



"Tomorrow's Instruments... Today"™

TAPERED BEARING SIMULATOR TBS 2100E-F VISCOMETER

HIGH TEMPERATURE, HIGH SHEAR RATE VISCOSITY

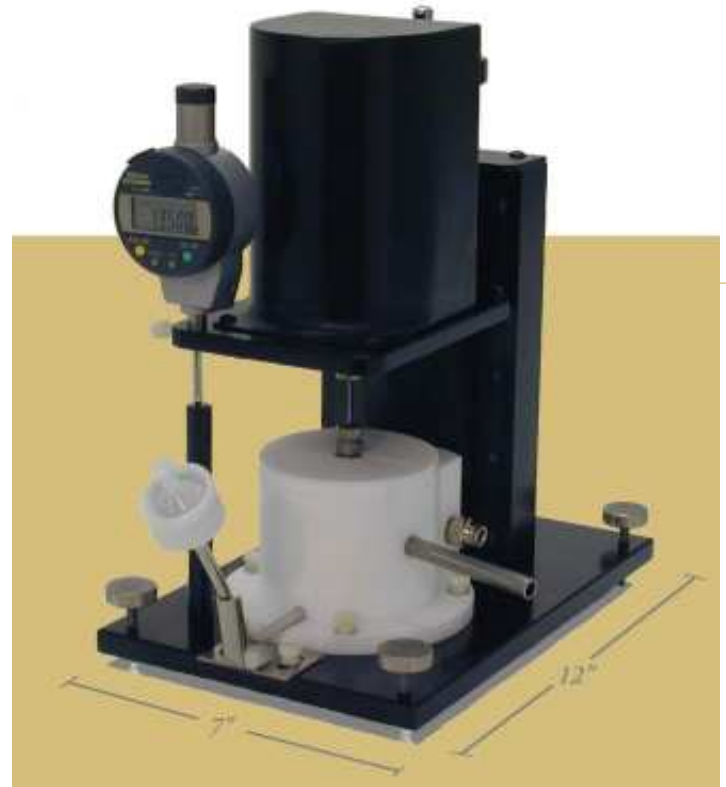
- ASTM D 4683, D 6616, CEC L36-A-90 – required to meet automotive engine oil specifications: SAE J300; ILSAC GF-3, GF-4; API 'SE' thru 'SM'. Basis for 100°C railroad oil viscosity classification.
- Applicable at 40°, 80°, 100°, 150°C, or other temperatures above ambient at which viscosity is less than 30 cP.
- *Viscosity Loss Trapezoid (VLT)* – technique to determine VI Improver polymer type and molecular weight distribution of oils.
- *Fuel Efficiency Index* – determines viscosity-related fuel-efficiency contributions of engine oils.

TBS advantages over any other true, proven, high shear rate viscometer:

- **No external hot oil bath** – simple, thin-film stator heating technique.
- **No special cleaning fluids** – simple, quick & easy total replacement of the completed fluid by the next fluid for test.
- **Full-Automation** if desired – load the samples, push a button, walk away, return to pick up your data -- 56 samples completed in less than 5 **unattended** hours. (*See reverse*)
- Excellent tool for **very high shear rate** testing – up to 10 million sec^{-1} simply by changing the motor speed through 12 stations from 800 to 8000 RPM.
- **Fresh or used** oils can be analyzed.

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The TBS Viscometer was the world's first very high shear rate viscometer, developed and patented in 1979. The TBS remains the bench-mark for high shear rate viscometry and has undergone some notable advances over the years.

Setting new standards for HTHS viscometry of new and used oils, the TBS 2100E-F Viscometer, with its 12-step adjustable speed motor, is now available in a *Fully-Automated* mode of operation. As with previous TBS models, the 2100E-F offers a number of unique advantages, such as constant temperature control, quick "chase-flush" sample exchange, single-point viscosity determination and simple adjustment of shear rate...to name a few. Additionally, the 2100E-F has the added value of complete PC control for automatic calibration and sample injection. The TBS 2100E-F Viscometer brings a new level of operator ease for both research and routine laboratory HTHS testing and dramatically increases worker productivity.

TBS 2100E-F Viscometer

Dimensions	Viscometer: 7"(w) x 12"(d) x 12" (18 x 30.5 x 30.5 cm) Console: 17"(w) x 18"(d) x 6" (43 x 46 x 15 cm)
Weight	Viscometer: 34 lbs. (15.5 kg) Console: 20 lbs. (9 kg)
Voltage	120 VAC, 50/60 Hz (Also available in 220 VAC)
Operating Temperatures	Constant temperature control; ~40C to over 200°C (±0.1°C) Replaceable internal thin-film heating
Shear Rates	Ranges from 100,000 sec ⁻¹ to beyond 7.5 x 10 ⁶ sec ⁻¹ Variable speed motor operates at 12 speeds (800-8000 rpm)
Viscosity Range	DC motor measures oils with viscosities up to 30 cP
Read-out	Torque: In-line Transducer to LED torque meter (0-1 VDC) Temperature: Continuous dual LED reading (actual & set) Automation: Computer R/S 232 communicationn & display
Applications	Organic and water-based fluids, including fresh & 'used' automotive and railroad engine oils, ATFs, hydraulic fluids, inks, and polymeric solutions.
Safety	Over-temperature Cut-off Fuse Programmable Temperature limit CE Marked



TBS 2100E-F Viscometer can be operated in *Manual* mode as shown above. Automation systems can be easily integrated later.



There are two TBS automation packages available -- one with a multi-position AutoSampler and one without. Both packages incorporate a PC for automated rotor/stator adjustments and instrument calibrations.

The *Full-Automation* package with AutoSampler (shown left) utilizes a multi-position Sampler Tray, Injector, PC, and Windows based software. The PC controls the sample injections, rotor/stator adjustments and output of test results in centipoise (cP). Simply load the sample tray, input the requested information and start the automation program. Periodic calibration checks and automatic adjustments ensure precise results throughout the rack of test samples. Using an enlarged (or multiple container) reservoir rack, an ample supply of reference oil are made available.

The *Full-Automation* package without the AutoSampler incorporates the same features as stated above except the operator *manually injects* each fluid as prompted by the PC.

TBS 2100E-F – “Simply the finest, easiest to use, precise high shear rate viscometer available on the market.”



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