CLIVET®

EFFICIENT AND LOW
ENVIRONMENTAL IMPACT

# NEW CHILLERS

*Inspiring Solutions since 1989*

# Regulation developments: refrigerants

## Scroll compressor chillers and heat pumps

| | GWP | flammability | series |
|---|---|---|---|
| R-410A | 2088 | NOT flammable | SPINchiller[3]<br>WSAT-XSC3 / WSAN-XSC3 / WSAN-XSC3 MF / WSAT-XSC3 FC |
| R-32 | 675 | LIGHTLY flammable | SPINchiller[4]<br>WSAT-YSC4 / WSAN-YSC4 |

## Screw compressor chillers

| | GWP | flammability | series |
|---|---|---|---|
| R-134a | 1430 | NOT flammable | SCREWLine[3]<br>WDAT-SL3 / WDAT-iL3 |
| R-513A | 631 | NOT flammable | SCREWLine[4]-i<br>WDAT-iK4 |
| R-1234ze | 7 | LIGHTLY flammable | SCREWLine[4]-i<br>WDAT-iZ4 |

## Centrifugal compressor chillers

| | GWP | flammability | series |
|---|---|---|---|
| R-134a | 1430 | NOT flammable | Centrifugal Chiller<br>WCH-i |
| R-1234ze | 7 | LIGHTLY flammable | Centrifugal Chiller HFO<br>WCH-iZ |

## low environmental impact refrigerants

For many decades, global policies to contain climate change have also affected refrigerants used in air conditioning. After cancelling the destructive effect on the atmospheric ozone layer (ODP = 0), laws and regulations are strongly oriented towards eliminating the greenhouse effect, measured by the GWP (Global Warming Potential) parameter and among the main causes of global warming.

In Europe, The current F-Gas Regulation (EU Reg. 517/2014) provides for the gradual reduction of the placing on the market of greenhouse effect refrigerants (phase down), through quote allocated to each European country and other constraints on the use of refrigerants. The objective is to reduce carbon dioxide equivalent emissions by 80% within 2031.

It is therefore essential to adopt the latest generation of high efficiency products equipped with low GWP refrigerants in air conditioning systems.

Clivet is at the forefront, already being able to provide solutions with low environmental impact:

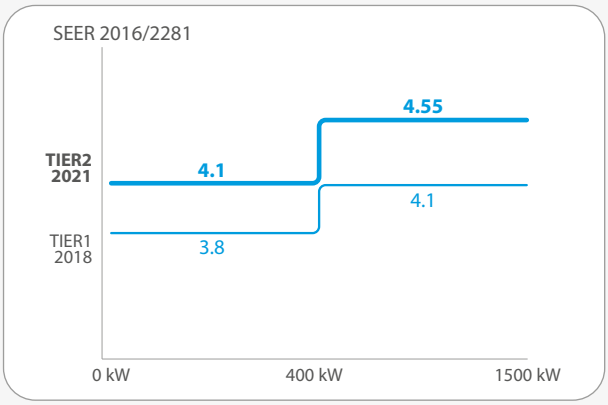
- ✓ units with scroll compressors with R-32 refrigerant;
- ✓ units with screw compressors with R-1234ze and R-513A refrigerants.

# Regulation developments: energy efficiency

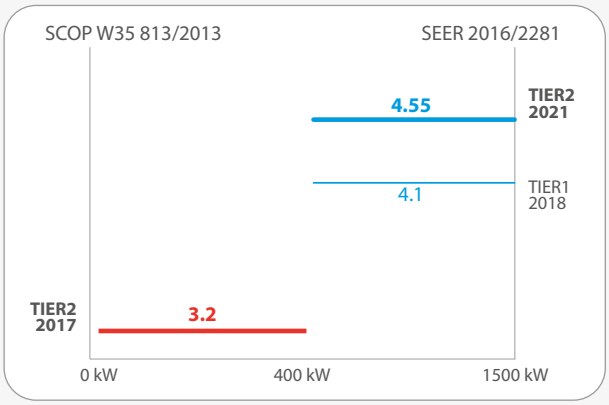
AIR

## Air-cooled chillers and heat pumps

chillers



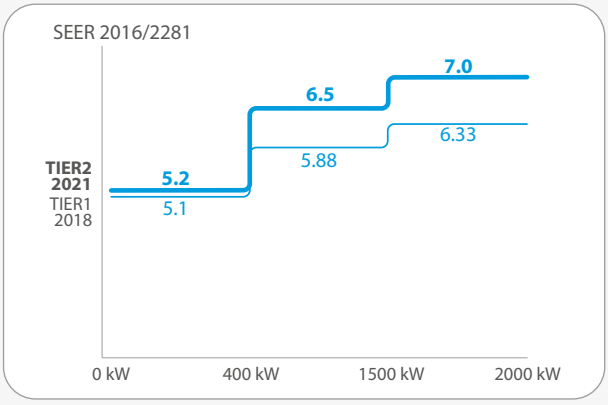

heat pumps



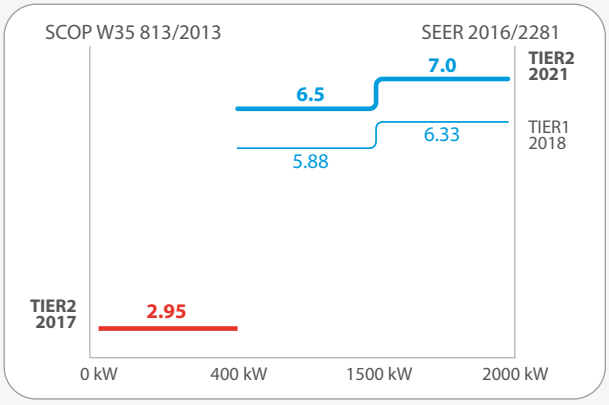

H2O

## Water-cooled chillers and heat pumps

chillers




heat pumps




The Ecodesign 2009/125/EC regulatory framework establishes consistent EU-wide standards for the improvement of product performance in terms of environmental impact, including HVAC equipment. For each product family, specific European legislation has been implemented under Directive 2009/125/EC.

The European Regulation n.813/2013 entered into force in September 2015 (for all heat pumps with capacities lower than 400 kW) and the European Regulation 2016/2281 entered into force on 1 January 2018 (for all liquid chillers and heat pumps with capacities above 400 kW) introduce a minimum seasonal efficiency threshold.

Each regulation has its own implementation plan, generally divided into two time phases (known as Tier).

On 1st January 2021 there will be even stricter and more difficult parameters.

All the products Clivet is developing already comply with all these European regulations.

# SPINchiller$^4$

**Air cooled liquid chillers and heat pumps with multiscroll technology for commercial and industrial installations**

**WSAT-YSC4**

Cool only

Range 220-675 kW - Seasonal efficiency SEER up to 5.00

Premium and Excellence version available

Low enviromental impact solution

**WSAN-YSC4**

Reversible heat pump

Range 220-650 kW - Seasonal efficiency SEER up to 4.90

Premium and Excellence version available

Low enviromental impact solution

*Available by the end of 2020*

## CONDENSING HEAT RECOVERY (OPTIONAL)

- ✓ Partial recovery = about 20% of available heat;
- ✓ total recovery = 100% of available heat;
- ✓ allows the free hot water production for:
  - re-heat hot water coil;
  - domestic hot water;
  - other processes or operation.

## ADVANTAGES

- ✓ High energy efficiency;
- ✓ great operating reliability;
- ✓ maximum versatility of choice;
- ✓ supplies the system with only the energy required, in all operating conditions;
- ✓ follows the load even in conditions of strong partialisation;
- ✓ guarantees high efficiency values reducing operating costs;
- ✓ compact dimensions;
- ✓ management up to 7 units in local network (ECOSHARE).

## MULTISCROLL COMPRESSORS: UP TO 8 CAPACITY STEPS

SPINchiller$^4$ uses up to 3 scroll compressors on two independent refrigerant circuits, for a better operational flexibility and very high efficiency in all load conditions. Modulation of capacity up to 8 steps and an extended operating range from +50°C (full load) to -10°C of external air temperature that are able to meet the needs of each system.

## ECOBREEZE FANS WITH ELECTRICAL CONTROL

Electronically switched permanent magnet synchronous motor with integrated control electronics that enables:

- ✓ 70% increase in efficiency thanks to the absence of brushes and special power supply;
- ✓ increase in service life;
- ✓ reduction of the system's electrical effort, thanks to the Soft Start function.

## PLATE / SHELL AND TUBE EXCHANGERS

SPINchiller[4] is supplied as standard with a high performance plate heat exchanger.

To satisfy installations where the water characteristics are particular, such as in the presence of non-pure water that can cause possible incrustations, it is possible to choose the shell and tube exchanger.

High efficiency heat exchanger, which keeps the performance of the unit unchanged and equipped with Victaulic connections.

## 3 ACOUSTIC VERSIONS

- ✓ ST: unit without compressor soundproofing casing (Standard);
- ✓ SC: unit with compressor soundproofing -3dB(A) in comparison to ST;
- ✓ EN: unit with compressor soundproofing + antivibration joints: -7dB(A) in comparison to ST.

## WIDE CAPACITY RANGE

WSAT-YSC4

Bicircuit, from 3 to 6 scroll compressors

- ✓ Excellence version
  220 - 675 kW
- ✓ Premium version
  230 - 645 kW

ErP 2021 COMPLIANT

R-32

## NEW LAYOUT: MICROCHANNEL EXCHANGER (WSAT-YSC4)

- ✓ V-shaped arrangement to improve heat exchange and reduce overall dimensions and weights;
- ✓ high strength aluminium alloy;
- ✓ up to 30% reduction in refrigerant charge compared to traditional coils.
- ✓ protective treatment for industrial and marine environments available (E-Coated)

# SCREWLine$^4$-i

**Air cooled liquid chillers with screw compressors and inverter technology for commercial and industrial installations**

**WDAT-iZ4**

Range 200-1050 kW - Seasonal efficiency 5.42

Excellence version available

R-1234ze: GWP = 7, lightly flammable

Zero enviromental impact solution

**WDAT-iK4**

Range 280-1420 kW - Seasonal efficiency 5.39

Excellence and Premium version available

R-513A: GWP = 631, non flammable

Low enviromental impact solution

## CONDENSING HEAT RECOVERY (OPTIONAL)

- ✓ Partial recovery = about 12% of available heat;
- ✓ allows free hot water production for:
  - re-heating hot water coils;
  - domestic hot water;
  - other processes or operation.

## ADVANTAGES

- ✓ High energy efficiency;
- ✓ great operating reliability;
- ✓ maximum versatility of choice;
- ✓ supplies the system with only the energy required, in all operating conditions;
- ✓ follows the load even in conditions of strong partialisation;
- ✓ guarantees high efficiency values reducing operating costs;
- ✓ ensures a null starting current;
- ✓ compact dimensions;
- ✓ management up to 7 units in local network (ECOSHARE).

## SCREW INVERTER COMPRESSOR: CAPACITY LOAD FROM 100% TO 15%

SCREWLine$^4$ uses inverter screw compressors for an improved operational flexibility and very high efficiency in all load conditions.

The capacity load from 100% to 15% and an extended operating range from +50°C (full load) to -10°C of external air temperature, are able to satisfy the needs of each system.

## ECOBREEZE FANS WITH ELECTRIC CONTROL

Electronically switched permanent magnet synchronous motor with integrated control electronics that enables:

- ✓ 70% increase in efficiency thanks to the absence of brushes and special power supply;
- ✓ increase in service life;
- ✓ reduction of the system's electrical effort, thanks to the Soft Start function.

## 3 ACOUSTIC VERSIONS

- ✓ ST: unit without compressor soundproofing casing (Standard);
- ✓ SC: unit with compressor soundproofing -3dB(A) in comparison to ST;
- ✓ EN: unit with compressor soundproofing + antivibration joints: -7dB(A) in comparison to ST.

## WIDE CAPACITY RANGE

WDAT-iZ4

- ✓ Single circuit Single compressor: 200-510 kW
- ✓ Double circuit Double compressor: 420-1050 kW

WDAT-iK4

- ✓ Single circuit Single compressor: 280-600 kW
- ✓ Double circuit Double compressor: 550-1420 kW

ErP 2021 COMPLIANT

R-1234ze

R-513A

## NEW LAYOUT: MICROCHANNEL EXCHANGER

- ✓ V disposition to improve heat exchange and reduce overall dimensions and weights;
- ✓ high strength aluminium alloy;
- ✓ up to 30% reduction in refrigerant charge compared to traditional coils;
- ✓ protective treatment for industrial and marine environments available (E-Coated).

# Centrifugal Chiller

**Water cooled liquid chillers with centrifugal compressors for industrial and commercial applications**

**WCH-i**

Range 880-1940 kW - Seasonal efficiency 9.06

R-134A: GWP = 1430, non flammable

**WCH-iZ**

Range 810-1600 kW - Seasonal efficiency 9.64

R-1234ze: GWP = 7, lightly flammable

Zero enviromental impact solution

## FALLING FILM EVAPORATOR (PATENTED)

- ✓ The Falling Film evaporator is distinguished by the patented refrigerant distributor, which injects from above a spray refrigerant. The surface of the heat exchenge tubes, in which water circulates, is completely covered by a film of refrigerant, greatly increasing the efficiency of the heat exchange and reducing the refrigerating charge up to 40% compared to a flooded evaporator;
- ✓ the high heat exchange efficiency and the low superheat allow an evaporation temperature very close to the supply water temperature, increasing the overall efficiency of the unit.

## ADVANTAGES

- ✓ High silence: sound pressure value (@ 1m) between 79 and 82 dB(A) and almost total absence of vibrations;
- ✓ compact dimensions: length less than 4 metres. The space savings are an increasingly important aspect in the design of buildings;
- ✓ maximum adaptability: the capacity load from 100% to 15% and condenser leaving temperature up to +40°C, are able to satisfy the requirements of multiple operating conditions;
- ✓ several options and accessories to satisfy the needs of each system.

## FREE STANDING INVERTER

The use of inverter technology makes it possible to adapt the rotation speed of the compressor to the real demand of the system:

- ✓ capacity load from 100% to 15%;
- ✓ SEER up to 9,64;
- ✓ linear inrush current;
- ✓ control of the compressor operation conditions.

## PATENTED TECHNOLOGY

### HORIZONTAL BACK TO BACK CENTRIFUGAL COMPRESSOR

- ✓ Clivet developed the patented horizontally back-to-back compression technology;
- ✓ balance the thrust forces for longer life span and improved efficiency by less seal leakage and no gear loss.

### DOUBLE COMPRESSION STAGE

- ✓ The technology of two-stage compression with economizer fully demonstrates the advantage of aerodynamic design and brings higher efficiency to the system;
- ✓ unique pipeline crossover, with large backflow radius to reduce flow losses and noise.

### DIRECT DRIVE MOTOR COUPLING

- ✓ 2 bearings instead of 4 = more compact structure and smaller size;
- ✓ no transmission loss;
- ✓ more silent.

## OIL CIRCULATION SYSTEM

It guarantees the optimal lubrication of the bearing and prevents oil circulation in the refrigeration circuit. This leads to:

- ✓ higher exchange efficiency at the evaporator and the condenser;
- ✓ improved compressor reliability.

ErP 2021 COMPLIANT

R-134a

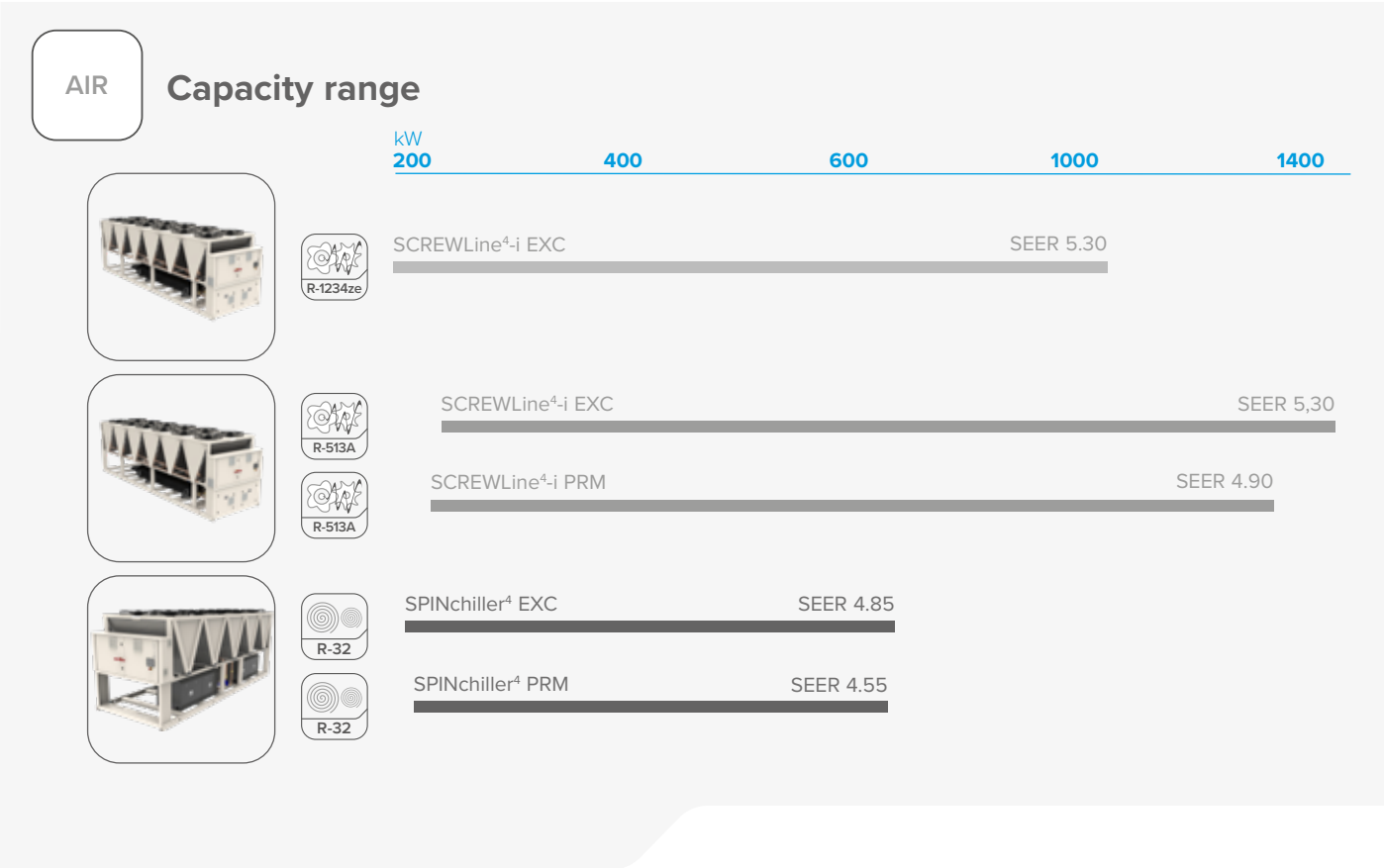
R-1234ze

## ECONOMIZER

The economizer, supplied as standard, improves the efficiency of the compression and expansion process:

- ✓ 6% more efficient than single stage compression;
- ✓ the compression ratio is equally distributed between the two impellers, reducing the rotation speed by 40% and increasing reliability;
- ✓ reliable, efficient and at three-stage separation economiser.

# Best choice of each installation




The new Clivet chillers, with low environmental impact and already in compliance with the new European requirements, are designed to meet the different plant requirements.

Covering the same capacity range (200-700 kW), they have different characteristics and advantages for a precise choice according to the type of building.

| Series | Energy version | Refrigerant | Enviromental respect | Seasonal efficiency | Silence | Compactness | Saving on first investment |
|---|---|---|---|---|---|---|---|
| SCREWLine⁴-i | EXC | R-1234ze | ●●●●● | ●●●●● | ●●● | ●●●● | ●●● |
| SCREWLine⁴-i | EXC | R-513a | ●●●● | ●●●●● | ●●●● | ●●●● | ●●● |
| SCREWLine⁴-i | PRM | R-513a | ●●●● | ●●●● | ●●●● | ●●●●● | ●●●● |
| SPINchiller⁴ | EXC | R-32 | ●●●● | ●●●● | ●●●●● | ●●●● | ●●●● |
| SPINchiller⁴ | PRM | R-32 | ●●●● | ●●● | ●●●●● | ●●●●● | ●●●●● |

●●●●● Very elevated
●●●● Elevated
●●● High
●● Medium
● Low

# Industry and Large Commercial range

| applications | kW | units | |
|---|---|---|---|
| | 237÷2050 | R-410A<br>REMOTEX<br>MSRT-XSC3, MSRN-XSC3 | |
| AIR<br>Air-condensed | 216÷1350 | R-32<br>SPINchiller[4]<br>WSAT-YSC4 | R-410A<br>SPINchiller[3]<br>WSAT-YSC3, WSAN-YSC3, WSAT-YSC3 FC, WSAN-XSC3 MFE |
| | 204÷1523 | R-1234ze R-513A<br>SCREWLine[4]<br>WDAT-iZ4, WDAT-iK4 | R-134a R-134a<br>SCREWLine[3]<br>WDAT-iL3, WDAT-SL3, WDAT-SL3 FC |
| | 210÷730 | R-410A<br>SPINchiller[3]<br>WSH-XSC3, WSHN-XSC3 | |
| H2O<br>Water-condensed | 570÷1500 | R-513A<br>SCREWLine[4]<br>WDH-iK4<br>*available by the end of 2020* | R-134a<br>SCREWLine[3]<br>WDH-SB3 |
| | 800÷1930 | R-1234ze R-134A<br>Centrifugal Chiller<br>WCH-iZ, WCH-i | |

# Why Clivet?

### PROFESSIONAL INSTALLATION

Clivet entrusts the proposal of its products to specialized professionals.

Clivet certified technicians carry out the first start-up of the installed unit, checking its correct installation and optimal operation.

### WARRANTY

EXTENSION
5 YEARS
WARRANTY

Clivet offers the possibility to extend the warranty up to a maximum of 5 years of the unit's life.

The warranty extension must be requested at the time of purchase of the unit and must be accompanied by the signing of a maintenance contract valid for the duration of the warranty to be signed at the time of purchase. This operation will be managed by an Authorized Clivet Service Center. During the warranty period, any activity must be performed by Authorized Service Centers and original spare parts must be used.

### ASSISTANCE AND MAINTENANCE

Clivet has a widespread network of service centers in Italy and abroad. This guarantees rapid interventions, limits travel expenses for any type of on-site intervention for repairs, modifications, verification of the condition of the unit.

For assistance or information on maintenance programs, contact the Authorized Service Center in your area.

### SPARE PARTS

The original Clivet spare parts are available at the spare parts warehouse of the Clivet headquarters in Feltre, offering replacement spare parts even in the event of discontinued units.

On the Italian territory there are local warehouses, with the possibility of collecting the goods even on pre-holiday and public holidays.

### CONNECTIVITY AND REMOTE UNIT MANAGEMENT

It allows the supervision of the systems through the main communication protocols (Modbus, LonWorks, BACnet). They are also available:

- ✓ Clivet Eye: remote management, analysis and troubleshooting service via Cloud for all Clivet HVAC systems;
- ✓ Intelliplant: Advanced Control module for the supervision and management of all the units and pumps of the large hydronic systems, optimises the efficiency of the Plant Room and reduces the energy consumption of the building.

### EUROVENT LEED CERTIFICATION

Most Clivet models meet both prerequisites 2 and 3 of the Energy and Environment thematic area. They also meet the parameters of Credit 4 which allows to acquire 2 points (Leed 2009)

### COMPLIANT WITH THE ECODESIGN DIRECTIVE 2021

LOT21

Since 2018, the European Regulation 2281:2016, also known as Ecodesign LOT 21, has defined a minimum seasonal efficiency for placing liquid chillers on the European market. The minimum seasonal efficiency values will increase further from 2021 (Tier 2).

Clivet's SPINchiller, SCREWLine and Centrifugo units already comply with the more stringent requirements of 2021 with both the Excellence and Premium energy versions.

# Best practice

**Torre Libeskind**

Milan, Italy
System: Centrifugal and AQX
Year: 2019

OFFICES

**Bennet I Laghi**

Erba, Italy
Systems: Hydronic
Year: 2020

RETAIL

**Westend Shopping Center**

Budapest, Hungary
System: Centrifugal
Year: 2020

RETAIL

## ALWAYS READY FOR THE FUTURE

# INSPIRING SOLUTIONS

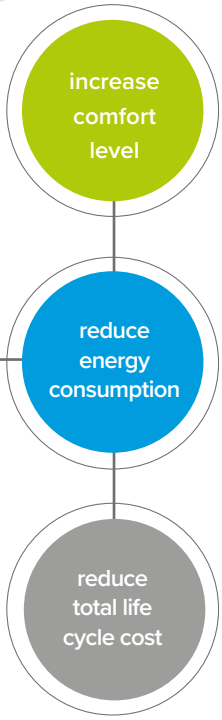
For over 30 years of working on the design, manufacturing and distribution of air conditioning and handling systems, combining high efficiency with minimal environmental impact, Clivet has developed solutions to ensure sustainable comfort and the well-being of people and the environment.
Designing and developing year-round air conditioning solutions with innovative technologies are part of Clivet's DNA, which means the company has always been ready for the future.

# COMFORT FOR THE PLANET & PEOPLE

# OUR VALUES

## IN THE RESIDENTIAL, COMMERCIAL AND INDUSTRIAL SECTORS

Increasing comfort, saving energy and providing customers with the best value for the entire life cycle of the system: these are the values that inspire our systems for the residential, services and industrial sectors.



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Clivet, in compliance with Regulation 517/2014, informs that its products contain
or operate with the use of fluorinated greenhouse gases.

FOR OVER 30 YEARS WE HAVE BEEN OFFERING SOLUTIONS TO ENSURE SUSTAINABLE COMFORT AND THE WELL-BEING OF PEOPLE AND THE ENVIRONMENT

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