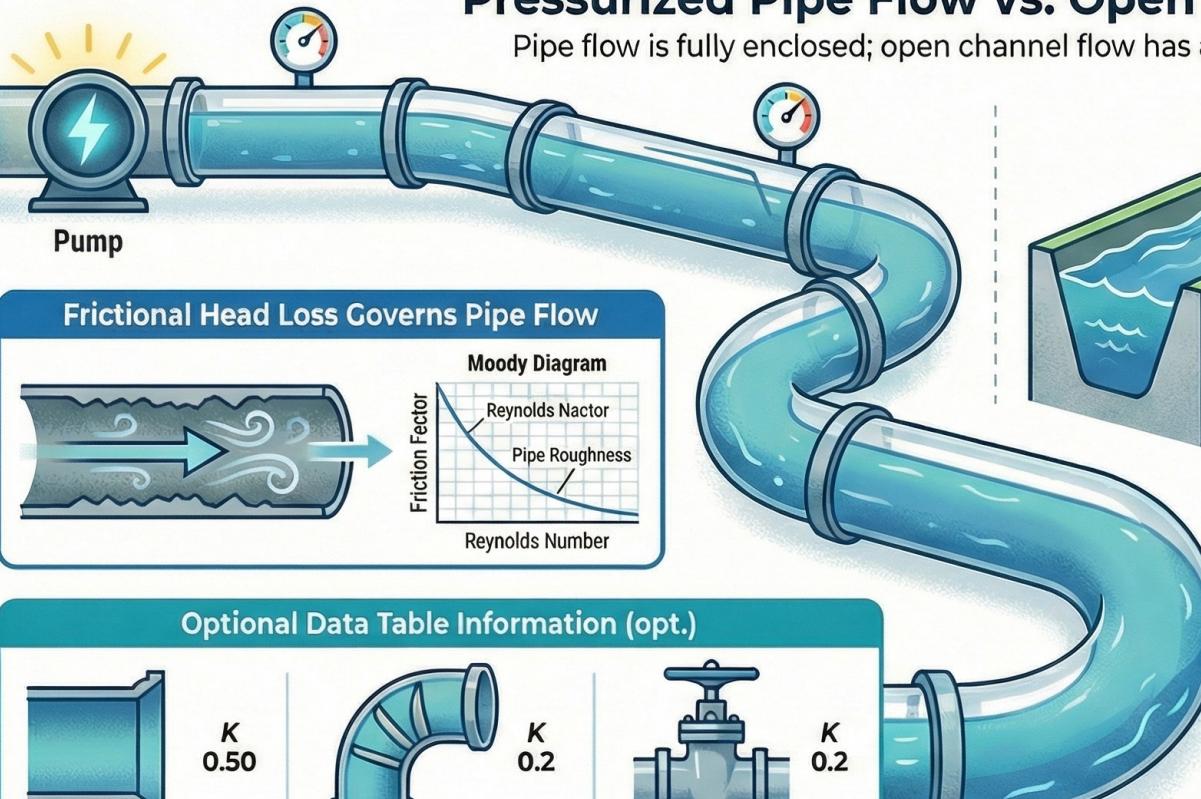


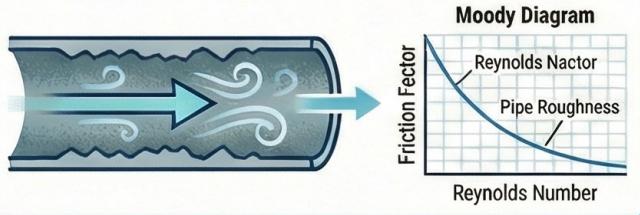
Hydraulics at a Glance: Key Flow Principles

Pressurized Pipe Flow vs. Open Channel Flow

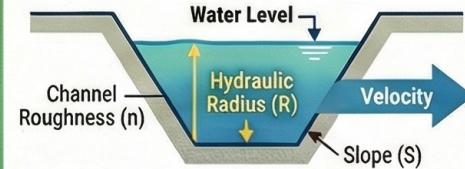
Pipe flow is fully enclosed; open channel flow has a free water surface.



Frictional Head Loss Governs Pipe Flow



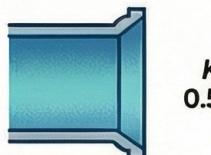
Manning's Equation Governs Open Channel Flow



$$V = \frac{1}{n} \times R^{\frac{2}{3}} \times S^{\frac{1}{2}}$$

Calculates velocity using channel roughness (n), hydraulic radius (R), and slope (S).

Optional Data Table Information (opt.)



Pipe Entrance
(sharp-edged)



90° Miter Bend
(with vanes)



$K = 0.2$

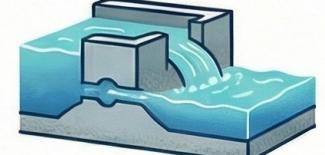
Gate Valve
(wide open)

Local Head Loss Coefficients (K) indicate energy loss for fittings.

Flow Control & Measurement



Pumps Add Energy to a System:
Required power is proportional to the flow rate and the dynamic head difference.



Outlets Control & Measure Discharge:
Structures like orifices and weirs are used to regulate and calculate flow rates.