C406H 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

- Brand new rainbow bridge structural test cell and 360° air circulation constant temperature technology ensure better temperature stability.
- The test cell is equipped with a high-precision humidity sensor to monitor and record humidity changes in real time.

- In the test process, the automatic control on flow, temperature and relative humidity is realized, reaching higher accuracy.

High Efficiency 6 Test Cells

- Independent six sets of 50cm^2 standard area test cells, which is three times the traditional oxygen transmission rate test instrument.
- Six samples can be tested at the same time under the same condition, with independent tests data.
- In the same test cycle, the number of samples completed increases from 2 to 6.
- 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.
- Intelligent test cell hood which opens and closes automatically with sound and light alert.

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 safety of operation.
- Safe Performance: the instrument uses global renowned brand components with stable and reliable performance.

Space Saving

- The width of the instrument is only 1/3 of the traditional six-cell instrument, saving laboratory space.

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

Applications	**Films**	The oxygen and water vapor transmission rate tests of various plastic films, paper plastic composite films, co-extrusion films, aluminized films, aluminum foil composite films, glass fiber aluminum foil paper composite films and other film-like materials.
	Sheets	The oxygen and water vapor transmission rate tests of PP sheet, PVC sheet, PVDC sheet, metal foil, rubber sheet, silicon sheet and other sheet materials.

Technical Parameters

Table 1: Test Parameters[note2]

Parameter\Model		**C406H**
Test range	**cc/(m²·day) (Standard area** 50cm²**)**	0.02 - 200
	g/(m²·day) (Standard area 50cm²**)**	0.02 - 40
	cc/(m²·day) (MASK **area** 5cm²**)**	0.2-2000（Optional）
	cc/(m²·day) (MASK **area** 5cm²**)**	1 - 10000（Optional）
	g/(m²·day) (MASK **area** 5cm²**)**	0.2 – 400（Optional）
	g/(m²·day) (MASK **area**1cm²**)**	1 – 2000（Optional）
Resolution ratio	**cc/(m²·day)**	0.0001
	g/(m²·day)	0.0001
Repeatability	**cc/(m²·day)**	0.02 or 1%, whichever is greater

	g/(m²·day)	0.02 or 2%, whichever is greater
Temperature range	℃	15 - 50 5 – 60（Optional）
Temperature fluctuation	℃	±0.15
Humidity range	**%RH (**Within standard temperature range)	0%, 5 - 90%±2%, 100%
Extended functions	GP-01 Gas Purification Unit	Optional
	DataShield™ Data Shield Note 3	Optional
	GMP Computer System Requirements	Optional
	CFR21Part11	Optional

Table 2: Technical Specifications

Test Cells	6 sets
Sample size	4.4” x 4.4”（11.2cm×11.2cm）
Sample thickness	≤120 Mil（3mm）
Standard test area	50cm²
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 19.2” W x 25.9” D (60cm× 49cm× 66cm)
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, air compressor, CFR21Part11, GMP computer system requirements DataShield™ Data Shield Note3
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: 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.