ENGLISH

ECO™ heat transfer coolers

MODINE®

CO_2

UNIT COOLERS AND GAS COOLERS

MODINE

Engineering a Cleaner, Healthier World



F-gas prohibitions

1 January 2030

“Refrigeration equipment that contains, or whose functioning relies upon fluorinated greenhouse gases with a GWP of 150 or more, except if required to meet safety requirements at the site of operation”

GENERAL FEATURES

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Highly efficient coils, made from special profile aluminium fins and copper tube, designed for use with new generation refrigerants. Coil options are also available for new alternatives of environmentally friendly refrigerants with an appropriate geometry proposed for each specific application.
We have paid great attention to design and construction of the coil end plates to protect the tubes.

The casings for the different product ranges have been designed to facilitate access to the internal components. The casings are made from smooth finish aluminium alloy or pre-painted galvanized steel sheet (1).
Key features:
- high corrosion and impact resistance;
- resistant to low temperatures;
- non-toxic;
- no release of environmentally harmful debris or particles;
- covered with protective plastic film.

Standard fan motors (2) manufactured according to our specifications and in compliance with the latest safety standards. When possible, the fan motors are fitted to the unit structure with an anti-vibration system.

A high air throw is achieved thanks to a perfect combination of factors. All published data are the result of measurements carried out in our Technical Lab.

For unit coolers with **standard electric defrosting**, the heat needed to dissolve the ice build-up is provided by stainless steel heating elements located in the finned pack of the coil and in the inner drip trays. The heater rods are strategically positioned to provide thorough heat distribution, even in the most critical areas of the unit. Given the high thermal conductivity of the materials employed heat diffusion is ensured throughout the unit.
The water resulting from defrosting is channelled from the internal drip trays to the drain pan. This system that has been specifically designed to allow the water to drain freely.

Electrical parts and casings are connected to an earth terminal.

Fan guards are made from fibreglass charged polyamide or painted steel. These components are manufactured in compliance to strict safety standards.

Standard wiring is carried out in heavy-duty junction boxes with access holes that are equipped with tear-proof cable glands.
All electrical wires in proximity to other elements are protected from wear and tear. All materials and components are carefully selected in order to assure long-term reliability.

The packaging is made either from duly reinforced recyclable carboard or entirely of wood, depending on the type of unit.
For industrial and brine coolers (3) the packaging was specifically designed to allow quick and easy ceiling installation.

Each unit is supplied with a technical manual, declaration of conformity (with testing certificate included) and PED report.
For special models additional documentation shall be issued and provided to complete the technical manual.

REFERENCE STANDARDS

Our products are manufactured in compliance with the following reference standards:
- electric motors, manufactured in accordance to EN 60335-1;
- fan guards in compliance to EN 294 safety standards;
- air throw measured in our technical lab according to CECOMAF GT 6-001 (final velocity = 0,25 m/s);
- 2006/42/EC Machine Directive, 2014/35/EU Low Voltage Directive and 2014/68/EU Pressure Equipment Directive;
- modified 2014/30/EU EMC Directive (Electromagnetic Compatibility).

ErP 2015 COMPLIANT

All the fan motors fitted in “ECO Heat Transfer Coolers” branded products comply with the 2009/125/EC Directive, meet the EU energy guidelines and are CE marked as they are manufactured in accordance to the European directives in force.
The ErP directive, mandatory in all EU countries, applies to fan motors with output power between 125 W and 500 kW. This directive covers products made in the EEA (European Economic Area countries) and imported from non-EU countries. EU products exported to other countries are not subject to this directive.
The ErP directive does not apply to products used in ATEX areas, fan motors used at particularly high and low temperatures (<–40°C or >+100°C), fan motors in units for short-term emergency use or fan motors used in means of transportation for persons or goods.
Modine incorporates fan motors and other associated devices used in its products to guarantee that they are in compliance with Commission Regulation (EU) No 327/2011.
Particular attention has been addressed to the components (fan rings) so as to ensure full respect of Directive efficiency and, overall, a perfect balance between air flow performance, energy consumption and noise level emissions.

WARRANTY

All technical information in this edition is based on tests carried out, which we deem exhaustive and reliable but which cannot be referred to all records of possible applications. Therefore, the purchaser must ascertain product suitability with regard to its intended use, undertaking all responsibility arising from its said use. Upon request by the purchaser, the seller shall be available to supply all useful information in order to better use its products.
All our models have a two-year warranty with effect from the date of invoice. Please refer to the Modine CIS Italy S.r.l Legal Office for detailed information. However, occasional failures such as those due to transport, tampering by unauthorised personnel, incorrect use and incorrect installation, which the products are subjected to, are all excluded from any form of warranty.
As a result of continuing research and design by our technical team and laboratories, aimed at offering top quality and innovative products, the information and materials contained herein may be subject to change without prior notice. If the said content contains any mistakes, omissions, inaccuracies and/or typographical errors Modine assumes no responsibility thereof and reserves the right to make amendments deemed necessary, without notice and at any time.
It will be up to the user to keep up to date with all possible modifications.
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(1) Prepainted steel for models TKE, PCV, PKE, PCR, EG, VCE and VCC, galvanized steel for LCE. Full bell mouth fan rings are produced in polyester painted galvanized steel.

(2) Fan motors produced by various manufacturers may be used.

(3) Models with packaging that has been specifically designed to facilitate ceiling installation: ICE, IDE, CTE Ø 630 mm, CDC Ø 630 mm.

CO_2



Low environmental impact refrigerants will soon replace halogenated ones.

Therefore, today, the construction of installations using refrigerants that are being phased out means being directly exposed to rising set up and running costs.

The continuous evolution of our products is inspired by current regulations, but sometimes we even anticipate the future with innovative product ranges.

Modine has developed a new cooler range for installations that use R744 refrigerant (CO_2 - carbon dioxide).

Advantages
- First-rate safety features and reduced environmental impact.
- Non-flammable.
- Non-toxic, chemically inert, with no risk of corrosion.
- Degree of contamination nil in case of contact with foodstuff.
- No particular precautionary measures required in case of retrofit of installation.
- Greater installation efficiency resulting in reduced dimensions of compressors and coils in comparison to regular installations.

We have developed a comprehensive range of CO_2 models (GWP = 1), capable of operating at higher operating pressures.

These products can now also be used in regions that are characterized by climates with higher temperatures.

Our units benefit from options and technical solutions that guarantee optimum performance and reduced energy consumption.

Our CO_2 unit coolers can be calculated for direct expansion or pump applications.

F-gas Ready!

The European Parliament has adopted a new regulation repealing Regulation (EU) No 517/2014, aimed at phasing down fluorinated gases (F-gases) and other substances that contribute to global warming and ozone layer depletion. While existing EU legislation has already significantly limited the use of these gases and substances, the new rules will further reduce their emissions into the atmosphere and help to mitigate global temperature rise in accordance with the Paris Agreement.

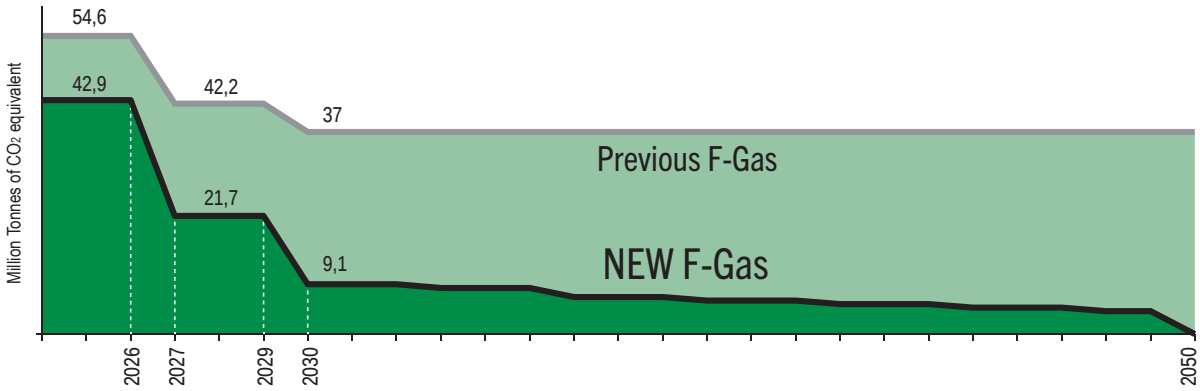
Under the new rules, the consumption of hydrofluorocarbons (HFCs) will be completely phased out by 2050. Conversely, the production of HFCs, in terms of production rights allocated by the Commission, will be gradually reduced to a minimum of 15% starting from 2036. Both production and consumption will follow a strict schedule with degressive quota allocations.

The regulation imposes a complete ban on placing products and equipment containing HFCs on the market for certain categories where it is technologically and economically feasible to switch to F-gas alternatives. This includes specific domestic refrigerators, chillers, foams, and aerosols. Furthermore, it establishes specific dates for the complete phase-out of F-gas use in air conditioning, heat pumps, and REFRIGERATION.

The industry is responding to this significant change by developing and introducing new technologies and innovative designs for refrigeration installations. The entire sector is rapidly evolving, from HFC producers to product plant management and maintenance operators.

Today, our product portfolio includes models with smaller internal volumes, ensuring higher efficiency with a substantial reduction in the amount of refrigerant used. Additionally, we have designed a comprehensive range of CO_2 models (GWP=1) that can operate at higher pressures. These units can now be used in regions characterized by higher temperatures, thanks to options and technical solutions that ensure optimal performance and reduced energy consumption.

HFC phase down





UNIT COOLERS FOR CO_2

CGC



Cubic unit coolers
for commercial cold rooms
- Fan motors diameter: from 250 to 350 mm
- Capacity: from 1 to 27,2 kW

CGD



Dual discharge unit coolers
for commercial cold rooms
- Fan motors diameter: 315 or 350 mm
- Capacity: from 1,4 to 34,7 kW

CDD



Dual discharge unit coolers
for commercial and industrial cold rooms
- Fan motors diameter: from 230 to 560 mm
- Capacity: from 0,82 to 81,5 kW

CGS



Slanted unit coolers
for commercial cold rooms
- Fan motors diameter: from 200 to 315 mm
- Capacity: from 0,24 to 8,9 kW

CGL



Dual discharge unit coolers
for commercial working rooms
- Fan motors diameter: 250 or 315 mm
- Capacity: from 3,4 to 8,8 kW

CDC



Cubic unit coolers
for commercial and industrial cold rooms
- Fan motors diameter: from 500 to 800 mm
- Capacity: from 8,2 to 164 kW

INNOVATION

Modine uses state-of-the-art technologies allowing the installation of its gas coolers in regions with higher temperatures

ENERGY SAVING

CO_2 systems recover an important part of the heat they produce, which can be used for heating buildings

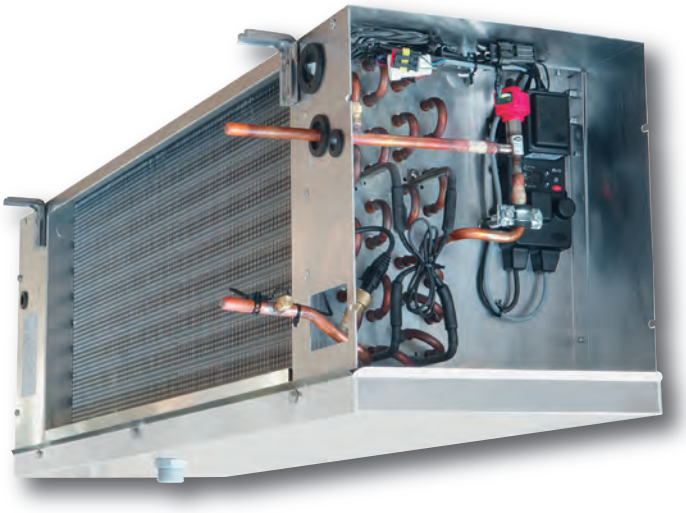
RELIABILITY

Thanks to the type of tubes used in Modine units, the maximum operating pressures that they can withstand are 80 bar for CO_2 unit coolers and 130 bar for CO_2 gas coolers

Scelte SELECTION SOFTWARE

www.modineselect.com

CVC PLUG AND PLAY CO_2 COOLERS



The new CVC range of unit coolers was specifically designed to attain the benefits of using CO_2 and to simplify installation operations.
To achieve these objectives, the CVC unit coolers are equipped with an electronic expansion valve that is regulated by a factory fitted and wired control device.

Thanks to these features the CVC can be considered a "**plug & play**" unit that can always function with the right amount of refrigerant, both with significant load variations and when the load is partial.

The control device instantly measures superheat value, which is kept at the minimum necessary level with a continuous adjustment of the valve.

CVC unit coolers, thanks to the electronics used and a distinctive heat exchanger configuration, constantly operate under optimum conditions allowing systems to reach the maximum COP (coefficient of performance) with reduced power consumption in full respect of the environment.

Key Benefits

- Quick installation thanks to a simplified structure.
- Easy to use.
- Reduced cold room temperature pull-down time.
- Reduced time to reach the set point.
- Fine tuning of the superheat setting.
- Electronic valve with a wider regulating range than manual regulators.
- Minimum maintenance: the periodic calibration of the valve is not required.
- The electronic valve guarantees emergency shutdown.
- A control panel to monitor and detect possible anomalies.
- Sturdiness and durability: electronics incorporated in a compartment made from resin used in the automotive industry.
- Control device with IP 66 protection grade against dust and liquids.
- Broad operating range: from –30 °C to +40 °C.

CVC E6, F6 and A6 are designed for medium cold room temperatures (≥ –15 °C), with 6 mm fin spacing.

CVC G8, F8 and E8 are designed for low cold room temperatures (≥ –35 °C), with 8 mm fin spacing.
The whole range is equipped with highly efficient coils made from aluminum fins and special copper tubes.
CVC features electric defrosting system (ED) that uses stainless steel heaters with vulcanised terminals preset for 400V/3/50-60 Hz (Ø 315-350 mm only).

CVC employs three types of standard fan motors:

- **Ø 250 mm**, shaded pole single-phase 230V/1/50-60 Hz with fiberglass charged polyamide fan guards and operating temperature: from –40 to +40 °C.
- **Ø 315 mm**, external rotor single-phase 230V/1/50-60 Hz with built-in electric capacitor and epoxy coated steel fan guard and operating temperature: from –40 to +45 °C.
- **Ø 350 mm**, external rotor single-phase 230V/1/50-60 Hz with built-in electric capacitor and epoxy coated steel fan guard and operating temperature: from –40 to +50 °C.

The optional high efficiency EC fan motors have the following features:

- **Ø 250 mm**:
  - IP 54 protection grade;
  - class H insulation;
  - built-in electronic protection;
  - operating temperature: from –40 to +50 °C.
- **Ø 315 mm**:
  - IP 54 protection grade;
  - class B insulation;
  - built-in electronic protection;
  - operating temperature: from–40 to +40 °C.
- **Ø 350 mm**:
  - IP 54 protection grade;
  - class B insulation;
  - built-in electronic protection;
  - operating temperature: from –25 to +60 °C.

Electric parts and casing are connected to an earth terminal.

Wiring of the motors and heaters is carried out in separate IP 54 protection grade junction boxes.

On request the models can be equipped with non-standard coils, defrosting and fan motors.

For special applications and further information please contact us.

Electronic expansion valve system

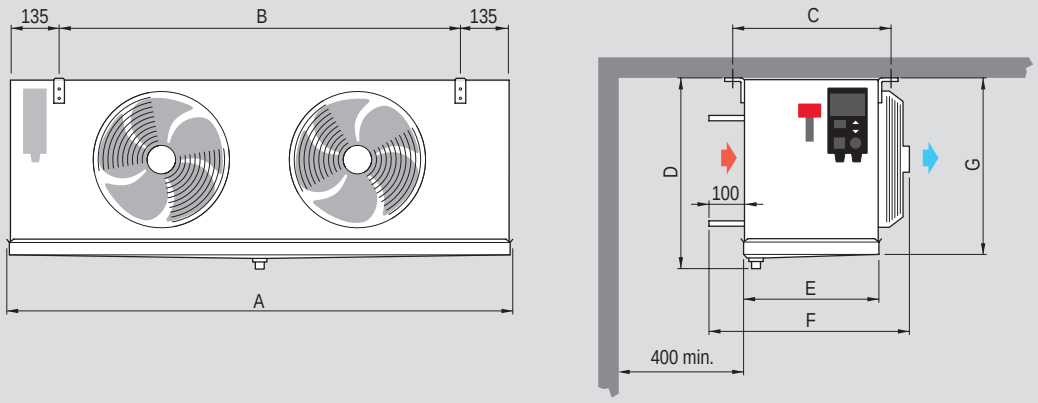


Picture: "EVD ice" electronic expansion valve system, courtesy of CAREL
"CAREL" and "EVD ice" brands are property of CAREL INDUSTRIES S.p.A.
www.carel.com



			MEDIUM TEMPERATURE						LOW TEMPERATURE		
Model			**252 E6**	**253 E6**	**312 F6**	**313 F6**	**351 A6**	**352 A6**	**253 G8**	**312 F8**	**352 E8**
Nominal capacity		**kW**	2,4	3,5	4,7	7,2	3,15	7,4	2,8	4,2	5,2
Air flow		m^3/h	1626	2430	3190	4970	2430	4850	2585	3290	5270
Air throw		m	9	11	15	17	14	16	13	16	18
Fin spacing		mm	6	6	6	6	6	6	8	8	8
Internal surface		m^2	0,92	1,38	1,56	2,34	1,12	2,24	1,03	1,56	1,5
External surface		m^2	13,2	19,9	22,6	33,9	15,8	31,5	11,5	17,3	16,6
Coil connections	In (mm)		12,7	12,7	12,7	12,7	12,7	12,7	12,7	12,7	12,7
	Out (mm)		12,7	12,7	12,7	12,7	12,7	12,7	12,7	12,7	12,7
Net weight		kg	25	34	36	50	28	51	31	36	43
Fan motor absorption		A	1,36	2,04	1,04	1,56	0,96	1,92	2,04	1,04	1,92
Nominal power		W	190	285	220	330	185	370	285	220	370
EC fan absorption		A	0,44	0,66	-	-	0,87	1,74	0,66	-	1,74
EC fan nominal power		W	52	78	-	-	150	300	78	-	300
Circuit capacity		dm^3	2,14	3,21	3,66	5,49	2,64	5,28	2,41	3,66	3,52
Electric defrost		W	2250	3325	3150	4900	2250	4050	3325	3150	3150
Enhanced electric defrost		W	2700	3990	-	-	2750	4950	3990	-	3600
Drain connection		Ø (GAS)	1	1	1	1	1	1	1	1	1

Nominal capacity assessed in practical operating ambient, i.e. in wet conditions, in direct expansion application, CO2 refrigerant; air inlet temperature 0 °C, evaporating temperature –7 °C; TD 7K



Model		**252 E6**	**253 E6**	**312 F6**	**313 F6**	**351 A6**	**352 A6**	**253 G8**	**312 F8**	**352 E8**
Fan motors	nr. x Ø mm	2x250	3x250	2x315	3x315	1x350	2x350	3x250	2x315	2x350
Dimensions mm	A	1224	1674	1425	1974	875	1425	1674	1425	1425
	B	930	1380	1130	1680	580	1130	1380	1130	1130
	C	407	407	407	407	453	453	407	407	453
	D	431	431	468	468	544	544	431	468	544
	E	336	336	336	336	382	382	336	336	382
	F	509	509	561	561	608	608	509	561	608
	G	387	387	424	424	499	499	387	424	499

Picture: “EVD ice” electronic expansion valve system, courtesy of CAREL
“CAREL” and “EVD ice” brands are property of CAREL INDUSTRIES S.p.A.
www.carel.com

"From an ecological point of view, CO_2 is a superior alternative to environmentally damaging hydrofluorocarbons (HFCs), as well as being non-flammable, non-toxic and less expensive. Modine designs and manufactures CO_2 units suitable for all your application needs"



Flat bed gas coolers

The CO_2 GAS COOLERS range has been specifically developed to satisfy a wide variety of applications in air conditioning and commercial/industrial refrigeration sectors.

The entire range is equipped with highly efficient coils made from special profile aluminium fins and copper tube, fin spacing is 2,1 mm for the entire range (different fin pitches are available upon request).

The coils have been designed for use with CO_2 and are supplied charged with dry air at a pressure of 2 bars.

In the flat and vertical versions, the particular structure of the side panels and legs/support brackets ensures improved sturdiness and stability, but also provides reinforced support to the coil and reduces vibration during operation with vertical airflow.

The compact V-shape version offers maximum capacity with a small footprint designed for installations in areas with particularly limited floor space.

The axial fan motors employed on the entire range are the most technologically up-to-date available.
New solutions like the hybrid shaped blades or bionic technology are widely used.
These fan motors, offered in AC or EC versions, have a wide range of diameters and rotation speeds:
Ø 350, 450, 500, 630, 710, 800, 910 and 1000 mm.

GAS COOLERS



V-shape gas coolers

AC fan motors features
- die cast aluminium sickle blades or aluminium/techno polymer hybrid version with optimized sickle blades;
- IP 44 protection grade for Ø 350 mm;
- IP 54 protection grade for Ø 450, 500, 630, 710, 800, 910 and 1000 mm;
- class 155 insulation;
- inner thermal contact protection;
- epoxy coated steel fan guards.

EC fan motors features
- IP 54 protection grade;
- class 130 insulation;
- built-in electronic protection;
- speed regulator with 0-10V signal;
- additional speed regulator with MODBUS system.

The fan motors and the casework are predisposed for grounding.

The selection of gas coolers is a complex operation, for this reason our qualified personnel is at your complete service to offer assistance.

By submitting the following information we will be able to quickly calculate the model that will meet your requirements:

1. CO_2 **inlet pressure**
2. CO_2 **imput temperature**
3. CO_2 **output temperature**
4. **Ambient air temperature**
5. **Installation altitude**
6. **Required capacity**
7. **Required fluid flow**
8. **Sound level**
9. **Type of fan motors, AC or EC**

We can also calculate subcoolers and gas coolers equipped with an additional heat exchangers (false load) for heat recovery.

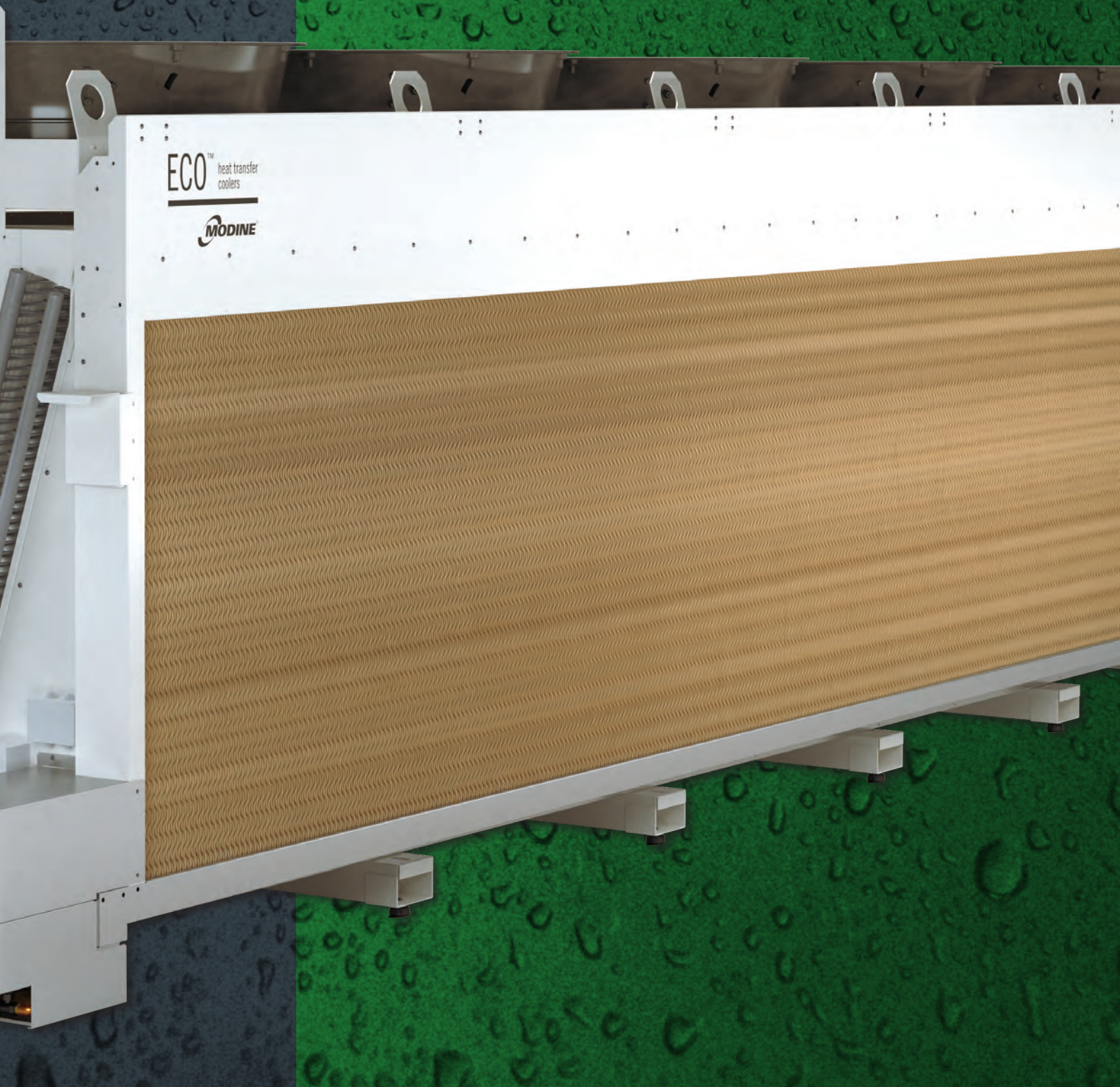
THE GROUNDBREAKING GAS COOLER LINE FOR A CLEANER, HEALTHIER WORLD

ECO™ heat transfer coolers

MODINE®



ECO-BATIC®



50 YEARS
OF ECO BRAND

Step into the world of refrigeration with ECO™ products.

Our experience and the technologies we employ
enable us to guarantee optimum levels of performance and energy efficiency.

Our units are reliable and flexible to use
in a wide range of applications.

Opting for our products means selecting quality solutions
that respect the environment.

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Modine Manufacturing Company

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F-GAS READY

ErP 2015

2 YEARS GUARANTEE

www.modinecoolers.com