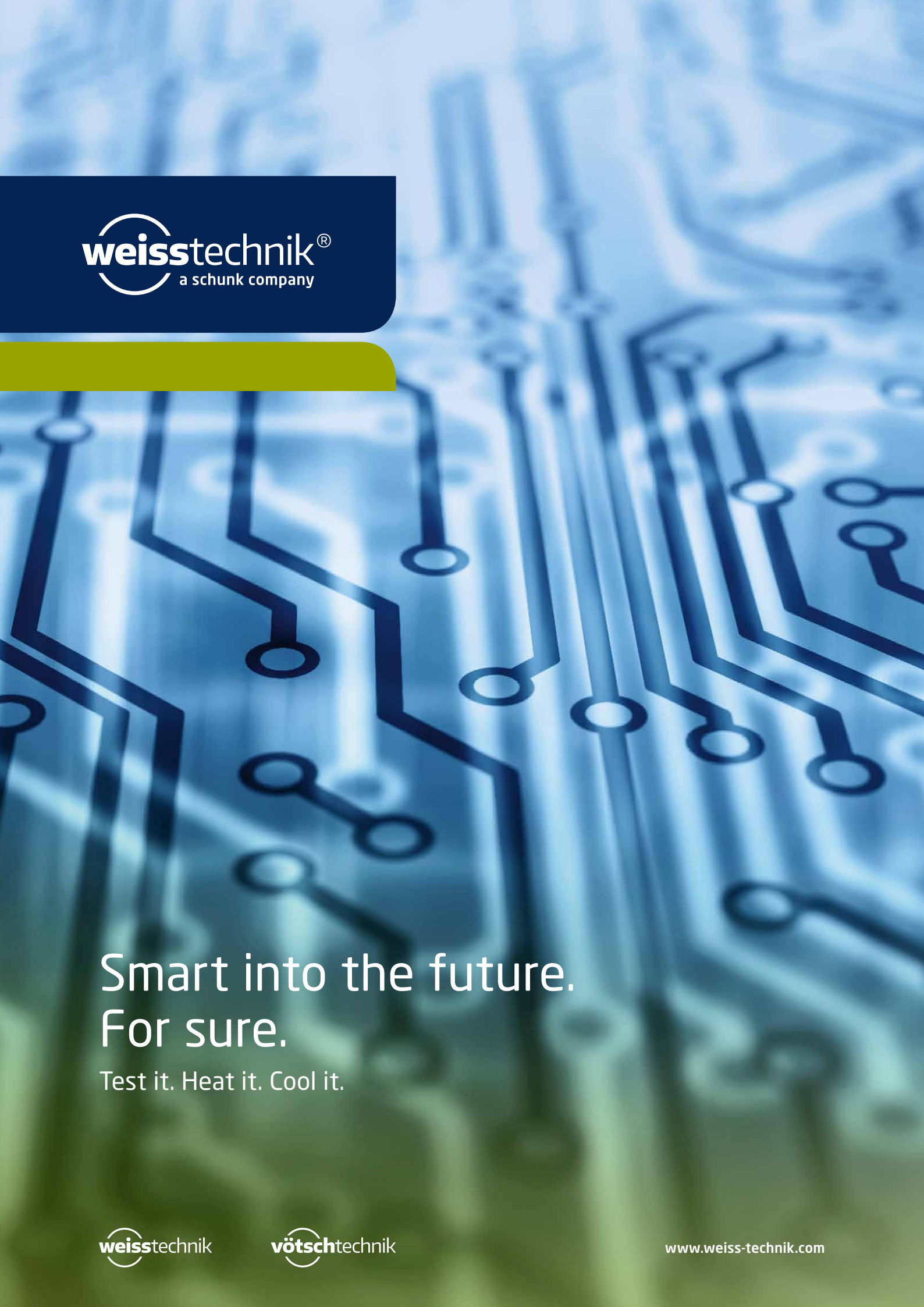
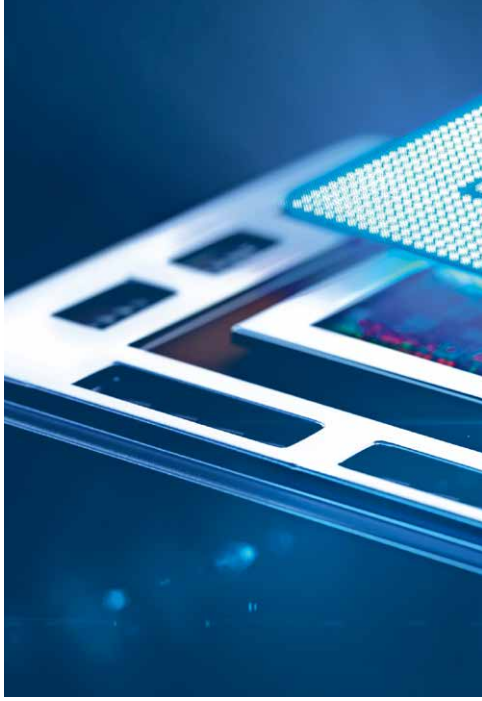

weisstechnik®
a schunk company
Smart into the future.
For sure.
Test it. Heat it. Cool it.
weisstechnik
vötschtechnik
www.weiss-technik.com

Smaller, faster, higher performance – the electronics of tomorrow.



The future is digital: visions such as the Internet of Things, cars as supercomputers, eye-tracking, wearables, and 3D printing are gradually becoming reality. These developments are based on electronic components such as sensors, opto-electronic components, processors, and connectors.

The increasingly extensive recording and processing of data are only possible with the interaction of these electronic components. With such advancements, we can use a smartphone to operate a washing machine which has been loaded by a robot. Or we can have a battery-operated electric car pick up the children from school without our presence, for that matter.

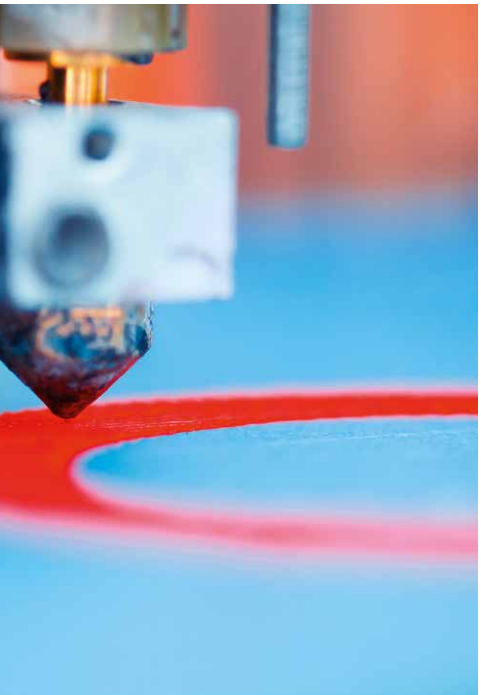
Regardless of whether Augmented Reality Glasses or Virtual Reality Goggles dominate the market in the future – the more extensively the virtual world interacts with our real world, the greater will be the demands for reliable electronic components.

Individual components as well as integrated systems must operate safely at all times under all conditions: with fluctuations in climate or temperature or in extremely hot, cold, wet, or dusty environments. These requirements can only be met by components and systems produced under optimum conditions according with state-of-the-art technology which have proven their durability and reliability in corresponding tests.

Weiss Technik and Vötsch Technik are amongst the most innovative and significant developers and manufacturers of systems in the field of environmental simulation, temperature processes and air conditioning. We have developed solutions specially for the electronics industry that meet the highest demands. To ensure that components excel in all applications, from electronic toys up to satellite control.

Passionately innovative.

We work in partnership to support companies in research, development, production and quality assurance.



Environmental Simulation

The first choice for engineers and researchers for innovative, safe environmental simulation facilities. In fast motion, our test systems can simulate all the influences in the world as well as for instance in space. In temperature, climate, corrosion, dust or combined stress tests. With a very high degree of reproducibility and precision.

Heat Technology

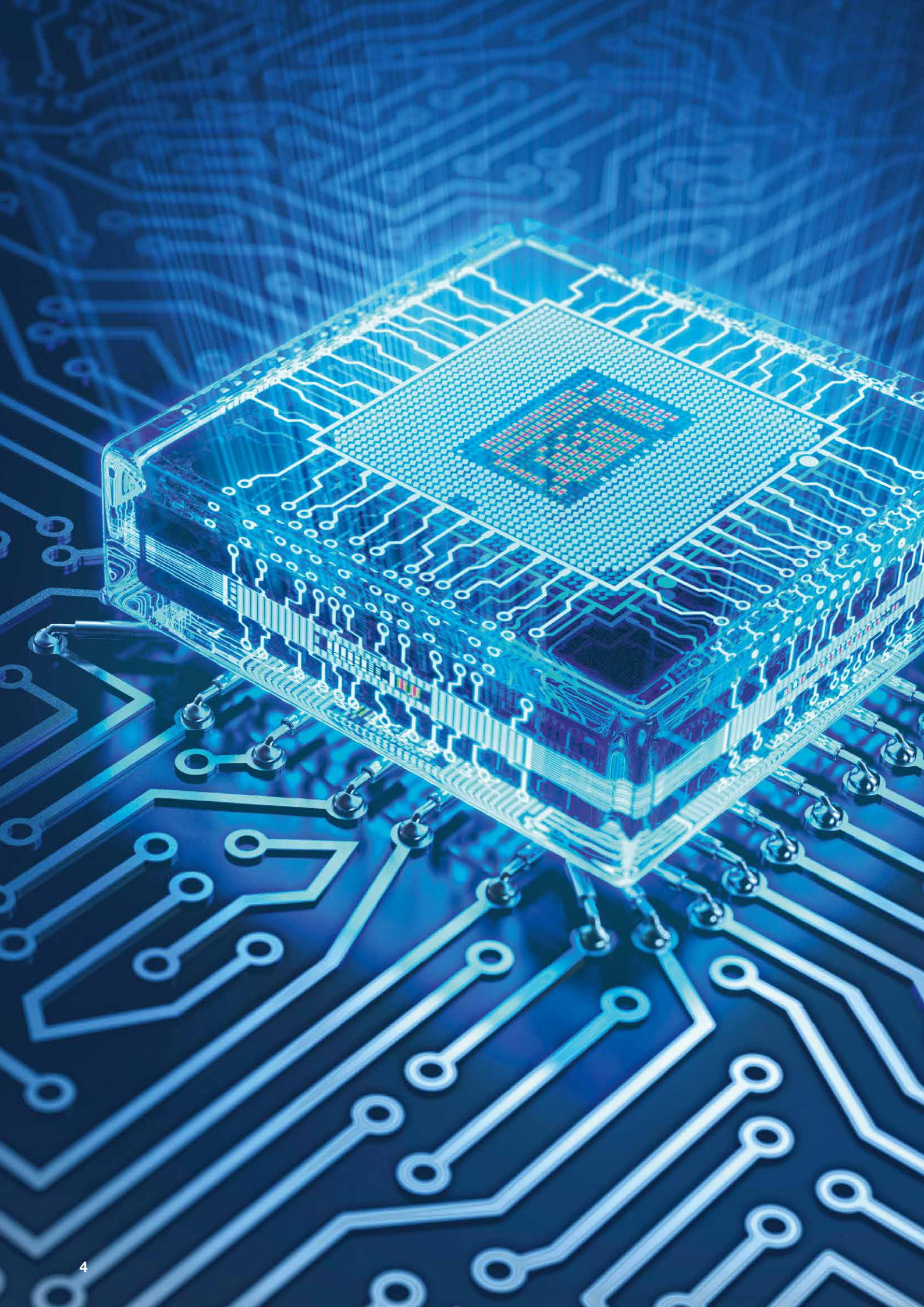
Experienced engineers and designers develop, plan and produce high-quality, reliable heat technology systems for a broad range of applications from heating and drying cabinets to microwave systems and industrial furnaces.

Climate Technology, Air Dehumidification, Clean Rooms

As the leading provider of clean rooms, climate technology and air dehumidification, we consistently ensure optimal climatic conditions for people and machines. For industrial production processes, in hospitals, mobile operation tents or in the field of information and telecommunications technology. From project planning to implementation.

Clean Air and Containment Systems

With decades of experience and know-how, we guarantee the most sophisticated clean air and containment solutions. Our comprehensive and innovative range of products includes barrier systems, laminar flow systems, safety workbenches, isolators and airlocks.



Speed up your processes.

Bring your product to market faster.

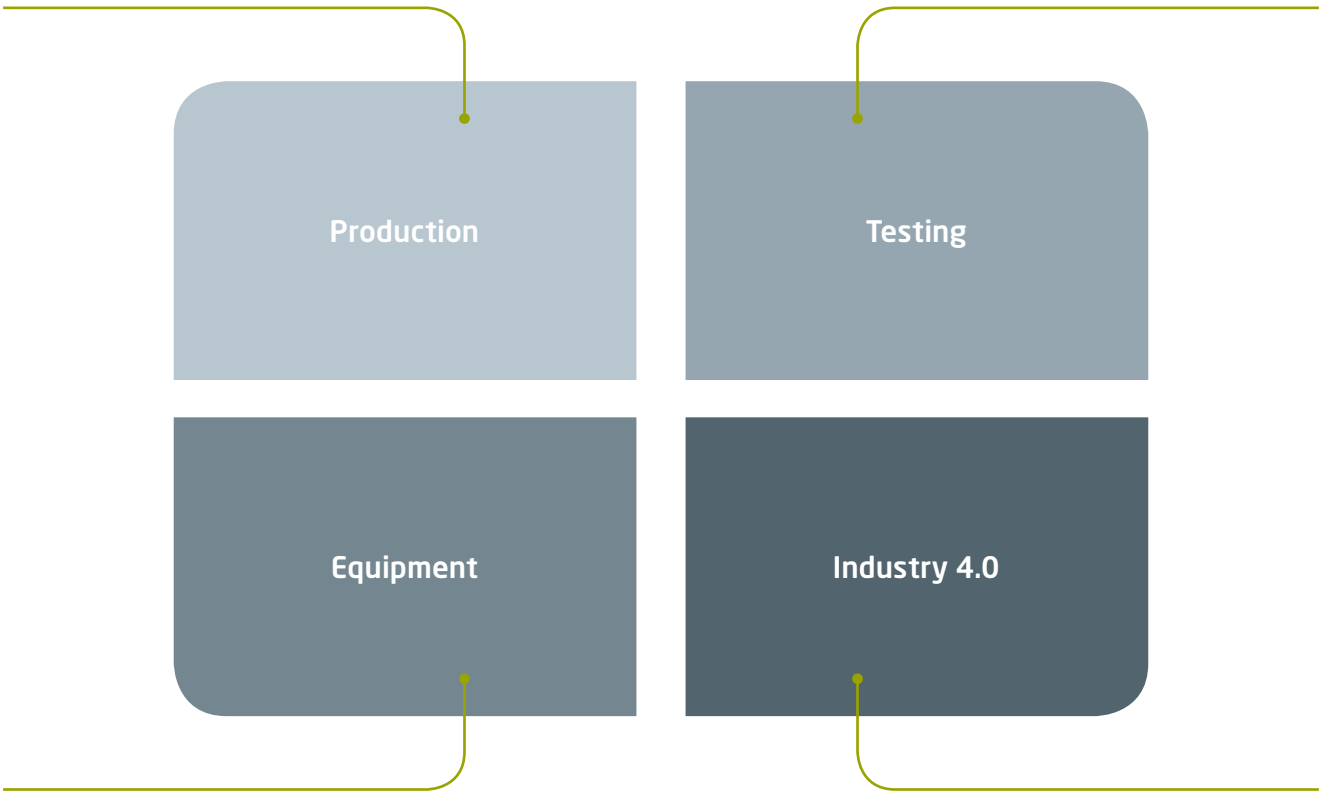
We love extremes, reproducible results, energy-efficient processes and excellent service. This is why we offer exactly that.

Heating technology

For research and production. So that your drying and heat treatment processes take even less time.

Environmental simulation

For development and quality assurance. So that the interaction of individual components functions properly in the complete system and processes and components can be optimised.

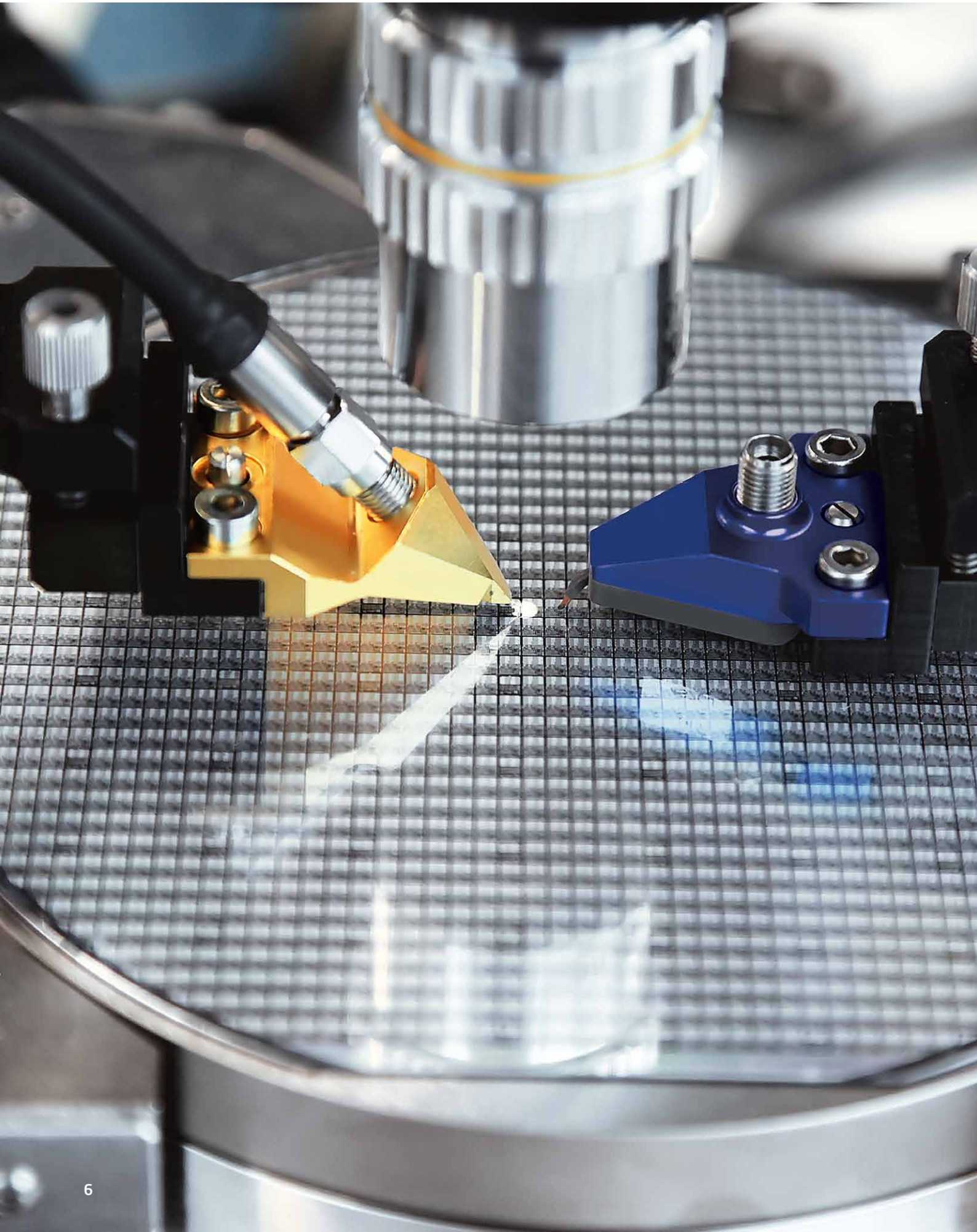


Climate control

For your production facilities and server room cooling. To maintain your computing power, even when things get hot.

Operating

For 100 % traceability and higher quality. Integrate your test systems into an intelligent factory. **S!M**PATI® makes it possible!



Heat up your processes.

Low failure rates for profitable results.

Heat technology of Vötsch Technik offers a wide range of production systems for the electronics industry. From chips to switches, for clean room heating, drying or vacuum ovens – with us, the focus is on your product.

Your benefits:

- Short process times thanks to rapid heating and cooling
- Constant product quality due to homogeneous temperature distribution in the workspace
- Reproducibility through the use of components with consistently high quality
- 100 % traceability through networked control systems
- Systems which are optimally tailored to the production processes through the development of customised solutions

For materials with a high proportion of solvents or inflammable materials, we have developed drying ovens with special protective devices – to keep you safe. Of course, we also supply our systems in versions suitable for clean rooms – for ultimate precision electronic components.

Heat treatment of wafers in a nitrogen atmosphere

Special features:
- Clean room class 5 according to DIN EN ISO 14644 in the working area and the workroom
- Adjustable inert gas supply
- Automatic or manually operated lifting doors


vötschtechnik
HeatEvent
vötschtechnik
HeatEvent

Hot. Hotter. HeatEvent.

The new generation of heating and drying ovens.

Competence for each process.

No matter how you want to use it – we have the right oven. Thanks to the high flexibility in standard and special zones, we are able to meet your exact requirements so you can receive customised solutions in virtually all areas. Whether electric, gas, heat transfer media, infra-red radiation or microwaves – from the different types of heating we offer the best solution for your particular process.

Heat for your products.

Reproducible results plus the product quality connected to it, minimum space requirements, short processing times and a high level of productivity are the requirements in all industrial production areas. Your components and materials can be reliably, quickly and energy-efficiently heat-treated at temperatures of up to 400 °C with the Heating and Drying Ovens HeatEvent from **vötsch**technik. In this way, you can manufacture excellent products 24/7.

Your benefits:

- Smallest footprint with the largest effective space
- Low energy consumption thanks to IE3 motors, optimised heat output, insulation and reliable door sealing designs
- World's largest range of options and accessories in addition to comprehensive basic equipment

Heating and Drying Ovens HeatEvent 100/150*

- Working chamber volume: 1.5 m^3
- Temperature distribution, spatial at 220 °C: ±2 K
- Time to heat to 220 °C: 18 min
- Recirculating air volume flow: 3,400 m^3/h

* Selected device type – other types on request, please contact us.

Your professional hot rods.

The right solution for every application.

Continuous oven systems

Each **vötsch**technik continuous oven systems is tailored to the particular application process and is therefore a unique item. It can be equally used to temper plastics or cure adhesives on electrical components and is especially suitable for heat treatment in automated production lines. Whether chains, hinge strips or roller conveyors, vertical or horizontal airflow – from conveyor systems to cooling: we have the perfect solution for your process.

Continuous oven VDU 120/20/240-200 °C*

- Dimensions: width: 1.64 m, height: 1.9 m, length: 5.7 m
- Nominal temperature: 200 °C
- Heating power: 40 kW

Clean room and heat treatment

Clean Room Heating and Drying Ovens VTF are available in six sizes, with workspace volumes between 60 and 3,125 l and nominal temperatures of 250, 300, and 350 °C. These are suitable for heat treatment under clean room conditions (clean room class ISO 5 working areas according to DIN EN ISO 14644-1).

Clean Room Heating and Drying Oven VTF 60/35/35-200 °C*

- Nominal temperature: 200 °C
- Heating power: 12 kW
- Clean room class: 100
- High temperature uniformity: ±1 K

Curing of siliconised power circuits

Offshore wind power modules are exposed to extreme environmental conditions. A proper protection of electrical and electronical components is to encapsulate with silicone. Curing of these siliconised products requires specific silicone tempering ovens which can realise 100-150 l fresh air per minute and kg silicone. The **vötsch**technik VTU oven series performs well to this specification and in addition is designed as ESD conform and for clean room class ISO 7 acc. to ISO 14644-1.

Silicone Tempering Oven VTU 100/150-150 °C ISO 7 silicone*

- Rated temperature: 150 °C
- Installation in clean room class ISO 7
- ESD version

* Selected device type – other types on request, please contact us.

Tested speed sensors – nothing else is used in automatic gearboxes.

Intelligent process integration at Bosch.

The environment for sensors in automatic gearboxes is harsh: large temperature fluctuations and oil which aggressively attacks surfaces. Bosch now uses ovens from Vötsch Technik to cross-link the thermosetting plastic housings of speed sensors and then subject them to an extensive stress test. The ovens are integrated into fully automated production lines. The rotation sensors are integrated into the 9G-TRONIC automatic gearboxes of a leading German car manufacturer.

The oven

The **vötsch**technik heating and activation oven consists of two chambers. In one of the chambers, there is a constant temperature during the process. The second chamber has two temperature zones, with greatly differing temperatures. The sensors are passed from one temperature zone to the other.

The oven is equipped with a separate controller and is integrated into a fully automated production line. The production line uses industrial robots to place the sensors in the oven. The oven doors, four for each chamber, are pneumatically powered, and opening and closing is requested with an input/output signal.

Wolfgang Paasch, Production Project Manager at Robert Bosch Fahrzeugelektrik Eisenach GmbH summarises the integration into the production line: "**vötsch**technik ovens are ideal for processing our small sensors in large packaging units and therefore only require a small amount of space. The ovens are notable for their robustness, reliability and once-a-year maintenance. Cooperation during the various projects was good and constructive and deadlines were always met. A second oven is planned to increase capacity."

The process

The robot places the sensors, which are plugged onto carrier plates, directly into the hot left-hand chamber of the oven. The thermosetting plastic, the packaging of the sensors if you will, is cross-linked at high temperatures. Cross-linking creates the finished structure of the plastic. This process takes several hours, during which the temperature of the oven is held stable.

Sensors which have already gone through this process are moved into the cooler of the two temperature zones in the right-hand chamber. The repeated transfer from one temperature zone to the other is triggered by the production line control system and is carried out automatically by the oven. The rapid change in temperature, from hot to cold or from cold to hot, simulates the thermal stresses on the sensor in the gearbox. The sensors are therefore being subjected to a stress test under extreme conditions.

A function test is carried out once the heat treatment is complete. Only sensors which have passed this test are installed in the gearboxes.

The sensors

Three speed sensors are installed in automatic gearboxes: one measures the engine speed, a second measures the speed of a ring gear in the gearbox and a third measures the speed at the output of the gearbox. The vehicle control unit receives the data from the sensors to decide when to shift gears.

Simulate the future. Now.

So your product passes the test of daily use in the future.

Our lives are becoming increasingly dominated by electronics: be it smartphones, tablets, Game Boys, navigation systems or intelligent household appliances, in every toy there is a chip, a battery, a switch. From sensors in cars to LED lights for minimally invasive surgery – we need to and must be able to rely on the quality and function of all components under all conditions. Every day, everywhere and in every weather.

To ensure this and to exclude possible weaknesses and thus expensive warranty claims right from the outset, we have developed test cabinets and chambers which can be used to simulate a wide variety of environmental influences under accelerated conditions. Whether hot or cold, damp or dry, dusty or wet, at rest or in motion – our test systems cover virtually all eventualties. This not only ensures safety, it also saves time and costs.

Generations of **weiss**technik and **vötsch**technik test cabinets and chambers have been successfully used for many years in research, development, production and quality assurance. With their wide variety of options, even series production devices fulfil many specific requirements with ease. In addition, our teams of experts develop special chambers on request, which are perfectly matched to your technical requirements.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Extreme. Strong. ClimeEvent.

The new era of environmental simulation.

Lots to test? No problem!

Environmental conditions have a great effect on the functionality and reliability of electronic components, devices and systems. These products are subjected to a large number of shock-like temperature changes, allowing latent weaknesses to be detected as quickly as possible. This provokes early failures, so that faults can be detected at an early stage of production and the life expectancy of the samples can be predicted.

Test whatever you like.

Setting standards in performance, future-proofness and operability: A new refrigerant that deceeds tomorrow's standards already today ensures high future-proofness, making ClimeEvent extremely eco- and user-friendly. Optimised air guidance delivers best-in-class performance. The innovative **WEB**Season® user interface allows you to programme, control and monitor your tests at any time and anywhere – even from your tablet or smartphone.

Our highlights:

- New, eco-friendly refrigerant
- Optimised airflow and temperature distribution
- Web-based user interface **WEB**Season®
- Available as ESD option

Our innovative Test Chambers are available as **weiss**technik or **vötsch**technik.

Climate Test Chamber ClimeEvent C/600/70/5*

- Test space volume: 600 l
- Temperature range: -72 to +180 °C
- Temperature changing rate heating: 6 K/min
- Temperature changing rate cooling: 6 K/min

* Selected device type – you can find further types in the product brochure TS Temperature Shock Test Chambers, please contact us.

Your stress makers.

Details are decisive – so you can stay relaxed.

ESD option

Environmental stress screening

Today's competitive market demands highly reliable products. During the ESS test, products are subjected to a precisely specified stress situation in order to detect faults in components and circuit boards at an early stage.

Climatic test chamber ClimeEvent C/480/70/15*

- Test space volume: 480 l
- Temperature range: -70 to +180 °C
- Heating rate: 15 K/min
- Cooling rate: 16 K/min

EMC testing

Electromagnetic influences may cause malfunctions in electrical devices and systems. Measurement of the electromagnetic compatibility of a system and the development of suitable protective measures for the reduction or suppression of electromagnetic interference are subject of many research projects. For this, we have developed special test chambers.

EMC Test Chamber LabEvent T/210/40/EMC*

- Test space volume: 200 l
- Temperature range: -35 to +100 °C
- EMC shield >50 db in the range of 0.5 – 3.0 GHz
- Nominal output: 1.5 kW

Temperature shock testing

ESD option

With the Temperature Shock Test Chambers, extremely rapid temperature changes ranging from -80 to +220 °C can be implemented. Thanks to sophisticated construction and high-quality workmanship the test cabinets dispose of outstanding temperature constancies and ensure correct and reliable measuring results.

Temperature Shock Test Chamber ShockEvent 120*

- Lifting cage volume: 120 l
- Load capacity of lifting cage: 50 kg
- Transfer time: <10 sec
- Temperature range: Hot chamber +50 to +220 °C, cold chamber -80 to +70 °C

Battery testing

High expectations for the reliability of battery cells, modules and packs make testing indispensable. Individual safety requirements for standard cabinets and special solutions make Weiss Technik your preferred partner.

ClimeEvent C/340/5/70 Hazard Level 7*

- Reach-in and walk-in solutions
- Coverage of EUCAR Hazard Level 0 to 7
- Individual consultation, many years of experience

* Selected device type - you can find further types in the product brochure, please contact us.

Your border crossers.

Test to the limit – only if the individidual parts pass the test, the entire system will work.

ESD option

Temperature testing

The Assembly Test Chamber LabEvent is designed to carry out constant temperature tests, temperature fluctuation tests and function tests on materials, individual components and finished products. With a test space volume of 580 l and a floor space of less than 1.5 m², the chamber is an absolute space miracle and the ideal space-saving solution for development, the laboratory or production.

Assembly Test Chamber LabEvent T/500/60/3*

- Test space volume: 580 l
- Temperature range: -60 to +130 °C
- Heating rate: 4.5 K/min
- Cooling rate: 3.3 K/min

ESD option

Vibration testing

With the **weiss**technik and **vötsch**technik test systems, you are in a position to simulate the mechanical and thermal/climatic stresses on components and devices. A total of 36 test systems in three sizes, in temperature ranges between -40 or -70 to +180 °C and temperature change rates of 5, 10 and 15 K/min, with and without air conditioning, represent the variety of our vibration test systems.

Vibration test chambers ShakeEvent*

- Test space volume: 600 to 2,200 l
- Temperature range: -70 to +180 °C
- Humidity range: 10 to 95 % RH
- Movability (as shown in picture): optional

Dust testing

Dust tests are mainly performed to test the functioning of electronic components under extreme environmental conditions. The dust is filled into the hopper below the test space. The formation of dust within the test space is effected by injecting compressed air through four special nozzles. Due to the intensive air movement, the dust is blown into the upper test space and swirled around.

Dust test chamber ST 1000*

- Test space volume: 900 l
- Testing according to SAE J575

Splash water testing

With the splash water test chamber, reproducible spray and splash water tests can be performed according to DIN VDE 0470 T1 or EN 60529 and for protection code testing (IP code) according to IPX3 and IPX4. This test determines the protection class of housings against ingress of water.

Splash water test chamber SWT 200/400*

- For testing water protection, IPX3 and IPX4
- According to DIN EN 60529

* Selected device type – other types on request, please contact us.

Easy handling of electronic components.

weisstechnik Test Cabinets with ESD protection ensure the mobility of tomorrow.

Modern vehicles have an increasing number of electronic components on board, for more driving comfort and security. Yet electronic components are highly sensitive and can be quickly and unnoticeably damaged through electrostatic discharge (ESD). Weiss Technik offers reliable protection for development divisions and production with its ESD options for environmental simulation cabinets.

ESD: discreet, invisible and extremely dangerous.

Electrostatic discharges are everyday phenomena. They occur wherever two differently charged, conductive materials approach each other or come into contact. This is the case, for example, when ESD-sensitive test items are placed into a test cabinet with one hand, while at the same time, the other hand holds the cabinet door or touches the operating field. The different charges offset each other suddenly and a high electric current flows. This voltage breakdown is called ESD.

Hidden danger for modern vehicles.

While people only feel an electric shock from voltages of around 3,500 volts and above, electronic components are already damaged from levels of 100 volts. If the damage does not lead to a complete failure of the component, it frequently goes unnoticed. Possible consequences are can be later functional errors and as a result, safety risks. With autonomously driving vehicles in particular, with their large number of sensors and control devices, faulty components can have severe consequences and in the worst case lead to accidents that cause death and injury. Guarantee claims may be asserted against the vehicle manufacturer and the suppliers of components as a result, and huge financial damage may be incurred, alongside a loss of image.

Avoiding overvoltage during development and production.

For manufacturers of electronic components for electric vehicles or autonomously driving vehicles, it is therefore particularly important to provide the best possible protection during development and production against electrostatic discharging. Only then can they reliably guarantee quality and safety of sensors, control devices and circuit boards, and the car manufacturing standards met. These include the establishment of ESD protection zones and the provision of ESD-safe fittings on the test equipment used.

Structural revision protects against ESD.

Weiss Technik offers special ESD options for its environmental simulation cabinets. These prevent damage from ESD and as a result help make vehicles safer and more reliable. With the ESD options, operating staff, the test space and the test items are all earthed. For this purpose, a series of structural measures is implemented on the test cabinet, depending on requirements, and components such as seals and locks are designed with electrically insulating materials. In addition, the test cabinets are coated with a special conductive paint.

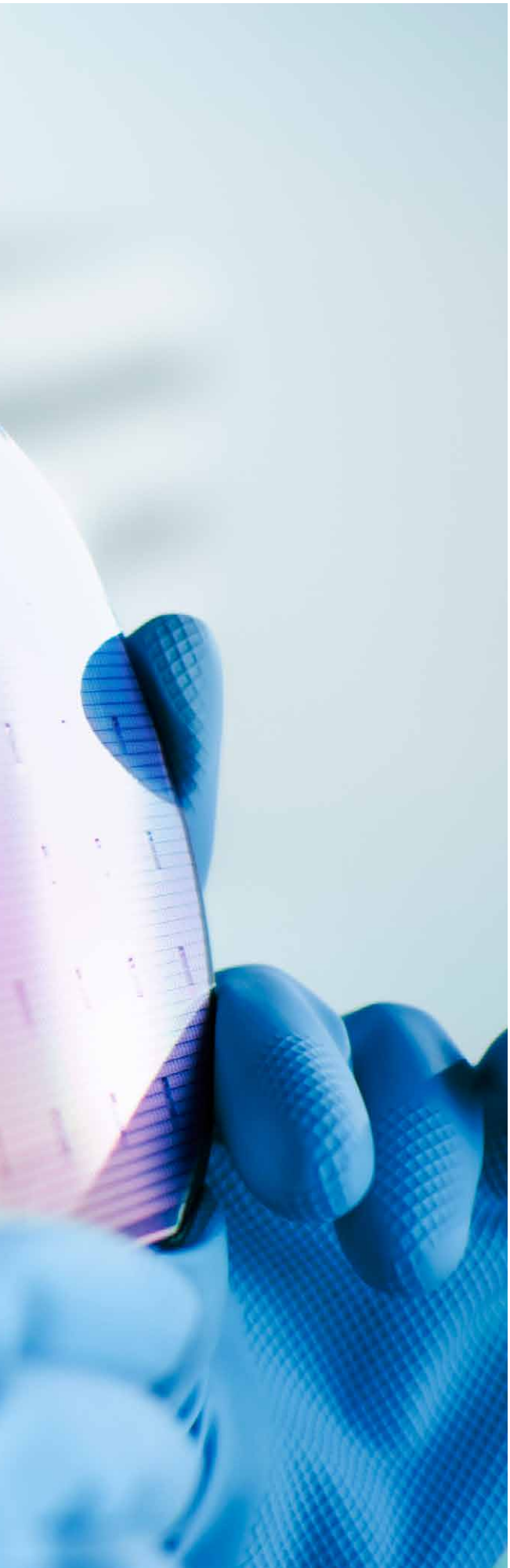
Test chambers with ESD protection.

ESD options are available for all weisstechnik environmental simulation cabinets in the LabEvent, ClimeEvent and ShockEvent series. These come with test space volumes of between 20 and 1,500 litres and in different designs and performance classes. There are also customised special designs and mobile models. In this way, Weiss Technik offers manufacturers of electric vehicles and autonomously driven vehicles and their suppliers reliable protection against the consequences of unwanted electrostatic discharge.

Standard-compliant and tested by the ESD-Akademie.

In order for the ESD measures to offer the desired protection, Weiss Technik cooperates closely with the ESD-Akademie in Großmaischeid. In this internationally recognised competence centre for ESD protection, all protective measures are tested and certified. In addition, staff are trained accordingly. The ESD options for Weiss Technik environmental simulation cabinets fulfil the standards of DIN EN 61340-5-1 on the "Protection of electronic devices against electrostatic phenomena". In this standard, all requirements are specified which companies must meet for the effective management of electrostatic charges.

ESD-AKADEMIE®
WISSENschafft Sicherheit



Individually planned. Expertly implemented.

Weiss Technik – experts for decades in the field of climate control.

Ideal climate for your applications

Purity, temperature, humidity, pressure and their permitted variation tolerances are indispensible conditions for sophisticated development, production and test processes.

The use of process climate control makes it possible to set the required narrow limits and control these precisely in both space and time.

In addition, people, the environment or the product itself must be protected against contamination in various processes. These core areas require significantly more complex control than other process stages.

Standard products and individual solutions

With its wide ranging product portfolio, Weiss Klimatechnik offers systems for every application, from complete clean rooms and measuring rooms to process climate control systems and individual workbenches to special air-conditioning systems for data centres. Customised solutions are our strength.

Compact, universal and reliable

From precision air-conditioning units to mini environments, our components and systems impress with their compact design combined with innovative technology. We provide you with comprehensive support right from the start – from planning to acceptance measurements and instruction of your employees. Through our service network we ensure constant availability of our systems and installations.

Your unerring quality assurance.

Controlled process environment for pure production and precise products.

Clean room air conditioning

With our UltraClean line of products, we offer our customers a technology in which the emphasis is on the cleanliness of the room. Depending on requirements, the solution is equipped with partial or full air-conditioning functions, i.e. cooling, heating and humidity control. With our system solutions we ensure compliance with national and international clean room standards such as VDI 2081 and DIN EN ISO 14644.

The spectrum of expertise ranges from simple machine housings to laminar flow systems and complex clean room systems. Together with you, we plan and build according to your wishes and requirements.

Clean room air-conditioning systems and equipment
Mini environment UltraClean® with high-precision climate control for micro-electronic inspection tools*

- Temperature stability: ±0.05 K
- Humidity stability: ±1 % RH
- Clean room class 2 according to DIN EN ISO 14644

Measuring room air conditioning

Measuring rooms are central components for quality assurance during production. The greater the reliability of the measurement, the lower the reject rate. This is particularly important for the narrow manufacturing tolerances of sensitive electronic components.

One major factor for the uncertainty of measurements are the environmental conditions, primarily the temperature. Weiss Technik plans and produces individually tailored measuring rooms in accordance with the requirements of VDI/VDE 2627. These reduce measurement uncertainty by suppressing the influences of temperature, through e.g. the prevention of draughts or direct light, the enclosure of the measuring device and thermal insulation of the measuring room.

Measuring room*

- Floor space: 112 m²
- Clear room height: 3.50 m
- Air supply: TMS (Turbulent Mixed Flow) via swirl diffusers

* Selected system – other versions available on request, please contact us.

Your protection for people and the environment.

Efficient solutions for your safe workplaces.

Safety workplaces

Progress in systems engineering places increasing demands on the protection of products and the protection from emissions for the people who work with the products. Workplaces and stations in which hazards could occur must fulfil functionally and economically critical conditions.

The WIBOjekt and the WIBObarrier system are the basic principles of our safety workplaces. Specially formed air outlets, known as ejectors, create a curtain of pure air, which safely separates the work area from the surrounding area. The WIBOjekt system provides optimum protection for employees and the room. Dust or gases which are released by the product are caught by the ejector air and removed by the extractor in the rear wall. The WIBObarrier system is used if pure product protection or protection of the product and persons is required. The vertical WIBObarrier air curtain operates according to the 3-zone principle and protects the product from external immissions. This achieves a reliable class 5 clean room zone according to DIN EN ISO 14644-1 in the work area.

Clean room line for production of electronic switching elements WIBObarrier® BAKVO 120/97*

- HEPA filtering of intake and exhaust air
- Air volume: air intake 1,000 m^3/h, exhaust 1,400 m^3/h
- Clean room class ISO 8

Safety workplace for coating and vapour deposition on electronic components WIBObarrier® BAPVO 120/87*

- HEPA filtering of intake air
- Air volume: air intake 1,000 m^3/h
- Special equipment: sliding front window
- Clean room class ISO 7

Your flexibility for higher efficiency.

Intelligent climate control for your data centre.

IT Climate Control

An absolute innovation in the area of IT climate control: CoolW@ll turns the entire technology room into a refrigerator and makes it possible to achieve extremely high cooling performance with low energy consumption. The technology is built into the walls saving space in the server room. Say goodbye to climate control chambers!

Air-conditioning unit Vindur® CoolW@ll® 300.4 CW*

- Air volume: 30,000 m³/h
- Cooling output: 150 kW at 10/15 °C water and 30 °C recirculation

The most important benefits of Vindur CoolW@ll at a glance:

- Most energy-efficient water-cooled climate control system for data centres
- Highly useful cooling output with a small installation area
- Modular system design with coordinated individual elements
- Can be freely adjusted to every room's infrastructure
- Maintenance-friendly walk-in system

*Selected device type – other types available on request, please contact us.

Optimal climate for the battery cells of tomorrow.

Weiss Technik supports the development of e-mobility.

Electromobility is an automotive mega trend. Durable and high-performance lithium-ion batteries are required for it to succeed. With the aim of improving their own expertise and becoming less dependent on established battery manufacturers, an increasing number of vehicle manufacturers are developing their own production lines. In order to ensure the necessary perfect air-conditioning and ambient conditions when manufacturing prototypes, Weiss Technik plans technical building equipment and air-conditioning technology and is a single-source provider of these systems.

Complete dryness protects production

In order to avoid damage and production defects, li-ion batteries must be produced in particularly clean and dry ambient conditions. In order for these conditions to always prevail in a reliable and reproducible manner, the production facility is generally located in a separate production space (chamber). A combined air-dehumidifying, air-purification and air-conditioning system continuously maintains the required ambient conditions in this space, irrespective of the load.

System expertise from a full-service provider

As a leading partner for building and system technology for environmental simulation, Weiss Technik benefits from many years of experience in the automotive industry and the research sector and has excellent references in these fields. Thanks to the targeted integration of expertise in the field of ventilation and air-dehumidifying technology, Weiss Technik is currently the only company that offers complete systems of technical building equipment and air-conditioning systems from a single provider. This benefit simplifies planning, optimises implementation, reduces subsequent costs and improves the result.

Reference from the automotive industry for battery prototypes

In 2016 a pioneering project for a leading German vehicle manufacturer was implemented. A production area of approx. 250 m^2 was built to manufacture lithium-ion batteries in accordance with the PHEV1 standard. Two thirds of the production area consist of the drying chamber and one third is the preparation area with a sluice and an equipment room. The following tasks should be carried out in the drying chamber under safe reproducible conditions: vacuum drying, coiling, joining diverters, assembling and welding subcomponents, filling electrolytes, pre-charging and sealing.

Chamber assembly using standard modules

When assembling the chamber for the production space, the optimal air-tightness of all components is to be considered. Therefore, Weiss Technik works with tried and tested standard modules that can be individually assembled and easily extended at any time. The chambers conform to the clean room class ISO 7 and if required, they can be fitted with appropriate sensor systems, e.g. for measuring particles or gas. They must be planned in such a way that even large pieces of production equipment can be brought in or out as required.

The sluice is continuously cleaned using dry air from the chamber and it can always only be opened and entered in one direction. In order to minimise the entry of humidity and particles, an air shower can be integrated in the sluice. In the shower, people are cleaned for a specified time with dry air before they enter the chamber.

Adsorption dehumidifiers ensure dry air

Durable and efficient systems based around adsorption dehumidifiers are the central components of the ventilation and air-conditioning system. As a central functional element, the integrated sorption rotor continuously dehumidifies the air in a reproducible manner. The adsorption dehumidifier guarantees very high dehumidification capacities with an extremely low residual water content of up to 0.001 g/kg air or rather a dew point of –70 °C.

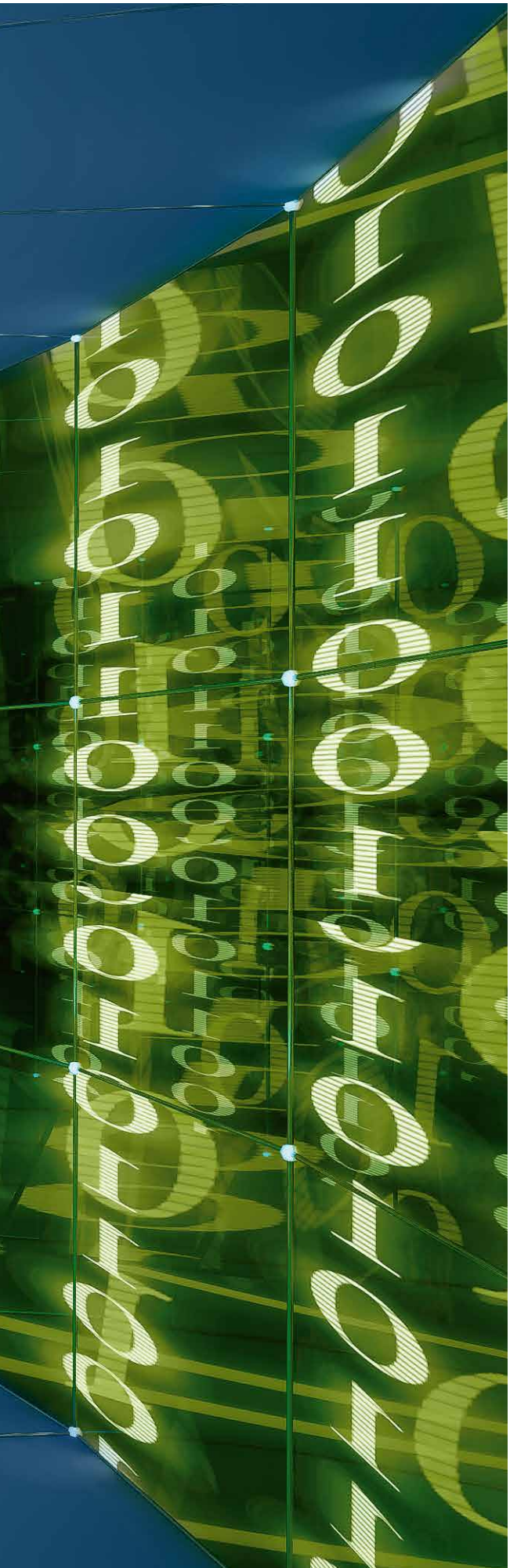
Depending on the structural requirements, the ventilation and dehumidification system can be positioned either next to the chamber or externally, e.g. on the roof of the building. Here the integration of appropriate filter units in the air-flows ensures the required air quality. The compact systems developed as air-circulation subsystems are developed in agreement with the client so that the humidity load of workers in the drying chamber is also safely compensated (per person approx. 150 g/h).

Using tried and tested air-conditioning technology

In order to guarantee the desired indoor climate at any time of year and whatever the external conditions, Weiss Technik draws on tried and tested air-conditioning systems that can be adapted to suit requirements. They cool or heat the air exactly as required by the process or the environment or as wanted by employees. At the same time, conditioned air is blown in through ventilation diffusers and the exhaust air is extracted through a duct on the floor. Additional air extractors, e.g. for production sub-processes, can be easily integrated. Furthermore, special exhaust air systems, e.g. for areas with an explosion risk, can be added.

Operation, reliability, safety and efficiency

weisstechnik Dehumidifying and Air-Conditioning Systems are particularly easy to operate and require very little maintenance. In order to ensure a high level of operational safety, they can be produced as redundant systems. In order to increase their efficiency, the systems can be produced with partial load operation capability if required. The control with an integrated regulating system ensures an efficient and continuous operation if desired. Furthermore, the integration of procedural heat recovery ensures the economic viability of the system.



Industry 4.0 – networking is a catalyst for innovation.

Exploit your potential with Weiss Technik.

With the increasing requirements for the use of electronic components, the need for 100 % quality control is also increasing. Quality control must be integrated into the process, enable comprehensive traceability and facilitate immediate intervention in case of deviations. The production flow must continue without hindrance by the tests so that delivery times can be met and products are available any time and any place in a globalised world. For this reason, individual solutions, as they are now commonly used in research and development laboratories, will become a model of the past in tomorrow's quality control.

In cooperation with leading process automation manufacturers, we have developed a special measuring software and continue to develop it further: **S!M**PATI® performs and documents the test process, interlinks up to 99 systems, which can be remotely monitored and controlled with **S!M**PATI® **web** via Internet browser from anywhere in the world. Visualisation of the test process through real-time monitoring by camera: **S!M**PATI® **time labs** and **S!M**PATI® **time labs infrared** enable precise tracking of changes during the testing process with simultaneous correlation of the measurement values.

In addition to automatic loading and unloading of test samples by robots and conveyor technology, **S!M**PATI® plays an important role in the integration of environmental simulation chambers into the production process. 100 % traceability of the process data enables complete evidence of quality – chip by chip.

Smart integration with **S!M**PATI®.

Future-proof use of test systems in intelligent factories.

S!M PATI®

Networking

The **S!M**PATI® control software enables the optimal integration of test equipment for environmental tests into smart production processes.

- Networking with different test systems
- Control of up to 99 systems, including additional measuring devices

Process control

Control of test systems becomes simpler and saves time. Integrated monitoring routines increase the reliability of system operation. The extent and frequency can be individually specified.

- Easy control of test sequences
- Easy creation of test programs with the program editor
- Clear management of programs for production sequences and tests
- Management and administration of various users and user groups
- Convenient configuration of outgoing e-mails in case of events
- Clear specification and display of future events with the planner

Evaluation and documentation

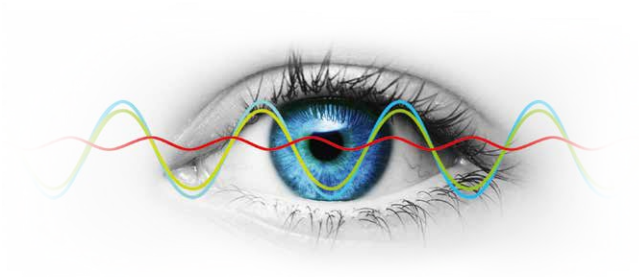
Evaluation and documentation of test sequences as well as the inclusion of your special measurement data guarantee and improve the quality standard.

- Save measurement data
- Record irregularities and malfunctions during the test sequence
- Print out measurement data in graphic form
- Export measurement data to other programs for evaluation
- Calculate the gradients of process parameters and times for changes to process parameters
- Display evaluations as illustrative graphs

Did you know? Equipment with infrared sensors for non-contact measurements can be available on request. To help you keep the test sample intact and accelerate the process.

A picture is worth a 1000 measurements.

The S!MPATI® time labs visual documentation system.



In addition to and in correlation with the recording of conventional measurement data, digital camera images are generated at regular intervals with a special software and saved in a common archive folder. The combined evaluation of the measurement data and the images creates new and valuable knowledge. And more so, when a special event has occurred.

S!MPATI® time labs

- Parallel documentation of images and measurement data
- Up to six cameras in HD quality
- Individual choice of cameras, be it industrial or notebook cameras, endoscopes, microscopes, webcams or thermal imaging cameras

S!MPATI® time labs documents:

Electronics
- Malfunctions
- Responses of LED/LCD displays

Mechanics/movement
- Fan stoppages
- Throttle control
- Valve control

Condensation
- Surface precipitation
- Moisture build-up

Corrosion
- Progress of processes

Fluid level
- Changes of fluid level

Behaviour of materials
- Deformation

Industry 4.0 – forward into the future.

Mitsubishi uses robots for climatic testing.

Almost everyone has tracked a parcel on the Internet. Via a link, it is possible to find out where a parcel is from anywhere and in real time – in the dispatch department, in the packing station or already in the delivery van. How does this work? Are there other applications for this system? The key to these questions is Industry 4.0.

The term "Industry 4.0" refers to the fourth industrial revolution, which is characterised by the systematic increase in the flexibility of products and production processes. This involves large-scale networking of machine and plant construction, automation technology and IT.

One feature includes the further development and use of modern automation, information and communications technologies, which will open up new possibilities for users in production and logistics.

The basis is the availability of relevant information in real time – just like tracking a parcel. Industry 4.0 describes the networking of product systems and products on the basis of cyber-physical systems in the Internet of Things. Advantages include greater flexibility, optimised processes and cost savings. The concept of the Internet of Things implies the virtual representation of physical objects "things" in a

structure similar to the Internet. This creates a link between humans, objects and systems, with which dynamic, real-time and self-organising inter-company value creation networks are developed. If a special spare part is produced somewhere, its status, availability and location can be tracked from the other side of the world.

Information which can be called up can be made available by means of RFID or QR codes, for example. This information is recorded and made available by a central system, so that it can be accessed regardless of the location. This is also how parcel tracking operates on the Internet.

With an indicatory cooperation project, the partners Weiss Umwelttechnik, the VDE Institute and Mitsubishi reveal, which immense advantages Industry 4.0 can create. Through the symbiosis of innovative robotics (Mitsubishi) and newest climatic testing equipment (Weiss Umwelttechnik), an automated test station for testing components in a climate-controlled environment was successfully executed.

Data are transferred to the robotic system using a barcode scanner. The **weiss**technik software **S!M**PATI® records the scanned data, including, for example, the name of the employee, loading or unloading of the climatic chamber and the number of test samples. The correct program for each previously scanned product is saved in a database and is selected automatically. The time stamps and measurement data are recorded during the process and are made available in an overview. Hence the information in the database can then be accessed from anywhere, even at a later time. Information is stored about which program has been, or will be run, when the product was inserted into or removed from the chamber, by whom this was done and whether there were any error messages. In this way, test processes are optimised and the testing and evaluation quality is increased.

The use of a robot perfects this system and assists testing in future mass production. Scanning and loading or removal of the test samples is carried out fully automatically, but works just as well manually. Employees operate the climatic chambers or the heating systems with the aid of a barcode scanner. The software **S!M**PATI® then records the data and generates a report on the progress of the test. Any other employee can then access the information in the database from any department by means of a browser – again, it's just like tracking a parcel.

Become more efficient.

Our solutions will save you time and money.

Developed exclusively for you:
the unique software simulation package for the perfect testing process.

Process management/documentation/networking

- Up to 99 systems can be networked
- Programs for automated processes
- Documentation, visualisation and management of process data
- Traceability of process data for seamless quality control

Reliable series control.

SIMPAC® controlled I.I

Digital measurement and regulation system to operate, monitor and document your test chamber.

Energy efficient thanks to greenmode®.

green mode®

Even our standard testing cabinets stand out with best insulation values and low operating costs. With **green**mode®, you can save an additional 40 % of electric energy and thus many tons of CO_2. We achieve these savings through the smart control of system components under certain operating conditions.

Secure your future - with greencold.

green cold

2020 will see a ban on refrigerants with a Global Warming Potential (GWP) of more than 2,500. Consequently, Weiss Technik has already switched, in the field of environmental simulation, to the new refrigerant R449A, whose GWP is just 1,397. Make your testing sustainable and future-proof, surpassing tomorrow's strict regulatory even today.

We measure ourselves by our service!

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+49 1805 666 556

Our services – lots of good arguments:

- Global service network
- Wide selection of preventive maintenance
- Reliable spare part supply
- Special deployments available any time
- Certified proper disposal of outdated devices

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