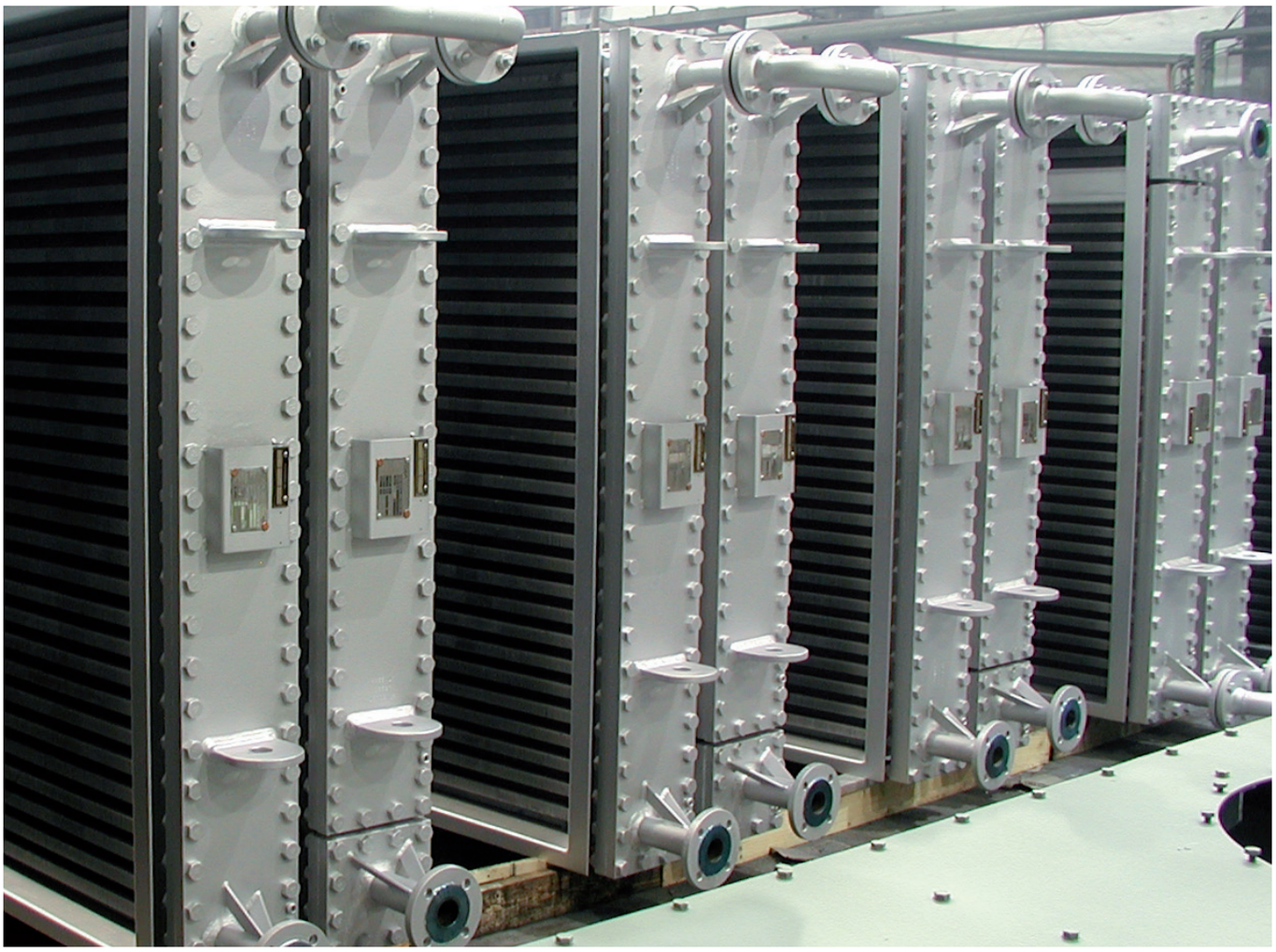
Kelvion

Industrial Air Dryers and Air Preheaters

SUSTAINABLE, VERSATILE, TAILORED



WE ARE KELVION – THE NEW BRAND IN HEAT EXCHANGE

GEA Heat Exchangers has changed: another new standalone company has been created out of the former Heat Exchanger Division of GEA Group AG. The name Kelvion is new, but we continue as global experts in heat exchange.
As always, we remain committed to earning your trust.

You'll still recognize us. We continue to develop our products, manufacture them with precision, and distribute globally. We continue to offer one of the world's largest heat exchanger product portfolios: plate heat exchangers, shell & tube heat exchangers, finned-tube heat exchangers, modular cooling towers, and refrigeration heat exchangers for a wide range of applications.

We operate in global markets for power generation, oil and gas, chemistry, marine applications, climate and environment, and food and beverages. From us, you can expect products with outstanding levels of efficiency, safety, and sustainability. More importantly, we care about your business like the close, trusted partners that we are.

Customers rely on us to understand their needs, boost their performance, and deliver products that always get the job done. We compete for the toughest deals, in the harshest environments. But we're not too big to care. We're Kelvion – ready to take on the challenges of heat exchange. **www.kelvion.com**

Experts in Heat Exchange.

PRODUCT AND USER EXPERTISE COMBINED

Wherever heat exchange is required in production processes, our engineers assure exact temperature regulation for everything. For oil and gas – and for chemical facilities, steel mills, and power plants – and from waste incineration to drying technology – we at Kelvion offer one of the most extensive – if not the most extensive – heat exchanger product folios in the world.

We develop and produce finned-tube and smooth-tube heat exchangers in all design types for all imaginable applications. Whether the requirement is only for simple components, or for complex processing plants: premium production quality, cost effectiveness, and flexibility add up to a big, fat efficiency plus for Kelvion customers. Industrial air-cooled heat exchangers and air preheaters must often prove their quality and ensure reliable operation under extreme ambient conditions. For this reason, a team of experts consisting of engineers, welding specialists, and quality inspectors conducts the strictest inspection possible of each unit and of every individual component. This is how we guarantee that Kelvion equipment satisfies all quality specifications – with unmatched results, as a great number of certifications have documented. Since we also install and commission these system, if the customer so requests, our installation department is extensively trained in occupational health and safety – as confirmed in our Safety Certificate for Contractors (SCC).

A key element is preparatory work conducted by experts on both sides. We can precisely adapt our heat exchangers to the customer's process and design them accordingly because engineering and production come from a single source at Kelvion. Long years of experience in welding procedures and overall production mean that we can apply all weldable materials in construction of the system. As a result, Kelvion customers profit from a highly diversified offering consisting of many and various finned-tube systems, any required model versions in any material or material combination, and a wide range of service packages.

Standards and certifications:

- DIN EN ISO 9001
- KTA 1401
- DIN EN ISO 14001
- OHSAS 18001
- Pressure Equipment Directive 97/23/EC (PED); AD 2000 Codes of Practice
- ASME U-Stamp
- GOST-R
- SQL

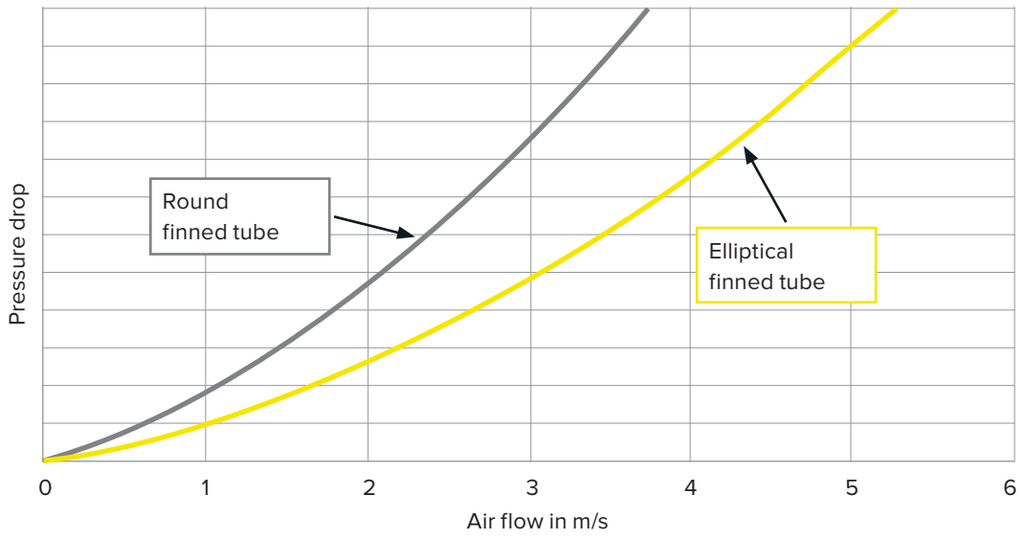
Inspection organizations:

- TÜV Rheinland
- TÜV Nord
- ONE/TÜV/BV
- TÜV-Österreich
- Stoomwezen
- Vincotte
- ISPESL
- SVDB
- Service des Mines
- Lloyd's Register
- TTK
- SA Schweden
- Germanischer Lloyd
- Det Norske Veritas
- RINA

Good reasons to select Kelvion air-cooled heat exchangers and air preheaters:

- Aerodynamically favorable core tubes
- Low pressure drop, as well as minimal fouling and contamination
- Large heat-transfer coefficients, resulting in small heat-exchange surface areas
- Quiet noise emissions
- Good corrosion protection by hot-dip galvanizing, together with optimal metallic bond between core tube and fins
- Compact design that enables good utilization of limited floor space
- Maximum life cycle
- Global presence of the manufacturer
- Ongoing optimization of the finned-tube system by computational fluid dynamics (CFD) simulation

ELLIPTICAL VS. ROUND FINNED TUBES



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1 An **air preheater** for a waste incineration plant

2 **Stainless steel smooth-tube heat exchanger** for the paper industry

3 **Galvanized steel heat exchanger** for drying processes

4 **Air-to-air heat exchangers**

Industrial air heaters and air dryers

THE ALL-ROUNDERS

Air-cooled heat exchangers
Kelvion air-cooled heat exchangers are tailored for individual applications and are available in a variety of materials:

Kelvion air-cooled heat exchangers made of galvanized steel have no difficulty with harsh industrial conditions or high temperatures. They are manufactured completely from steel in one welded unit. The elliptical finned tubes are hot-dip galvanized. The frame and the compartments are protected from corrosion by zinc powder coating and an epoxy-aluminum topcoat. Of course, the entire heat exchanger unit is also available in a hot-dip-galvanized version.

Stainless steel air-cooled heat exchangers are the professional solutions for the strictest hygiene demands or for environments with aggressive media. The seamless connections between tubes and fins, provided by a laser process, enables lengthy operation without loss of output. With Kelvion laser-finned tubes, you benefit from the latest in production technology. The heat exchanger surface consists of elliptical or round stainless steel finned tubes**.**

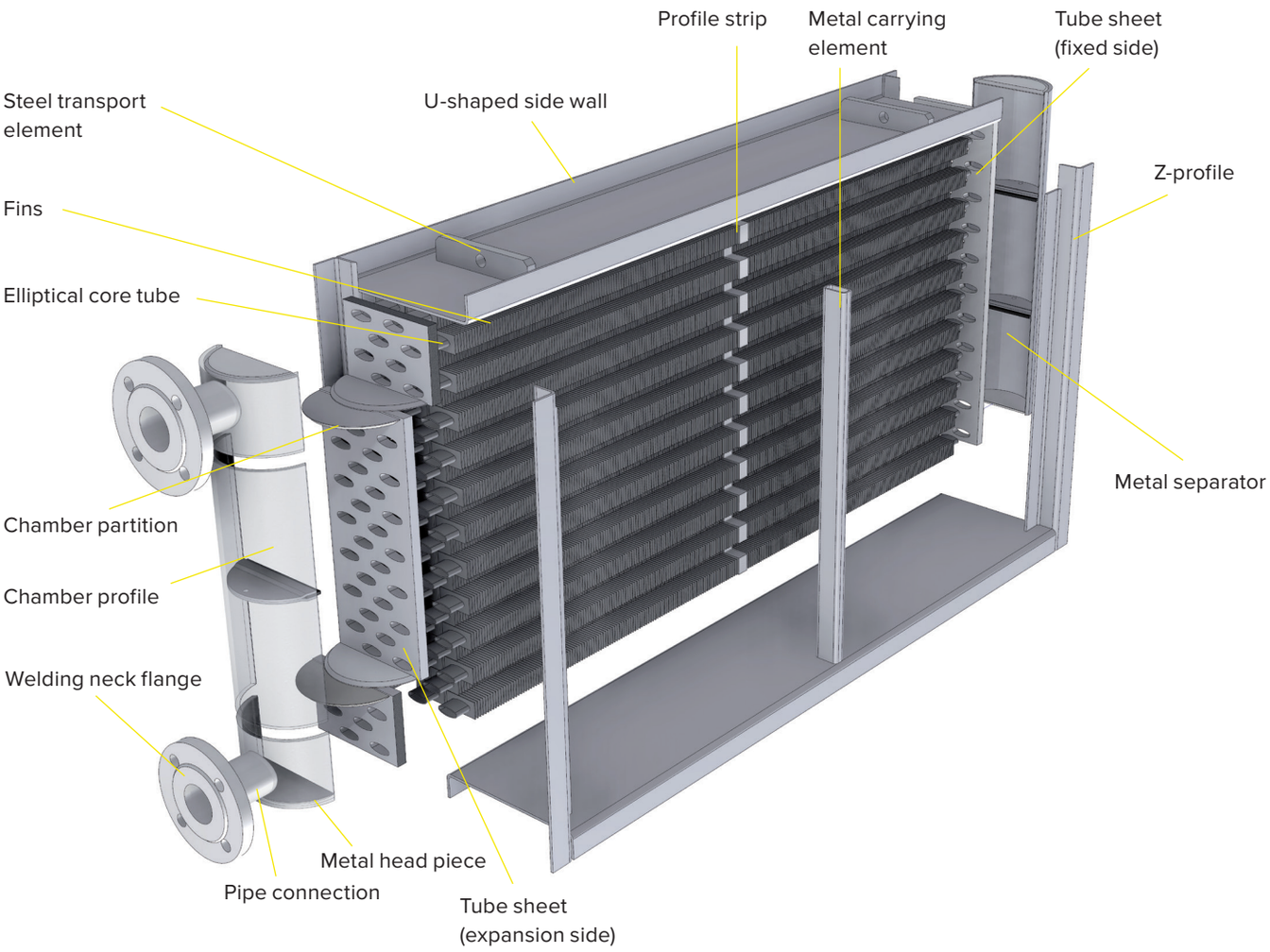
If top performance is required, despite severe air pollution, our smooth tube heat exchangers are the solution of choice. Their heat exchange surfaces consist of smooth, round tubes. These models allow simple cleaning and lengthy operation interruptions. Crossflow heat exchange, stainless steel models, and galvanized steel: Kelvion engineers will find a solution for your application. Our hairpin models offer further benefits: both from cost-efficiency as well as from thermodynamic standpoints. In addition to enhanced temperature distribution, these models also ensure unimpeded expansion of the individual tubes.

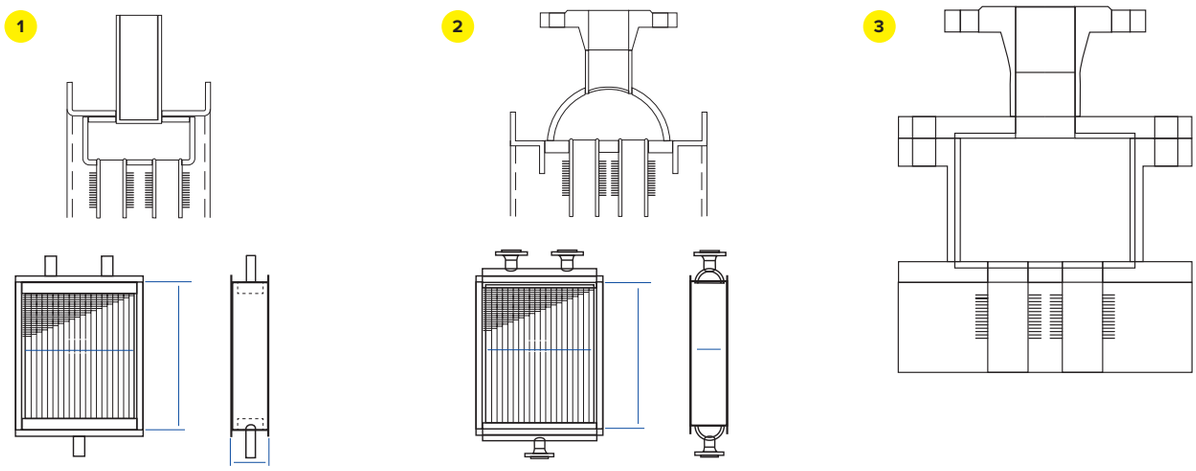
Industrial air preheaters
Air preheaters are heat exchangers for heating and evaporating, for cooling and condensing, and for heat recovery. Decades of experience in design and manufacture have made Kelvion a leading supplier of heat exchangers for the cooling and heating of gaseous and liquid media. An essential factor in the success of our customers has surely been the great diversity of the smooth and finned-tube systems available from Kelvion.

Finned-tube heat exchangers can be manufactured from many materials: steel, stainless steel, copper/aluminum, aluminum, as well as other special materials. Smooth-tube heat exchangers are primarily employed where fluids flowing around the tubes are so contaminated that finned tubes cannot be used. It is possible to arrange smooth tubes in various configurations, either one behind the other, or adjacent to each other. Versions in steel or stainless steel are possible, in addition to hairpin models, for example.

Benefits of elliptical finned tubes:
- Aerodynamically favorable core tubes: from one-tenth to one-third the flow resistance of a round tube
- Lower pressure drop and minimal fouling
- Large heat-transfer coefficients, resulting in small heat-exchange surface areas
- Quiet noise emissions
- Good corrosion protection by hot-dip galvanizing, at the same time with optimal metallic bond between core tube and fins
- Compact design which enables good utilization of limited floor space
- Maximum life cycle

Numerous variants, including special versions:
- Completely galvanized heat exchangers
- Hairpin heat exchanger models
- Heat exchangers with steam-side and condensate-side fittings
- Heat recovery systems made of galvanized steel or aluminum
- Economizers
  Air-to-air heat exchangers for efficient heat recovery





1 Example for model type E

- With or without air-side connection frame
- Connection frame – airtight or not airtight

2 Example for model type D

- Heavy welded model
- With or without air-side connection frame
- Connection frame – airtight, gastight, or not airtight

3 Example for special model types

- Individual as per customer specifications

MODEL VARIANTS FOR ANY REQUIREMENT

Kelvion industrial air coolers and air heaters are designed for use with water, steam, or oil as heating or cooling medium. The heat exchangers are manufactured from individual elliptical or round finned tubes, or from smooth tubes, or as compact heat exchangers. Kelvion uses dedicated machines and processes to produce the various finned-tube systems: both for individual finned-tube production, as well as for compact heat exchangers. Kelvion manufactures these systems completely in its own production plants.

The air heaters basically have a sliding tube sheet, so that the tube bundle can expand independently of the connection frame. The water-side and steam-side connections are installed such that the expansion is not blocked. For air heaters for hot water, separate reversal chambers can be used to compensate for the thermal stress that results from the temperature difference between entry and exit of the water.

Air coolers can also be equipped with a drip tray for condensate.

The model types provided will depend on customer requirements and especially on the pressure relationships prevailing in the system.

Model type E
Model type E is especially well suited for heat exchangers that do not require special acceptance procedures. The heating and cooling surfaces consist of hot-dip galvanized finned tubes. Heating- or cooling-medium connections are provided as welding ends and are standard for this model type. If requested, however, welding neck flanges can also be installed. The air-side connection frame is provided with a protective coating. Special versions are likewise possible.

Model type D
Model type D is designed for greater pressures. This model fulfills the relevant acceptance specifications. In all cases, the heating- or cooling-medium connections are provided as welding neck flanges, in accordance with the required pressure level. Heating and cooling surfaces consist of galvanized finned tubes. Here as well, special versions are of course possible.

Special model types
With our special model types, Kelvion customers have extensive opportunities for selection with respect to the version of the compartments, the tubes (rolled-in or welded-in), and the materials and their coatings.

- Model type R: removable compartment cover, welded-in tubes, possibility of mechanically cleaning the tubes and compartments
- Model type S: removable compartments, rolled-in or welded-in tubes, possibility of interior coating of the compartments, possibility of mechanically cleaning the tubes and compartments
- Model type T: welded compartments that cannot be removed; welded-in tubes

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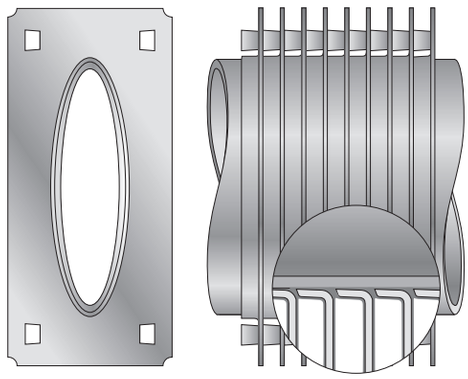

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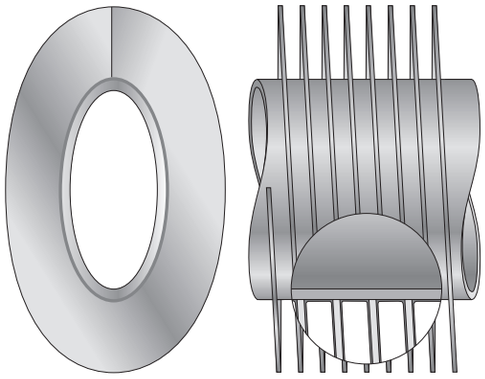

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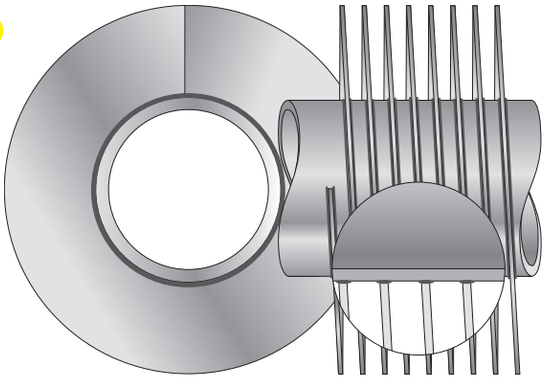

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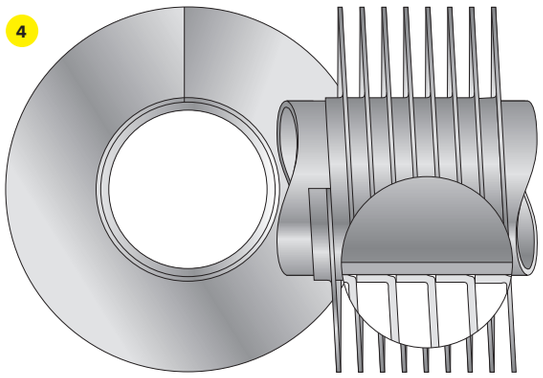

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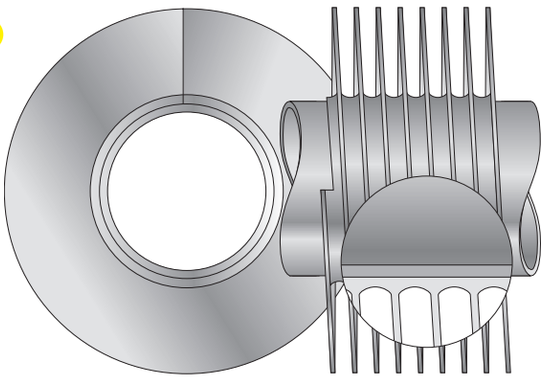

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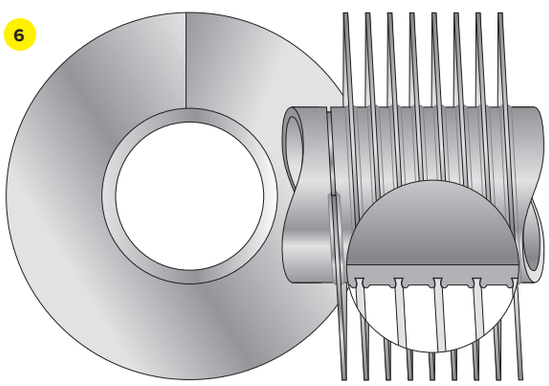


TAILORED DESIGN

The connection between the fins and the core tube has an important effect on the thermal duty. Fins made of aluminum or hot-dip galvanized steel are primarily used together with core tubes manufactured from steel or stainless steel. Aluminum can be easily worked and is also an especially good conductor of heat. Steel as fin material enables particularly robust, resistant tubes – which can also be cleaned under high pressure.

1. **FE:**
   Elliptical finned tubes have a wide, stamped fin collar that enables excellent heat transfer. Benefit: absolutely insensitive to thermal and mechanical stress. Maximum operating temperature: 360 °C.

2. **PI/HI:**
   For these models, the steel strip is wound onto the core tube in spiral form. The following hot-dip galvanizing assures effective thermal transfer and very good corrosion protection. Maximum operating temperature: 360 °C.

3. **S-Fin:**
   In this production process, the finned tubes made of seamless steel tubing are continuously welded with fins made of steel strip wrapped helically onto the tubes. These tubes can be employed up to 550 °C.

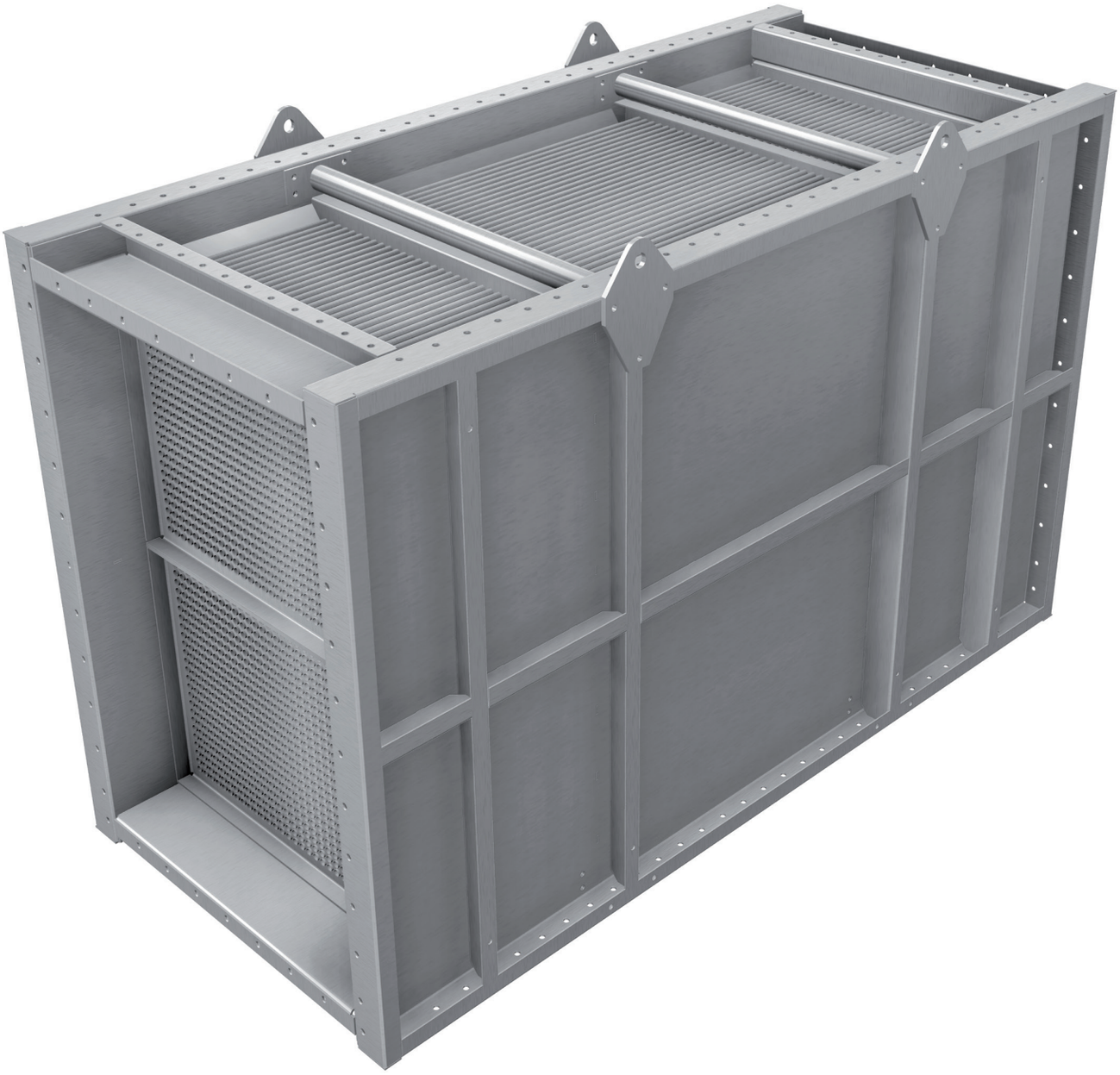
4. **L-Fin:**
   An L-shaped, pre-formed fin strip is wrapped in a spiral around the core tube. This production technique provides a large contact surface, and the heat is uniformly transferred from the entire core tube surface to the fins. This process is economical, but the systems are not designed for very high temperatures.

5. **E-Fin:**
   Finned tubes of this type are rolled out of a pure-aluminum, blank tube that is slid onto the core tube. The fins are stable, easily cleaned, and suited for use with chemically aggressive media and with temperatures up to 200 °C.

6. **G-Fin:**
   The G-Fin type involves a high-finned spiral finned tube. The fins, consisting of aluminum or steel, are slot-anchored in the core tube – which makes this variant suitable for use under great thermal and mechanical stresses.

Spacing for elliptical finned tubes
The fins punched from metal coils are wrapped onto the elliptical core tube. Hot-dip galvanizing produces a good metallic bond. The thermal duty is determined by the spacing of the fins – between 2.1 and 6 millimeters – and by punched-out elements in the form of spacers or turbulators.

Fin form with round tubes
With round core tubes, the form and the material of the fins determine the thermal duty and the area of application.



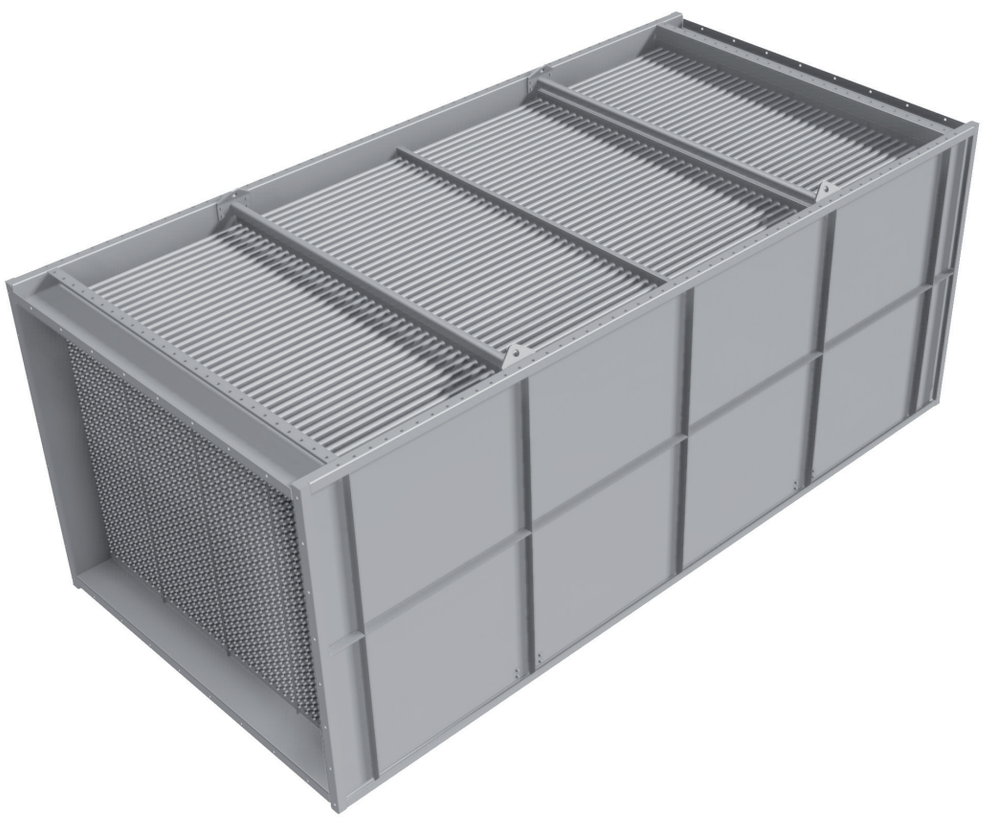
Air-to-air heat exchangers

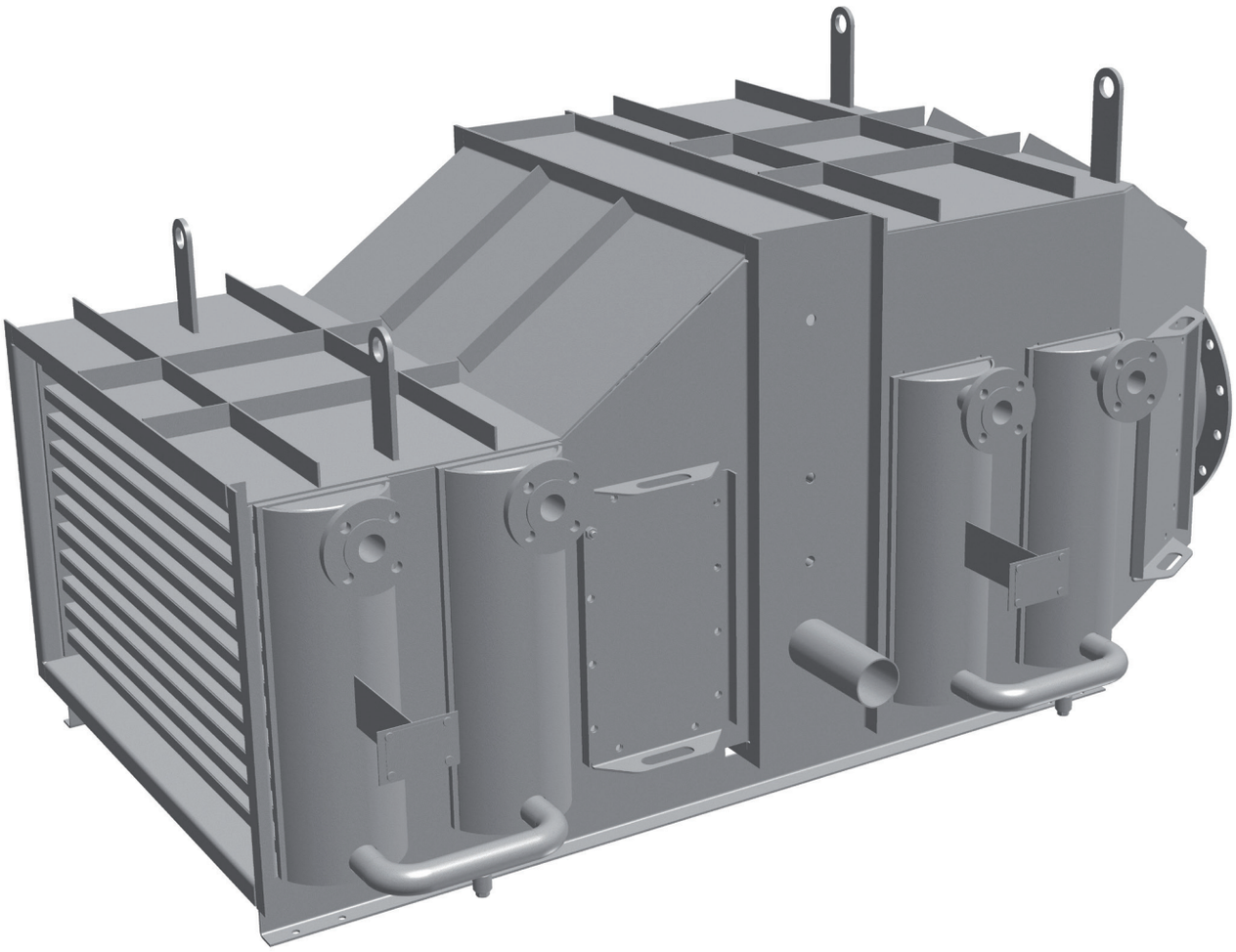
EFFICIENT HEAT RECOVERY FROM AIR TO AIR

Wherever heat energy is intended to be recovered from exhaust-air flow, in order to heat fresh air, Kelvion air-to-air heat exchangers represent the optimal solution in design of processes to operate more efficiently and to reduce operating costs.

Hot exhaust air from processes flows around thin-walled smooth heat exchanger tubes. This air cools in the process and may condense under certain conditions. Fresh air at lower temperature flows through the smooth tubes, is pre-warmed by the exhaust air, and is then provided to the process. These heat exchangers represent the solution of choice, even in cases of severe air pollutants – since the smooth pipes can be easily cleaned.

Stainless steel is used as material, with the result that condensation of moisture causes no difficulties. Air-to-air heat exchangers are available in pure crossflow, as well as in crossflow and counter-flow systems with reversal hoods. This enables covering air flow requirements from 5,000 to 300,000 m^3/h. The heat exchangers are designed to be air-tight, water-tight, and odor-tight.





Economizers

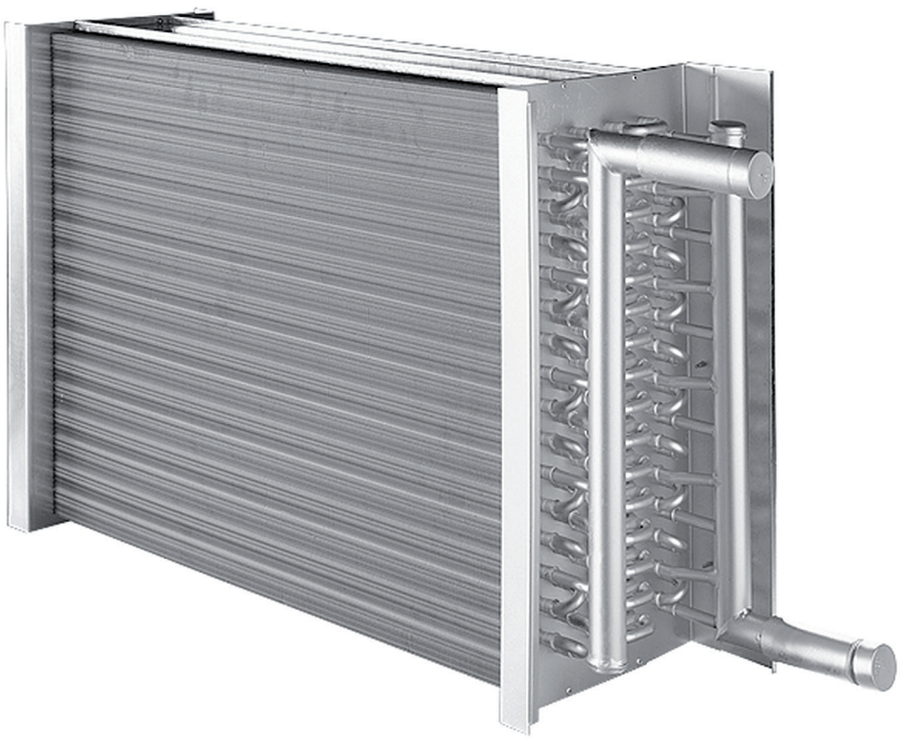
HEAT FROM WASTE HEAT

Economizers are heat exchangers for heat recovery by using waste heat from various industrial processes.

Kelvion exhaust gas coolers and calorific-value Economizers provide a valuable contribution for the saving of primary energy. Our Economizers are employed for heat recovery from the exhaust gases of boiler plants fired by oil, gas, or wood – and from exhaust air from industrial facilities. The materials used for manufacture are chosen with respect to the requirements involving corrosion and pollutants. We at Kelvion can resort to experience gained in many years since the very beginning of this technology. Our products are used by boilermakers who provide initial equipment, by specialized companies that build new plants, as well as in the retrofitting of existing industrial facilities.

Kelvion compact heat exchangers

THE BENEFITS OF VERSATILITY



There are good reasons why finned-tube heat exchangers play such a key role in air treatment. One of the primary reasons is their many and various opportunities of application. As heaters, coolers, condensers, evaporators, or as Power Tubes – these heat exchangers represent one solution for everything: wherever heat exchange takes place to the air from heating or cooling media such as water, refrigerants, and brine – or vice versa.

These heat exchangers consist of round copper-core tubes, with aluminum or copper fins that have been slid onto the tubes. As a result, the finned tubes extend over the entire width of the element. This production process causes mechanical enlargement of the core tubes, and the especially designed form of the fin collars creates a permanent and mechanically secure connection between the fins and the core tubes. Copper reversing elbows are soldered into place, which connects the core tubes on the water side – and soldering also connects them to the copper headers. The diameter of the headers is oriented here to the flow volume. In addition, connections for inlet and outlet are provided as standard in all versions in the form of threaded steel fittings, with fittings also provided for draining and venting.

For stationary and mobile applications
The small-footprint design of Kelvion compact heat exchangers also makes them outstandingly well suited for use in transport. For example, they enable providing air in passenger trains with the designed ambient conditions. Or, in refrigerated vehicles, they create ideal conditions for the safe and effective transport of food and beverages. The use of special fins also enables these heat exchangers to be used in other sensitive areas: e.g., in marine applications or in areas with similarly corrosive ambient conditions, where they are used for dehumidification. This great diversity of possibilities is just as effective in non-industrial applications: whether in use for central air conditioning in the heating or cooling of air in office complexes; or as dehumidifiers in indoor swimming pools, museums, or laundry facilities; or in air curtains in the entrances of large shopping centers and smaller retail shops. You can’t go wrong with Kelvion compact heat exchangers.

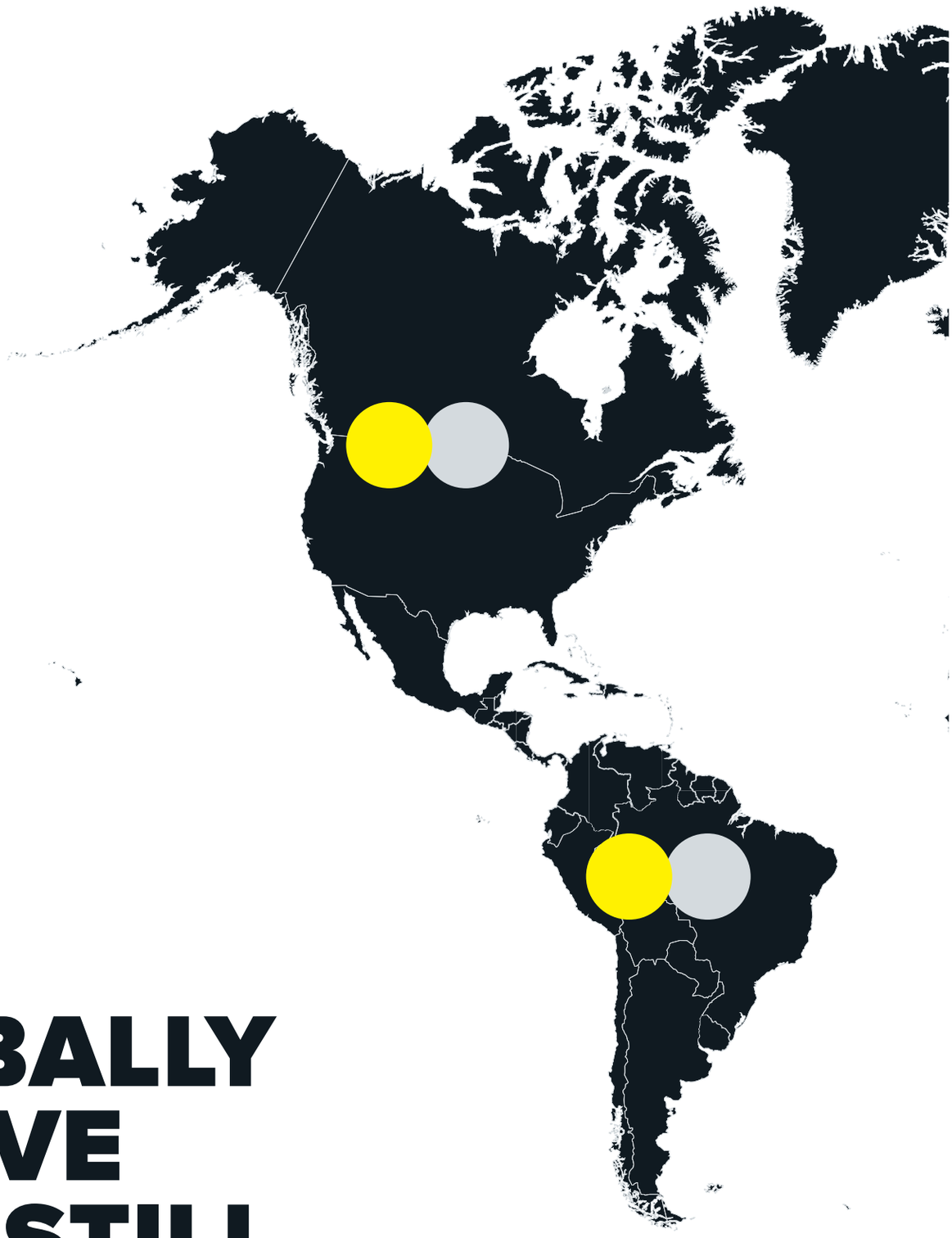
EXPERIENCE
+ SYSTEM VERSATILITY
= APPLICATION VERSATILITY

Kelvion supplies heat exchangers for many user sectors – for heating and evaporation, for cooling and condensing – as well as for heat recovery.

Our engineers can work on the basis of almost 100 years of experience in the design and production of our systems – and on experience gained with nearly 100 different systems. This experience indeed helps to implement many solutions for a great number and variety of project requirements:

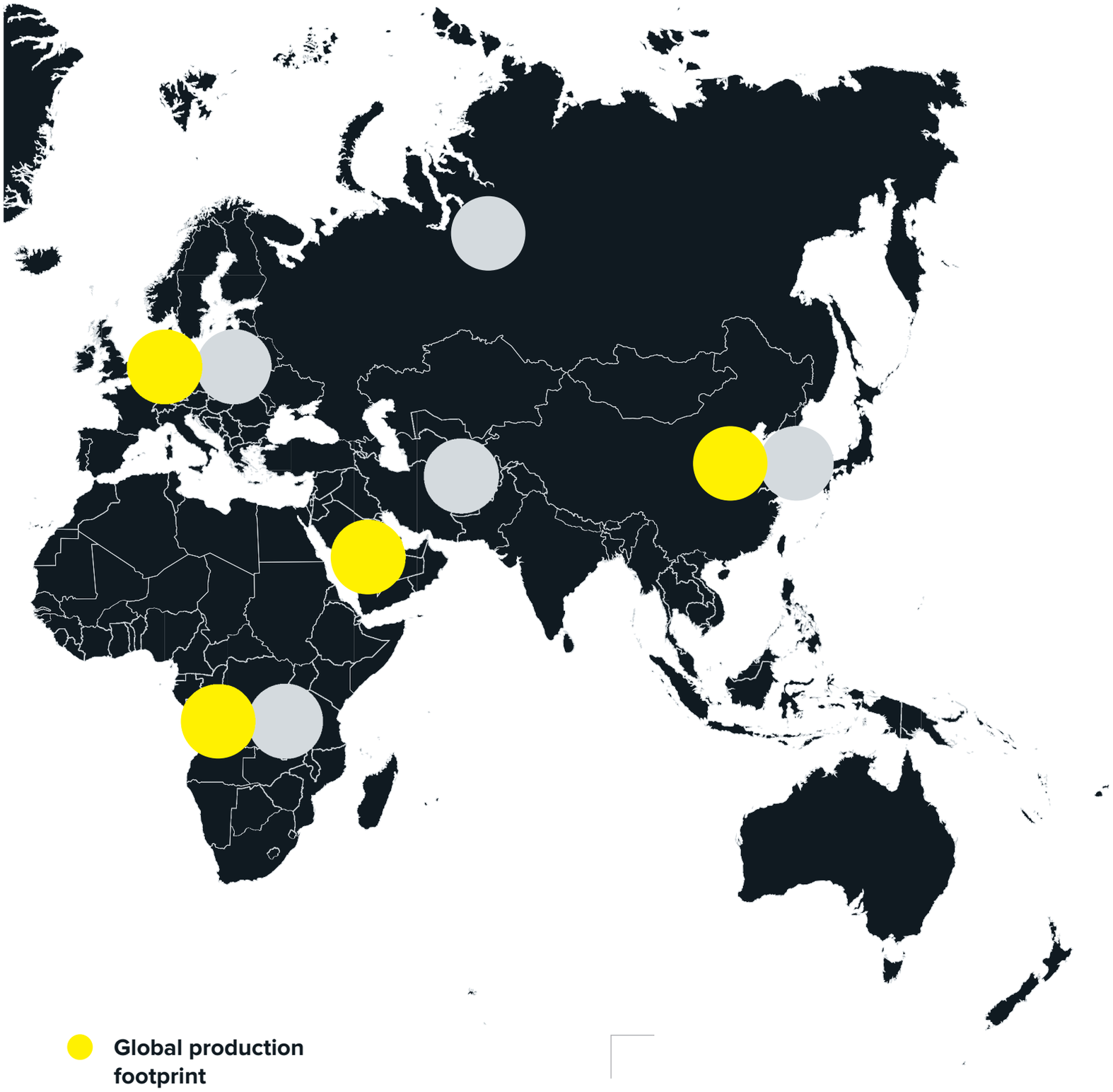
- Air coolers and air heaters for chemistry and for production and process engineering
- Air heaters for drying engineering: e.g., stenter dryers with integrated, finned-tube heat exchangers made of hot-dip galvanized steel, and heat exchangers made of stainless steel for the drying of chemicals
- Air preheaters for boiler facilities: e.g., in power stations and waste incineration plants
- Air-to-air heat exchangers for heat recovery and saving energy
- Economizers for steam and oil plants and for hot-water production
- Steam and water recoolers
- Exhaust-gas recirculation coolers after thermal combustion
- Air coolers for wind tunnels in the automotive industry
- Production of food and beverages
- Air conditioning and refrigeration engineering, including marine applications
- The paper and cellulose industry, as well as wood processing
- The textile industry
- The steel industry
- The plastics-processing industry
- Printing engineering
- Production of veneer wood, lumber, and oriented strand board (OSB)
- The construction materials industry

Our specialized staff will be glad to help you with more detailed information.



GLOBALLY ACTIVE AND STILL CLOSE BY

No matter which market you operate in, regardless of country, we are never far away. We are always happy to answer any questions you may have and meet your requirements. Even the biggest, most successful project begins with a fruitful conversation. We look forward to hearing from you.



Global production footprint

Global sales and service

Just scan this QR code with your smartphone or visit our website at: www.kelvion.com – here you will find a competent person to contact right nearby.

www.kelvion.com