Environmental Testing

AAC

aerospace & advanced composites

Aerospace & Advanced Composites GmbH
Viktor-Kaplan-Straße 2
2700 Wiener Neustadt, Österreich
office@aac-research.at
+43 2622 90550-50
+43 2622 90550-99

Accelerated weathering tester

Overview

UV light plays a significant role in the degradation of durable outdoor materials. UV exposure in combination to moisture and temperature significantly reduces the lifespan of outdoor products, leading to frequent maintenance or replacement. In addressing the challenges, it is essential to explore effective testing methods. Environmental simulators, like QUV accelerated weathering testers play a crucial role in evaluating a material's resilience to UV exposure, enabling manufacturers to develop more durable and UV-resistant products. Such proactive measures are essential for creating sustainable, long-lasting (mainly) outdoor materials and minimizing the environmental impact of their degradation.

How it works

The accelerated weathering tester replicates the impact of outdoor weathering on materials by subjecting them to alternating cycles of UV radiation and moisture, all while maintaining precise control over elevated temperatures. This comprehensive simulation encompasses the combined effects of natural sunlight and artificial UV light, using specialized fluorescent lamps. In outdoor environments, materials often face prolonged exposure to moisture, mainly from dew rather than rain. The QUV addresses this by simulating moisture exposure through a distinctive condensation process. It's worth noting that higher temperatures can hasten the damaging effects of light and moisture on materials. Therefore, the tester ensures accurate temperature control and offers a means to elevate the temperature for accelerated testing purposes.

What AAC offers

The Accelerated Weathering Tester with SOLAR EYE® irradiance control system, available by AAC, effectively simulates the effects of sunlight, rain, and dew-induced damage. It employs a fluorescent UVA-340 lamp to recreate the impact of short-wave UV radiation in the range of 365-295 nm, emulating the harm caused by sunlight. In just a few days or weeks, this advanced QUV tester can replicate the types of damage that would ordinarily take months or even years to occur when exposed to outdoor environmental conditions.

Aerospace & Advanced Composites GmbH
Viktor-Kaplan-Straße 2
2700 Wiener Neustadt, Österreich
office@aac-research.at
+43 2622 90550-50
+43 2622 90550-99

Key features and specifications

Model	Q-Lab QUV Se
Specimen Orientation	75° (from horizontal)
Lamp Type	UVA-340
Black Panel Temperature **Light Cycle (°C)** **Condensation Cycle (°C)**	 35-80 40-60
Minimum Irradiance (W/m² /nm)	0.20
Typical Irradiance (W/m² /nm)	0.68-0.89
Maximum Irradiance (W/m² /nm)	1.55

Specimen Size

Description	Size	Exposure Area	Sample Capacity
Standard Holder	75 ×150 mm	95 × 63 mm	48
Medium Holder	100 × 150 mm	95 × 88 mm	32
Large Holder	150 × 150 mm	95 × 132 mm	24

If you would like to perform a test according to your unique needs or specific standards, our team is here to help and discuss your requirements. We're committed to providing detailed information and offering a tailored solution that meets your needs.

Aerospace & Advanced Composites GmbH
Viktor-Kaplan-Straße 2
2700 Wiener Neustadt, Österreich
office@aac-research.at
+43 2622 90550-50
+43 2622 90550-99

Xenon test chamber

Overview

Sunlight, heat, and moisture collectively contribute to millions of dollars in product damage annually, causing issues such as cracking, crazing, hazing, fading, and yellowing. To mitigate these damages, industries utilize accelerated weathering testing, a process that simulates long-term outdoor exposure by subjecting test samples to intense conditions of light, water, moisture, and heat. This testing aids in understanding the specific impacts on materials, helping manufacturers develop strategies to enhance sunlight resistance, withstand high temperatures, improve resistance to water-related damage and their combination. Accelerated weathering testing is a crucial tool for industries to enable the creation of more durable and weather-resistant products. By proactively addressing the challenges posed by the elements, businesses can save millions in potential damages and replacements while ensuring the longevity and quality of their offerings.

How it works

The Xenon test chamber was designed to simulate the repetitive cycles of sunlight, heat and water. The use of xenon arc lamps reproduces full spectrum sunlight. This includes ultraviolet, visible light, and infrared radiation, offering a realistic simulation crucial for accurately assessing color change, lightfastness and any other change that can occur under those conditions. Additionally, proper filtering of light ensures the appropriate spectrum for each application, resulting that differences in spectra can influence the speed and type of material degradation. Moisture plays also a critical role in testing. Simulating the damaging effects of outdoor moisture attack, water spray can be programmed to operate during light or dark periods, creating thermal shock and mechanical erosion. Relative humidity can be also controlled as humidity can impact degradation, especially when materials are physically stressed while attempting to maintain moisture equilibrium. Controlled humidity also affects the drying rate of specimens. Similarly, temperature control ,which is done by utilizing a black panel temperature sensor, is equally crucial, as it significantly influences the rate of degradation. In essence, Xenon test chambers provide a comprehensive solution for material testing, offering versatility, precision, and reliability across a wide array of industries and applications.

What AAC offers

The Xenon Test Chamber, available by AAC, replicates the damage caused by full-spectrum sunlight and rain in a timeframe of days or weeks. Equipped with a Daylight - F Filter, it accurately reproduces the spectral qualities of direct sunlight, particularly in the short-wavelength UV region. The tester also features standard humidity control and an optional spray function, providing versatility in testing conditions. This chamber is an optimal solution for industries seeking to assess the durability and performance of their products.

Aerospace & Advanced Composites GmbH
Viktor-Kaplan-Straße 2
2700 Wiener Neustadt, Österreich
office@aac-research.at
+43 2622 90550-50
+43 2622 90550-99

Key features and specifications

Model		Q-Lab Q-Sun Xe-3 HS	
Specimen Orientation		flat-array	
Lamp Type		air-cooled xenon arc	
Filter Type		Daylight-F	
Black Panel Temperature **Light Cycle (°C)** **Light Cycle with IR Filter (°C)** **Dark Cycle (°C)**		 50-120 45-100 25-50	
Typical irradiance Values with Daylight-F Filter (W/m^2)	At 340 nm 0.80 (1.30)	At 420 nm 1.50 (2.40)	At 300-400 nm 75 (125)
Relative Humidity (%RH)		20-95	

Specimen Size

Description	Size	Exposure Area	Sample Capacity
Standard Holder	50 ×100 mm	43 × 96 mm	51
Medium Holder	75 × 150 mm	65 × 147 mm	20
Large Holder	100 × 150 mm	93 × 147 mm	16

If you would like to perform a test according to your unique needs or specific standards, our team is here to help and discuss your requirements. We're committed to providing detailed information and offering a tailored solution that meets your needs.

Aerospace & Advanced Composites GmbH
Viktor-Kaplan-Straße 2
2700 Wiener Neustadt, Österreich
office@aac-research.at
+43 2622 90550-50
+43 2622 90550-99

Pressure Cooker Test (Autoclave)

Overview

Autoclave testing is a crucial step in evaluating novel materials and products for their ability to withstand physical, chemical, and environmental challenges. By subjecting materials to a combination of liquid, temperature, and pressure, along with different atmospheric conditions, this testing method simulates real-world scenarios in a controlled laboratory environment. The process is effective in quickly assessing a material's resistance to corrosion, coating degradation, and reactions with the environment, allowing for the establishment of application limits. Autoclave testing is versatile, extending beyond coatings to aging tests for plastics, ceramics, and metal parts. Additionally, autoclaves play a key role in various synthesis processes, including hydrogenation, nanoparticle synthesis, and hydrothermal or solvothermal synthesis, making them a critical tool in both material testing and synthesis methodologies across diverse industries.

How it works

An autoclave is a closed, gas-tight, and static testing apparatus designed for subjecting test samples to corrosive conditions under elevated temperatures and pressures, allowing the evaluation of the effects of these changes. The autoclave consists of a high-pressure vessel made of hast alloy, featuring a Teflon liner, with internal dimensions measuring Ø 125 mm in diameter and 380 mm in height. Additionally, the autoclave can be outfitted with a rack to accommodate a greater quantity of smaller specimens. Temperature regulation is achieved through an internal Teflon-covered thermometer, while a digital pressure sensor monitors the autonomous pressure of water vapor, with the ability to transmit data to a PC.

Application area

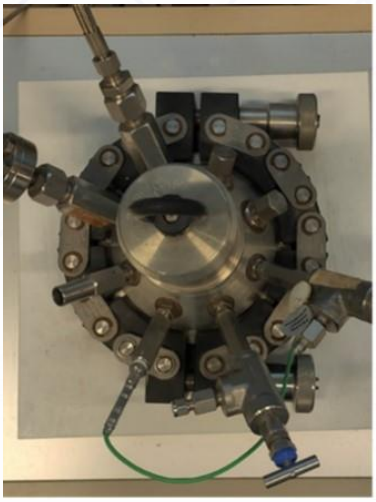
- Corrosion of metals, ceramics, plastics, glass
- Hydrothermal synthesis of nanoparticles
- Solvothermal synthesis of nanoparticles
- Chemical resistance testing
- Hydrolysis - resistance to water vapor
- Rapid evaluation of material´s degradation

Testing according to Standards

- ASTM G31-21
- G11-19, G46-2013
- G48-2015
- G170-2012
- NACE Standard TM0185-2006 (No. 21217)
- ISO 6872:2015

Key features and specifications

Model	BERGHOF HR-4000 AUTOCLAVE
Volume (mL)	4000
Pressure (bars)	150
Working Temperature (°C)	200
Inner Dimensions (mm)	Ø 125 H: 380
Liquid Phase	Water, glycols, alcohols, etc
Gas	Air, Ar, N_2, O_2
Material	C276 Hastelloy with Teflon liner



Aerospace & Advanced Composites GmbH
Viktor-Kaplan-Straße 2
2700 Wiener Neustadt, Österreich
office@aac-research.at
+43 2622 90550-50
+43 2622 90550-99

Climate/ Thermal Chambers

Overview

A climate chamber, also known as an environmental chamber, is a controlled environment designed to simulate various climatic conditions such as temperature and humidity. Widely used in research and development, these chambers facilitate product and material testing, assessing performance, durability, and reliability under different scenarios. Industries utilize them for electronics testing, studying the impact of climate change, conducting weathering studies, and calibrating sensitive instruments. The versatility of these chambers allows for customized simulations, aiding researchers and engineers in understanding real-world scenarios to ensure the reliability, safety, and performance of diverse components, devices, products and materials.

What AAC offers

A variety of tests can be performed in our climate chambers, depending on the specific requirements and objectives of the research or testing.

1. **Temperature Testing:**
   - **Temperature Stability Tests:** Assessing how products, materials, components, or devices perform under constant temperatures, both high and low.
   - **Thermal Cycling Tests:** Subjecting products, materials, components or devices to repeated cycles of heating and cooling to assess reliability and durability.
2. **Aging and Durability Testing:**
   - **Accelerated Aging Tests:** Simulating conditions that accelerate the aging process to predict the long-term durability of products or materials.
   - **Humidity Stability Tests:** Studying the impact of varying humidity levels on products, materials, components, or devices.
   - **Damp Heat Tests:** Assessing the impact of high humidity (>85 %RH) and elevated temperatures (40 to 85 °C) according to international standards such as IEC 61215, IEC 61646, and IEC 60068-2-30:2005.

Key features and specifications

Model	Weiss SB22/300/40	Weiss WK111-340
Internal Dimensions W x H x D (mm)	540 x 680 x 820	580 x 750 x 765
Interior Volume (L)	301	335
Temperature Range (°C)	-40 – +180	-10 - +90
Humidity Range (% RH)	10 – 98	10 – 98