The Bernoulli equation:

1) In a "pressure" form
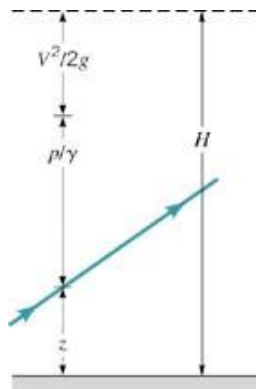
$$\underbrace{\overset{\substack{static\\pressure}}{\hat{p}} + \underbrace{\overset{\substack{dynaic\\pressure}}{\frac{1}{2}\rho V^2}} + \overset{\substack{hydrostatic\\pressure}}{\widehat{\gamma z}}}_{\substack{Stagnation\ pressure}} = constant$$

$$\underbrace{\phantom{\hat{p} + \frac{1}{2}\rho V^2 + \gamma z}}_{Total\ pressure}$$

V, p, γ

$h = \dfrac{p}{\gamma}$

$\Delta h = \dfrac{V^2}{2g}$
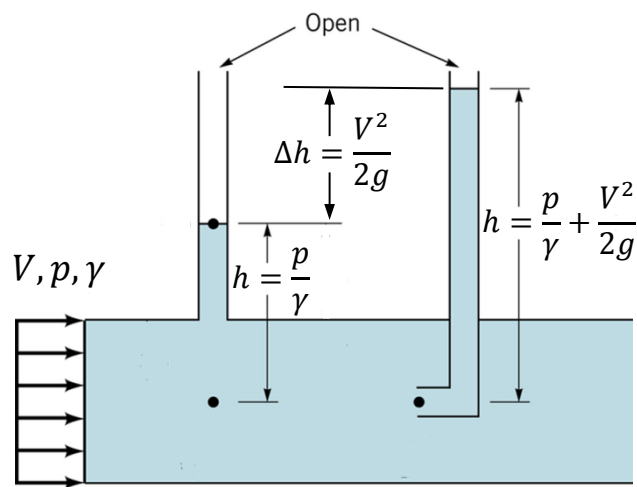
$h = \dfrac{p}{\gamma} + \dfrac{V^2}{2g}$

2) In the "head" form:

$$\underbrace{\frac{p}{\gamma}}_{\substack{pressure\\head}} + \underbrace{\frac{V^2}{2g}}_{\substack{velocity\\head}} + \underbrace{z}_{\substack{elevation\\head}} = constant = H$$

$v^2/2g$

p/γ

H

The Energy Grade Line (EGL) and the Hydraulic Grade Line (HGL): A geometrical interpretation of a flow

$$EGL \equiv \frac{p}{\gamma} + \frac{V^2}{2g} + z$$
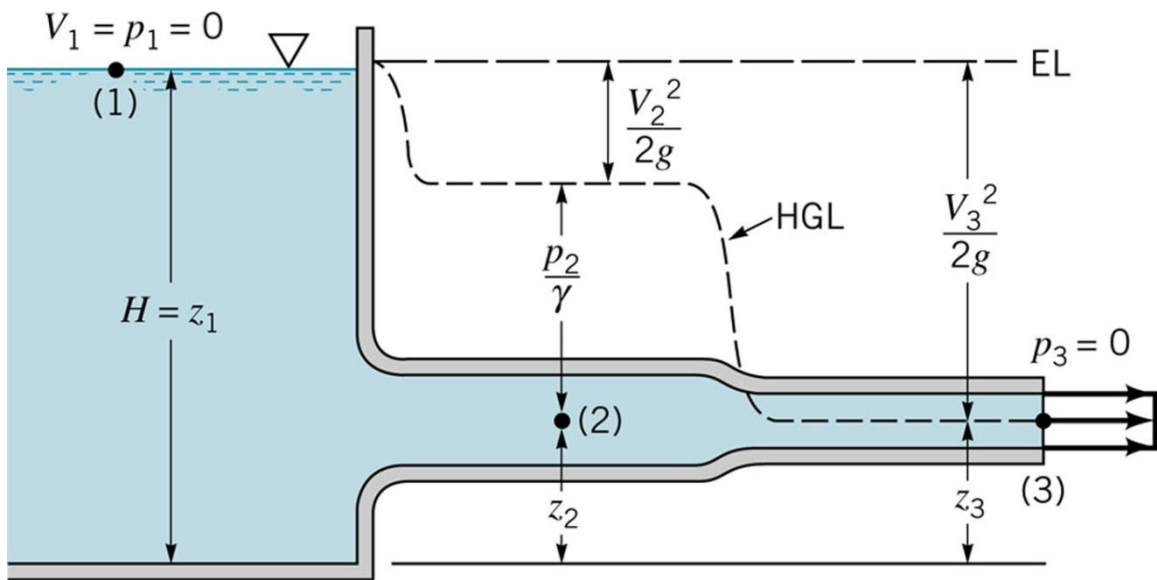
$$HGL \equiv \frac{p}{\gamma} + z$$
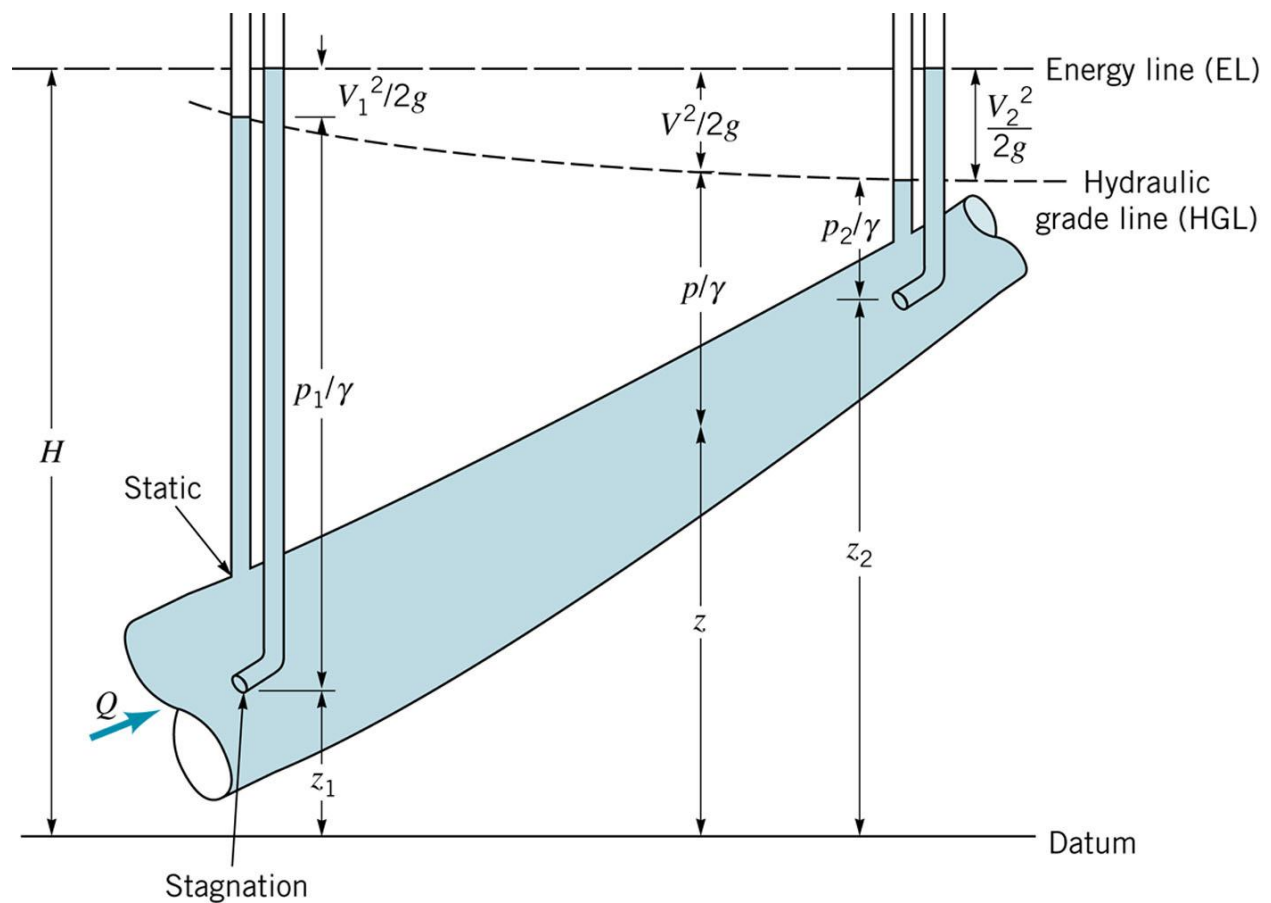
Note:

- Stagnation tube: Measurement of the total head (energy) of the flow.
- Pressure tap: Measurement of the sum of the pressure head and the elevation head.
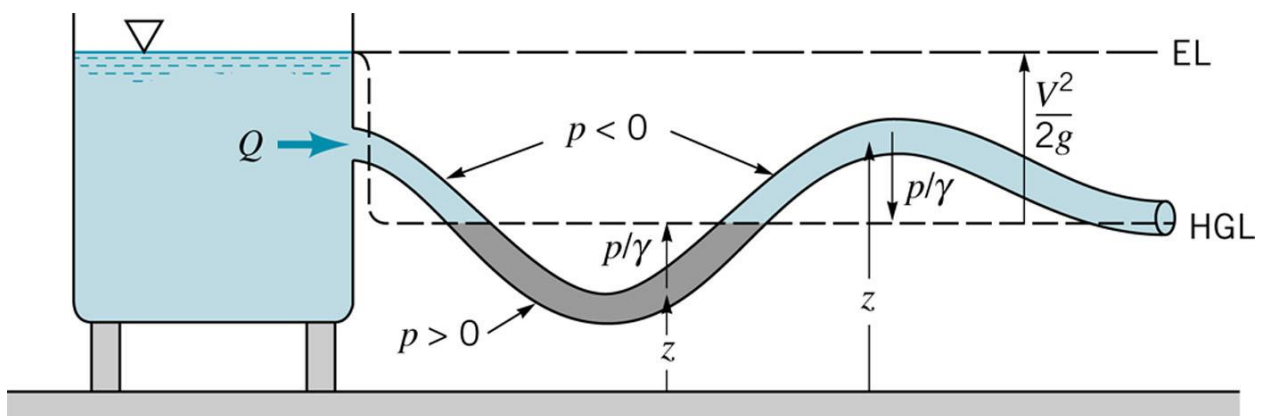
$$EGL = \frac{p}{\gamma} + \frac{V^2}{2g} + z$$

$$HGL = \frac{p}{\gamma} + z$$

Example 1:

Example 2:

$$\frac{p}{\gamma} = HGL - z$$