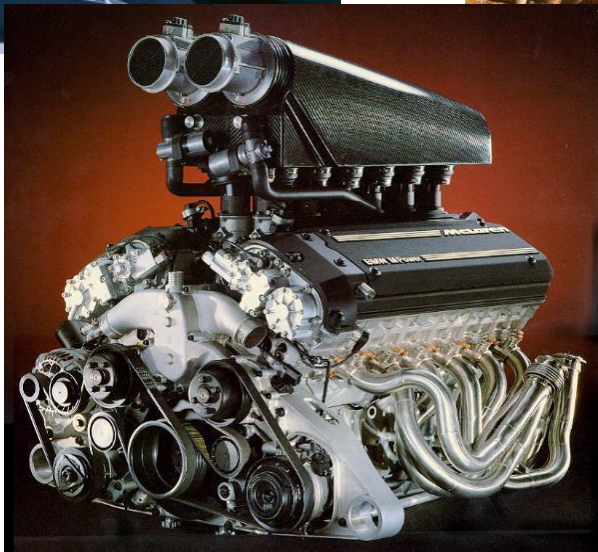
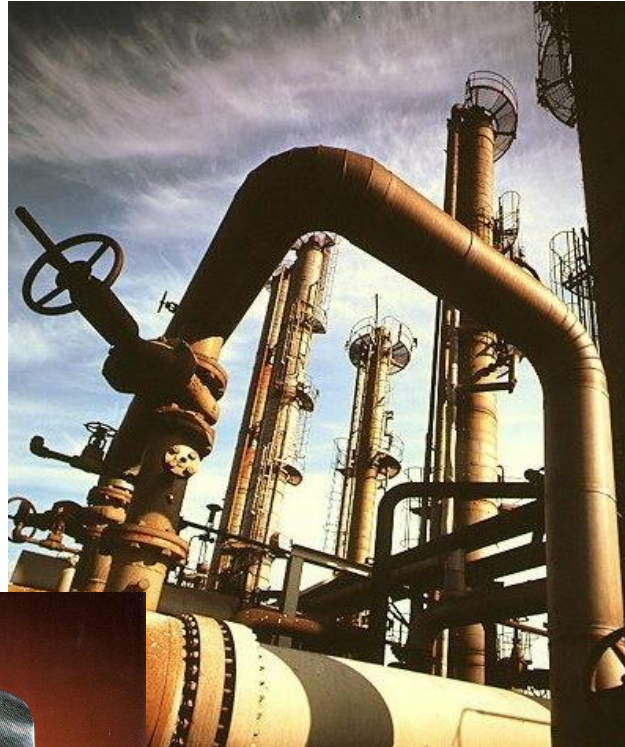
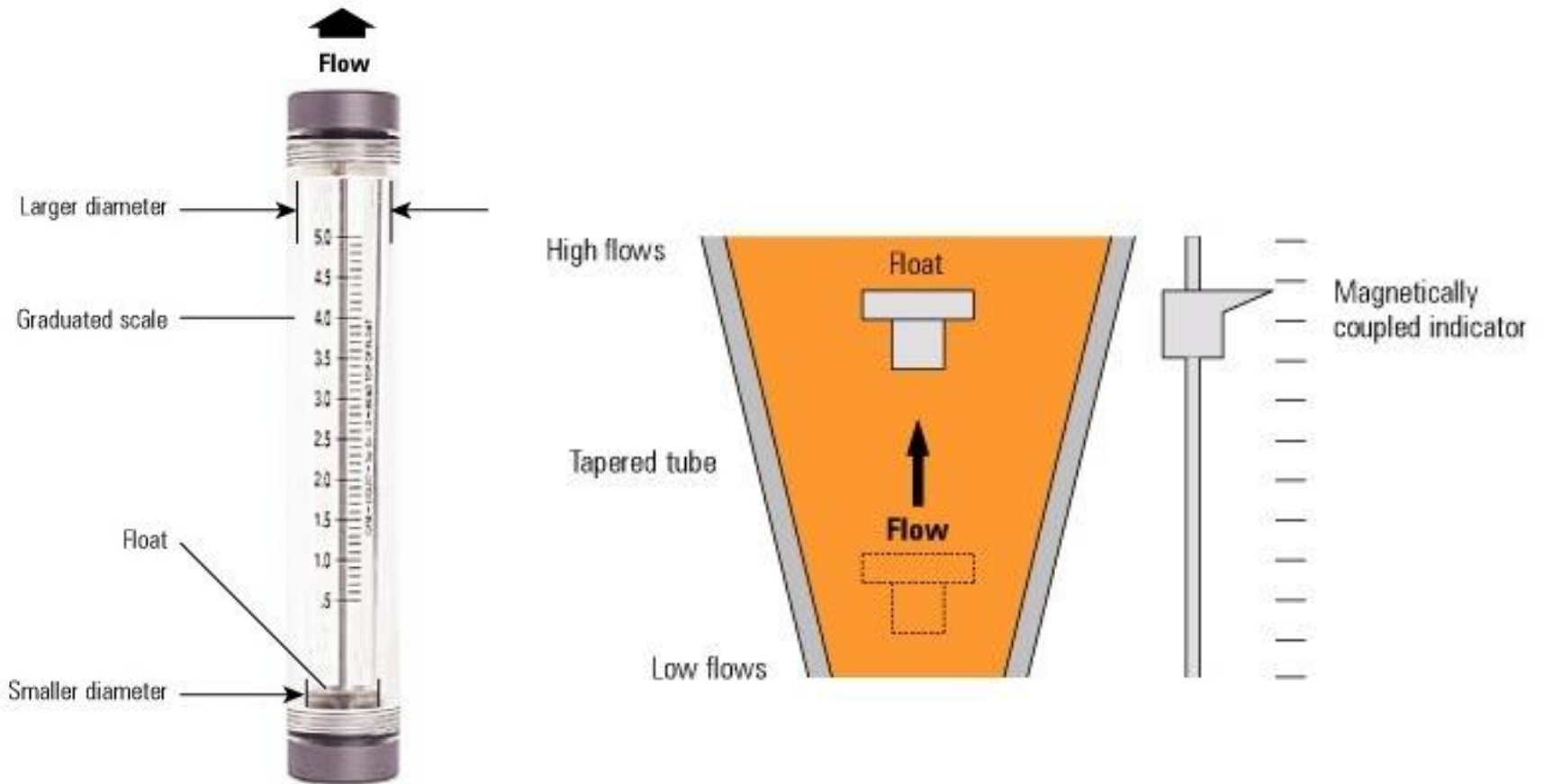


# Flow rate measurements internal flows - Pipelines

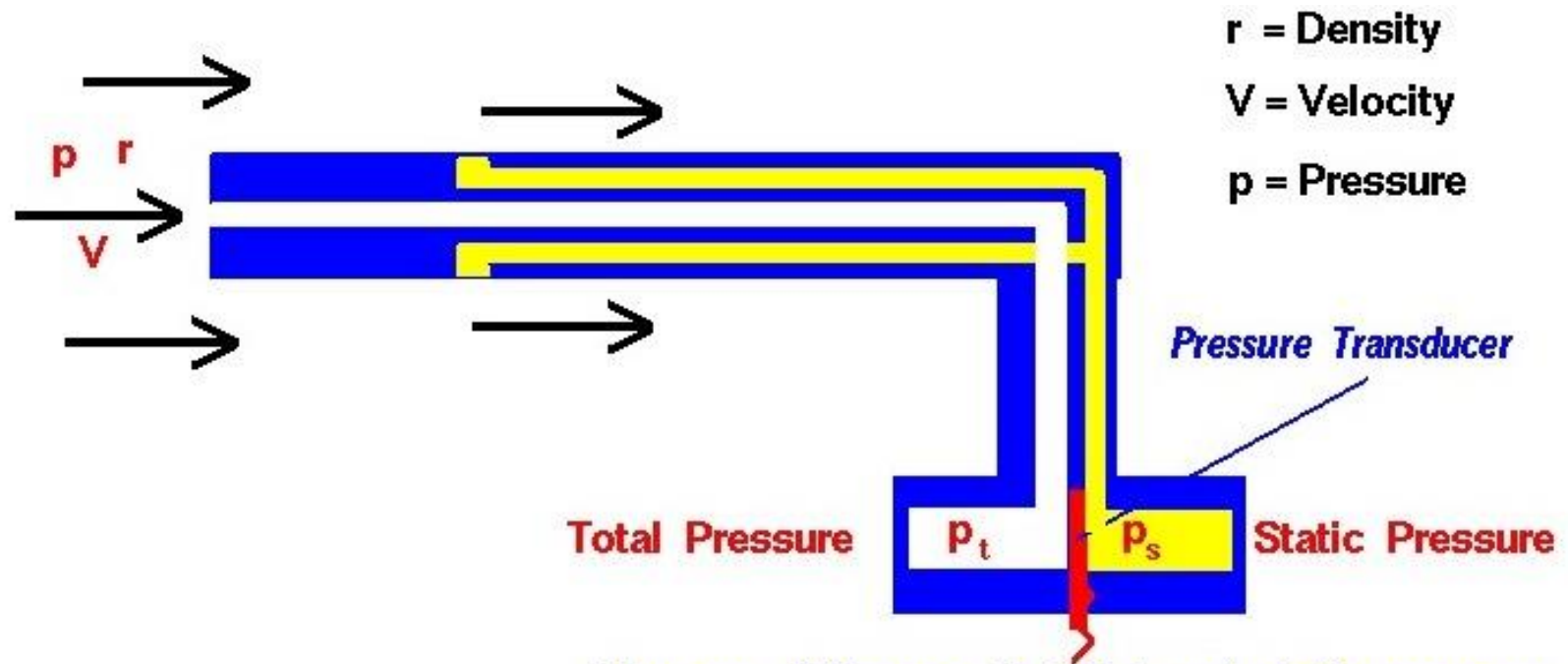


# Rotameters

Force balance between drag on insert and gravity



# Flow rate measurements external flows – Pitot-Static tubes



*Bernoulli's Equation:*

static pressure + dynamic pressure = total pressure

$$\left( p_s + r \times \frac{V^2}{2} \right) = p_t$$

*Solve for Velocity:*

$$V^2 = \frac{2(p_t - p_s)}{r}$$

Measure difference in total and static pressure



# Flow rate measurements external flows – Pitot-Static tubes

