

HUMIDITY SENSOR WVTR TESTER (6-CELL)



Humidity Sensor WVTR Tester (6-Cell) - ToronWVTR™ H6

Relative Humidity Sensor WVTR Tester with 6 Independent Chambers

The ToronWVTR™ H6 is a humidity sensor WVTR tester that measures the water vapor transmission rate of nonwoven fabrics, heat-exchange membranes, and flexible barrier materials. The instrument uses the relative humidity sensor method, which tracks the moisture building on the dry side of a film and handles high transmission rates that saturate other sensor types. Six chambers test six specimens at once with independent results. Built around methods such as ASTM E398 and ISO 15106-1, it serves packaging, nonwoven, membrane, and materials labs.

The ToronWVTR™ H6 covers a standard range of 5 to 6,500 g/m²·24h, with an optional range to 100,000 for very open structures, which suits breathable and permeable materials. Water-bath temperature control holds each chamber at a set point across a 5°C to 90°C range, and standard testing runs at up to 100% RH. A Swagelok stainless-steel gas path and digital flow control keep each measurement stable and leak-tight.

The ToronWVTR™ H6 automates the full test process, and live data curves let operators follow humidity, temperature, and transmission in real time. Five-level user management, an audit-ready system log, and GAMP5-aligned controls support regulated pharmaceutical and medical labs. The ToronWVTR™ H6 (6-Cell Humidity Sensor Water Vapor Transmission Rate Tester) suits nonwoven, membrane, packaging, and regulated testing labs.

APPLICATIONS

Humidity Sensor WVTR Tester (6-Cell) - ToronWVTR™ H6 Applications

The ToronWVTR™ H6 suits water vapor transmission testing of breathable and permeable materials where transmission rates are moderate to high.

- **Nonwoven Fabrics and Hygiene Materials:** measures water vapor transmission of nonwovens used in diapers, medical gowns, and hygiene products.
- **Breathable and Microporous Films:** tests breathable membranes and films where high moisture transmission is a design target.
- **Heat-Exchange and Energy-Recovery Membranes:** characterizes water vapor transfer through HVAC energy-recovery and heat-exchange membranes.
- **Medical Textiles and Wound Dressings:** verifies the moisture-vapor transmission of breathable medical fabrics and dressings.
- **General Packaging Films:** batch WVTR testing of everyday packaging films with moderate-to-high permeability.
- **Building and Construction Membranes:** tests breathable housewraps and vapor-permeable barrier membranes.
- **Filtration and Separation Membranes:** evaluates water vapor transport through permeable membranes.
- **Pharmaceutical and Regulated Labs:** supports moisture-barrier testing under GAMP5-aligned data-integrity controls.



Standards

The ToronWVTR™ H6 is designed to align with internationally recognized humidity-sensor test methods for water vapor transmission rate measurement.

- ASTM E398 - Standard Test Method for Water Vapor Transmission Rate of Sheet Materials Using Dynamic Relative Humidity Measurement
- ASTM D6701 - Standard Test Method for Determining Water Vapor Transmission Rate Through Nonwoven and Plastic Barriers
- ISO 15106-1 - Plastics: Film and Sheeting: Determination of Water Vapour Transmission Rate: Part 1: Humidity Detection Sensor Method
- TAPPI T523 - Dynamic Water Vapor Transmission Rate of Sheet Materials Using a Relative Humidity Sensor
- JIS K 7129 - Plastics: Film and Sheeting: Determination of Water-Vapour Transmission Rate: Instrumental Method

FEATURES

Humidity Sensor WVTR Tester (6-Cell) - ToronWVTR™ H6 Key Features

The ToronWVTR™ H6 pairs a high-permeability humidity sensor with six-chamber throughput and regulated-lab data controls.

- **Relative Humidity Sensor Method:** a high-accuracy RH sensor tracks moisture building on the dry side of the film, measuring high transmission rates that saturate other sensor types.
- **Six Independent Test Chambers:** six specimens run at once, each with its own temperature sensor and result, for high throughput.
- **High-Permeability Range:** covers 5 to 6,500 g/m²·24h standard, with an optional range to 100,000, suited to nonwovens, membranes, and breathable films.

- **Water-Bath Temperature Control:** holds each chamber at a set point across a 5°C to 90°C range for standardized, isothermal testing.
- **100% RH Test Capability:** runs standard tests at up to 100% RH to reproduce demanding moisture conditions.
- **Swagelok Stainless-Steel Gas Path:** durable Swagelok fittings and stainless tubing give a leak-tight gas path with a long service life.
- **Digital Carrier-Flow Control:** adjustable dry-air or nitrogen sweep keeps carrier flow stable and repeatable across each cell.
- **Independent Digital Temperature Sensing:** each of the six chambers carries its own digital temperature sensor for accurate, independent control.
- **Highly Automated Workflow:** the instrument runs the full test process with minimal operator input, reducing effort and variability.
- **GAMP5-Aligned Data Integrity:** five-level user management, an audit-ready system log, and GAMP5-aligned controls support regulated pharmaceutical and medical labs.
- **Remote Maintenance and Updates:** the embedded system supports remote diagnostics and firmware updates to reduce service downtime.
- **Overload Protection:** built-in protection circuits guard the instrument during unattended runs.
- **Real-Time Data Curves:** on-screen plots of humidity, temperature, and transmission 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.
- **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 relative humidity sensor method measures water vapor transmission by tracking the humidity that builds up on the dry side of a film. The specimen separates a diffusion cell into two sides. One side is held at a high, controlled relative humidity, up to 100% RH, while the other side starts dry. The humidity gradient across the film drives water vapor from the wet side toward the dry side.

Water vapor permeates the film and raises the humidity in the dry chamber, where a high-accuracy relative humidity sensor tracks the rise. The rate at which humidity climbs, together with the chamber volume, carrier flow, and test area, gives the water vapor transmission rate. A dry air or nitrogen sweep and digital flow control keep the measurement stable.

The humidity sensor method handles high transmission rates that would overwhelm electrolytic or infrared sensors, which makes it well suited to breathable and permeable materials such as nonwovens and heat-exchange membranes. Water-bath temperature control holds each chamber isothermal, and six chambers run independently for parallel testing. A standard range of 5 to 6,500 g/m²·24h covers most high-permeability materials, with an optional range to 100,000 for very open structures.

TECHNICAL SPECIFICATIONS

Humidity Sensor WVTR Tester (6-Cell) - ToronWVTR™ H6 Technical Specifications

Parameter	Specification
Measurement Range (Standard)	5 to 6,500 g/m ² ·24h

Parameter	Specification
Measurement Range (Optional)	500 to 100,000 g/m ² ·24h
Resolution	0.001 g/m ² ·24h
Specimen Amount	6, independent
Temperature Range	5°C to 90°C (water bath)
Temperature Accuracy	±0.1°C
Test Humidity	100% RH (standard)
Humidity Accuracy	±1% RH
Test Area	13 cm ² (standard)
Specimen Size	≥ 150 mm × 94 mm
Specimen Thickness	< 3 mm
Carrier Gas	Dry air or 99.999% Nitrogen
Carrier Flow	0 to 200 ml/min
Gas Interface	1/8 inch
Voltage	AC 220 V, 50 Hz (110V is also available)
Dimensions	650 mm (L) × 690 mm (W) × 415 mm (H)
Net Weight	86 kg

Standard Delivery

Item	Description
Main Unit	Six-chamber humidity-sensor WVTR test instrument
Computer	Dedicated control PC
Control Software	Instrument operation and data-analysis software
Temperature Controller	Water-bath temperature control unit
Tank Regulator	Regulates carrier gas supply pressure
PCIe Acquisition Card	Data acquisition interface for the control PC
Communication Cable	Connects the instrument to the control PC
Sample Cutter	Prepares specimens to the required test size
Vacuum Grease	Seals the specimen at the chamber interface

Optional Accessories

Item	Description
Reference Film	Certified film for traceable calibration
Vacuum Grease	Additional sealing grease for specimen mounting
Sample Cutter	Additional specimen-preparation cutter
Laboratory Data Management System	Centralized data management and reporting software



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