

VALIDATION LAB

Driving innovation and quality through advanced, industry-specific testing solutions

Our testing capabilities support **R&D, product development and quality assurance** across various industries such as automotive, aerospace, electronics, and materials science. We offer advanced testing solutions tailored to industry-specific standards, helping clients accelerate innovation, and enhance product performance, reliability and lifetime. With a broad portfolio of physical, mechanical, environmental, and chemical testing methods, we provide detailed insights that drive smarter design decisions and continuous improvement. Our specialists work closely with clients to improve accuracy, efficiency, and technical excellence.

GAS TESTING

- Evaluate reactions in controlled gas environments to understand materials and components' behaviour.
- Test gas flow and pressure parameters to simulate operational conditions.
- Analyse chemical interactions occurring within gas environments to assess performance and durability.
- Ensure system integrity by detecting leaks and verifying airtightness under gas exposure.
- Support product development and quality assurance with precise gas testing protocols.

HUMIDITY TESTING

- Control and vary humidity levels precisely to simulate different environmental conditions.
- Conduct combined temperature-humidity aging tests to assess material and component durability.
- Evaluate long-term performance under varying moisture and temperature conditions to predict real-world reliability.
- Essential for testing products exposed to humid, tropical, or variable climates.
- Supports accelerated aging tests to identify potential moisture-related failures early in product development.

VIBRATION AND SHOCK TESTING

- Simulate transport and operational vibrations to assess mechanical stability.
- Conduct mechanical fatigue testing to evaluate material and component endurance over time.
- Perform resonance testing to detect potential structural weaknesses and failure points.
- Ensure products that withstand real-world vibration and shock stresses encountered during use and transportation.

TIGHTNESS / LEAKAGE TESTING

- Detect and measure leaks in packaging and sealed systems to ensure product integrity.
- Assess the airtightness of components to maintain performance and safety standards.
- Use precise testing methods to identify even minor leaks that could compromise system reliability.
- Testing supports quality assurance by verifying sealing effectiveness under various environmental conditions.

TEMPERATURE TESTING

- Simulate hot and cold conditions to assess material and component resilience.
- Thermal cycling testing involves repeatedly exposing samples to alternating high and low temperatures to identify potential failures.
- Thermal shock testing rapidly changes temperature to evaluate the ability of materials to withstand sudden thermal stresses.
- These tests help ensure the reliability and performance of products in real-world temperature variations.
- Crucial for industries like electronics, automotive, and aerospace, where temperature extremes impact the product.

CORROSION TESTING

- Salt spray and fog chamber tests simulate accelerated corrosion processes.
- These tests evaluate how materials degrade under harsh chemical or salt environments.
- Corrosion testing helps predict long-term environmental degradation and material lifespan.
- Testing ensures that products can withstand corrosive conditions encountered in real-world applications.
- Results support improvements in material selection and protective coatings for enhanced durability.

ALTITUDE / PRESSURE TESTING

- Simulate high-altitude conditions to assess device performance.
- Evaluate pressure variation and low-pressure environments for reliability testing.
- Ensure products function safely and effectively under atmospheric extremes.
- Used for testing aerospace, electronics, and other critical components exposed to altitude changes.

LIFETIME / RELIABILITY TESTING

- Accelerated aging and stress testing simulate extended use in a shorter timeframe to predict product lifespan.
- Tests evaluate long-term performance, identifying potential failure points before market release.
- Simulated use conditions replicate real-world stresses to ensure the reliability and durability of materials and components.
- These tests support product development and quality assurance by validating durability claims and improving design robustness.

EQUIPMENT SPECIFICATIONS

ANALYSIS TOOLS FOR VIBRATIONS

StrobCAM

Allows video & analysis of the movement when the oscillation is applied



StrobCAM

VibroGo

Measures surface movement using an optical method

- Frequency: up to 100 kHz
- Max Velocity: 2 m/s
- Single-point HeNe laser



VibroGo

CORROSION CHAMBER

Testing of devices under corrosive conditions

- Corrosion due to salt-spray
- Temperature control:
 - 10 °C to 55 °C
- Testing area:
 - 1000 x 600 x 850 mm (500 l)



HAST CHAMBER

Accelerated aging of devices

- Temperature: 105 °C to +142.9 °C
- Relative humidity: 75 % to 100 %
- Pressure range: 0.020 to 0.196 MPa
- Interior volume: 51 l x 2
- Customised feedthrough to allow high-current supply



CLIMATE CHAMBER INCLUDING A SHAKER

Combined testing under g-force (up to 200 g), temperature and humidity changes

- Temperature: -70 °C to 180 °C
- Relative humidity:
 - 10 % to 95 % (4 °C to 95 °C)
- Temperature ramp speed:
 - Cooling: 14.5 °C / min
 - Heating: 16.5 °C / min

SHAKER IMV A11/EMIHAG

- Frequency: up to 4500 Hz
- Force (sine): 11 kN
- Force (shock): 22 kN
- Max Displacement: 55 mm
- Max Load: 200 kg

Tira TV 51110 (small)

- Frequency: up to 7000 Hz
- Force (sine): 100 N
- Max Displacement: 13 mm
- Max Load: 3 kg



GAS TEST STAND

Testing of gas sensors in complex atmospheres

- Temperature: 0 °C to 60 °C
- Humidity (rH): 0 to 90 % (@ 10 °C to 60 °C)
- Carbon dioxide CO₂: 200 - 4000 ppm
- Carbon monoxide CO: 3 - 30 ppm
- Ammonia NH₃: 50 ppb - 10 ppm
- Hydrogen sulfide H₂S: 20 ppb - 25 ppm
- Sulfur dioxide SO₂: 0.5 - 25 ppm



ALTITUDE CHAMBER

Simulating the sea-level height

- Pressure range: ambient pressure to 5 mbar
- Temperature (at ambient pressure to 150 mbar): -60 °C to 120 °C
- Humidity (at ambient pressure): 15 %rh to 95 %rh
- Interior volume: 1 m x 1 m x 1 m
- Customizable feedthrough



SUN SIMULATION CHAMBER

Simulation of the circadian sun spectrum including IR and UV light

- Performance data for irradiation:
 - Spectral irradiation distribution: 280 to 3000 nm
 - Irradiation intensity: 600 to 1120 W/m²
- Climate tests with irradiation:
 - Temperature: 15 °C to +80 °C
 - Relative humidity: 10 % to 80 %
- Temperature tests with irradiation:
 - Temperature: -20 °C to +100 °C



Precision matters.

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