

SBT® Direct Cool

Scanning Brookfield Technique™ | Gelation Index

ASTM D5133, D7110

Principle

Low-Temperature Pumpability & Gelation Index:

The Scanning Brookfield Technique™ (SBT®) measures apparent viscosity of fresh, sooted, or highly oxidized engine oils at low temperatures. It determines the susceptibility of engine oils to flow-limited and air-binding responses during slow cooling conditions by providing continuous rheological data over a broad temperature range (+90°C to -45°C).

Viscometric data obtained from this technique provide essential insights regarding the effects of base oils, wax content, VI Improvers, Pour Point Depressants, and other additives on the pumpability and gel structure of engine oils, fuels, and other liquid petroleum products.

History

The harsh winter of 1980 contributed to numerous engine failures from gelled oil. Savant Labs developed the SBT® method to understand structure formation in gelation-susceptible engine oils and the conditions that can lead to catastrophic air-binding failures in engines. Tannas introduced the patented SBT® in the mid-1980s and began manufacturing and marketing liquid cooling bath models. The SBT® has been included in several automotive engine oil specifications since the early 1990's.

Innovation

The SBT® offers the most complete analysis available of the low-temperature rheological properties of engine oils and liquid petroleum products, and is the only technique capable of generating the *Gelation Index*. Tannas has continually improved the test design, functionality and safety. The SBT® Direct Cool incorporates several new patented refrigeration techniques, including the ability to both pre-heat and precisely cool two samples per unit according to the designated test methods.

Features

- The *non*-liquid system eliminates flammable bath mediums from laboratory environments.
- Dual position, independent test sample design.
- Simple vertical alignment and centering of viscometers.

- Small bench-top footprint.
- Self-contained pre-heating: Heats samples to 90°C prior to analysis, while remaining in position.
- Internal automatic dry air system removes moisture that accumulates during the test.
- Programmable Temperature Controller maintains bath temperature within $\pm 0.1^\circ\text{C}$ to -45°C .

The enhanced SBT® Automation Package (w/laptop) offers the capacity to operate up to four, 2-place, Direct Cool units simultaneously and independently.



ASTM D5133
JPI-5S-56-99
SH/T0732

Continuous viscosity measurement of engine oils throughout cooling profile of $1^\circ\text{C}/\text{hour}$ from -5 to -40°C .

Required for :

- ILSAC GF-2 through upcoming GF-6 (A&B) and dexos™ Engine Oil Specifications.
- API 'SL', 'SM' and 'SN' categories for modern engine oils.

ASTM D7110

Continuous viscosity measurement of *used* and *soot*-containing engine oils throughout cooling profile of $3^\circ\text{C}/\text{hour}$ from -5 to -40°C .



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Parts & Accessories

SBT® Direct Cool Instrument:

100800: 208-220 VAC, 60 Hz Power

100900: 220 VAC, 50 Hz Power

ASTM D5133 & D7110:

100750: Tannas SBT2010 Automation Package

100854: SBT® Direct Cool Viscometer (TAV-III)

160022: SBT® Direct Cool Stator

160021: SBT® Direct Cool Adapter Assembly

160011: SBT® Direct Cool Rotor

100031: Female Hook

100032: Male Hook

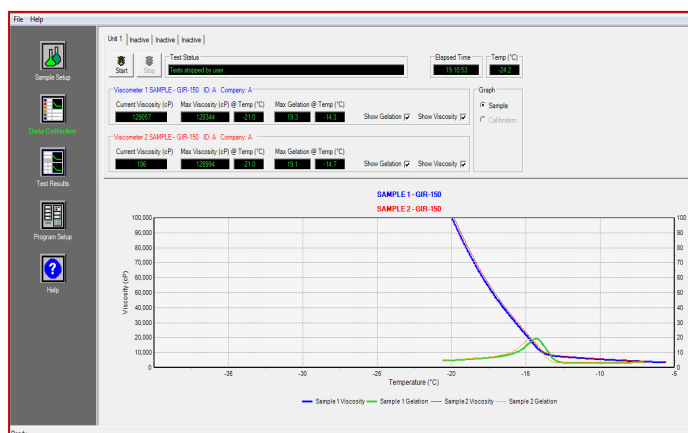
040013: LNP-5 Calibration Fluid

030007: Gelation Index Reference Oil (GIR-150)

Instrument Specifications

Dimensions	Bench-top: 32(w) x 51(d) x 74(h) cm (12.5 x 20 x 29 inches)
Weight	~36.3 kg (80 lbs.)
Voltage	220-240 VAC
Frequency	50/60 Hz.
Advanced Features	Solid, direct refrigeration without liquids Self-contained pre-heating capability to 90°C
Cooling Capability	+90°C to -45°C ($\pm 0.1^\circ\text{C}$ stability) Average greater than 60°C/hour cool rate
Test Methods & Specifications	ASTM D5133, D7110, <i>Gelation Index</i> ILSAC GF-2 to GF-5 & upcoming GF-6 (A&B) and dexos™ API <i>SL</i> , <i>SM</i> & <i>SN</i> China National Standard: GB-11121, SH/T0732; JPI-5S-56-99
Testing Capacity	One or two test samples per unit Data-link up to four units with laptop
Safety	High pressure cutout High temperature limits CE Marked
Shipping Weight & Dimensions	~125 kg (275 lbs.) approx. ~81 x 76 x 104 cm (32 x 30 x 41 inches) approx.

Automated Software



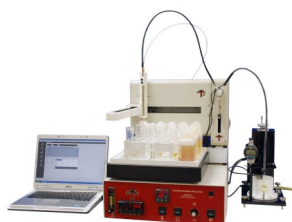
The SBT® Automation Software Package generates a comprehensive analysis of low-temperature pumpability and the gelation phenomenon. The Sample Report screen displays real-time viscosity/temperature graphing and reporting over the selected temperature range. It also generates the *Gelation Index* and the Gelation Index Temperature at the end of the test by using the first derivative of the MacCoull-Walther-Wright viscosity/temperature equation. User Selectable Fields provide operators the versatility of entering critical temperatures after the test to obtain the sample's associated viscosity at those temperatures.

Additional TANNAS CO. Precision Laboratory Instruments



Tannas Foam Air Bath (TFAB™)

- ASTM D892, D6082, IP146
- Non-liquid bath
- 24°C to 150°C range



Tapered Bearing Simulator (TBS™) Viscometer

- ASTM D4683, D6616, CEC L-36-A90, IP370
- High-Temperature, High-Shear (HTHS) Viscosity



Quantum® Oxidation Tester

- ASTM D2272, D2112, D4742, D942, IP229
- RPVOT, TFOOT, Grease Oxidation
- Non-liquid 'dry cylinder' sample heating



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