Student's Name

Instructor's Name

Course

Date

Laboratory #2: Introduction to Viscosity (Marsh Funnel)

Objectives

At the end of this lab, you should be able to do the following:

1. Calibrate a Marsh funnel;
2. Compare the funnel viscosity of water with the funnel viscosity of drilling fluids;
3. Measure viscosity based on the concentration of a relative viscosifier;
4. Understand the procedure of batch mixing;
5. Adjust the concentration of a viscosifier as per a required viscosity.

Results

Samples

	Set-Up	**Requirements**
	Calibrate the Marsh funnel	Show the readings: - Time / quart - Temperature(°F)
	400ml Water+ 10, 20, 30 and 40g of Bentonite	Compare the F.V. reading in different Bentonite Concentration.

	Note: Mixing time per batch is 5mins	Use a graph to represent our results.
	Using the Marsh funnel: a. 160sec/quart **Note: Mixing time per batch is 5 mins**	1. Compute for the "x" g of Bentonite to be used to attain the required funnel viscosity reading. **Note: Use 400ml of water per batch**

Results obtained from lab

10g of bentonite

It took 27.95 sec/QT For water to pass through the funnel

20g-32.95sec/QT

30g-52.24sec/QT

<u>Marsh Funnel Viscosity</u>

Equipment

Marsh funnel—a simple device for the routine measurement of viscosity.

Instruments

The Marsh funnel is used for the routine field measurement of the viscosity of drilling mud. The Fann V-G meter is used to supplement the information obtained from the Marsh funnel, particularly with respect to the gel characteristics of the mud. TheV-Gmeters measure the apparent viscosity, plastic viscosity, yield point and gel strengths (initial and timed).

MarshFunnel:

Description

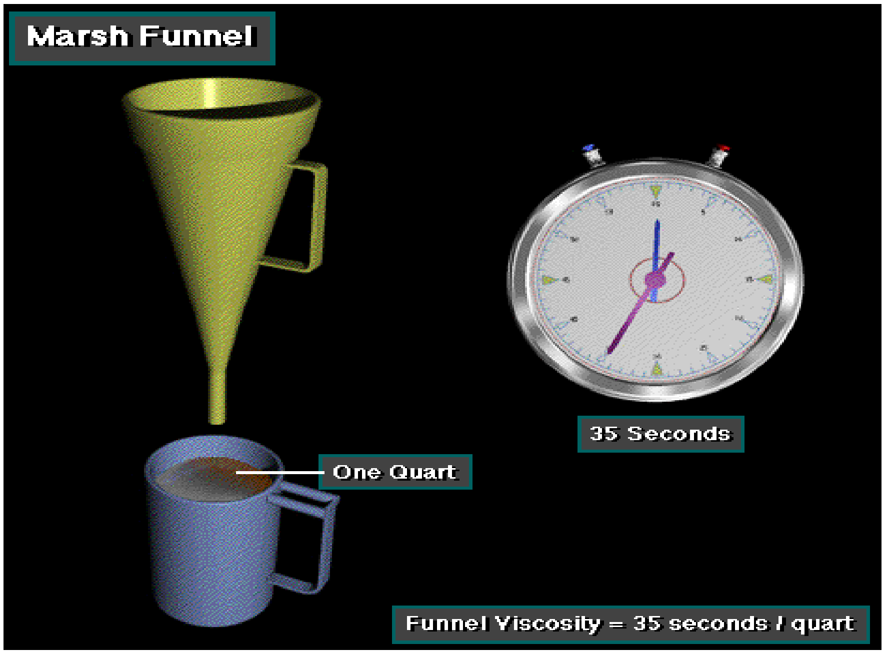
The Marshfunnel (seeFigure2) is 6in. in diameter at the top and 12in long. At the bottom, a smooth-bore tube, 2in. long and having an inside diameter of 3⁄16 in., is attached in such a way that there is no constriction at the joint. A wire screen having 1⁄16-in. openings, covering one-half of the funnel, is fixed at a level of 3⁄4in. below the top of the funnel.

Calibration

Fill the funnel to the bottom of the screen (1,500ml) with fresh water at 70±5°F. The outflow time of 1qt (946ml) should be 26 sec±0.5sec.

Procedure

1. With the funnel in an upright position, cover the orifice with a finger and pour the freshly collected mud (sample-4) through the screen into a clean funnel until the fluid level reaches the bottom of the screen (1,500ml).
2. Immediately remove the finger from the outlet and measure the time required for the mud to fill the receiving cup to the 1-qt mark on the cup.
3. Report the result to the nearest second as Marsh funnel viscosity. Report the fluid temperature in degrees Fahrenheit or Centigrade.


Marsh Funnel
35 Seconds
One Quart
Funnel Viscosity = 35 seconds / quart

Simulated Results (503)

	Mass,g		Volume discharge	Time,sec
Water, ml	Bentonite	Flowzan	946ml or 1 quart	
400	-	-	946	A = 0
400	5	-	946	B = 5
400	10	-	946	C = 10
400	15	-	946	D = 15
400	20	-	946	E = 20
400	25	-	946	F = 25
400	30	-	946	G = 30
400	35	-	946	H = 35
400	40	-	946	I = 40
400	-	0.25	946	29.87
400	-	0.5	946	41.20
400	-	0.	946	93.71

		75		
400	-	1	946	149.34
400	-	1.25	946	257.46
400	-	1.5	946	513.71
400	-	1.75	946	792.25
400	-	2	946	1166.70

A. Calculate and determine the results from A–I.;

Mass flow rate

Qd = Vt

T = Qd/V = Qd + m / V = 1000+m / 1000

A = 1000 + 0 / 1000 = 0

B = 1000 + 5 / 1000 = 5

C = 1000 + 10 / 1000 = 10

D = 1000 + 15 / 1000 = 15

E = 1000 + 20 / 1000 = 20

F = 1000 + 25 / 1000 = 25

G = 1000 + 30 / 1000 = 30

H = 1000 + 35 / 1000 = 35

I = 1000 + 40 / 1000 = 40

B. Evaluate the data based on the actual and predicted results;

The actual results made it apparent that;

For 10g of bentonite, it took 27.95 sec/QT for water to pass through the funnel

20g-32.95sec/QT

30g-52.24sec/QT

Clearly, the actual results are much higher than the predicted ones stemming from the calculations done. It follows that the difference may be due to the fact that experimental data is poised to have some degree of errors. For instance, there may be a parallax error when reading the water level in the containers. There may also be human error in the process of starting and stopping the watch used to measure time in the process.

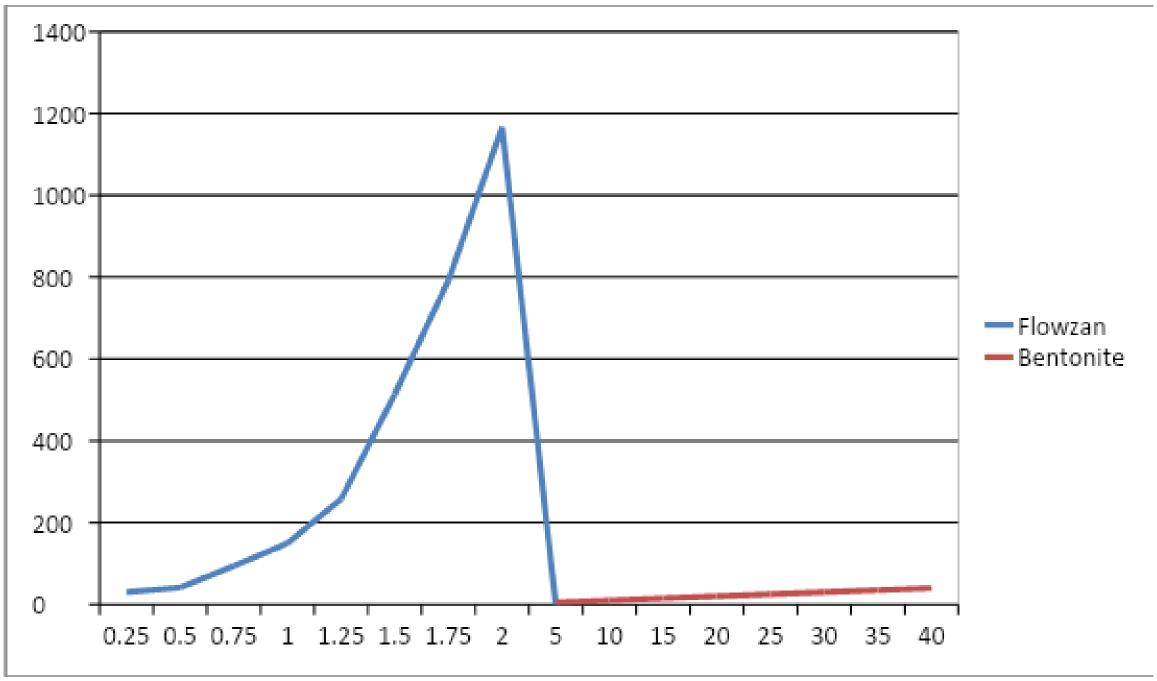
C. Compare the results of Bentonite vs Flowzan.

Bentonite Mass (g)	Time (s)
0	0
5	5
10	10
15	15
20	20
25	25

30	30
35	35
40	40

Flowzan Mass (g)	Time (s)
0.25	29.87
0.5	41.20
0.75	93.71
1	149.34
1.25	257.46
1.5	513.71

1.75	792.25
2	1166.70



It is evident that Flowzan tends to immensely reduce the amount of time taken for the liquid to pass through the funnel as compared to Bentonite. A much smaller mass change of Flowzan causes a huge degree of change in the viscosity of the liquid. On the other hand, a change in the mass of Bentonite has a less significant impact on viscosity relative to that of Flowzan. It may be concluded that Flowzan is more viscous than Bentonite.