C390H Water Vapor Transmission Rate Test System

C390H Water Vapor Transmission Rate Test System, is designed and manufactured based on infrared sensor method and conforms to the requirements of ISO 15106-2 and ASTM F1249. This instrument can be used to measure the water vapor transmission rate of barrier materials with high, and medium moisture barrier properties with a wide testing range and high testing efficiency. The instrument is featured with patented design of integrated block consisting of 3 test cells. Equipped with high precision sensors and professional computer-controlled system, the instrument can regulate and control the temperature, humidity and flow rate precisely, which guarantee the testing sensitivity and repeatability of test results. C390H is applicable to determination of water vapor permeability of plastic films, sheeting, paper, packages and other relative packaging materials in food, pharmaceutical, medical apparatus, consumer goods, photovoltaic and electronic industries, etc.

High Precision

- New type infrared sensor for water vapor analysis with higher sensitivity.
- Patented integrated test block with advanced hydrodynamic and thermodynamic design
- Temperature and humidity are accurately and automatically controlled throughout the test, eliminating the need for operator intervention or separate data-logging devices.
- Temperature and humidity sensor for independent monitoring of test cells.

High Efficiency

- Three identical specimens can be tested simultaneously, which meets the requirements for parallel test.
- Three distinct specimens can be tested under same testing condition, delivering higher throughput while reducing the number of instruments required.

Labor Saving

- Automatic temperature and humidity control eliminate the need for operator monitoring and adjustment.

Simplified Operation

- 12’’ touch-screen pad powered by Windows™ 10 operating system
- Fast automatic testing process
- Optional DataShield™ software and accessories for automatic data management

Product Features[Note3]

- **Patented Sensor Technology**

  The instrument uses Labthink’s proprietary infrared sensor for water vapor analysis, which has excellent precision, repeatability and service life. Higher sensitivity and stability make it unnecessary to calibrate with distinct reference films for different test ranges and the interval between calibrations is extended. The test range

of the sensor can be set automatically according to the transmission rate of the specimens without manual adjustment.

- **New Generation Integrated Testing Block**

  The patented three-cell integrated test block structure using advanced thermodynamics and hydrodynamics analysis greatly improves the temperature, humidity and flow measurement accuracy across the three test cells and supports sequential testing of three samples.

- **Automatic Control of Temperature, Humidity and Flow Rate**

  The internal temperature and humidity of the instrument are automatically adjusted with temperature and humidity sensors, maintaining the stability of the test specimen environment. Automatic flow rate control ensures constant flow during the testing process and minimizes any errors caused by an unstable flow rate.

- **Easy-to-use and High-efficiency System**

  The automatic test mode, combined with the instrument features, eliminates the need for manual adjustments to quickly obtain accurate results, saving training costs and releasing staff from manual monitoring so that they are available for other tasks.

  The professional test mode provides flexible and rich instrument control functions to meet individual scientific research needs.

  Unique, optional DataShield™ system, meets the requirements for centralized management of user data. It supports a variety of formats of exported data. Reliable security algorithms are used to prevent data leakage. It supports universal wired and wireless LAN, optional private wireless network and third-party software.

- **User-oriented Service Concept**

  Adhering to our user-oriented service concept, Labthink has created a customization system that provides flexible and comprehensive customization services for the accommodation of non-standard specimens and packages.

Test Principle

The test specimen is mounted in the diffusion cell, which is divided into a dry chamber and a controlled-humidity chamber. The dry side of the specimen is swept by a flow of dry nitrogen, and the water vapor permeating through the specimen from the controlled-humidity chamber is carried by dry nitrogen to the infrared sensor where proportional electrical signals will be generated. The water vapor transmission rate is obtained by analyzing and calculating the electrical signals. For whole package specimens, the dry nitrogen flows inside the specimen while the outside of specimen is maintained in a high humidity environment.

Test Standards

ISO 15106-2, ASTM F1249, GB/T 26253, JIS K7129, YBB 00092003-2015

Applications [Note3]

Basic Applications	**Films**	Plastic films, paper-plastic composite films, coextruded films, aluminum foils, aluminum composite films, glass fiber aluminum foil composite films and many others.
	Sheeting	PP, PVC and PVDC sheets, metal foils, rubber pads, silicon wafers and other sheeting materials.
	Packages	Plastic, rubber, paper, paper-plastic composite, glass and metal packages, e.g. plastic bottles, pouches, coated paper cartons, vacuum bags, metal three-piece cans, plastic packages for cosmetics, soft tubes for tooth paste, jelly and yogurt cups.
Extended Applications	**Closure Systems**	Water vapor barrier property of various closure systems for bottles, cartons and pouches.
	Solar Back-sheets	Water vapor permeability test of solar back-sheets
	Plastic Tubes	Water vapor permeability test of various sorts of tubes e.g. cosmetic tubes
	Blister Packs	Water vapor transmission rate of whole blister packs
	Automotive and Small Engine Fuel Tanks	Permeability of plastic fuel tanks
	Battery Plastic Shell	Water vapor transmission rate of battery plastic cell

Technical Specifications

Table 1: Test Parameters[Note1]

	Parameter	Model C390H
Test Range	g/(m^2·day) (Standard)	0.005 ~ 40
	g/(100in^2·day)	0.0003 ~ 2.6
	g/(pkg·day) (Package)	0.000025 ~ 0.2
Resolution	g/(m^2·day)	0.0001
Repeatability	g/(m^2·day)	0.005 or 2%
Test Temperature	℃	10 ~ 55 ±0.2
Test Humidity	RH	5% ~ 90% ±1%, 100%
Additional Functions	Package Test (3L Max.)	Option
	DataShield™ Note2	Option
	Computer System required by GMP	Option
	CFR21 Part11	Option

Table 2: Technical Specifications

Test Chamber	3 test chambers
Specimen Size	108mm×108mm
Specimen Thickness	≤3mm
Standard Test Area	50cm^2
Carrier Gas	99.999% High-purity Nitrogen (outside of supply scope)
Carrier Gas Pressure	≥0.28MPa/40.6psi
Port Size	1/8 inch metal tubing

Note 1: The parameters in the table are measured by professional operators in Labthink laboratory under strictly controlled laboratory conditions.

Note 2: DataShield™ provides safe and reliable data application support. Multiple Labthink instruments can share one single DataShield™ system which can be configured as required.

Note3: The described product features and test standards should be in line with Table 1: Test Parameters.

Please Note: Labthink is dedicated to the innovation and improvement of product performance and function. Therefore, technical specifications are subject to change without notice. Labthink reserves the right of final interpretation and revision.