TORONTECH

FULL AUTOMATIC DUAL TUBE KINEMATIC VISCOSITY TESTER WITH HOUILLON VISCOMETER

Full Automatic Dual Tube Kinematic Viscosity Tester with Houillon Viscometer – ToronVT™ FA-DT

ToronVT™ FA-DT is a full-automatic kinematic viscosity tester with Houillon viscometer technology, designed for rapid and precise measurement of kinematic viscosity in lubricating oils, petroleum products, and other Newtonian fluids in accordance with ASTM D7279. As a fully unattended platform, the ToronVT™ FA-DT integrates automatic sample injection, automatic measurement, automatic drying, automatic cleaning, and automatic repeatability calculation — eliminating the need for operator presence throughout the entire test cycle.

Equipped with dual Houillon viscometer tubes and a 24-bit intelligent injection system, this kinematic viscosity tester delivers outstanding measurement consistency across transparent and opaque sample types including gasoline, diesel oil, kerosene, cutting fluid, fresh lubricating oil, and in-service lubricating oil. Its performance is directly comparable to leading imported competing instruments at a substantially lower cost of ownership.

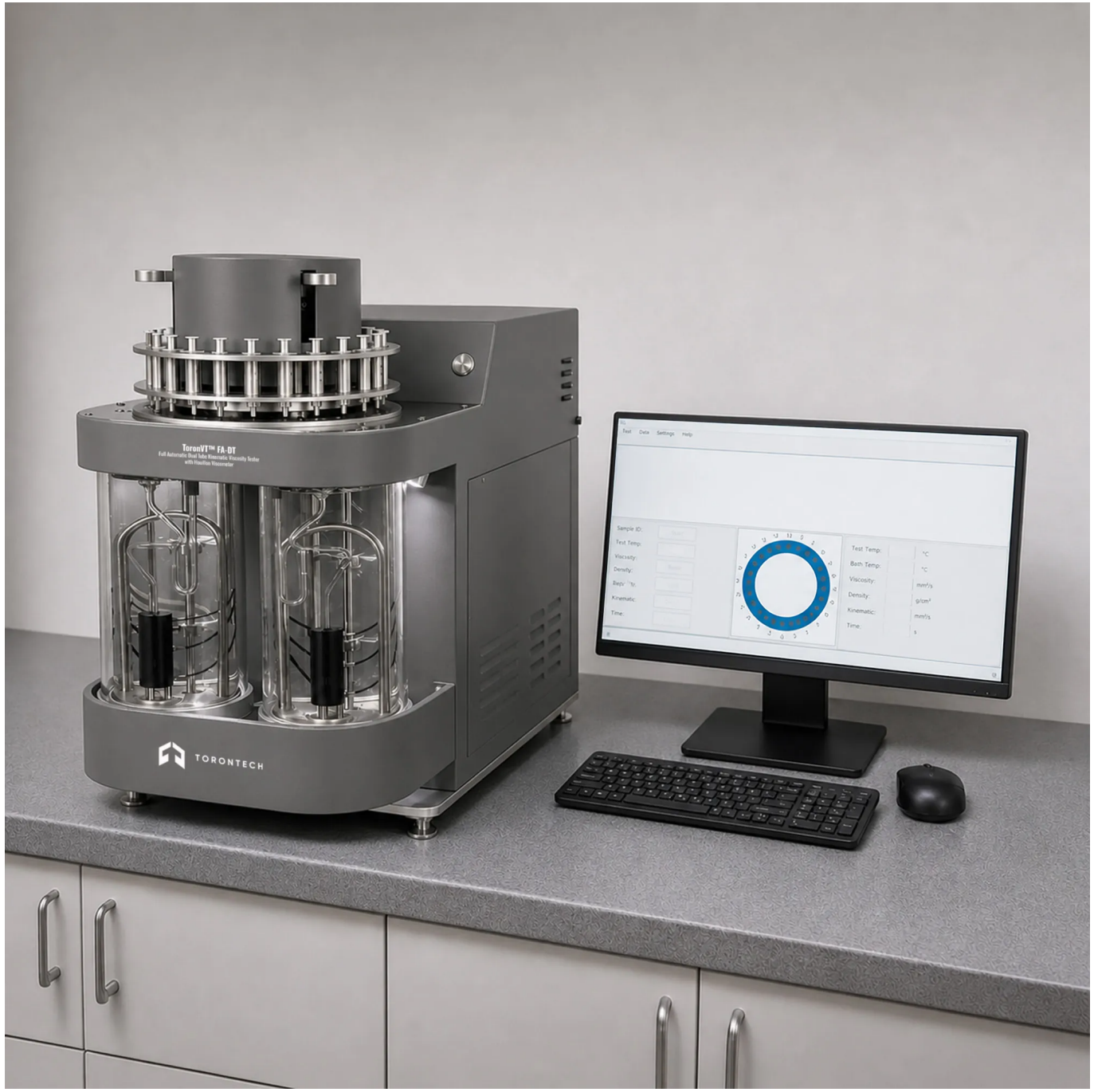
APPLICATIONS

Full Automatic Dual Tube Kinematic Viscosity Tester with Houillon Viscometer – ToronVT™ FA-DT Applications

The ToronVT™ FA-DT Full Automatic Dual Tube Kinematic Viscosity Tester with Houillon Viscometer is used across petroleum testing, lubricant quality control, and industrial fluid analysis:

- Petroleum laboratories: ASTM D7279-compliant kinematic viscosity testing of crude oil fractions, base oils, and refined petroleum products
- Lubricant manufacturing QC: automated viscosity grading and release testing for engine oils, gear oils, and hydraulic fluids

- Refinery and blending operations: fast-batch kinematic viscosity measurement for process control and blend verification
- Industrial fluid testing: cutting fluids, fresh and in-service lubricating oil, kerosene, gasoline, and diesel
- Independent testing laboratories: unattended overnight or shift-long automated testing for high-sample-throughput environments
- Research and development: precision kinematic viscosity data for formulation development and fluid performance characterization


ToronVT™ FA-DT
Full Automatic Dual Tube Kinematic Viscosity Tester
with Houillon Viscometer
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Test
Data
Settings
Help
Sample ID:
Test Temp:
Viscosity:
Density:
Kinematic:
Time:
Test Temp:
Bath Temp:
Viscosity:
Density:
Kinematic:
Time:
°C
°C
mm²/s
g/cm³
mm²/s
s

Applicable Standards

The ToronVT™ FA-DT kinematic viscosity tester is designed to support testing in compliance with the following international standards:

- ASTM D7279: Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids by Automated Houillon Viscometer
- ASTM D445: Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids
- ASTM D446: Standard Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers

FEATURES

Full Automatic Dual Tube Kinematic Viscosity Tester with Houillon Viscometer – ToronVT™ FA-DT Key Features

The ToronVT™ FA-DT full-automatic kinematic viscosity tester with Houillon viscometer delivers an industry-leading feature set for high-throughput, unattended petroleum viscosity testing:

- Fastest Test Speed in Class: In fast mode, the instrument returns results in as little as 15 seconds. Full test cycle time — from sample injection through result output — is generally under 3 minutes. The complete measurement sequence including cleaning does not exceed 7 minutes.
- True 24-Hour Unattended Operation: the ToronVT™ FA-DT can operate continuously for 24 hours without operator intervention. All functions (sample injection, measuring, cleaning, drying, result calculation, and repeatability analysis) are fully automated. Both viscometer tubes are independently automated, enabling simultaneous multi-sample processing.
- Broad Sample Compatibility: the instrument handles the full range of transparent and opaque Newtonian liquids, including gasoline, diesel oil, kerosene, cutting fluid, fresh lubricating oil, in-service lubricating oil, and additive

solutions. This makes the ToronVT™ FA-DT the single instrument needed for most petroleum laboratory testing workflows.

- Secondary Accurate Quantification: the instrument features a secondary accurate quantification function that controls the sample liquid column precisely, eliminating the limitations and deviations associated with micro-pipette injection. This directly reduces sample dosing variability and ensures accuracy of the measurement data without manual intervention.
- Intelligent Auto-Cleaning System: the best cleaning mode is automatically selected based on the measured viscosity value. The system uses automatic double-solvent cleaning with a fast, efficient cycle that consumes no more than 10 mL of cleaning fluid per run — minimizing solvent consumption and waste.
- Intelligent Software and Automatic Sample Management: the software automatically selects the appropriate viscometer tube, distributes sample sets in an optimal test sequence, manages priority testing, and provides real-time viscosity testing. It automatically converts kinematic viscosity to Engler viscosity at any time.
- Comprehensive Auxiliary Functions: includes automatic plugging, constant calibration, temperature calibration, internal clock calibration, kinematic-to-Engler viscosity automatic conversion, software and hardware over-temperature protection with alarm function, anti-dry burning protection, and cleaning agent level and waste liquid level alarm functions.
- Double Bath Design: dual bath construction allows different temperature points to be tested and cleaned simultaneously without interference — baths can be quickly swapped without emptying the thermostat bath. Micro-automatic temperature controlling system enables low failure rate, smooth sample delivery, and small vibration.
- High-Precision Temperature Sensing: uses PT1000 high-precision temperature sensors for stable, accurate constant-temperature bath conditions. Temperature controlling accuracy reaches 0.005°C.
- LIMS Connectivity and Disposable Filters: the Windows operating system with Chinese interface, simple operation and friendly human-machine interface. The system can access LIMS via USB connection. The instrument can be equipped with disposable filters, which significantly reduces the workload of sample pretreatment.

THEORY & METHOD

Theory and Method

The ToronVT™ FA-DT measures kinematic viscosity using the Houillon viscometer method, which is the basis of ASTM D7279. In this method, a precisely controlled volume of sample is injected into a Houillon-type capillary viscometer tube that is fully immersed in a precision constant-temperature bath. As the sample flows through the calibrated capillary under gravity, the time required for the sample meniscus to travel between two detection points is measured with high-precision optical sensors. Kinematic viscosity is then calculated as the product of this flow time and the tube's viscometer constant.

Unlike conventional Ubbelohde or Cannon-Fenske viscometers that require manual loading and timing, the Houillon viscometer design used in the ToronVT™ FA-DT allows full automation of the injection, timing, cleaning, and drying cycle. The 24-bit intelligent injection system precisely controls the sample dosage (0.3–1 mL), ensuring that sample volume variability does not contribute to measurement error. The secondary accurate quantification function of the instrument's liquid column control further eliminates the limitations of micro-pipette-based dosing — contributing to a repeatability of less than 0.5% and temperature control accuracy of 0.005°C.

TECHNICAL SPECIFICATIONS

Full Automatic Dual Tube Kinematic Viscosity Tester with Houillon Viscometer – ToronVT™ FA-DT Technical Specifications

Parameter	Specification
Model	ToronVT™ FA-DT
Standard	ASTM D7279, ASTM D445, ASTM D446; IP/CBC 127-2016
Measurement Range	0.3 – 6,000 mm^2/s; measuring span of one viscosity tube is 100×
Sample Dosage	0.3 – 1 mL

Parameter	Specification
Injection Method	24-bit intelligent injection
Repeatability	≤0.5%
Viscometer Tube Volume	2L × 2
Total Power	≤600 W
Timing Accuracy	0.01 S
Temperature Controlling Range	20 – 100°C (when target temp <40°C, extra refrigerator required)
Temperature Controlling Accuracy	0.005°C
Host Size	350 × 640 × 600 mm
Voltage	AC220V ± 10%; 50Hz ± 10% (110V is also available)
Relative Humidity	<80% RH
Ambient Temperature	10 – 28°C
Other Notes	No strong vibration, airflow, strong electromagnetic interference or corrosive gases around the laboratory

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