ELECTRICAL STABILITY TESTER (EST)

The Electrical Stability (ES) of an oil based drilling fluid is the property of the material related to its emulsion stability and oil wetting capability. The electrical stability is determined by applying a steadily increasing sinusoidal alternating voltage across a pair of parallel flat plate electrodes submerged in the oil base drilling fluid. The resulting current will remain very low until a threshold voltage is reached. At this voltage conduction between the two electrodes occurs resulting in a rapid increase in current. When this current reaches 61 micro-amps, the value of the peak voltage at this point is measured and is reported as the (ES) value for the drilling fluid or other material.

The ***Fann Model 23D Electrical Stability Tester*** (EST) is a battery powered; portable instrument which meets the criteria outlined above and conforms to the test procedure as described in the ***API RECOMMENDED PRACTICE 13B-2.***

The composition of the oil base drilling fluid controls the absolute magnitude of (ES) in a complex fashion. Several conditions influence the Electrical Stability of a given drilling fluid. The principal ones are:

- Resistivity of the continuous phase (typically oil)
- Conductivity of the non-continuous phase (typically water droplets with dissolved salts)
- Properties of suspended solids
- Temperature
- Droplet size
- Type of emulsifier used
- Dielectric properties of the fluids
- Shear history of the sample

Consequently, interpreting the oil-wet state of a drilling fluid from a single (ES) measurement is not necessarily representative of the drilling fluid. Since so many factors influence the measurement, the absolute magnitude of a single measurement is not very meaningful. It is recommended that several readings be taken to establish a trend. This series of (ES) measurements will reflect a more accurate condition of the drilling fluid on which drilling fluid treatments can be based.

The ***Model 23D EST*** is calibrated in peak volts which is the maximum voltage that the fluid experiences between the two electrodes. Peak voltage may be converted to *Root Mean Square* (RMS) voltage by multiplying the peak voltage by 0.7071.

Parameters of the Emulsion Stability measurement have been standardized with respect to electrode size and spacing of the electrode and current flow deemed as conduction of the fluid. The two electrodes of equal size are spaced 0.155 cm (0.061 inches) apart. The current value considered as conduction is set at 61 micro amps. An alternating voltage of a constant frequency and steadily increasing sinusoidal amplitude is imposed across the electrode. When the fluid between the immersed electrodes starts to conduct, and conduction increases to 61 micro amperes, this automatically stops the voltage ramp and freezes the peak voltage reading. At that point the peak voltage of the alternating field is read out and reported as the dielectric breakdown voltage.

Specifications

Output Frequency ……340 ± 2 Hz
Output wave form……Sinusoidal
Output voltage range…… 0 to 2025 V ± 25 V peak to ground (1432 RMS)
Breakdown peak output current……61 micro-amps
Peak Volts readout…… Digital LCD 4 digit
Voltage ramp rate…… 150 ± 10 V/second
Power supply…… Four, 9-Volt alkaline batteries
Battery life…… Approximately 500 tests
Dimensions…… 9 X 7.9 X 3.5 in. (22.9 X 20.1 X 8.9 cm)
Complete Weight…… 4 lbs (1.8 kg)
Accuracy…… Cal. Standard; ± 10 V - sample, ± 3% of reading
Repeatability…… Cal. Standard; ± 5 V - sample, ± 2% of reading
Operating temperature range…… 32° to 122°F (0° to 50°C)

The Fann Model 23D Electrical Stability Tester consist of: Meter, Probe, 4 Batteries, 2 Calibration Resistors, and a Water-Tight Carrying Case

Ordering Information

Item	Part Number
Electrical Stability Tester	**209058**
Parts and Accessories	
Probe with Cable	**208557**
9 Volt Battery	**205643**
Calibration Standard High Range	**209067**
Calibration Standard Low Range	**209068**
Calibration Standard Set	**209066**
Battery Eliminator 115 Volt	**209065**
Battery Eliminator 230 Volt	**209074**

Fann Instrument Company offers a complete line of instruments for use in testing drilling fluids in accordance with the following American Petroleum Institute publications:
API Recommended Practice 13B-1, ANSI/API 13B-1/ISO 10414-1,
API Recommended Practice 13B-2, & API Specification 13A

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