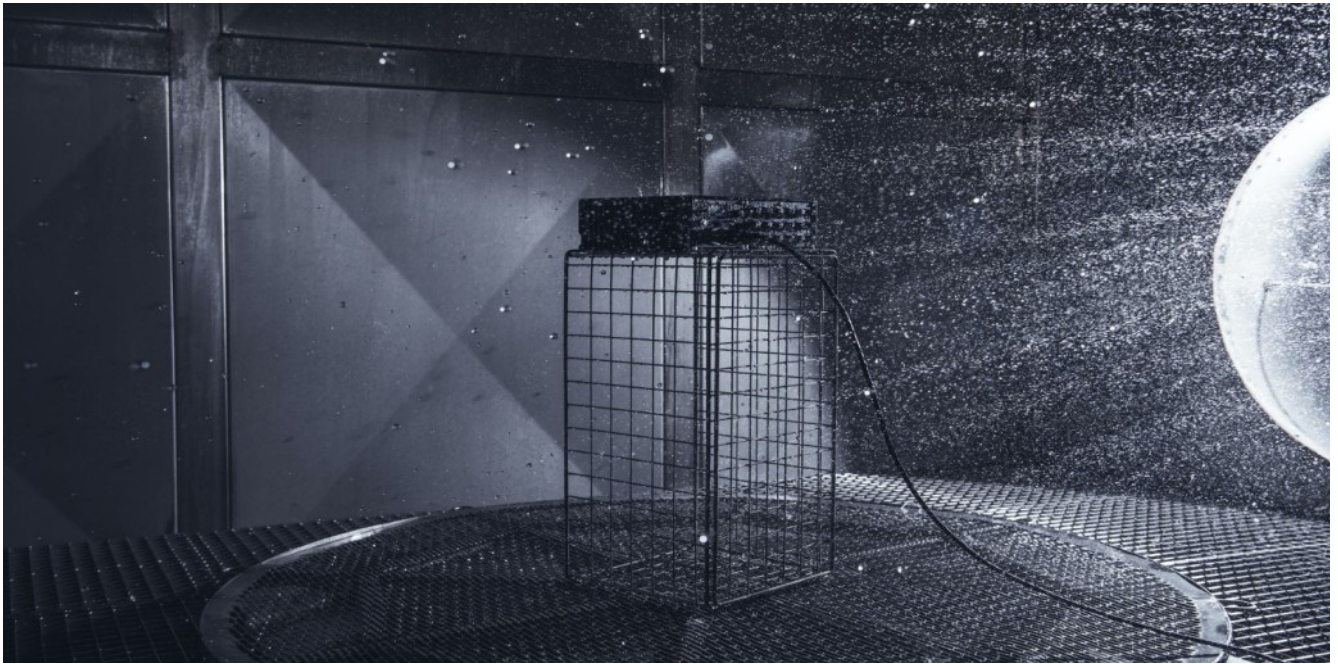


RUAG TEST CENTER

# Environmental Simulation



➤ Environmental influences affect the reliability, quality and service life of technical products. Environmental simulation tests are indispensable for a product to function properly over its entire service life, even under different environmental influences. The test results provide information about the resilience of the product and the components to environmental influences.

As an accredited test center, we carry out environmental simulation tests in accordance with national and international standards, as well as individual customer requirements. We carry out tests early in the development process and therefore support you with comprehensive quality assurance and subsequently contribute to the minimization of risks and the reliability of your products.

## ➤ Our Services

In our accredited test center, we carry out simulations for the detection of environmental influences. Our specialists convince in all aspects with experience and tailor-made services. They meet the high requirements for quality, reliability and accuracy. For comprehensive quality assurance, they are already involved in the start-up phase of projects.

Our services include:

- Mechanical testing: vibration, mechanical shock, fall
- Temperature and humidity
- Corrosion: salt spray
- Ingress protection: dust, rain and immersion
- Negative pressure
- Packaging: storage and transport of dangerous goods
- Testing of ammunition and explosives
- Testing of (rechargeable) batteries

## ➤ Your Benefits

Thanks to our well-equipped testing infrastructure, we are able to test under standardized conditions. You will benefit from maximum transparency and our high quality standards, supported by the guidelines set by the Swiss Accreditation Service [SAS]. On request, we work closely with our partners for tests with special requirements. You will receive precise and complete results in a timely manner.

Our range of offers includes the following services in particular:

- Comprehensive advice and tests in one place.
- Support with comprehensive quality assurance.
- Support for reliable products.
- Accurate results through accredited test methods and processes.
- Maximum transparency and consistent high quality with cost-efficient implementation.

## ➤ LIFE CYCLE OF A SYSTEM

The life cycle of a system can be divided into different phases (see phase model according to EN 50126). It begins with conception and ends with decommissioning or management. System tests to meet qualitative requirements should be constant companions in the life cycle of a system. The RUAG Environmental Simulation Test Center advises and supports you during the various project phases:

### ➤ CONCEPTION AND SPECIFICATION

- Support in conception with respect to the load on the product during operation, storage and transport.
- Determination of risks caused by environmental influences (which shorten the life of the product or cause high maintenance costs).
- Definition of the applicable standards, test parameters and assessment criteria.

### ➤ DEVELOPMENT AND PRODUCTION

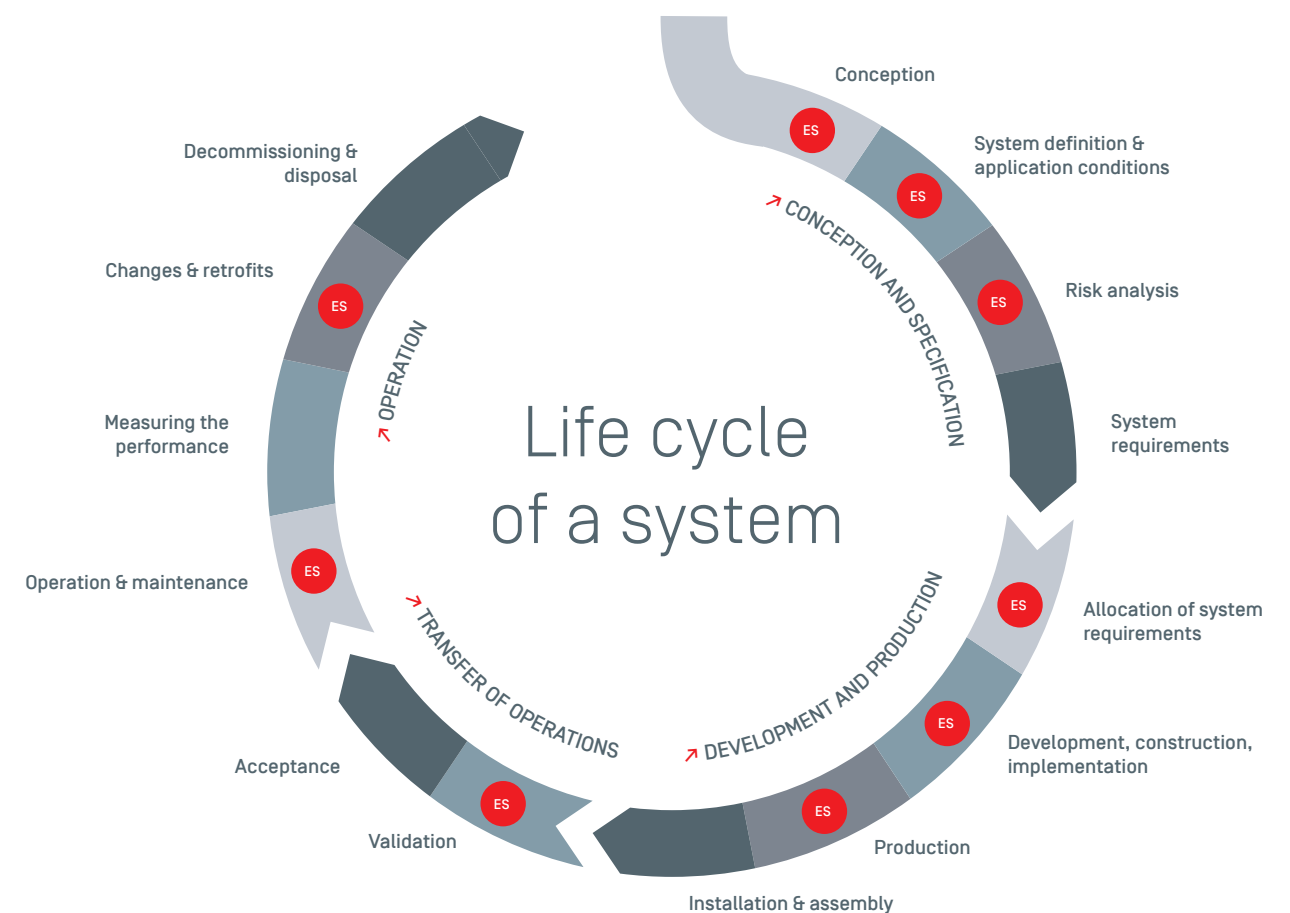
- Develop, construct, implement: Engineering support in the design and implementation phase.
- Manufacture, install, assemble: Suitability testing with respect to load requirements ["pre-compliance" test] at component or subsystem level including test report; engineering support in finding a solution to any problems that may arise.
- Testing of prototypes or models.
- Review of the production batches.

### ➤ OPERATIONS TRANSFER

- Validation of the end product prior to acceptance.

### ➤ OPERATION

- Changes and upgrades: Support in conception with respect to load on the product during operation, storage and transport.
- Test for quality problems in the company or when shipping spare parts.
- Test in the event of damage.



# Applied Test Methods

THE TEST CENTER FOR ENVIRONMENTAL SIMULATION OFFERS THE FOLLOWING TESTS IN BOTH ACCREDITED AND NON-ACCREDITED AREAS:

TEST METHOD	DESCRIPTION
- Civil standards	- SN / EN / ISO / IEC standards
- Military standards	- MIL-STD, AECTP
- Aviation	- RCTA DO-160
- Customer requirements	- specific, non-standard requirements
<b>Mechanical tests</b>	
- Vibration	<ul style="list-style-type: none"> <li>- From 5 Hz to 5000 Hz</li> <li>- Test specimen weight to 700 kg</li> <li>- Sine wave &amp; shock: 2.2 kN to 89 kN, acceleration to 100 g</li> <li>- Random: 0.9 kN to 80 kN, acceleration to 10 gRMS</li> </ul>
- Vibration with temperature & humidity	<ul style="list-style-type: none"> <li>- From 5 Hz to 5000 Hz</li> <li>- Test specimen weight to 700 kg</li> <li>- Sine wave &amp; shock: 2.2 kN to 89 kN, acceleration to 100 g</li> <li>- Random: 0.9 kN to 80 kN, acceleration to 70 gRMS</li> <li>- Temperature -40 °C to +80 °C</li> </ul>
- Mechanical shock	<ul style="list-style-type: none"> <li>- Vibrator: Test specimen weight to 700 kg</li> <li>- Shock: 2.2 kN to 89 kN, acceleration to 100 g</li> <li>- Shock machine: Test specimen weight to 90 kg</li> <li>- 10 g to 3000 g, with shock amplifier to 20,000 g</li> <li>- Pulse length 0.6 ms to 30 ms</li> </ul>
- Mechanical shock with temperature & humidity	<ul style="list-style-type: none"> <li>- Test specimen weight to 700 kg</li> <li>- Shock: 2.2 kN to 89 kN, acceleration to 100 g</li> <li>- Temperature -40 °C to +80 °C</li> </ul>
- Fall	- Free fall or guided, to 15 m

TEST METHOD	DESCRIPTION
<b>Temperature and humidity</b>	
- Temperature	- -70 °C to +180 °C
- Humidity	- 10 - 98 %rH at temperatures from +10 °C to +95 °C
- Temperature shock	<ul style="list-style-type: none"> <li>- -70 °C to +200 °C</li> <li>- Minimum change time 10 s</li> </ul>
<b>Corrosion</b>	
- Salt spray	<ul style="list-style-type: none"> <li>- 5 % NaCl</li> <li>- Temperature to 55 °C</li> </ul>
<b>Impermeability</b>	
- Dust system MIL	- According to MIL standard
- Dust system IP	- IP1X to IP6X (with extraction for to 20 mbar negative pressure)
- Rain system MIL & IP	- According to MIL standard and IPX1 to IPX8
<b>Negative pressure</b>	
- Negative pressure	- Ambient pressure to minimal 50 mbar (absolute)
- Negative pressure & temperature	- Ambient pressure to 50 mbar (absolute), temperature -60 °C to +80 °C
- Pressure change tests	- +10 kPa to -10 kPa

CONTACT US  
FOR YOUR PROJECT:



## Accreditations & certifications

- Accredited test laboratory according to ISO/IEC 17025
- Accreditation number STS 0050
- Certified according to ISO 9001
- The test personnel are audited in accordance with Federal regulations, with respect to access to classified information, materials and facilities.