

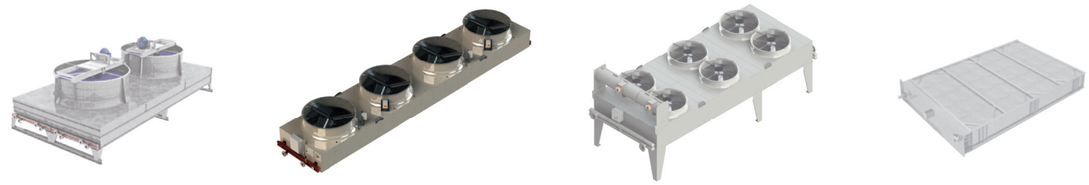
GEA Energy Modular Compact Radiators with HX-Factor

Maximum efficiency with reliable heat transfer for power plants



Heat exchange with HX-Factor

The HX-Factor is our promise. It stands for our unique expertise in heat exchange (**HX** = **H**EAT E**X**CHANGE) and ensures a wide range of product benefits for you. Like with GEA Energy Modular Compact Radiators, our top quality products with highest modularity and flexibility. They offer best performance and efficiency for a competitive price.



The new standard in heat transfer

GEA Compact Radiators for the energy industry

Worldwide leading in heat exchange

As an internationally active technological group, GEA group concentrates on process technology and components for demanding production processes in a wide variety of end-user markets. GEA Heat Exchangers, the largest segment within GEA Group, consolidates all the activities in the area of heat exchangers and comes with probably the largest portfolio in this field worldwide. Heat exchange with HX-Factor: That means customized, reliable and sustainable solutions conforming to the signs of the times. GEA Compact Radiators prove this quality and innovative strength.

GEA Energy Modular Compact Radiators (EMCR)

GEA Energy Modular Compact Radiators (EMCR), top quality products with competitive price and short delivery times, offer an improved product range developed to match the technical requirements of the main players in the large diesel engine market. With a basis of 40 years of successful applications, even more-advanced technologies now ensure reliable performance in heat transfer and ventilation, with increased efficiency similar to that of Customized Compact Radiators. Our range of pre-specified Compact Radiators enables us to be highly proactive with respect to delivery deadlines – and enables us to offer an optimized cost-benefit ratio. This improved product range is dedicated to large stationary diesel or gas engine power plants that offer medium to high cooling capacity engines > 2.5 MW. The GEA EMCR product range impresses through a reduced noise level and low power consumption and uses horizontal induced-draft design, with single- or double-bank configuration (HT/LT). Motors and fans are fully dedicated to diesel or gas engine power plants. All components of the GEA EMCR range are standard items, and outsourced repetition with a long delivery time are put on stock to ensure ad-hoc availability. Only a limited range of outsourced components (fans, motors, etc.) have been selected; they ensure, however, price-worthiness based on ordering large quantities of similar components. Standard quotes are delivered within three days, including 3-D drawing. The high modularity of the product range ensures sizing as close as possible to the customer's needs. A wide variety of dimensions is available, with an extensive selection of lengths, two widths and various bundle characteristics. The selection of optimized solutions is possible with dedicated software. Internal manufacturing in 4 plants – located in France, UK, Poland and China – allows a maximum of flexibility.

Dimensions and configurations

Width	Fan diameter	Module length (1 to 6 modules)	Radiator length
2,200 mm container size	1,250 mm / 4'	1,700 to 3,000 mm	max. 13,500 mm max. 11,500 mm
2,700 mm large duties	1,250 mm / 4' 1,829 mm / 6'	1,700 to 3,000 mm	max. 13,500 mm

Compliance to codes and standards

Pressure vessel

- PED article 3.3

E-motors

- Low voltage
  European directive 2006/95/CE
- Electromagnetic compatibility
  European directive 2004/108/CE

Radiators

Requirements of the machine directive, including

- Grid type and position of fans, equipped with safety screws
- Safety switches on fan rings
- Machines
  European directive 2006/42/CE

Fans

- ERP 2013 regulation available

ErP ready

Optional solutions for smooth continous operation

GEA EMCR product range

Benefits from large dimensions

- 2,700 mm wide bundles with less tube rows enables:
  - Higher heat transfer coefficients
  - Reduced pressure drop (external)
- Larger fan diameters:
  - Low velocity pressure thus less power consumption
  - Increased efficiency
- Implementation of larger tube diameters to reach lower internal and external pressure drop

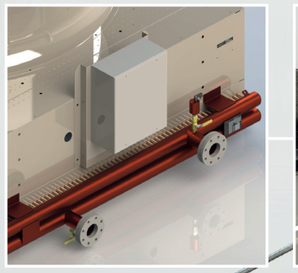
Main criteria for low noises from the EMCR range

- Bundles width:
  - Increased HTC and low ΔP
- Large fan diameters equipped with elliptical inlet bell:
  - Lower velocity pressure
  - Less fans means less noise sources
- Low speed motors and VFD control
- High efficiency fan blades profiles
- High efficiency fins with fin pitch up to 4.0 mm for low ΔP

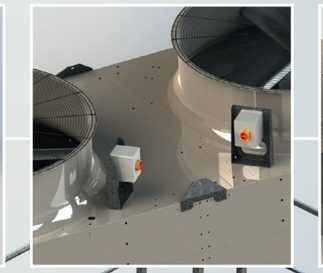
Reduced effort and easy installation

The electrical connections between the junction boxes and the motors are made by GEA. This plug & play solution reduces work at site and allows an easy and quick installation. Besides, armoured cables will be used for VFD control of the fans.

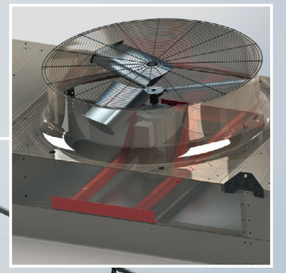
Junction box

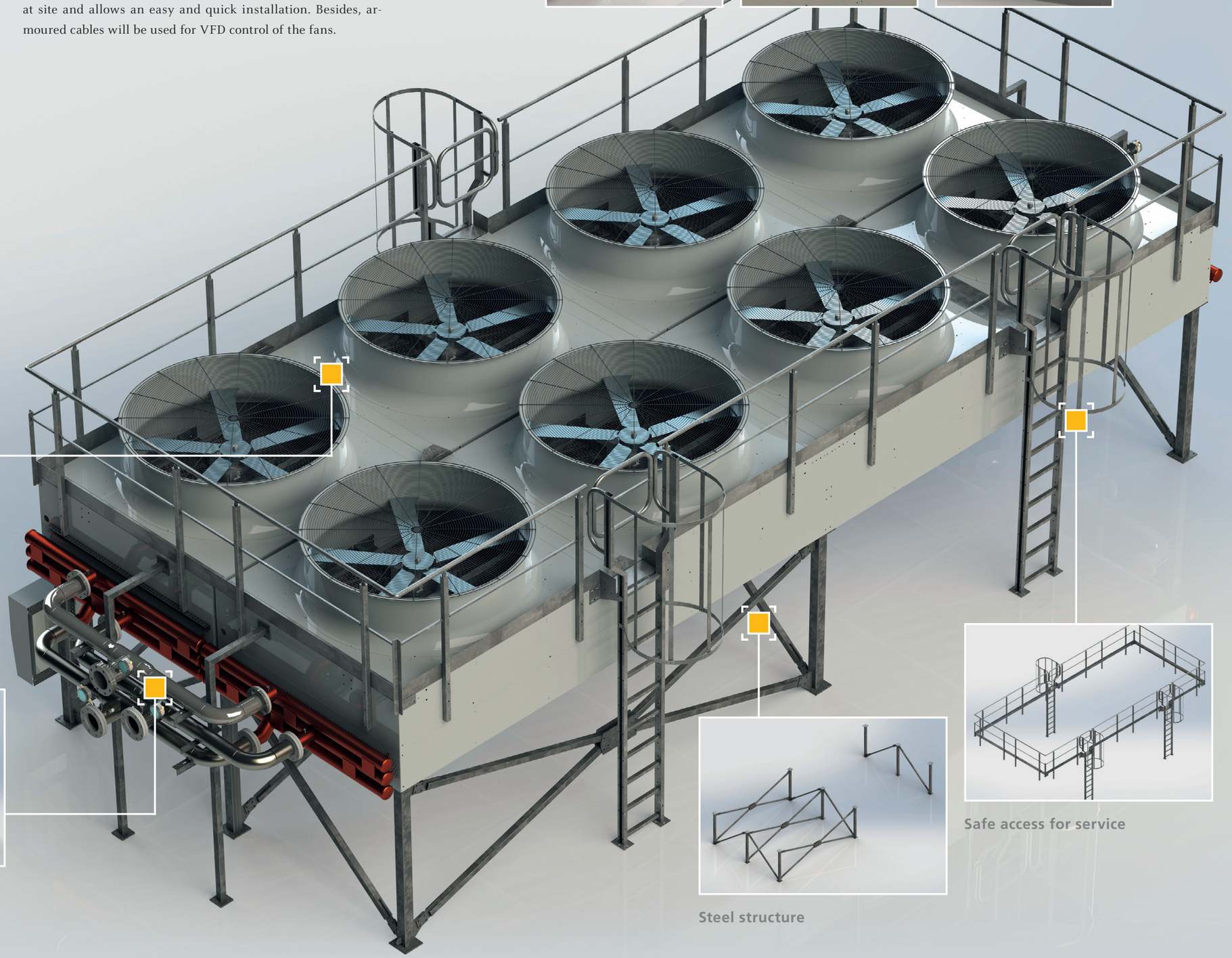


Safety switches



E-motor and fan







Anti-slippery horizontal fan deck free of any obstacle. Lifting lugs removed after installation.



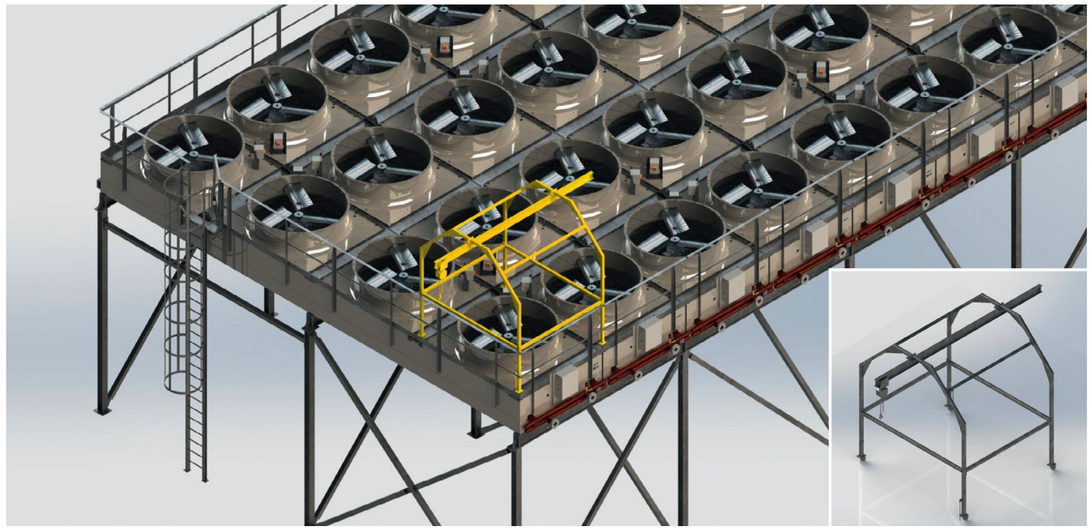
Inter-connection piping

Steel structure

Safe access for service

Technology and functionalities

Main components and optional items



Structural components and assembly principle

Main components and standard configuration

- Induced draft only
- Directly driven fans suitable for VFD control
- Fans, motor types and dimensions limited to the range
- Max. 8 tube rows for single circuit cooler
- Max. 6 tube rows per circuit for double circuit cooler

Optional equipment

- Steel structure
- Handrails and ladders
- Piping and accessories
- Water spraying system
- PTC probes on motors
- Junction boxes, cables and MCC
- Safety switches on fans

Seaworthy packing

- SEI3B and SEI4B
- Standard containers (dry and OT types)

Steel structures

- Made of HDG angle beams
- Up to 2 modules between 2 legs
- Mechanical calculation report available on request

Fans access and repair

- Anti-slippery horizontal fan decks free of any obstacles
  - Specific forms punched on the horizontal walking areas
  - Cables located inside the ventilation chamber
- Ladders and peripheral handrail
  - Modular systems made of HDG angle beams
  - Assembled by bolting only
- Crane to lift and replace fans and motors

E-motors – technical characteristics

- Height: 160 or 180 mm
- Rotation speed: 8, 10 and 12 poles
- Insulation class: H/F
- Epoxy painted, tropicalized
- NT-condensation heaters
- Suitable for VFD control (on nameplate)

Heat exchanger – based on S32 and 5S technologies from GEA with:

- Fins: Alu, AlMg or Copper – flat, rippled or turbulated
- Fins thickness from 0.135 to 0.20 mm
- Fins pitch from 1.8 mm to 4.0 mm – tubes to fins bonding made by mechanical expansion
- Copper headers brazed to the tubes
- S32: Triangular tube pattern – staggered layout
  - Copper tubes – Ø12 mm thickness 0.35 mm
- 5S: Triangular tube pattern – staggered layout
  - Copper tubes Ø15.65 mm thickness 0.45 mm

Guaranteed safety

Surface treatment and quality tests

With more than 80 years of experience in the design and construction of heat exchangers, GEA has developed countless types of compact fin tube systems to meet all specific requirements involving media temperature, pressure, noise levels, reduced footprint, vibration, and protective coatings. In partnership with Blygold, GEA has developed a unique automated process to apply a perfectly graduated coating. It protects the compact finned coils against harsh environmental conditions such as erosion by sand or salt. It provides a barrier and avoids the risk of electrolytic reactions between the two metals involved. The coating contains aluminum to maintain the thermal performance of the compact coil, resulting in extension of the lifetime, maximum cooling capacity, and reduction of energy costs. In the event of any incident or shock to the exchange surface, the fins and the film can be repaired on site without changing or even moving the radiator.

GEA advanced ring fin features

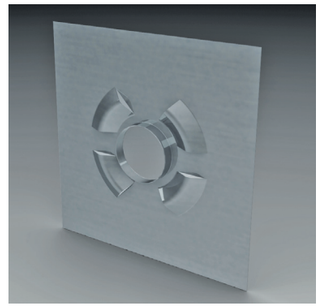
- Market's best ratio efficiency/pressure drop
- Very low sensitivity to clogging risks
- High-tech ring guides the cold air behind the tube
- No obstacle to generate turbulences (louvered fins)
- Technology fully suitable for all industrial environments
- Extensively and successfully used for more than 30 years in power generation all over the world

Surface treatment for normal conditions

- Casing and fan rings: Z275
- Structural steel and access: HDG to ISO 1461
- Motors: 50 µm std supplier
- Headers: Alu HT paint
- Fins: N.A.

Surface treatment for corrosive, chemical and mechanical resistance

- Casing and fan rings: Z275 + coating (Sorabond-C4, C5 or C5M)
- Structural steel and access: HDG to ISO 1461
- Motors: C3 150 µm thick or C5M 300 µm
- Headers: Alu HT paint
- Fins: depending on site conditions (see diagram No. 2)



Patented ring shape



Fin coating

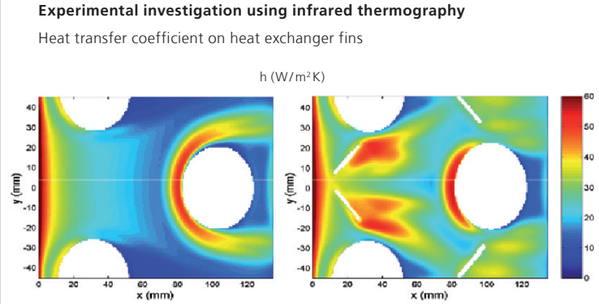


Diagram No. 1: IR thermography

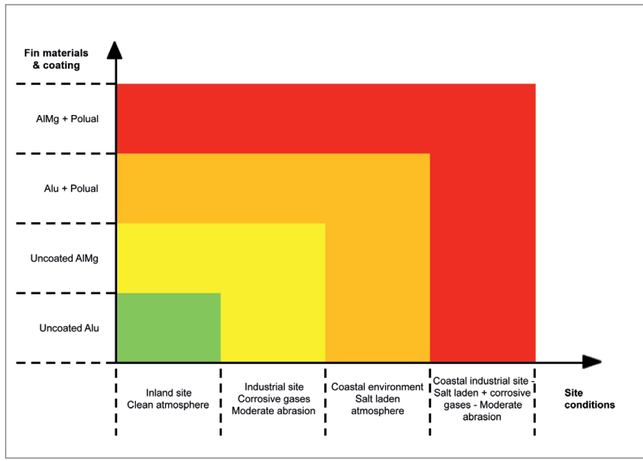


Diagram No. 2: Fin technologies vs site conditions

Standard tests, documentation and reports

- Leakage test
- Vibration tests
- Electrical tests
- Noise measurement on request
- Technical data sheets & MOMs

We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index.

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