

MUD HYDRAULICS



Units

Where:

P_a = Annular Pressure Drop (lbs/in²)

P_p = Pipe Pressure Drop (lbs/in²)

P_h = Hydrostatic Pressure (lbs/in²)

TVD = Total Vertical Depth (ft)

D_h = Casing/Hole Inside Diameter (in)

D_p = Pipe Outside Diameter (in)

D_i = Pipe Inside Diameter (in)

Hydrostatic Pressure (psi)

$$P_h = (.052)(MW)(TVD)$$

Pressure Gradient (psi/ft)

$$PG = (.052)(MW)$$

Equivalent Circulating Density (ppg)

$$ECD = \frac{\sum P_a(\text{psi})}{(.052)(TVD)} + MW$$

Annular Mud Velocity (ft/min)

$$A_v = \frac{(24.51)(Q)}{(D_h^2 - D_p^2)}$$

Annular Pressure Losses (psi)

$$P_a = \frac{1.4327 \times 10^{-7} (TVD)(MW)(A_v)}{(D_h - D_p)}$$

Drill Stem Bore Pressure Losses (psi)

$$P_p = \frac{6.1 \times 10^{-5} (TVD)(MW)(Q^{1.86})}{D_i^{4.86}}$$

Plastic Viscosity (cp)

$$PV = Fann\ 600 - Fann\ 300$$

Yield Point

$$YP = Fann\ 300 - PV$$

Specific Gravity using MW ppg

$$S_g = \frac{MW}{8.33}$$

Capacity between Casing, Hole and Drill Pipe

$$A_c, \text{ bbl/ft} = \frac{D_h^2 - D_p^2}{1029.4} \quad A_c, \text{ ft/bbl} = \frac{1029.4}{D_h^2 - D_p^2}$$