C390 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 same 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 eliminates 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 identical or distinct 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 the 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 supports 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 subsequently 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 package specimens, the dry nitrogen flows inside the specimen while the outside of specimen is 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**	Including plastic films, plastic composite films, paper-plastic composite films, geomembranes, coextruded films, metalized films, aluminum foil, aluminum composite films, glass fiber paper composite films and many other film materials
	Sheeting	Including PP, PVC, PVDC, metal foil, film and silicon wafers
	Paper and Paper Board	Including paper and paper board e.g. tobacco packaging paper, paper plastic composite film
	Packages	Plastic, rubber, paper, paper-plastic composite, glass and metal packages, e.g. plastic bottles, peanut oil packages, coated paper cartons, vacuum bags, metal three-piece cans, plastic packages for cosmetics, soft tubes for toothpaste, jelly and yogurt cups
Extended Applications	**Closure Systems**	Test water vapor permeability of different closure systems
	Solar Back-sheets	Including solar back-sheets and related packaging material
	LCD Monitor	Including LCD monitor and films used for LCD monitor
	Pipes	Including various pipes e.g. PPR pipes
	Blister Pack	Water vapor permeability of blister pack
	Aseptic Wound Protection Films	Including aseptic wound protecting films, and protective clothing materials
	Battery Plastic Shell	Water vapor permeability 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 and 2% (Choose the bigger value)
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 further notice. Labthink reserves the rights of final interpretation and revision.