



# Product components perform on trust

We help validate it with environmental testing to prove durability



## Trusted experts helping you meet product requirements

At UL, we work with manufacturers, original equipment manufacturers (OEMs) and their suppliers to bring safer, smarter products to market. We offer a comprehensive set of services throughout the entire development cycle, providing you with single destination testing and advisory services.

Our expertise and key relationships offer a level of quality and confidence that your components will be validated against market specifications. We work closely with key international regulatory agencies, code authorities and manufacturers on the development of consensus-based standards and services that apply to emerging technologies within your industry.

## Covering the elements of environmental testing

Your products and their components can spend a majority of their existence outdoors, so making sure your products perform under varying conditions is important. Our environmental testing brings a variety of real-world simulations and accelerated testing together to help you validate resistance, durability, safety and performance.

Some of the simulated environments we offer:

- » Temperature
- » Humidity
- » Altitude
- » Vibration
- » Thermal shock
- » Water Ingress Protection (IP)
- » Dust
- » Salt fog
- » Ozone
- » Ultraviolet (UV)
- » Combine Environments (Thermal w/Vibration)



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We provide environmental testing to validate for:

- » LV124
- » EC 60529
- » SO 20653
- » JIS D 0203
- » IEC 60068 Series
- » Automotive Manufacturer Standards

#### Temperature: thermal testing

Our array of thermal testing equipment can produce a range of temperatures from negative 70 degrees Celsius to 180 degrees Celsius. They can also incorporate noncondensing relative humidity from 10%-95% and offer a ramp rate up to 15c per minute.

Standards include:

- » IEC 60068-2-1
- » IEC 60068-2-2
- » IEC 60068-2-30
- » IEC 60068-2-38
- » IEC 60068-2-67
- » IEC 60068-2-68

#### Thermal shock

Our thermal shock testing exposes and evaluates components' resistance to sudden changes of temperature within short time periods. Hot chambers range from 50 degrees Celsius to 210 degrees Celsius, while cold chambers range from negative 75 degrees Celsius to negative 190 degrees Celsius.

Standards include:

- » GMW 3172
- » SAE J1455
- » IEC 60068-2-14
- » LV 124-2
- » ISO 16750-4

#### Altitude

Our standard and large capacity altitude testing ranges from sea level to 70,000 feet at temperatures that range from negative 73 degrees Celsius to 177 degrees Celsius with ramp rates 2.5c – 5c per minute.

Standards include:

- » IEC 60068-2-13
- » IEC 60068-2-40 (-15c at 50,000 feet)
- » IEC 60068-2-41 (+85c at 45,000 feet)

#### Ingress Protection (IP) water and dust

Our IP water and dust testing evaluates liquid ingress and solid particle protection. Tests include various substances such as hands, steel balls, steel wires, dust, water and more.

Standards and IP test ratings include:

- » IEC/EN 60529
- » Water IP
- » IPx1, IPx2, IPx3, IPx4,
- » IPx5, IPx6, IPx7, IPx8
- » Dust IP (Talcum powder only)
- » IP5x, IP6x

#### Ozone testing

Our ozone chamber testing simulates ranges from 0-250 PPHM/VOL and 0-1,000 PPHM/VOL2 at zero to six cubic feet per minute air flow.

Test methods include:

- » ASTM D1149
- » ASTM D1171
- » ASTM D1149
- » ASTM D3395
- » ASTM D4575 (Method A Only)
- » ISO 1431—1: 1989
- » ISO 1431—2: 1994
- » ISO 1431—3: 2000

For more information about UL's complete environmental testing services and offerings, visit [UL.com](http://UL.com) or contact us at [consumertechinfo@ul.com](mailto:consumertechinfo@ul.com).



**Empowering Trust®**