

Slurry Test Kit, Model 833

Instruction Manual



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fann[®]

Fann Instrument Company

Slurry Test Kit Instruction Manual

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Houston, Texas, USA

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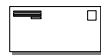
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1 Introduction

The Slurry Test Kit Model 833 is a portable kit with materials and equipment for measuring slurry properties. With this kit, the user can obtain laboratory-quality measurements of Marsh funnel viscosity, specific gravity or density, pH, water hardness, and sand content.

These tests comply with API Recommended Practice for Field Testing Water Based Drilling Fluids, API RP 13B-1.

1.1 Document Conventions

The following icons are used as necessary to distinguish elements of text.



NOTE. Notes emphasize additional information that may be useful to the reader.



CAUTION. Describes a situation or practice that requires operator awareness or action in order to avoid undesirable consequences.



MANDATORY ACTION. Gives directions that, if not observed, could result in loss of data or in damage to equipment.



WARNING! Describes an unsafe condition or practice that if not corrected, could result in personal injury or threat to health.



ELECTRICITY WARNING! Alerts the operator that there is risk of electric shock.



HOT SURFACE! Alerts the operator that there is a hot surface and that there is risk of getting burned if the surface is touched.

2 Safety

Safe laboratory practices and procedures should be observed while operating and maintaining the Slurry Test Kit.

Wear appropriate personal protective equipment (PPE).

Follow your waste management procedures.

3 Viscosity Measurement

The Marsh funnel is a rugged, easy to operate instrument that measures slurry viscosity. Users can make rapid, on the spot measurements in the lab, field, or drilling rig. The rate of gelation and the density of the slurry considerably influence the viscosity measurement. Frequent reporting of the funnel viscosity makes it possible to observe sudden changes in the slurry viscosity and to take corrective action when necessary.

Funnel viscosity is the ratio of the speed of the slurry as it passes through the outlet tube (shear rate) to the force (weight of the slurry) causing the slurry to flow (shear stress). Funnel viscosity is reported as the seconds required for one quart of slurry to flow out a full funnel.

Equipment:

- Marsh funnel
- Measuring Cup (graduated)
- Stopwatch
- Thermometer



The Marsh funnel should be clean and dry before beginning this procedure.

3.1 Procedure

1. Collect a fresh slurry sample.
2. Hold the funnel erect with a finger over the outlet tube, and pour the slurry into the funnel through the screen until the slurry level reaches the bottom of the screen. (The screen will filter out the larger particles that could clog the outlet tube.)



When the funnel is filled to the proper level, it holds more than one quart of slurry.

3. Quickly remove your finger from the outlet tube, and at the same time, begin timing the slurry outflow.
4. Allow one quart (946 ml) of slurry to flow from the Marsh funnel into a measuring container.
5. Record the seconds it takes for the quart of slurry to flow from the funnel. Report this value as the Marsh funnel viscosity. Also record the temperature of the slurry sample.

3.2 Calibration Check

Periodically check the calibration of the Marsh funnel by measuring the viscosity of fresh water. The Marsh funnel viscosity of one quart of fresh water at $70^{\circ}\text{F} \pm 5^{\circ}\text{F}$ ($21^{\circ}\text{C} \pm 3^{\circ}\text{C}$) is 26 ± 0.5 seconds.

If the funnel is out of calibration, clean it using a pipe cleaner to make sure that nothing is obstructing the outlet. If the funnel continues to give an incorrect reading for fresh water after cleaning, then the outlet tube has probably been damaged and the funnel should be replaced.

4 Density Measurement

The Fann four scale Mud Balance Model 140 is an accurate, self-contained measuring device used to determine the density of a slurry.

The measuring range is 6 to 24 pounds per gallon or 0.72 to 2.88 specific gravity.

The Mud Balance has a constant-volume sample cup with a lid that is connected to a balance arm. The balance arm has four graduated scales:

- pounds per gallon
- specific gravity
- pounds per cubic feet
- pounds per square inch per 1,000 feet of depth

4.1 Procedure



The balance cup should be clean and dry before filling it with slurry sample.

1. Slurry samples containing large amounts of gas should be de-aerated before measuring the density. A Fann Deaerator (P/N 206814) is available for optional purchase.
2. Place the base stand on a level surface.
3. Fill the balance cup with the sample. Tap the side of the balance cup several times to break up any entrained air or gases. Put the lid onto the balance cup, pushing it downward while slowly rotating until it is firmly seated. Make sure that some of the sample is forced out through the vent hole in the lid. (This action helps release entrained air or gas.)
4. Wipe off any sample from the outside of the balance cup and lid.
5. Fit the knife edge of the balance arm into the fulcrum, and then move the rider along the arm to balance the assembly. The mud balance is horizontal when the level bubble fluctuates an equal distance to either side of the center line.

6. Take the reading from the side of the rider where the arrow points. Report this measurement to the nearest 0.1 lb/gal, 0.5 lb/ft³, or 0.01 g/cm³ (equivalent to the specific gravity).
7. Empty the sample cup. Clean and dry the entire assembly as soon as possible.

4.2 Calibration

The mud balance calibration can be checked using water. At 70°F (21°C), fresh water should give a reading of

- 1.00 specific gravity
- 8.34 lb/gal
- 62.3 lb/ft³

This position on the balance arm is marked with a longer scale division line or water line. Small amounts of mud on the balance arm or rider can cause incorrect readings. If the mud balance does not give correct measurements for fresh water, then you should thoroughly clean the instrument.



A new lid on the balance cup can cause the mud balance to be out of calibration. Check the calibration whenever you use a different lid, and if necessary, recalibrate the instrument using the new lid.

If the mud balance continues to give incorrect measurements for fresh water after cleaning, you should recalibrate it. To recalibrate, remove the screw cover from the weight adjustment compartment, and then add or remove lead shot until the mud balance is correctly calibrated.

5 Sand Content Measurement

Sieve analysis is the preferred method for measuring sand content because the test is reliable and the equipment is simple.

The volume of sand, including the spaces between the grains, is expressed as a percentage of the slurry volume. The value read from the measuring tube is reported as % by volume.

Equipment:

- Sand Content Screen
- Sand Content Funnel
- Sand Content Tube
- Wash Bottle

5.1 Procedure

1. Fill the measuring tube with drilling fluid to the line labeled **Mud to Here**, and then use the wash bottle to add clear water to the line labeled **Water to Here**. Place your thumb over the mouth of the tube and shake the tube vigorously.
2. Pour the mixture onto the screen. Continue adding water to the tube, shaking, and pouring the contents onto the screen until all the drilling fluid sample has been washed from the tube.



Do not stir or manually force the mixture through the screen. Tapping the side of the screen holder while pouring the mixture onto the screen will help the mixture pass through the screen.

3. Using the wash bottle, spray water onto the screen to wash away the remaining drilling fluid and shale particles until only sand is left on the screen.
4. Fit the large end of the funnel over the top of the screen holder. Then slowly invert the screen and funnel assembly, fitting the funnel tip into the mouth of the glass measuring tube.

5. Using a fine spray of water from the wash bottle, wash the sand from the screen through the funnel into the glass measuring tube. Let the sand settle.
6. Note the quantity of sand that has settled, and using the scale, determine the percentage of the total mud volume that is sand. Report this value as % by volume sand.



If other coarse solids or lost circulation material (LCM) is retained on the screen, report this information.

6 pH Measurement

1. Dip the pH strip into the slurry sample.
2. Remove the pH strip and read it while the strip is still moist.
3. Observe the four color squares and compare the changes with the chart on the container.
4. Record the pH to the nearest 0.5 pH.



The pH strip may be washed with deionized water to remove any residual drilling fluid which could make color determination difficult.

7 Water Hardness Measurement

1. Dip the test strip into the slurry sample.
2. Remove the test strip and compare it to the chart on the container.
3. Record the water hardness as CaCO₃ grains per gallon or mg/L.

8 Instrument Care

After each use, wash dirt or slurry from the entire assembly and thoroughly dry.

Carefully and thoroughly clean and dry the sand content screen.

Refill the wash bottle.

The Marsh funnel viscosity readings are computed using the exact diameter of the brass outlet at the bottom of the funnel. If this outlet becomes bent, flattened, or otherwise distorted, the readings will be inaccurate.

Small amounts of slurry on the mud balance arm or rider can cause incorrect readings.

9 Parts List

Table 9-1 Slurry Test Kit, Model 833, P/N 210392

Part No.	Description
206037*	Metal Dial Thermometer, 0-220° F
206044*	Digital Thermometer (Fahrenheit and Centigrade)
206769	Mud Balance
206884	Marsh Funnel Viscometer, Plastic
206889	Measuring Cup, Plastic
206893*	Measuring Cup, Stainless Steel
206898	Digital Stopwatch
209658	Wash Bottle, 500ml
209661	Sieve, 200 Mesh
209662	Funnel, Sand Content
209663	Glass Measuring Tube
210151	Water Hardness Test Strips
101450380	pH Strips, range 0-14

* Optional items

10 Warranty and Returns

10.1 Warranty

Fann Instrument Company warrants its products to be free from defects in material and workmanship for a period of 12 months from the time of shipment. If repair or adjustment is necessary, and has not been the result of abuse or misuse within the twelve-month period, please return, freight prepaid, and correction of the defect will be made without charge.

Out of warranty products will be repaired for a nominal charge.

Please refer to the accompanying warranty statement enclosed with the product.

10.2 Returns

For your protection, items being returned must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Fann will not be responsible for damage resulting from careless or insufficient packing.

Before returning items for any reason, authorization must be obtained from Fann Instrument Company. When applying for authorization, please include information regarding the reason the items are to be returned.

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