



MIL-STD-810

The Ideal Tool for Demanding Environments.

Nowadays, technical devices and systems must withstand extreme environmental conditions – whether in freezing cold, dusty desert heat, or heavy rain.

MIL standards are technical standards originally developed by the US Department of Defense (DoD). In recent years, the use of MIL standards, especially MIL-STD-810, has expanded significantly beyond military applications. This development reflects the growing importance of robust and durable products, even in the civilian sector. Manufacturers and users alike increasingly demand reliable technology that performs under adverse conditions.

One of the best-known military standards is MIL-STD-810. It comprises a wide range of tests designed to simulate extreme environmental influences. What makes MIL-STD-810 special is that it is not a rigid standard with fixed limits, but a flexible set of rules. The focus is on realistic test scenarios that can be adapted to the specific environmental conditions of the intended product application.

As a leading supplier of environmental simulation systems, Weiss Technik GmbH offers a wide range of test chambers and test systems for temperature change, humidity, vibration, and many other test methods. These systems enable companies to test their products under realistic and extreme conditions and ensure compliance with the strict requirements of MIL-STD-810.

Key Facts:

- MIL-STD- 810 originated in the Department of Defense (DoD)
- Its aim is to ensure uniform quality and safety of military equipment
- It is used for robust and durable products
- Part II of MIL-STD-810 contains 29 specific test methods in the field of environmental simulation
- Weiss Technik can offer the right solution for a wide range of test methods

Origin and Development of MIL-STD-810

MIL-STD-810 was first published in 1962 by the US Department of Defense (DoD). Its purpose was to prepare military equipment for use in extreme climatic and mechanical conditions, such as desert heat, Arctic cold and the intense mechanical stress experienced by military vehicles. The standard has since been revised several times to keep pace with technological advances. The latest version of MIL-STD-810 was published in 2022. Unlike many other standards, it does not describe test requirements, but instead provides structured test methods and guidelines for environmental testing. Its purpose is to evaluate products under simulated environmental conditions that could actually occur in real-world use. This makes the standard particularly practical and flexible.



Structure of MIL-STD-810

MIL-STD-810 is a comprehensive document divided into three main parts comprising a total of over 1,100 pages. It provides both conceptual principles and specific test methods. The modular design allows users to select and adapt the parts that are relevant for their specific application.

Part I - Environmental engineering program guidelines

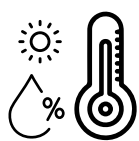
This part forms the methodological basis of the standard. It explains how an environmental testing program should be structured – from analyzing environmental conditions to selecting suitable test methods. The chapters cover topics such as: description of a product's life cycle (transport, storage, operation), determination of relevant environmental factors, guidelines for conducting laboratory and field data analysis, creation of environmental profiles and test plans, requirements for test documentation and verification.

Part II - Laboratory test methods

This part describes the specific environmental tests in detail. The standard currently contains over 29 individual test methods (Method Numbers), each of which simulates a specific influencing factor. These include: temperature tests (high/low storage temperature, temperature changes), humidity tests (cyclic humidity, condensation), mechanical tests (vibration, shock, drop, acceleration), particle and liquid influences (dust, sand, rain, freezing rain), corrosion tests (salt spray, fungal attack), radiation and pressure tests (solar radiation, negative pressure).

Part III - Supporting information

This part contains extensive climate data and information on global environmental conditions to develop realistic scenarios for product testing.



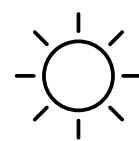
Temperature & climate



Water & liquids



Corrosion



Light & radiant exposure



Particles & atmospheric influences



Altitude



Combination tests & special methods



Mechanical stress

Relevant Industries & Examples

MIL-STD-810 is now used in a wide range of industries where products are exposed to extreme environmental conditions.

Aerospace

Aircraft, helicopters, drones, satellites and space probes are exposed to extreme conditions: high altitudes, extreme temperature differences, pressure fluctuations and intense vibrations. Tests that comply with MIL-STD-810 check the on-board electronics for pressure changes, vibrations, icing and exposure to UV and solar radiation.

Automotive industry

Vehicles intended for civil and commercial use, including off-road and construction site vehicles, as well as commercial vehicles, must also be protected against environmental influences such as mud, dust, moisture and vibrations. MIL-STD-810 tests are used, for example, to test control units (ECUs) for shock and vibration, to test headlights for dust tightness, and to test on-board cameras for temperature fluctuations in the engine compartment.

Communication and network technology

Radio units, base stations or mobile devices for safety-critical communication must remain operational under all conditions –

whether in urban areas or disaster zones: Vibration testing for devices in vehicles, salt fog testing for coastal applications, testing for rain, dust and thermal stress.

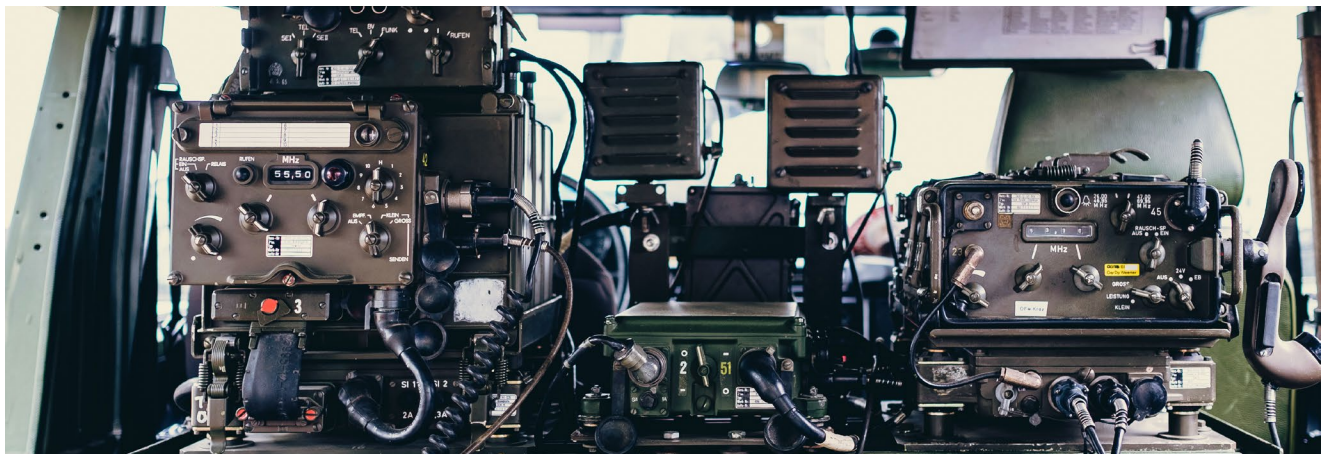
Outdoor electronics & consumer products

More and more manufacturers are advertising their products as MIL-STD-810 compliant, especially in the outdoor, sports and adventure sectors: like rugged smartphones, smartwatches and action cameras for mountaineers, hikers or emergency services.

Defence & security

Of course, the military origin remains relevant. The equipment used by the armed forces, the police and the emergency services is tested in accordance with strict standards. This includes temperature change tests for radio equipment, corrosion tests for maritime operations and stress tests for armoured vehicles.

The wide range of applications demonstrates the versatility of MIL-STD-810 as a tool for ensuring that technical products are fit for demanding environments worldwide, ranging from deserts to the Arctic and from satellites to smartwatches.



Weiss Technik can offer the right solution for a wide range of methods.

- Temperature & climate testing
- Water & fluid tests
- Corrosion tests
- Light and radiation tests
- Particles and atmospheric influences
- Altitude and pressure tests
- Mechanical stress
- Combination tests & special methods

We offer the right solution for every test specimen – from compact bench-top models with a test space volume of 16 liters to reach-in test chambers and drive-in systems for large-volume applications. In addition to our standard products, we work closely with our customers to develop customized solutions tailored precisely to specific requirements.



Product Overview



MIL-STD-810, Method 500.6

Low Pressure (Altitude)

Method 500.6 of MIL-STD-810 is used to evaluate the resistance and functionality of materials under conditions of low ambient pressure or rapid pressure changes. It comprises four specific procedures adapted to the life cycle of the test object. This method is particularly relevant for materials stored, transported, or operated at high altitudes, such as in pressurized or unpressurized areas of aircraft, or for materials that may be exposed to extreme decompression.

Product: Altitude simulation chambers SkyEvent



MIL-STD-810, Method 501.7

High Temperature

Method 501.7 evaluates the effects of high-temperature conditions on the reliability, material resistance, and serviceability of technical equipment. The test includes constant and cyclic temperature exposure and monitoring for physical or functional changes. High temperatures can lead to material degradation, component failure, and performance loss.

Product: Laboratory test chamber LabEvent, temperature test chamber TempEvent and climate test chamber ClimeEvent (reach-in, walk-in, drive-in), as well as customized solutions and ammunition temperature control trailers (depending on sample size)



MIL-STD-810, Method 502.7

Low Temperature

Method 502.7 of MIL-STD-810 defines how to evaluate devices exposed to low temperatures. It comprises three procedures: storage, operation, and handling. It is used, for example, to test the hardening and embrittlement of materials, mechanical damage, and functional faults.

Product: Laboratory test chamber LabEvent, Temperature test chamber TempEvent and climate test chamber ClimeEvent (reach-in, walk-in, drive-in), as well as customized solutions and ammunition temperature control trailers (depending on sample size)



MIL-STD-810, Method 503.7

Temperature Shock

Method 503.7 (temperature shock) evaluates the ability of a test item to withstand sudden, extreme changes in ambient temperature. It simulates rapid transitions between hot and cold environments to assess structural integrity and operational reliability. This helps identify failure mechanisms caused by sudden, extreme temperature fluctuations. For example, mechanical parts may deform or fail due to differing rates of thermal expansion.

Product: Temperature shock test chamber ShockEvent, temperature & climate test chambers for stress screening tests TempEvent & ClimeEvent with 15...25K/min



MIL-STD-810, Method 505.7

Solar Radiation

Method 505.7 of MIL-STD-810 evaluates the effects of solar radiation on the durability, function, and safety of equipment used outdoors. The test takes into account both heating from solar energy and light-induced ageing processes triggered by UV radiation. Attention is paid to physical or functional changes. Solar radiation can cause material degradation, malfunctions, and mechanical problems such as loosening or jamming of moving parts.

Product: Solar simulation chamber SunEvent



MIL-STD-810, Method 506.6

Rain

Method 506.6 of MIL-STD-810 is used to evaluate the protective effect of covers, enclosures, and seals against the ingress of water. It tests the functionality of the material during and after exposure to water, as well as possible physical damage and the effectiveness of water drainage systems. It is relevant for equipment that may be exposed to rain, splashing water, or dripping water and includes three procedures for realistically simulating typical rain conditions in military scenarios.

Product: Climate test chamber ClimeEvent with special equipment, Water Test MIL SprayEvent RK/5800/MIL



MIL-STD-810, Method 507.6

Humidity

Method 507.6 simulates warm and humid climatic conditions in two variants: induced and natural cycles. It evaluates the effects of high humidity on materials and components. Typical risks include corrosion, loss of insulation, material deformation, and functional failures. The method enables realistic testing and supports the development of robust products for demanding operating environments with high climatic stress.

Product: Laboratory test chamber LabEvent, Climate test chamber ClimeEvent (reach-in, walk-in, drive-in) as well as customized solutions



MIL-STD-810, Method 509.8

Salt Fog / Corrosive Environments

This method is used to evaluate the effectiveness of protective coatings and surface treatments under corrosive conditions such as those found in saline environments. It analyses the effects of salt fog, salt deposits, moisture and temperature fluctuations on the physical and electrical properties of materials. The aim is to identify potential weak points at an early stage – not to predict service life. This method is particularly relevant for marine applications, coastal infrastructure and military equipment in corrosive climates.

Product: Advanced cyclic corrosion test chamber Atmosfär Premium



MIL-STD-810, Method 510.7

Sand and Dust

MIL-STD-810 method 510.7 is used to evaluate the resistance of materials to sand and dust environments tailored to specific environmental conditions and material requirements. This method is relevant for a wide range of mechanical, optical, electrical, electronic, electrochemical, and electromechanical devices in industries where such exposure is expected.

Product: Dust testing chamber DustEvent ST/600 /MIL



MIL-STD-810, Method 511.7

Explosive Atmosphere

Method 511.7 is used to evaluate equipment and materials in potentially explosive atmospheres. It ensures that no ignition occurs due to sparks, hot surfaces, or electrical components. This method is essential for safety-critical applications in the defence, aerospace, and energy industries. Typical applications include aircraft avionics, fuel system components, and maintenance tools operated in environments with flammable gases or vapours.

Product: Explosion-proof test chamber ExtremeEvent



MIL-STD-810, Method 514.8

Vibration

The aim of this method is to define vibration environments to which materials may be exposed during their life cycle and to carry out laboratory tests to assess their resistance. The tests ensure that the material remains functional under realistic vibration loads, even in combination with other environmental factors. Method 514.8 of MIL-STD-810 provides four specific procedures for simulating typical vibration scenarios that occur during transport, operation or storage of military equipment.

Product: Test chamber for vibration testing ShakeEvent



MIL-STD-810, Method 520.5

Combined Environment

Method 520.5 of MIL-STD-810 evaluates the combined effects of multiple environmental factors – including temperature, altitude, humidity, electrical input power, and vibration – on aircraft-qualified electronic and electromechanical equipment during ground and flight operations. The aim is to identify weaknesses that remain undetected in individual tests. This method is specifically tailored to the requirements of the defence industry, particularly for applications in aviation and missile electronics.

Product: Altitude simulation cabinet SkyEvent



MIL-STD-810, Method 521.4

Icing/Freezing rain

This method is used to assess the effects of icing on the functionality of materials and the effectiveness of de-icing procedures, including field-available methods. It applies to equipment that may be exposed to ice formation due to freezing rain, drizzle, fog, or spray. The aim is to determine whether the material remains operational after ice accumulation or can be successfully de-iced. Method 521.4 is particularly relevant for military applications in cold, humid operating environments.

Product: Climate test chamber ClimeEvent with special equipment



MIL-STD-810H, Method 524.1

Freeze-Thaw

Method 524.1 evaluates the ability of material to withstand repeated freeze-thaw cycles in which moisture within or on the material changes between liquid and solid states. It also investigates the effects of temperature changes between cold and warm environments. The method focuses on physical changes caused by phase changes and is not intended for evaluating low-temperature behavior, thermal shock, rain or icing. It is particularly relevant for military applications in humid, frost-prone areas of operation.

Product: Climate test chamber ClimeEvent and laboratory test chamber LabEvent, both with special equipment



MIL-STD-810, Method 528.1

Mechanical Vibrations of Shipboard Equipment

The mechanical vibrations of shipboard equipment method assesses the effects of mechanical vibrations on the operational safety, structural stability and functionality of onboard materials and equipment. The test includes environmental and internally induced vibrations, as well as monitoring physical and functional changes. Vibrations can lead to material deterioration, component failure and performance degradation.

Product: Test chamber for vibration testing ShakeEvent