OFITE®

DRILLING FLUIDS EQUIPMENT

For over 30 years OFI Testing Equipment (OFITE) has provided instruments and reagents for testing drilling fluids, well cements, completion fluids, and wastewater. In addition to these product lines we also offer a range of instruments for core analysis. From our manufacturing facility in Houston, TX we provide customers all over the world with quality products and exceptional service.

Our drilling fluids product line includes innovative designs such as the Model 900 Viscometer, which showcases our ability to develop new technology to meet customer and industry demands. We also offer Retorts, Aging Cells, Roller Ovens, Mud Balances, Filter Presses, and all other instruments required to evaluate drilling fluid properties according to API Recommended Practice 13B-1 and 13B-2.

As an independent manufacturer and supplier, OFITE has one priority, our customers.

EP (Extreme Pressure) and Lubricity Tester

The EP and Lubricity tester from OFITE is a high-quality instrument used to measure the lubricating quality of drilling fluids, provide data to evaluate the type and quantity of lubricating additives that may be required, and predict wear rates of mechanical parts in known fluid systems.

EP (Extreme Pressure) Test
This test produces an indication of the film strength of the fluid being tested by applying a measured force to a torque-sensitive bearing cup with the torque arm. The EP test is typically run at a high shear rate, 1,000 RPM, with fluid pressures ranging from 5,000 to 100,000 PSI between the steel surfaces.

Lubricity (Surface to Surface Drag) Test
The more common lubricity test measures fluid resistance of various lubricating additives. For the standard lubricity coefficient test, 150 in-pounds of force (the equivalent of 5,000 to 10,000 PSI pressure on the intermediate fluid) is applied between two hardened steel surfaces, a block, and a ring rotating at 60 RPM.

Features

- Digital Control - The digital control board provides more accurate data than older, analog methods.
- Automatic Speed Control - The motor automatically increases torque to maintain a constant speed when force is applied to the ring and block. Manual speed adjustments are unnecessary.
- User-Friendly Interface - The simple, intuitive interface makes testing quick and easy. Functions include preset speeds (60, 200, 600, and 1000 RPM), manual speed control, and torque zeroing.
- Optional software* records torque reading and temperature with respect to time.
- Maximum Speed - 1,000 RPM
- Maximum Torque - 600 inch-pounds

**Software available on #112-00-T, #112-00-1-T, #112-00-C, and #112-00-1-C only.*

Technical Specifications and Requirements

- #112-00 115 Volt
- #112-00-1 230 Volt
- #112-00-T With Data Acquisition, 115 Volt
- #112-00-1-T With Data Acquisition, 230 Volt
- #112-00-C With Heat Cup, Ultrasonic Cleaner, Data Acquisition, and Carrying Case, 115 Volt
- #112-00-1-C With Heat Cup, Ultrasonic Cleaner, Data Acquisition, and Carrying Case, 230 Volt

Specifications

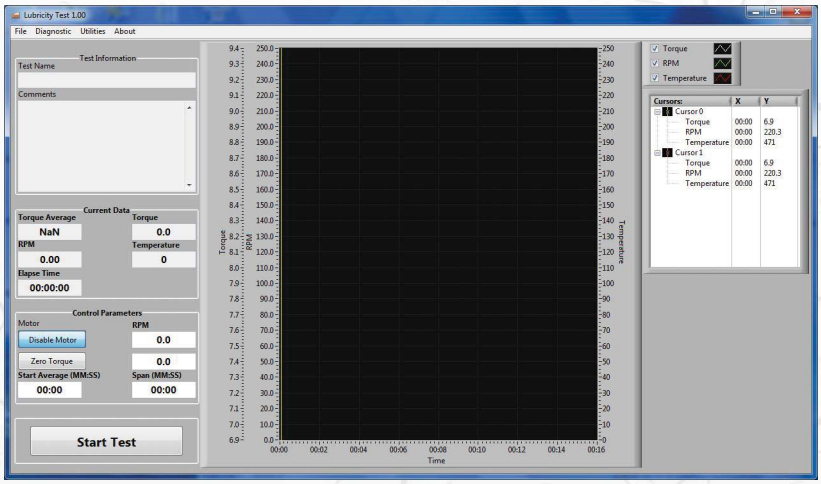
- Belt-Driven Motor: ½ horsepower, 90 Volt DC, 5.5 Amps
- Maximum 600 inch-pounds of torque
- Shear rate: 1,000 RPM Maximum
- Fluid Pressure Range: 5,000 to 10,000 PSI (34,500-69,000 kPa)
- Size: 19" × 15" × 14" (48.3 × 38.1 × 35.6 cm)
- Weight: 56 lb (25.4 kg)
- Crated Size: 22" × 20" × 21" (56 × 51 × 53 cm)
- Crated Weight: 95 lb (43 kg)
- Power Requirement: 115 / 230 VAC, 50/60 Hz

Optional Items

- #111-01 Padded Transport Case
- #111-13 Grinding Compound, Fine, 16 oz can
- #111-14 Grinding Compound, Coarse, 16 oz can
- #144-91 Disposable Latex gloves
- #206-06 Deionized Water 1 gal (3.785 L)
- #280-31 Acetone (UN1090), 16 oz (500 ml)

Data Acquisition Features*

- Records torque reading and temperature with respect to time



Software available on #112-00-T, #112-00-1-T, #112-00-C, and #112-00-1-C only.

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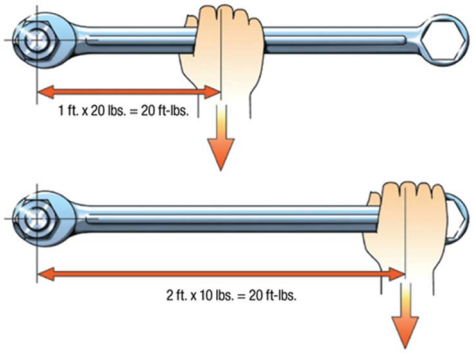
Introduction

When there is relative motion between two contacting bodies, frictional forces that resist motion always come into play. Frictional resistance to rotation of the drill string is called torque, and is especially enhanced when drilling a deviated hole. Serious casing wear occurs in deep and ultra-deep wells. The main influential factor of casing wear is rotation of the drill pipe, horizontal drilling, and tripping in and out of the hole. Many materials, such as Graphite, Fine Mica, and Diesel or Crude Oil, have been used to improve lubricity.

Since evaluation of the various materials cannot realistically be done on the drill string, a lubricity test was designed to simulate the speed of rotation of the drill pipe and the pressure with which the pipe bears against the wall of the bore hole. The OFITE combination EP (Extreme Pressure) and Lubricity Tester is a high-quality instrument used to measure the lubricating quality of drilling fluids, provide data to evaluate the type and quantity of lubricating additives that may be required, and predict wear rates of mechanical parts in known fluid systems.

Inch – Pounds

Torque is defined as the measure of force applied to produce rotational motion (usually measured in foot-pounds). Torque is determined by multiplying the applied force by the distance from the pivot point to the point where the force is applied. Inch-pounds × 0.0833 = Foot-pounds



Torque is measured in units of distance multiplied by force. A force of 10 lb. – acting through a distance of 2 feet – produces exactly the same torque, 20 ft-lb., as a force of 20 lb. – acting through a distance of 1 foot.

Description

Lubricity (Surface to Surface Drag) Test

The more common lubricity test measures fluid resistance of various lubricating additives.

For the standard lubricity coefficient test:

Rotation Rate: 60 RPM

150 inch-pounds of force (the equivalent of approximately 600 PSI (4,137 kPa) pressure on the intermediate fluid) is read directly from the gauge on the torque arm and applied between two hardened steel surfaces:

a. Stationary Block
b. Rotating Ring

Expected life of the ring and block: When they can no longer be calibrated to a torque reading of 34 ± 2 after three runs with Deionized Water (See calibration section page 40).

Friction is measured as the coefficient of friction (μ). The coefficient of friction between two solids is defined as the frictional force of the load or the force perpendicular to the surfaces. The coefficient of friction is independent of the apparent areas of contact as long as this area is not so small as to break through the film. The force to overcome friction will be the same for a small area as for a larger area. The force, F, required to slide the block and the ring surfaces across each other at a given rate is measured by the power required to turn the test ring shaft at a prescribed rate of revolutions per minute.

$$\text{The Coefficient of Friction, } \mu = \frac{\text{Meter Reading}}{\text{Load or Force}}$$

EP (Extreme Pressure) Test

This test produces an indication of the film strength of the fluid being tested by applying a measured force to a torque-sensitive bearing cup with the torque arm.

The EP test is typically run:

At a high shear rate, 1,000 RPM, with fluid pressures ranging from 30,000 to 100,000 PSI (206,820 - 689,400 kPa) between the steel surfaces.

Increasing pressure in inch-pounds of force is applied until a seizure or pass is obtained.

Expected life of the ring and block: 8 tests per block (two on each face).

Automated Control and Data Acquisition

The unit is designed to run manually via the digital control panel or using Windows PC. An RS232 interface exists between the computer and the machine. Test data is stored in a comma-delimited text file suitable for import into commercially available spreadsheet software if more detailed analysis is required. The bob rotation can be controlled by the personal computer.

Features

Digital Control

- The digital control panel provides more accurate data than older analog models.
- The rotational speed (RPM) is automatically maintained as the torque is increased, resulting in more accurate data collection and is less labor intensive for the technician.

User-Friendly Interface

The simple, intuitive interface makes testing quick and easy.

Functions include:

- Pre-Set Speeds – 60, 200, 600 and 1000 RPM
- Manual Speed Control
- Zeroing – Torque and Time
- Maximum Speed: 1,000 RPM
- Maximum Torque: 600 inch-pounds

Specifications

- Belt-Driven Motor: ½ HP, 90 Volt DC, 5.5 Amps
- Maximum 600 inch-pounds of torque
- 1,000 RPM Maximum
- Size: 19" × 15" × 14" (48.3 × 38.1 × 35.6 cm)
- Weight: 56 lb (25.4 kg)

Components

Included:

#111-02-01	Test Ring for Lubricity Test
#111-04-01	Test Block for EP Test
#111-06-01	Test Ring for EP Test
#111-08-01	Test Block for Lubricity Test
#111-09	Sample Cup
#111-10	Torque Wrench
#111-16	Service Wrench, ¾"
#111-17	Service Wrench, 1¼"
#111-18	Combination Wrench, 15⁄16"
#111-19	Grinding Compound, Silicone

Replacement Parts:

#111-00-006	Belt, Timing
#111-00-007	Pulley, Timing 36 Teeth
#111-00-016	Motor, ½ HP, 5.5 Volts, Fan Cooled
#111-00-35	Retainer Nut
#111-00-37	Socket Extension
#111-00-38	Test Block Holder
#111-00-54	Assembly, Top Pulley Belt Guard
#111-00-55	Assembly, Cup Holder
#141-18	Thumb Screw
#164-32	Male Connector for Power Cable (230 Volt Only)
#172-09	Fuse, 10 Amp

Optional:

#111-01	Padded Transport Case
#111-11	7× Measuring Magnifier with Inch Scale
#112-50	Heat Cup
#152-59	Ultrasonic Cleaner, 16 oz, 115V

Top Row (Left to Right): Retainer Nut, Lubricity Test Ring, Lubricity Test Block
Bottom Row: EP Test Block (Left), EP Test Ring (Right)

#111-00-SP Spare Parts Kit

Part Number	Description	Quantity
#111-02-01	Test Ring for Lubricity Test	6
#111-04-01	Test Block for EP Test	6
#111-06-01	Test Ring for EP Test	6
#111-08-01	Test Block for Lubricity Test	6
#111-09	Sample Cup, stainless steel	1
#111-11	Measuring Magnifier, 7×, with scale	1
#111-13	Grinding Compound, Grit 280, Fine, 16 oz	1
#111-14	Grinding Compound, Grit 120, Coarse, 16 oz	1

Spare parts listings are intended to be used as a reference for future purchases. Everyone's consumable requirements will be different, and replacement quantities needed will depend upon the number of tests performed on a daily and/or weekly basis.