



LIQUID COOLERS

REFRION
a better innovation

LIQUID COOLERS

Built with modular components in hot-dip galvanised steel, powder coated in different colours (std: RAL 9002) and corrosion-resistant. The U bends are protected by a safety panel fastened to the structure. The fastening elements (screws, threaded inserts, rivets, washers and nuts) are all in stainless steel.

HEAT EXCHANGER

- With OVAL SECTION tubes: 12 mm nominal diameter; staggered pitch pattern and high-efficiency fins.
- With ROUND SECTION tubes: 7,2 mm, 3/8", 12 mm or with 5/8" nominal diameter, staggered pitch pattern and high-efficiency fins. Standard fin pitch: 2.1 mm.

The pressure vessel is designed for a PS = 10 bar and a TS = 110 °C in accordance with EC Pressure Equipment Directive 2014/68/EU. Testing performed with dry air.



TUBE MATERIALS

- Standard material: copper Cu-DHP. Suitable for environments classified as ISO 12944 C3 (e.g.: urban and industrial atmospheres, moderate sulphur dioxide levels, production areas with high humidity).
- On request: stainless steel. Suitable for corrosive environments or in case of fluids incompatible with copper. AISI 304 is suitable for installations in industrial atmosphere or in coastal region. AISI 316L is recommended in naval/offshore application and polluted environments.



FIN MATERIALS

- Standard materials: aluminum alloys A8006 or A8079 (pre-painted). Suitable for environments classified as ISO 12944 C3.
- On request:
 - Aluminum-Magnesium alloys. They provide good resistance to corrosion in marine atmospheres. AlMg fins are available in AlMg2,5 (A5052) and AlMg3 (A5754).
 - Stainless steels: When the concentration of aggressive agents and particles in the ambient air is significant, stainless steel fins is an alternative option to a corrosion protection painting. Stainless steel fins are available in AISI 304 or AISI 316L.

AXIAL FANS

- Maintenance-free, external rotor axial fans. Protective grid compliant with EN ISO 13857.
- Standard AC three-phase or single-phase: with thermal protection, lubricated for life, statically and dynamically balanced.
 - Brushless energy-saving EC three-phase or single-phase: combines excellent performance with extremely low consumption and noise levels.



PROBLEM SOLVING ORIENTED

Tackling a wide range of problems and the most extreme conditions is our daily challenge: thanks to operational flexibility and our technical know-how, we offer solutions that maximise efficiency and energy savings.



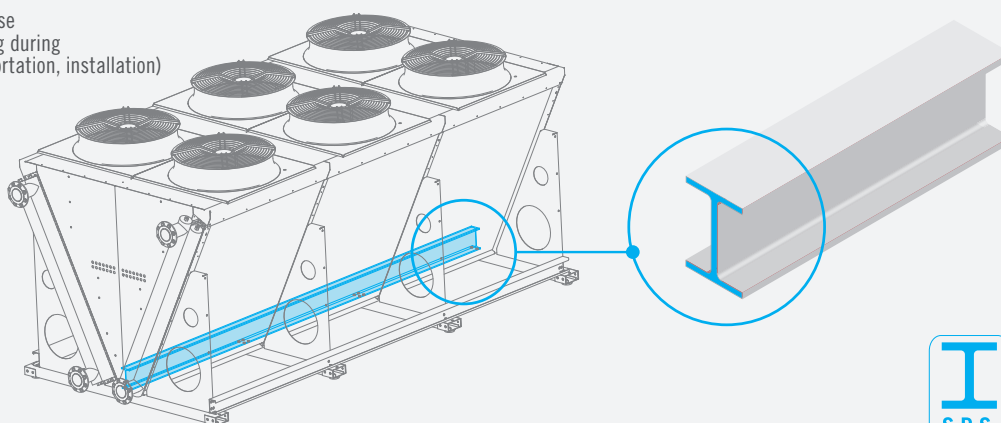
TECHNICAL KNOW-HOW AND FLEXIBILITY

Refrion products have been researched to meet the specific size and supply requirements of the system in which they will be installed. Each device is unique and tailor made.



S.R.S. - STRAIN RELIEF SYSTEM

Our exclusive system to stabilise the machine and avoid bending during all movements (lifting, transportation, installation) and over its entire life cycle.



REFERENCE STANDARDS AND EU DIRECTIVES

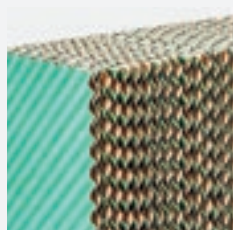
- EN 1048 (Air Cooled Liquid Coolers Performances)
- EN 378 (Safety and Environmental requirements)
- EN 60204-1 (Safety - Electrical equipment)
- EN13487 (Sound Measurements)
- EN ISO 13857 (Fan Guards)
- ISO 12944 (Corrosion protection paint systems)
- CSA C22.2 No. 236-11- UL 1995
- MD Directive 2006/42/EC (Machinery Directive).
- PED Directive 2014/68/EU (Pressure Equipments Directive).
- RoHS Directive 2002/95/EC (Restriction of Hazardous Substances Directive).
- EMC Directive 2014/30/EU (Electromagnetic Compatibility Directive).
- LVD Directive 2014/35/EU (Low voltage Directive).
- ErP Directive 2009/125/EC (Eco-Design Directive).

ECOOLER

- kw** COOLING CAPACITY
Up to 3000 kW*
- FAN** NUMBER OF FANS
1-7 4-20
- FAN** FAN DIAMETER
800-1250 mm
- Q** AIR FLOW
Up to 450.000 m³/h

THE ECO-FRIENDLY ADIABATIC PRODUCT RANGE

Units designed to meet the increasing demand for free-cooling applications, they optimise the benefits coming from the adiabatic saturation of the air adopting a water recirculation system and electronically commutated fans. The water and power consumption are thus minimised, resulting in Energy Ratio maximisation and the possibility to use "free-cooling" applications throughout all the year.



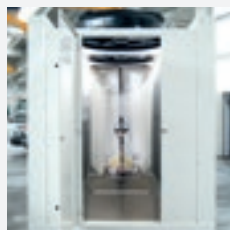
EVAPORATIVE COOLING PADS

Panels made of pure cellulose imbued with resins and biocide and antibacterial agents.



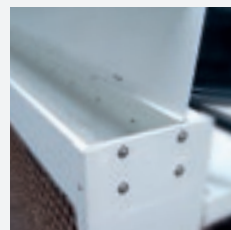
RECIRCULATION PUMP

Submersible centrifugal pumps in stainless steel material. Enclosure class: IP 68



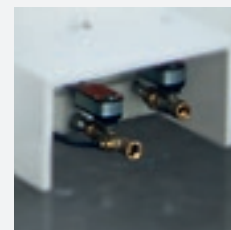
MAINTENANCE DOOR

Full access to the inside of the unit protected by security switch.



INSPECTIONABLE TOP GUTTER

Complete inspection possibility of the recirculation circuit for easy maintenance.



FEED/DISCHARGE ACTUATED VALVES

IP54, maintenance free approvals: CE, UL, CSA.

SUPERJUMBO

- kw** COOLING CAPACITY
158-2670 kW*
- FAN** NUMBER OF FANS
4-20
- FAN** FAN DIAMETER
800-910-1000 mm
- FAN** MODULE Short (Q) Standard (S)
- I** S.B.S.



EXTREMELY EFFICIENT

The Superjumbo model features the best performance in the Refrion Dry Cooler series: it guarantees the highest efficiency per occupied area unit.



Refrion participates in the ECP programme for Dry Coolers. Check ongoing validity of certificate: www.eurovent-certification.com

COMBO

- kw** COOLING CAPACITY
133-2340 kW*
- FAN** NUMBER OF FANS
4-20
- FAN** FAN DIAMETER
800-910 mm
- FAN** MODULE Short (R) Standard (K)
- I** S.B.S.



EFFICIENCY AND TRANSPORTABILITY

The Combo series has a special feature to generate the greatest amount of power that can be transported via container. Combo, in fact, achieves excellent results bringing together power and transportability.



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TOWER

- COOLING CAPACITY**
41-1355 kW*
- NUMBER OF FANS**
1-10
- FAN DIAMETER**
800-910-1000 mm
- MODULE**
Short (L)
Standard (T)
- S.R.S.**



SPECIAL ARCHITECTURAL REQUIREMENTS

Refrion has designed the Tower series which maintains the same level of performance, while limiting the overall height dimensions, thus achieving an installation with a low visual impact.



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WALL

- COOLING CAPACITY**
66-1170 kW*
- NUMBER OF FANS**
1-10
- FAN DIAMETER**
800-910 mm
- MODULE**
Short (R)
Standard (K)



INNOVATION

The new Wall model meets the increasingly challenging market demands. A wall installation represents the best ergonomic design, even in small spaces.



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HORIZONTAL / VERTICAL AIR FLOW

- COOLING CAPACITY**
8-1605 kW*
- NUMBER OF FANS**
1-20
- FAN DIAMETER**
**500-630-800-
910-1000-1250 mm**
- MODULE**
Short (C)
Standard (A)
Long (B)



VERSATILITY AND FLEXIBILITY

The entire series has been redesigned with the intent of providing greater selection, reducing delivery time, lowering transport costs and offering maximum flexibility during installation.



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RADIAL

- COOLING CAPACITY**
40-245 kW*
- NUMBER OF FANS**
1-4
- FAN DIAMETER**
500-710 mm



STURDY, COMPACT AND STACKABLE

Designed and made to be modular. It is built with double-wall panels in galvanised steel and mineral wool in the hollow space for soundproofing and heat insulation. Powder coated (standard colour: RAL 7035).

RADIAL FANS

- Residual static pressure 200 Pa.
- Standard AC three-phase, diameter 500mm.
 - Brushless energy-saving EC, diameter 710mm.

CUSTOMIZED SOLUTIONS

Thanks to the wide range of materials used and to customized solutions, the Refrion ventilated equipment for industrial applications are suitable for conditions and needs that range from being compatible in aggressive environments to minimizing noise or vibrations. The heat exchangers are designed for very high air flow and, therefore, are ideal for the application in the most demanding fields such as naval, military, oil & gas, offshore, nuclear, etc. Refrion specializes in building machines for the industrial process cooling in various sectors:

- power generation
- cogeneration and trigeneration
- production of vegetable oils
- power generation data centers
- industrial processes, in general

DRY COOLERS FOR OIL&GAS APPLICATION

- HT** HIGH TEMPERATURE CIRCUIT
900 kW
- 8** NUMBER OF FANS
- 910 mm** FAN DIAMETER
- 216.600 m³/h** AIR FLOW



- Stainless steel AISI 316 frame and Fans
- Self-draining system
- Special version to operating to ambient -40°C
- Heat exchanger with Heresite® treatment

RADIATOR FOR GENSET

- HT** HIGH TEMPERATURE CIRCUIT
770 kW
- LT** LOW TEMPERATURE CIRCUIT
482 kW
- 4** NUMBER OF FANS
- 1000 mm** FAN DIAMETER
- 97.200 m³/h** AIR FLOW



- Double coils: LT for cooling of the turbocharger, HT for the motor-generator unit jacket
- Ducted fans
- Header tank

RADIATOR FOR GENSET

- HT** HIGH TEMPERATURE CIRCUIT
140 kW
- 8** NUMBER OF FANS
- 910 mm** FAN DIAMETER
- 119.100 m³/h** AIR FLOW



- Stainless steel heat exchanger
- High temperature + Low temperature circuit
- Frame coating: C5-M (ISO 12944)
- Forced draught
- Fin protection: ELECTROFIN®

RADIATOR FOR CO-GENERATION SYSTEM

- HT** HIGH TEMPERATURE CIRCUIT
717 kW
- LT** LOW TEMPERATURE CIRCUIT
87 kW
- 4** NUMBER OF FANS
- 800 mm** FAN DIAMETER
- 59.100 m³/h** AIR FLOW



- Double coils: LT for cooling of the turbocharger, HT for the motor-generator unit jacket
- Forced-draught stator fan
- "Plenum" inspection doors
- Protective sheath of fin pack

WE ARE ALL OVER THE WORLD



TABLE OF CODES

DESIGN

H-FLOW / V-FLOW Short Module	C
H-FLOW / V-FLOW Standard Module	A
H-FLOW / V-FLOW Long Module	B
V Shape "Tower" Short Module	L
V Shape "Tower" Standard Module	T
V Shape "Combo" Short Module	R
V Shape "Combo" Standard Module	K
V Shape "SuperJumbo" Short Module	Q
V Shape "SuperJumbo" Standard Module	S
RADIAL	R
ECOOLER	P

ROWS OF FANS

1 or 2	1 or 2
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FANS PER ROW

1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / A (=10)	1 to 10
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COIL ROWS

2 / 3 / 4 / 5 / 6	2 to 6
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SPEED RATE (EC FANS ONLY)

30% / 40% / 50% / 60% / 70% / 80% / 90% / 100%	30% to 100%
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PRODUCT CODE

E

S

3C

2

4

90

6

2

100%

COIL TYPE

E	31S0 (30x25,98 OVAL PIPE copper)
T	2507 (25x21,65 pipe $\phi=7,2$ mm copper)
V	3110 (30x25,98 pipe $\phi=3/8$ " copper)
J	3120 (30x25,98 pipe $\phi=12$ mm copper)
W	3712 (37,50x32,48 pipe $\phi=12$ mm copper)
U	4816 (48x41,57 pipe $\phi=3/8$ " copper)
X	4816 (48x41,57 pipe $\phi=3/8$ " AISI 304)
4	4816 (48x41,57 pipe $\phi=3/8$ " AISI 316L)

FAN TYPE PERFORMANCE CONFIGURATION

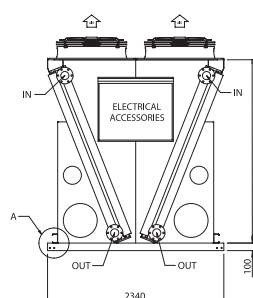
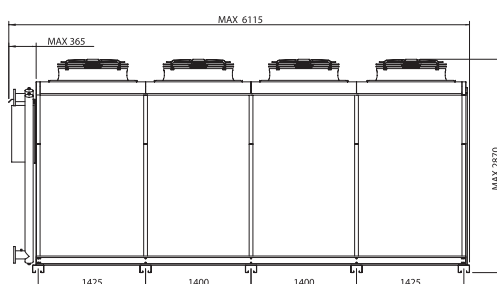
5C	Axial 3- phase EC / High Power
5X	Axial 1- phase EC / High Power
UC	Axial 3- phase EC / High Power + High Efficiency Diffuser
4C	Axial 3- phase EC / Standard
4X	Axial 1- phase EC / Standard
PC	Axial 3- phase EC / Standard + High Efficiency Diffuser
3C	Axial 3- phase EC / Low Noise
3X	Axial 1- phase EC / Low Noise
VC	Axial 3- phase EC / Low Noise + High Efficiency Diffuser
4D	Axial 3- phase AC / Standard / Delta
4Y	Axial 3- phase AC / Standard / Star
3D	Axial 3- phase AC / Low Noise / Delta
3Y	Axial 3- phase AC / Low Noise / Star
2D	Axial 3- phase AC / Quiet / Delta
2Y	Axial 3- phase AC / Quiet / Star
GC	Radial 3- phase EC
RD	Radial 3- phase AC / Delta
RY	Radial 3- phase AC / Star
4M	Axial 1- phase AC Standard / Standard
3M	Axial 1- phase AC Standard / Low Noise
2M	Axial 1- phase AC Standard / Quiet

DIAMETER OF THE FANS

50	500mm
63	630mm
71	710mm
80	800mm
90	910mm
10	1000mm
12	1250mm

NO. OF TUBES PER CIRCUIT

2 to 14	2 / 4 / 6 / 8 / 10 / 12 / 14
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HIGHLIGHTS

HIGH EFFICIENCY EC FANS

Compared to units equipped with standard EC fans, the high efficiency diffusers allow to:

- reduce the speed of the fans;
 - reduce the sound level down to 3dB(A);
 - reduce the energy consumption down to 15%;
- or
- increase the air flow up to 9%;
 - increase the thermal exchange up to 8%.

- The series of coolers that use the high efficiency diffusers are distinguished by the fan type performance configuration codes **UC**, **VC e PC**.

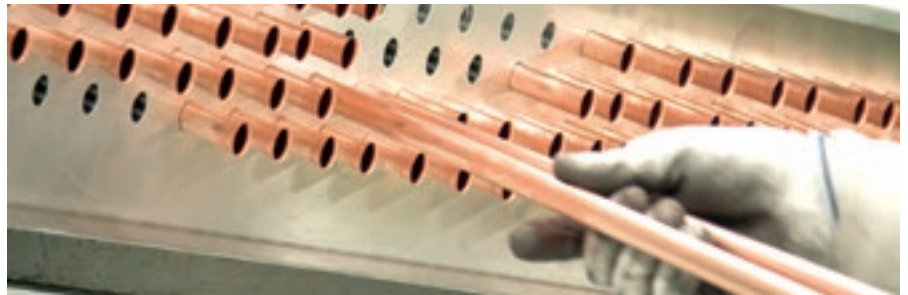


OVAL TUBE

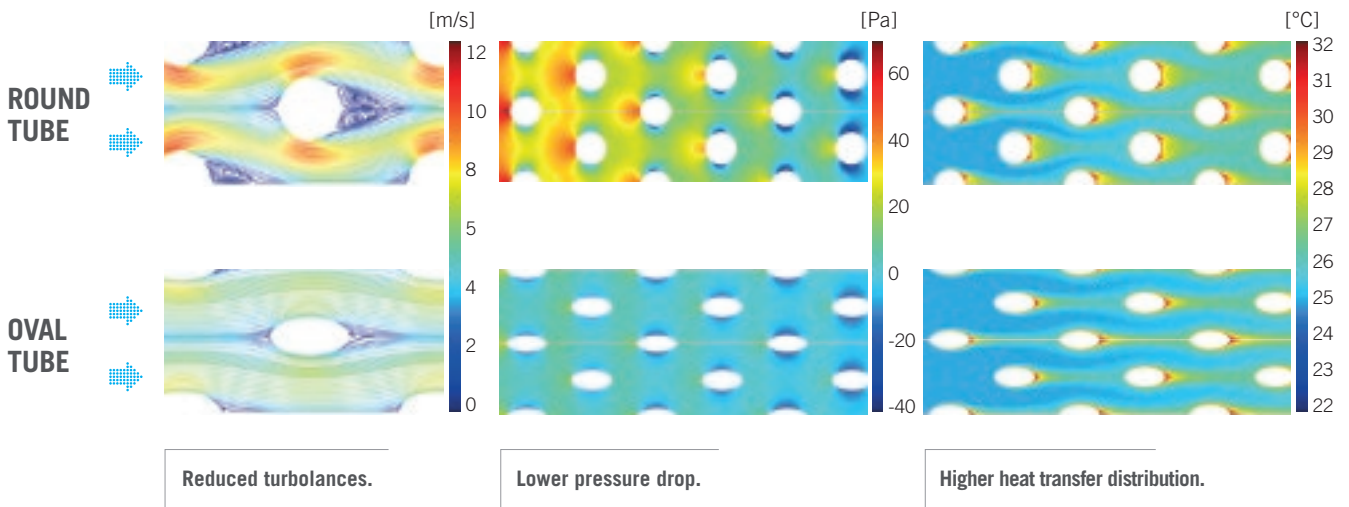
The revolutionary 31S0 geometry with oval tubes is the real innovation in the production of heat exchangers.

The 31S0 geometry enhances performances up to 15% compared to the round tube geometries. Air-side pressure drops can be reduced by 40%, allowing a better performance of the axial fans. All this leads to a quieter operation and a lower energy consumption.

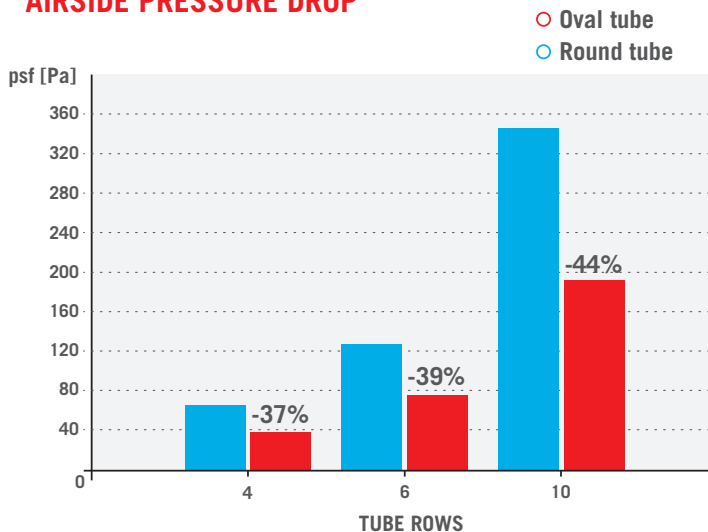
- The series of coolers that use the oval tube are distinguished by the coil type **code E**.

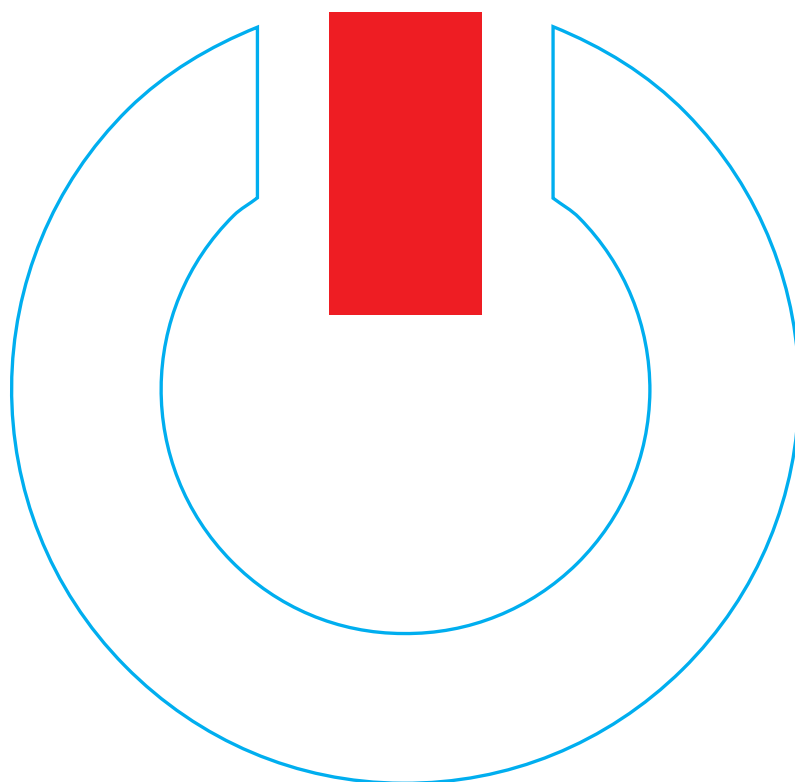


ROUND AND OVAL TUBE COMPARISON



AIRSIDE PRESSURE DROP





ITALY

Refrion S.r.l.
Vicolo Malvis, 1
33030 Flumignano di Talmassons (UD)
Ph.: +39 0432 765533

SWITZERLAND

Refrion Schweiz GmbH
Tannackerstrasse, 7
3073 Gümliigen BE
Ph.: +41 (0) 31 952 66 58

RUSSIA

Xchange RUS
Borisovskie prudy, 10-5
115211 Moscow
Ph.: +7 (495) 585-11-89

GERMANY

Refrion Deutschland GmbH
An der Bahn, 51
23867 Sülfeld
Ph.: +49 (0) 4537 7066055

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