**Solids Analysis**

**Basic solids analysis calculations**

NOTE : Steps 1 — 4 are performed on high salt content muds. For low

chloride muds begin with Step 5.

**Step l**

Percent by volume saltwater (SW)

*SW = (5.88 x 10-8) x [(ppm Cl)1.2] x % by vol water*

**Step 2**

Percent by volume suspended solids (SS)

*SS = 1OO — % by vol oil — % by vol SW*

**Step 3**

Average specific gravity of saltwater (ASGSW)

*ASGSW = (ppm C)0.95 x (1.94 x 10-6) + 1*

**Step 4**

Average specific gravity of solids (ASG)

**Step 5**

Average specific gravity of solids (ASG)

**Step 6**

Percent by volume low gravity solids (LGS)

**Step 7**

Percent by volume barite

Barite % by vol = % by vol solids — % bý vol LGS

**Step 8**

Pounds per barrel barite

Barite (lb/bbl) = % by vol barite x 14.71

**Step 9**

Bentonite determination :

If cation exchange capacity (CEC) / methylene blue test (MBT) of shale and mud are KNOWN :

a. Bentonite (lb/bbl):

Where ;

S = CEC of shale  
 M = CEC of mud

b. Bentonite % by volume :

Bentonite % by vol = bentonite (lb/bbl) ÷ 9.1

If the cation exchange capacity (CEC)/ methylene blue test(MBT) of SHALE

is UNKNOWN :

Where M = CEC of mud

b. Bentonite (lb/bbl) = bentonite % by vol x 9.1

**Step 10**

Drilled solids % by volume

Drilled solids % by vol = LGS % by vol – bentonite % by vol

**Step 11**

Drilled solids (lb/bbl)

Drilled solids (lb/bbl) = drilled solids % by vol x 9.1

Sample Case : Mud weight = 16.0 ppg  
 Chlorides = 73,000 ppm  
 CEC of mud = 3O lb/bbl  
 CEC of shale = 7 lb/bbl  
 Retort Analysis :  
 Water = 57.0% by volume

Oil = 7.5% by volume  
 Solids = 35.5% by volume

1. Percent by volume saltwater (SW)

SW = [(5.88 x 10-8) (73,O0O)1.2 + 1] x 57

= [(5.88 x 685468.39) + l] x 57

= (O.0403055 + 1) x 57

= 59.2974 percent by volume

2. Percent by volume suspended solids (SS)

SS = 100 — 7.5 — 59.2974

= 33.2026 percent by volume

3. Average specific gravity of saltwater (ASGSW)

ASGSW = [(73,00O)0.95 (1.94 x 10-6)] + 1

= (41,701.984 x 1.94-6) + 1

= 0.0809018 + 1

= 1.0809

4. Average specific gravity of solids (ASG)

5. Because a high chloride example is being used, Step 5 is omitted

6. Percent by volume low gravity solids (LGS)

7. Percent by volume barite

Barite % by volume = 33.2026 — 11.154

= 22.0486 % by volume

8. Barite (lb/bbl)

Barite (lb/bbl) = 22.0486 x 14.71

= 324.3349 lb/bbl

9. Bentonite determination

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b. Bentonite % by volume

Bentonite % by vol = 28.2696 ÷ 9.1

= 3.10655 % by vol

10. Drilled solids percent by volume

Drilled solids % by vol = 11.154 — 3.10655

= 8.047 % by vol

1l. Drilled solids pounds per barrel

Drilled solids (lb/bbl) = 8.047 x 9.1

= 73.2277 lb/bbl