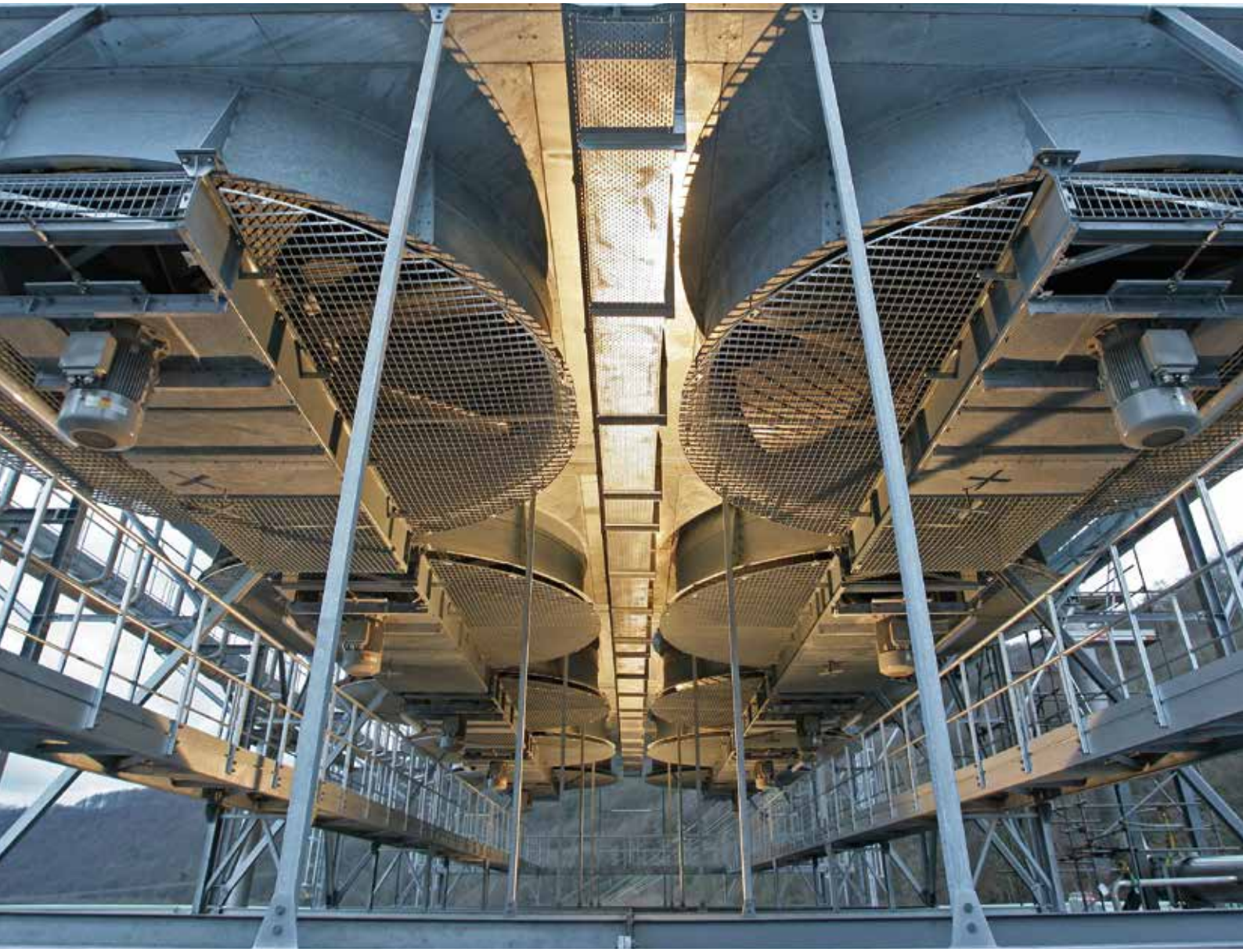


Air-cooled heat exchangers

Cutting-edge technologies for individual solutions



Benefiting from the HX factor: Focussed competence and excellence in heat exchanging

Efficiency and sustainability are standards. GEA Heat Exchangers (HX stands for heat exchange) offers you more. Because we have the HX factor. Everyone at GEA has it. Every team. Every employee. It can be found in all our products and services. It makes the difference. And gives you the edge in heat exchanging. Thanks to engineering know-how based on market experience and expertise. With skills and understanding leading to the right solution even in the most complex projects. With reliability in every situation. With enjoyment of the challenge. With commitment, foresight and precision. This is all a part of our HX Factor. Experience it. Benefit from it.

Your requirements define our solutions

Wherever cooling processes are required within your industrial production facilities, we regulate it all to a precise temperature. Oil, gas and chemicals, steelworks and power stations, from paper to textiles – GEA provides you with individual solutions throughout the world:

- Air-cooled heat exchangers and condensers
- Heat exchangers with galvanized finned tubes

Our company was founded in 1920. In the meantime, we are active in engineering and manufacturing around the globe as part of the GEA Group and integrated in an international network of up-to-date production locations.

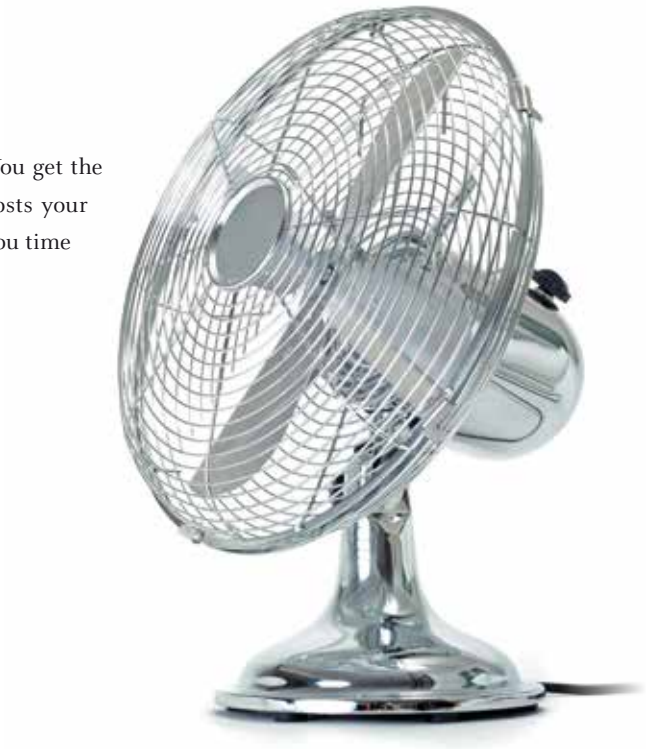
Our portfolio includes all air cooler designs for all applications, starting with simple components and ending with complex process engineering. Your benefits include: manufacturing quality, economic efficiency and flexibility – a winning combination in terms of efficiency.

The best solutions for your needs are ours.

When it comes to air cooling, we have more than one string to our bow for you. Feel free to have high expectations of us – we are on the same level.
Our range comprises the most varied finned tube types and every conceivable header design in all materials or material combinations as well as complete service packages. Our delivery includes the benefits of a technology leader with a complete range of services:

- reliable: preliminary and feasibility studies innovative: own research and development
- precise: measuring of vibrations, thermal and acoustic power
- selected: material and manufacturing quality
- experienced: familiar with industrial requirements
- productive: application-related solutions
- profitable: energy-efficient air cooling
- complex: from engineering to commissioning

You can have it all or make your choice. So you are flexible. You get the solution you want because we speak your language. This boosts your competitiveness. We are never far from wher you are. Saving you time in the long run.





One feature of our quality: Your satisfaction

GEA air coolers often have to prove their worth under extreme conditions and guarantee reliable operation. This is why a team of experts including engineers, welding experts and other quality inspectors scrutinizes every apparatus and every single component very precisely. This procedure ensures that we meet all quality requirements. And we achieve this in complete control as numerous certifications demonstrate.These certifications comprise both the safety requirements according to international pressure vessel regulations PED 97/23/EG, EN13445, ASME (U-Stamp) and special certificates for the Chinese (SQL) and the Russian (GOST) market. As we also install and commission our plants if you want us to, our installation department is comprehensively trained in all aspects of occupational safety. Our confirmation: the SCC Certificate (Safety Certificate Contractors).



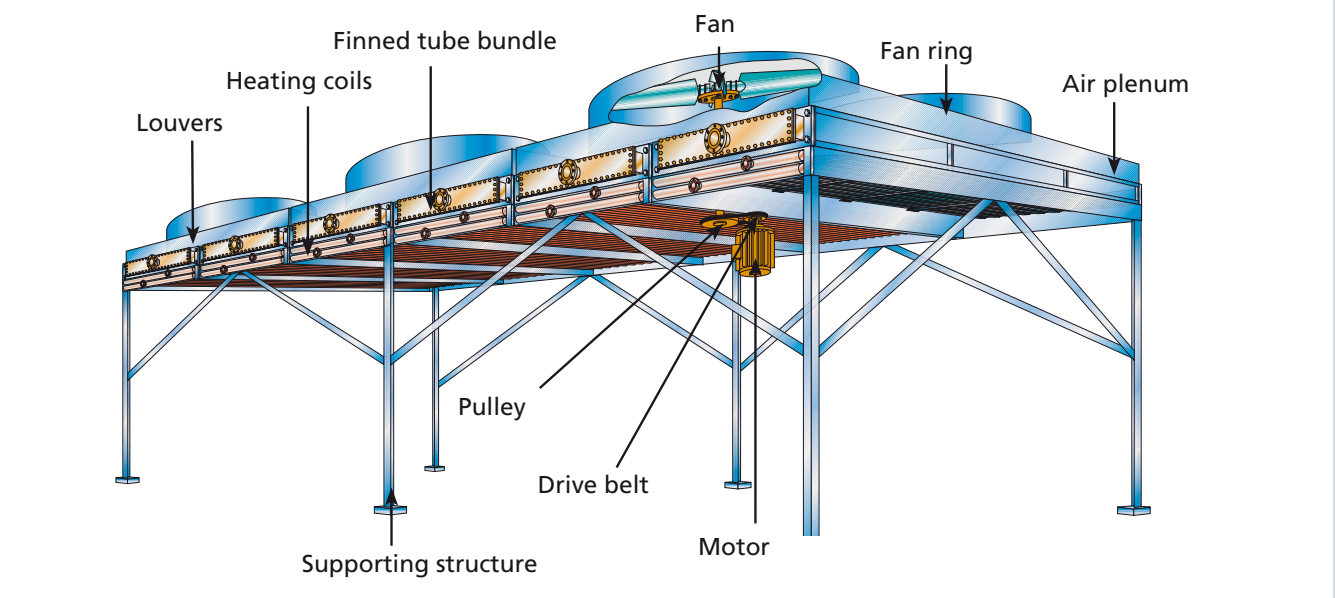
GEA air-cooled heat exchangers – always in the right place

Wherever cooling is required in production processes – we offer you the optimum air cooler for your application:

- Refineries
- Petrochemistry
- Steelworks, steel industry
- Gas facilities
- Power stations
- Other industrial cooling applications

Inspired by the efficiency concept.

Designed for maximum performance.



Air cooler bank

The air cooler bank essentially consists of finned tube bundles, fan rings, axial fans with suitable drive units and a supporting structure. It can be equipped individually with maintenance platforms, louvers and other equipment as requested by the customer.

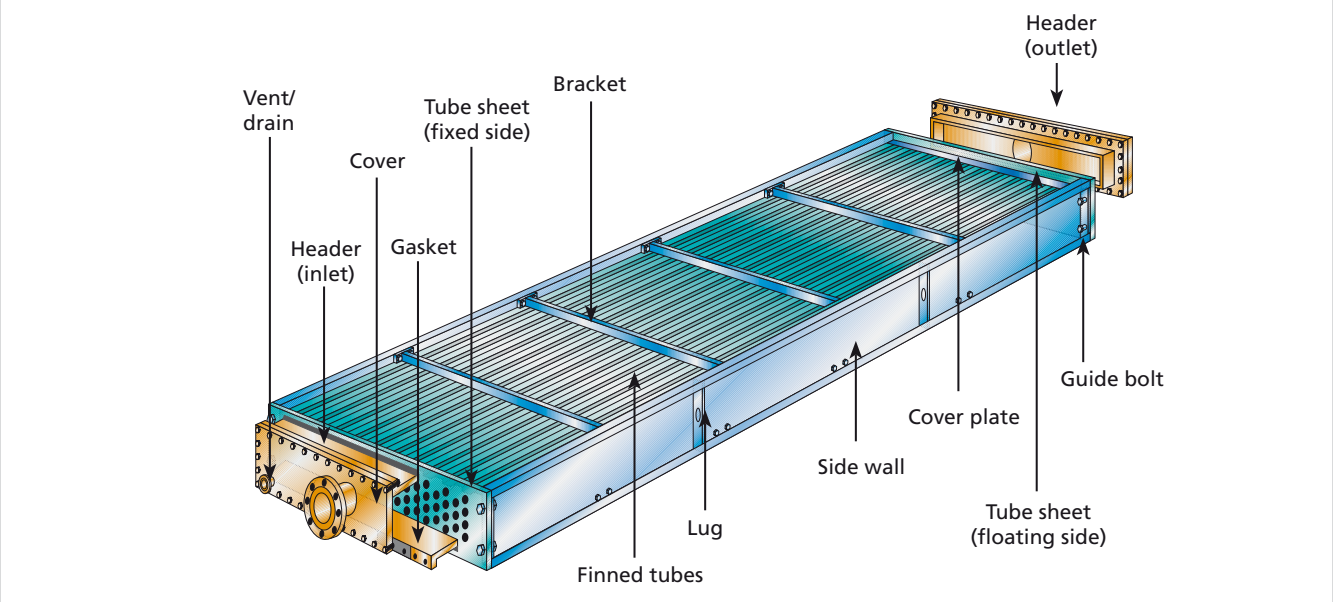


GEA constantly underpins its technological leadership with new product developments. This includes special high-performance finned tubes with optimized material and design, enabling clearly more efficient heat exchange. This pays off for you in two ways. The investment cost is reduced and you save in operating costs. Both benefits can be achieved while enjoying high-level product reliability even under extreme conditions.

In addition, GEA offers you a choice you rarely find elsewhere – the choice between aluminium fins and steel fins on the finned tube systems. Both variants have specific benefits.

Finned tube bundles with aluminium fins are considerably more lighter, are insensitive to soiling and easy to clean. On the other hand, systems using galvanized steel offer a very long service life of up to 30 years, are extremely resistant to mechanical influences such as hailstorms and provide optimum corrosion protection as aluminium.

Depending on your specific requirement: GEA air coolers are oriented towards the respective process requirements and the particular features of the location. Regardless of design characteristics, unhindered air feeding and discharge must be ensured. Where space is at a premium, roof structures are used.



Finned tube bundle

A finned tube bundle consists of finned tubes (in special cases unfinned tubes are also possible), the headers for distributing the product and a supporting frame.

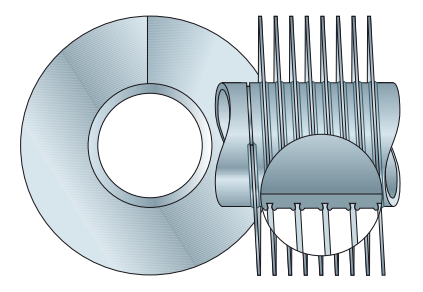
Air coolers are used in fundamentally different and sometimes extremely difficult ambient conditions. This refers to both production processes and climate-related conditions. What is needed are designs that are up to these requirements at any time, while also taking the customers' wishes into account.

From the very beginning, our experts have designed and realised the most varied units for all branches of industry. Multi-faceted experience combined with an eye for everything that is feasible produce solutions which integrate perfectly into your industrial production.

Where special solutions are called for

GEA develops suitable special designs for the specific applications of our customers. Circulation air coolers, acid coolers with anode protection system, high-pressure coolers with baffles or welded lip seals up to wind tunnel coolers – we manufacture what you need. And how you need it, e.g. as a roof-mounted unit with forced draft or as an in-line unit with induced draft. To achieve successful solutions, we also use the golden mean with the GEA evaporation air cooler which combines the benefits of a dry air cooler with those of a wet cooler.

Finned tubes in detail



Groovy Fin tube type

Product benefits:

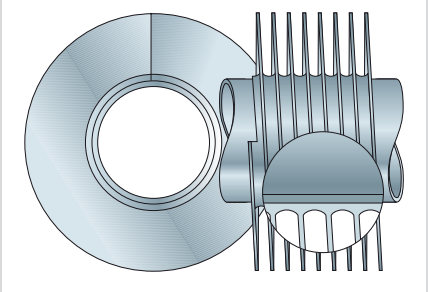
- new patented high-performance finned tube, pioneering technology
- resists high loads, both thermally and mechanically
- extremely dimensionally stable
- hardly any maintenance is required – maximum reliability
- optimised surface, less fans – clearly reduced energy consumption
- less space required, less cabling – less installation effort
- economically very profitable – saves labour, material and costs

Design:
The fin strip is subject to tensile stress and inserted into a pre-shaped spiral core tube groove and firmly rolled into the groove in a rolling process using high pressure. The displaced material is then pressed on the fin side.

Fin material: aluminium

Core tube material: all materials which can be easily machined.

Maximum operating temperature: 400°C



Extruded tube type

Product benefits:

- compared with similar fins, extruded fins consist of more than 40% more aluminium, thus the core tube is very well protected against atmospheric corrosion
- very sturdy design – resists mechanical damage very well
- easy to clean with steam or water
- different core tube materials for different requirements – can be used with almost all chemically aggressive media

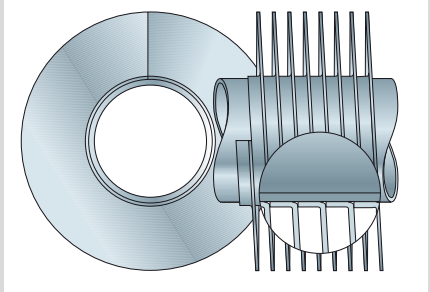
Design:
The fins are rolled from a hollow blank tube slid over the core tube. In this process, the inner diameter of the hollow blank tube is reduced and at the same time, the tube is pressed on the core tube.

Result: a mechanically solid joint with good heat transfer properties

Fin material: aluminium

Core tube material: all metal materials

Maximum operating temperature: 300°C



L Fin tube type

Product benefits:

- large contact area between tube and fins enable good heat transfer
- developed for low temperatures necessitating a certain corrosion protection of the tube wall

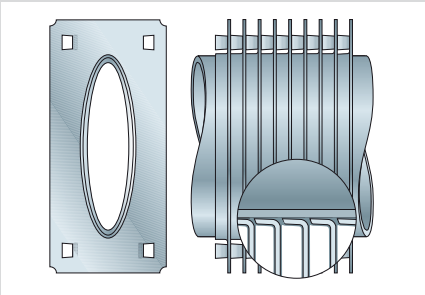
Design:
The fin base is pre-shaped to form a L and wrapped around the core tube while applying tensile stress. Every fin has contact with an adjoining fin. This protects the core tube when handling less aggressive media. In addition, the manufacturing process enables the use of relatively thin-walled core tubes.

Fin material: aluminium

Core tube material: All metal materials can be used.

Maximum operating temperature: 130°C

The economic profitability of an air-cooled heat exchanger depends on the capacity of the finned tubes. The capacity results from the transfer of the maximum heat exchanged in the smallest possible space while keeping thermodynamic losses on the air side low.



FE/KE/AE tube types

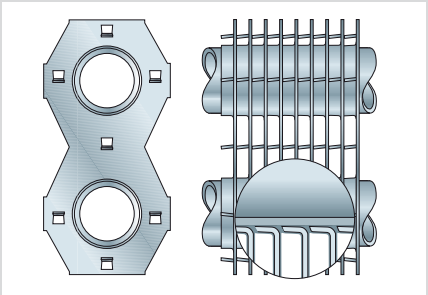
Product benefits:

- the elliptic shape enables excellent thermodynamic properties
- less vortex formation results in reduced pressure loss on the air side
- additional baffle surfaces/turbulators achieve very good heat transfer coefficients
- rectangular fins ensure that the face area remains small and that the design volume is used optimally
- wide galvanized fin collar for excellent heat transfer and absolute insensitivity to thermal and mechanical loads
- galvanization in a dipping bath provides optimum corrosion protection
- easy to clean with high-pressure water

Design:
The fins are punched first and then automatically installed on the tube, followed by complete galvanization in a dipping bath.

Fin material: Steel
Core tube material: Steel / stainless steel

Maximum operating temperature: 360° C



XE tube type

Product benefits:

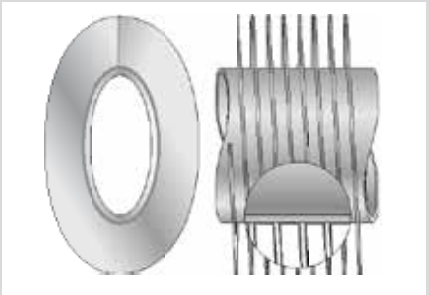
- special design for high pressure ratings and restricted space
- the excellent properties of galvanized tubes with steel fins are combined with the geometry of round tubes, resulting in high rigidity
- reduced size due to design featuring two tubes in one fin
- easy to clean with high-pressure water without damaging the fins.

Manufacturing: similar to FE tube

Fin material: Steel

Core tube material: Steel/stainless steel

Maximum operating temperature: 360 °C



PI/HI tube type

Product benefits:

- thermodynamic properties and air-side pressure losses are similar to the FE tube type
- larger clearance between the elliptic core tubes for applications with increased soiling hazard – provides good cleaning possibilities
- is preferably used for combustion air heaters and air coolers

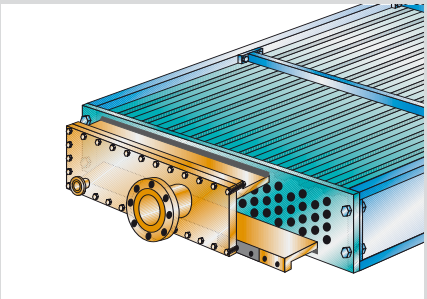
Design:
The steel strip is wrapped around the core tube as a spiral. Subsequent hot-dip galvanizing ensures heat transfer and corrosion protection.

Fin material: Steel

Core tube material: Steel/stainless steel

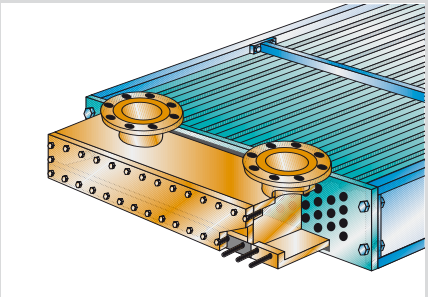
Maximum operating temperature: 360 °C

Headers in detail



Cover plate header with through bolts

This header version has a removable cover to enable easy inspection and cleaning of the inner tube walls. For inspections it is generally sufficient to remove only a manifold because this already offers a partial view of the tubes through the nozzles.

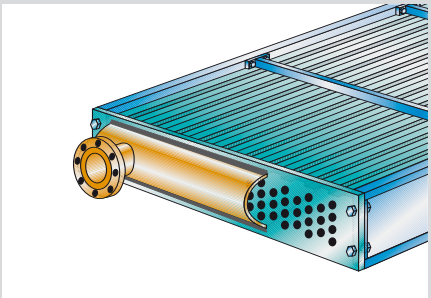


Cover plate header with stud bolts

In this version, the nozzles are arranged at the top and at the bottom. The benefit: 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. GEA can manufacture special versions for all applications beyond this range.

Both cover plate versions have either welded-in or rolled-in tubes.



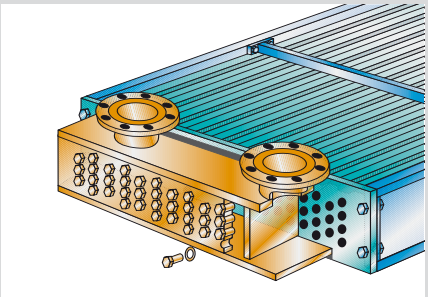
Welded header (D type)

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.

Depending on the header version, the tubes are either welded or rolled into the tube sheets.

Different header designs are available for the different applications and requirements.

The specific feature: GEA headers are available in all material types. They can be used in all pressure and temperature ranges and therefore predestined for various media and marginal conditions.

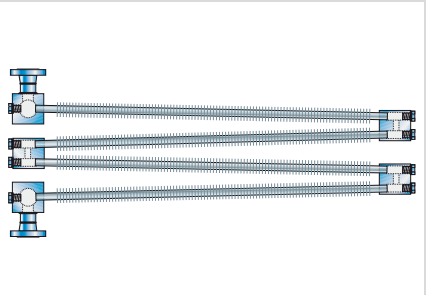


Plug-type header

Here the tubes are usually rolled into the plug headers; in special cases, they are directly welded into the tube sheets.

A threaded plug with a soft iron seal is provided opposite every tube; this seal can be easily removed for re-rolling or internal cleaning of the tubes. As the nozzles are fitted at the top or bottom of the header, dismounting the tube connections is not required for inspections and cleaning.

The header design can be used even at high pressure levels.



High-pressure header with return segments

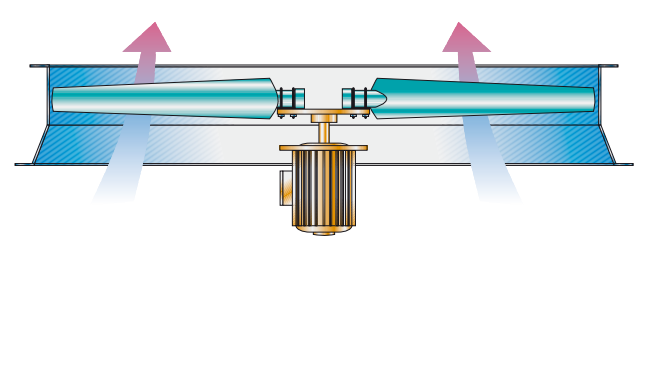
A threaded plug with a soft iron seal is provided opposite every tube. This plug can be simply removed for re-rolling or for internal cleaning of the tubes.



High-pressure header with welded return bends

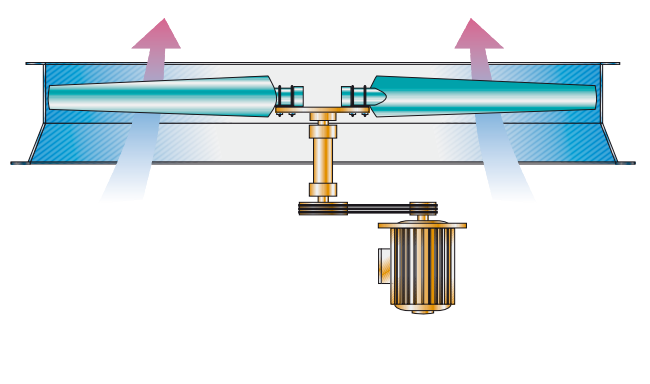
This high-pressure header, just as the variant with the return segments, is perfectly suited for high temperature differences as the finned tubes expand individually.

Fan drive details



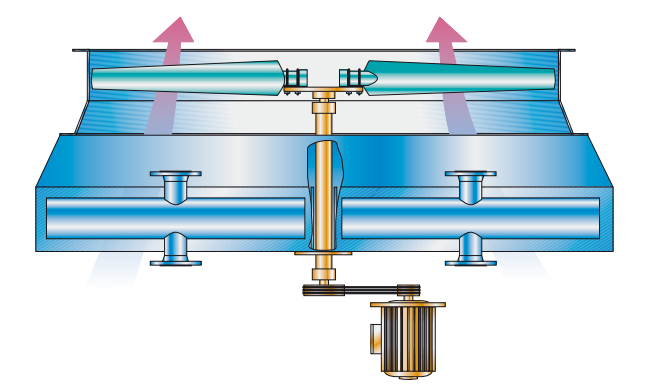
Direct drive

The fan is fitted directly to the motor shaft, using a flange. Fan speed and motor speed are identical.



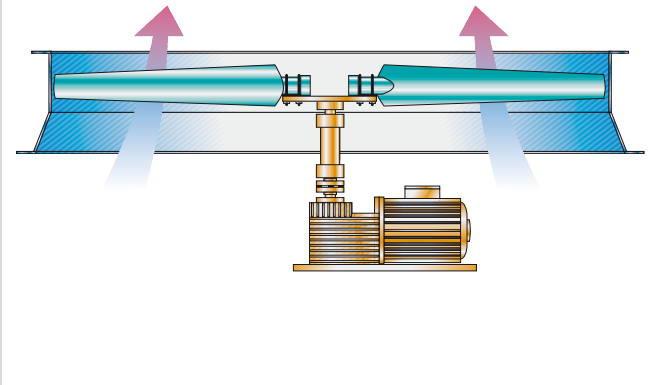
Belt drive for forced draft configuration

This version uses pulleys for reducing the motor speed to the required fan speed.



Belt drive for induced draft configuration

When waste air temperatures are low, the motor can also be installed above the bundle.



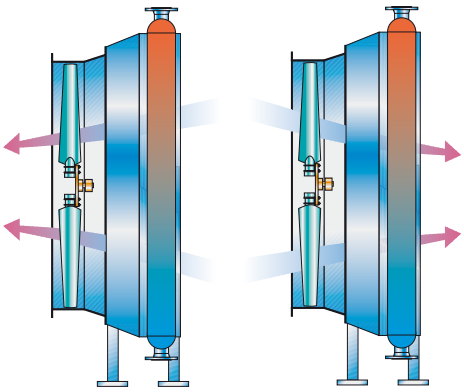
Gearbox drive

This drive includes a fan joined directly to the output shaft of the gearbox motor.

Different versions, one common feature: GEA air cooler fan drives are convincing with their high degree of reliability and their low vibration level. They are available in various diameters and offer infinitely variable speed control, depending on the version.

Configurations

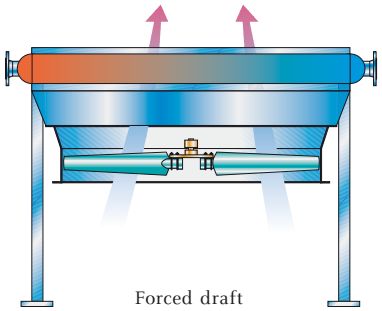
Vertical configuration



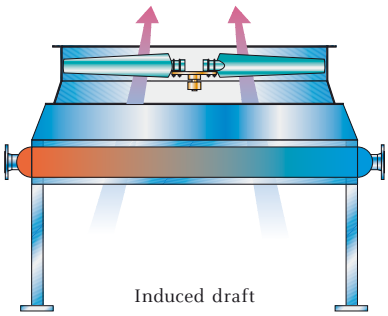
Induced draft

Forced draft

Horizontal configuration

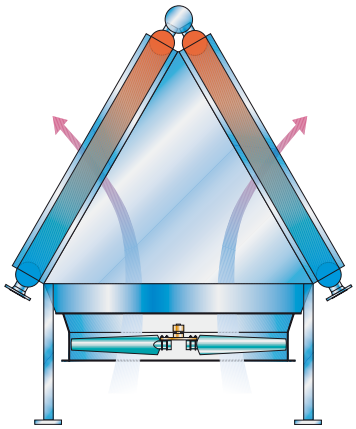


Forced draft



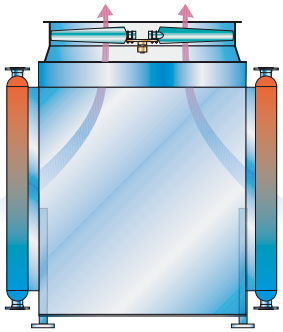
Induced draft

Roof-mounted configuration



Forced draft

In-line configuration



Induced draft

GEA offers numerous different air cooler versions in order to meet differing requirements of the process and the place of installation. Regardless of the selected design, free air feeding and discharge must be ensured. Where space is at a premium, roof-mounted configurations are frequently used.



We are adapting – to low-noise

Our inventive genius is inspired in particular in two ways. One way is to create efficient industrial solutions with customized products which pay off for our customers in every respect. The other way is to play a leading role also in environmental matters, using advanced technologies. There is a lot at stake here – to make less noise. Because, apart from examples where a roaring engine is a matter of good taste, the trend with automobiles indicates that the general direction is towards noise reduction.

Apart from the dB(A) measuring unit indicating sound pressure level, factors such as the duration of the noise, time of day or frequency also serve for classifying and evaluating so-called acoustical events such as traffic. From 40 dB(A) and above, sound sources can affect communication, from 65 dB(A) health risks start appearing, from 85 dB(A) there is an unpleasant pressure on the ears, and from 120 dB(A) noise becomes unbearable.

The example of a passenger car: At a distance of 10 metres, the sound pressure level is between 60 and just under 80 dB(A). This value is equal to the former industrial standard at a distance of 1 metre. When converting this to 100 metres, this value is 55 dB(A) which is roughly equal to moderate volume.

The good news: We can make even less noise. Which is of particular benefit in steel plants, refineries or natural gas compressor stations in the framework of network extensions where GEA air coolers are used.



A technological leader such as GEA has only one goal – stay at the top. So we are not revealing any secrets when we talk about considerable investments in research and development. A part of this has been used for soundproofing which, of course, you will hardly hear.

If your industrial location is quite close to residential buildings or near a town, you know the permitted threshold values in decibels. These conditions require soundproofing measures for machinery and plants. When requirements are strict today and a medium-size plant is involved, the standard is only 57 dB(A) at a distance of 1 metre, equalling 35 dB(A) at 100 metres. Anyone living in such surroundings may count himself absolutely lucky.

GEA offers you solutions with the necessary noise levels, all of which comply with existing threshold values. The special soundproofing of the electric motors in frequency converter mode is ensured by an encapsulation which also supplies the electric motor with a sufficient amount of cooling air.

This low-noise drive has even more benefits to offer. Low speeds and a lower air throughput reduce energy consumption, which improves profitability. Moreover, this opens up another source for cost reductions – the health of your employees. And you can't put a price on that.

Your investments are in good hands



GEA is the specialist for air-cooled heat exchangers and plays a leading role in industrial applications, innovative development and worldwide use of this technology. GEA stands out as a partner for design, execution, planning and service of customized solutions. The GEA air coolers service applies this knowledge and these skills in a goal-oriented and powerful department.

A team of highly qualified fitters and technicians ensures optimum plant performance, preventing damage and plant standstill and supporting our customers with additional expertise and labour. The GEA air coolers service is the partner to contact for comprehensive services tailored to your needs.

Safety as well as responsible handling of health and environmental protection standards during installation and servicing have always played an important role in our company. The GEA air coolers installation and service department has been awarded a SCC Certificate in May 2002. This certificate issued by TUEV Cert Certification Agency for Management-Systems of the RW TUEV documents that safety is a declared company objective and that GEA employees are continuously trained in safety, health and environmental issues and are recurringly examined by an independent institution. The certificate has a duration of 3 years after which the examination is repeated.

The strong points of a market leader are implemented in competent and quick service. The range of services is detailed below:

- Regular plant inspections
- Preventive maintenance
- Performance checks and improvement of existing plants
- Adaptations for reasons such as meeting noise reduction requirements, increasing capacity or complying with stricter environmental requirements
- Replacement and overhaul: modification of cooling components, depending on the customer's wishes
- Procurement of spare parts and special tools
- Support of plant operators in planning and implementation of standstills

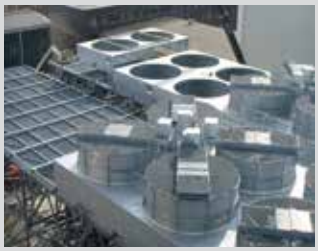
- Independent execution of work during standstill periods, from planning through to commissioning of air coolers
- Consulting in case of problems with air coolers
- Elaboration of customer-oriented special solutions for maintenance and conversions of existing air coolers – with the goal of avoiding or minimizing production downtimes
- Complete installation of air coolers and their components from planning through to commissioning.
- Provision of control personnel for service and installation.

The genuine spare parts and special tools we use enable smooth plant operation, even after many on-stream hours. GEA Luftkühler GmbH spare parts service delivers all spare parts and tools required for air cooler systems as quickly as possible.

No matter if you use the service on a regular basis or occasionally, as a supplement or a substitute for your own technical service, for GEA plants or plants of other manufacturers: The GEA air cooler service for dry coolers offers tailor-made service agreements to suit your needs.



Automated outside cooler cleaning.



Installation of air coolers, Vattenfall, Berlin.



Air cooler with an automatically travelling cleaning platform



Maintenance work on fans.



Air cooler maintenance platform.



Various spare parts.



Repair welds on a leaky tube bundle.

Your partners for air-cooled heat exchangers throughout the world

We are there, whenever and wherever you need us

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Sales/Service

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