fann®

Model 280 Rheometer
Instruction Manual

Part No. 206989 Rev. E

Printed in USA

NOTE:
Fann reserves the right to make improvements in design, construction and appearance of our products without prior notice.

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DESCRIPTION

The Model 280 Rheometer is a manually operated, rotational viscometer specifically designed for routine field testing of drilling fluids. The viscosity in Centipoise (cp) is found by making two subtractions using the dial readings at 600 rpm and 300 rpm. The Gel strength is read directly from the dial in pounds per 100 sq. ft.

SAFETY TIPS

Before releasing the leg lock in preparation for raising the instrument head make sure the head of the Rheometer is steadied with the other hand. The Rheometer head may jump upward and hit the operator in the face or damage the telescoping mechanism if not restrained.

When pressing the head of the Rheometer downward to the transport position make sure hands are not on top of the base where they could be pinched between the sleeve and the base.

Always support the instrument with one hand while turning the crank with the other. If not, it is possible for the instrument to slip on the bench resulting in spillage of the sample fluid and if the sample fluid is hot, burns could result.

RHEOMETER OPERATION

The Rheometer usually will be in the transport mode when it is to be used. Refer to Figure page 6 for parts described in the following procedure.

A. Prepare the Rheometer for use:

1. Loosen the Leg Locknut while restraining the instrument head from raising, then allow the head to raise extending the legs. Remove the Sample Cup from the base.

2. Assemble the Dust Shield onto the Bob Shaft with the flange end up and hold in place.

3. Assemble the Bob (6) onto the Bob Shaft by screwing it clockwise until it is tight against the Dust Shield.

4. Assemble the Sleeve onto the Rotor by screwing it clockwise. Make sure the threads in the Sleeve and on the Rotor are clean so the Sleeve will shoulder on the Rotor by hand tightening.

   NOTE: If the Rheometer has not been used recently, the Rotor speeds should be verified. Refer to Rheometer Calibration Tests.

5. Fill the Sample Cup to the line scribed in it with a recently agitated sample of the fluid to be tested.

6. Set the cup in the forward cup alignment holes in the base.

7. Lower the instrument head until the sleeve is immersed exactly to the line scribed on it, then tighten the Leg Locknut.

B. Viscosity and Yield Point Measurement.

1. Set the Speed Shift Lever to the stirring speed position (all the way down) and turn the crank at a comfortable speed for about 15 seconds.

2. Set the Speed Shift Lever in the detent at the 600 rpm position (center position) and continue cranking. Wait for the dial to read a steady value. Record this value as the 600 rpm reading.

3. Set the Speed Shift Lever to the 300 rpm position (all the way up) and continue cranking. Wait for the dial to read a steady value. Record this value as the 300 rpm reading.

4. Determine the Plastic Viscosity and Yield Point of the sample fluid as follows:

   600 rpm reading - 300 rpm reading = plastic viscosity in centipoise (cp).

   300 rpm reading - plastic viscosity = yield point in lb/100 ft^2.

C. Gel Strength Measurement.

1. Set the Speed Shift Lever to the stirring speed position (all the way down) and crank for about 15 seconds then stop cranking.

2. Wait the desired Gelling Time (10 seconds, 10 minutes, etc.); then turn the Gel Knob slowly but steadily clockwise while observing the dial.

3. Record the maximum dial reading before the Gel breaks and allows the dial reading to decrease. This reading is the Gel Strength in pounds per 100 square feet for the Gel Time used.

RHEOMETER CALIBRATION TESTS

These tests are used to determine whether the Rheometer is in calibration and operating properly or is in need of repair.

A. Torsion Shaft Bearings.

Test to verify the torsion bearings are operating properly and no sticking. Operate the Rheometer at 300 rpm with the Rotor and Bob attached but turning in air and not sample fluid. The dial deflection should be less than two divisions. Next, rotate the sleeve slowly as when taking a Gel reading and observe the dial deflection, less than two divisions. If in either test the dial deflection is greater, the Torsion Shaft Bearings are defective and should be replaced.

B. Speed Calibration.

Test the Rheometer for speed calibration. The dial readings are directly related to the rpm of the rotating Sleeve. For correct dial readings it is essential that the instrument operate at 300 ±6 rpm at 600 or ±12 rpm. Check these tolerances as follows:

1. Select a location lighted by fluorescent or neon light operating on 60 hertz current. The closer the light is to the Rheometer the easier it will be to read the speed. The Rotor has 12 holes in it. Refer to Figure Page 4. If the Rheometer Rotor is rotating at exactly 300 rpm or 600 rpm these holes will appear to stand still when viewed in fluorescent light. If the holes appear to rotate clockwise the Rheometer is running slightly fast. If the holes appear to rotate counterclockwise, the Rheometer is running slightly slow. The Rheometer should run slightly fast when rotated without fluid around the Sleeve.

2. Fill the cup to the scribed line with 100 cp calibration fluid. (Part No. 207121).

3. Set the Cup in the front cup alignment holes in the base.

4. Lower the instrument head until the sleeve is immersed in the fluid to the scribed line on the sleeve then tighten the Leg Locknut.

5. Set the Speed Shift Lever to the 300 rpm position (all the way up) then turn the crank until a steady dial reading is shown.

6. Time the number of seconds required for 12 holes to appear to rotate past. This time should be a least 10 seconds.

7. Set the Speed Shift Lever to the 600 rpm position (in the detent, middle position) and turn the crank until a steady dial reading is shown.

8. Time the number of seconds required for 12 holes to appear to rotate past. This time should be at least five seconds.

9. If during either of these tests the holes appear to rotate past faster than the prescribed time, the Rheometer speed must be recalibrated. Repair instructions and a calibration check kit are both available.

C. Torsion spring calibration.

1. Test the Torsion Spring calibration by noting the dial reading at 300 rpm obtained in B-5 test above and noting the temperature of the calibration fluid as the test was run. The dial reading should be the viscosity of the calibration fluid at that temperature. Compare the reading with the viscosity from the chart supplied with the calibration fluid. A deviation of two or more centipoise (two dial divisions) should be considered a defective spring and be repaired.

MAINTENANCE

The Sleeve (5), Bob (6), and Dust Shield should be removed and washed after each test. Unscrew the Sleeve (4) from the Rotor and the Bob (6) from the Bob Shaft, and remove the Bob and Dust Shield. When reassembling these parts, the flange end of the dust shield goes on the shaft first.

CAUTION

SET THE INSTRUMENT UPRIGHT WHEN CLEANING TO KEEP WATER OUT OF THE BEARINGS.

NOTE: IF MORE THAN ONE MODEL 280 RHEOMETER IS USED, DO NOT INTERCHANGE SLEEVES AND BOBS.

To prevent damage to the Rheometer during storage and transport, always remove the Sleeve (5), Bob (6) and Dust Shield from the Rheometer and close the telescoping legs to the full down position and lock the Leg Lock Screw. Place the Rheometer in its carrying case if one is available, or in its compartment in part of a portable test laboratory.

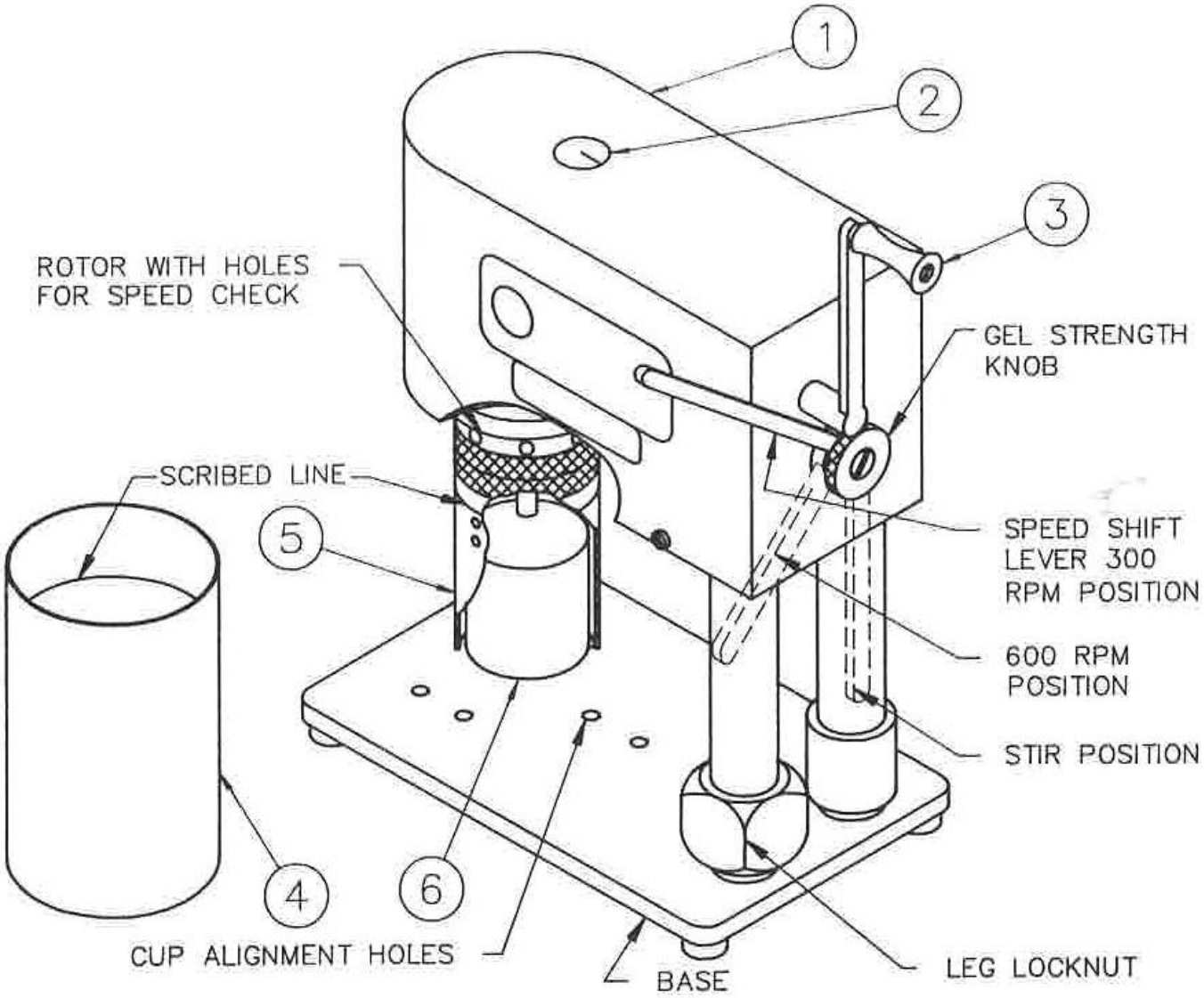

Fig. 1
Model 280 Rheometer

SPECIFICATIONS

DRIVE	HAND CRANK W/SLIP CLUTCH
VISCOSITY SPEEDS	300 RPM W/SHIFT LEVER UP 600 RPM W/SHIFT LEVER CENTER STIR (ABOVE 600) W/SHIFT LEVER DOWN
GEL STRENGTH	ROTATE GEL KNOB
DIMENSIONS	RHEOMETER - 8.5 in (21.6 cm) x 6.5 in (16.5 cm) x 4 in (10.1 cm) CASE - 15 in (38.1 cm) x 9.5 in (24.1 cm) x 4.5 in (11.4 cm)
WEIGHT	RHEOMETER - 6.5 lbs (3 kg) CASE - 3.4 lbs (1.5 kg) RHEOMETER W/CASE - 9.9 lbs (4.5 kg)

PARTS LIST

ITEM NO.	PART NO.	DESCRIPTION
1	206986	COVER
2	206987	JEWEL
3	207025	CRANK
*	207026	CALIBRATION CHECK KIT
4	207030	CUP
5	207031	SLEEVE
*	207032	DUST SHIELD
6	207033	BOB
*	207121	FLUID, CALIBRATION 100cp
*	207041	CARRYING CASE

* Part not shown in drawing.

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 12-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

Return of Items

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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