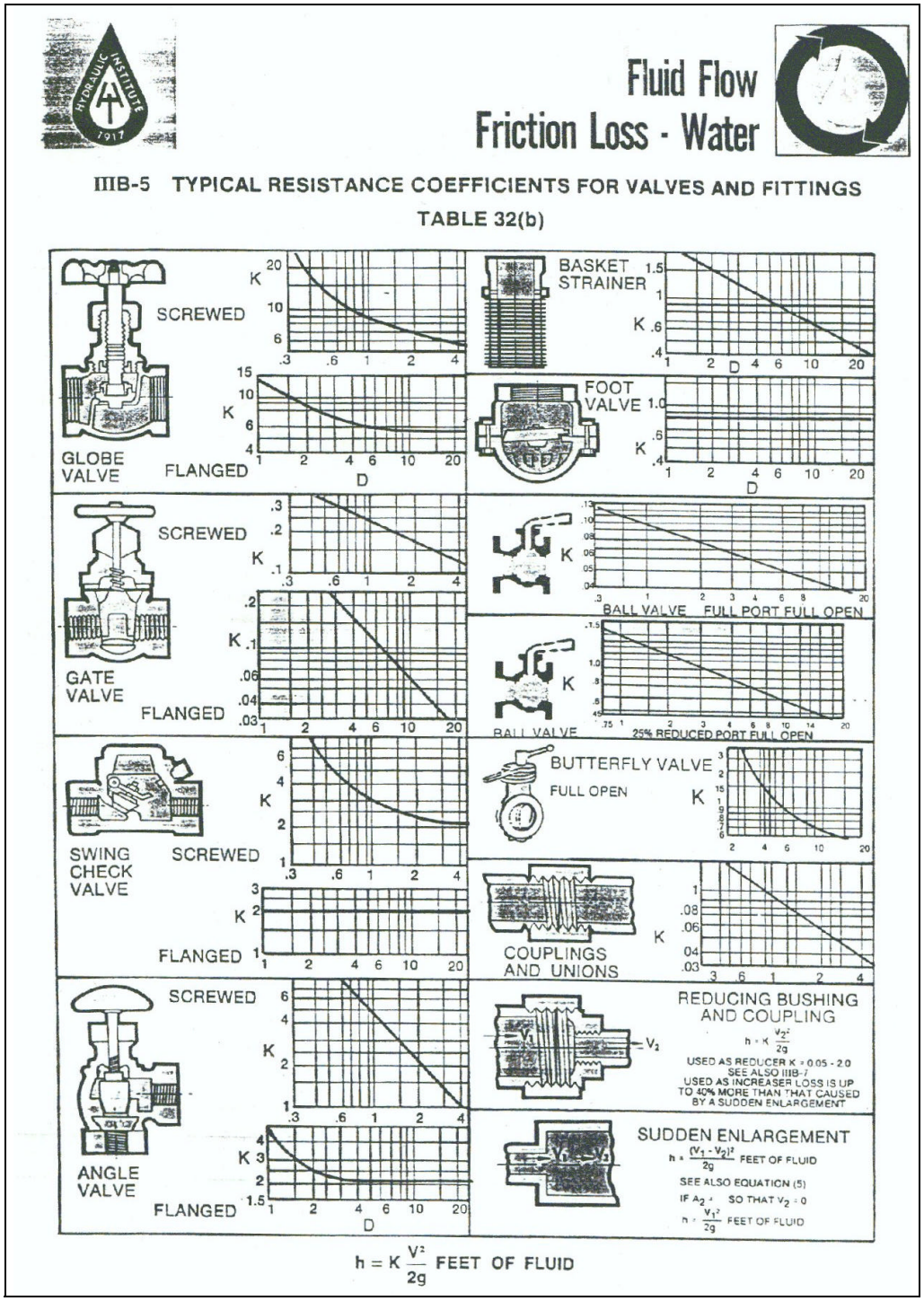

Figure 2 Pressure head loss K coefficients for manual valves and other devices (source the Hydraulic Institute Standards book www.pumps.org).