



AUTOMATIC KINEMATIC VISCOSITY TESTER

Automatic Kinematic Viscosity Tester TT-445NZ

Automatic Kinematic Viscosity Tester TT-445NZ complies with the ASTM D445 Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity).

Automatic Kinematic Viscosity Tester TT-445NZ utilized to test the viscosity of liquid petroleum products, both transparent and opaque, by measuring the time for a volume of liquid to flow under gravity through a calibrated glass capillary viscometer. The dynamic viscosity, η , can be determined by multiplying the kinematic viscosity, ν , by the density, ρ , of the liquid, under certain constant temperature conditions. The range of kinematic viscosities covered by this apparatus method spans from 0.2 to 300,000 mm²/s at all temperatures.

APPLICATIONS

The primary application of the Automatic Kinematic Viscosity Tester TT-445NZ is to **automatically determine the kinematic viscosity** of both transparent and opaque liquid petroleum products, in compliance with the **ASTM D445** standard. The instrument automates the entire test sequence—from heating and temperature maintenance to timing the sample flow, calculating the results, and cleaning the viscometer. This makes it an efficient and reliable tool for routine quality control of fuels, lubricants, and other petroleum fluids.

Key Industries

- **Lubricant Manufacturing:** Viscosity is the most important physical property of a lubricant. Manufacturers rely on this automated tester for the quality control of base oils and finished products (e.g., engine oils, hydraulic fluids) to ensure they meet precise viscosity grades.
- **Petroleum Refining:** Refineries use this instrument for routine quality control on a wide range of products, including fuels (diesel, jet fuel, kerosene) and the base oils that are the foundation for lubricants, to certify that they meet commercial and regulatory specifications.

- **Third-Party Testing Laboratories:** These commercial labs provide analytical services to all other industries, and kinematic viscosity is one of the most frequently requested tests. The automation and multi-station capability are ideal for the high-volume sample throughput required for in-service oil analysis and quality certification.

FEATURES

- Features a 10-inch touch screen interface, entirely in English.
- Utilizes photoelectric amplifiers with high-quality optical fiber heads, featuring high temperature resistance and waterproof characteristics.
- Ensures accurate liquid level detection, coupled with a high-frequency electronic timing unit to guarantee reliable flow timing.
- Incorporates high-precision temperature control modules with PID tuning for exceptional temperature control accuracy.
- The Main Unit can store multiple viscometer constants, readily accessible at any time.
- Equipped with multiple sets of viscometers to accommodate different sample viscosity values.
- Provides 4 test stations, capable of simultaneous testing or individual tests.
- Offers one-button operation, allowing the tester to complete the test automatically.
- The Main Unit features microprocessor program control, facilitating automatic heating, stirring, temperature maintenance, identification, timing, suction, calculation, storage, printing, cleaning, and shutdown upon completion of the test.
- The photoelectric amplifier is outfitted with a special fixture, enabling easy replacement of viscometers as needed, accommodating various viscosity sizes. Viscometers can be cleaned automatically or removed for manual cleaning.

THEORY & METHOD

Kinematic viscosity measures how readily a liquid flows under the force of gravity. It is one of the most common quality tests for oils, fuels, and lubricants, because viscosity directly affects how a fluid performs in an engine, a pump, or a process line.

The Capillary Flow Method

The test uses a calibrated glass capillary viscometer held at a precisely controlled temperature in a heated bath. A measured volume of sample is drawn into the viscometer, then released to flow down through the narrow capillary under its own weight. The instrument records the time the liquid takes to flow between two timing marks.

From Flow Time to Viscosity

Each viscometer has a known calibration constant. The kinematic viscosity equals the measured flow time multiplied by that constant, with the result reported in centistokes (mm²/s). Because viscosity changes sharply with temperature, the bath must hold the set temperature within tight limits, which is why temperature control is central to the method. The procedure follows ASTM D445 and ISO 3104, so results stay comparable between laboratories.

TECHNICAL SPECIFICATIONS

1. Temperature control range: 10 to 100°C
2. Temperature precision: $\pm 0.1^\circ\text{C}$
3. Heating mode: Electronic heating rod
4. Heating power: 1000W
5. Timing mode: Automatic
6. Timing accuracy: $\pm 0.1\text{s}$
7. Liquid level detection: Photoelectric sensor
8. Test stations: 4
9. Record storage: 200 pieces
10. Printing method: Micro printer

11. Rated voltage: AC220V $\pm$ 10%, 50Hz (110V also available)



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