WKM

Thermal process technology
Environmental simulation
Project planning

Whatever you are going to simulate.

We project it.

Temperature control systems

Temperature control systems

Contents

We are WKM

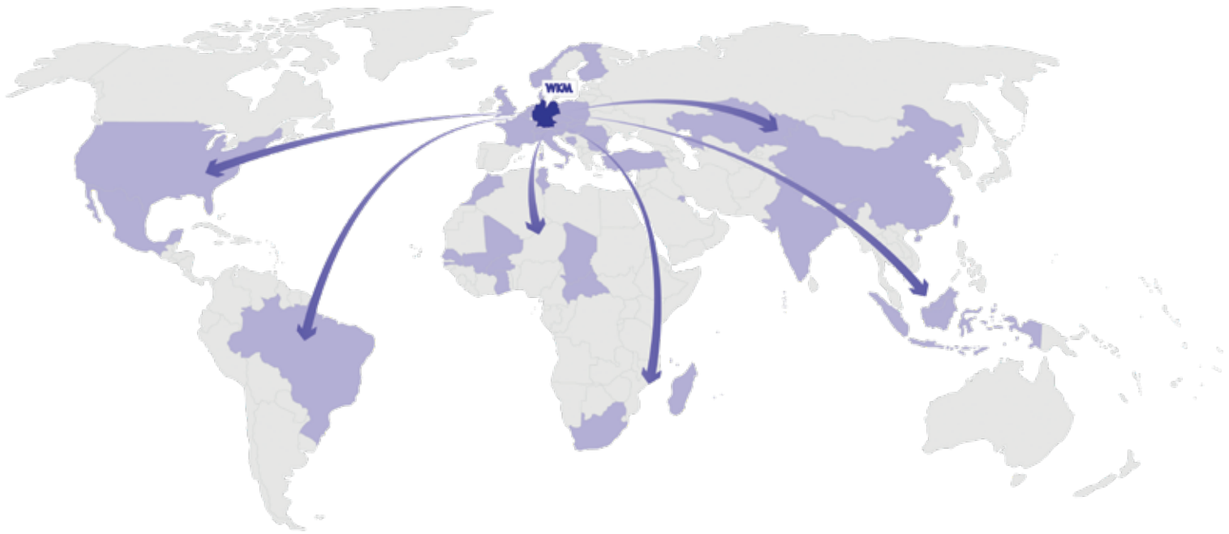
WKM has been active as an independent sales company since 1996. We work as Factory representation and sales partner together with renowned manufacturers. Lachendorf in Lower Saxony became our new headquarters in 2014.

You can reach us for a personal conversation - without an automativ telephone waiting loop! Technical consultation on site is a matter of course for us. We would be pleased to arrange an appointment for a visit to your company or on a virtual meeting. For us, advice does not end with the order. After delivery of the system, you will receive a commissioning and equipment training on request.

You are invited to visit our technical centre to get a detailed impression of our work and the quality characteristics of the product range. Here we can also carry out individual training and further education programmes for you.

WKM offers a comprehensive program to determine all project-specific basics. We implement your requirements precisely and consistently and assist you in all phases of your projects.

Our key to success: **Listen, Advise, Act**.



Whatever you are going to simulate.

We project it.

Typical applications of the temperature control systems

- Tempering water
- Shock test
- Volume flow control
- Tempering oil
- Pressure control
- Cold water set Chiller

Full Service

Our internal service team can be reached by phone workdays from 7:00 a.m. to 5:30 p.m. WKM is also your contact person after purchase and commissioning and ensures a proper function of your equipment and system. Our regularly trained service employees are always at your side. We also help without a maintenance contract.

Our services

- Repairs
- Maintenance
- Calibration
- Leakage test acc. to F-Gas regulation
- DGUV - V3 measurements (previous BGV-A3)
- Leased devices

Temperature control systems

Medium water / glycol

Performance parameters

Temperature range
–40 °C to +150 °C

Device properties

Needs-based
device dimensions

Heating / cooling performance
according to requirements profile

Especially in the field of electromobility and fuel cell research, different components (e.g. power electronics, batteries, electric motors) must be subjected to reproducible functional and endurance testing. Accelerated temperature change times are reached with the tempering of the internal water / glycol or oil circuit. Furthermore, the thermal energy emitted by the test specimen is dissipated via the medium.Thus the test specimen is protected from overheating and earlier test results can be achieved through faster test cycles.

Not much space? We design your tempering device according to your requirements. Profit from our experience.

Options:

- automatic filling, emptying and ventilating
- central refrigeration
- energy savings systems
- external setpoint pre-set
- fill speeds, adjustable
- isolating transformer for system separation
- leakage monitoring
- multi-circuit systems
- remote maintenance modules
- sensor inputs (pressure + temperature)
- split construction method

Conditioning system | Set up in control cabinet housing

The following product properties are highly recommended for reproducible validation of energy storage systems and power electronics and thus are included in our standard design:

- powerful consumer pumps to –40 °C
- volume flow control over the entire temperature range
- needs-based heating and cooling capacity
- media resistance
- energy savings functions
- the fastest possible change speeds from regulated temperature ramps up to abrupt temperature change
- communication interfaces Modbus TCP, Ethernet, ProfiNet, ProfiBus etc.
- specially developed systems for achieving very low temperatures, e.g. –40 °C with water / glycol mixture

2-circuit tempering device | Volume flow and pressure control per circuit I movable design

2-circuit tempering device | Temperature, volume flow and pressure control per circuit I Variable positioning of the connections

Temperature control systems

Medium oil

Performance parameters

Temperature range
–40 °C to +300 °C

Device properties

Needs-based
device dimensions

Heating / cooling performance
according to requirements profile

The tempering of the internal cooling and lubrication systems of the test specimen is important for the function and endurance test of electric motors, gearboxes and other components.

Here the function of your development is tested for various temperatures. Through fast temperature change of your test specimen, test times can be significantly reduced. Overheating of the total system and a subsequent damage to your test specimen is thus reduced. Also simulations under changed flow rate and pressure conditions can be tested and documented. You can use our conditioning systems process-reliable and powerfully.

Not much space? We can gladly adapt the dimensions uniquely to your installation conditions. Using our experience you achieve your goal.

The following product properties are elemental for the reproducible validation of gearboxes and electric motors:

- needs-based heating and cooling capacity
- energy savings functions
- ventilation via special tank design to prevent foaming
- communication interfaces Modbus TCP, Ethernet, ProfiNet, ProfiBus etc.
- powerful consumer pumps to –40 °C
- media resistance
- the fastest possible change speeds from regulated temperature ramps up to abrupt temperature change
- volume flow control over the entire temperature range
- specially developed tempering design for achieving very low temperatures, e.g. –40 °C with gear oils
- adaptation to on-site connections

Options:

- automatic filling, emptying and ventilating
- central refrigeration
- energy savings option for additional cooling capacity
- external setpoint pre-sets
- fill speeds, adjustable
- isolating transformer for system separation
- leakage monitoring
- multi-circuit systems
- recirculation pump
- remote maintenance modules
- sensor inputs (pressure + temperature)
- split construction method

1-circuit tempering device | Volume flow and pressure control
Extra thin shape

1-circuit oil tempering device

2-circuit oil tempering device | Integrated collection pan I Large control panel I Movable design

Worth knowing

What do you need?

Give us your requirement profiles for the conditioning of liquid media. Flexible module production enables a customer-optimised technical solution.

Not much space? We design your conditioning device according to your requirements.

With simultaneous tempering of several test specimen setups, frequently a separate tempering device is procured per test specimen. This increases the required space and budget demand. A conditioning system with **several consumer circuits** has significant advantages for you:

- reduction of the installation dimensions and procurement costs compared to several 1-circuit systems
- connections can be positioned to your installation conditions (side or rear wall as well as top of equipment)
- split construction method for a reduced noise level in the work and testing area

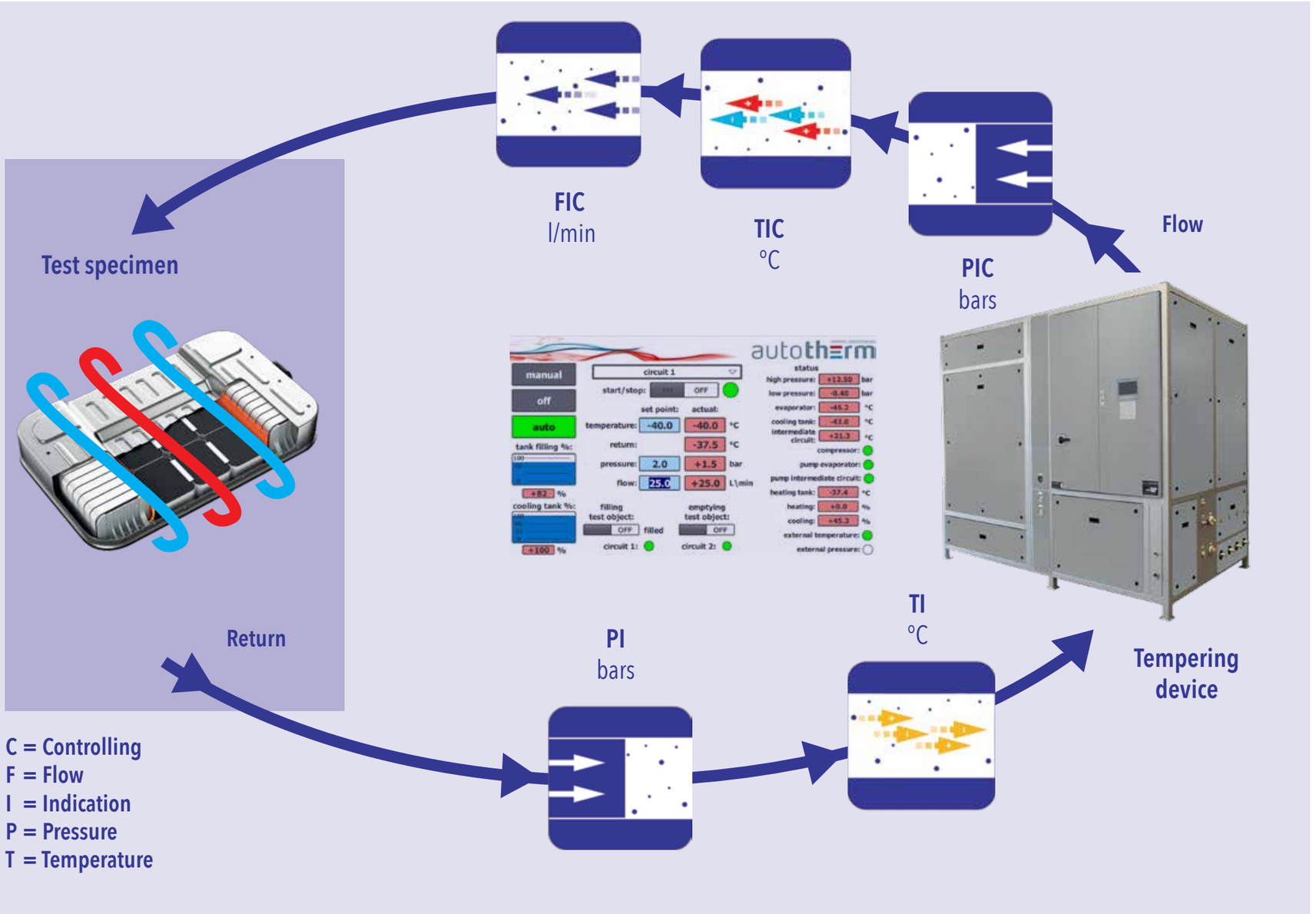
Custom solutions for your tasks

Depending on the tasks, we match the tempering system exactly to your requirements:

- volume flow rate and pressure control for 1-circuit or multi-circuit systems over the entire temperature range
- wide temperature ranges, system technology adjusted to test media
- leakage monitoring
- automatic filling and refilling equipment
- emptying equipment for clean change of test specimen
- energy savings system so that the conservation of resource already begins during the development

Simple integration in your higher-order test bench control

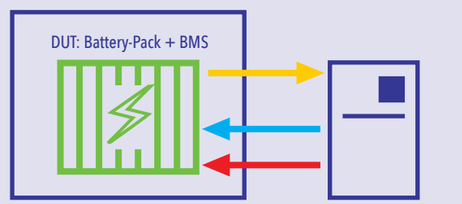
- communication interfaces to connect to your higher-order test bench control Modbus TCP, Ethernet, Profinet, Profibus, etc.
- control and monitoring via large touchscreen directly at the tempering system
- reduction of downtimes through direct notification from error/malfunction messages
- flexible programmable parameters



Electromobility on the test bench

Only if battery, battery management system, electric motor, power electronics and gearbox are perfectly synchronised with each other is it possible to develop a reliable assembly or a complete vehicle.

In testing technology, among other things it is important to characterise the components independently of each other, or also as a complete technical module and to test for their functional efficiency.



Cooling water generation

Cold water set / chiller

Performance parameters

Temperature range
6 °C cold water
20 °C cooling water
to –50 °C for brine or silicon oils

Device properties

Needs-based
device dimensions

Heating / cooling performance
according to requirements profile

When using water cooled systems and machines, a cooling water system absorbs the existing lost heat in order to take it away from the installation location. Frequently cold water units/chillers are used for central reverse cooling of the cooling water to the outlet temperature. Optionally this system can also be offered as an efficient free cooling system.

Made in Germany.
Reliable and affordable.

When we have explained our talking points, such as

- frequency controlled consumer pumps
- minimised noise level at the installation location
- power consumption
- power-controlled fans
- setup conditions.

We will be glad
to show you a
target-oriented solution.

Compressor cooling device for outdoors installation

Large compact free cooling equipment

Calculation example for energy efficiency of the free cooler

Armortisation calculation

400 kW chiller with free-air cooling

	KW/h	Ambient temperature	Annual hours	kwh/a
Power consumption of compressor with free cooler (average value) per 100 kW cooling capacity	27,70	>27 °C (value 26 °C)	66,00	1.828,20
Power consumption of compressor with air-conditioned condenser (average value) per 100 kW cooling capacity	20,20	>27 °C (value 26 °C)	66,00	1.333,20
Power consumption compressor with free-cooler (average value) per 100 kW cooling capacity	23,90	>22 °C (value 21 °C)	325,00	7.767,50
Power consumption of compressors with air-conditioned condenser (average value) per 100 kW cooling capacity	17,50	>22 °C (value 21 °C)	325,00	5.687,50
Power consumption compressor with free-cooling condenser (average value) per 100 kW refrigerating capacity*	17,60	>17 °C (value 16 °C)	918,00	16.156,80
Power consumption of compressors with air-conditioned condenser (average value) per 100 kW cooling capacity*	15,60	>17 °C (value 16 °C)	918,00	14.320,80
Power consumption of compressor with free-cooler (average value) per 100 kW refrigerating capacity**	12,00	>12 °C (value 11 °C)	1.815,00	21.780,00
Power consumption of compressor with air-conditioned condenser (average value) per 100 kW cooling capacity*	15,60	>12 °C (value 11 °C)	1.815,00	28.314,00
Power consumption of compressor with free cooler (average value) per 100 kW cooling capacity	2,90	<12 °C (value 11 °C)	5.644,00	16.367,60
Power consumption of compressor with air-conditioned condenser (average value) per 100 kW cooling capacity*	15,60	<12 °C (value 11 °C)	5.644,00	88.046,40

* Condensing temperature regulated to 35 °C

** Partial discharge via free cooler

Annual power consumption 24/7, 365d/a with air-cooled condenser:	137.701,90
Annual power consumption 24/7, 365d/a with free cooler:	63.900,10
Energy savings per 100 kW cooling capacity / year with free cooler	**73.801,80**
assumed energy costs per kwh:	0,24 €
Annual savings in euros with free cooler per 100 kW cooling capacity	**17.712,43 €**
Cooling capacity at 20 °C flow temperature and 32 °C ambient temperature in kW	400
Average utilisation factor:	65%
Annual savings in euros with free-cooler total system	**46.052,32 €**

Note:

This calculation was made to the best of our knowledge with partly assumed and/or averaged values and can only be considered as a guideline.

You can also benefit from our expertise

Environmental simulation

- Temperature
- Shock test
- Climate
- Plant growth
- Sunlight
- Vibration
- Leakage test
- Tempering Medium Oil
- Corrosion
- Height simulation
- Container systems
- Tempering Medium Water / Glycol

Thermal process technology

- Drying
- Tempering Heating
- Vulcanising
- Vacuum
- Solvents
- Coil-Coating Test
- Annealing - Hardening- Tempering
- Elastomer Plastic

We will be pleased to advise you in the fields of thermal process technology and environmental simulation, in order to project an individual solution for your application. Contact us under the phone number +49 (0) 5145-28666-10.

References

Tempering systems combined with a total test bench are an important element. The solution is continually designed customer-specific.

In the last 5 years we have supervised numerous projects.

WKM
Wärmeprozess- und Klimaprüftechnik Michel GmbH & Co. KG
Im Bulloh 30 – 32
29331 Lachendorf

Phone.: +49 (0) 5145 – 28 666 - 10
Fax: +49 (0) 5145 – 28 666 - 77
E-mail: info@wkm-michel.de
Homepage: www.wkm-michel.de

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