**Misscelaneous Equations & Calculation**

**Surface Equipment Pressure Losses**

Where, SEpl = surface equipment pressure loss (psi)  
 C = friction factor for type of surface equipment  
 W = mud weight (ppg)  
 Q = circulation rate (gpm)

|  |  |
| --- | --- |
| **Type of Surface Equipment** | **C** |
| 1 | 1.0 |
| 2 | 0.36 |
| 3 | 0.22 |
| 4 | 0.15 |

Sample Case : Surface equipment type = 3  
 C = 0.22  
 Mud weight = 11.8 ppg  
 Circulation rate = 350 gpm

**DRILL STEM BORE PRESSURE LOSSES**

Where, P = drill stem bore pressure losses (psi)  
 MW = mud weight (ppg)  
 L = length of pipe (ft)

Q = circulation rate (gpm)  
 d = inside diameter (inch)

Sample Case : Mud weight = 10.9 ppg  
 Length of pipe = 6500 ft  
 Circulation rate = 350 gpm  
 Drill pipe ID = 4.276 in.

**ANNULAR PRESSURE LOSSES**

Where, P = annular pressure losses (psi)  
 MW = mud weight (ppg)  
 L = length (ft)  
 V = annular velocity (ft/min)  
 Dh = hole or casing ID (inch)  
 Dp = drill pipe or drill collar OD (inch)

**MINIMUM FLOWRATE FOR PDC BITS**

Minimum flowrate (gpm) = 12.72 x bit diameter1.47 inch

Sample Case : Determine the minimum flowrate for a 12-1/4 in. PDC Bit

Minimum flowrate (gpm) = 12.72 x 12.251.47

= 12.72 x 39.77

= 505.87 gpm

**CRITICAL RPM : RPM TO AVOID DUE TO EXCESSIVE VIBRATION (Accurate for Approximately 15%)**

Sample Case : L = length of one joint of drill pipe = 31 ft

OD = drill pipe outside diameter = 5.0 in.  
 ID = drill pipe inside diameter = 4.276 in.

NOTE : As a rule of thumb, for 5.0 in. drill pipe, do n2747 lb/bblx ot

exceed 200 RPM at any depth.

**DRILL PIPE CAPACITY AND DISPLACEMENT**

**SURVEY**

TVD = TVD1 + (C1 Cos I)

Where, TVD1 = TVD last survey

C1 = Course length

I = Inclination

**BULK DENSITY**

**SHALE FACTOR**

Where, Mass = Sample masss (gram)

Vol = Volume (ml)

N = Normality of methylele blue solution

**TRUE HOLE DIAMETER FROM CARBIDE**

Where, D = true hole diameter (inch)

POP = pump output (bbl/stk)

L = open hole length (ft)

OH = bit size (inch)