

# Environmental Simulation

CTC advanced's environmental test center is accredited according to DIN EN ISO/IEC 17025 and offers a range of state-of-the-art test equipment to assess the resistance, long-term behaviour and ageing effects of a product under various simulated conditions. CTC advanced tests against international standards or customized standards which include also those of many automotive manufacturers.

## CLIMATIC TESTS

### Test facility features:

- Test chambers up to 1600 x 2130 x 2100 mm
- Temperature range: -70 °C up to +300 °C
- Thermal shock testing: -75 °C up to 200 °C
- Temperature changing rates up to 10 k/min normal, <10s under shock condition
- Humidity 10 % to 95 % RH
- Tests under inerting gas atmosphere
- Dewing test

### Testing according to the following standards:

- DIN EN IEC 60068-2-1, -2, -14, -30, -38, -41, -48, -78
- DIN ISO 16750-4
- ISO 19453-4

## VIBRATION & SHOCK

Various shakers for 3D simulation and forces up to 300 kN with a climatic chamber size of 2.500 x 2.500 x 1.400 mm and even more for climate-independent shaker tests.

### Test scope:

- sine, random, sine on random, random on random
- shock response spectrum (SRS shock) and shock
- resonance analysis
- real time profiles

### Test facility features:

- Displacement up to 3 inches
- Testing mass of max 2.500 kg
- Slip table
- Sinus up to 220 g (pk)
- Random Vibration up to 180 g (rms)
- Shock up to 500 g
- Boosted Head-Expander

### Testing according the following standards:

- DIN EN IEC 60068-2-6/-27, -29, -47, -57, 64, -80
- DIN ISO 16750-3
- ISO 19453-3

## CRASH TEST BENCH

The crash and shock bench is integrated in a protected area and can be used universally. Besides real crash tests we can perform defined acceleration in positive and negative direction.

### Test facility features:

- High velocity shock up to 70 km/h
- Testing mass up to 600 kg
- Slider size: 1200 x 1200 mm
- Max. force: 900 kN
- Max. acceleration: 70 g
- Max. stroke: 1100 mm
- Crash block: 8 t

## IP-CLASSIFICATION

A method to classify the degrees of protection provided by the housings of electrical devices. This means the ingress of moisture or dirt.

### Test facility features:

- available space in IP test chamber (2nd characteristic numeral): 2500 x 6000 mm
- Turntable diameter: 1500 mm
- samples up to 300 kg can be handled

### Testing of the protection against several kinds of water according to the following standards:

- IP code testing acc. DIN EN/IEC 60529 and ISO 20653
- IP X1 until X8, X6K and IPX9K / IP1X-6X

## DUST CHAMBER

Testing of the protection against dust according to current standards with several types of dust:

- talcum dust
- Arizona dust (fine or coarse)

### Test facility features:

- internal dimension (1st characteristic numeral of IP protection class): 1100 x 1200 x 900 mm
- max load 300 kg

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## SALT SPRAY CHAMBER

In the walk-in salt spray chamber the corrosion behavior due to the exposure of salt air, salt fog or salt spray can be simulated in fast motion:

### Test facility features:

- Chamber base area: 3 x 2 m
- Floor load: up to 1000 kg/m<sup>2</sup>

### Testing scope:

- Corrosion tests according to DIN EN ISO 9227, DIN EN IEC 60068-2-11, -52 and ASTM B 117 etc.

## VACUUM CHAMBER

This test procedure enables the simulation of aircraft transportations under negative pressure conditions. Aerospace applications can be tested as well.

- Generating low pressure up to 1 kPa (absolute)
- Temperature up to 200° C
- Appropriate for sample sizes up to 2.000 x 1.500 x 500 mm and a testing mass of up to 500 kg
- Altitude tests / Low Pressure tests according to DIN EN EC 60068-2-13, -41 / etc.

## SUN SIMULATION

### Testing according to the following standards:

- DIN EN IEC 60068-2-5 and DIN 75220
- ISO 4892-1, -2, -3
- VW PV 3929, -3930
- SAE J2527, -J2412
- ASTM G155 etc.

### Test scope:

- Outdoor and indoor exposure
- Temperature range: -40 to 100°C
- Load capacity: 100 kg
- Humidity: 90%
- Front- & backspray / humidity

## CHEMICAL RESISTANCE

- Chemical tests according to DIN EN 60068-2-74 / DIN ISO 16750-5 / VW 80000 / ISO 19453-5 etc.
- Application methods: Spraying / Brushing / Wiping / Pouring / Dipping / Immersing

## HIGH SPEED CAMERA

A high-speed camera can record test results which occur during tests and cannot be perceived by the human eye.

- 10.000 fps (frames per second) in 640 x 480
- 5.300 fps in HD Ready (1280 x 720)
- 2.500 fps in Full HD (1920 x 1080)

Measurements can be taken up to 100kSa/s, image-synchronized as well.

## TEST TAILORING

- Tailoring according to DIN EN 60068-1
- Consulting in life time, functional tests, etc.
- Development of individual test plans and specifications