AIR BLAST COOLERS

Basic, Premium, High-Grade

ErP 2015

Coiltech® industrial heat transfer

MODINE

A03

TAILOR-MADE COOLERS FOR A WIDE RANGE OF APPLICATIONS

A TRUSTED PARTNER

Modine is a leading manufacturer of coolers for almost any industrial process or application and, thanks to our know-how, tailor-made products and delivery dependability, we are the partner of choice for many of the leading names in the power generation industry worldwide.

Modine´s Air Blast Coolers are the result of many years of experience. We believe that they deliver the highest level of safety, reliability and durability in the market today, to meet the industry's most demanding requirements. With Modine you know your cooling processes are in good hands.

BASIC, PREMIUM AND HIGH-GRADE RANGE

Air Blast Coolers come in three ranges: Basic, Premium and High-Grade.

BASIC - Our Basic range is designed for single cooler installations and to meet the requirements for standard projects or those with few additional specifications.

PREMIUM - Our Premium coolers are designed to handle the demands of the toughest environments, and come with a variety of energy-efficient fan options.

HIGH-GRADE - Our top-of-the-range coolers offer flexibility in material choices and almost limitless scope for customisation.

WHERE QUALITY ALWAYS COMES FIRST

Quality is essential to the success of any project and we know that our customers have high expectations of us. Our focus on quality extends to the entire supply chain, from production to administration. Our work is process-oriented with well-documented procedures and follow-up actions at all stages. On delivery, every product comes with customer-approved dimensional drawings and any other specified documentation.

VERIFICATION

Our pressure vessels comply with European pressure equipment directive PED/97/23/EC. Bespoke projects can be designed according to ASME BPVC Section VIII Division 1 on request. Welding and brazing processes at Modine and our suppliers are certified according to EN ISO 3834-2.
We use Advanced Finite Element Method (FEM) analysis for structural verification and risk assessment.

ISO CERTIFIED

Modine´s management system is certified according to ISO 9001:2008, ISO 14001:2004 and ISO 3834-2:2005.
Following quality documentation can be supplied if requested when ordering our products:

- Final inspection certificate
- Test certificate/inspection plan
- Material list and material certificates
- Motor certificate type test report
- Motor certificate routine test report
- Client specific test report
- Certificate of fan testing
- Product weight certificate
- Sound measurement certificate
- Client inspection – Light/Medium/Heavy
- Painting certificate
- Photo documentation of product
- Insulation test of electrical installation
- Built drawing
- Special testing etc.

Modine´s Management System is certified according to ISO 9001:2008, ISO 14001:2004 and ISO 3834-2:2005.

OUR SERVICE SOLUTIONS

Our team of experienced technicians can customise a maintenance package to suit specific needs, whether we are supporting a complete replacement project or a smaller inspection. *More on page 15.*

A COOLER FOR EVERY PURPOSE

Modine supply Air Blast Coolers for countless applications, ranging from water cooling for large diesel engines to chillers for air conditioning and waste incinerators. Each cooler is designed to meet precise specifications for cooling capacity and noise levels. Customers can choose from our Basic, Premium and High-Grade ranges to find the perfect solution for any project.

BASIC RANGE (SINGLE CIRCUIT)

Modine's Basic range is designed to meet the requirements for standard projects or those with few additional specifications. We select our fans to comply with European regulations for high efficiency and low power consumption. The coolers themselves are designed for single cooler installation and are delivered with high cooler legs. They range between corrosion protection categories C3 and C4 (ISO 12944).
To help create the optimum specification for each project, we have developed our own selection software COILS, which ensures that every cooler is fit for purpose.

PREMIUM RANGE ABCS (SINGLE CIRCUIT)

Our Premium range was designed in response to increasingly tough market demands, from energy efficiency requirements for fans, to protection from harsh outdoor environments. Our Premium coolers can handle the toughest environments and come with a variety of energy-efficient fan options. The cooler casing is designed so that the top of the cooler is service-friendly, with no sharp edges from the casing or lifting lugs on top. The coolers have internal cable trays on both long sides with easy access from the top and the short sides. The roof deck is strong enough to walk on, and the casing can withstand heavy external loads from wind, snow and ice.

Premium coolers can be supplied with a high supporting structure that has a railing around the complete cooler bank and a ladder for easy access to the top. We can also provide service platforms which are mounted on the structure below the cooler bank. These platforms can be accessed either by ladder or by stairs, so servicing can be carried out safely, even on large installations with multiple coolers. Premium coolers range between corrosion protection categories C3 and C5 (ISO 12944).

A variety of accessories can be mounted on or delivered with our Premium coolers.

PREMIUM RANGE ABCD (DOUBLE CIRCUIT)

Following the success of the ABCS Premium range Modine now also supplies double circuit coolers (ABCD). Cooling performance is assured by two individual heat exchangers which are optimised for the specific needs of each cooling process.

The double circuit cooler comes with the same robust casing and structure, design type and corrosion protection as the ABCS Premium. All the optional extras and accessories are also available.

HIGH-GRADE RANGE HGPC

To meet the most complex requirements of the rapidly changing global market, Modine has developed a High-Grade Process Cooler (HGPC) representing the best in class for overall performance.

HGPCs are designed from the same concept as the Premium range but contain highly sophisticated material inside the heat exchangers. They meet the highest requirements for inside cleanliness and cooling water processes, and have the highest possible corrosion protection to guarantee long life and durability.

The water connection box is bolted to the cooler for strength and robustness, and to minimise the risk of damages from external forces on site. HGPCs are designed for high operating water temperatures and can handle thermal expansion of the tubes for coolers up to 14 meters in length.

HGPCs come with all the same optional accessories as the Premium range.

More information about Basic, Premium and High-Grade Range on page 7-10.

COILS SELECTION SOFTWARE

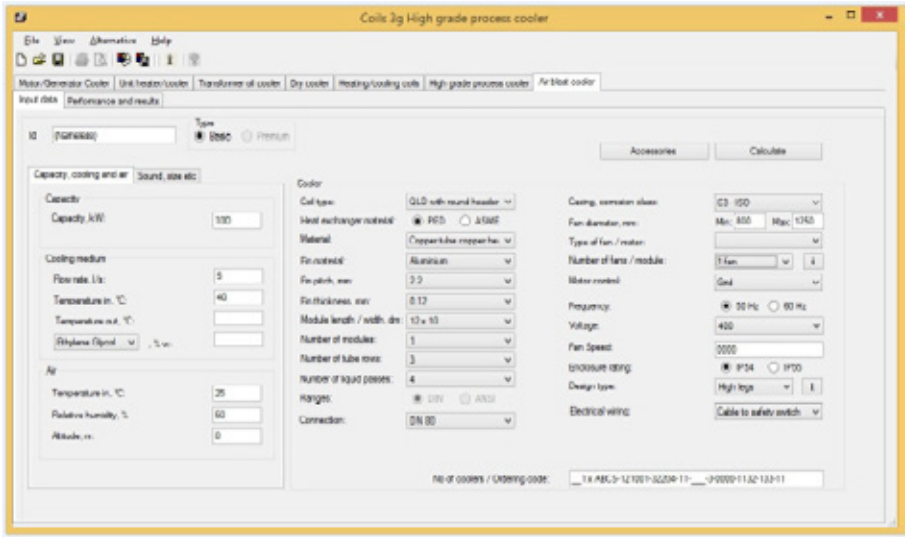
Modine's selection software COILS makes it possible to select and size the ideal Air Blast Cooler for any installation. COILS has been rigorously tested for reliability, and is a highly flexible tool. Output consists of a print-out of technical data and a dimensional drawing of the selected cooler.

To meet the needs of the varied and demanding projects our customers embark upon, our Air Blast Coolers come in a vast range of dimensions and configurations. To help navigate through the options, we recommend using COILS or contacting our sales staff as a first step.

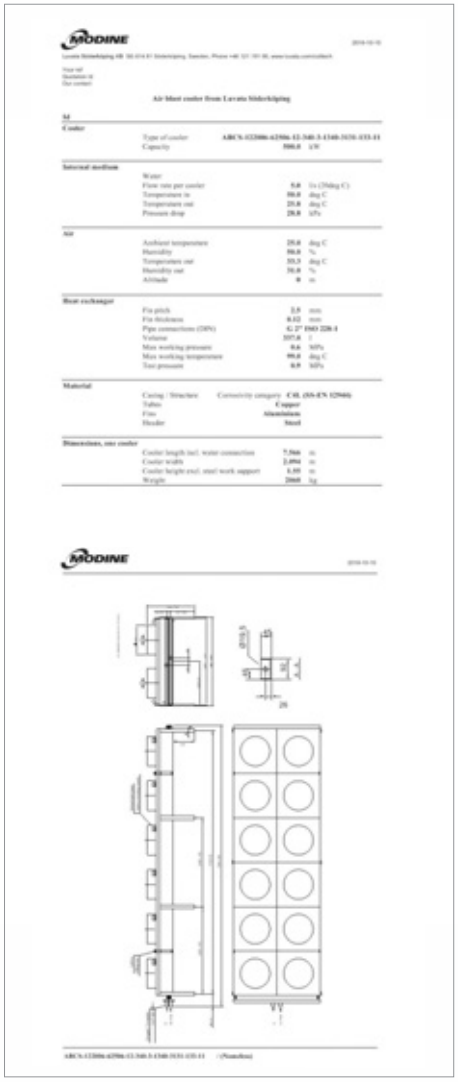
Variables to be considered while sizing and selecting include:

- Cooling capacity
- Ambient temperature
- Sound level (fan speed)
- Cooler size
- Fan motor power supply
- Environmental conditions
- Number of fans, tube rows
- Liquid flow rate, etc.

Download COILS at www.modine.com



Coils user interface.



Dimensional drawing of the selected cooler.
COILS generates a print-out of the selected cooler.

BASIC RANGE

APPLICATION

The ABCS Basic is a free-standing cooler, designed to be installed on a roof top, or close to a building. It is typically used for cooling chillers or diesel motors for power generation and is suitable for projects where site conditions are not overly harsh. Our Basic coolers are cost efficient and meet all the requirements for highly efficient fans and low power consumption.

ABCS – BASIC RANGE (SINGLE CIRCUIT)

Heat exchanger size
From 1.2 x 1.0 to 8 x 2.33 meters

Fan size
From 710 to 1250 mm diameter

Number of fans
From 1 to 12

Maximum working pressure
0.6 MPa (higher on request)

Maximum working inlet temperature (liquid)
80°C (higher on request)

Minimum ambient temperature
-30°C (lower on request)

Material in tubes and manifolds
Copper tubes with painted black steel or copper header

Air Blast Coolers, Basic Range, with different type of fan solutions.

PREMIUM RANGE

APPLICATION

The Premium Range is suitable for projects where ambient conditions are harsh, material choice matters and quality and reliability are a priority. Typical applications include cooling for industrial processes or cooling large diesel or gas turbine engines for power generation. ABC Premium coolers are free standing and can be installed as multiple units on a single structure (supplied separately). They are designed to withstand external forces such as heavy wind storms, ice loads and earthquakes. Optional reports of loads for foot print or structural analyses can be supplied on request.

BENEFITS

Our Premium coolers are designed to be robust enough for the industrial market. The strength of the casing and structure, together with flexibility in fan and heat exchanger size, mean that every cooler is uniquely suited to its application. The Premium Range is ideal for the toughest environments and the most rigorous noise restrictions. They meet all the requirements for highly efficient fans and low power consumption.

ABCS – PREMIUM RANGE (SINGLE CIRCUIT)
ABCD – PREMIUM RANGE (DOUBLE CIRCUIT)

Heat exchanger size: Up to 14 x 2.8 meters

Fan size: From 450 to 2,000 mm in diameter

Maximum working pressure: 0.6 MPa (higher on request)

Maximum working inlet temperature (liquid): 99°C (higher on request)

Minimum ambient temperature: -30°C (lower on request)

Material in tubes and manifolds: Copper tubes with copper header (others available on request)

CODE KEY

Air Blast Cooler, Single Circuit, Basic + Premium

ABCS-aabbcc-deeff-gg-hhh-i-jjjj-kllm-nop-qr

aa = Module length

bb = Module width

cc = Number of modules

d = Number of tube rows

ee = Fin pitch

ff = No of liquid passes

gg = Number of fans per module (single/double module)

hhh = Fan type, motor type

i = Motor control

jjjj = Fan speed

k = Material in heat exchanger

ll = Fin material and fin thickness

m = Flange connection size

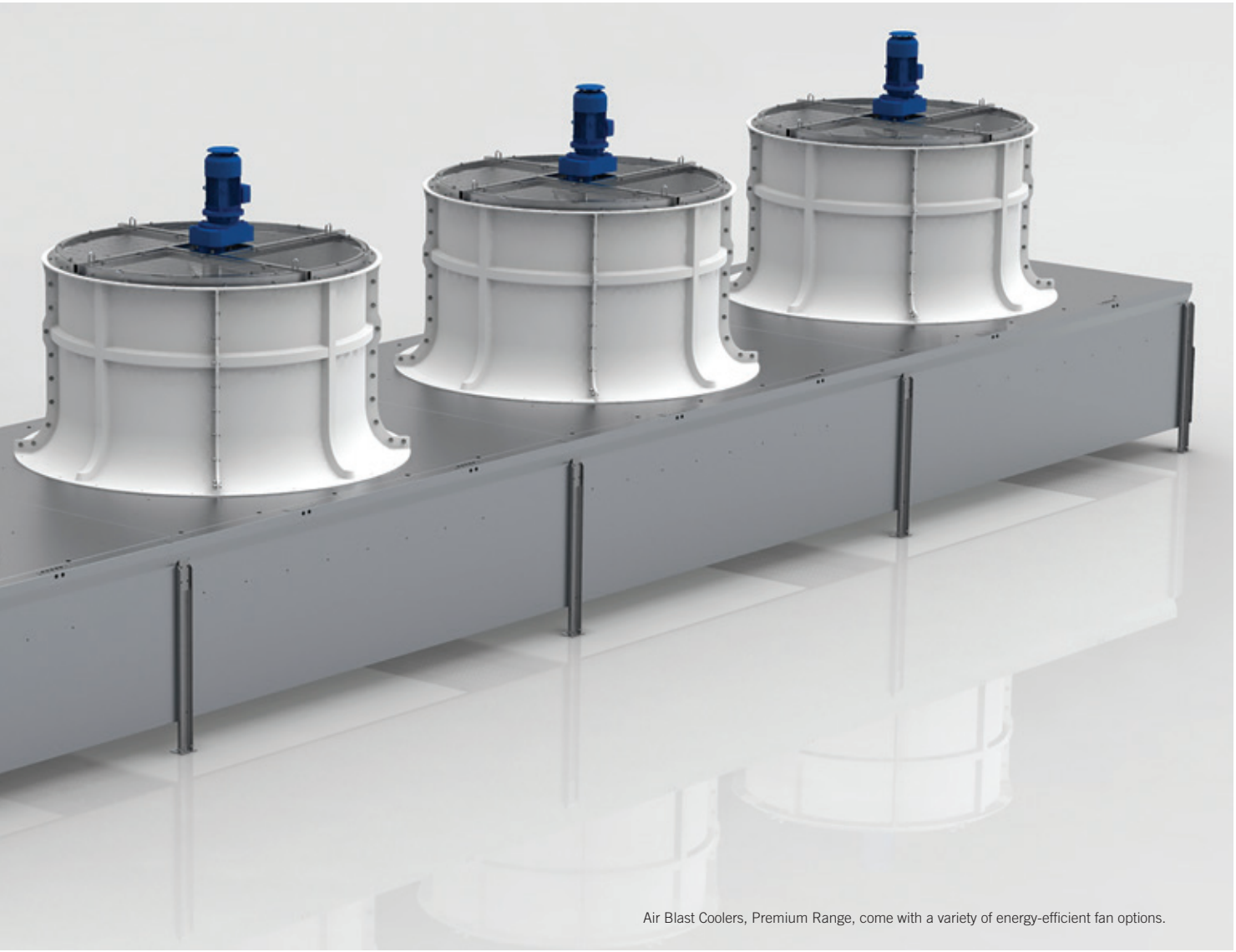
n = Coil type

o = Design type: 1,2 (Premium), 3 (Basic)

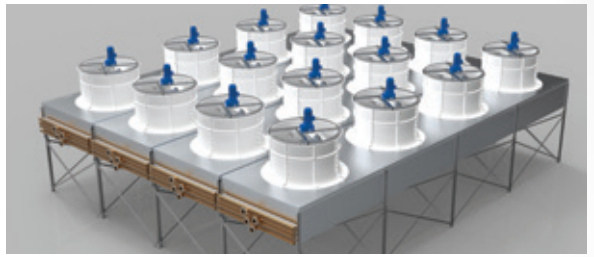
p = Corrosion category protection class

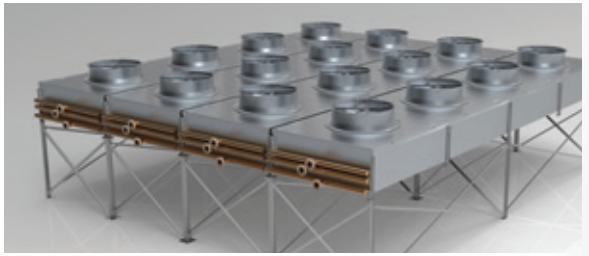
q = Design revision

r = Electrical wiring



Air Blast Coolers, Premium Range, come with a variety of energy-efficient fan options.





HIGH-GRADE RANGE

APPLICATION

Our High-Grade Process Coolers, HGPC, are tailor-made for projects where ambient conditions are harsh, material choice matters and quality and reliability are a priority. Typical applications include cooling thyristor valves in HVDC power converter stations and cooling large diesel or gas turbine engines.

BENEFITS

Each HGPC is designed on a project-by-project basis. The cooler size is calculated using our bespoke selection software COILS, which enables us to meet exact specifications. Our extensive product ordering codes make it simple to select the appropriate options for every cooler. The cooler and its components are pre designed to allow multiple combinations, ensuring an optimal final design for each project.

The coolers can contain heat exchangers up to a maximum size of 14 x 2.8 meters. The number of available tube rows and fin pitches can be adapted to match exact cooling requirements. They can also be designed for different working pressures (on the liquid side) and with a selection of different flange sizes and nozzles.
If the coolers need to be shipped overseas, they can be made to fit perfectly in a standard container.

HGPC – HIGH-GRADE RANGE

Heat exchanger size: From 1.0 x 1.0 to 14 x 2.8 meters

Fan size: From 450 to 1,800 mm in diameter

Maximum working pressure: 0.6, 1.0 or 1.2 MPa (higher on request)

Maximum working inlet temperature (liquid): 99°C (higher on request)

Minimum ambient temperature: -30°C (lower on request)

Material in tubes and manifolds: Aluminium, stainless steel or acid proof stainless steel

CODE KEY

HGPC-aabbcc-deeff-gg-hhh-i-jjjj-kllm-nop-qrst-u

aa = Module length

bb = Module width

cc = Number of modules

d = Number of tube rows

ee = Fin pitch

ff = No of liquid passes

gg = Number of fans per module

hhh = Fan type, motor type

i = Motor control

jjjj = Fan speed

k = Material in tubes and manifolds

ll = Fin material and fin thickness

m = Flange connection size

n = Coil type

o = Type of installation

p = Corrosion category protection class

q = Design revision

r = Safety switch/circuit breaker to motor

s = Electrical wiring

t = Draining and venting valves

u = Pressure class

Our High-Grade Process Coolers are tailor-made for projects where ambient conditions are harsh, material choice matters and quality are a priority.

OPTIONS AND ACCESSORIES

Modine coolers come with a range of optional accessories. These include special cabling options and terminal connection boxes. Cabling is prepared for EMC with frequency drive. The water connection manifolds are available with mounted drain and air venting valves. Leg support structures for single or group installations can be specified, where the required height is dictated by the number of coolers. We also provide service platforms which can be mounted on the structure below the cooler bank, and which are accessed by ladder or stairs so that servicing can be carried out safely, even on large installations with multiple coolers.

PACKAGING

Different types of wooden packaging are available, according to the chosen shipping method. We supply pallets for truck or container loading, standard wooden boxes, seaworthy wooden boxes and many other options.

SPRAY SYSTEM

As an option, it's possible to add on a spray equipment to boost the cooling capacity temporary at certain ambient conditions. The spray system is built up with piping and nozzles. The nozzles are dimensioned to create the right amount of water fog to make the cooler work in a closer to wet ambient condition.

LABELLING

Our HGPC coolers carry stainless steel nameplates with tag numbers. Our Basic and Premium ranges come with sticker data labels, although nameplates are available on request.

ACCESSORIES

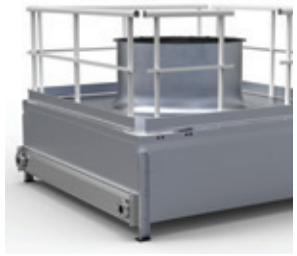
- Supporting structure
- Railing and ladder
- Maintenance platform
- Individual fan marking in stainless steel
- Aesthetic painting of complete cooler in required colour
- Counter flanges
- Venting and draining valves
- Common terminal box for wiring to fan motors
- Cabling in conduits
- VFD Frequency controlled or STEP controlled fan motors
- Special fan motors (ATEX, NEMA, etc.)
- Motors equipped with many different accessories:
  - Anti-condensation heating elements
  - PTO
  - PTC
- Expansion tanks


Common terminal box for motors.


Supporting structures.

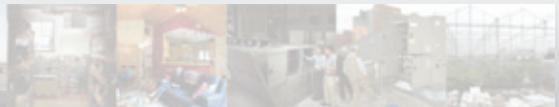

Railing, ladder & maintenance platform.


Electric connection box.


Cooler with railing.


Expansion tanks.


Bottom pallet packing.

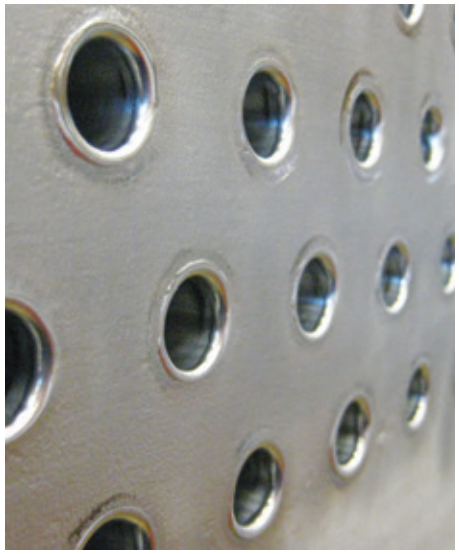


MATERIALS

Modine offers a wide choice of materials for both air side (external) and liquid side (inside the heat exchanger). With our experience of metallurgy and heat transfer, we can recommend the best material for the project environment and application, according to corrosion protection category C3, C4 or C5.

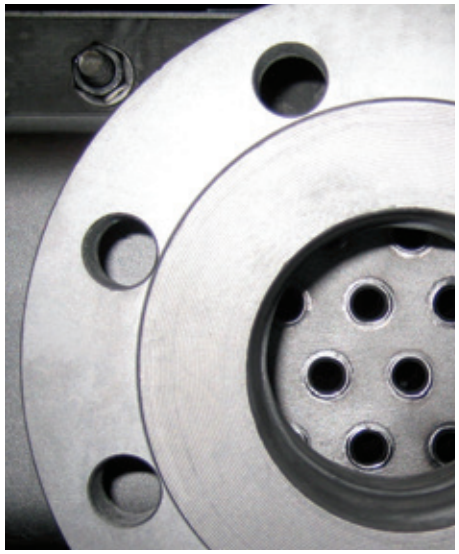
BASIC RANGE (SINGLE CIRCUIT)

- Heat exchanger has tubes in copper as standard.
- Fins in aluminium or epoxy-coated aluminium.
- Standard casing material is galvanised steel type aluzinc in sheet metal parts.
- Structure parts in hot dip galvanised steel.



PREMIUM RANGE (SINGLE CIRCUIT)

- Heat exchanger has tubes in copper as standard.
- Available tube materials include copper-nickel as a special option, with fins in aluminium as standard. Other materials in range include epoxy coated aluminium, AlMg alloy, copper and pre-tinned copper.
- Standard casing material is galvanised steel type Aluzinc in sheet metal parts.
- Structure parts in hot dip galvanised steel.
- Painted material and stainless steel in casing is also available for higher corrosion protection.



HIGH-GRADE RANGE

- Heat exchanger has tubes in aluminium, stainless steel or acid proof stainless steel as standard.
- Fins in aluminium as standard. Other materials in range include epoxy coated aluminium, AlMg alloy, copper and pre-tinned copper.
- Standard casing material is galvanised steel type aluzinc in sheet metal parts.
- Structure parts in hot dip galvanised steel.
- Painted material and stainless steel in casing is also available for higher corrosion protection.

CORROSION PROTECTION

CORROSION PROTECTION

When selecting the right cooler, corrosion protection is an important consideration. The site conditions and outside environment, the liquid conditions inside the heat exchanger, the general operating conditions and operational lifetime requirements will help to determine the required corrosivity category.

Our standard cooler design meets corrosivity category C3 requirements (ISO 12944/ ISO 12944:5) as standard. This can easily be extended by selecting category C4 or C5 in our sales software to alter the product code and the material choices. The selected protection level will then be met by identifying the appropriate materials and coating application systems for the fan and motor as well as other components.

We can also help with projects that need a combination of materials to meet corrosivity requirements. In the most extreme conditions, even the heat exchanger can be treated with multiple layers of surface protection.

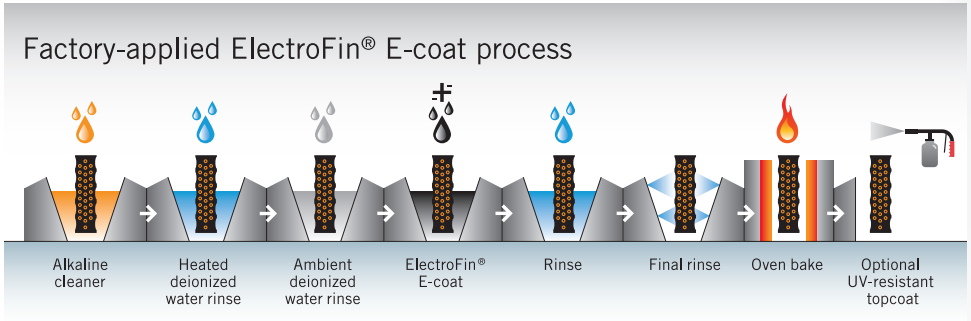
Modine's paint system has been laboratory tested to ensure that our coolers have the longest possible working life and enjoy a reputation for reliability.

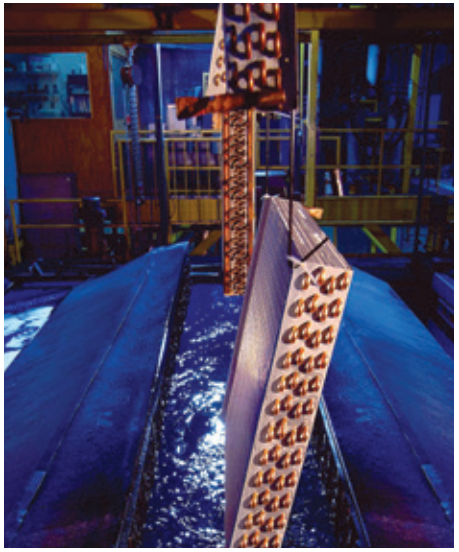
ELECTROFIN®
E-COAT WITH C5 CLASSIFICATION

Modine's ElectroFin E-coat with UV topcoat guarantees corrosion protection and long-term reliability, and is suitable for both copper and aluminium parts. Coolers treated with ElectroFin E-coat are corrosion resistant for over 15 years, even in the harshest environments. ElectroFin E-coat is ideally suited for industrial areas with high humidity and hostile atmospheres such as nuclear and power plants, refineries, steam turbines, deserts, coastal and offshore areas with high salinity, and buildings or areas with nearly permanent condensation and high pollution.

ISO 12944 is the most comprehensive and frequently accepted certification, and divides paint coatings into five corrosion-protection classes. Classification C5 (Marine & Industrial / High Durability) is the highest certification for heat exchanger coatings in terms of application, performance and durability. It covers:

- Coating thickness and adhesion testing (ISO 2808 and ISO 2409)
- Long exposure in water and high-humidity atmospheres (ISO 2812 and ISO 6270)
- Salt-spray test and exposure to chemicals (ISO 9227 and ISO 2812).





E-coating, with C5 classification, makes the cooler corrosion resistant for over 15 years.

MODERN SOLUTIONS FOR MAXIMUM EFFICIENCY

FAN AND MOTOR

Modine supply a vast choice of fans and motors to suit parameters such as power supply voltage, frequency variations, sound restrictions, power consumption, thermal contact and space heaters in winding, corrosion protection and method of speed regulation, which could be by frequency control or by using EC fan motors. Whether an individual cooler needs one fan or more than twenty, we can supply it.

For high performance cooling capacity, and when noise levels are not an issue, we can provide a foot-mounted inner rotor motor solution with a separate impeller for big fan units, compliant with NEMA standards. Alternatively, when space restrictions and low noise level requirements apply, we can supply external rotor motor fans.

Modine works closely with the major fan and motor manufacturers to provide modern efficient solutions in line with the latest ErP directives. We conduct sound tests and validate the sound data provided by the suppliers, both in our own test area, and in their laboratories and wind tunnels.

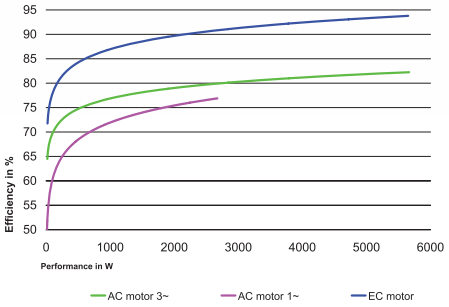
ENERGY SAVING AND NOISE REDUCTION

With energy costs soaring and climate change increasingly in the news, energy efficiency is more important than ever. So at Modine, all our fans have electronically commutated (EC) technology to help guarantee lower energy usage.

EC motors are synchronous electric motors with electronic commutation systems, instead of mechanical commutators and brushes. The speed of the fans or motors depends on the electronically generated rotating field in the stator. The rotor, with its permanent magnets, follows this electronically generated field inside the fixed stator. As magnets are permanent, no magnetic field is generated by induction to the rotor. This increases efficiency in comparison with a standard asynchronous motor.

All our fans are tested and validated under extreme conditions, including shock and vibration, constant loads under extreme temperatures and saltfog, and all have proved themselves to be consistently reliable.

Each cooler has its own temperature control gauge, connected to the EC-fan, which can be programmed to adjust speed levels, for example if the outside temperature drops at night or if sound levels need to be reduced at certain times of day. It can also be programmed to monitor the outlet cooling water and adjust the fan speed accordingly, keeping power consumption as low as possible.



The difference between AC and EC motors focused on the efficiency. EC motors achieve an efficiency up to 93%. AC motors up to 82%. AC motors with 1~ up to 77%. Note: The comparison is focused on external rotor motors.

Modine's AC-Fans can be speed-controlled as option by a Variable Frequency Drive (VFD), located in a control cabinet which allows remote monitoring, and which is shielded from magnetic fields. This can be EMC approved if needed. External rotor motor fans do not have the same need for shielded cables as a filter is built in to the frequency drive. AC-Fans controlled by a VFD can also have a temperature gauge connected to the outlet header. All fans work together for optimum performance.

ELECTRIC CABLING

Modine's fan motors are delivered wired and connected to a safety switch located close to the fan shroud. We can also provide complete cabling, including terminals for control signals, to a common connection box mounted on the cooler. Complete systems with a VFD built in to a control cabinet are also wired to a safety switch.

INTELLIGENT FAN SYSTEM

Modine's intelligent fan system is highly efficient with a sophisticated design which helps to reach higher airflow capacity while reducing sound levels.

- Up to 29% less electrical power consumption*
- Savings of up to €150* on annual electricity bills per fan unit
- Significantly higher volumetric air flow rate (up to 9%)*
- Reduced noise with up to 7 dB(A) at same air flow

* Compared to AC-installation for 800 fan size and 6-pole.

For installations requiring ultra-low noise levels, we can provide fans up to two meters in diameter. These have been laboratory tested and are perfect for large-scale projects. Using larger fans means that fewer fans are needed overall, resulting in lower transport and project cost, lower installation costs, and lower ongoing maintenance costs.

ADDITIONAL INFORMATION

ENVIRONMENTAL THINKING

We have a conscious and structured approach to protecting the environment throughout the lifecycle of our products, from development, manufacture and application to phase-out and recycling. We streamline and monitor our use of materials and energy, as part of our commitment to the long-term management of natural resources.

HISTORY

In 1941, Modine in Sweden began manufacturing heat exchangers and coolers. Since then, we have developed our product range to include Air Blast Coolers (also known as dry coolers), for a wide variety of applications.

SPECIAL SOLUTIONS

We have a wide range of standard products, but if you need a cooling solution with corrosion protection, specific materials, special dimensions or installation in limited spaces, we can create a bespoke solution just for you.

SERVICE SOLUTIONS

Our experienced team of technicians can customise a maintenance package to meet specific needs, whether for a complete replacement project or a smaller-scale inspection.

OUR SERVICE SOLUTIONS

- Repair of heat exchangers and fan units
- Cleaning / review / service
- Installation supervision
- Noise reduction
- Instrumentation & Control (I&C)
- HVAC
- Electrical installation
- Conversion of cooling systems
- Energy savings
- Environmental measures

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MODINE IS A TRULY GLOBAL PARTNER

Talent: 10,500 employees across five continents
Global Footprint: Operations in North America, South America, Europe, Asia and Africa

MODINE®
Always Innovating. Always Improving.

To learn more, visit
www.modine.com

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See us at YouTube.com/ModineHVAC

Modine specializes in providing innovative thermal management solutions, and is a leading provider of engineered heat transfer systems and high-quality heat transfer components.

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Modine Commercial and Industrial Solutions. 17-10. Subject to alteration.