TORONTECH

UV WEATHERING TEST CHAMBER TORONUV™-300

UV Weathering Test Chamber ToronUV™-300 features a high-precision LCD controller for temperature and humidity management with PID auto-tuning, customizable programs, and touch-screen functionality. Offers a wide control range (-99.9°C to +200°C, 5–98% RH), advanced fault detection, and communication interfaces (485-232 & USB).

APPLICATIONS

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Application Area:

1. The UV fluorescent aging tester is mainly used to simulate the destructive effects of sunlight, moisture, and temperature on materials. Material aging effects include fading, loss of gloss, strength reduction, cracking, peeling, pulverization, and oxidation. The fluorescent UV aging test chamber simulates sunshine, condensation, and mimics natural moisture to cause material damage in a controlled environment. Tests may require a few days or weeks to reproduce the outdoor effects.
2. In the UV fluorescent aging test chamber, UV fluorescent lamps simulate sunlight, while the condensation and water spray systems reproduce the effects of rain and dew. The temperature is controlled throughout the test

loop. A typical test loop involves high-temperature UV irradiation followed by a dark, wet condensation cycle at 100% relative humidity. This is commonly applied in industries such as paint, automotive, plastic products, wood products, and adhesives.

Simulating the Sun:

1. Ultraviolet radiation from the sun is the main factor causing damage to most materials. UV light simulates the short-wavelength ultraviolet part of sunlight, which produces minimal visible or infrared energy. Different wavelengths of UV light can be selected depending on the test requirements, as the total ultraviolet radiation energy and wavelengths vary. UV lamps are typically categorized into UVA and UVB types.

UV Light Tube:

1. The UV lamps effectively simulate solar light in the short-wave ultraviolet range, from 365 nm to the sun’s cut-off wavelength of 295 nm (using lamps).
2. The short-wavelength ultraviolet light emitted by the lamp closely mimics the UV radiation found on Earth's surface, accelerating the aging of materials. However, the lamp may cause damage to some materials that do not align with natural sunlight.
3. These lamps are mainly used for quality control, research and development, or testing the weather resistance of materials.
4. The lamp simulates the ultraviolet light of the sun filtered by window glass, making it ideal for aging tests on indoor materials.

Irradiation Intensity Control:

1. The irradiation intensity control is optional and allows for accurate, repeatable test results. The light intensity control system lets users adjust the light intensity according to test requirements. A feedback loop device

ensures precise control of irradiation intensity, while also prolonging the service life of the fluorescent lamps.

Chamber Material:

1. The inner chamber is made of SUS304 stainless steel.
2. The outer chamber is made of SUS304 stainless steel.
3. The sample frame is made of stainless steel and aluminum alloy, offering easy access to test samples.
4. The chamber is equipped with 8 UVA or UVB ultraviolet lamps mounted on both sides.
5. The heating system uses a bladder-type heat sink, which provides high heating speed and uniform temperature distribution.
6. The chamber has a swing-up door for easy access.
7. The bottom of the chamber is fitted with high-quality fixed PU wheels for easy mobility.
8. The distance from the UV lamp to the surface of the sample is 230 mm, with the lamps arranged parallel to the surface.

Heating System:

1. High-speed electric heating tube with U-type titanium alloy.
2. Completely independent system, not affecting the control line.
3. Power output temperature control through microcomputer calculation, improving accuracy and efficiency of energy use.
4. Anti-over-temperature function in the heating system.

Name and Quantities:

1. UVA/B Lamp: 8 pcs
2. Temperature Controller: 1 set

3. Blackboard Thermometer: 1 pc
4. Radiometer: 1 pc
5. Electronic Components: 1 set
6. Rectifier: 4 sets
7. Electric Heating Tube: 2 pcs

Blackboard Temperature Control:

1. The temperature sensor is connected to a black aluminum plate.
2. The blackboard temperature is controlled using a blackboard thermometer to maintain stable temperature.

Controller Specification:

1. The main controller is a high-precision LCD temperature and humidity controller. It displays settings, execution time, heater status, and includes a PID auto-tuning function. The system allows for program control, with a user-friendly interface for setting temperatures and automating cooling operations. The control system includes a sound detection device to display and alarm faults automatically.
2. Customized touch-screen controller.
3. User program capacity: 120 sets with 1200 segments.
4. Running modes: Program running, fixed value running.
5. Program time: Selectable from 0 to 99 hours.
6. Controllable temperature range: -99.9°C to +200.0°C.
7. Controllable humidity range: 5% to 98% RH (humidity not displayed when temperature is below 20°C or above 90°C).
8. Controller accuracy: Temperature ±0.1°C / Humidity ±0.5 RH.
9. Controller resolution: Temperature ±0.1°C / Humidity ±0.5 RH.
10. Accumulative timer for working hours.

11. Equipped with 485-232 and USB communication interfaces and running software.
12. Temperature sensor: PT-100 SUS#316 (Platinum induction).
13. If a failure occurs, an independent over-temperature protection device and buzzer will activate automatically.
14. Fixed conditions can be set for 0 to 9999 hours, and fixed or alternating conditions can be selected.
15. The system includes nine points of failure warning and a simple maintenance method (Troubleshooting). The machine cannot be restarted until the problem is resolved.
16. Temperature rise and fall can be controlled with slope control, including self-calibration of the temperature reference point.
17. PID + SSR system is used for temperature control to improve stability and extend the life of the control elements and interface (OMRON).
18. With PID automatic calculation, the system reduces the inconvenience of manual settings. Error warnings are provided if a fault occurs. The controller includes a recording signal output for connection to a temperature recorder (optional) and a remote monitoring system (optional).

Control System Program:

1. **Door Lock:** If the UV lamps are on, the machine automatically cuts off the lamp power supply and enters a cooling mode when the door is opened to prevent harm. The safety door lock meets IEC 047-5-1 security requirements.
2. **Temperature Protection:** If the box temperature exceeds 93°C by 10%, the machine will automatically cut off the lamp and heater power supply and enter a cooling mode. This system also includes leakage, short circuit, over-temperature, over-current protection, and controller outage memory.

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   Radiation Measurement:

1. Handheld radiation meter with probe type (can be removed anytime if measurement is not needed).
2. Special high-precision ultraviolet radiation meter for accurate measurement.
3. The irradiance should not exceed 50W/m².

Light Source:

1. The emission spectrum of the lamp is primarily concentrated around the 313nm wavelength.
2. The emission spectrum of the lamp is mainly concentrated at a wavelength of 340nm.
3. As the energy output of the fluorescent lamp gradually decreases over time, to minimize the effects of light energy decay, the test chamber is fitted with a new tube. This setup includes a combination of new and used lamps to maintain consistent light energy output.
4. The effective service life of the lamp is between 1800 and 2000 hours.

Protection System:

1. **Door Lock:** If the UV lamps are on and the box is opened, the system will automatically cut off the lamp power and enter a cooling state to prevent harm. The safety door lock complies with IEC 047-5-1 security requirements.
2. **Temperature Protection:** If the temperature inside the box exceeds 93°C by 10%, the machine will automatically cut off the lamp and heater power, entering a cooling state to protect the equipment. The system also includes protection against leakage, short circuits, over-temperature, over-current, and controller outages.

Compliance with Standards:

This equipment complies with the following standards:

1. **ASTM D4329, D499, D4587, D5208, G154, G53**
2. **ISO 4892-3, ISO 11507**
3. **EN 534, PREN 1062-4**

4. **BS 2782**
5. **JIS D0205**
6. **SAE J2020**

Environment & Facilities:

1. **Allowable Working Environment Temperature:** 20°C to 30°C.
2. **Water Pressure:** 4 kg/cm², Diameter 8 cm.
3. **Air Supply Pressure:** None required.
4. **Drainage:** Wastewater from experiments must be excluded. Pipe diameter: 3 inches.

Optional Function: Adjustable irradiance.

TECHNICAL SPECIFICATIONS

No.	Function	Parameter
1	Inner Dimension	D×W×H ≥ 600×1170×500mm
2	Lighting area	Approximately W1000×D600mm ±2mm, 12pcs
3	Temperature Range	RT +10℃～ 70℃
4	Humidity Range	≥95～ R.H
5	Humidity uniformity	Within ±3%
6	Temperature uniformity	Within ±2℃
7	Humidity fluctuation	Within ±1%
8	Distance between sample and tube	230mm

No.	Function	Parameter
9	Ultraviolet wavelength	320nm～ 400nm UV-A
10	Lamp power	40W
11	Sink depth requirement	Automatic control
12	Blackboard temperature	40℃～ 65℃
13	Test time	0-999H Adjustable
14	Spray function	Required
15	Temperature Controller	LCD touch screen controller
16	Time Controller	Time computer integrated controller
17	Illumination heating system	The whole system is independent, nickel chromium alloy electric heating type heater
18	Condensation humidification system	All stainless steel shallow surface evaporative humidifier
19	Blackboard temperature	Double metal blackboard thermometer
20	Water supply system	Automatic control of water supply
21	Exposure mode	Steam condensation exposure, Light exposure
22	Safety protection	Leakage, short circuit, over temperature, water shortage, over current protection, Controller outage memory
23	Spray function	Yes

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