



Fann Instrument Company has been the predominate supplier of instruments for drilling fluids analysis since 1939. Their instruments are used in research laboratories and on drilling rigs throughout the world.

Fann Instrument Company specializes in the design and manufacture of instrumentation for measuring the physical and chemical properties of various fluid properties and especially the measurement of flow and viscosity. Their product line is the most comprehensive offering of instruments and accessories, test kits, and portable laboratories for testing; drilling fluids, completion fluids, fracturing fluids, oil-field cements, and industrial slurries. Fann Instrument Company also provides reagents, supplies, and replacement parts through a worldwide distribution system.

Many of the instruments and test kits are designed to conform to the testing standards established by the American Petroleum Institute (API) and published in API SPEC 10, API RP 10B-2, API SPEC 13A, API RP 13B-1, 13B-2, 13D, 13I, 13J, and 13K, and they are suitable for field and laboratory use. Some instruments are designed to meet the requirements of the American Society for Testing and Materials (ASTM) as well as other technical specification groups.

Fann is recognized as a leading supplier of sophisticated viscometers and rheometers, which are used in many industries for the measurement of absolute dynamic viscosity of all types of fluids. Fann Direct Indicating Viscometers have been in continuous production for over 60 years. The basic designs have been proven in years of service to be rugged, accurate and dependable. Manufacturing processes have been upgraded to improve productivity and to reduce delivery time while keeping prices and quality in line.

No one instrument will solve all fluids measuring problems. The Fann product line includes over fifty different instruments and test kits for fluid analysis, including twelve different instruments for viscosity measurement and characterization of the rheological attributes of fluids.

## **FANN FAMILY OF VISCOMETERS AND RHEOMETERS**

### Orifice Type Viscometers



**Marsh Funnel Viscometer** is a simple orifice type viscometer, which is used for routine checks of mud viscosity on drilling rigs. It is provided in a rugged plastic construction and is used to measure the relative viscosity of drilling mud compared to the outflow time of water.

### Direct Reading Viscometers/Rheometers



**Fann Model 35 Viscometers** have been in continuous production for over sixty years. The basic designs have been proven in years of service to be rugged, accurate and dependable. Manufacturing processes have been upgraded to improve productivity and to reduce delivery time without compromising our quality. Fann's Model 35 Viscometer is the recognized “*standard of the industry*” for measurement of drilling fluid viscosity.

Model 35 Viscometers are Direct Reading, Couette type, coaxial cylinder viscometers which, are used under laboratory and field conditions for determining the rheological characteristics of materials under prescribed conditions of shear stress (torque) and shear rate (RPM).

Model 35 Viscometers are available in 6-speed and 12-speed models. All can be used with a wide assortment of accessories including interchangeable bobs, rotors, torsion springs, temperature control vessels and a calibration kit.



The Model **280 and 286 Rheometers** are also Direct Reading, Couette type, Coaxial Cylinder rheometers. The Model 280 is a two speed, hand-cranked version, while the Model 286 is a variable speed version with a digital readout for RPM.

#### High Temperature, High Pressure Viscometers



The **Model 50SL Viscometer** is a unique coaxial cylinder type viscometer, which has measuring capability up to 500°F and 1,000 PSIG. It has internal capability for shear rate and temperature programs.



The ***ix77 Rheometer*** is a High-Temperature, High-Pressure, coaxial cylinder type Rheometer capable of temperatures up to 600°F and pressures up to 30,000 psig. This unit is Modeled after an instrument developed by Sandia National Laboratories.

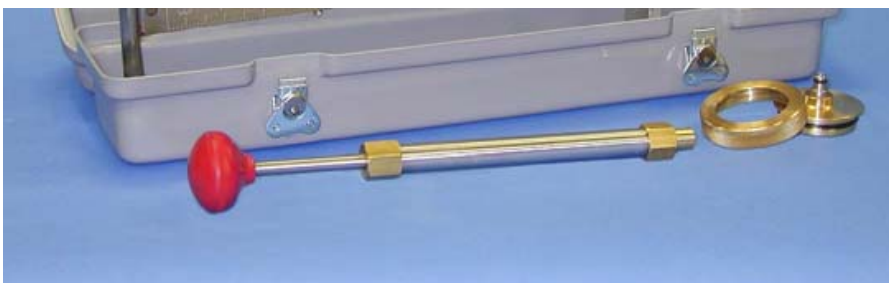
## **CEMENT TESTING EQUIPMENT**



**HPHT Consistometer Model 275** High-Pressure, High-Temperature Consistometer is a device used to measure cement slurry viscosity or consistency under elevated pressure and temperature conditions. Its primary function is to determine the maximum available pumping time of a cement slurry before the slurry reaches an un-pumpable consistency before setting.



**Ultrasonic Cement Analyzers (UCA)** The Ultrasonic Cement Analyzer provides a non-destructive method for determining the relative strength development of a cement sample under down-hole temperature and pressure conditions. The theory of operation is based on the correlation between ultrasonic pulse velocity in the cement sample and its compressive strength.



**Pressurized Mud Balance** The TRU-WATE Balance is an instrument for measuring the absolute density of a fluid sample. With the TRU-WATE Balance, the density of a fluid sample, such as cement slurry, can be measured in a fixed volume sample under pressure.

**Fluid Loss Testing Devices**

**LPLT (Low Pressure Low Temperature) Filter Presses** are used for the determination of the filtration characteristics of cement slurries, and fracturing fluids. Low Pressure Filter Presses are available in a variety of configurations to fill every need for field or laboratory use.

**HPHT (High Pressure High Temperature) Filter Presses** have been designed with the flexibility to enable the use of end caps, heating jackets, cells, screens and pressuring assemblies, in an assortment of configurations and sizes to meet all current API standards for testing.



**Stirring Fluid Loss** Measures fluid loss of cement slurries, drilling fluids, and fracturing fluids under various high-temperature and high-pressure conditions. Slurry preconditioning and testing are performed in the same cell, eliminating the need to cool or transfer hot test samples.



**Wettability Tester** The Model C1001 Wettability Tester is designed specifically for evaluation of spacers and/or pre-flushes designed to water-wet the surfaces that the cement is expected to bond to after said surfaces have been exposed to non-aqueous fluids, specifically oil and synthetic-based drilling fluids. Both the apparent wettability of various mud/spacer interface volumes and the apparent wettability of just the spacer system against oil-wetted surfaces can be evaluated.

## **FILTRATION DEVICES AND SYSTEMS**

**API (Low Pressure Low Temperature) Filter Presses** used for the determination of the filtration and wall building characteristics of drilling muds, cement slurries, and fracturing fluids. Low Pressure Filter Presses are available in a variety of configurations to fill every need for field or laboratory use.

**HPHT (High Pressure High Temperature) Filter Presses** have been designed with the flexibility to enable the use of end caps, heating jackets, cells, screens and pressuring assemblies, in an assortment of configurations and sizes to meet all current API standards for testing.

The **Permeability Plugging Apparatus (PPA)** is designed to provide accurate simulation and measurement of down-hole static filtration. This 5,000 psig rated PPA is very useful in predicting how a drilling fluid can form a permeable filter cake to seal off depleted/under pressure intervals.



The **Model 90 Dynamic Filtration System** is the industry's first truly dynamic filtration system for conducting filter cake formation and permeability analysis for drilling fluids optimization. The Model 90 can be heated to 500°F and pressurized to 2,500 psig to provide the closest possible simulation of down-hole conditions.

Ceramic filters in various porosities and permeabilities are available for use in conducting all manner of test including the **Permeability Plugging Test**.

## **OTHER INSTRUMENTS**



Electrical Stability Tester: The **Model 23D ES Tester** is designed for field or laboratory use to indicate the relative strength of emulsions having a continuous oil phase.



Resistivity Meters provide a direct readout of resistivity of drilling muds, filtrates, filter cakes, and slurries according to API procedures. The **Model 88C Resistivity Meter** features solid state electronics, a digital readout and a built-in temperature probe.



The **Model 653** provides a direct analog readout of resistivity of drilling muds, filtrates, filter cakes or slurries according to API procedures in three ranges: 2, 20, or 200 ohm meters.



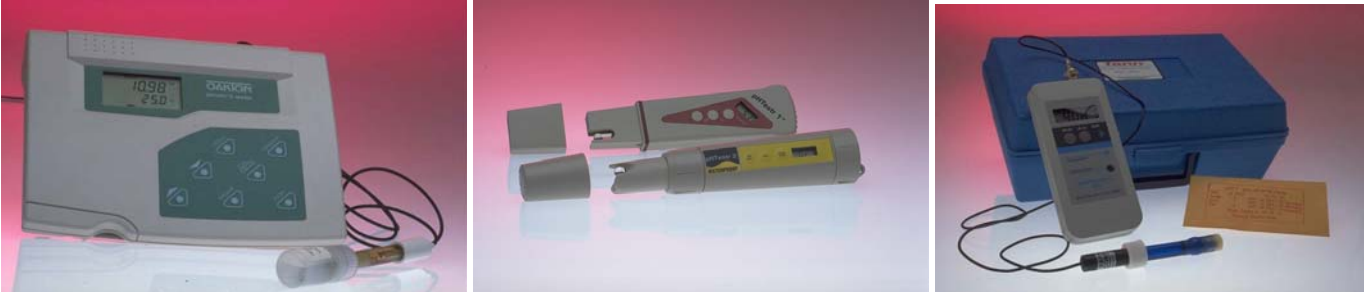
**Mud Retorts & Mud Stills:** Retorts and Mud Stills suitable for evaluation liquids and solids content are available. These kits are offered in sizes of 10ml, 20ml, and 50ml. Models are available in 12 volts, 115 volts, or 230 volts.



**Garrett Gas Train:** This test is the standard chemical analysis for determining of hydrogen sulfide in drilling fluids. The Garrett Gas Train also includes the capability for the determination of carbonates in water based fluids.



**Mud Balance:** For the determination of density (mud weight). Density may be expressed as pounds per gallon, pounds per cubic foot, grams per cubic centimeter or as specific gravity.



**pH Determination:** Different styles of pH meters are available including an inexpensive portable pocket meter. A wide assortment of paper and plastic strips, buffer solutions, and replacement

probes are also available.

### **TEST KITS**

Approximately twenty different test kits are available. Each kit contains the reagents, lab ware and supplies necessary for a particular test or determination in the field. These kits include the following:

Alkalinity, Aniline, and Brine Testing, Calcium-Magnesium Ion, Cation Exchange Capacity, Chloride and Alkalinity and Water Hardness, Corrosion Equipment, Hydrogen Sulfide (H<sub>2</sub>S) Detection, Methylene Blue Adsorption (CEC), Kit Phosphate Potassium Ion, Sand Content, Shale Density, Sulfide Test, Zinc Carbonate

### **MUD LABORATORIES**

A mud laboratory is a collection of instruments, accessories and test kits, usually with some special packaging and some special supplies, to provide all of the test equipment necessary to perform a complete field analysis of a drilling fluid. Particular configurations or grouping of test equipment are designed to meet the needs of mud engineers under various field conditions. Our mud laboratories include:

#### 1. Porta-Lab™ Kits



#### 2. Rig Laboratory Kits



#### 3. Oil Mud Test Kits

#### 4. Pilot Test Kit



#### 5. Basic Mud Testing Kit



## 6. Slurry Testing Kit

### ***REAGENTS, SUPPLIES AND REPLACEMENT PARTS***

A complete stock of high purity analytical chemicals and prepared reagents are provided as replacements for test kits and mud laboratories. In addition, we maintain an inventory of glass and plastic lab ware and consumable supplies such as test papers and filter papers for instruments and test kits. Fann manufactures and maintains an inventory of spare parts and replacement parts for all models of instruments which continue to be used in the field.

### ***REPAIR AND SERVICE***

Factory trained technicians are available for repair and service of Fann testing equipment. Our repair department is structured for fast turnaround of your equipment with original factory parts. Telephone consultation for troubleshooting of your equipment by your technicians is also provided.

### **FANN'S RESEARCH OBJECTIVES**

Our ongoing *Research and Product Development* program is intended to preserve the company's strong position as the leading supplier of viscometers and rheometers to the petroleum production industry and to expand its role as a manufacturer and supplier of other instruments and test kit for fluids analysis.

Sixty-Five years of R & D and continuous production has led to the design of sophisticated instrumentation used for laboratory research, and highly efficient, portable kits used on remote rig sites and other field locations. The basic designs have been proven in years of service to be rugged, accurate and dependable. Manufacturing processes have been upgraded to improve productivity and to reduce delivery time without compromising our quality.

### **SUMMARY**

Fann Instrument Company has the capability and the knowledge to solve your viscosity measuring problems and other fluids testing problems in the field, in quality control or in the research laboratory.

As the demand for energy continues to increase, so do the complexities of drilling. Fann will continue to develop strategic alliances and partnerships that will provide our customers the benefits of leading edge technology, efficient service, and the highest quality products.