

# Laboratory for Environmental Testing



## SPEKTRA offers comprehensive Environmental Testing services



Vibration testing system with climate chamber

**SPEKTRA - Your valued partner for quality assurance in research, development and production.**

Farsighted companies include environmental evaluation in the early phases of product development as part of a total cost optimization process.

Automotive suppliers as well as manufacturers of electronic components, sensors, and test and measurement equipment utilize our expertise in a wide range of services offered.

We react flexibly to your time constraints. Different tests are performed in parallel. Additional testing requirements such as function monitoring during the test can also be realized.

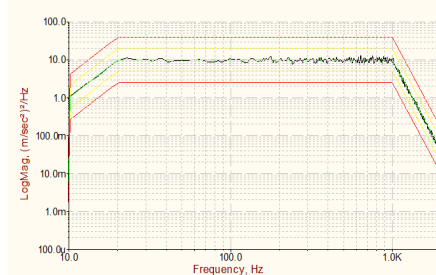


Vibration testing of small modules under Thermostream®

## Mechanical Tests, e.g. according to IEC 60068 or factory standards

- **Vibration Testing**
  - Sinusoidal
  - Resonance Search
  - Sweep
  - Random
  - Sine on Random

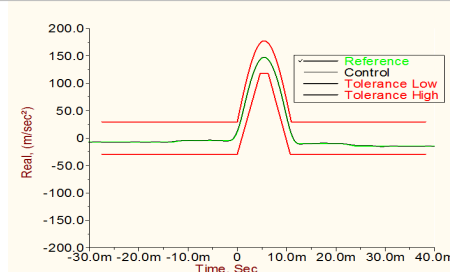
Maximum Displacement:  
**100 mm (peak-peak)**  
Maximum Acceleration:  
**650 m/s<sup>2</sup>**  
Maximum Velocity:  
**3,0 m/s**  
Maximum Force vector:  
**11000 N**



Broad band Random

- **Shock Testing**
  - half-sine shock
  - saw-tooth shock
  - trapezoid shock
- **Continuous Shock Tests**

Maximum Displacement:  
**100 mm (peak-peak)**  
Maximum Acceleration:  
**1300 m/s<sup>2</sup>**  
Maximum Velocity:  
**4,5 m/s**  
Maximum Force vector:  
**27500 N**



Single Shock

## Climatic Tests, e.g. according to DIN EN 60068 or factory standards

- Cold
- Dry heat
- Damp heat, constant
- Damp heat, cyclic

The **payload bay volume** of our climatic chamber is 0.6 m<sup>3</sup> (600 liter), the dimensions are **800 x 800 x 950 mm**.

Temperature range for constant and cyclic tests: **-70°C ... +180°C**

Change of temperature:  
**10 K/min**

Range of relative humidity:  
**10 % ... 95 %**



Change of temperature / storage

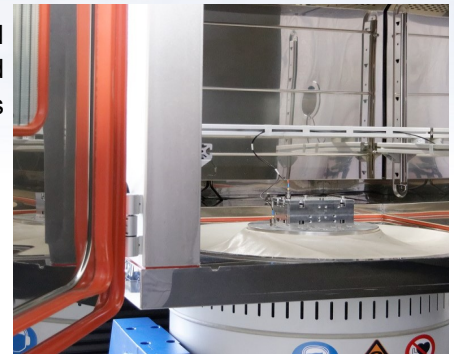
# Laboratory for Environmental Simulation



## Combined mechanical / climatic tests

**Combined tests** with **vibration** and **temperature** are often required by product or factory standards. Those combined tests are realized with our climatic chamber that has a connection to our shaker in its base element.

For projects where there are no specific product or factory standards, we **counsel** our customers on how to specify tests, test severity and how to carry out the examination.



Combined test Vibration / Temperature

## Monitoring / Recording of digital and analog signals

With our monitoring software "Observer", both digital and analog output signals can be monitored at sampling rates up to 2 MHz.

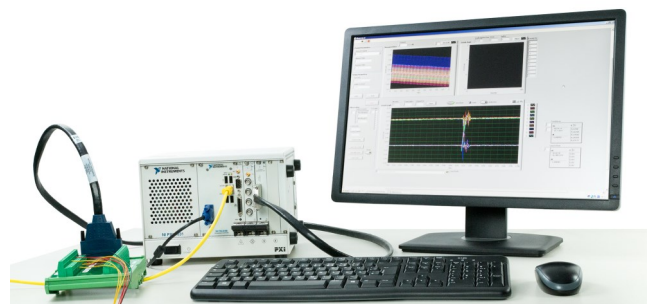
The software was written specifically for this monitoring and can be adapted - if necessary - to meet special requirements of our customers.

With an A/D-converter, voltages up to 10 V can be digitized (higher voltages are provided with voltage divider). By means of suitable converters, additional measured quantities such as current consumption can be monitored.

For the monitoring of devices under test, up to 16 channels are available that can detect very small deviations (in the  $\mu\text{s}$  - range), made possible because of the high sampling rate.

Our software displays the relevant test data and stores it as required. Special setups allow recording of specific intervals in a ring buffer.

For the monitored channels, limits can be defined that activate the ring buffer. When the measured values are below or above those limits the data from the ring buffer is automatically stored.



Computerized monitoring of output signals

## Example of Use:

The sliding contacts of a device under test should be examined for contact bouncing during a shock test. For this purpose, the output signal (behind the sliding contacts) was decoupled, digitized and recorded with a sampling rate of 20 kHz in the ring buffer with a capacity of one second. This finely graduated sampling rate allowed detection of the shortest interruptions of the output voltage in the microsecond range.

In another example, the output voltages of test devices were monitored during various shock tests. Again, the output signal was decoupled with a voltage divider, digitized by an A/D converter, and recorded with a sampling rate of 50 microseconds in the ring buffer. When the conditions for the predetermined tolerance range (adjustable limit areas that can be programmed with the software) were satisfied, the recorded data of the ring buffer was automatically stored .

All data are subject to change

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