



TANNAS CO.
LABORATORY INSTRUMENTS

NEW

Direct Cool II

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 -40°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 Direct Cool II is the latest model in the SBT instrument line incorporating Thermoelectric Module Cooling (TMC), built-in touchscreen control, and the ability to both pre-heat and precisely cool two samples per unit.

Features

- Thermoelectric Module Cooling (TMC) eliminates flammable bath mediums.
- Small, Dual-position, bench-top footprint.
- Incorporates new all-digital TAV-IIIIM SBT Viscometer model.



- Self-contained pre-heating: Heats samples to 90°C prior to prescribed cooling profile.
- SBT Automation Package (w/Laptop) offers capability to operate up to four, 2-place Direct Cool II units simultaneously and independently.
- Programmable Temperature Controller maintains bath temperature within $\pm 0.1^\circ\text{C}$ to -40°C .
- Universal Power capability (110—240VAC, 50/60 Hz)
- Internal automatic dry air system removes moisture that accumulates during the test.
- Built-in touchscreen for easy-access temperature control settings and bath operations.



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 GF-6 (A&B) and dexos™ Engine Oil Specifications.
- API 'SL', 'SM', 'SN' and 'SP' 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

Direct Cool II Instrument:

102000: 110-240 VAC, 50/60 Hz Power

ASTM D5133 & D7110:

102500: SBT® DC II Automation Package

100022: SBT® Viscometer (TAV-IIIIM)

160022: SBT® Direct Cool Stator

102127: SBT® Direct Cool Adapter Assembly

160011: SBT® Direct Cool Rotor

100031: Female Hook

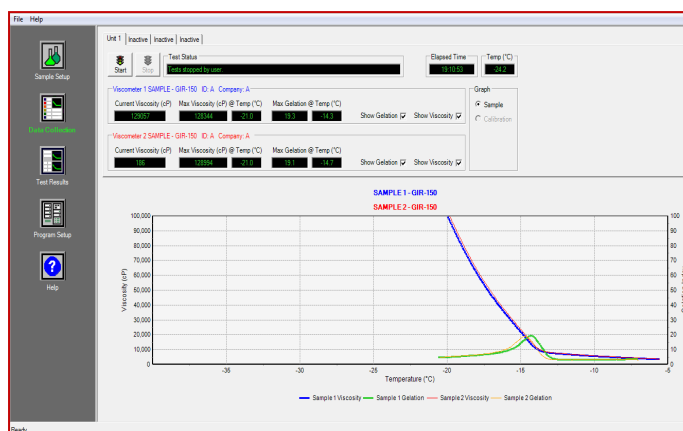
100032: Male Hook

160500: SBT Oil Package

040013: LNP-5 Calibration Fluid (1/2 gal)

030007: Gelation Index Reference Oil (GIR-150) (quart)

Automated Software



Instrument Specifications

Dimensions	Bench-top: 37(w) x 61(d) x 69(h) cm (14.5 x 24 x 27 in)
Weight	~25 kg (55 lbs.)
Voltage	110-240 VAC
Frequency	50/60 Hz.
Advanced Features	Thermoelectric Module Cooling eliminates liquid medium Self-contained pre-heating capability to 90°C
Cooling Capability	+90°C to -40°C (± 0.1°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-6 (A&B) and dexos™ API SL, SM, SN & SP China National Standard: GB-11121, SH/T0732; JPI-55-56-99
Testing Capacity	One or two test samples per unit Data-link up to four units with laptop
Safety	Inherent over-temperature measurement/protection/ alarm.
Shipping weight & dimensions	~114 kg (250 lbs.) approx. ~81 x 76 x 104 cm (32 x 30 x 41 inches) approx.

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



Noack S2® Volatility Test

- ASTM D5800, Proc. D Evaporation Loss
- Phosphorus Volatility
- non-Wood's metal heating system



Quantum® Oxidation Tester

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



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