

# LIQUID COOLERS



**REFRION**  
COOL GENERATION

# WHY REFRION LIQUID COOLERS

Liquid coolers can adapt to various uses, such commercial and data-centre application air conditioning, process and industrial cooling.

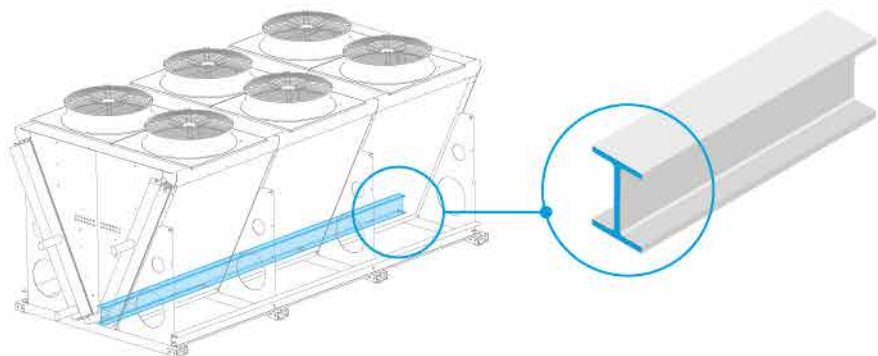
Fairing consists of modular components in hot-dip galvanised steel, powder coated (standard colour: RAL 9002) and corrosion resistant up to corrosion class C5.

The fastening elements (screws, threaded inserts, rivets, washers and nuts) are all in stainless steel.



## 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 / EU DIRECTIVES

### EN 1048

(Air Cooled refrigerant Condensers Performances)

### EN 378

(Safety and Environmental requirements)

### EN 60204-1

(Safety - Electrical equipment)

### EN 13487

(Sound Measurements)

### EN ISO 13857

(Fan Guards)

### CSA C22.2

No. 236-11- UL 1995

### EN ISO 12944

(Corrosion protection of the steel structure)

### MD DIRECTIVE 2006/42/EC

(Machinery Directive)

### PED DIRECTIVE 2014/68/EU

(Pressure Equipments 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)



## HEAT EXCHANGERS

- **WITH OVAL SECTION TUBES:**  
12 mm nominal diameter; staggered pitch pattern and high-efficiency fins.
- **WITH ROUND SECTION TUBES:**  
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.



## 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 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**  
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.

# REFRION HIGHLIGHTS



## HIGH EFFICIENCY EC DIFFUSERS

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%.



## ADIABATIC SYSTEMS Available upon request

The adiabatic saturation reduces the suction air temperature (respect to the ambient air) and therefore the efficiency of the heat exchanger increases.

The adiabatic saturation temperature lowers - since evaporating water removes heat - though it is still higher than the dew temperature, as evaporation itself raises the partial pressure of water vapour. Thanks to Refrion's systems, the adiabatic saturation guarantees an increase of the relative humidity up to the whole saturation of the air (R.H.=100%)

SCAN HERE  
AND WATCH MORE



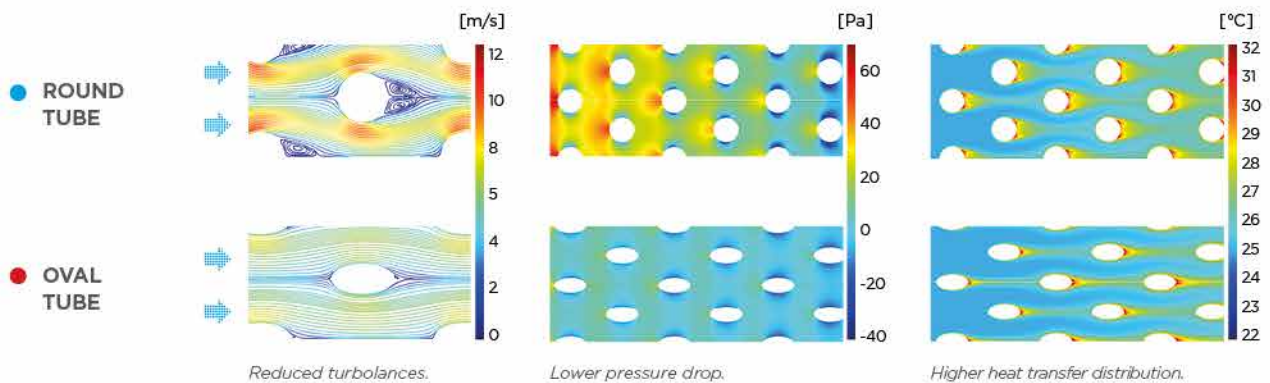
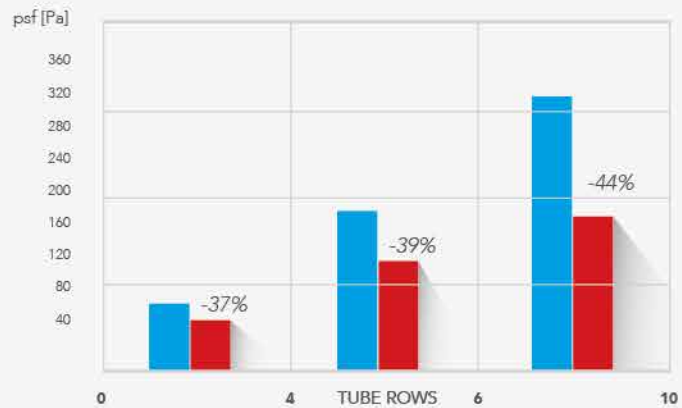
## OVAL TUBES

The revolutionary 3ISO geometry with oval tubes is the real innovation in the production of heat exchangers.

The 3ISO 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.



### ROUND AND OVAL TUBE COMPARISON



Refrion has developed 3 different adiabatic systems, to guarantee maximum system efficiency for different environmental conditions and a single control system for their management.

#### SPRAY ADIABATIC SYSTEM



open circuit

#### HYBRID SPRAY SYSTEM (H.S.S.)



close circuit

#### INDUSTRIAL ADIABATIC SYSTEM (PADS)



open circuit



close circuit

# ECOOLER

The frame is designed to be stable and strong; overall dimensions designed for common means of ground transportation.

All the components are made of hot-dip galvanized steel and epoxy powder coating (standard colour: RAL 9002) suitable for medium corrosive environments classified C3 (EN 12944-2).

All the operations involved in the production of the components are performed before painting, guaranteeing the highest level of protection for the steel against corrosion.

The water recirculation system is self-draining and fully accessible for inspection. The main components (tank, distributors and drip trays) are made of aluminium; available in stainless steel on request.

All the internal components are accessible for servicing through the maintenance door protected by a security switch. If the door is opened, the power is completely disconnected and access to the inside of the unit is only possible after the fans have stopped.



#### COOLING CAPACITY

Up to 3000 kW\*



#### AIR FLOW

Up to 450.000 m<sup>3</sup>/h



#### NUMBER OF FANS

1-7 4-20



#### OVERALL LENGTH

Single row 2284-11884 mm  
Double row 3184-12784 mm



#### FAN DIAMETER

800-1250 mm

\* Standard conditions EN1048



#### EVAPORTATIVE COOLING PADS

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



#### RECIRCULATION PUMP

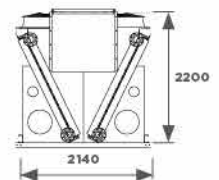
Submersible centrifugal pumps in stainless steel material. Enclosure class: IP 68



#### MAINTENANCE DOOR

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

# COMBO



## 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.

Refrion participates in the ECP programme for Dry Coolers. Check ongoing validity of certificate: [www.eurovent-certification.com](http://www.eurovent-certification.com)



- kW** **COOLING CAPACITY**  
133-2340 kW\*
- NUMBER OF FANS**  
4-20
- FAN DIAMETER**  
800-910 mm
- OVERALL LENGTH**  
2915 mm-12515 mm
- MODULE**  
S.R.S. Strain Relief System

### OPTIONAL ACCESSORIES:

-  **SPRAY ADIABATIC SYSTEM**
-   **HYBRID SPRAY SYSTEM (H.S.S.)**  
OPEN AND CLOSE CIRCUIT
-   **INDUSTRIAL ADIABATIC SYSTEM (PADS)**  
OPEN AND CLOSE CIRCUIT

\* Standard conditions EN1048

**SUGGESTED BUSINESS LINES**



**AIR CONDITIONING**



**INDUSTRIAL COOLING**



**PROCESS COOLING**



**DATA CENTER COOLING**