

Be sustainable while protecting your business

Aquaflair

50Hz Air-cooled chillers and free-cooling chillers with double screw compressors and HFO R1234ze refrigerant

(400V/3ph/50Hz)



300 - 1000 kW Aquaflair BREC-BREF chillers with environment friendly refrigerant R1234ze combines cutting-edge technology with energy efficiency and global warming reduction.

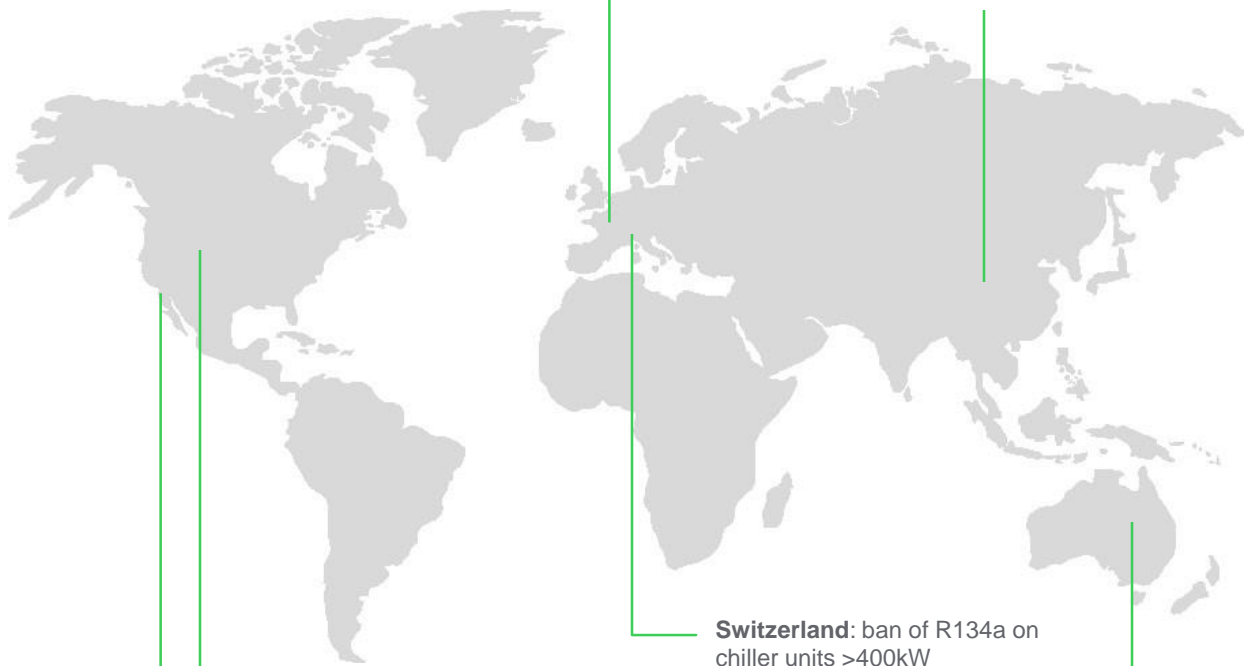
- All-in-one units, completely configurable for easy design and installation, continuous and quiet operation in multiple applications and environmental conditions.
- Aquaflair chillers are designed for Tier III and IV mission-critical data center installations

Global trend

Aiming at reducing the impact of emissions from refrigeration and air conditioning systems, governments worldwide are regulating or banning the use of HFC refrigerants¹.

Europe: F-Gas regulation to reduce average GWP² forcing the replacement of current refrigerants with low GWP ones

China: announced in 2014 the management and replacement of HFC refrigerants as part of an energy conservation and emissions reduction plan



North America: possible ban of HFC refrigerants in 2025. Climate Action Plan to reduce HFC emissions

Switzerland: ban of R134a on chiller units >400kW

California: proposal to ban the sale of all HFC refrigerants with high GWP in 2020 and to ban new stationary refrigeration equipment using HFC with a GWP >150

Australia: new phase down strategy for HFC-refrigerants starting Jan 2018, reducing HFC emissions by 85% by 2036

1. HFC refrigerants commonly used on chillers have GWP values between 1000 and 4000. New alternative refrigerants dramatically decrease such values. 2. GWP (Global Warming Potential) is an index based on CO₂ equivalent tons to measure the impact of a greenhouse gas on the atmosphere

Focus on EU F-Gas Challenge

The F-Gas³ Challenge is a phase-down regulation based on the total quantity of CO₂ equivalents and an average value of the GWP index, aiming at dramatically reducing F-Gas emissions over 15 years.



A greater quantity of lower GWP refrigerants can be sold compared to those with a higher GWP

When

Starting from January 1st, 2015

What

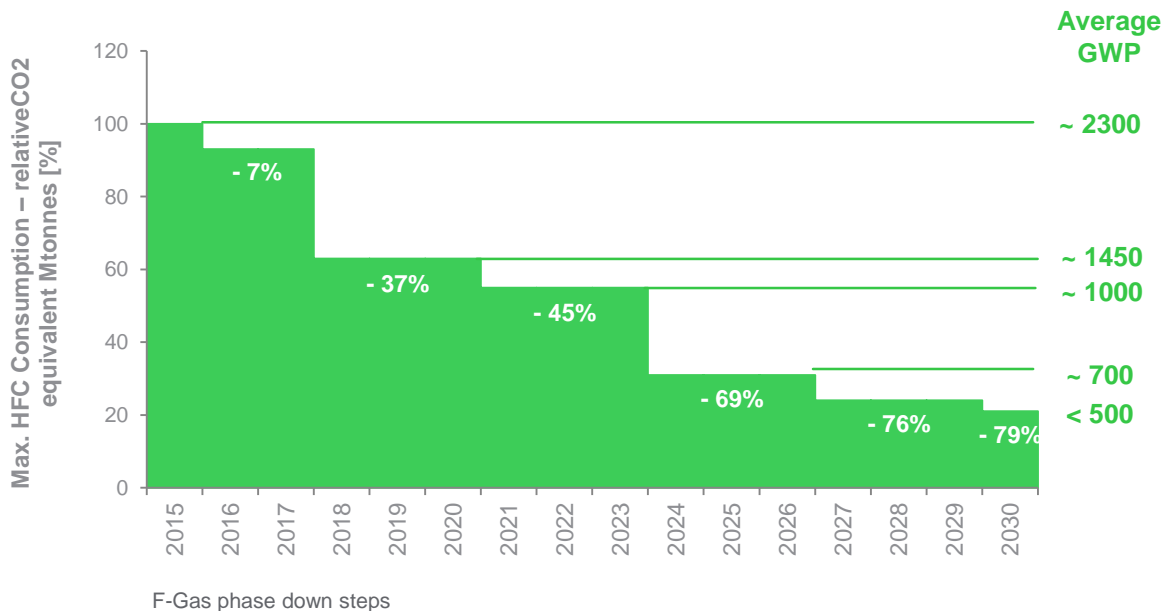
By 2030 cut the EU's F-gas emissions by two-thirds compared with 2014 levels

Base line

Annual average GWP of the total refrigerant quantity deployed into the EU from 2009 to 2012

How to perform the phase down

- Switch to lower GWP refrigerants
- Prevent leakage
- Design for lower refrigerant charge
- Reduce usage of high GWP refrigerants
- Recover during retrofit/end of equipment life

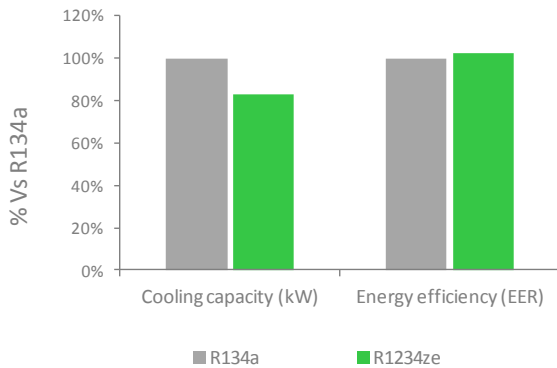


HFO R1234ze refrigerant

R1234ze performance compared to R134a⁴

HFO R1234ze cooling units are featured by:

- Wider operation envelope
- Better energy efficiency (EER)
- Lower cooling capacity per footprint



R1234ze and Safety: what you need to know

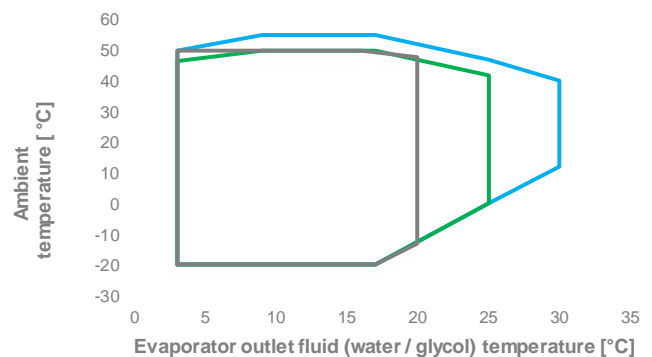
- Safety Class A2L (Slightly flammable). A2L refrigerants have a low flammability limit
- BREC-BREF units are air-cooled chillers installed outside, this ensures extremely low risk. Water-cooled chillers however are typically installed indoors and need constant room monitoring and pose a greater risk in the case of possible refrigerant leakage.
- The flammability risk is minimal, however a site risk analysis may be needed based on local regulations

What are the main requirements for this new refrigerant?

- Compressors specifically manufactured for R1234ze use
- ATEX explosion proof components for compressors
- Refrigerant leakage sensors located in the compressor acoustical casing (if present)
- Ventilation system for compressor acoustical casing (if present)

Operation limits: R1234ze Vs R134a

- Zero ambient impact: GWP < 1
- High ambient temperature operation, up to 50°C (up to 55°C on request)
- High chilled water outlet temperature, up to 25°C at full load (up to 30°C on request)
- Mono-component refrigerant: constant performance over time



- R1234ze high temperature version (on request and to be checked with Schneider Electric)
- R1234ze basic version
- R134a high temperature version

4. R134a is the current standard refrigerant used on Schneider air-cooled large chillers

Main components of BREC-BREF with R1234ze

Electrical panel

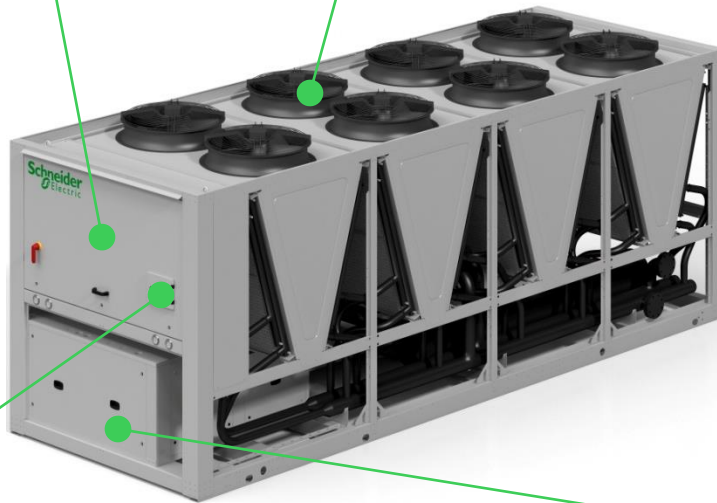
- IP54 rated
- Main disconnect switch
- Electric bars distribution for power supply
- Absorbed current monitoring
- Max internal temperature control
- Magneto-thermal cut-off switch on the fans and auxiliaries fuses for the compressors

Acousti-Composite fans

- Sickle-blade axial fans
- Statically and dynamically balanced
- Composite materials for high efficiency
- Low acoustic impact
- Protective safety grilles

Optional fans with Electronically Commutated (EC) motors

- High energy efficiency
- Low motor noise
- Higher ambient temperature operation



Microprocessor controller

- Local user interface with external display
- Exclusive PID algorithm for chilled water supply temperature regulation
- Indirect and direct refrigerant charge monitoring
- Monitoring for predictive maintenance
- Advanced freeze protection on evaporator
- Pump rotation and management
- Integrated management card
- Quick restart after power failure

Two semi-hermetic double screw compressors

- Internal thermal protection, discharge shut-off valve, oil heaters, and anti-vibration supports.
- Designed for mission critical applications
- High temperature operation

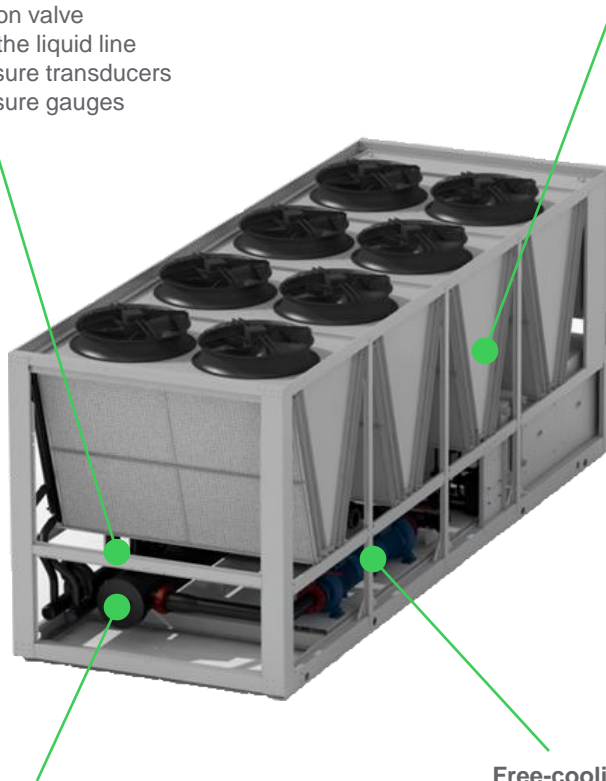
Main components of BREC-BREF with R1234ze

Refrigerant circuits

- Two refrigerant circuits
- Compressor discharge shut-off valve
- Dehydration filter
- Liquid sight glass
- Electronic expansion valve
- Solenoid valve on the liquid line
- High and low pressure transducers
- High and low pressure gauges

Air-side heat exchangers

- Oversized condensing coils (and free-cooling coils for BREF) with aluminum fins in "V" shape
- Flexibility for movement and maintenance
- Ease of maintenance
- Low acoustic impact
- High maximum ambient temperature operation



Water-side heat exchanger

- High efficiency single passage shell-and-tubes evaporator
- Maximize efficiency with counter flow design
- Uniform temperature even at part-load conditions
- Designed to improve oil drag
- Insulated with UV resistant neoprene

Free-cooling pump (BREF only)

- Dedicated free-cooling pump completely managed by the microprocessor control
- BREF units can operate in ambient temperature down to -25°C (in free-cooling mode) and up to -40°C (optional)

Main Configurable Options

Dual and/or separate power supply

- Dual power supply with automatic transfer switch (ATS) for complete redundancy
- Separate power supply from UPS for microprocessor control for quick start and emergency operation
- Automatic dual and separate power supply from UPS for redundancy and quick restart

Acoustic options

Aquaflair air-cooled chillers with screw compressors can be featured by different options in order to be compliant to noise limitations and requirements:

- Basic version (standard)
- Quiet* version: soundproof enclosures for compressors
- Quiet* version with noise reduction chimneys
- UltraQuiet* version: soundproof enclosures for compressors and modulating condensation control for fans

* If Quiet or UltraQuiet options are selected, the soundproofed enclosure for compressors is equipped with a refrigerant leakage sensor and a ventilation system

Onboard pumps

Onboard pumps allow a direct contact with the primary circuit only. The available options are:

- Integrated hydronic system with one or two circulation pumps (1 + 1 standby).
- Integrated hydronic system with one or two (1+1 standby) inverter-driven circulation pumps and pressure transducers for increased efficiency, flexibility and modularity

Free-cooling options

- Intelligent free-cooling for increased efficiency leveraging on standby units
- Glycol-free free-cooling: Integrated system to separate the main water system (pure water) from the free-cooling circuit (water + glycol)

Additional options

Aquaflair chillers can be equipped with special devices to operate at particular ambient conditions

- For aggressive ambient conditions: metal safety grilles and filters, coil manifolds protection panels and coil anti-corrosive protection treatment
- Low ambient temperature option (standard for BREF models): electrical heaters in the electrical board