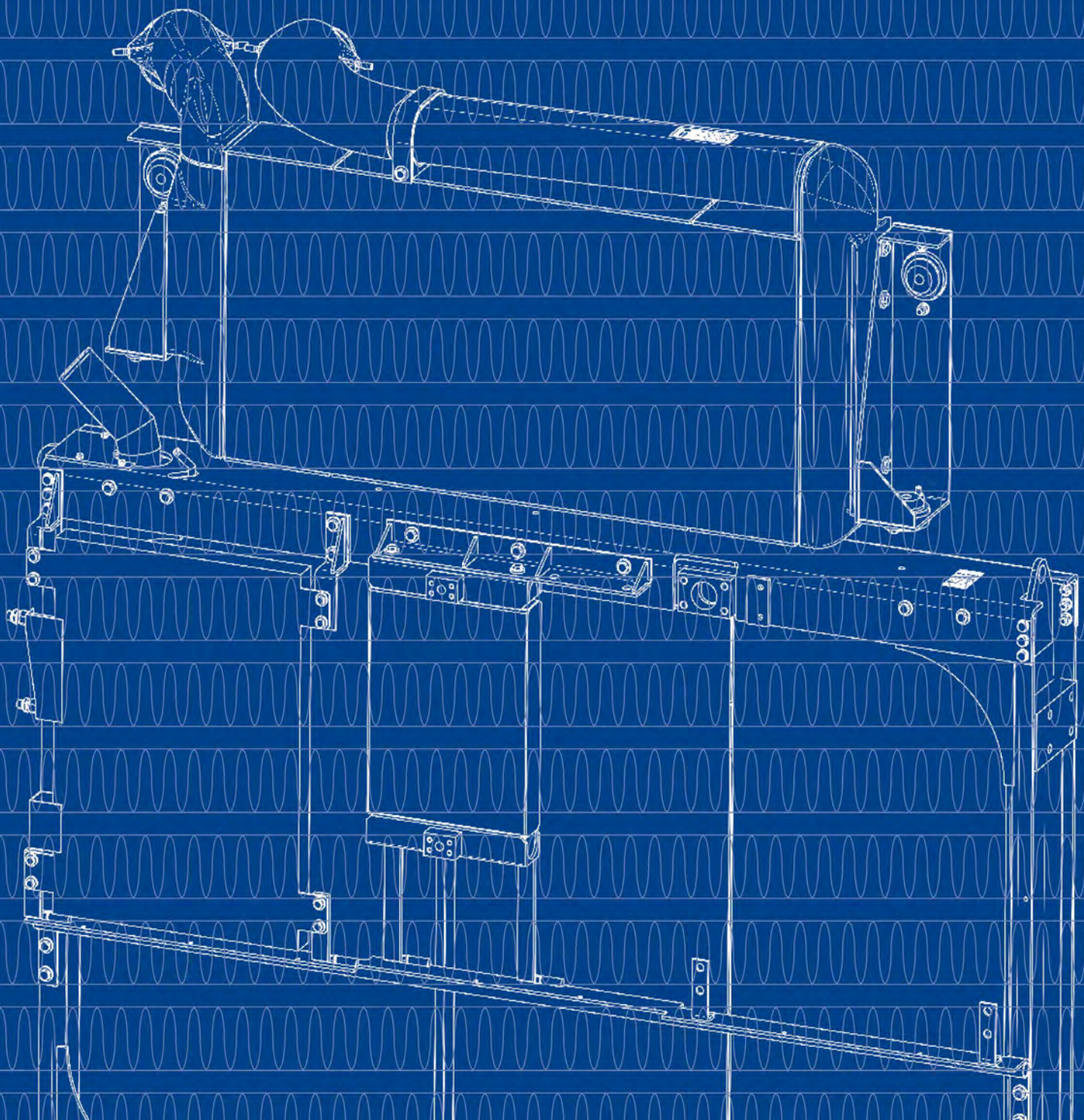
Manufacturer of Coolers and Heat Exchangers Worldwide



Experience and competence...

FROM TRADITION TO PROGRESS

AKG is a private family-owned company founded in 1919 as „Autokühlergesellschaft“ (automotive cooler company) that was started with small-scale production of coolers and repair work. In 1946, AKG entered into direct production of heat exchangers for the automobile industry. This is still recognizable in the name “Autokühler” of some subsidiaries of the AKG Group. Over the years, AKG has continuously expanded its expertise to new applications, resulting in a major portion of its revenue coming from markets such as construction equipment, air compressors, industrial coolers, agriculture and forestry equipment, automotive vehicles, railed vehicles, household appliances and special applications. As a leading supplier of custom solutions, AKG has acquired a worldwide reputation for producing high-quality coolers, heat exchangers and thermal management systems.

OUR MISSION IS

- Technical expertise
- Product innovation
- Customer orientation
- Quality and reliability

COMPANY PHILOSOPHY

The success of AKG results from its creativity and technical innovation. Continued growth across Europe, North America and Asia shows that AKG is on the right track to address the variety of market requirements and to provide custom solutions. More than 150 highly qualified engineers and technicians in development, research and project engineering develop heat-exchangers with our customers for various applications. Innovative manufacturing processes ensure excellent quality and sustainable production.

THE AKG GROUP

The central office in Hofgeismar coordinates the operation of the AKG Group, whose more than 3,300 employees produce over 2,5 million heat exchangers in various designs per year.
To achieve this, eleven business units as well as fourteen marketing companies around the globe are in operation twenty-four hours per day.

AKG - a strong globally integrated group of companies.

...innovative and highly efficient!

AKG OFFERS THE RIGHT SOLUTION FOR EACH COOLING PROBLEM!

A pioneering spirit has always been the driving force behind AKG‘s engineers for **over 100 years.**

Market monitoring and continuous product improvements were the starting point for several inventions at AKG, continuing to provide direction for heat exchanger technology in the years to come.

- **Compact, high efficiency, motor-integrated cooling systems for engine coolant, charge-air and oil**
- **High temperature charge-air coolers**
- **Aluminium refrigerant heat exchangers for compressed air dryers**
- **Bonded high-performance condensers for tumble dryers manufactured from aluminium or plastic**
- **High performance heat sinks for electronic modules**
- **High performance oil to water heat exchangers for retarding brake systems**

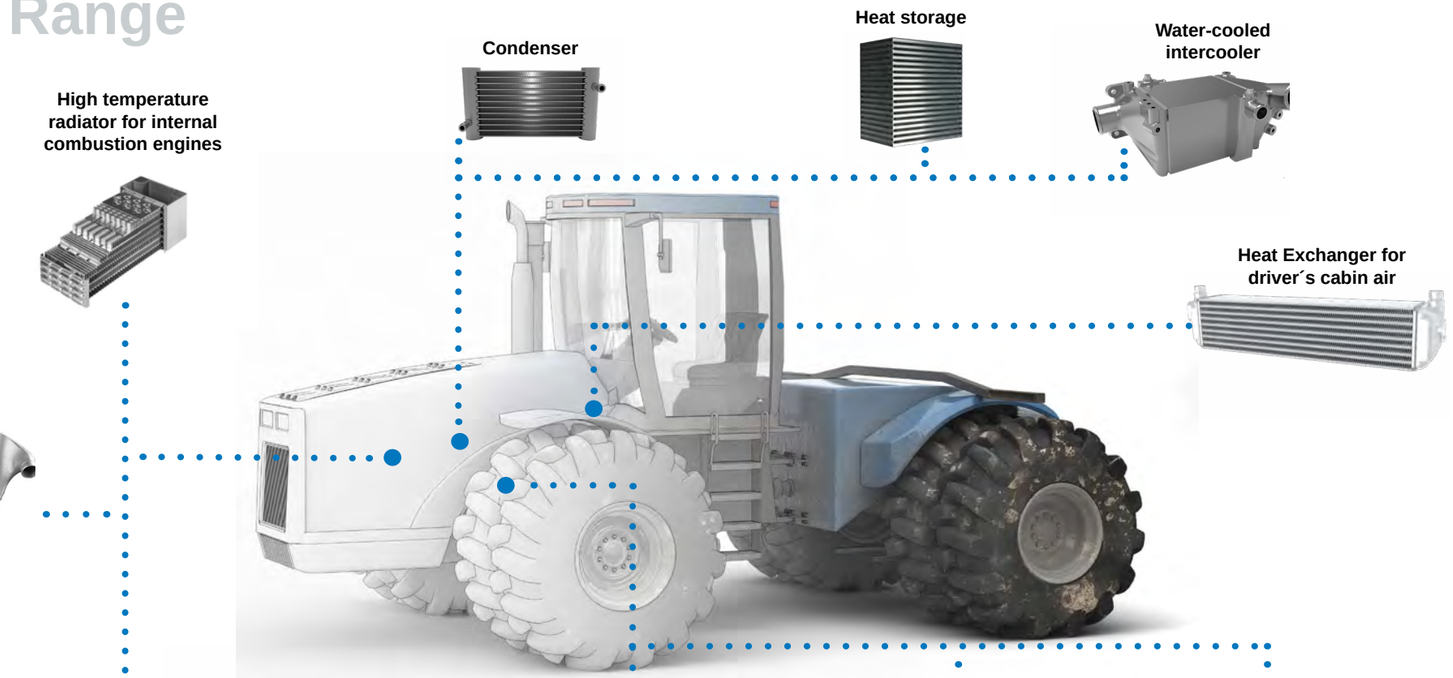
Heat exchangers for various applications

RESEARCH AND DEVELOPMENT

In the area of research and development, AKG uses in-house developed special software for the optimal design of coolers in addition to the conventional FEM and CFD simulants.

A highly developed testing area allows exacting trials to prove the heat exchanger performance data and strength parameters.

AKG Product Range



Condenser

Heat storage

Water-cooled intercooler

High temperature radiator for internal combustion engines

Heat Exchanger for driver´s cabin air

Intercooler

Low temperature radiator for cooling battery, e-machine, power electronics, intercooler

Chiller for battery cooling or for thermal management system

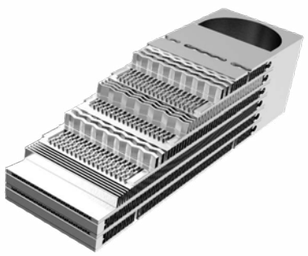
Battery cooling unit

Liquid cold plate for cooling power electronics

AKG Benefits

- Over **100 years** experience
- Customer specific solutions
- Comprehensive research and development
- Optimized costs and space efficency
- Highly flexible dimensionable
- Global availability
- High cooling capacity
- Innovative and highly efficent
- High durability

Barplate Cooler



- Robust construction
- Deep cores
- Weight optimized

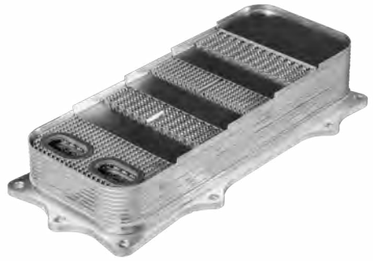
LightWeight Cooler (LC)

- Fully brazed, no welding
- Light weight & robust construction
- High performance
- Less manufacturing time

Modular Cooling System

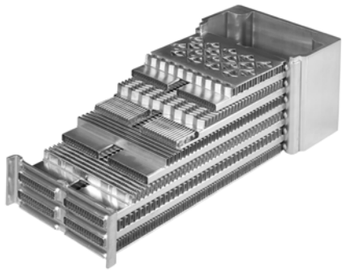
- Easy exchange of single cooling segments
- Less tensions (temperature, pressure)
- Reduced variety of parts

Stack Shell Cooler (SSC)



- Weight optimized
- Individual adaptable

TubeFin



- Robust construction
- Deep cores
- Weight optimized

Flexibility with a Vision for the Future...

Innovative and high-performance products are manufactured using advanced manufacturing technology. AKG is state of the art is terms of its product diversity. This applies in particular to brazing - the key process for heat exchanger production.

FLEXIBLE PRODUCTION

The layout of multiple production lines allows AKG to process small and large production orders at the same time with short lead-times.

QUALITY

AKG's commitment to quality includes all aspects of customer service, from design, order, production, to aftermarket support. Each business unit of the AKG Group in Europe, USA, Turkey, India and China is certified in accordance with DIN EN ISO 9001.

BRAZING

Each individual cooler design, cooler application and/or batch size can be brazed with one of three technologies: Flux Bath Brazing, Controlled Atmosphere Brazing or Vacuum Brazing.

ENVIRONMENTAL PROTECTION

AKG has a strong commitment to protect the environment. The manufacturing organization and all production processes assure minimum waste generation and utilize every recycling opportunity possible. This guarantees that not just economical goals are met, but environmental criteria as well. AKG is certified in accordance with DIN 14001 and 50001.

On-Highway

COMMERCIAL VEHICLES AND BUSES

Commercial vehicles are subject to a wide variety of requirements and must benefit their users permanently and without malfunctions. AKG develops individual solutions for the cooling requirements of small to heavy commercial vehicles and special vehicles in close cooperation with the customers‘ engineers.

MUNICIPAL VEHICLES

Commercial vehicles are subject to different requirements and have to offer their users permanent and trouble-free utilization. In close collaboration with customers’ engineers, AKG develops individual solutions for the cooling requirements of small to heavy commercial vehicles and specialist vehicles.

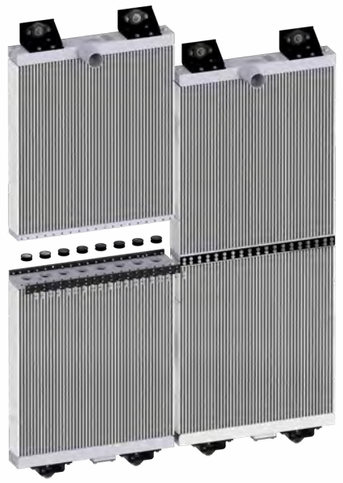
AUTOMOTIVE

AKG has been a reliable partner in the automobile industry for over 100 years. AKG products include high-quality heat exchangers for the leading models in the automobile industry. Working closely with our customers we develop solutions ranging from customer-specific heat exchangers to complete cooler modules.

MATERIALS HANDLING DEVICES

The most diverse types of material handling devices equipped with AKG heat exchangers are in use throughout the world. As an OEM supplier, AKG supplies custom solutions.

AKG heat exchangers provide a high degree of flexibility for these machines. Through optimal adjustment to the respective operating and application conditions, the best possible technical and economical solution for the available installation space can be offered. AKG‘s range of services includes single coolers, cooling modules and complete cooling systems consisting of the products mentioned previously as well as electrical or hydraulic driven fans.



Off-Highway

CONSTRUCTION EQUIPMENT

Construction machines of all types generate heat from many different sources (drive motor, transmission, hydraulics, air conditioning, etc.), which must be discharged via suitable heat exchangers.

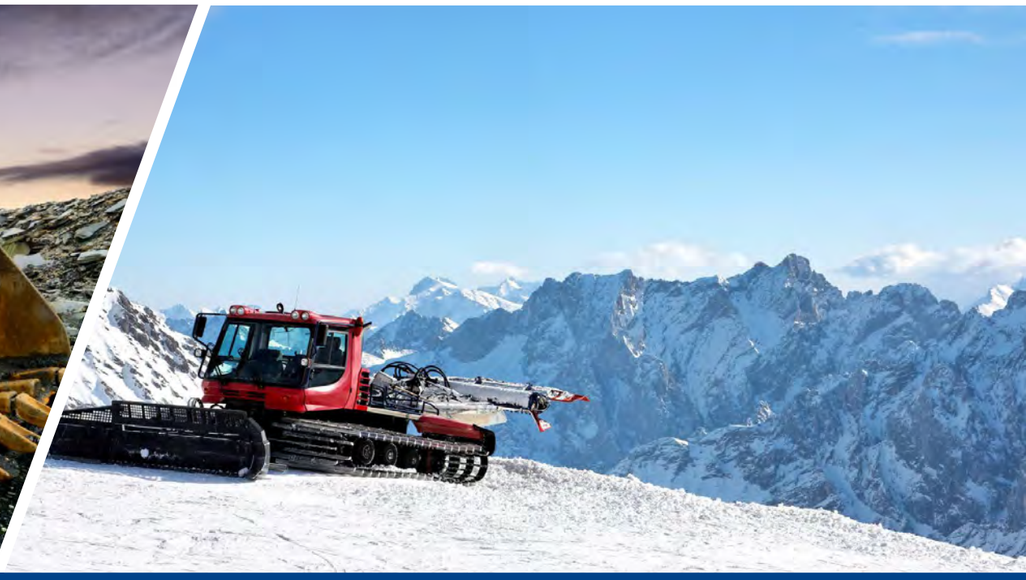
AKG designs and manufactures optimized heat exchanger solutions for all applications and media to be cooled (engine coolant, charge air, fuel, engine oil, transmission oil, hydraulic oil and other cooling media).

AGRICULTURAL AND FORESTRY MACHINERY

In close collaboration with the leading manufacturers of agricultural and forestry machinery, AKG develops solutions for the cooling of engine and hydraulic systems. Special cooling air fins permit high performance cooling with low susceptibility to contamination.

MINING

The Modular Cooling System (MCS) was developed especially for heavy-duty applications with increased cooling requirements. A special advantage of this modular solution is that the individual elements can be replaced in the unit within a very short time, thus reducing machine downtimes.



Railway

In recent years AKG Thermotechnik International (AKG) has gained a lot of application experience with systems in the rail vehicle industry. Based on this wide range of experience in the system business, AKG is able to offer its customers more complete solutions for cooling tasks.

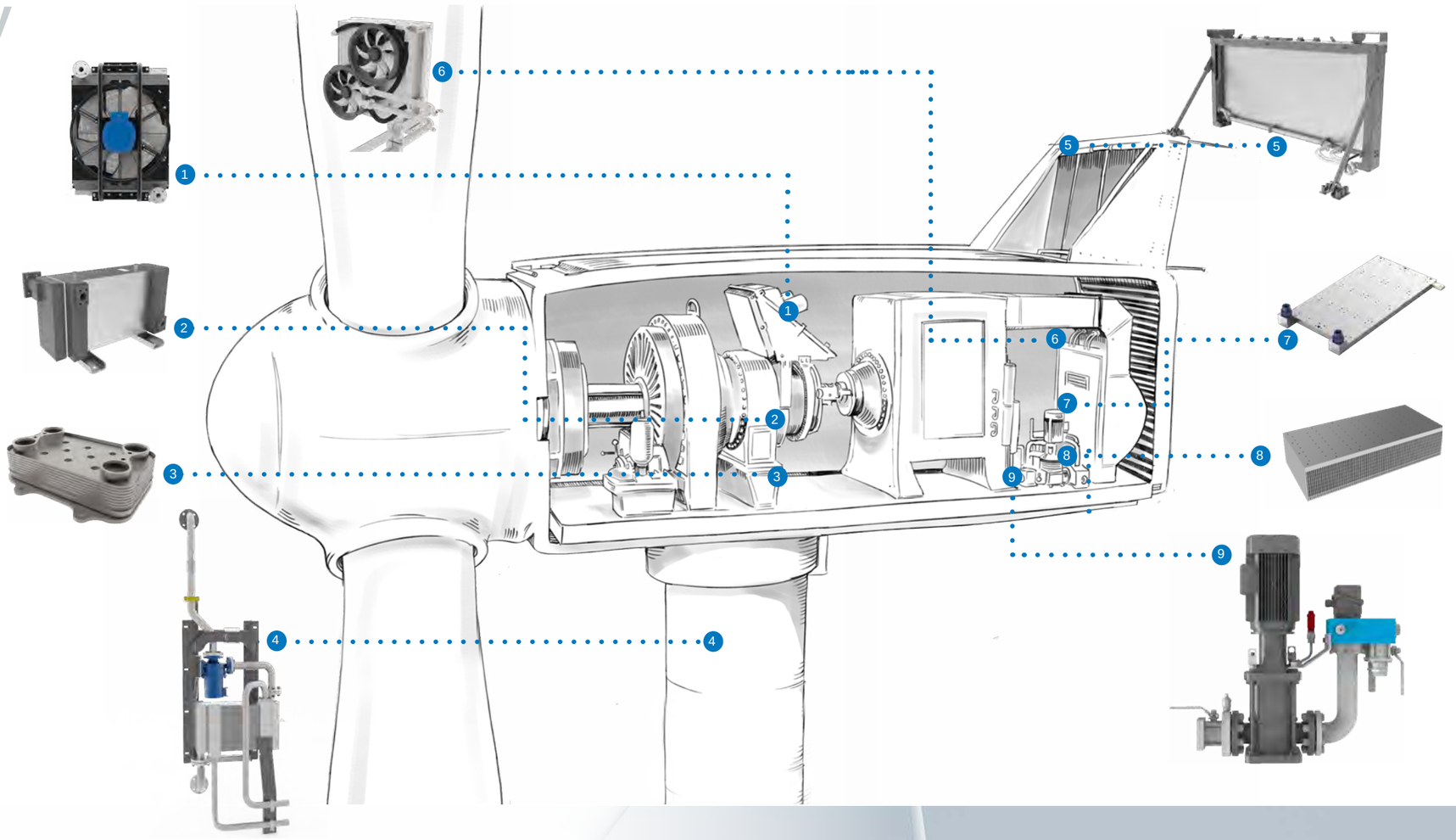
COOLING MODULES

When it comes to cooling rail vehicles, AKG offers you reliable and robust cooling solutions tailored to your needs. From converter cooling with coolant and transformer oil cooling to combined systems - everything is available. The accessories extend far beyond protective grilles, filters, expansion joints and sensors. From the compact cooling unit with low weight to the meter-high cooling tower, we are your reliable partner on the rail. We develop and produce underfloor as well as roof cooling systems installed in trains according to your wishes. The components developed by AKG are used in trams and electrically powered trains (regional and high-speed trains), diesel locomotives and magnetic levitation trains.

SYSTEM SOLUTIONS

When designing system solutions, we pay close attention to combining individual components into assemblies leads to cost savings. The system solution does not become more expensive than the previous solution with individual components. In some cases, previously mounted components on the cooler can also be integrated into the radiator collection tank or welded to the radiator. AKG has appointed a team of experts in the relevant disciplines like; noise, strength calculation, fans, hydraulic and electrical drives, sensors, vibration, and bearing support to assist the sales force in acquiring and processing system projects. These experts work on the respective system projects as required.

Energy



1. Gearbox Cooling (active)
2. Oil-to-Water Gearbox Heat Exchanger (Bar Plate)
3. Oil-to-Water Gearbox Heat Exchanger (Stacked Shell)
4. Transformer Cooler
5. Passive Cooling
6. Generator Cooling (active)
7. Liquid Cooled Heat Sink
8. Cabinet Cooling
9. Pump Station

ELECTRONICS

The electronics industry offers a wide range of applications for coolers and cooling systems with sometimes very different operating conditions. However, the same basic requirements apply to all applications: highest quality and reliability manufactured according to certified processes and delivered on time. The AKG Group successfully meets this challenge every day.

WIND POWER

In recent years, AKG has been a component supplier for manufacturers of wind turbines. After gaining knowledge and understanding of the complexities of the wind power industry, AKG can now offer its own customized cooling solutions for a complete wind turbine system with different types of coolers for various applications. Examples include: generator cooling, passive cooling, transmission cooling, switch cabinet cooling, pump station, transformer safety cooling and other components such as pipes, clamps, hoses, etc.

Aviation

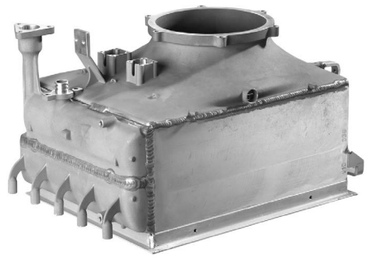
In addition to our proven Galley Cooling heat exchangers, which are used in the A 380 and A 350 aircraft, AKG also offers coolers for engines, transmissions and on-board systems on aircraft and helicopters.

ON-BOARD SYSTEMS

The tight installation space and the demand for lightweight components consistently offers new challenges to the AKG development team. The answer is customized cooler solutions based on decades of experience in design, manufacturing and certification of performance and weight-optimized aluminum coolers.

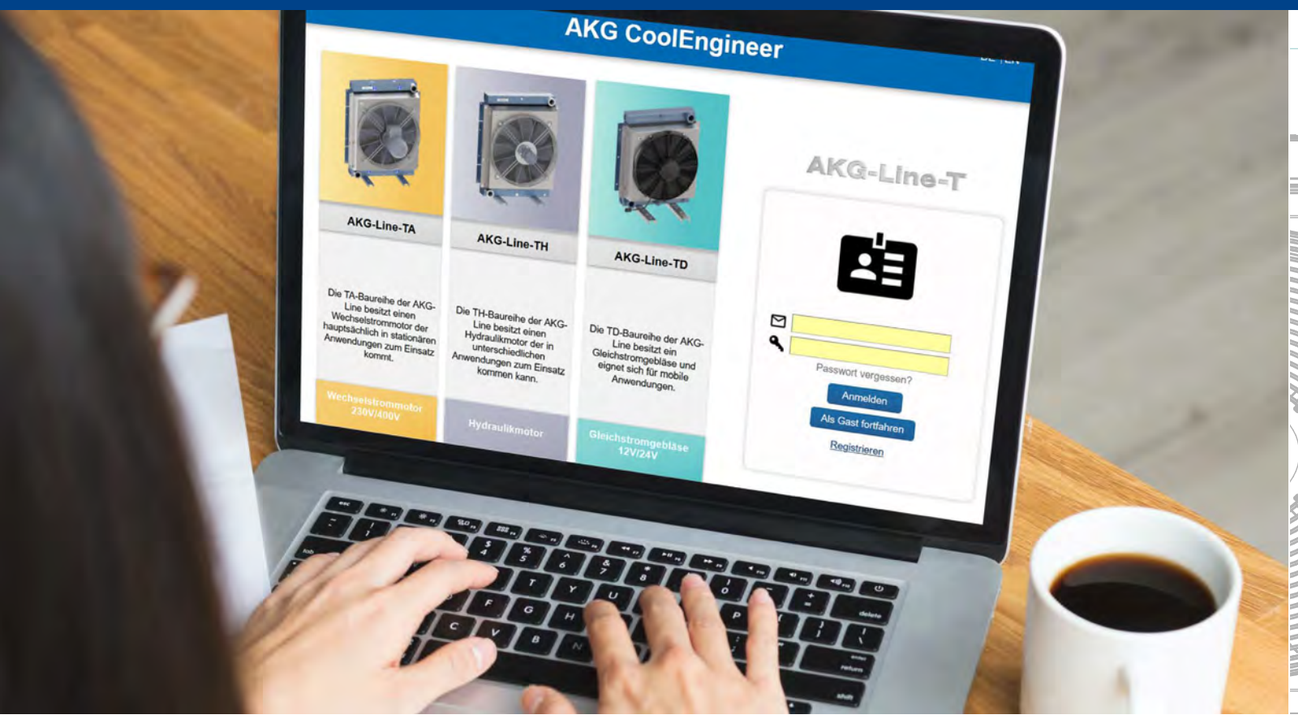
AIRCRAFT ENGINES AND TRANSMISSIONS

AKG is offering oil coolers, radiators, intercoolers and oil-to-coolant heat exchangers for turboprop and piston engines, helicopters as well as for general aviation aircraft. A broad portfolio of fins and heat exchanger designs make sure that AKG is always able to offer the optimal solution to the customer.



ELECTRICAL AIRCRAFT PROPULSION SYSTEMS

AKG supplies combined oil and coolant coolers for the latest generation of electric and hybrid-electric aircraft propulsion systems, cooling the motors and inverters.



AKG CoolEngineer

Our ***AKG CoolEngineer*** is your digital tool to select the right cooler for your application. With simple steps you can configure your cooler and adapt it to your specific requirements. Start by selecting the appropriate series and immediately receive a suggested list of coolers. Then refine your search with additional criteria: Fan motorization, cooling capacity and size. Our calculation tool will then show you exactly the coolers for your requirements.

Save time and effort in finding the optimal cooler and use AKG CoolEngineer!

Thanks to state-off-the-art components and high manufacturing quality, our coolers are not only energy-efficient and durable but also cost-effective. However, should a part need to be replaced, this can be done easily at any time due to our modular design.

Sustainable Cooling Solutions

As the world's leading supplier of customer-oriented system solutions, we particularly focus on sustainability and environment protection. We are proud that our aluminum is 100% recyclable. This enables us to ensure that our products are not only effective, but also environmentally friendly.

AKG offers the ideal solution for any cooling application with low total cost of ownership and optimized product carbon footprint!

AKG-Line-T

High-performance cooling systems made of aluminum for mobile and stationary use!

Our AKG-Line-T standard series offers industrial high-performance cooling systems made up of aluminium, that convince with reliable product quality at competitive prices. These units are manufactured according to German engineering and are available in various designs for mobile and stationary use. The assemblies include universally applicable complete systems that comply with European standards and are also suitable for extremely harsh operating conditions. The fans are driven bythree-phase (TA/TLA series), direct current (TD/TLD series), or hydraulic motors (TH/TLH series), depending on the requirements.

The knowledge and experience gained so far from the toughest practical applications have been incorporated into the product development of the AKG-Line-T. The cooling units are manufactured with the highest quality standards in our own AKG factories and is extensively tested in the company's R&D center. This ensures that our customers always receive the best possible solution.

Features

- High-performance cooling systems made up of Aluminium in robust plate/bar design capable of withstanding operating pressures up to a maximum of 26 bar, as well as weight-reduced (-30%) tube/fin construction capable of withstanding operating pressures up to a maximum of 16 bar
- The heat to be dissipated is transferred from the medium to be cooled to the ambient air
- Universally applicable in hydraulic oil, gearbox oil, engine oil, lubricating oil, and coolant circuits
- For cooling mineral oil, synthetic oil, bio-oil, HFA, -B, -C, and -D liquids, coolant water with at least 50% antifreeze and corrosion inhibitors, other media upon request

Compressors and Refrigeration Dryers

COMPRESSORS

Depending on the degree of compression (pressure difference), different temperatures in the compressed media arise during the compression of gases. In many applications it is necessary to cool down these partly very high temperatures (usually between 100°C and 300°C) to a defined value. In a desired side-effect during cooling, any moisture that may be present in the intake volume can be separated at the same time, thus dehumidifying the compressed gas.

AKG designs and manufactures optimized heat exchanger solutions for a wide range of applications and for the cooling of gases in the range up to 45 bar operating pressure.

REFRIGERATION DRYERS

The air sucked in by the compressor contains a proportion of water, which must be reduced to varying degrees depending on the requirements of the downstream production process. Since the water absorption capacity of air decreases with falling temperature, the cooling in the compressor‘s air aftercooler can reduce the air humidity by draining off the water.

However, if there is a demand for compressed air that is as dry as possible, an air treatment unit must be installed downstream. An effective method of reducing air humidity is refrigeration drying, which allows the compressed air to be cooled down to approx. 2-5°C. At these temperatures, the water absorption capacity of air is extremely low.

Engines and Combinations

ENGINES

AKG has been a reliable system partner in engine cooling for construction and agricultural machinery, as well as mining equipment, portable compressors and generators for decades.

AKG cooling experts work with the equipment manufacturers to design and produce compact high-performance cooling systems with up to six cooling circuits. In addition, modules with radiators and charge air coolers are available both in standard design and as individually designed solutions for engine cooling in power packs and in gensets.

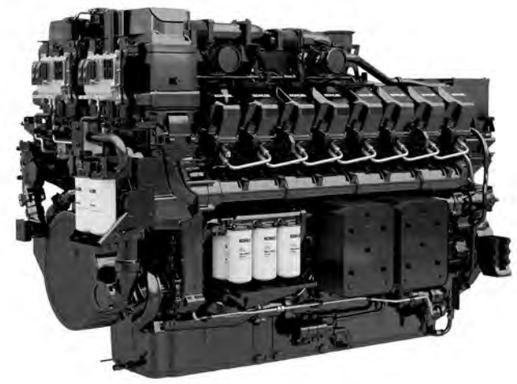
With increasing requirements due to strict emissions regulations, there is now a need for inner engine solutions inside the drive center of these machines, the diesel engine, to optimize all of the factors that influence combustion. Here the focus is more on water-cooled charge-air cooling.

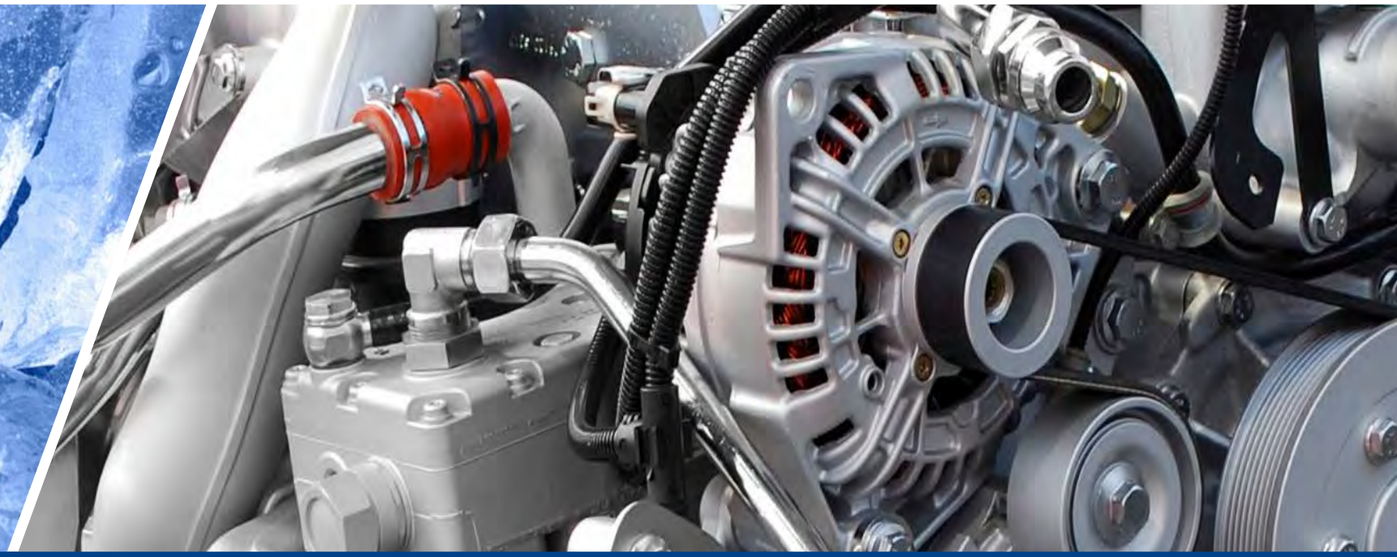
AKG collaborates with leading engine manufacturers for customized solutions that integrate directly into the infrastructure of the particular engine. Reducing the charge-air temperature helps to increase the oxygen quantity in the cylinder and thus to optimize combustion.

COMBINATIONS

These are internal combustion engines that are equipped with all the heat exchangers necessary to transfer the heat generated by the engine to the ambient air. These motor/heat exchanger units are used e. g. as drive units of mobile machines, power generators or pumps.

AKG has a standard range of engine cooling systems and designs and manufactures optimized heat exchanger solutions for the cooling of internal combustion engines.





E - Mobility

E-MOBILITY

The mobility sector worldwide is demanded to contribute to reducing greenhouse gases, which will lead to increasing demand for electric and hybridized applications in the future. AKG has gathered substantial knowledge in this area through early research. Therefore, AKG can support customers in their development work and offer efficient thermal management for all electrical components.

COLD PLATES

Cold plates are used for indirect cooling of batteries and power electronics in mobile and stationary applications. If the battery is heavily loaded for a longer period of time, for example during rapid charging, high power dissipation occurs, which would quickly heat up the battery. The resulting high battery temperatures cause permanent damage to the battery and reduce its life cycle. In extreme cases, the battery can start to burn due to thermal runaway of the cells. For this reason a good cooling of the battery is necessary.

However, batteries that are too cold are also damaged by operation at low temperatures, which shortens the battery life cycle. In addition, the performance of batteries that are too cold will be greatly reduced. Therefore, the required heating of the battery can be recognized in a flexible and application-oriented way, especially by using a thermal management system in combination with cold plates.

THERMAL MANAGEMENT SYSTEM

The amount of energy is very limited in mobile electrical applications. Therefore, the efficient use of the available energy is necessary on one hand, and the use of waste heat is essential on the other. Both points can be recognized with a heat pump by intelligent wiring of the coolant inflows and outflows. The AKG Stacked Shell Cooler was developed to make the heat pump as compact and efficient as possible. These can be flexibly adapted to any specific application and offer an optimal heat transfer depending on fluid properties and thermal parameters.

Strom bewegt
HESSEN
This project (HA project no.:1372/22-77) is funded by the Electromobility in Hesse funding program.

AKG Thermal Management System – Compact Module

The AKG Thermal Management System for electric vehicles is designed to regulate and maintain optimal temperature conditions for batteries, ensuring their efficient operation, long lifetime and reliable power. Our system is designed for off-road and on-highway applications.

With a compact and modular design, our Thermal Management System is easily integrated in many types of equipment. The battery is cooled using a closed refrigerant circuit and can optionally be heated with an electrical high voltage heater. An on-board controller manages the complete thermal system operation.

Our heat exchangers play a crucial role in transferring the absorbed heat through the cooling medium to the refrigerant and the surrounding environment. AKG's design and placement of the heat exchangers within the Thermal Management System are optimized to maximize cooling effectiveness while minimizing energy consumption. .

Benefits

1. Modular design
- Pre-assembled modules, no individual parts need to be integrated into the vehicle
- Flexible to customer requirements

2. Closed-loop refrigerant circuit
- Low maintenance; no additional refrigerant lines to the vehicle needed

3. Simulation
- Simulations at the component and system level speed up the vehicle development on the customer's side

4. Robustness
- Same performance verified under different inclinations and robustness confirmed in vibration tests

5. Global product portfolio
- AKG's diversified product portfolio offers all heat exchangers types needed for the vehicle

6. AKG stacked shell cooler
- Optimally designed for Thermal Management Systems with less weight and high performance

7. AKG engineering service
- Comprehensive engineering support regarding the integration of Thermal Management Systems into the vehicle architecture

8. Environmental friendly
- Low refrigerant volume means the use of natural refrigerant (propane/R290) is possible

Applications – Markets

- Agricultural equipment
- Automobile
- Commercial vehicle
- Construction equipment
- Forestry equipment
- Generator set
- Municipal vehicles
- Battery storage

AKG Fuel Cell Cooling System

Elevating Efficiency in Off-Road equipment: Advanced Thermal Management for Fuel Cell Electric Vehicles
Step into the future of off-road equipment with our state-of-the-art thermal management solutions for fuel cell electric vehicles (FCEVs). As pioneers in the field of off-road cooling solutions, we are proud to introduce our state-of-the-art heat exchangers and thermal management systems that improve performance, efficiency and durability of FCEVs. In the world of alternative drivetrains, optimizing thermal efficiency is critical and our solutions stand at the forefront of innovation. Join us as we advance thermal management for the efficient and sustainable operation of FCEVs. Discover how our precision-engineered heat exchangers are driving the development of sustainable off-road vehicles for a greener future.

Fuel Cell Cooling
Fuel cells require efficient cooling when converting hydrogen and charge air into electrical energy, with only air and water as byproducts instead of exhaust gases. To avoid short circuits within the fuel cell, the use of an electrically insulating coolant is essential. Our vacuum-brazed aluminum heat exchangers are particularly suitable for these coolants.
To keep the required conductivity criteria, deionization processes are used to maintain the low conductivity of the coolant. Deionization must be continuously applied when using heat exchangers from other brazing processes.
Two fuel cell cooling methods are commonly used: direct and indirect. These are selected depending on the cooling requirements of the fuel cell system. AKG specializes in lightweight, high performance heat exchangers that provide exceptional cooling and heating capabilities for fuel cell applications.

Applications – Markets

- Agricultural equipment
- Automobile
- Commercial vehicle
- Construction equipment
- Forestry equipment
- Generator set
- Municipal vehicles
- Rail vehicles

Heat Exchanger for Medical Technology

MEDICAL TECHNOLOGY

AKG develops and produces tailor-made heat exchangers for medical technology devices. Based on decades of experience and the use of the latest manufacturing and test methods, heat exchangers for gaseous and liquid media are manufactured for the use in ventilators, X-ray or MRI devices. The use of special materials and connection methods enable an optimal adaptation to the respective customer requirements. This guarantees the highest possible precision and quality for safe and reliable operation.

Household Appliances

HOUSEHOLD APPLIANCES

As the market leader in this sector, AKG has been developing and producing heat exchangers for air-cooled condensation laundry dryers and washer/dryer combination units since 1981. Continuous improvements in performance, quality and handling of these high-performance heat exchangers enables fast and consistent energy-efficient drying processes.

The products are specially developed for the individual customer requirements and manufactured cost-effectively using the latest production technology.

Condensers for Dehumidifying the Exhaust Air from the Baking or Cooking Process

CONDENSERS FOR DEHUMIDIFYING THE EXHAUST AIR FROM THE BAKING OR COOKING PROCESS

AKG is your partner for the development and production of efficient heat exchangers for condensation of vapors on or in the furnace. Whether baking station, combi steamer, extractor hood, or in professional kitchens or in sales rooms - AKG will gladly advise you on the right heat exchanger technology.

We created an optimal product that can be individually customized to your needs. You benefit from over 35 years of experience in development and production of steam condensers at AKG.

ADVANTAGES

- Highly efficient dehumidification
- Compact design
- Independent installation site
- Reliability
- Cost advantage

Cooling Experts Around the Globe

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Since *100 years*, manufacturer of Coolers and Heat Exchangers worldwide!