

C403H Oxygen /Water Vapor Transmission Rate Test

System is based on the testing principle of Coulometric oxygen sensor and infrared water vapor sensor. It is designed and manufactured according to ASTM D3985, ASTM F1249, ISO 15106-2 and other relevant standards to provide high precision and high efficiency oxygen and water vapor transmission rate tests for high and medium gas barrier materials. It is suitable for testing the oxygen and water vapor transmission performance of films, sheets and related materials in the fields of food, medicine, medical devices, daily chemicals, photovoltaic, electronic and many others.

Product Features^{note1}**OTR/WVTR tested in One Instrument**

- OTR \ WVTR mode, OTR mode and WVTR mode are available for selection.
- OTR and WVTR tests can be automatically completed for each sample mounting.
- Genuinely reflect the OTR \ WVTR performance of the same sample, avoiding effect on test data due to sample contamination arising from instrument switching.

Coulometric Oxygen Sensor

- The instrument is equipped with a ppb level Coulometric Oxygen Sensor, as one of new Labthink technical achievements, which can obtain a lower limit of the test.
- Designed according to ASTM D3985 with absolute value, and no calibration is permitted.
- Longer service life, two times longer than that of a traditional Coulometric oxygen sensor.
- Over limit alarm and automatic protection.

Infrared Moisture Sensor

- The instrument is equipped with Labthink patented infrared moisture sensor which can obtain a lower limit of the test.
- Designed according to ASTM F1249.
- Longer service life, non-consumable.
- Over limit alarm and automatic protection.

Accurate Data

- Using 360 ° air circulation constant temperature technology, the temperature stability is better.
 - Equipped with high-precision temperature and humidity sensor, to monitor and record temperature and humidity changes in real time.
-

- In the test process, the automatic control on flow, temperature and relative humidity is realized, reaching higher accuracy.
- Higher test repeatability of 0.01 cc / (m²·day) can be achieved.

High Efficiency Three-cell

- Independent three sets of 50cm² standard area test cells, in line with parallel sample detection required by standards.
- Three samples can be tested at the same time under the same conditions, with independent tests data.
- In the same test cycle, the number of samples completed increases from 2 to 3.
- Automatic sample clamping, saving time and effort, ensuring consistent clamping force and better sealing.

Intelligent Operation

- The 12 Inch Touch panel of windows system is used for more convenient operation.
- Automatic mode - after inputting test temperature and humidity and clicking one key, the test proceeds automatically.
- New drawer type test cell, one key automatic in-and-out with sound and light reminder.

Safe and Reliable

- Safe Running: Labthink's high-end industrial computer is embedded to eliminate the system failure caused by computer virus and ensure the operation reliability and data storage security.
- Safe Operation: equipped with optical and other intelligent sensors as well as intelligent sound and light alarms to ensure the operation safety.
- Safe Performance: the instrument uses global renowned brand components with stable and reliable performance.

Powerful Functions

- Professional test mode provides flexible and plentiful control functions to meet the needs of scientific research.
- Display oxygen/water vapor transmission rate curve, oxygen/water vapor transmission coefficient curve, temperature curve and humidity curve.
- Wide temperature range, allowing the barrier test at different temperatures (customized).
- The gas purification device independently developed by Labthink can remove trace oxygen in nitrogen, providing oxygen-free carrier gas (optional).

Testing Principle

The pre-treated sample is clamped between the test chambers, oxygen or nitrogen with stable

relative humidity flows on one side of the film, and the high purity nitrogen flows on the other side; oxygen or water molecules diffuse through the film into high-purity nitrogen on the other side, and are carried to the sensor by the flowing nitrogen. By analyzing the oxygen or water vapor concentration measured by the sensor, the oxygen or water vapor transmission rate can be calculated.

Reference Standards

ASTM D3985, ASTM F1307, GB/T 19789, GB/T 31354, DIN 53380-3, JIS K7126-2-B, YBB 00082003-2015

ASTM F1249, ISO 15106-2, GB/T 26253, JIS K7129, YBB00092003-2015

Test Applications

Basic Applications	Films	The water vapor and oxygen transmission rate tests of various plastic film, paper plastic composite film, co-extrusion film, aluminum plating film, aluminum foil composite film, glass fiber aluminum foil paper composite film and other film materials.
	Sheet	The water vapor and oxygen transmission rate tests of PP sheet, PVC sheet, PVDC sheet, metal foil, rubber sheet, silicon sheet and other sheet materials.
Extended Applications	Package	Water vapor and oxygen transmission rate testing for bottles, bags, cans, boxes, and drums made of plastic, rubber, paper-plastic composites, glass, or metal—including pharmaceutical packaging, liquor bottles, cola bottles, peanut oil drums, Tetra Pak cartons, vacuum packaging bags, three-piece cans, cosmetic packaging, toothpaste tubes, jelly cups, and yogurt cups.

Technical Parameters

Table 1: Test Parameters^{note2}

Parameter/Model		C403H
Test Range	cc/(m ² ·day) (Standard area 50cm ²)	0.01~200
	g/(m ² ·day) (Standard area 50cm ²)	0.005~40
	cc/(pkg·day) (Package)	0.00005~1 (Optional)
	g/(pkg·day) (Package)	0.00002~0.2 (Optional)
	cc/(m ² ·day) (MASK area 5cm ²)	0.2~2000 (Optional)
	g/(m ² ·day) (MASK area 5cm ²)	0.2~400 (Optional)

OTR Resolution	cc/(m ² ·day)	0.0001
WVTR Resolution	g/(m ² ·day)	0.0001
OTR Repeatability	cc/(m ² ·day)	0.01 or 1%, whichever is greater
WVTR Repeatability	g/(m ² ·day)	0.005 or 2%, whichever is greater
Temperature range	°C	15 - 50 5 – 60 (Customized)
Temperature fluctuation	°C	±0.05
Humidity range	%RH (Within standard temperature range)	0%, 5 - 90%±2%
Extended functions	GP-01 Gas Purification Unit	Optional
	Package Test Chamber ^{Note3}	Optional
	DataShield™ Data Shield ^{Note 4}	Optional
	GMP Computer System Requirements	Optional
	CFR21Part11	Optional

Table 2: Technical Specifications

Test Cell	3 sets
Sample Size	4.4" x 4.4" (11.2cm×11.2cm)
Sample Thickness	≤120 Mil (3mm)
Standard Test Area	50cm ²
Carrier Gas Specification	99.999% high purity nitrogen, 99.5% oxygen (gas source is out of supply scope)
Air Source Pressure	≥ 40.6 PSI / 280 kPa
Interface Size	1/8" metal tube
Instrument Dimensions	23.6" H x 19.6" W x 27.5" D (60cm× 50cm× 70cm)
Power Supply	120VAC±10% 60Hz / 220VAC±10% 50Hz (either one of two)
Net weight	220Lbs (100kg)

Table 3: Product Configuration

Standard Configuration	Mainframe, tablet, sampler, vacuum grease, polyurethane pipe of 6 mm in diameter
Options	GP-01 Gas Purification Unit, Package Test Chamber, air compressor, CFR21Part11, GMP computer system requirements

Remarks

The compressed air inlet on the mainframe is a Φ 6 mm polyurethane pipe (pressure ≥ 79.7 psi / 550 kPa); the air source is out of supply scope.

Note 1: All the product features are subject to detailed descriptions in the “Technical Parameters”.

Note 2: The parameters in the table are measured by professional operators in Labthink Laboratory according to the requirements and conditions of relevant laboratory environmental standards.

Note 3: package fixtures can be customized to sample size.

Note 4: DataShield™ Data Shield System provides safe and reliable data application support. The system can be shared by multiple Labthink products. Please purchase separately as needed.