CO₂ SOLUTIONS

Transcritical CO₂ solutions

**eCO2Boost**
Transcritical CO₂ booster unit for production of low and chill temperatures for supermarkets applications

Sub-critical CO₂ solutions

**MULTIWAVE**
Sub-critical CO₂ condensation unit with cascade for production of low (R134a) and chill (CO₂) temperatures for supermarkets applications

**eCO2Gen**
Sub-critical CO₂ rack with cascade in medium-temperature circuit for supermarkets applications

**eCO / eMR**
Sub-critical CO₂ rack with cascade in glycol water circuit for industrial applications
Our label E Solutions
Our commitment toward green solutions

Natural fluids
Reducing the impact of systems on the climate

TEWI is a measurement defining the impact of a refrigeration system on the greenhouse effect. It incorporates the direct impact of refrigerant emission and the indirect impact of electricity use (CO2 emitted when power is generated).

Refrigeration solutions that use natural fluids have come into their own since the European Union committed to reducing greenhouse emissions by 20% in the coming years.

Large-scale food distributors have decided to reduce their carbon footprints. Nowadays, refrigeration accounts for up to 50% of energy use in stores.

Environment
“Life Cycle Cost Performance”

• Designing refrigeration systems whose performance in terms of climate change is optimised throughout their life cycle > less CO2 (R744) refrigerant is required and it is less expensive.
• Preparing for end-of-life recycling: CO2 (R744) is not subject to any legislation in terms of elimination or recovery > by choosing natural CO fluid (R744) it is possible to pre-empt tax issues relating to refrigerants (abolition of HFCs in 2015).

Energy efficiency
Optimising energy consumption

• Energy consumption can be reduced by up to 20% with a CO2 (R744) system with cascade in a medium-temperature circuit.

Services and Expertise
An entire team at your disposal!
We provide you with our expertise to help you set up your CO2 (R744) systems

Training on commissioning CO2 (R744) equipment
• Description of how the CO2 (R744) unit and its various components operate.
• Training on the principle of regulation.
• Performing the system load and start-up procedure.
• Performing an assessment of the system.

On-site audit and advice
• General operating principle of a CO2 rack.
• Inspecting the regulation system in place and addressing the various specific features of this type of installation.

A summary of benefits:
• Non-toxic and non-flammable
• Not subject to legislation on fluorinated fluids
• No decline in food quality
• No load limit
• Inexpensive
• 1,300 to 4,000 times less impact on the climate than HFC-type refrigerants (CO2 (R744) Global Warming Potential =1)
• Compact systems: due to the physical properties of CO2, all components (compressor, piping, valve, etc.) are more compact than in conventional refrigerant-based systems.

CO2 increases the efficiency of systems

• High theoretical coefficient of performance (COP) for lower condensation temperatures than the critical temperature for CO2.
• High heat transfer coefficients during evaporation and condensation (up to 60% higher than with HFCs).
• Highly compatible with standard materials and refrigerator oils.

A range tailored to your new or remodelling projects

• Production of low temperatures
• Production of chill temperatures
• An electrical and control cabinet
• A support package: training, on-site audits and technical advice

Refrigeration equipment selection software
This software is used to size the entire system (chill temperature CO2 rack, low temperature unit and options) and access technical data.

CO2 (R744)
A natural refrigerant for the production of cold

New regulations aimed at reducing greenhouse gases and protecting the environment are prompting manufacturers to develop new technologies and use new refrigerants with low global warming potential. CO2, whose global warming potential is on average 3,800 times lower than R404A, is therefore increasingly being used for refrigeration.

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‘Transcritical’ technology

The defining feature of transcritical CO₂ technology is that it is impossible to condense CO₂ on the high-pressure side of the refrigerating circuit if its temperature exceeds 31°C (approximately 72 bar). Our technology adapts particularly well to this constraint and optimises the performance of systems including in regions where ambient temperatures are relatively high.

**eCO2Boost**

Transcritical CO₂ booster rack

The eCO2Boost transcritical system is a booster rack enabling all low and chill temperature requirements to be covered with CO₂. The booster configuration allows to optimise the way the system runs by stepping compression which improves operating conditions of the compressors. eCO2Boost is designed based on a single frame that includes all low and chill temperature compression assemblies, the liquid receiver and all refrigerating and control components that enable this type of system to operate (high-pressure control, heat exchanger control, oil management, etc.).

eCO2Boost can also accommodate heat exchangers to recover heat for sanitary hot water and heating. In slightly warmer climates, the efficiency of the eCO2Boost transcritical system can be optimised using parallel compression or external subcooler solutions. Our service also includes a gas cooler which cools CO₂ under high pressure.

**3C-A**

Cubic unit cooler

1 > 35 kW
MULTIWAVE - THE SUB-CRITICAL CO₂ SOLUTION FOR SUPERMARKETS

MULTIWAVE
Encased condensation unit
• An innovatively designed range for installations where space may be a problem.
• Environmentally-friendly, natural refrigerant (CO₂) for refrigeration in supermarkets.
• “Ready-to-use” range with refrigeration and electrical equipment grouped and connected on a single frame.
• Low energy consumption thanks to EC motors, compressor speed variation and heat recovery (optional extras).
• Microchannel technology allowing a significant reduction of refrigerant charge.
• State of the art design with hidden fans for a perfect architectural integration.

'Multicritical' technology
CO₂ condenses below 31°C (critical point). Sub-critical applications or cascade refrigerating systems are projects in which a cascade system is created where CO₂ is condensed either by a heat transfer liquid (e.g. glycol water) or a refrigerant whose characteristics enable condensation to occur in line with external temperature conditions: NH₃, hydrocarbon (propane), HFC (R404A or R 134a).

MULTIWAVE
Packaged encased CO₂ unit for production of low and chill temperatures
23 > 200 kW

3C-A
Cubic unit cooler
1 > 35 kW
**eCO2Gen**

**Installation in a machine room**

*eCO2Gen* operates in cascade with chilled water production enabling HFCs to be increasingly confined to a machine room. A cascaded configuration in a glycol water loop is beneficial as it offers flexible control and thermal inertia.

The *eCO2Gen* range is designed based on a shared frame where the various CO₂ compression and condensation assemblies and liquid receiver are grouped and interconnected. These different sub-assemblies include all the special equipment for this type of technology that enables a system to function properly.

Our service also includes the supply of all components needed to fit a store including:

- A low temperature rack.
- A Eurovent-certified air-cooled condenser.
- All safety and control elements.

A range of compressor racks operating with CO₂

- Chill temperature
- Sub-critical operation
- Cooling capacity of 18 to 80 kW
- CO₂ (R744) system with cascade in a medium-temperature circuit:
  - Glycol water as heat transfer liquid
  - or direct expansion R404A/R134a

**Low temperature production**

**MOPSH**

Low temperature rack with glycol water heat exchanger or in direct expansion semi-hermetic piston compressors

**PEG**

Low temperature rack with glycol water heat exchanger semi-hermetic screw compressors

**3C-A**

Cubic unit cooler

**Cooling capacity in kW (-35°C / -5°C)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Cooling Capacity</th>
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<tbody>
<tr>
<td>eCO2Gen 18/3</td>
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<tr>
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<td>eCO2Gen 80/4</td>
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eCO / eMR
A complete CO₂ solution for industrial applications

A comprehensive range designed to meet the demands of current markets:
- Natural fluids and reduced refrigerant charge
- Energy efficient
- Compact
- Quiet equipment

eCO / eMR
Sub-critical CO₂ chill temperature rack
108 > 341 kW

- CO₂ racks with condensation in a glycol water circuit that are both reliable and compact.
- Cooling capacity: 108 to 341 kW (-35/-3°C; glycol water at -8/-4°C).
- Two versions available:
  - eCO = encased outdoor
  - eMR = machine room
- Heat recovery for producing hot glycol water at a temperature of 40/50°C

eCO/eMR options
- DES = Braze plate desuperheater
- GMP = Safety group (MINI unit delivered mounted and connected)
- 2CD = 2 x 50/50% condensers
- PCT = Rack pre-wired with 5 m cable available
- PEI = Painted frame
- MPI = Injected polyurethane foam insulation
- VAR = Head compressor speed variator

PEG
Chilled water production
300 > 760 kW

- Cooling capacity:
  - 290 to 780 kW (glycol water -4°C/-8°C / +45°C condensation temperature)
  - 280 to 690 kW (glycol water -5°C/-9°C / +45°C condensation temperature)
- Refrigerant charge confined.
- 1, 2 or 3 separate refrigerating circuits.
- Up to three levels of capacity steps: 100%/75%/50%.
- Electronic expansion valves with controller, probes, sensors and solenoid valve.

MXW
Axial fan condenser with microchannel coil technology
50 > 1660 kW
**NK**  
Industrial cubic unit cooler  
7 > 130 kW

- Range available in tow versions:
  - **NKT**: Large heat exchange surface suitable for humidity-sensitive products.
  - **NKH**: High efficiency suitable for storage of packaged products.
  - High-performance defrosting systems for chill temperature applications.

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**GTA**  
Industrial dual discharge evaporator  
20 > 82 kW

- High level of acoustic comfort.
- Low air speed
- Easy access for commissioning and maintenance
- EC motors (option).

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**Energy comparison of heat exchanger technologies**

- Copper tube/aluminium fin coil
- Microchannel coil

Pressure drop on air reduced by 30% to 40%