



TORONTECH



HIGH PRECISION DISTILLATION APPARATUS

High Precision Distillation Apparatus - ToronDIS™ 86

ToronDIS™ 86 is a fully automated distillation apparatus purpose-built for the determination of distillation range (boiling range) characteristics of petroleum products, aviation fuels, solvents, and other volatile liquids. Designed and manufactured in accordance with ASTM D86, ASTM D850, ISO 3405, and equivalent standards, the instrument features a single-tube modular structure, a constant-temperature cold bath (0 – +80 °C), a high-precision infrared graduated cylinder reading system, and a main control architecture based on multi-chip microprocessors.

The ToronDIS™ 86 distillation apparatus provides real-time automatic detection of atmospheric pressure and an automatically controlled constant-temperature recovery chamber — functions essential for precise atmospheric pressure correction of distillation data. A 10-inch industrial smart screen (1280 × 800, 10-point touch), support for HDMI 4K output, and interfaces including Ethernet, USB, Bluetooth, Wi-Fi, and CAN bus make it one of the most comprehensively connected distillation instruments available for the petroleum testing laboratory.

APPLICATIONS

High Precision Distillation Apparatus - ToronDIS™ 86 Applications

- Distillation range determination of gasoline, diesel, jet fuel, aviation turbine fuel, and naphtha per ASTM D86
- Boiling point and distillation curve testing of petroleum solvents, white spirits, and coal tar distillates
- Process control and product specification compliance in oil refining and fuel blending operations
- Chemical engineering and solvent characterization in chemical manufacturing plants
- Aviation and aerospace fuel quality testing per ASTM and international aviation standards
- Railway and marine fuel analysis for operational quality assurance
- Power plant fuel specification testing and condition monitoring

- Academic and industrial research on volatile organic compound (VOC) distillation profiles



Standards & Compliance

- ASTM D86: Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure

FEATURES

High Precision Distillation Apparatus – ToronDIS™ 86 Key Features

- 10-inch industrial smart screen (1280 × 800 resolution, 10-point capacitive touch) with HDMI 4K output support and peripheral control via mouse/keyboard
- Safe 24 V heating system with real-time power detection (0 – 1000 W) and ± 3 W control accuracy; high-precision PT100 temperature sensor (0 – 450 °C, resolution 0.01 °C)
- Peltier thermostat cold bath (0 – 60 °C, resolution 0.01 °C) with high-performance compressor for reliable temperature stability, minimal lag, and long service life
- Precision infrared graduated cylinder reader: flow rate detection range 0 – 20 mL/min, measurement resolution 0.01 mL, accuracy ± 1 mL, distillation loss detection sensitivity 0.1%
- Real-time automatic atmospheric pressure detection: high-precision barometric sensor (30 – 110 kPa, 0.01 kPa resolution, ± 0.12 hPa relative accuracy equivalent to ± 1 m altitude variation)
- Comprehensive system diagnostics: monitors chamber sealing, core component current, nitrogen/gas line connections, and motherboard connectivity for preventive maintenance
- Safety features: hardware-level automatic fire detection with inert gas suppression; automatic lifting platform for heating elements and bottle placement; protective hood with auto-lift for safe flask handling at high temperatures
- Multi-level user access control with hierarchical permission system for secure operation, maintenance, and regulatory data protection
- Extensive connectivity: Ethernet × 1, USB × 3, HDMI × 1, Bluetooth, Wi-Fi, CAN bus for complete laboratory network integration and data export

- Single-tube modular structure: compact, stable design with an automatically controlled constant-temperature recovery chamber for consistent distillation performance

THEORY & METHOD

Theory and Method

The ToronDIS™ 86 performs atmospheric distillation in strict accordance with ASTM D86 methodology. A specified volume of liquid sample is charged into a standardized distillation flask, which is heated at a controlled rate (4 – 5 mL/min distillation rate) using a safe 24 V heating system (0 – 1000 W, real-time power detection with ± 3 W control accuracy). Vapors rise through the flask neck into a water-cooled condenser and condense into a graduated cylinder. A high-precision infrared graduated cylinder reader measures the recovered volume continuously, with a flow rate detection range of 0 – 20 mL/min and loss-detection sensitivity of 0.1%.

A high-precision PT100 temperature sensor (0 – 450 °C, resolution 0.01 °C) monitors vapor temperature at defined recovery percentages. Atmospheric pressure is measured in real time by a high-precision barometric sensor (range 30 – 110 kPa, resolution 0.01 kPa, relative accuracy ± 0.12 hPa), enabling automatic atmospheric pressure correction per ASTM D86 Appendix procedures. A Peltier thermostat cold bath (0 – 60 °C, resolution 0.01 °C) maintains condenser water temperature for reliable, consistent condensate recovery throughout the run.

TECHNICAL SPECIFICATIONS

High Precision Distillation Apparatus – ToronDIS™ 86 Technical Specifications

Parameter	Specification
Display	10-inch Industrial Smart Screen, 1280 × 800, 10-point capacitive touch
Distillation Rate	4 – 5 mL/min
Temperature Range	Ambient – 450 °C (resolution: 0.01 °C)
Temperature Sensor	High-precision PT100 glass sensor
Cold Bath Range	0 – +80 °C
Cold Bath Thermostat	Peltier system, resolution 0.01 °C
Volume Detection Range	0 – 105 mL (resolution: 0.01 mL)
Infrared Reader Accuracy	±1 mL; loss-detection sensitivity 0.1%
Atmospheric Pressure Sensor	Range 30–110 kPa; resolution 0.01 kPa; accuracy ±0.12 hPa
Heating Power	0 – 1000 W; control accuracy ±3 W; supply 24 V
Power Consumption	≤ 1500 W
Main Unit Size (W × D × H)	980 × 690 × 620 mm
Voltage	AC 230 V ± 10%, 50 Hz ± 10% (110V is also available)
Relative Humidity	< 80% RH
Ambient Temperature	0 – 60 °C
Connectivity	Ethernet × 1, USB × 3, HDMI × 1, Bluetooth, Wi-Fi, CAN bus
Other Notes	No strong vibration, airflow, strong electromagnetic interference, or corrosive gases near instrument



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