

GRAVIMETRIC WATER VAPOR TRANSMISSION RATE TESTER (6-CELL)



Gravimetric Water Vapor Transmission Rate Tester (6-Cell) - ToronWVTR™ C6

Six-Station Weighing-Method WVTR Analyzer for Films, Foils, and Laminates

The ToronWVTR™ C6 is a gravimetric water vapor transmission rate tester that measures the WVTR of plastic films, aluminum foil, aluminized films, and composite laminates. The instrument uses the weighing method, a direct gravimetric technique that tracks how much moisture actually crosses a barrier. Six stations test six specimens continuously, which raises throughput for busy QC and R&D labs. Built around methods such as ASTM E96 and ISO 2528, it delivers standards-based moisture barrier data.

Automatic temperature and humidity control hold the chamber at a set condition across a 15°C to 60°C range, so tests run to recognized conditions without manual adjustment. A precision balance weighs each dish on a schedule, and a 24-bit delta-sigma converter resolves small mass changes, which suits high-barrier foils and metallized films. Controlled air velocity across the specimen keeps results repeatable across successive tests.

One-button operation runs the full sequence automatically, and live data curves let operators follow mass change, temperature, and humidity in real time. Traceable reference-film calibration keeps results defensible for audits and certification. The ToronWVTR™ C6 (Gravimetric 6-Cell Water Vapor Transmission Rate Tester) suits food, pharmaceutical, flexible-packaging, and materials labs that need dependable moisture barrier data at scale.

APPLICATIONS

Gravimetric Water Vapor Transmission Rate Tester (6-Cell) - ToronWVTR™ C6 Applications

The ToronWVTR™ C6 supports moisture barrier testing wherever water vapor ingress affects product quality, shelf life, or stability.

- **Food and Beverage Packaging:** measures moisture ingress through films, foils, and laminates to protect dry and moisture-sensitive products from spoilage and caking.
- **Pharmaceutical and Medical Packaging:** verifies the moisture barrier of blister foils, sachets, and pouches for hygroscopic and moisture-sensitive drug products.
- **Flexible Packaging and Converting:** qualifies aluminum foil, aluminized films, and multilayer laminates during development and production QC.
- **High-Barrier and Metallized Films:** measures very low water vapor transmission through foil and metallized structures where the gravimetric method performs well.
- **Building and Construction Materials:** tests the moisture barrier of membranes, coatings, and sheet materials per ASTM E96.
- **Paper, Board, and Coatings:** evaluates the moisture barrier of coated papers, boards, and organic coating films.
- **Electronics and Photovoltaic Encapsulation:** screens moisture-barrier films that protect sensitive electronic and PV components.
- **Textiles and Nonwovens:** characterizes water vapor transmission of breathable and barrier fabrics.
- **Academic and Materials Research:** quantifies WVTR for barrier material development and standards correlation.



Standards

The ToronWVTR™ C6 is designed to align with internationally recognized gravimetric test methods for water vapor transmission rate measurement.

- ISO 2528 - Sheet Materials: Determination of Water Vapour Transmission Rate (WVTR): Gravimetric (Dish) Method
- ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
- ASTM D1653 - Standard Test Methods for Water Vapor Transmission of Organic Coating Films
- DIN 53122-1 - Testing of Plastics and Elastomer Films, Paper, Board, and Other Sheet Materials: Determination of Water Vapour Transmission Rate: Part 1: Gravimetric Method
- JIS Z 0208 - Testing Methods for Determination of the Water Vapour Transmission Rate of Moisture-Proof Packaging Materials (Dish Method)
- TAPPI T464 - Water Vapor Transmission Rate of Sheet Materials at High Temperature and Humidity

FEATURES

Gravimetric Water Vapor Transmission Rate Tester (6-Cell) - ToronWVTR™ C6 Key Features

The ToronWVTR™ C6 pairs the gravimetric reference method with six-station throughput and automated conditioning.

- **Gravimetric Weighing Method:** a direct mass measurement of permeated moisture, the recognized reference approach for standards correlation and high-barrier materials.
- **Six-Station Continuous Testing:** six independent specimens run at once, raising daily throughput for QC and R&D labs.
- **Automated Precision Weighing:** the instrument weighs each dish on a schedule, removing the manual weighing errors of a traditional dish test.

- **Automatic Temperature and Humidity Control:** the chamber holds a set condition without manual adjustment, so tests run to recognized standard conditions.
- **Controlled Air Velocity:** adjustable airflow across the specimen keeps the boundary layer thin and results repeatable.
- **24-Bit Delta-Sigma Data Acquisition:** high-resolution conversion resolves the small mass changes produced by high-barrier foils and films.
- **One-Button Automated Testing:** a single command runs the complete sequence automatically, reducing operator effort and variability.
- **Real-Time Data Curves:** on-screen plots of mass change, temperature, and humidity let operators judge test progress and stability.
- **Built-In Ambient Monitoring:** an internal temperature and humidity sensor logs room conditions with every test for better traceability.
- **Multiple Test Modes:** selectable modes adapt the instrument to different materials and barrier levels.
- **Traceable Reference-Film Calibration:** calibration against certified reference films keeps results defensible for QC release and certification audits.
- **Laboratory Data Management Integration:** connects to lab data management software for centralized records, review, and reporting.

THEORY & METHOD

Theory and Method

The gravimetric (weighing) method measures water vapor transmission by tracking the mass change of a sealed test-dish assembly as moisture permeates the film. The specimen is clamped over a dish that holds a desiccant, so the space beneath the film stays dry. The assembly sits in a chamber held at a controlled temperature and humidity, which sets up a water-vapor pressure gradient across the film: humid on the chamber side, dry on the desiccant side.

Water vapor permeates from the humid chamber through the film and is captured by the desiccant, so the dish assembly gains mass over time. The instrument weighs each dish on a precision balance at set intervals. Once the mass gain reaches a steady rate, the slope of mass against time, divided by the exposed test area, gives the water vapor transmission rate in g/m²·24h.

The gravimetric approach is a direct, primary measurement: it counts the moisture that actually crosses the film rather than inferring it from a sensor signal, which makes it a reference method for standards correlation and high-barrier work. Controlled air velocity across the specimen keeps the boundary layer thin so the film governs the rate. Six stations run continuously, and automatic temperature and humidity control hold the test condition steady across long runs.

TECHNICAL SPECIFICATIONS

Gravimetric Water Vapor Transmission Rate Tester (6-Cell) - ToronWVTR™
C6 Technical Specifications

Parameter	Specification
Measurement Range	0.1 to 19,000 g/m ² ·24h (standard)
Test Accuracy	0.01 g/m ² ·24h
Specimen Amount	6, independent
Temperature Range	15°C to 60°C
Temperature Accuracy	±0.1°C
Differential Humidity Range	Room to 95% RH (standard condition 90% RH)
Humidity Accuracy	±1% RH

Parameter	Specification
Test Area	28.26 cm ²
Specimen Size	Ø76 mm
Air Velocity	0.5 to 2.5 m/s (customization available)
Test Chamber Volume	36 L
Gas Supply	Air
Gas Interface	Ø8 mm
Voltage	AC 220 V, 50 Hz (110V is also available)
Dimensions	650 mm (L) × 550 mm (W) × 475 mm (H)
Net Weight	67 kg

Standard Delivery

Item	Description
Main Unit	Six-station gravimetric WVTR test instrument
Computer	Dedicated control PC
Control Software	Instrument operation and data-analysis software
Test Dishes (6)	Gravimetric test dishes for the six stations
Desiccant Tube	Supplies desiccant for the dry side of each dish
Pressure Regulator	Regulates the air supply pressure
Automatic Moisture Filter	Conditions incoming air for stable humidity

Item	Description
Calibration Weight	Reference weight for balance calibration
Communication Cable	Connects the instrument to the control PC
Sample Cutter	Prepares specimens to the required test size

Optional Accessories

Item	Description
Reference Film	Certified film for traceable calibration
Air Drying Device	Additional air-drying for low-humidity test conditions
Sample Cutter	Additional specimen-preparation cutter
Laboratory Data Management System	Centralized data management and reporting software



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