

GRAVIMETRIC WATER VAPOR TRANSMISSION RATE TESTER (SINGLE- CELL)



Gravimetric Water Vapor Transmission Rate Tester (Single-Cell) - ToronWVTR™ C1

Compact Single-Station Weighing-Method WVTR Analyzer for Film and Foil Testing

The ToronWVTR™ C1 is a single cell WVTR tester that measures the water vapor transmission rate of plastic films, aluminum foil, aluminized films, and composite laminates. The instrument uses the gravimetric weighing method, a direct technique that weighs the moisture crossing a barrier. A single station and a compact benchtop footprint make it a practical entry point for labs adding WVTR testing. 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 follow recognized conditions without manual adjustment. A precision balance weighs the dish on a schedule, and a 24-bit delta-sigma converter resolves small mass changes for high-barrier foils and metallized films. An 8 L chamber and a 35 kg frame keep the unit small enough for a crowded bench.

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™ C1 (Gravimetric Single-Cell Water Vapor Transmission Rate Tester) suits food, pharmaceutical, packaging, and academic labs that need reliable moisture barrier data at a benchtop scale.

APPLICATIONS

Gravimetric Water Vapor Transmission Rate Tester (Single-Cell) - ToronWVTR™ C1 Applications

The ToronWVTR™ C1 supports single-sample moisture barrier testing wherever water vapor ingress affects product quality, shelf life, or stability.

- **Entry-Level and Low-Volume QC:** a starting point for labs adding gravimetric WVTR testing or running modest sample counts on a compact benchtop.
- **Food and Beverage Packaging:** measures moisture ingress through films, foils, and laminates that protect dry and moisture-sensitive products.
- **Pharmaceutical and Medical Packaging:** verifies the moisture barrier of blister foils, sachets, and pouches for hygroscopic drug products.
- **Plastic Film and Sheet Testing:** checks PE, PP, PET, and coated films against defined moisture barrier targets.
- **Aluminum Foil and Metallized Materials:** measures very low moisture transmission where the gravimetric method performs well.
- **Paper, Board, and Coatings:** evaluates the moisture barrier of coated papers, boards, and organic coating films.
- **Building and Construction Materials:** tests the moisture barrier of membranes, coatings, and sheet materials per ASTM E96.
- **Universities and Teaching Labs:** a manageable single-station platform for training on WVTR measurement and barrier science.



Standards

The ToronWVTR™ C1 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 (Single-Cell) - ToronWVTR™ C1 Key Features

The ToronWVTR™ C1 delivers the gravimetric reference method in a compact single-station package suited to focused testing and tighter budgets.

- **Gravimetric Weighing Method:** a direct mass measurement of permeated moisture, the recognized reference approach for WVTR and high-barrier materials.
- **Single-Station Design:** one specimen at a time in a compact instrument, a practical entry point for labs adding WVTR testing.
- **Compact Benchtop Footprint:** a small, 35 kg unit with an 8 L chamber fits limited bench space in QC and R&D labs.

- **Automated Precision Weighing:** scheduled automatic weighing removes 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 match 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

Weighing-method WVTR testing measures how much moisture passes through a film by tracking the weight of a sealed dish assembly over time. The specimen is clamped over a dish holding a desiccant, so the underside of the film stays dry. The dish sits in a chamber held at a set temperature and humidity, creating a water-vapor pressure gradient across the film:

moist above, dry below.

Water vapor permeates the film and is absorbed by the desiccant, so the dish gains weight as the test runs. A precision balance records the weight at set intervals. Once the gain settles to a steady rate, its slope against time, divided by the exposed area, gives the WVTR in $\text{g/m}^2\cdot 24\text{h}$, a value that reflects the moisture that actually crossed the film.

Weighing the moisture directly makes the gravimetric method a primary reference, valued for method correlation and for high-barrier foils. Airflow across the specimen holds surface resistance low so the film sets the rate. A single station handles one specimen at a time under automatic temperature and humidity control, which keeps the compact instrument simple to run.

TECHNICAL SPECIFICATIONS

Gravimetric Water Vapor Transmission Rate Tester (Single-Cell) - ToronWVTR™ C1 Technical Specifications

Parameter	Specification
Measurement Range	0.1 to 19,000 $\text{g/m}^2\cdot 24\text{h}$ (standard)
Test Accuracy	0.01 $\text{g/m}^2\cdot 24\text{h}$
Specimen Amount	1 (single specimen)
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	8 L
Gas Supply	Air
Gas Interface	Ø8 mm
Voltage	AC 220 V, 50 Hz (110V is also available)
Dimensions	330 mm (L) × 600 mm (D) × 340 mm (H)
Net Weight	35 kg

Standard Delivery

Item	Description
Main Unit	Single-station gravimetric WVTR test instrument
Computer	Dedicated control PC
Control Software	Instrument operation and data-analysis software
Test Dish (1)	Gravimetric test dish for the single station
Desiccant Tube	Supplies desiccant for the dry side of the 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



Torontech Inc.

251 Consumers Road, Suite 1200
Toronto, Ontario, M2J 4R3, Canada 

Phone: +1 416 368 2721 | Fax: +1 416 981 7652
Email: info@torontech.com

Torontech, LLC

601 Brickell Key Drive, Suite 700
Miami, FL 33131, USA 

Toll-Free: 1-866-383-7919
Email: sales@torontech.com

Torontech ME FZE

Meydan Grandstand, 6th Floor,
Meydan Road, Nad Al Sheba,
Dubai-261440, UAE 

Phone: +971 488 19252
Email: me@torontech.com

