



DRILLING MUD LIQUID & SOLIDS CONTENT

The retort apparatus is used to determine the amount and type of solids and liquids present in a drilling mud sample. Mud is placed in the steel container and then heated until the liquid portion is vaporized. The vapor is passed through a condenser in which it is cooled and then collected in a graduated cylinder. The volume of the water and oil is measured as a fraction of the total mud volume. For accurate results a true mud density should be used for calculations, an accurate air free sample must be used and a volume correction factor should be determined for oil content if it is present in the mud.

The correction factor, F_o , can be determined from running the retort in the manner described below and determining the oil correction factor as the fraction of oil recovered by running the oil blank. (For some crude oils F_o may be as low as 0.6, i.e. only 6 mL of an accurately measured 10 mL sample were recovered).

TEST PROCEDURE

1. Lift retort assembly out of insulator block. Using the spatula provided as a screwdriver, unscrew the lower mud chamber from the upper chamber. Pack the upper chamber with fine steel wool.
2. Fill the mud chamber carefully with mud, place the leveling lid firmly onto the mud chamber and allow excess mud to escape through the hole in the leveling lid making sure no air is trapped below the lid or in the mud. An accurate sample volume is essential to the accuracy of the test results.
3. Remove the leveling lid with a turning and sliding action so that mud adhering to the lid is wiped back into the sample chamber. Wipe off any excess mud, lightly coat the threads with the high temperature lubricant provided and screw the sample chamber into the bottom of the upper chamber.
4. Place the retort in the insulator block and put the insulator cover in place.
5. Add a drop of wetting agent to the 10 ml, graduated cylinder and place it under the condenser drain tube. Plug in the retort.
6. Continue heating until liquid ceases to drip from the drain tube or until the pilot light goes off.

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CALCULATIONS

Volume fraction oil = mL oil / (10 x F_o)

- if F_o was not determined, F_o = 1.0

Volume fraction water = mL water / 10

Volume fraction solids = 1.0 - vol. fraction oil - vol. fraction water

Grams oil = (mL oil x oil density) / (100 x F_o)

- oil density in kg/m³ as determined using the mud balance

Grams water = mL water

Grams mud = kg/m³ mud density / 100

Grams mud solids = grams mud - grams oil - grams water

Mud solids mL = 10 x volume fraction solids

Average solids sg = grams mud solids / mud solids (mL)

Volume fraction high gravity solids = [(1000 x average solids sg) - 2500] / 1700

Volume fraction low gravity (2500 kg/m³) solids = 1.0 - volume - fraction hgs

CALCULATIONS

1. The high gravity solids are taken to have a 4.2 SG and the low gravity solids are taken to have a 2.5 sg.
2. The volume fraction of high and low gravity solids are determined on the basis of the total solids volume present in the mud.
3. The volume fraction solids include both dissolved and undissolved solids. The dissolved solids (as NaCl) can be approximated from the following table (see next page):

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Volume Fraction Salt (as NaCl) in the Water Phase		
Chloride Content (mg/L)	Volume Fraction (Salt)	SG
5000	0.003	1.004
10000	0.006	1.010
20000	0.012	1.021
30000	0.018	1.032
40000	0.023	1.043
60000	0.034	1.065
80000	0.045	1.082
100000	0.057	1.098
120000	0.070	1.129
140000	0.082	1.149
160000	0.095	1.170
180000	0.108	1.194

HANDLING AND INSTRUMENT CARE

1. Use the spatula to scrape the dried mud from the mud chamber and lid to assure correct volume.
2. Use the high temperature lubricant on the threads of the mud chamber and lid to make dismantling easier.
3. Remove and replace any mud caked steel wool.
4. Use the pipe cleaner to clean the drain tube and condenser.
5. The retort should be cooled prior to dismantling. It is extremely hot during and after the test.