

Kelvion



Product Line: Air Fin Cooler

TAKING THE **HEAT** OUT OF MAJOR INDUSTRIES



Kelvion



EXPERTS IN HEAT EXCHANGE – SINCE 1920

Welcome to Kelvion! Where Heat Exchange is our Business. We are one of the leading global manufacturers of heat exchangers and have been providing solutions for almost every industrial application imaginable since the 1920s, specializing in customized solutions suitable for extreme environmental conditions - as of 2015 under the name of Kelvion.

With one of the most extensive selections of heat exchangers in the world, we are a well-known partner in many industries, including transportation, energy, oil and gas, chemical, marine as well as food and beverage, data center and the HVAC and refrigeration technology sector. Our products include Compact Fin Heat Exchangers, Plate Heat Exchangers, Single Tube Heat Exchangers, Transformer Cooling Systems, Cooling Towers and Shell & Tube Heat Exchangers.

Our many years of experience and in-depth expertise have made us specialists in this field. Our heat exchangers are designed specifically to meet the needs of the respective machine or equipment system, ensuring outstanding energy efficiency and reliability in any market segment. This gives our customers a cutting-edge over their competitors while also reducing operating costs over the long term.

As your heat exchange partner, we understand that outstanding and reliable after-sales services are critical for you, our customer, and we work alongside with you in close partnership supporting you throughout the full life cycle of your plant and equipment to ensure lasting business success.

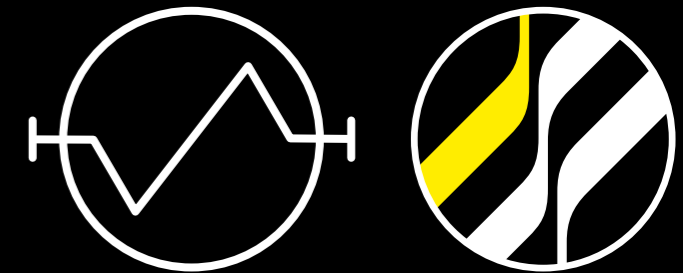
Kelvion – Experts in Heat Exchange.

KELVION – A TRIBUTE TO LORD KELVIN (1824 - 1907)

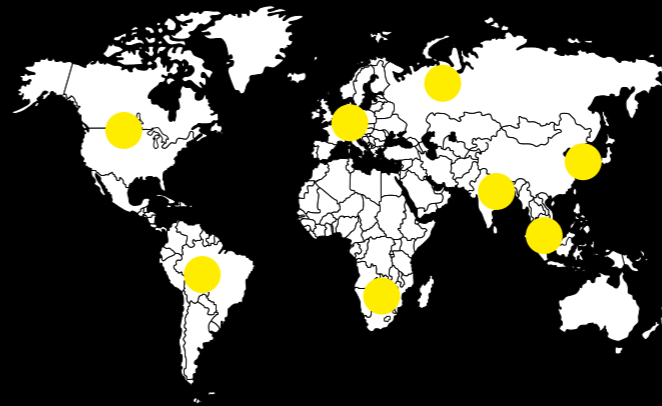


Lord Kelvin formulated the laws of thermodynamics and absolute units of temperature are stated in kelvin, in his honor.

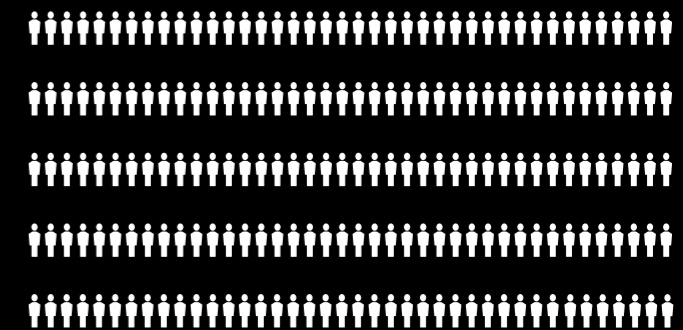
OUR LOGO – INSPIRED FROM THE SCHEMATIC FOR HEAT EXCHANGER



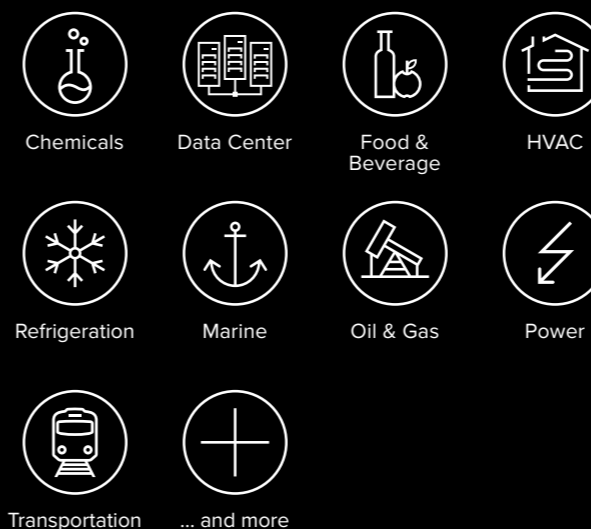
67 BRANCHES AND SALES PARTNERS WORLDWIDE



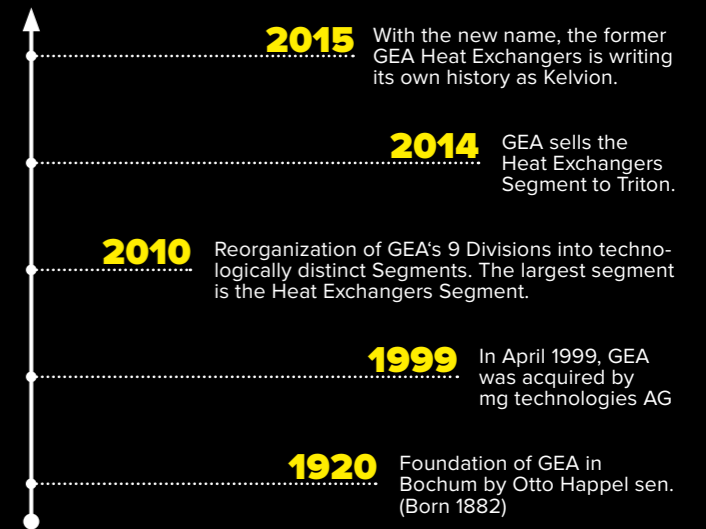
5,000 EMPLOYEES WORLDWIDE



YOUR MARKETS ARE OUR MARKETS

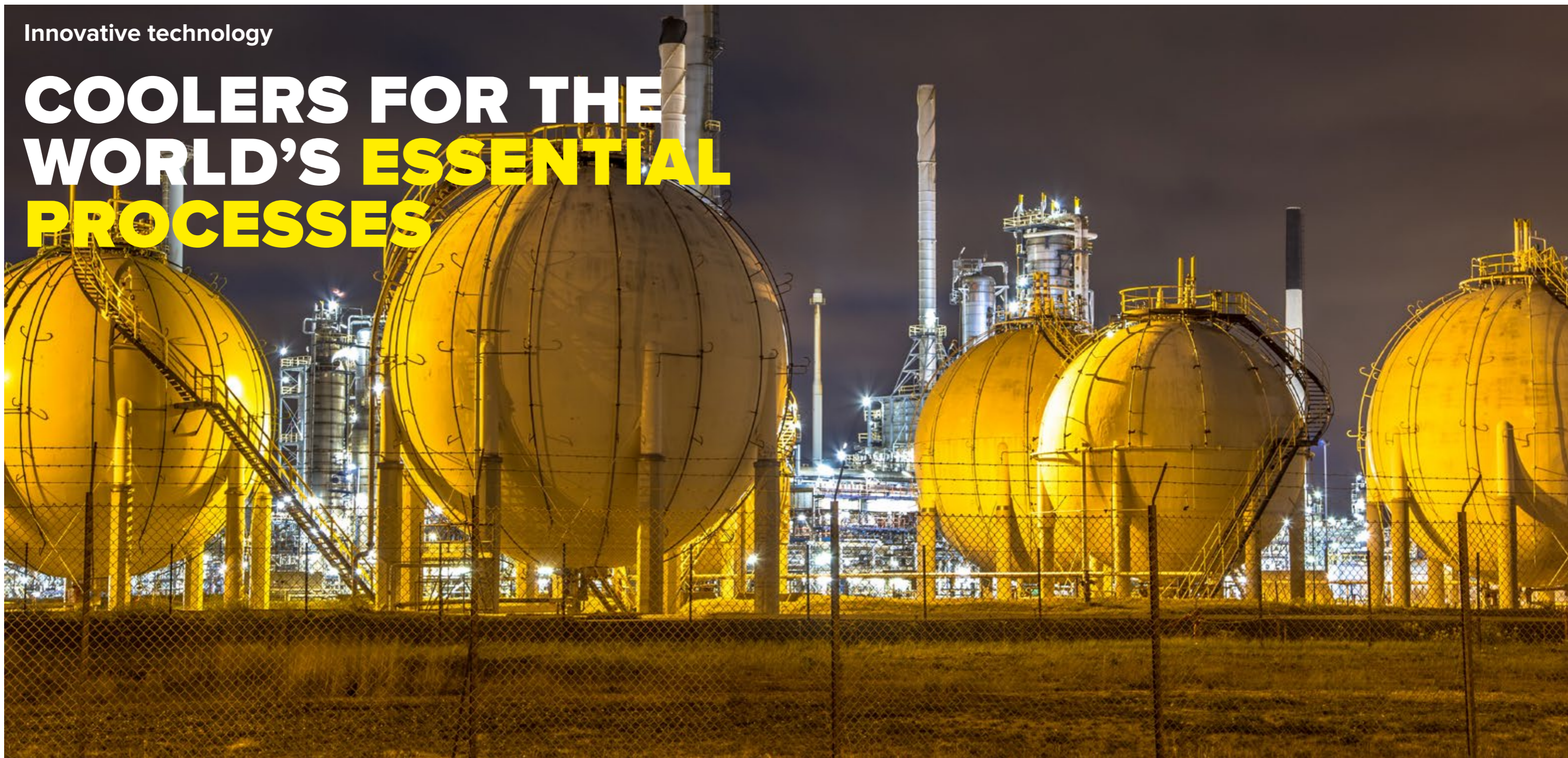


KELVION HAS A LONG HISTORY



Innovative technology

COOLERS FOR THE WORLD'S ESSENTIAL PROCESSES



Air fin coolers are ideally suited to processes that require the transfer of large quantities of heat. They are the products of choice for most of the major industries that keep the modern world functioning as air is cost-effective, non-corrosive and has unlimited availability.

Kelvion has been at the forefront of air fin heat exchange technology for more than 90 years. Today, our air fin coolers can be found in all corners of the world – in power plants, refineries, chemical and petrochemical sites, geothermal plants, mining operations and heavy and light industry, as well as a number of gas processes.

A typical air fin cooler measures approximately 11 x 7 x 6 meters and Kelvion has been involved in applications where hundreds of units are connected, equal to the size of several soccer pitches.

WHY CHOOSE KELVION AIR FIN COOLERS?

- ▶ Enhanced technology
- ▶ Wide range of fin shapes, tubes, headers and materials
- ▶ Leading design and manufacturing technologies
- ▶ Complete service packages
- ▶ Fast delivery
- ▶ Long life cycle

Aluminum or hot dip galvanized

We provide two main types of air fin cooler (AFC) – aluminum (ALU) and hot dip galvanized (HDG). AFC ALU models are ideally suited to oil & gas, petrochemical and power applications and AFC HDG are more appropriate for the chemical, mining, light and heavy industries. All our air fin coolers are designed and manufactured to the highest standards of precision engineering and to meet the toughest operational requirements of our customers.

Technology pioneers

Kelvion has a long and distinguished track record in air fin cooling technology. Since we manufactured our first air fin cooler in 1927 we have continuously developed and improved our products to better serve our customers' needs. Recent innovations include the novel groovy fin and DIESTA tube technologies, which offer increased thermal

efficiency and take up less space. DIESTA tubes increase the duty by up to 15%, compared to conventional tube bundles. Our low-noise EFFASY fan was specially developed to help customers comply with noise regulations. For AFC HDG we have the CW elliptical tube that reduces air-side pressure drop while achieving higher heat transfer efficiency.

Global network

With our worldwide network – including factories in Europe, the US, Qatar, Russia, India and China – we can respond to inquiries both local and international. We can also handle international orders from one continent requiring manufacturing in another. Wherever you are in the world, we can supply the optimum air fin cooler to suit your application.

APPLICATIONS



OIL & GAS
ONSHORE



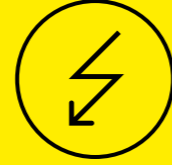
OIL & GAS
OFFSHORE



HEAVY INDUSTRY



CHEMICALS



POWER



MINING

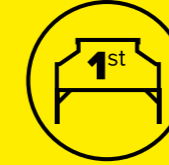
OUR EXPERIENCE



15 PATENTS
SINCE 2007



OVER 120,000
TUBE BUNDLES
SOLD SINCE THE
1970'S



FIRST AIR FIN
COOLER
INSTALLED IN
1927

CUSTOM MADE FOR YOUR APPLICATION

When you choose AFCs from Kelvion you are investing in reliable, robust and quality technology that will provide optimum cooling of your processes over a long life cycle. With our extensive engineering expertise, built up over six decades, we have shown our capability to manufacture AFCs to meet the most complicated project specifications – Kelvion engineers have built almost every conceivable variant.

Our in-depth knowledge of different design codes and international standards, as well as our customers' process requirements, means we have the flexibility to design for each project. As a result, customers trust us to provide the right design to meet their particular process specifications.

Applications

The AFC ALU models are geared to the oil & gas industry, from upstream to downstream. This includes offshore extraction, natural gas liquefaction, gas pipelines, oil refineries, petrochemical processes, waste to energy plants and geothermal plants.

Heavy and light industries, chemical plants and mining benefit from our AFC HDG products.

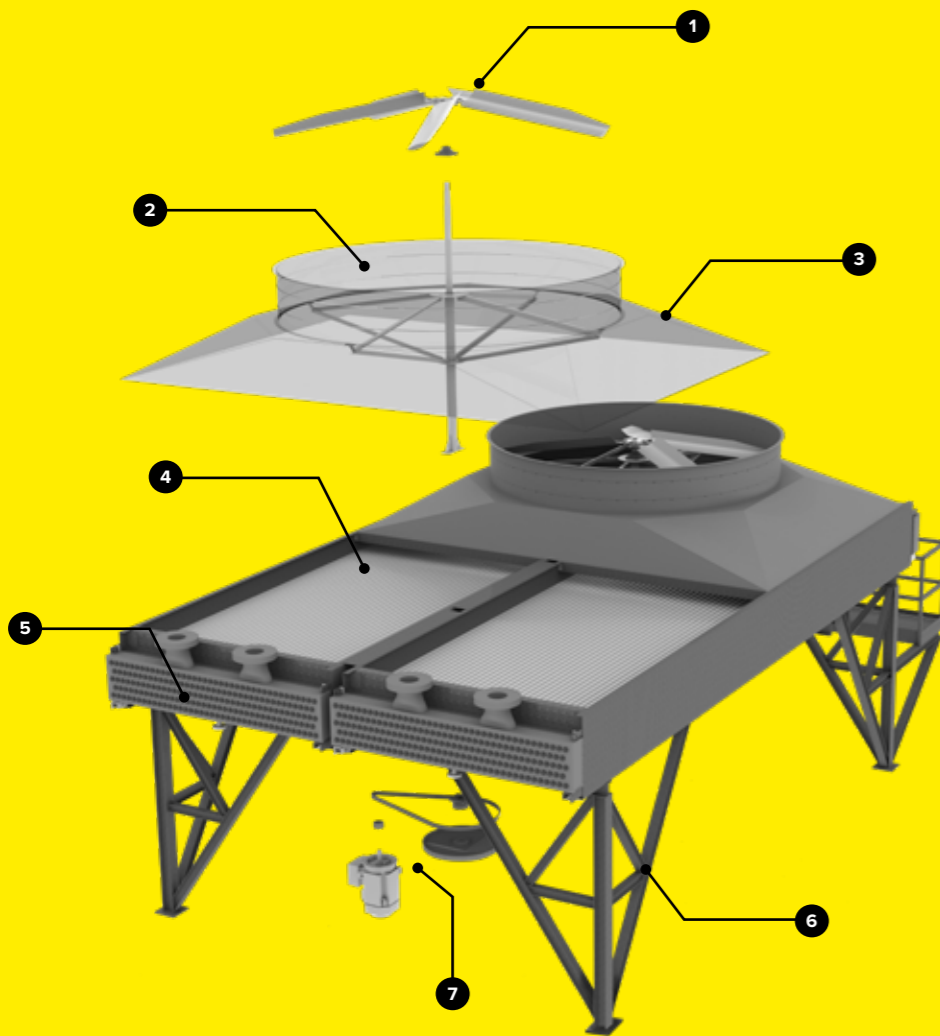
Custom-built units

Because all our AFC products are custom made for each customer, there are no off-the-shelf units. Typically, an AFC consists of a series of horizontal finned tube bundles with box headers at each end that run either underneath or above axial fans within a plenum chamber, which directs the air flow. Usually the air blows upwards through the tube bundles, cooling the hot liquid or gas from the refining or other industrial process. But the fans can be configured to forced or induced draft, depending on whether the air is pushed or pulled through the tube bundle.

Special designs

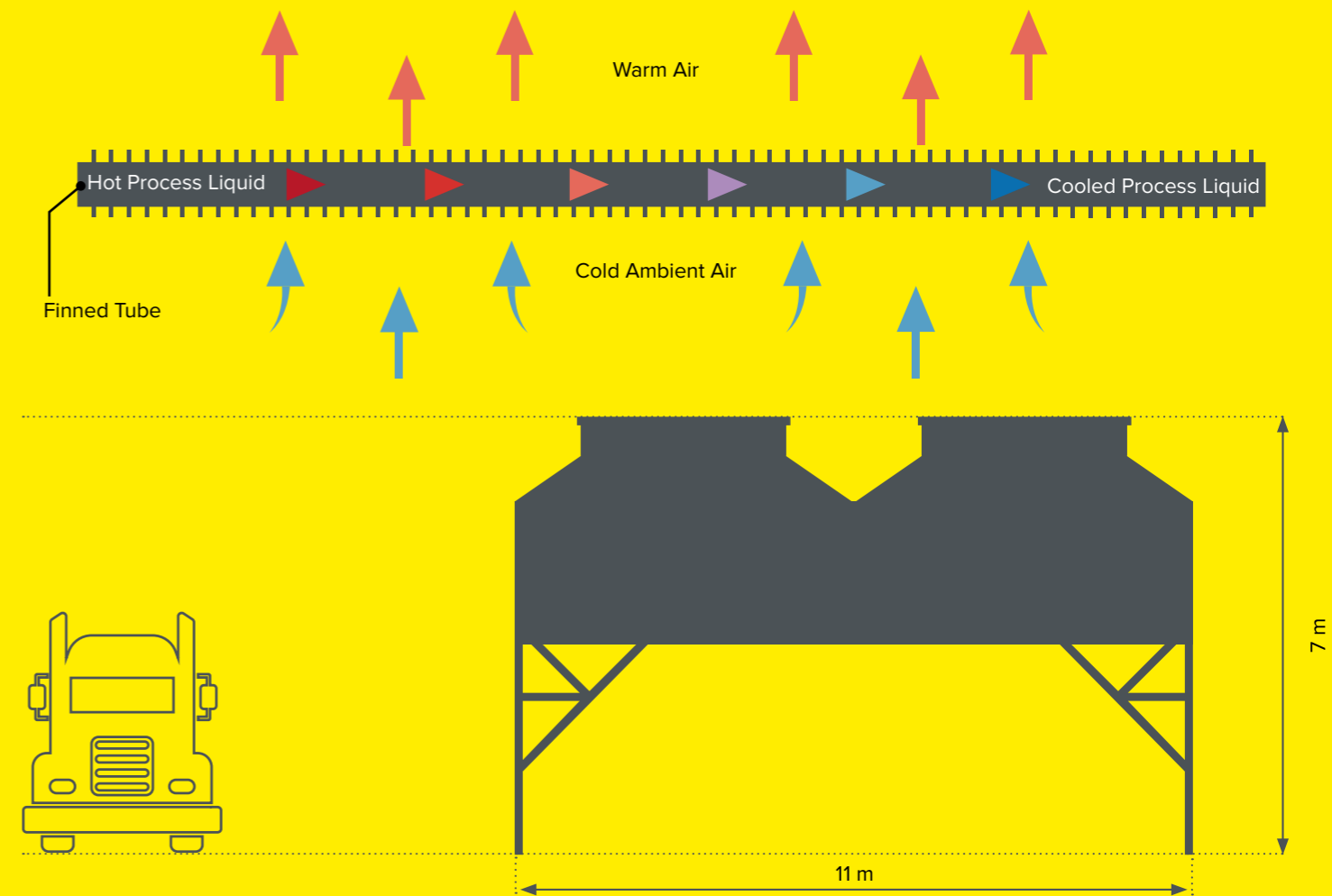
Where coolers are required to operate in extremely cold climates, we incorporate an internal recirculation system. This controls the cooling air temperature and helps prevent clogging of the fluids. In hot countries, where the fluid outlet temperature is very close to that of the ambient air, water humidification systems are required, usually involving high pressure spraying. Whatever the duty or pressure range, just tell us what you need and we can supply the right cooler for the task.





- 1 Fan
- 2 Fan ring
- 3 Plenum
- 4 Finned Tube Bundle
- 5 Header
- 6 Supporting structure
- 7 Pulley, Engine, Drive Belt

HEAT EXCHANGE PRINCIPLE



LEADING TECHNOLOGY FOR OPTIMUM COOLING

At Kelvion we don't believe in standing still, which is why we are constantly underpinning our technological leadership with new product developments. These include special high-performance finned tubes with optimized materials and design – all geared towards more efficient heat exchange. This, in turn, reduces your operating costs.

We offer a choice of aluminum finned tubes or hot dip galvanized steel finned tubes. Tube bundles with aluminum finned tubes are considerably lighter, insensitive to soiling and easy to clean. The galvanized steel systems offer a very long service life of up to 30 years and are extremely resistant to rough weather conditions.

Whichever type of cooler you choose, you can also select from a wide range of finned tube surfaces – the most varied on the market – headers and materials. The size of each AFC is determined by the choice of tube and finned surface. Depending on your process requirements and installation space, our coolers can be configured vertically, horizontally, in-line or mounted on the roof.

The best in green, cost effective and quality engineering
Kelvion AFCs will help you to keep your costs down and boost your green credentials. Using air for cooling, instead of water is better for the environment – it's non-polluting and doesn't impact nearby rivers and lakes.

The big plus is that air is generally non-corrosive and of unlimited supply. Our units have a low-noise drive which offers the twin benefits of low operating speeds and a lower air throughput. This makes them even more energy-efficient, which also improves your profitability.

Lower energy consumption and economic efficiency is underpinned by unrivalled engineering expertise. Our capabilities, developed over the last 90 years, enable us to manufacture AFCs with a wide range of complex material welding and to suit the toughest process conditions. Over the years we have become a trusted supplier to main industry customers who can rely on us to supply technology that meets all their requirements.

With AFCs from Kelvion, the highest quality comes as standard. As well as being easy to install and remove, our units are also designed to allow changes to suit the demands of your processes.



API Standard 661



ASME VIII Div 1, Div 2



ISO 9001 : 2015

DESIGN STRUCTURES

Forced Draft

Using the forced draft, the air is pushed through the tube bundles. This configuration provides easy access to the tube bundles, which supports cleaning, maintenance and replacement of the tubes. By using the forced draft an operation with high air outlet temperatures ($>100^{\circ}\text{C}$) is possible. Working with cold air requires lower electrical consumption due to lower volume flow at the same mass flow.

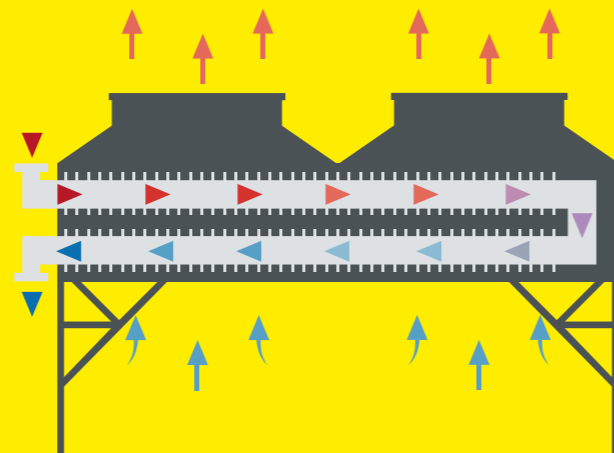
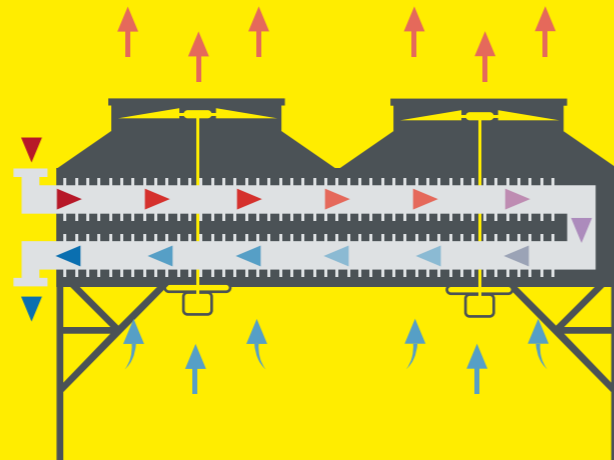
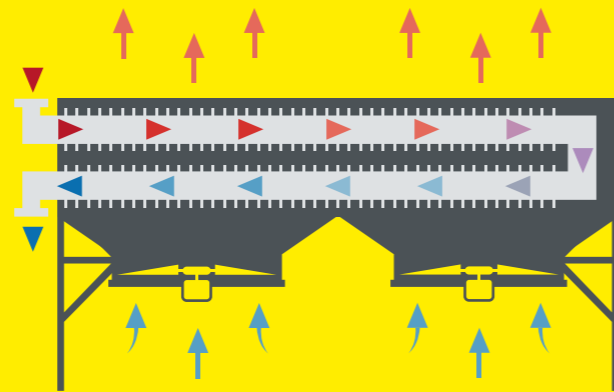
Induced Draft

The fan pulls the ambient air through the tube bundle. Thus the chance of recirculation is reduced. Also the casing protects the fin bundles from atmospheric and environmental influences. The low structure design reveals cost and material saving effects.

Natural Draft

Natural ventilation does not need any mechanical device to operate (no fan). Air circulation is induced by convection, due to the temperature differences between the inside and outside and the differences in height. In order to increase the draft, additional rings are added.

Natural draft is commonly called the "chimney effect". One of the advantages of natural draft is that of a silent and economical unit.



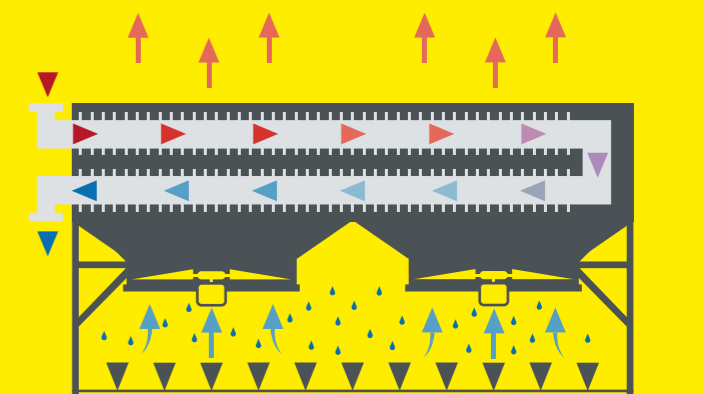
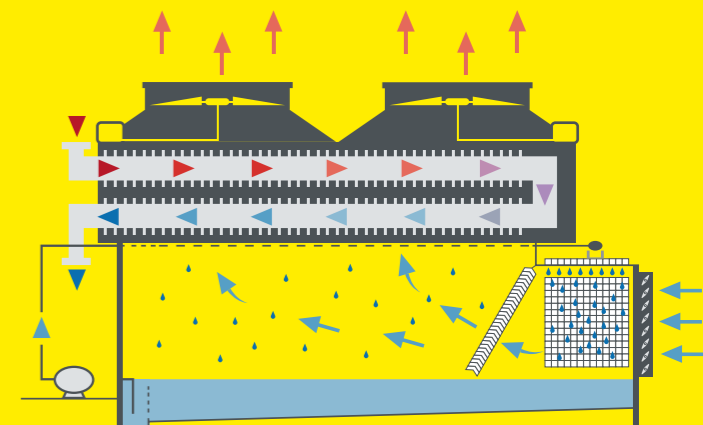
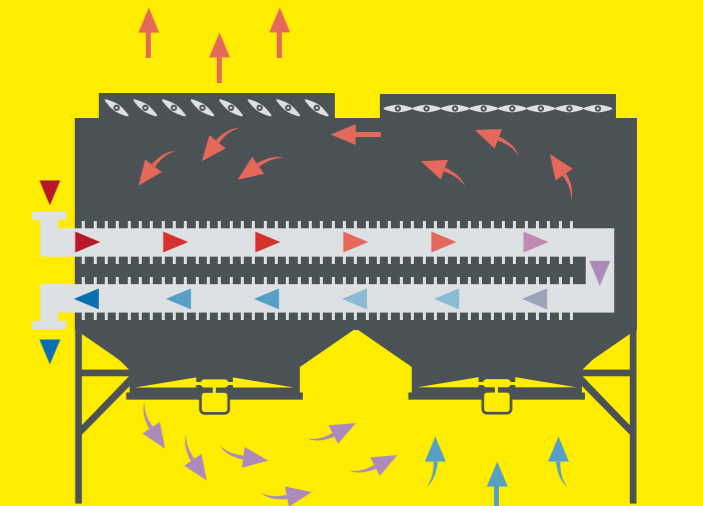
Recirculation

Air cooled heat exchangers with internal recirculation systems are used in extremely cold climates (Canada, Siberia, polar zones...). This system is used to control the cooling air temperature regardless of ambient air temperature. This prevents, for example, clogging of the fluids to be cooled. Internal recirculation systems require the use of positive and negative step autovariable fans.

Air cooled exchanger with air humidification by flow or spray

For certain extreme cases in hot countries with a fluid outlet temperature very close to the ambient air temperature, it is necessary to use water humidification systems by flow (humidifier) or high pressure spraying (peak cooling / moisturizing). Air cooled heat exchangers with air humidification by flow currently represent a very marginal part of the production of atmospheric air cooled heat exchangers. They are intended to be installed in tropical countries where it is necessary to use the latent heat of evaporation of water to cool the ambient air. Much ancillary equipment, such as the circulation pump, the recovery sump and the humidifiers, is added to the air cooled exchanger to allow the humidification of the intake air.

The humidification systems can be installed after the fact on existing installations when the dry air cooled exchanger is no longer powerful enough (change in climatic conditions or process). This system is made up of humidification sprayers fed by a high pressure pump. The fineness of the droplets allows thermal exchange with the ambient air. This system generally operates without a recovery tank.



AIR FIN COOLERS ALUMINIUM SOLUTIONS



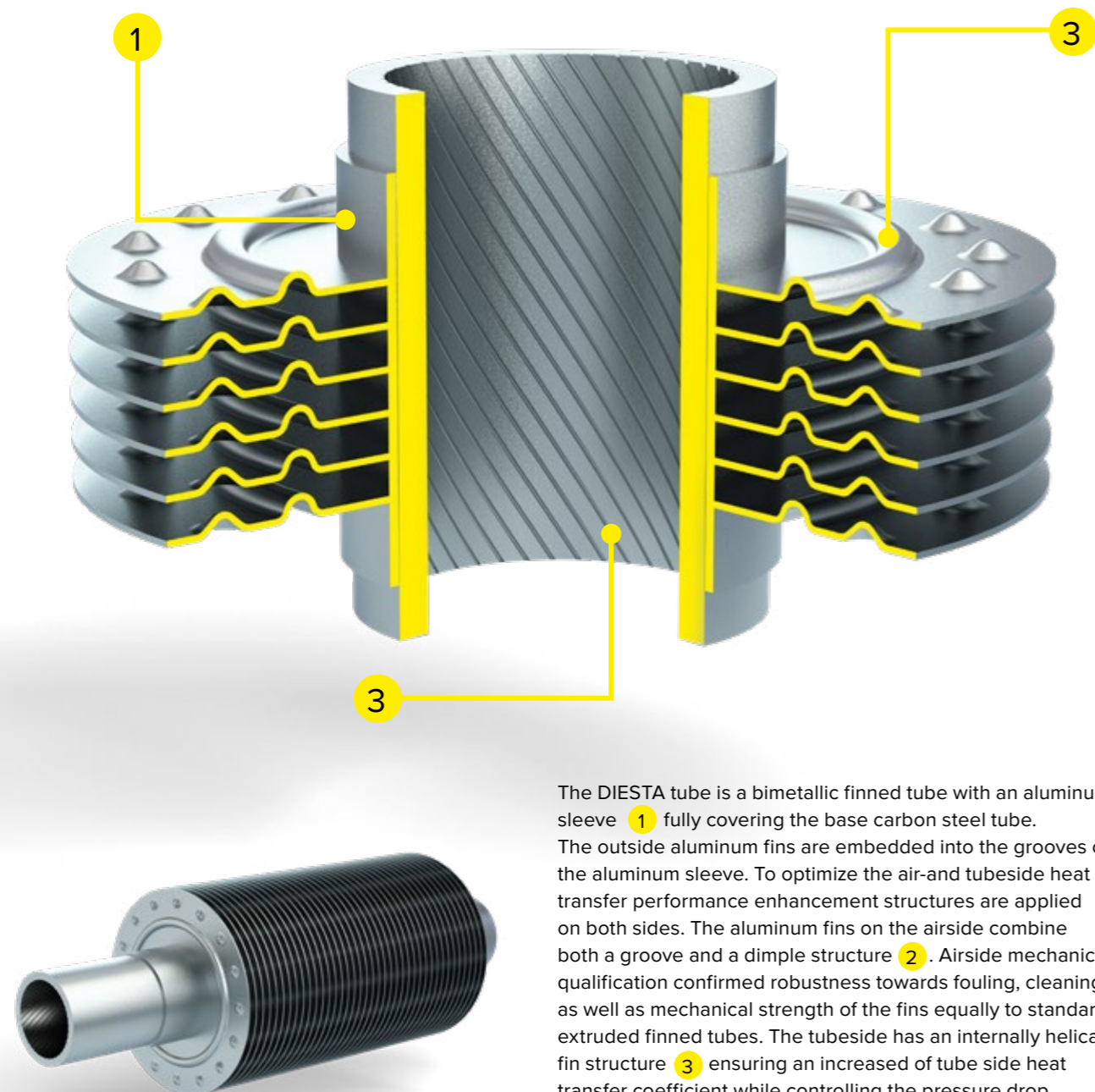
Our leading design and manufacturing technologies are geared towards providing optimum heat exchange. We offer the most varied range of aluminum finned tubes on the market.

They include rolled, double wrapped, bimetallic and embedded fin types. As a result of our commitment to R&D we introduced the innovative Groovy fins and DIESTA finned tubes, which offer enhanced energy efficiency. Also our in-house developed EFFASY fan combines reliable operation with ultra-low noise levels – ideal for customers who need to comply with strict noise regulations.

We have every conceivable header design for our AFC ALU models and in an extensive choice of materials: standard carbon steel, stainless steel, duplex, super duplex, Inconel, incoloy, titanium and hastelloy.

AFC ALU units are purpose-built to suit your application. From recirculation air coolers and humidified air coolers to lethal or sour services coolers and high pressure coolers, we will design and manufacture the right cooler for you.

DIESTA TUBES



The DIESTA tube is a bimetallic finned tube with an aluminum sleeve 1 fully covering the base carbon steel tube. The outside aluminum fins are embedded into the grooves of the aluminum sleeve. To optimize the air-and tubeside heat transfer performance enhancement structures are applied on both sides. The aluminum fins on the airside combine both a groove and a dimple structure 2. Airside mechanical qualification confirmed robustness towards fouling, cleaning as well as mechanical strength of the fins equally to standard extruded finned tubes. The tubeside has an internally helical fin structure 3 ensuring an increased of tube side heat transfer coefficient while controlling the pressure drop. DIESTA Technology is a development by the cooperation of Wieland®, TechnipFMC® and Kelvion.

DIESTA PRODUCTION PROGRAM

TUBE MATERIAL	TUBE OD	PLAIN END CORE TUBE THICKNESS	FIN MATERIAL	FIN DENSITY
Carbon steel (ASME SA179 & SA334 Grade 6)	1 inch 1 ¼ inch 1 ½ inch	2.11 mm (in accordance with API 661)	aluminium 1100	10 fpi (394 fpm)

DIFFERENT INTERNAL STRUCTURES ARE AVAILABLE FOR		
Gas cooling	Condensation	Liquid cooling (incl. high viscous fluid Pr < 100)

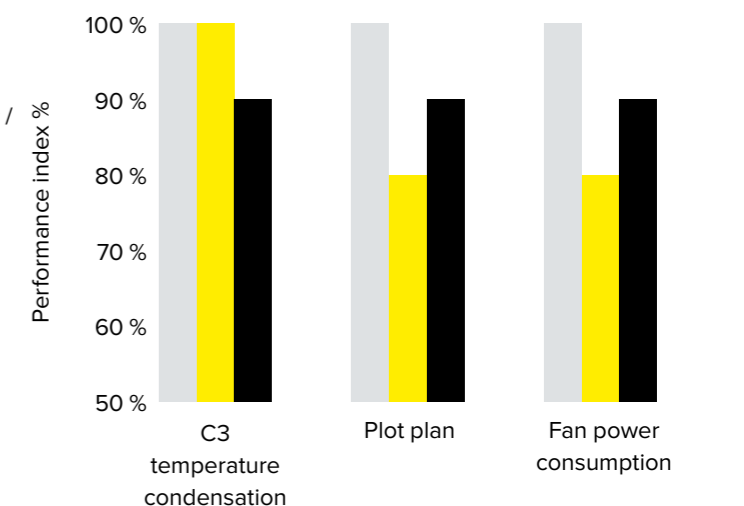
CASE STUDY FOR LNG AIR-COOLER FIELD

Assumptions:

- ▶ APCI type C₃/MR LNG process
- ▶ Design optimization for whole air-cooler field with services HP and LP MR after-coolers, C₃ ref. desuperheater / condenser / sub-cooler and others

3 potential benefits depending on project objective:

- ▶ Either maximize LNG production capacity or to minimize CO₂ footprint by optimizing C₃ condensation temperature
- ▶ Either CAPEX minimization by optimizing plot plan
- ▶ Or minimize CO₂ footprint by reducing fan power consumption

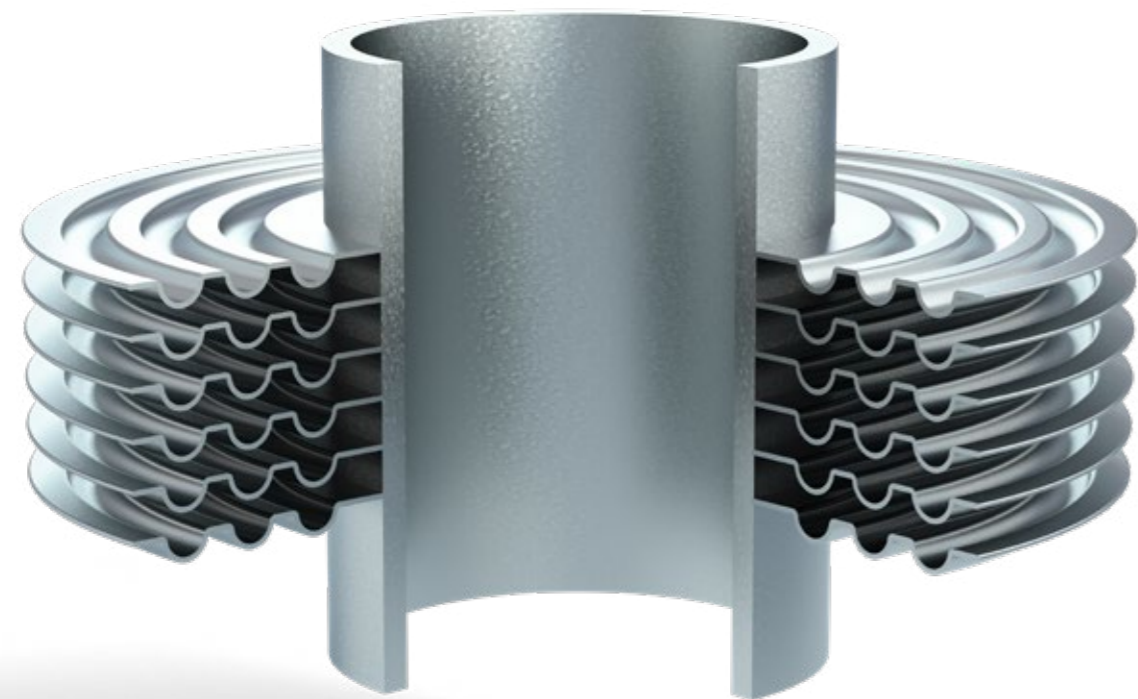


Standard Design 1: standard finned tubes

DIESTA Design 2: CAPEX reduction with plot plan optimization

DIESTA Design 3: OPEX optimization by reducing the C_w condensing temperature and CAPEX reduction by optimizing footprint of other services

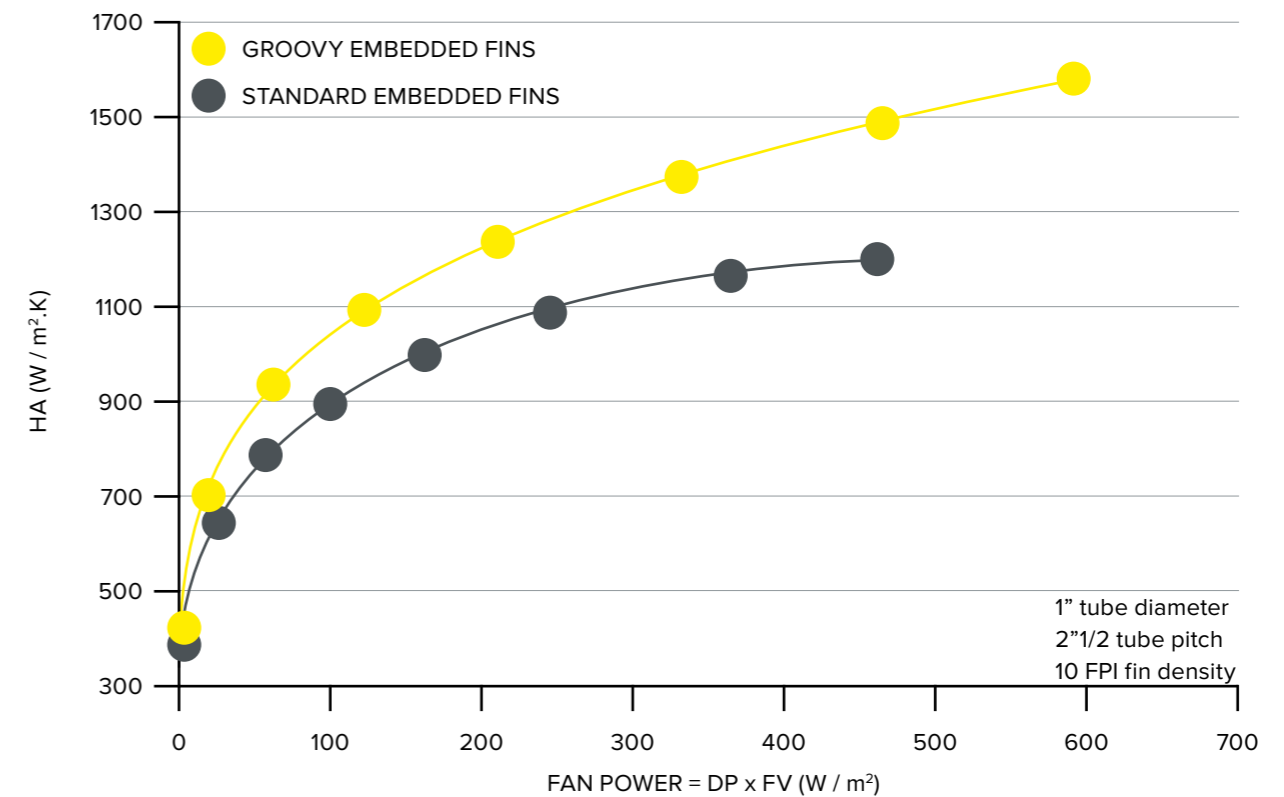
GROOVY TUBES



Groovy Fin

Groovy® fins have a grooved profile allowing an improvement in heat exchange of 8% to 15% for the same power consumption. Their pioneering and patented shape channels the air around the tube, maximizing the exchange surface. Products fitted with Groovy© fins require less space and use 10% less electricity.

While enhancing the performance, the Groovy Fins have still provide optimal fouling resistance and cleaning capability. Groovy Fins cause CAPEX / OPEX savings by increasing existing capacity with the same plot. Also they decrease the AFC cost for a given capacity and reduce the plot area on grassroots projects.



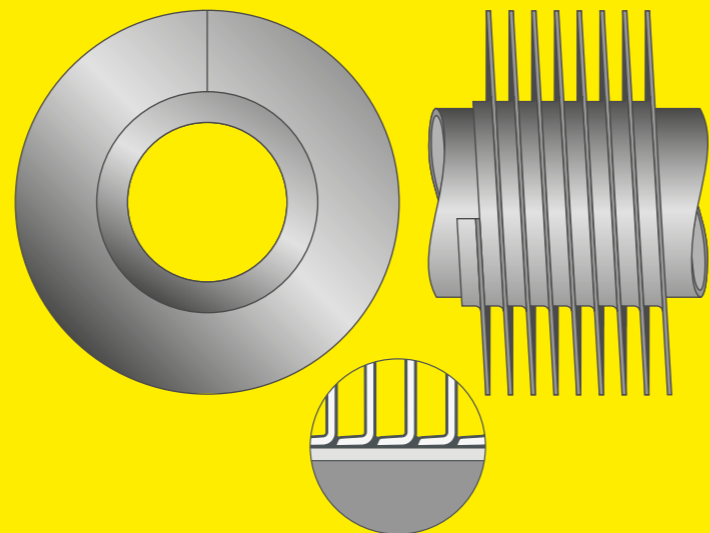
- ▶ Less plot area
- ▶ Less concrete rack construction
- ▶ Less piping
- ▶ Less cabling / wiring
- ▶ Less pipe rack modules
- ▶ Less transportation costs
- ▶ Less site erection works
- ▶ Less OPEX

FURTHER **TUBE** TYPES

Rolled fin (type L and KL)

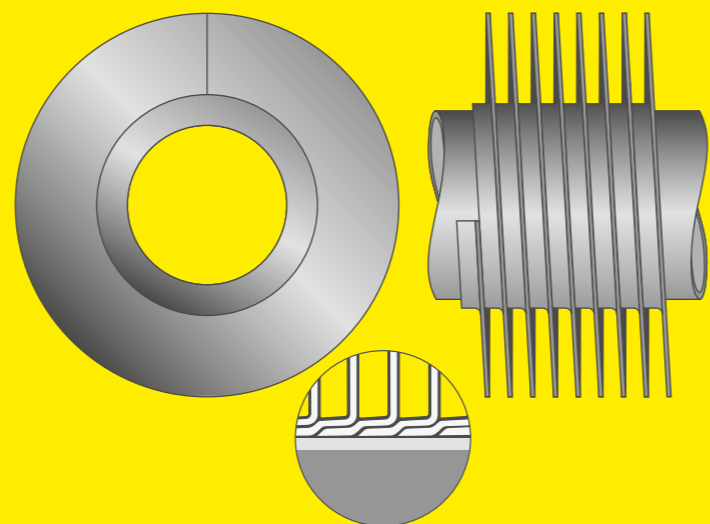
The base of the aluminum strip is folded to form an "L" then laminated and rolled onto the base tube. Then the feet of the fins are joined together to ensure continuous coverage of the base tube surface to protect it from corrosion. The large contact area between tube and fins promotes good heat transfer.

In the type KL version, the fin foot is knurled over its whole width, increasing the contact between the spiral fin and the base tube.



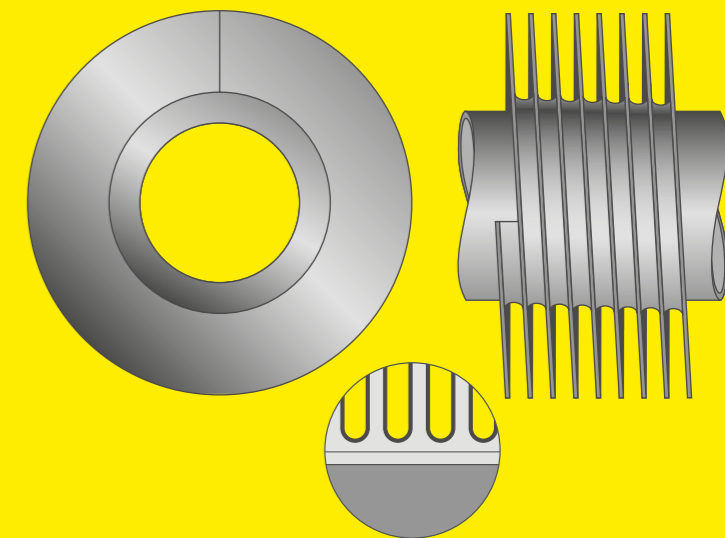
Double wrapped fin (type LL)

The base of the fin is formed into a double stepped "L", which is double the width of a single "L", then rolled around the base tube to overlap with the previous turn of the "LL" fin. The surface of the base tube is thus effectively and continuously protected against corrosion by a double thickness of the strip.



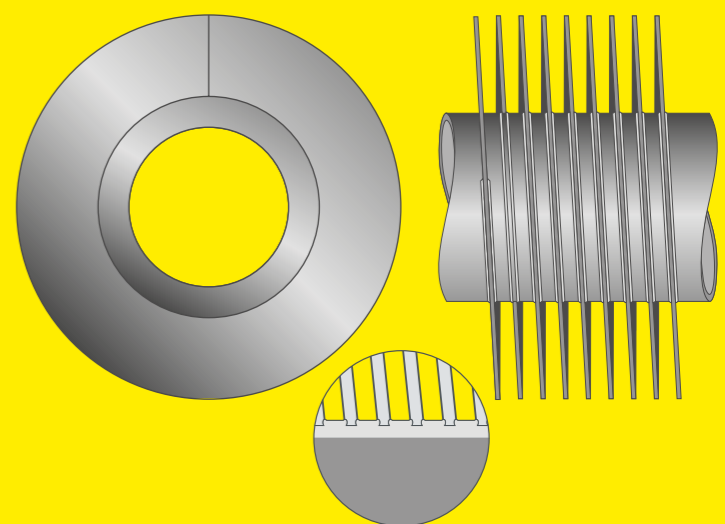
Bimetallic extruded fin (type EX)

The EX (extruded) type is well protected against corrosion as the base tube is entirely covered in aluminum. A smooth steel tube, carefully degreased, is inserted into an aluminum sleeve. The assembly is loaded into a finning machine equipped with three broaches, each spaced at 120 degrees and equipped with multiple disks. These disks, which are stepped in profile and diameter, extrude and profile the fin and then crimp the aluminum fin to the base tube. We have developed a high efficiency bimetallic extrusion with 11 fins per 2.5 cm. It combines a large cross flow section with an extended life expectancy.



Embedded fin (type G)

The fin is formed from a rolled aluminum strip and fitted into the wall of the base tube. A disk or tool creates a groove in the tube wall. A roller laminates the strip to form a spiral. A guide positions the aluminum strip into the groove, and a second disk solidly crimps the base of the strip into the groove by "mating" the edges of the groove.



HEADER



Plug headers – generally the most used

This is the most common design due to its high service pressure resistance. It allows as many passes as necessary. Each tube can be serviced by removing the 2 corresponding plugs for cleaning and/or inspection.



Cover plate header – For very dirty flows

As the name suggests, this design is in the form of a plate that can be removed in a single piece, thanks to its assembly, by bolting to the rectangular flange of the header. This design is ideal for very dirty flows as it is easily accessible for cleaning.



Pipe header

This is a cylindrical header used for high pressure (>200 bar): in such cases, the possibilities for distributing and circulating the fluid are very limited.



Welded bonnet header

This is a half tube that is welded to the tube plate. It is mainly used in vacuum applications where sealing against air intrusion is paramount



Bonnet header

The bonnet header is a half tube or folded sheet which is welded or bolted to the tube plate. It is used mainly within the framework of an industrial refrigeration application with fluids such as water, glycols, etc.





AIR FIN COOLERS HOT DIP GALVANIZED SOLUTIONS

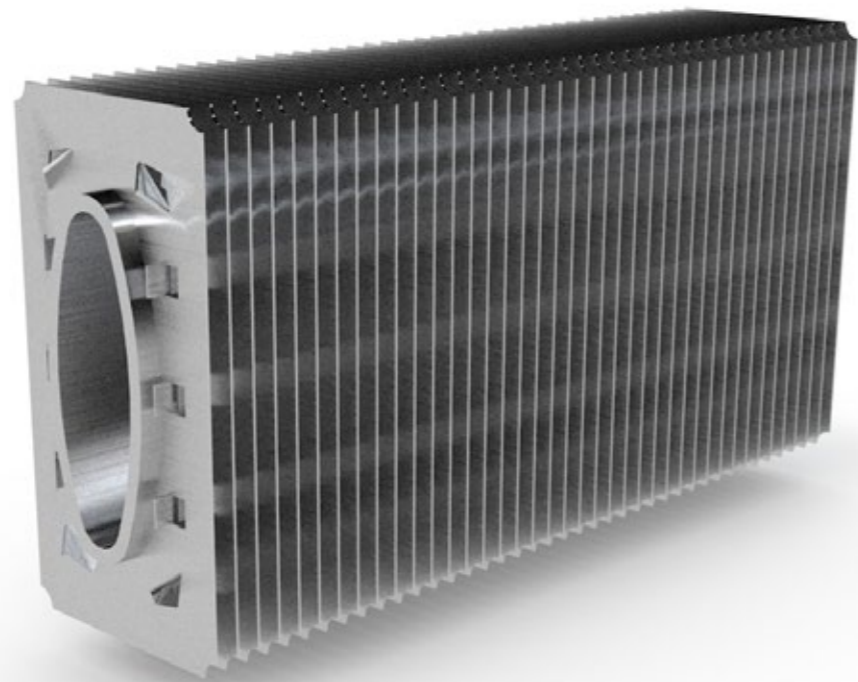
Chemical plants, mining operations and heavy/light industries require reliable heat exchangers that can withstand harsh conditions. They need to be corrosion proof and be easy to clean and maintain.

Our AFC HDG models have proved time and again that they are more than up to the task. We offer various tube types, all of which provide excellent thermodynamics. With the new CW tube Kelvion has taken the hot dip galvanized fin tube to the next level. As well as being more efficient, it also requires less power for the fans.

HDG coolers feature a homogenous zinc layer to protect against corrosion and ensure a long life cycle. We offer various header types, depending on the duty, pressure and operating temperature.

All AFC HDG models are individually designed built to meet your operational needs.

CW TUBE THE ELLIPTICAL FIN TUBE – REINVENTED



Inspired by concept of efficiency – Making proved solutions even better

The hot dip galvanized elliptical fin tube – with its favorable flow characteristics has been proving its marketability for decades and will continue to play an outstanding role on the heat exchanger market in the future.

Wherever heat transfer is needed in industrial production processes, the elliptical fin tube has demonstrated its high efficiency in different areas of application.

Experience, knowledge and precision

We have conducted development work in collaboration with the Westpalian University of Applied Sciences in Gelsenkirchen, Germany. This collaboration has revealed that the elliptical fin tube still offered room for optimization.

With the method of numerical flow simulation (CFD) we have e.g. investigated the effects of innovative turbulators on the fins. The results were validated by wind tunnel measurements. A patent was applied for the new invention which is called: CW Tube.

Lighter, higher efficiency and more silent – The CW Tube redefines standards

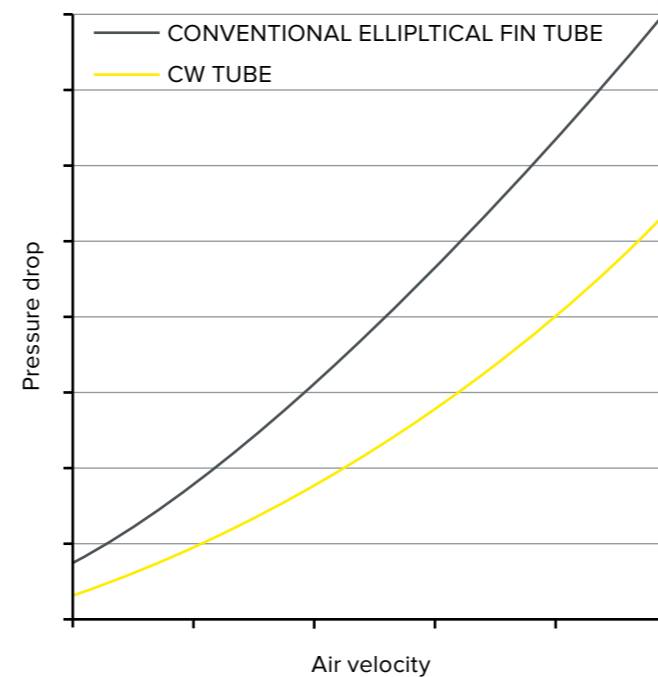
As a result of reduction in specific air-side pressure drop, while achieving a higher heat transfer coefficient at the same time the CW Tube requires up to 25% less of heat exchanger tubes and up to 30% less electrical power consumption of the fans.

This pays off in many respects: Both investment and operating costs can be saved. In parallel, the environment will be protected by reduction of CO₂ and noise emission.

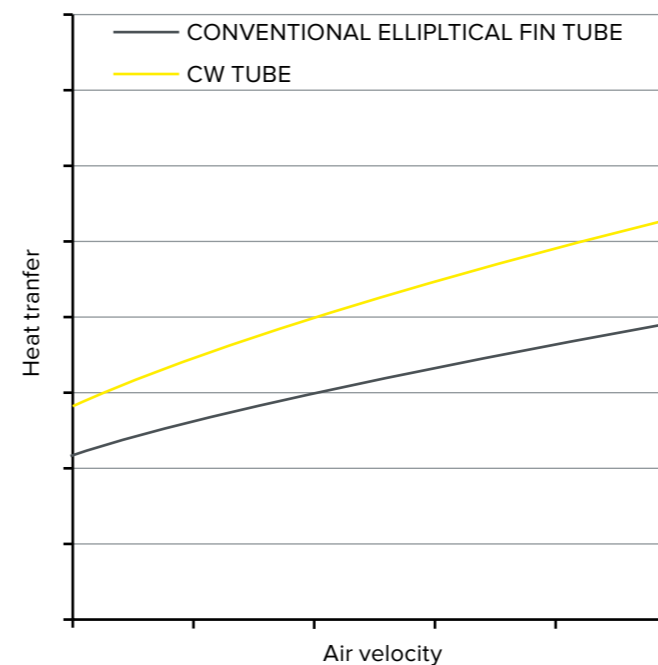
These benefits get together with a higher degree of product reliability, even under extreme conditions.

Reduction of	Increase of
Power consumption	Efficiency
Material usage	Thermal performance
Carbon footprint	Solidity
Weight	Corrosion resistance
Noise level	Cleanability

Pressure drop



Heat transfer



APPLICATIONS

- ▶ Refineries
- ▶ Petrochemical Industry
- ▶ Steel Mills and steel industry
- ▶ Natural gas facilities
- ▶ Power plants
- ▶ Paper industry
- ▶ Textile industry

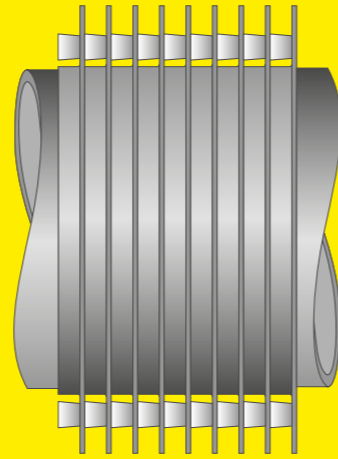
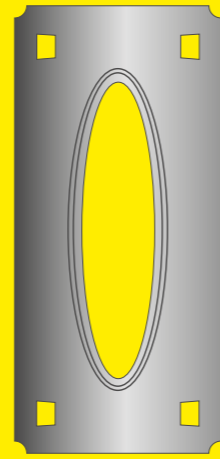
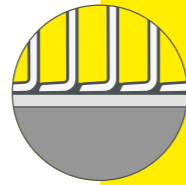


AIR FIN COOLER HDG

HDG TUBES

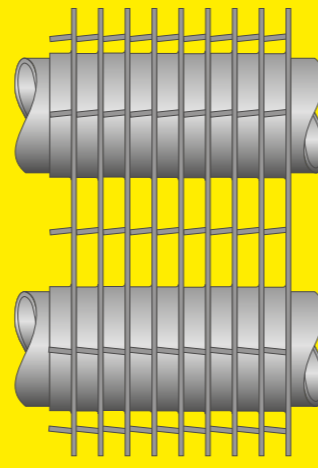
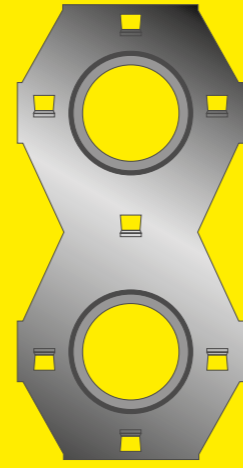
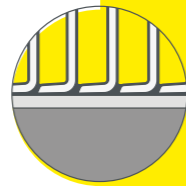
FE/KE/AE tube types

The elliptic shape provides excellent thermodynamics and there is reduced pressure loss on the air side, due to a lower vortex formation. Additional baffle surfaces/ turbulators achieve very good heat transfer coefficients. These tube types are galvanized in a dipping bath to provide optimum corrosion protection.



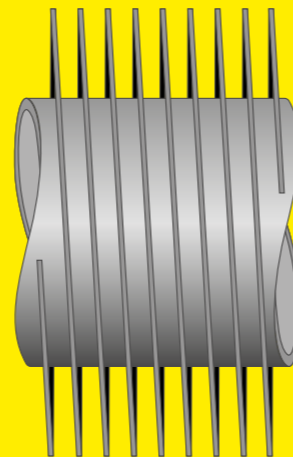
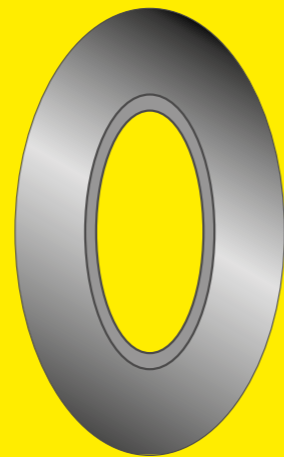
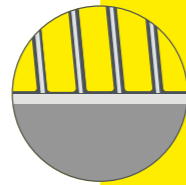
XE tube type

The excellent properties of galvanized tubes with steel fins are combined with the geometry of round tubes, resulting in high rigidity. This design is ideal for high pressure ratings and restricted space.



PI/HI tube type

This has similar thermodynamic properties and air-side pressure losses to the FE tube type. With a larger clearance between the elliptic core tubes this type is suitable for applications where regular cleaning is required.



AIR FIN COOLER HDG

HDG HEADERS

Cover plate header – For very dirty flows

As the name suggests, this design is in the form of a plate that can be removed in a single piece, thanks to its assembly, by bolting to the rectangular flange of the header. This design is ideal for very dirty flows as it is easily accessible for cleaning.



Cover plate header with stud bolts

In this version, the nozzles are arranged at the top and bottom. This means you can remove the cover plate without dismantling any tubes. The cover plates are also available with built-in nozzles.



Depending on temperature and gasket type, this header works up to an operating pressure of 40 bar. Kelvion can manufacture special versions for all applications beyond this range. Both cover plate versions have either welded-in or rolled-in tubes.

Bonnet header

The bonnet header is a half tube or folded sheet which is welded or bolted to the tube plate. It is used mainly within the framework of an industrial refrigeration application with fluids such as water, glycols, etc.



Welded header (D type)

The inexpensive header design is mainly used for clean products or a high vacuum. The tubes are welded into tube sheets, and D type headers with the required connecting nozzles are welded on.



AIR FIN COOLER

FANS



Air Cooler fans

Kelvion air cooler fan drives are highly reliable and have low vibration levels. They are available in various diameters and offer infinitely variable speed control.

The fan is installed horizontally either below (forced draft) or above (induced draft) the bundles. Its flow is always directed from the bottom to the top.

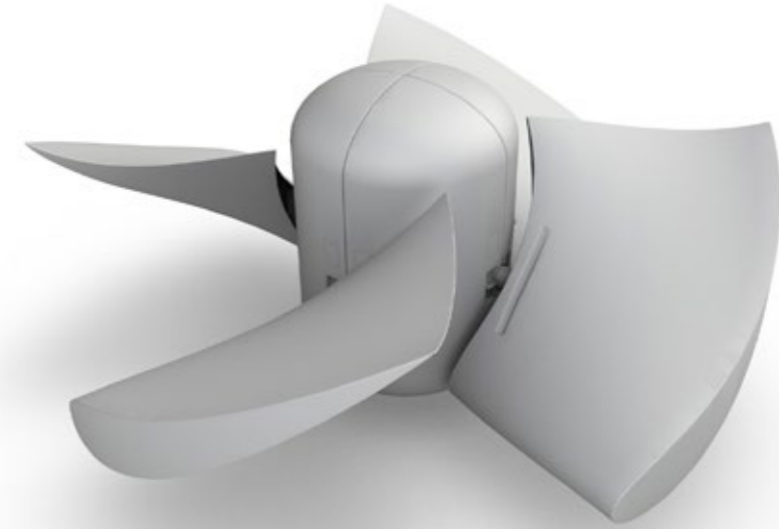
Fan blades are made from aluminum or glass fiber reinforced plastic. Aluminum blades have superior temperature and abrasion resistance, they are easy to manufacture and there is no risk of static electricity build up.

Using plastic provides greater scope for different blade profiles. Plastic blades also have better aerodynamics, are low on noise and have a higher resistance to atmospheric corrosion.

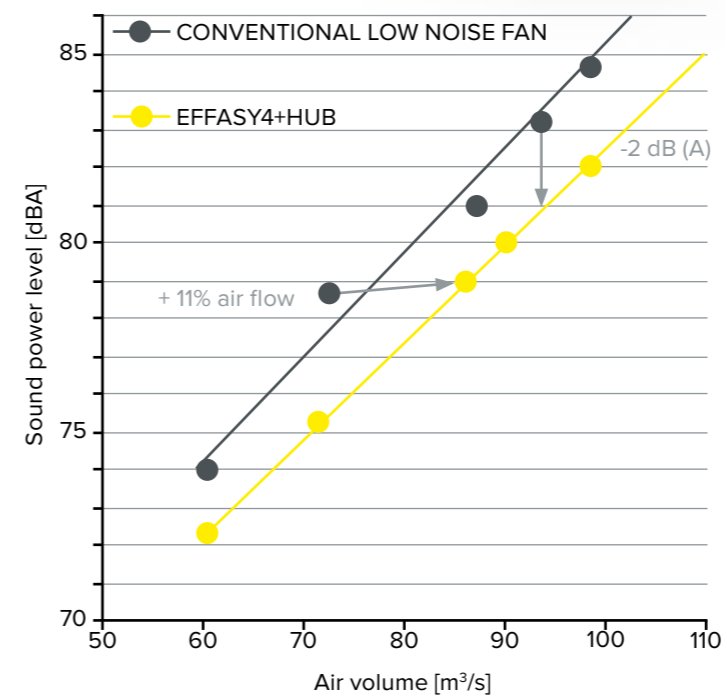
The fan speed is based on the air flow rate needed to reach the desired thermal performance for the unit, depending on the noise pressure level required by the environment. The fan speed is lower than the motor speed which requires the installation of a speed reducer between them.

AIR FIN COOLER

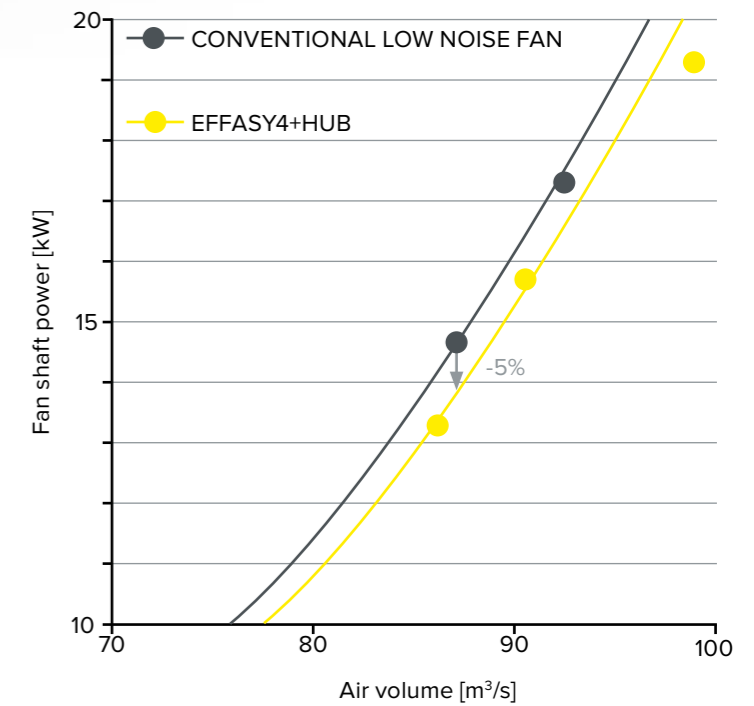
EFFASY FAN



EFFASY fan - Sound power level



EFFASY fan - Fan shaft power

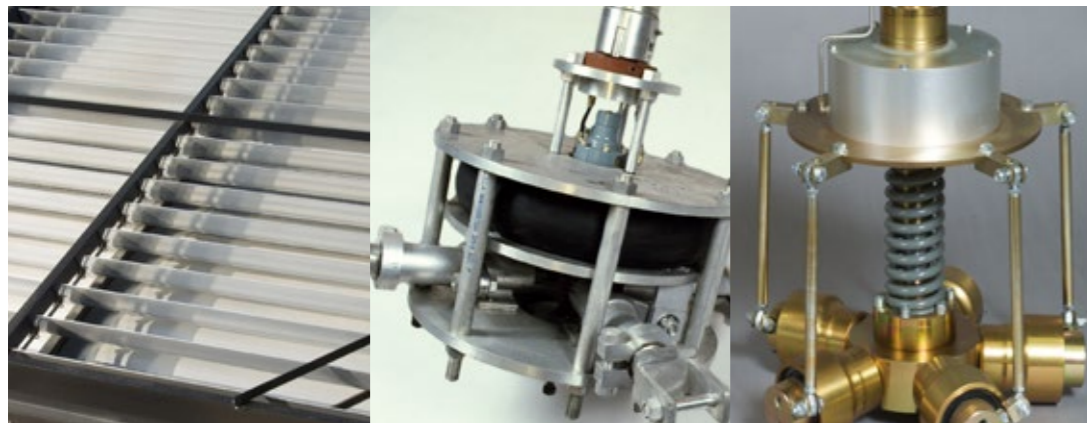


EFFASY fan

This is an ultra-low noise, high-efficiency fan that we developed in house to help customers meet strict noise regulations, such as when a plant is close to a residential area. The blades and hub profiles have been optimized together to create a uniform pressure repartition on the blades. Combined with the special hub design, it provides excellent aerodynamic efficiency and lower noise emission. This novel design has been validated by Computational Fluid Dynamics (CFD).

- ▶ Increased efficiency + 11% air flow
- ▶ Less noise - 2dB(A)
- ▶ 5% reduction of power consumption
- ▶ Made 4 blades and an optimized hub shape
- ▶ Available diameters: 12, 14 and 16 feet
- ▶ Standard operating temperature: -20°C - +70°C
- ▶ Extended operating temperature: -20°C - +100°C

TEMPERATURE CONTROL



Louvers

On induced or forced draft AFCs, the louvers control the air flow before or after the bundle or prevent natural draft (frost protection). The use of louvers causes recirculation of hot air, which mixes with the fresh air. They can be controlled manually, remotely and automatically.

Heating coil

The heating coil, known as a “steam coil, oil coil or electrical coil” as it uses saturated steam, is a single-pass bundle equipped with a single row of sloping tubes and two pipe headers equipped with a single tube. They are placed under the bundle and heat the air before it passes across the tubes in the main bundle (used in cold countries or in processes with clotting fluid at start-up). The heating coil is manufactured in accordance with the same strict quality requirements as the main bundle.

Auto-variable fan

The pneumatic auto-variable hub varies the blade angles (like a helicopter) during rotation. When the air temperature drops (measured by a sensor on air intake side), the auto-variable fan lowers the air flow rate by reducing the blade angle required for the unit’s cooling needs and thus reduces the electrical consumption. This guarantees control of the fluid outlet temperature. The control mechanism maintains the process fluid at a roughly constant temperature over a limited range of ambient air temperature fluctuations.

Variable frequency drive

One of the solutions for controlling process temperature is to install variable frequency motor(s) in each bay to vary the air flow rate. Adding a variable frequency drive mechanism to motor-driven equipment offers energy savings in a system where the parameters (temperature, flow rate...) vary over time (winter/summer, process change). Variable speed drive mechanisms improve the efficiency of motor-driven equipment by adjusting its speed to the ever-changing load. This allows precise and constant control of the process over a wide range of speeds.

Two-speed motors

The two-speed motor offers a simple, efficient and more economical solution than the variable speed drive motor, especially for power ratings below 15kW. It is ideal for simple applications and widely used in air cooled condensers.

Optional accessories

Back stop or anti-rotation device

The use of a back-stop prevents the fan from turning in the reverse direction, which can cause belts to break or overload of the motor current.

Accelerometer

This device is used to periodically check the vibration level: vibration measurement gives a good indication of the condition of the installation. It is therefore recommended to check these measurements frequently.

Vibration switch

The vibration switch is a device that operates directly (stops the motor) if the vibration amplitude is abnormal.

OUR SERVICE IN THREE WORDS: PEACE OF MIND



START-UP SERVICES & ONSITE SERVICES

We ensure that our products are delivered safely and are fully validated to give a robust and reliable performance over as long a life cycle as possible.

And should you encounter a problem with your equipment after it is fully commissioned, our team of experienced Field Service technicians is at your disposal to come to your site to investigate and correct any malfunctions.

- ▶ Design, manufacturing, delivery, erection, commissioning of revamped AFC
- ▶ Supervision of construction on site
- ▶ Commissioning assistance
- ▶ Assistance to erection sub-contractor



SPARE PARTS AND SPARE PARTS SOLUTIONS

Even the best equipment shows signs of wear over time. We use only the highest quality spare parts, designed to match the excellence of the originals. This ensures that the optimum interaction between components is maintained.

By safeguarding the original design, we offer maximum security of your investment.

- ▶ Spare AFC and ACC bundles
- ▶ Spare finned tubes
- ▶ Design, manufacturing and testing of spares done in-house
- ▶ Spare trade parts (fan, belt, rings ...)
- ▶ Certified interchange-ability of spare parts



MONITORING, CONSULTING & TRAINING

Knowledge of the equipment's condition allows you to secure reliable production, improve safety and energy efficiency, increase equipment lifetime and prevent breakdowns.

We offer consultancy services that take into account the special features of your process, making use of our profound design knowledge of heat exchange equipment. And we work closely with you to develop the exact solution that is best tailored to your needs.

- ▶ Thermography
- ▶ Process temperature analysis
- ▶ Noise pressure testing
- ▶ Vibration analysis
- ▶ Airflow testing
- ▶ FAN RPM
- ▶ Power consumption
- ▶ AFC thermal performance control
- ▶ CFD modelling



REPAIRS, OVERHAULS & MAINTENANCE

Unscheduled downtime can be disastrous. That is why our trained engineers are ready to respond quickly in case of an emergency, and review and repair components while keeping any disruption to your production to a minimum. Any overhaul work is carried out quality-oriented in our service centers or on your site with the supervision of our qualified staff.

Regular inspections and maintenance help to reduce costs, extend the lifetime of your Kelvion products and achieve reliable performance.

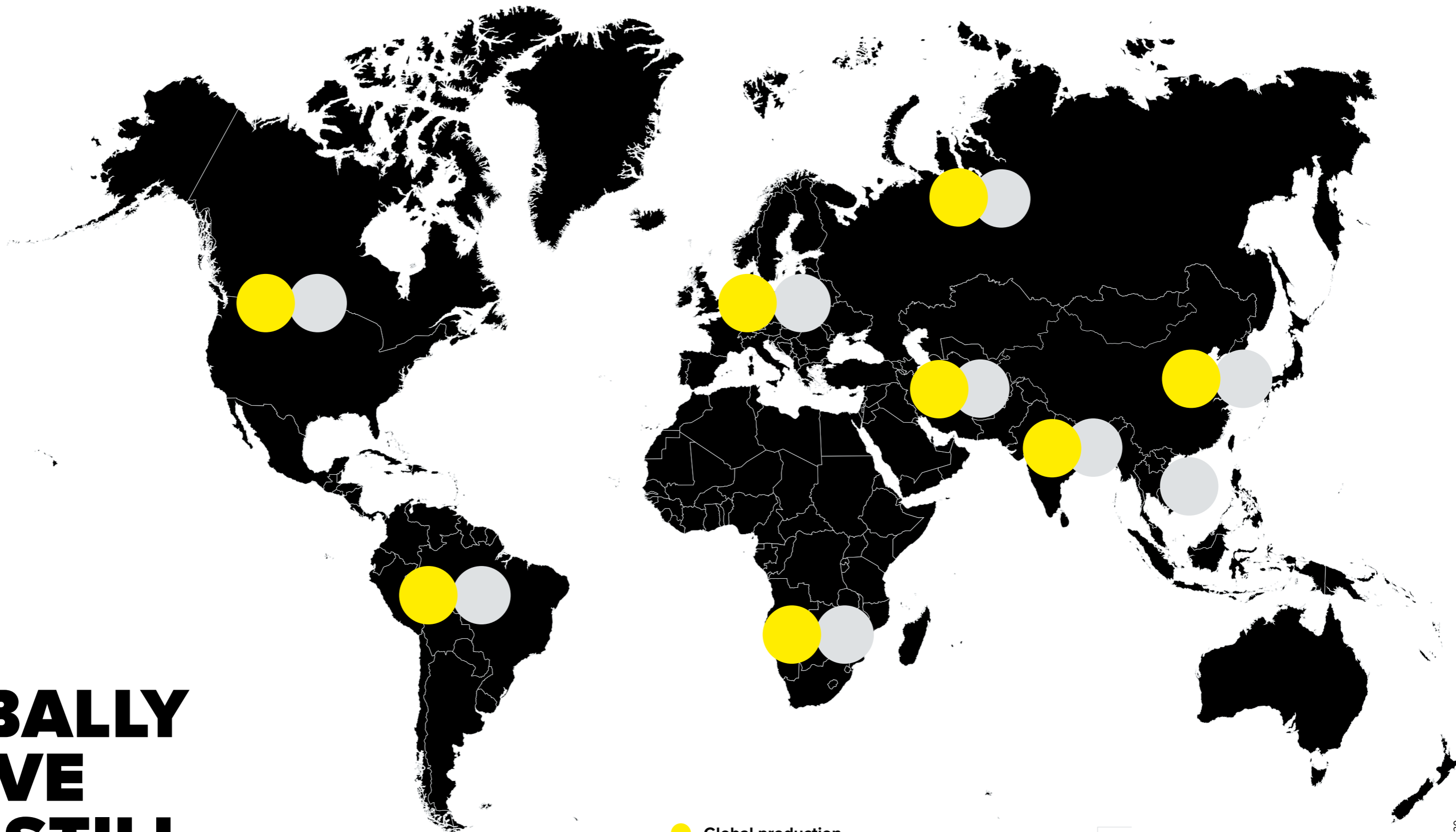
- ▶ On-site diagnosis Overhaul
- ▶ MTBF improvement
- ▶ Preventive & corrective maintenance
- ▶ Cleaning



UPGRADES AND REPLACEMENTS

We replace components to keep our heat exchangers running smoothly and to prevent downtime. Where parts or components have become obsolete due to age, we will suggest a suitable upgrade. In these cases, we can often also suggest new, state-of-the-art technology which additionally enhances the performance and reliability of your process.

- ▶ Analysis and assessment of performance bottle-necks
- ▶ MTBF improvement



GLOBALLY ACTIVE AND STILL CLOSE BY

No matter where your market is, 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 largest, most successful project begins with an initial, profitable 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 – there you will find a highly competent contact in your immediate vicinity.

www.kelvion.com