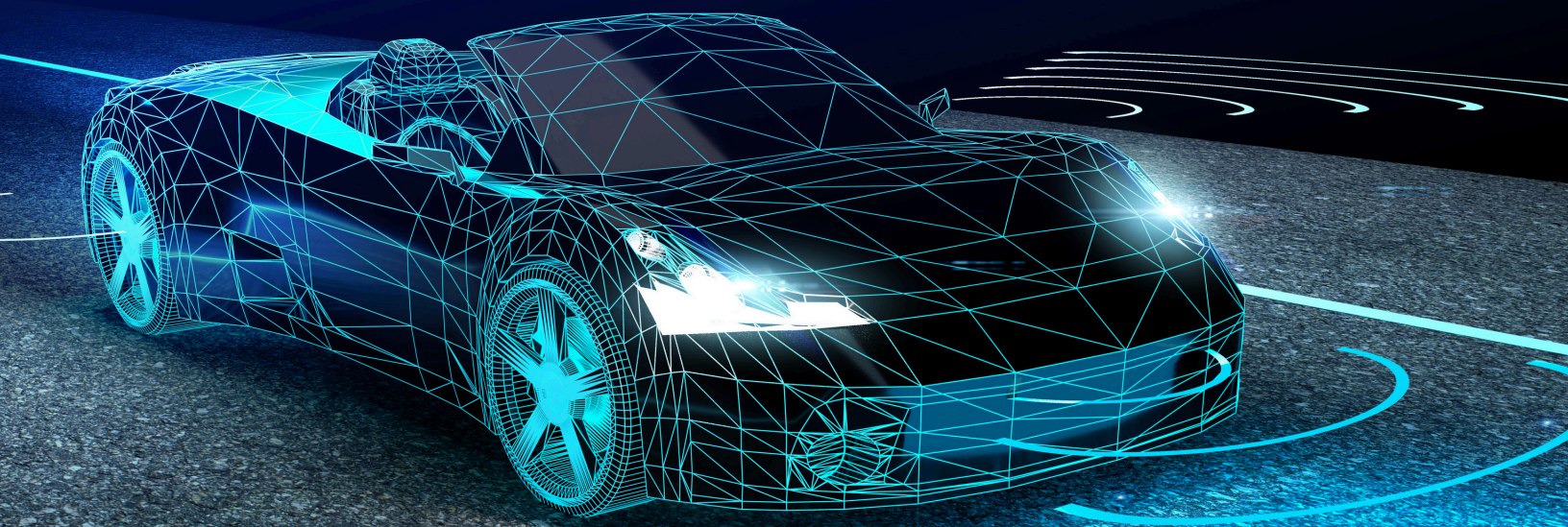
weisstechnik®
a schunk company



Production & Testing Solutions Battery & EV Requirements

Stand the test of time.

www.weiss-na.com

Trust Weiss Technik for Your Battery & EV Production and Testing Requirements. Play it Safe.

Weiss Technik designs, develops and delivers high-quality battery production and battery test chambers solutions that ensure your power sources can power through harsh and challenging conditions.

Our Production and Environmental simulators test and assess the quality, durability and performance of batteries to make sure they meet your exacting specifications and stringent industry standards.

We manufacture and supply battery production and battery testing equipment and testing systems in all sizes, from pre-engineered versions up to customized, process-integrated facilities that deliver high reproducibility and precise test results. For example, with our lithium-ion test chambers, you can perform temperature tests, humidity tests, vibration tests, corrosion tests and temperature shock tests.

Weiss Technik - Customized Battery Testing – Step by Step

Our well-defined workflow of project management ensures optimum results

1 Requirement analysis

In joint workshops with our customers, we specify the required test standards, test capacities and other requirements of the planned testing laboratory.

2 Definition of scope of supply

In technical discussions, we clarify which test technology is needed exactly and whether a turnkey solution is applicable. A rough price indication can then be given.

3 Technical definition of subsections of the project

A project team, consisting of Weiss Technik experts and customers, defines the technical specifications for all relevant subsections. We then quote a non-binding budget price.

4 Develop Proposal

After finalizing and consolidating all subsections, we prepare a binding quotation. Within the framework of final agreements, changes can still be made if necessary.

5 Production of the test systems

After finalizing and consolidating all subsections, we prepare a binding quotation. Within the framework of final agreements, changes can still be made if necessary.

6 Installation and commissioning

After shipment, our experienced service technicians will install the test systems on site and commission them professionally.

7 Training of employees

In the initial stage, we support our customers with trainings for their employees. Weiss Technik Academy also offers online and classroom trainings.

8 After sales service

Customer service is the focus of our thinking and acting. We offer a comprehensive service network with short response times, reliable support by qualified service technicians, preventive maintenance and reliable spare parts supply.

Battery Testing Standards

Testing the future of energy

Many industry standards and EUCAR safety level standards are necessary for Battery Production and Testing. Weiss Technik's battery testing equipment and battery testing systems ensure your products meet or exceed a long list of international standards and norms. Our test chambers can measure the safety, performance and reliability of batteries based on standards established by the International Electrotechnical Commission (IEC) and other international manufacturing associations. We also can test, measure and assess products based on the exacting and stringent requirements requested by the client.

EUCAR Hazard Level

Hazard Severity Level	Description	Classification Criteria and Effect
0	No Effect	No effect. No loss of functionality
1	Passive Protection Activated	No defect; no leakage; no venting, fire, or flame; no rupture; no explosion; no exothermic reaction or thermal runaway. Cell reversibly damaged. Repair of protection device needed.
2	Defect/Damage	No leakage; no venting, fire, or flame; no rupture; no explosion; no exothermic reaction or thermal runaway. Cell irreversibly damaged. Repair needed.
3	Minor Leakage	No venting, fire, or flame*; no rupture; no explosion. Weight loss
4	Major Leakage/ Venting	No fire or flame; no rupture; no explosion. Weight loss ≥50% of electrolyte weight (electrolyte = solvent + salt).
5	Fire or Flame	No rupture; no explosion (i.e., no flying parts).
6	Rupture	No explosion, but flying parts of the active mass
7	Explosion	Explosion (i.e., disintegration of the cell).

Battery Industry Test Standards

Below is a sample list of common battery testing standards. Please contact us for other test requirements.

ANSI C18.3M, Part 2	Portable Lithium Primary Cells and Batteries - Safety Standard
UN/DOT 38.3	Covers transportation safety testing for all lithium metal and lithium ion cells and batteries
UL 1642	Used for testing lithium cells. Battery level tests are covered by UL 2054
UL 2054	(Household and Commercial Batteries) - Component cell level testing covered by UL 1642
UL 2580	No venting, fire, or flame*; no rupture; no explosion. Weight loss
USCAR	Battery safety and performance from the EV Battery Test Procedures Manual, Battery Technology Life Verification Test Manual
IEC 62133	For Portable Sealed Secondary Cells and for Batteries made from them, for use in Portable Applications
IEC 60086-4	Primary Batteries – Safety of Lithium Batteries
IEC 61960	Secondary Lithium Cells and Batteries for Portable Applications
IEC 62281	Safety of primary and secondary lithium cells and batteries during transport (similar to UN/DOT 38.3)
IEEE 1725	Rechargeable Batteries for Cellular Telephones
IEEE 1625	Rechargeable Batteries for Multi-Cell Mobile Computing Devices
SAE J 2929	Electric and Hybrid Vehicle Propulsion Battery System Safety Standard - Lithium -Based Rechargeable Cells
SAE J 2289	Electric Drive Battery Pack System Functional Guidelines
SAE J 2464	Electric and Hybrid Electric Vehicle Rechargeable Energy Storage System (RESS) Safety and Abuse Testing
UNECE Regulation R100	Safety requirements specific to the electric power train of road vehicles including rechargeable battery systems

Battery Production Solutions

Testing the future of energy

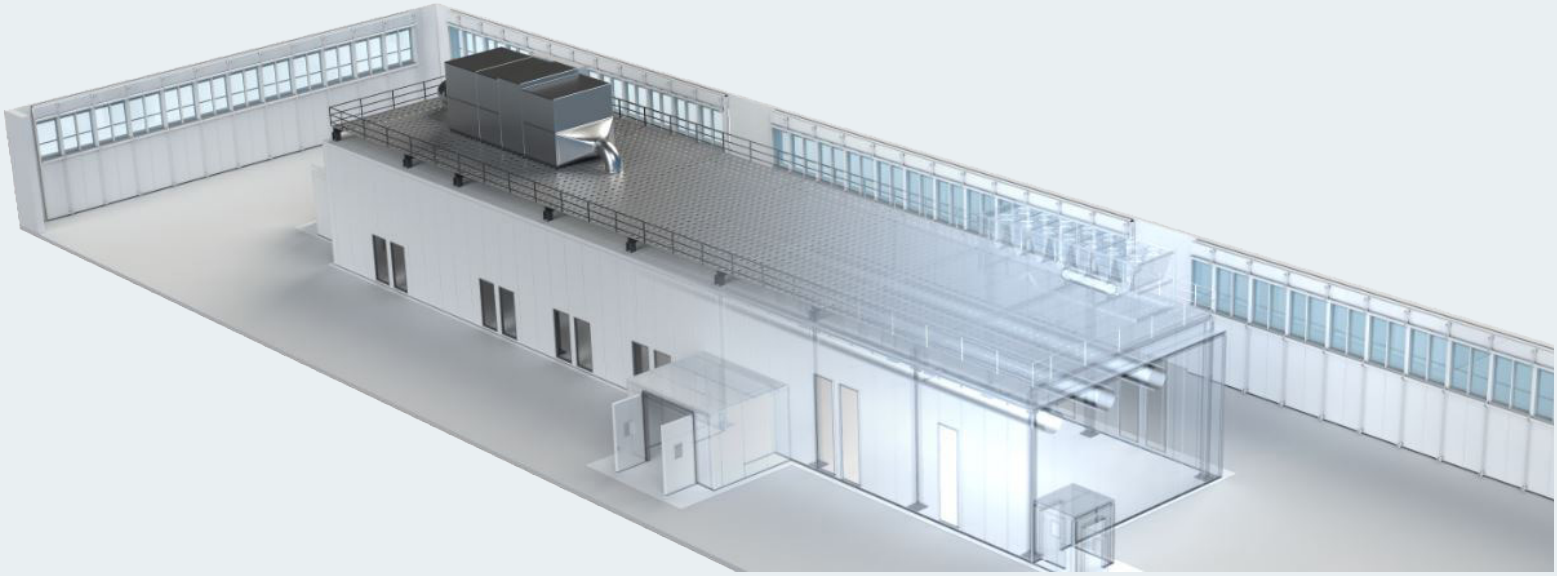
Dry Rooms

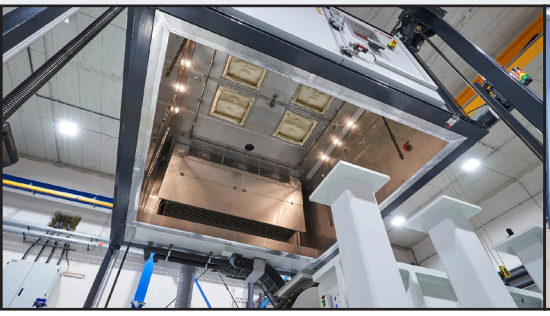
Discover Our Systems

The production of Li-Ion batteries requires special care in the environment. Weiss Technik has the experience and knowledge to supply the required clean dry air to produce Li-Ion batteries. We know the quality of the manufacturing space has a direct impact on the safety and quality of the product being produced. With our ultra-low humidity environments customers can have confidence in their process.

Regulation, Control & Traceability

Reliable control in series - Depending on your requirements, our dehumidification systems are controlled autonomously in process control and monitoring by SIMPAC®, the digital measuring and control system. The transmission of process and sensor data to higher-level controllers or control centers is done via a data bus. DAQ also allows us to track when and where each individual cell was manufactured.





Battery Production Solutions

Testing the future of energy

Vacuum Ovens

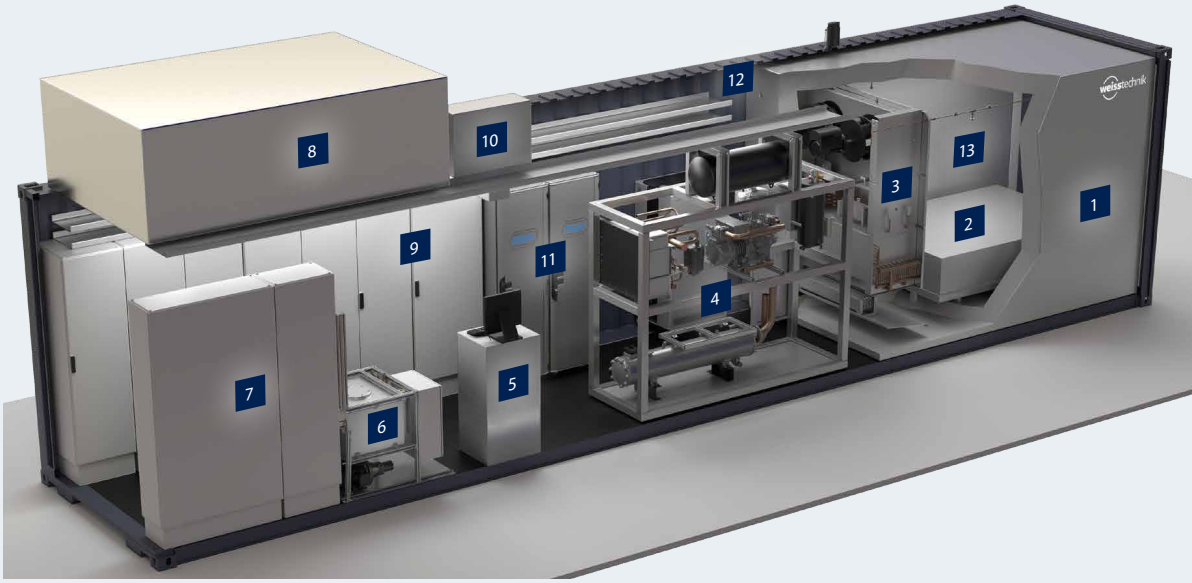
Temperature-Vacuum Test

Vacuum ovens play an important role in the production of lithium-ion batteries for electric vehicles. Ideal for coil-drying in the production of batteries and fuel-cells. Thanks to our many years of cross-sector experience in industrial heating technology, we can develop customized heating and vacuum oven systems that are perfectly matched to your product application. This enables us to provide product-oriented, reliable and highly precise drying processes.

Plug & Test Lab

Weiss Technik has developed a mobile, container-based Plug &Test Solution for precisely this purpose. This enables standards-compliant testing and fulfills all the necessary safety specifications for electrical energy storage systems.

1. Test chamber
2. Specimen (battery pack)
3. Air-treatment system
4. Cooling machines
5. Operator station
6. Extinguishing system
7. Switch cabinet cooling
8. External liquifier
9. Cycler
10. Split air-conditioner
11. Central automation system
12. Battery conditioning system
13. Decentral automation system



A Battery Test Center

Testing the future of energy

The various thermal, climatic and mechanical stresses on energy storage devices have a particularly large impact. Sophisticated testing technology is required to test their safety, reliability and performance.

Walk In test chambers are ideal for Battery Pack level testing

With Weiss Technik WEBSeason Controller and SIMPATI Software you can network up to 99 chambers in your Battery Test Center

An interconnect system for a Battery Test Center allows for separate chamber and machine pack locations

Proven Testing Technology for all Dimensions

Weiss Technik provides advanced testing for your Battery applications. We have the experience and knowledge for you specific applications including:

- Cells
- Modules
- Bettery Packs
- Battery Management System (BMS)
- Complete Drive Units

A Battery Test Center

Testing the future of energy

Weiss Technik provides expert advice on technical modifications, plant conversion or expansion, networking, maintenance, calibration, qualification and energy efficiency to fit your exact Battery & EV requirements.

A Battery Test Center can also accommodate MAST application chambers for temperature/vibration testing.

Our chambers are designed for easy access for upgrades, service and PM

Weiss Technik can help with Battery Test Center layout for the most efficient space use.

One Thing Always Applies: Safety First

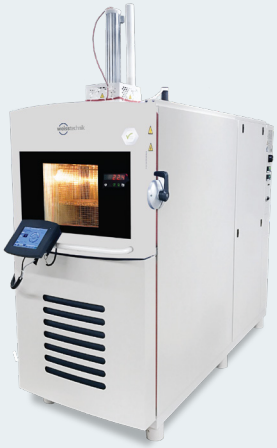
Safety is critical in battery testing. Measures need to be in place to protect personnel, facilities, and product. At Weiss Technik we give special attention to the aspect of safety in our systems – giving you peace of mind.

EV/Battery Testing Solutions

Testing the future of energy

Temperature & Humidity Environmental Testing

Often referred to as temperature cycling, or thermal testing, temperature and humidity stress testing is a process of cycling between two extreme temperature conditions. The air temperature may be changed at a slow rate or a fast rate of change by controlling the air temperature and temperature transition rate. Temperature and humidity testing allows for accelerated changes inside the chamber but at a gradual rate of transition compared to traditional thermal shock testing.



Thermal Shock Testing

A thermal shock test can be performed on individual parts or assembled components. Its purpose is to accelerate the stresses that occur on materials when rapid transitions of extreme temperatures are applied. By creating a temperature shock we can evaluate how different materials respond to expansion and contraction brought on by rapid temperature transitions.

Vibration Testing

Vibration testing is used with battery testing to simulate real world conditions and help identify product failures. Our vibration testing chambers are ideal for use in Battery Packs and Battery Management Systems (BMS) to fit your exact testing requirements.

Temperature-Vacuum Testing

Vacuum drying ovens in the production phase provide assurances that the end product is homogenous, and without potential defect. Weiss Technik has technology that not only dries out your materials, but can also cycle pressures to aid in the vacuum drying process of the electrodes.

EV/Battery Testing Solutions

Testing the future of energy

Climate Change Corrosion Testing

Batteries are successively subjected to salt spray tests, condensation water tests and climate tests with changing or constant temperatures over predefined times. In order to withstand the high stresses caused by climate change and salt solution, the test barrier and all components installed in it are made of corrosion-resistant stainless steel (V5A).

Dust Testing

Our Dust chambers are designed for settling dust testing applications for automotive, electronics and defense test requirements. The Weiss Technik D Series Dust Test Chamber is designed to test a component's resistance to a dust-filled environment as defined in SAE Dust Test Specifications . Test Standard – Dust Exposure Test SAE J-575 2015-08 Ed. Section 4.12

Splash Water Testing

Batteries or battery packs are exposed to water jets of a defined strength for a set time. The leak tests according to IPX 5, IPX 6 and IPX 6K are carried out manually with a jet nozzle. Water is sprayed onto the test specimen from the intervals specified in the standard at ambient temperature and a water pressure of 0.3 to 10.0 bar. For the high-pressure/steam jet tests according to IPX 9K, a nozzle rack is fixed to the ceiling above the test object, the rotating platform is realised on site.

Air-Liquid Shock Testing

Batteries are subjected to a hot air temperature, typically between +60°C to +90°C in the top of the chamber. They are then immersed in a basin below, in a +0°C corrosive solution to test durability and resistance to shock. A mixture, if you will, of two types of tests air to air and liquid to liquid shock testing to provide a different testing result."

Controllers & Software

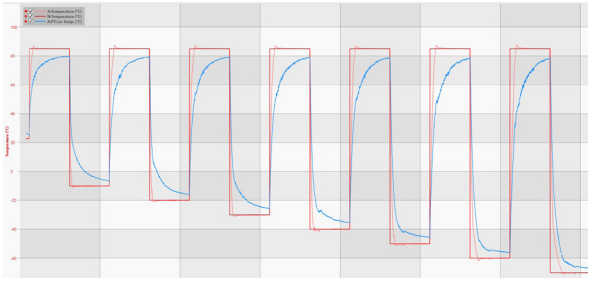
Streamlined operations, elevated performance

WEBSeason® Chamber Control

The WEBSeason® control system is the latest technology in digital chamber control and programming. With the simple, easy-to-use touchscreen and menu-guided user interface, no programming knowledge is necessary. WEBSeason® offers many features including USB and Ethernet interfaces, remote control and remote monitoring, networking with other test systems, and a 32- bit control and monitoring system to ensure accurate control of temperature and humidity.

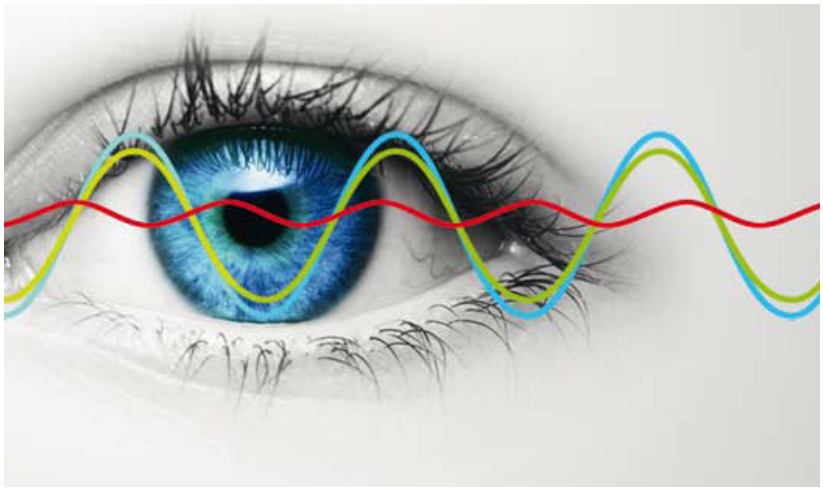
Complete Remote Access with S!MPATI

The Simulation Package for Test System Integration (S!MPATI) software enables full chamber control and operation via remote access. The operation of test systems becomes easy and time-saving while increasing reliability. The integrated monitoring feature enhances the reliability of your test systems. The simple user-friendly operation and menu-guided interface does not require user training. S!MPATI offers the user the ability to control up to 99 chambers at the same time. A single user can control up to 99 chambers at the same time using S!MPATI.



S!MPATI TimeLabs - A Picture Says More Than a Thousand Measurements

S!MPATI TimeLabs provides simultaneous documentation of digital images and measured data to give you precise and accurate product testing. TimeLabs assures reliability and provides exact visual evaluation of your testing processes while the data-protected documentation feature of your test sequence adds security to your results.



Integration

Weiss Technik controllers and software are the most advanced in the industry. WebSeason® and with Simpati can be integrated with BMS Systems, battery cyclers, and other equipment and are compatible with many protocols including:

- EtherCAT
- ProfiNET
- ProifBUS
- ASCII/SimServ
- Modbus RTU
- Modbus TCP/IP & more

Contact us for information on integration with other controller platforms.

Sustainability in Test Chambers

Streamlined operations, elevated performance

The Future of Test Chamber Refrigeration Technology – Today

LEEF Technology provides unmatched performance in your testing requirements. LEEF's high efficiency innovative technology offers significant benefits and reduces carbon footprint at the same time.

Environmental test chambers are often used for more than 15 years. Weiss Technik provides you the technology of the future – making your test chambers and lab future-proof!

Let Weiss Technik help improve your testing and your environmental stewardship.

Customer Benefits

- Reliability of test results: Up to 70% improved accuracy of temperature and humidity settings
- Productivity: Reduce test time thanks to up to 60% faster temperature pull down rates
- Cost Savings: Up to 40% energy savings
- Sustainability: LEEF actively supports policies to reduce the Carbon Footprint
- LOW GWP (Global Warming Potential): R-449A Refrigerant

Impact Your Business More... and the Environment Less.

Begin preparing for the future standards and regulations as far as the use of more environmental friendly refrigerants is concerned. At Weiss Technik, our unique energy ecient designs and low GWP (Global Warming Potential) R449A refrigerant protect the planet while boosting yourbottom line. It's a win-win for the future of the earth and the future of your business.

Let Weiss Technik help modernize your testing and improve your environmental stewardship.

Customer Benefits

- R-449A was specifically designed to replace R-404A (a common test chamber refrigerant)
- Applicable in ALL Weiss Technik test chambers that previously used R-404A
- Lower Energy use when used in conjunction with LEEF Technology
- Solutions available for both new and existing test chambers
- Lower Carbon Footprint
- Supports Corporate & Federal Sustainability Programs
- R-449A supports the EPA's hydrofluorocarbon (HFC) phasedown, Docket ID: EPA-HQ-OAR-2021-0044, as part of the American Innovation and Manufacturing (AIM) Act
- Avoids availability and pricing issues of high GWP HFC refrigerants expected in the United States per the AIM Act
- Many individual states have already implemented HFC regulations

Service Support

We're here to help

Our products are backed by our global factory trained service department. With over 400 service technicians located throughout the globe.

We offer our customers a wide variety of services including the following:

- After hours support helpline
- Preventive maintenance program
- Chamber start-up
- Installations
- Emergency service
- Technical support
- Spare parts & materials
- Calibrations per ISO 17025 (instrument and chamber)
- Chamber diagnostics, troubleshooting and evaluations
- Equipment upgrades and retrofits
- Refrigerant removal and disposal
- Chamber liner leak test
- Chamber modifications
- Equipment relocations
- Training on proper equipment use and programming
- Rental programs /used equipment
- Service on all makes and models

Quality - Count on Weiss Technik

Weiss Technik helps make the task of compliance with the QS9000 3rd Edition Calibration Mandate much simpler. There is no need for you to take the time to actively seek an accredited laboratory. Weiss Technik, certified ISO9001 in 1997, can provide the latest required ISO/IEC 17025 (A2LA accredited) calibration services at your facility. These services meet 17025 requirements and ensure that your company is in compliance with the most recent changes in the QS9000 3rd Edition mandate.

A2LA ACCREDITED CALIBRATION LABORATORY Certificate No. 1276-01

Weiss Technik North America, Inc. Calibration Services are accredited by A2LA to ISO/IEC 17025

Quality System Registered to ISO 9001

Weiss Technik North America, Inc. Quality System is registered to ISO9001:2015

Weiss Technik North America, Inc.
3881 N. Greenbrooke Dr. SE
Grand Rapids, MI 49512 USA
(616) 554-5020 • (800) 368-4768 • Fax: (616) 554-5021
www.weiss-na.com
After Hours Service Support Helpline: 1-800-361-6731

Join us on LinkedIn

Stand the test of time.

BATTERYMFGTESTBROCHUREFEB2025