Carrier

SOLUTIONS FOR INDUSTRY

Our expertise

For Industry

The cooling requirements of an industrial process are specific to each application.

Whether you are in the agri-food industry, pharmaceuticals, plastic manufacturing or any other industry, it is a major challenge for businesses to secure the production tools, **optimize energy consumption and minimize carbon footprints**.

With our **comprehensive selection of liquid chillers covering wide water temperature ranges (-15°C to +20°C)**, we offer a variety of products to meet the requirements of all industrial manufacturers.

The advantages of Carrier solutions

Chilled water production down to -15 °C

Low-temperature chilled water production down to -8°C (medium) or to -15°C (low) meets the requirements of specific applications such as ice storage and industrial process cooling.

High-efficiency at partial or total load

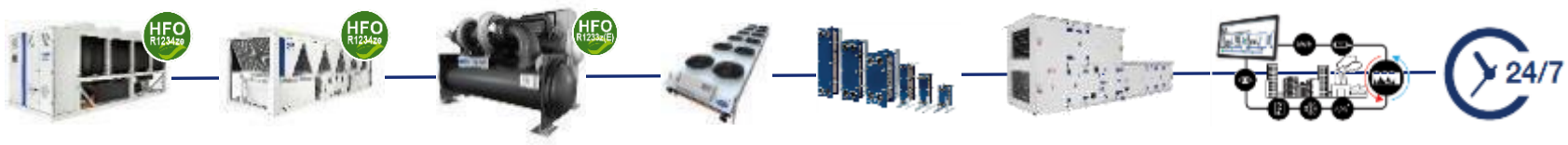
Thanks to Greenspeed® intelligence, Carrier solutions offer a very high level of efficiency at partial load or total load, according to the specific requirements of the application.

Advanced monitoring solutions

Our solutions continually gather data in order to avoid any drop in performance or any damage, and to take preventive and corrective measures remotely, thereby optimising the service life of the equipment.

Smart energy management

Advanced control solutions enable overall optimisation of the HVAC system to ensure maximum availability, keep energy consumption low and guarantee high levels of energy efficiency.



When you choose Carrier...

You are assured that your equipment will have a long service life.

Benefiting from a **high level of energy efficiency,** our products anticipate the requirements of the Ecodesign standard while complying with the F-Gas standard designed to reduce the carbon footprint of our equipment.

This means you can concentrate on your core business and develop your operations.

You benefit from full visibility and complete control of the performance of your equipment.

Our units **can be connected to your building management system** to analyse data, optimise their operation and predictive maintenance.

You benefit from a comprehensive range of reliable services.

We can offer you a variety of **maintenance contracts** adapted to the industrial requirements.

Our team of experts can quickly provide assistance on site to **give you complete peace of mind.**

BLUEDGE

Contents

REGULATORY CONTEXT

Ecodesign – For industrial cooling processes

Liquid chillers in industrial processes

- High temperature (+7 °C water)
- Medium temperature (-8 °C brine)
- Low temperature (-15 °C brine)

Liquid chillers in comfort cooling applications

Heating

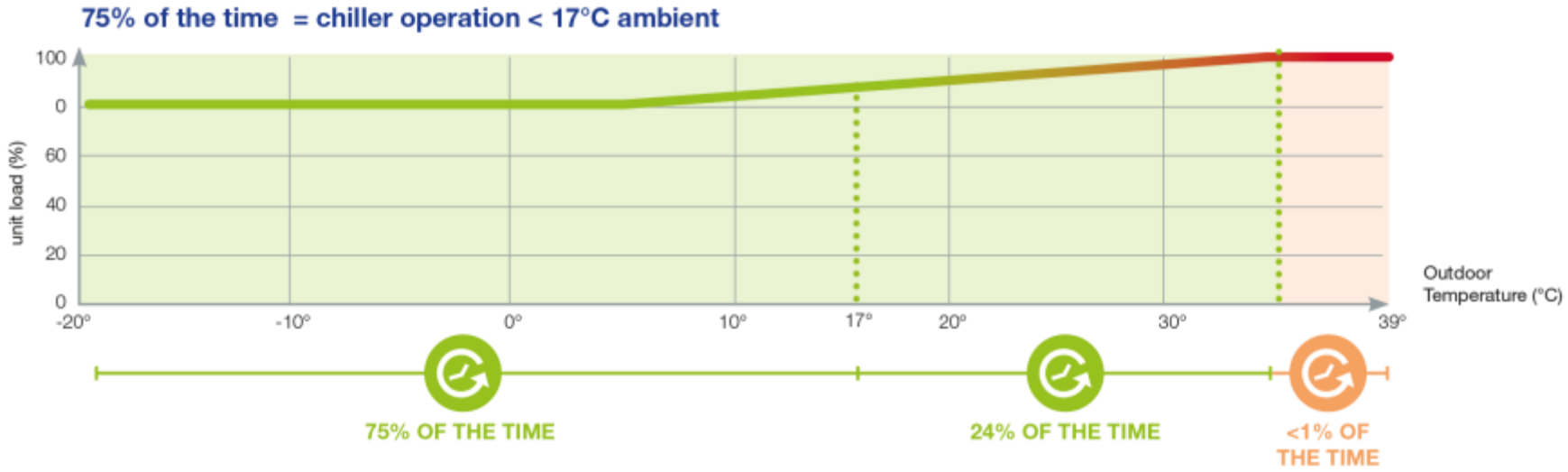
Before → Today

Ecodesign – For industrial cooling processes

SEPR - Seasonal Energy Performance Ratio

SEPR measures the seasonal energy efficiency of process chillers by calculating the ratio between annual cooling demand and annual energy input.

It takes into account the energy efficiency achieved at each outdoor temperature of an average climate weighted by the number of hours observed for each of these temperatures. It gives a much more realistic indication of the energy efficiency and the actual environmental impact of the cooling system.



Ecodesign – For industrial cooling processes

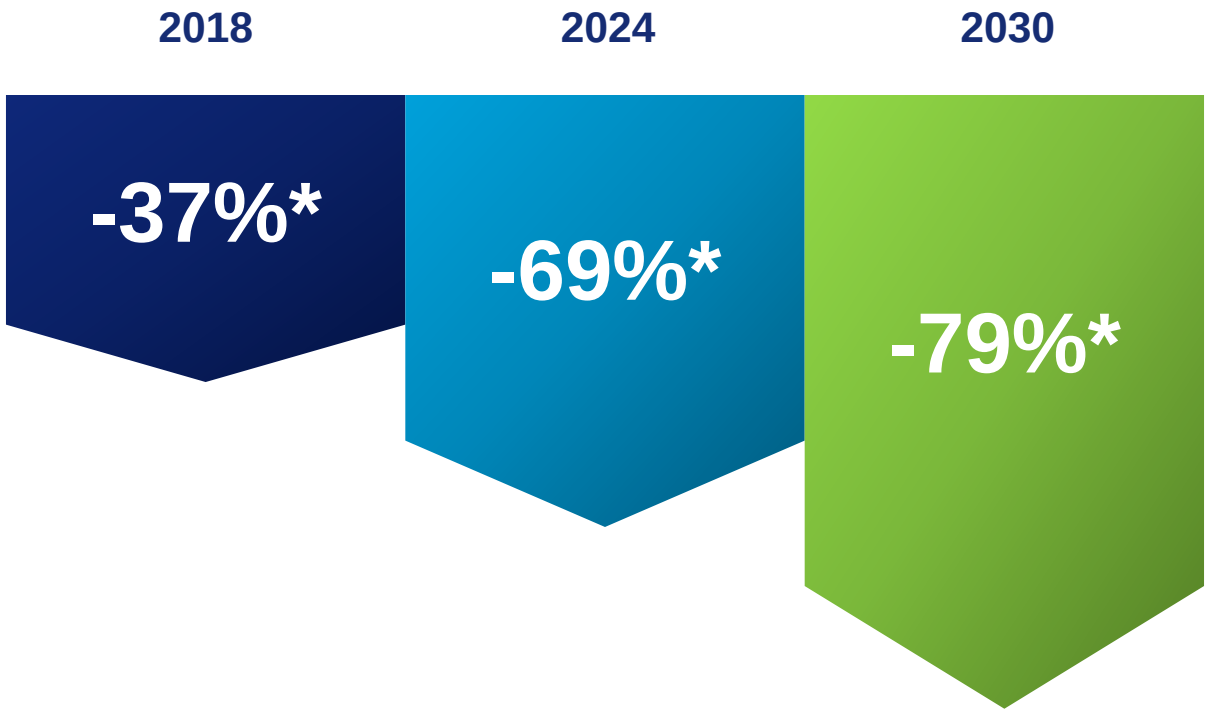
Efficiency requirements for high-temperature process chillers

Regulation 2016/2281 sets minimum efficiency levels for positive leaving water temperature chillers (high-temperature chillers) rated up to 2000 kW used in industrial process cooling applications. There is no high-temperature SEPR requirement for heat pumps concerned by regulation 813/2011 or medium-temperature industrial process chillers concerned by regulation 2015/1095.

HIGH TEMPERATURE PROCESS CHILLERS	From 01/2018	From 01/2021
	SEPR 12/7°	SEPR 12/7°
Air-cooled < 400kW	4,5	5
Air cooled 400 to 2000 kW	5	5,5
Water-cooled < 400 kW	6,5	7
Water cooled 400 to 1500 kW	7,5	8
Water cooled 1500 to 2000	8	8,5

F-Gas constant regulatory requirements

To reduce refrigerant emissions by progressively reducing the use of HFCs (F-Gas 2014)



**Versus 2015 reference value*

The environmental impact of refrigerants

Very High GWP
PROHIBITION

HFC R-404A

High GWP
REDUCTION & PRICE INCREASE

HFC R-134a

Low GWP
TRANSITION

HFC/HFO blends

Very low GWP & non-toxic
LONG-TERM SOLUTION

GWP 1

CO_2

R-744

GWP <1

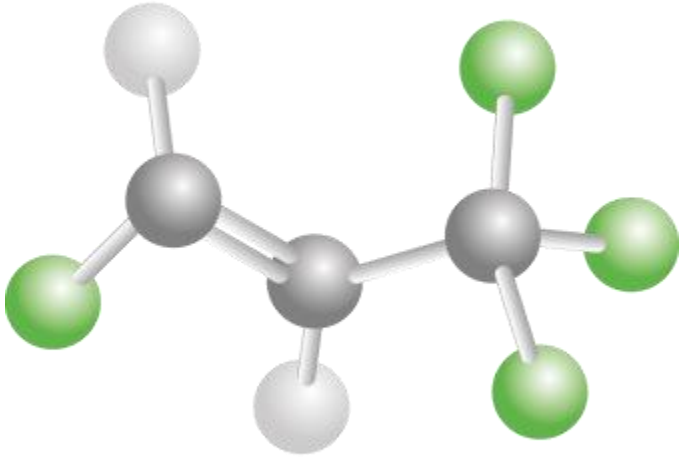
HFO

R-1234ze(E)

Long-term refrigerants should have GWP < 150

**Global Warming Potential (GWP)*
Note: GWP according to AR4 from the IPCC, excluding HFOs: AR5 from the IPCC (International Panel on Climate Change)

What are HFOs?



- A molecule with a carbon-to-carbon double bond = less stable in the atmosphere than HFCs
- Very short lifespan in the atmosphere = very low GWP
- Very low energy consumption
- R-1233zd(E) at low pressure for turbomachinery, non-flammable (A1)
- R-1234ze(E) at medium pressure for screw machinery, moderately flammable (A2L)

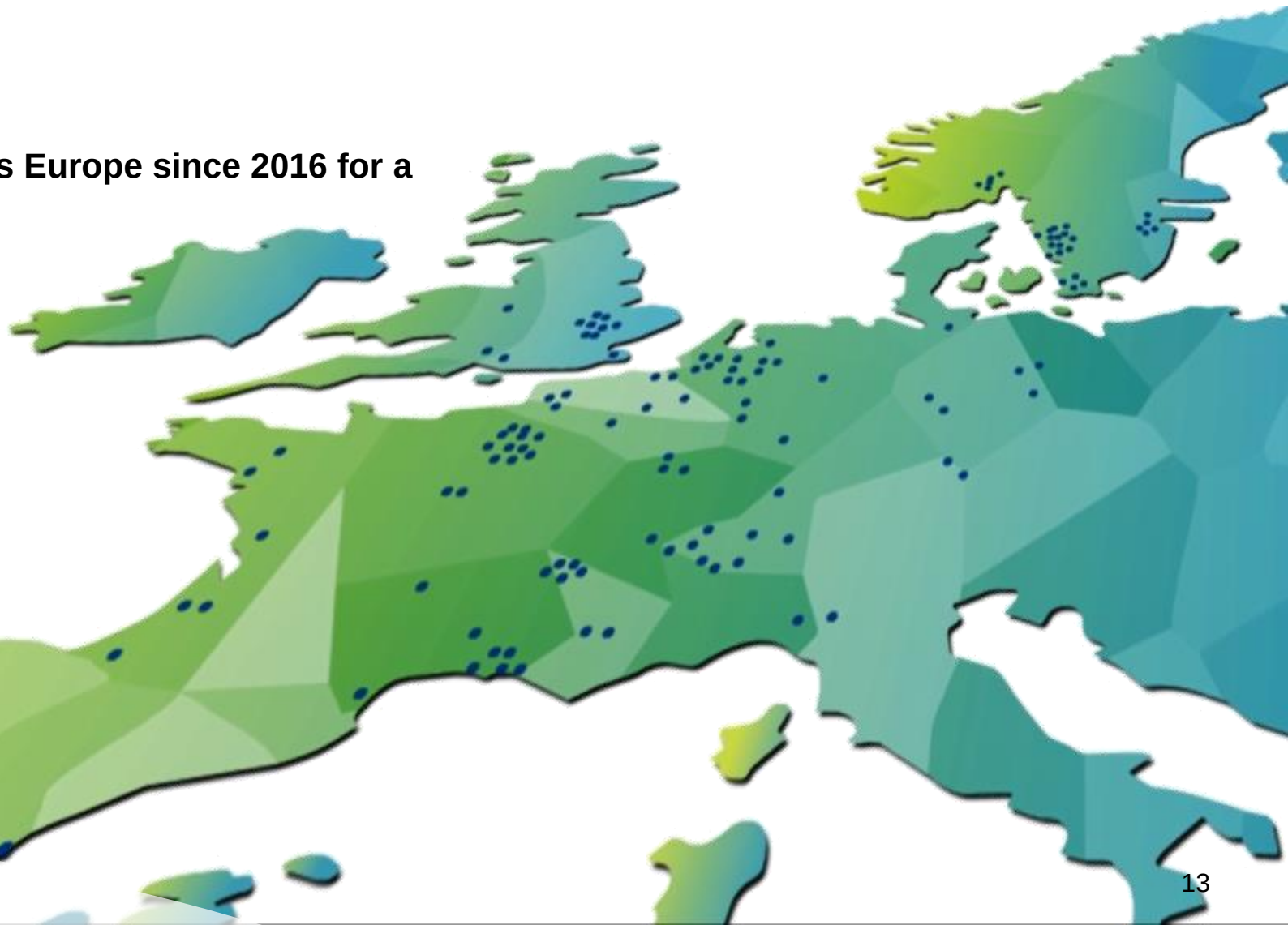
	Atmospheric lifetime	GWP - IPCC AR5
R-134a	13.4 years	1430
R-1233zd(E)	26 days	1
R-1234ze(E)	16 days	< 1

PURETec tried and trusted solution

PURETec

has been chosen by over 1000 sites across Europe since 2016 for a variety of applications:

- Comfort
- Culture & leisure
- Industry
- District heating
- Healthcare
- Data centre



Carrier at the cutting edge of technology

First air conditioning system developed by Willis Carrier

Universal awareness of the environmental impact of greenhouse gases

Launch of the Global Chiller™, the first screw compressor using **R-134a**

AquaSnap® using **R-407C**

AquaSnap® Puron with air-cooled condenser using **R-410A**

AquaForce® MCHE reducing the refrigerant charge to 50%

AquaForce® PUREtec™ using **R-1234ze(E)**

AquaEdge® PUREtec™ using **R-1233zd(E)**

PUREtec

1902 1970 1996 1998 2004 2006 2015 2016

CFC | **HCFC** *High ODP* and GWP* | **HFC** *ODP = 0, high GWP* | **HFO** *ODP = 0, GWP close to 0*

MONTREAL protocol

KYOTO protocol

F-Gas regulations

**ODP = Ozone Depletion Potential*

PUREtec™ range

2016

AQUAFORCE PUREtec

Air-cooled and water-cooled screw chillers

30XAZE
30XAVZE
30XWPZE (250-1100 kW)
30XWVZE (450-1350 kW)

2017-2018

AQUAFORCE PUREtec

High-temperature water-source heat pump

61XWHZE (200-2500 kW)

2019

greenspeed AQUAEDGE PUREtec

Water-cooled Centrifugal chiller

19DV (1400-3500 kW)

AQUAFORCE PUREtec

Air-cooled screw chillers

30KAV(P)ZE (350-1300 kW)
30XBE/PZE (200-1200 kW)

2021

AQUAFORCE PUREtec

Dedicated to Industry Air-cooled screw chiller

30KAVIZE
(530-1300 kW)

SOLUTIONS FOR INDUSTRY

One-stop solutions for industry

EQUIPMENT

1. Chillers
2. Air handling units
3. Close control units
4. Fan coil
5. Heat exchangers
6. Dry coolers
7. Rooftops

SERVICE

- Connected services
- Connected technicians
- Plant room management
- Rental

One-stop solutions for industry

30KAVPZE
Air-cooled variable-speed screw chiller

New

30KAVIZE
Air-cooled variable-speed screw chiller

30XBPZE
Air-cooled fixed-speed screw chiller

61XWH-ZE
High-temperature water source heat-pump

61WG
High-temperature water source heat-pump

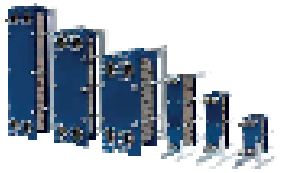
19DV
Water-cooled centrifugal chiller

30RBP
Air-cooled scroll chiller

39CP
Air handling unit

50FC/FF & 50EN/EH
Rooftop units

42 AM
Air heaters destratifier unit



10TE
Gasketed plate heat exchangers

30KAV(P)ZE

High efficiency air-cooled screw chiller for process cooling

AquaForce® PUREtec 30KAV(P)ZE

greenspeed AQUAFORCE PUREtec

SEPR
3.9
(-8 °C)

EER
2.1
(-8 °C)

- **RANGE:** Air-cooled variable-speed screw chiller.
- **CAPACITY** : 170 - 750 kW (-4/-8 °C, 35% MEG)
- **REFRIGERANT:** HFO R-1234ze(E) with GWP < 1
- **APPLICATIONS:** Commercial and industrial. Operation from -20°C up to 55°C air ambient temperature.

30% annual energy savings*

*Compared to the previous generation

AquaForce® PUREtec™ 30KAV(P)ZE

30% annual energy savings*

Up to 25% above EcoDesign requirements for 2021

Applications:

Commercial and industrial. Operation from -20°C up to 55°C air ambient temperature.

30KAV-ZE

350kW – 1300kW

Variable-speed screw chiller
with variable-speed fans with AC motors

SEPR **6,5** (12 / 7°C)

SEER **5,5** (12 / 7°C)

30KAVPZE

350kW – 800kW

Screw chiller with permanent magnet compressor and Greenspeed® Intelligence
+ EC fans
+ additional condenser

SEPR **7,3** (12 / 7°C)

SEER **6,0** (12 / 7°C)

COMFORT & PROCESS CHILLERS	From 01/2021		
	SEPR -2/-8°	SEPR 12 / 7	SEER 12 / 7
Air-cooled < 400 kW	2,32	5,00	4,10
Air-cooled 400 to 2000 kW	2,90	5,50	4,55

Note: for medium temperature process chillers intended to be charged with a refrigerant fluid with a GWP<150, SEPR values can be lowered by a maximum of 10%

Eurovent certified range according to the ECP LCP/HP programme.

*Compared to the previous generation

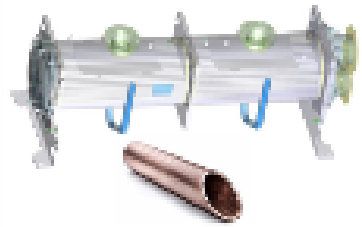
AquaForce® PUREtec 30KAV(P)ZE

Flying Bird™ fans with AC or EC motors (option 17)

HFO R-1234ze(E) refrigerant with GWP < 1

All-aluminum micro-channel coil 40% reduction in the refrigerant charge

Flooded shell and tube evaporator for leaving water operation -12 °C (MEG)

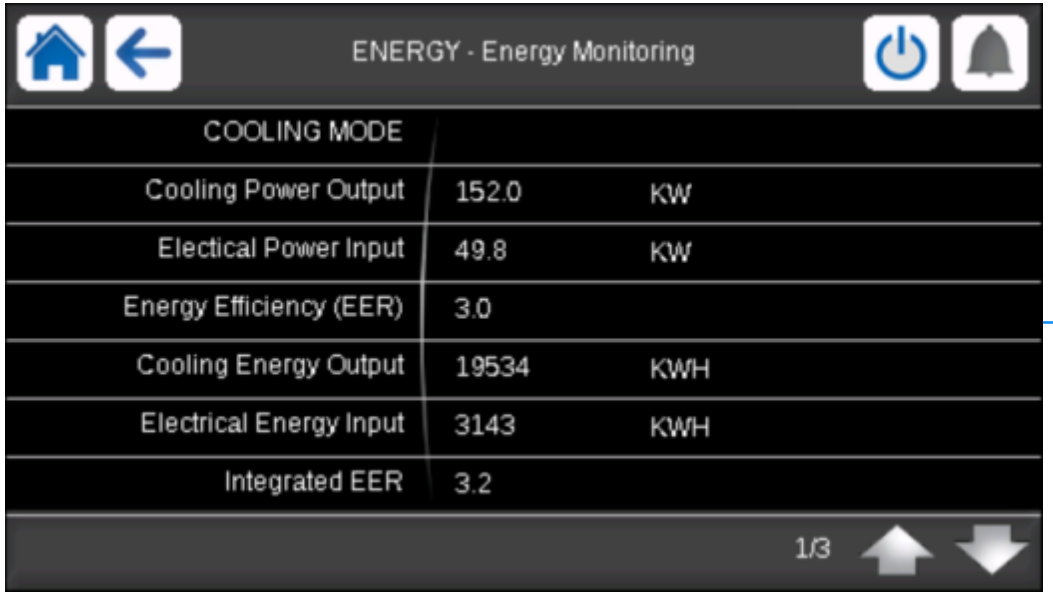


Variable-speed and screw compressor High efficiency, with permanent magnets

AquaForce® PUREtec 30KAV(P)ZE

Smart energy monitoring function

- Provides data based on intelligent algorithms
- Measures energy consumption in real time (kWh)
- Measures cooling capacity in real time (kWh)
- Provides instantaneous and average values from seasonal energy efficiency reports



AquaForce® PUREtec 30KAV(P)-ZE

Flooded shell and tube evaporator

- Exclusive Carrier design
- Flooded evaporator for high energy efficiency
- New generation of copper tubes with specific profile to reduce pressure drops when operating with glycol
- Capable of producing chilled water down to -12 °C
- Compatible with variable water flow: reduction in installation, maintenance and operating costs

- Compatible with variable water flow
- Reduction in installation, maintenance and operating costs
- Capable of producing chilled water down to -12 °C (HFO) and -15 °C (R-134a)

AquaForce® PUREtec 30KAV(P)ZE

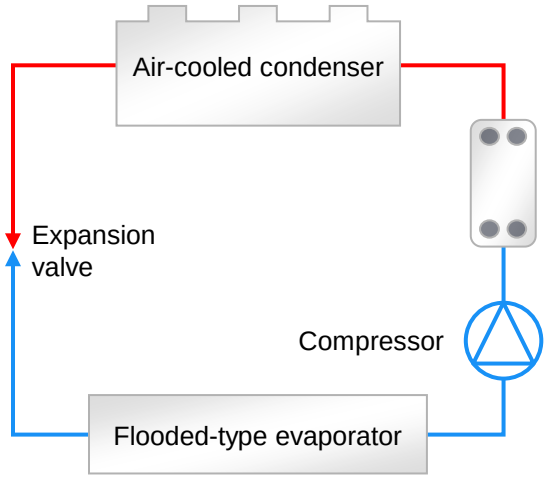
Ip54 (20a) electric box

- This option is used to make the 30KAV/P unit compliant with the IP54 standard to meet the specific requirements **of industrial environments.**
- **Standard:** 850 m^3/h ventilation compatible with high-temperature environments (16)
- **IP54 option:** 560 m^3/h ventilation not compatible option 16.

AquaForce® PUREtec 30KAV(P)ZE

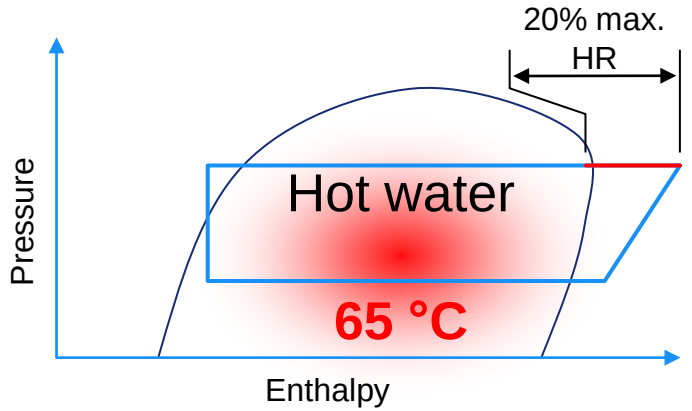
Partial and total heat recovery options

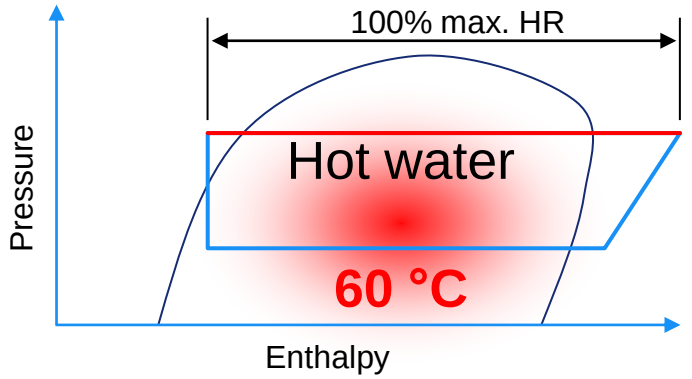
- Brazed plate heat exchanger
- Simple & reliable
- Variable recovery: no load limit to activate recovery
- BPHE as standard with air-cooled condenser
- Less complex, more flexible
- Desuperheater mode



Partial heat recovery exchanger

Total heat recovery exchanger





30KAVIZE

High efficiency air-cooled screw chiller dedicated to industry for process cooling

AquaForce® PURETec™ 30KAVIZE

Dedicated to industry

Up to 5% annual energy savings*

Up to 10% above 2021 Ecodesign requirements

Applications: Operation -20°C up to 48°C air ambient temperature.

Cooling Capacity:

530 – 1300 kW (12/7°C)

280 – 800 kW (-4/-8 °C, 35% MEG)

New Carrier air-cooled variable speed screw chiller

30KAVIZE

530kW – 1300kW

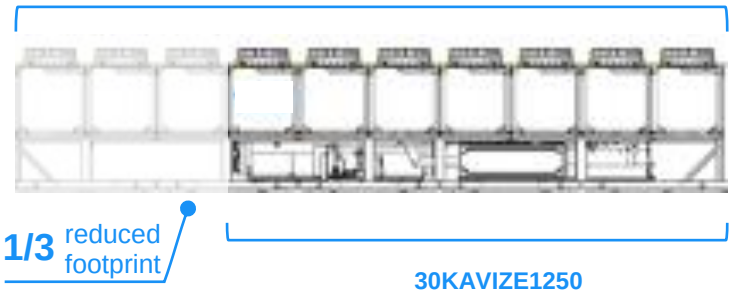
Variable-speed screw chiller with variable-speed fans

Specific industry options

SEPR **3,7** (-2 / -8°C)

SEPR **6,0** (12 / 7°C)

SEER **5,2** (12 / 7°C)



COMFORT & PROCESS CHILLERS	From 01/2021		
	SEPR -2 / -8°	SEPR 12 / 7	SEER 12 / 7
Air-cooled < 400 kW	2,32	5,00	4,10
Air-cooled 400 to 2000 kW	2,90	5,50	4,55

Eligible to comfort application

Eurovent certified range according to the ECP LCP/HP programme.

*Compared to the previous generation

AquaForce® PUREtec 30KAVIZE

Dedicated to industry

New

Ultra fast
capacity recovery (<1 min)

+

New

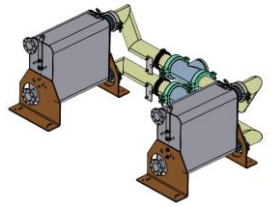
Energy meter

New

Neutral IT System

Total Heat Recovery

New



Brine options

Compressor
PM Motor

AquaForce® PUREtec 30KAVIZE

Dedicated to industry

New

Ultra fast capacity recovery

Option 295+

- Full cooling capacity recovery within 1 minute after power restauration
- Plug & Play built-in solution
- Maximized energy efficiency
- Minimized temperature drop
- High unit availability rate

+

AquaForce® PUREtec 30KAVIZE

Dedicated to industry

New

Energy metering

Option 294

- Power energy monitoring
- Plug & Play built-in solution

New

Neutral IT system

Option 333

- The IT regime is used where business continuity is essential: hospital rooms, industry, etc …
- Solution dedicated to industry electricity network

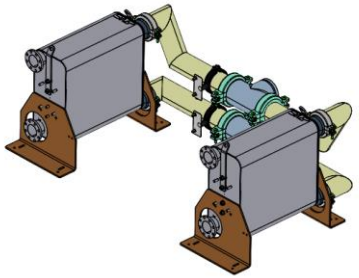
AquaForce® PUREtec 30KAVIZE

Dedicated to industry

Total Heat Recovery

Option 50

- Simultaneously generates chilled water up to -12°C and hot water up to 60°C
- Compatible with brine options
- Significant energy savings



New

Boosted Total Heat Recovery

Option 50+

- Up to 20% performance increase

AquaForce® PUREtec 30KAVIZE

Dedicated to industry

Brine Options

Option 6

Operation down to -12 °C leaving water temperature

- Reduction of pressure drops
- High efficiency
- Lower pumping costs

AquaForce® PUREtec 30KAVIZE

Dedicated to industry

Compressor PM Motor

Option 329

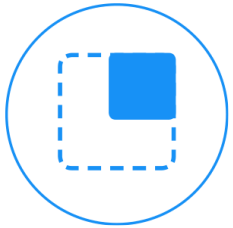
- Permanent magnet synchronous motor
- Performances increased by 3%
- Step-less inverter control (0%-100%)

Key benefits AquaForce® PUREtec 30KAVIZE

Dedicated to industry

Cost effective solution

Lower footprint



Easy installation & maintenance

Outstanding performance

Environmental sustainability

Key benefits AquaForce® PURETec 30KAVIZE

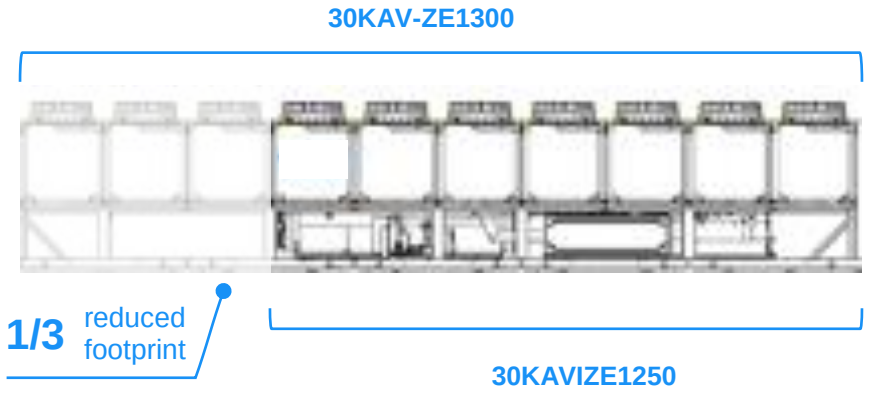
Dedicated to industry

Cost effective solution

- 30KAVIZE is the **optimal cost-effective solution** for industry uses..
- Up to **10% above 2021 Ecodesign** requirements

Reduced footprint

- **1/3 shorter than 30KAV**, the new 30KAVIZE takes up **less place** and provide **peace of mind** for installers and service companies alike.



Key benefits AquaForce® PUREtec 30KAVIZE

Dedicated to industry

Easy installation & Maintenance

- The chiller requires smaller **pumps** which makes installation much easier in addition to **lower installation costs** and **reduce energy consumption**.
- Installation in industrial environment is now possible thanks to **Neutral IT System** which has been developed to comply with customer specific electrical network.
- **Smart Energy Monitoring** and **Smart Leak Detection** makes maintenance and daily monitoring easier.

Outstanding performance

- **Up to 10%** above 2021 Ecodesign requirements
- **Performances up to 3%** thanks to the compressor PM motor
- **Ultra fast capacity recovery** maximizes **energy efficiency** by minimizing water loop temperature drop.

Key benefits AquaForce® PUREtec 30KAVIZE

Dedicated to industry

Environmental sustainability

Up to **-40%** less refrigerant charge

GWP < 1

- Combining a **reduced load refrigerant** thanks to the use of **Novation® microchannel heat exchangers** and high energy efficiency.

- With **PUREtec™** refrigerant, the 30KAVIZE offers a **long-term refrigerant solution.**

FOCUS ON HEAT RECOVERY

AquaForce® PUREtec

Partial and total heat recovery options

Hot water is required for many purposes

- Heating
- Domestic hot water production
- The agri-food industry
- Industrial processes
- Cleaning installations

With the total heat recovery option

Energy bills can be significantly reduced compared to using traditional heating equipment such as fossil fuel-fired boilers or immersion heaters.

AQUAFORCE PUREtec

30KAV(P)ZE

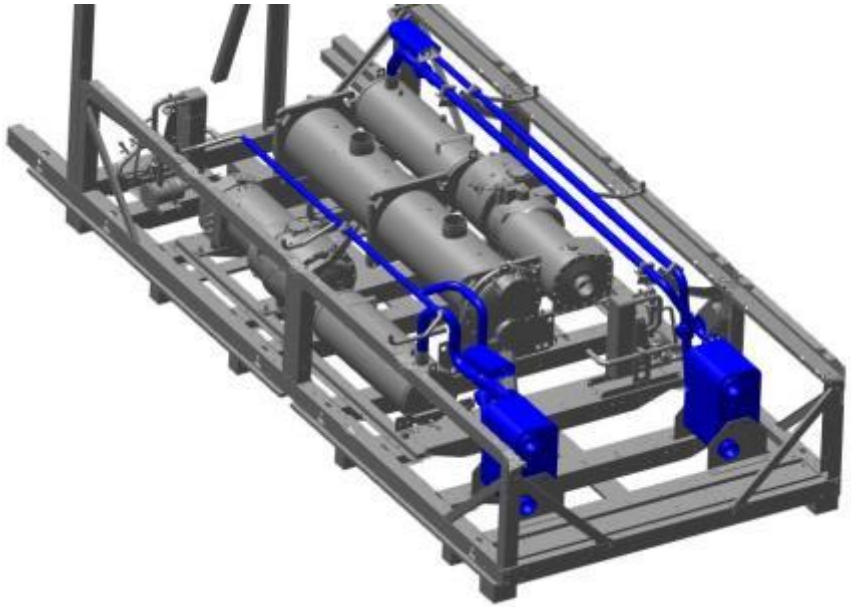
30KAVIZE

30XBPZE

Heat recovery design

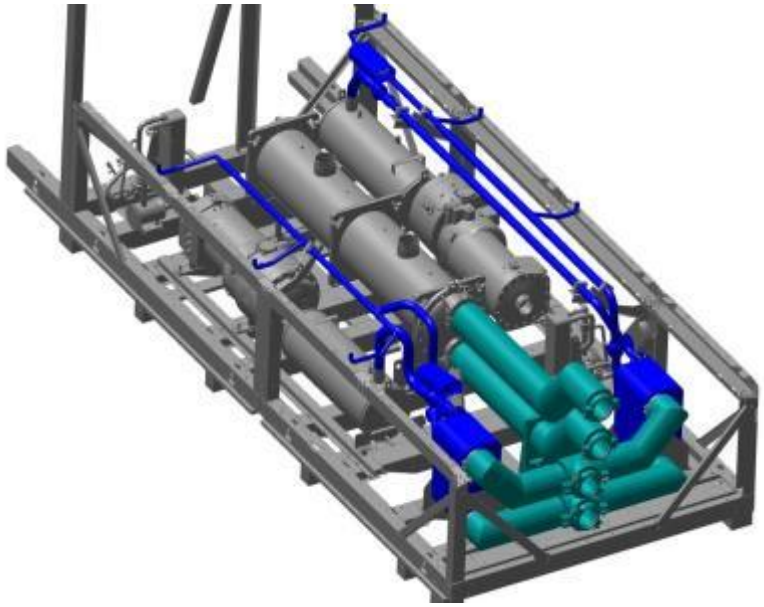
30KAV models

Heat Recovery option
Option 49 = partial HR
Option 50 = total HR
Option 50+ = boosted total HR



Heat Recovery option
Option 49 = partial HR
Option 50 = total HR
Option 50+ = boosted total HR

+ **Option 325:**
Hydraulic connection kit



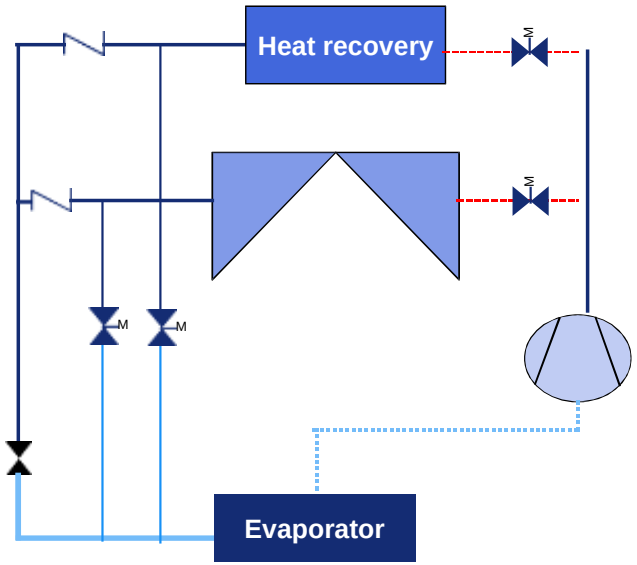
30KAV: Heat recovery

- Option 49 and 50 share the same design
- Heat recovery exchanger as standard with the condenser
- Option compatible with chilled water and HFO

Heat recovery design

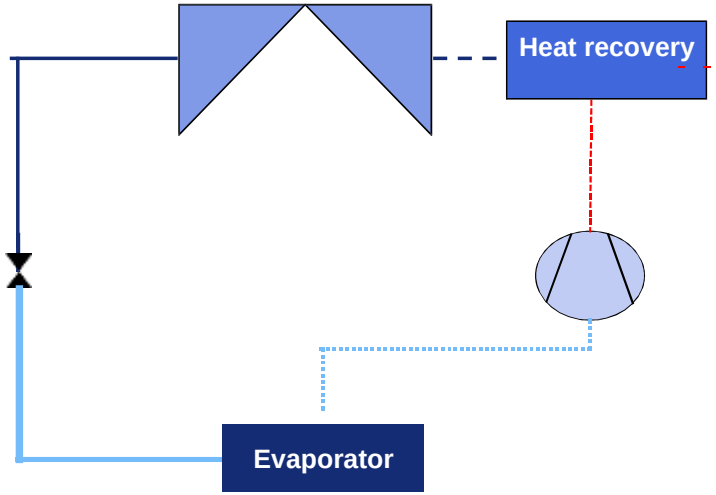
2 different concepts

Parallel concept: XB/RB



Performance
HR% =100%

In-series concept: KAV



Reliability
Cost
Compatible with chilled water
Production adapted to actual need

Total heat recovery design

HR mode: OFF

- Option 50 does not impact unit performance except for exchanger pressure drops
- The pressure drops are very low, the unit's input power does not increase more than 1.5% compared to a machine without total recovery (option 50) at full load
- The cooling capacity is identical
- (Same conditions for brine)

HR mode: ON

- In total recovery mode, the cooling capacity drops by approx. -10% compared to with HR mode OFF (at same suction and condensing temperature). This drop in power is linked to the in-series design of our Total Recovery
- (Same brine conditions: Cooling capacity = -10% vs HR OFF)

30XBE/PZE

Air-cooled screw chiller for process cooling

AquaForce® PUREtec™ 30XBE/PZE

AQUAFORCE
PUREtec

SEPR
3.7
(-8 °C)

EER
2.3
(-8 °C)

- **RANGE:** Fixed-speed screw liquid chiller
- **30XBE/PZE**: 200 kW – 1200kW
- **REFRIGERANT:** HFO R-1234ze(E) with GWP < 1
- **APPLICATIONS:** Commercial and industrial. Operation from -20°C up to 55°C air ambient temperature.

AquaForce® PUREtec 30XBE/PZE

30XBEZE

200kW - 1200kW

Variable-speed fans with AC motors

SEPR **6,4** (12 / 7°C)

SEER **4,7** (12 / 7°C)

30XBPZE

200kW - 1200kW

Premium version with EC fans

SEPR **6,5** (12 / 7°C)

SEER **4,9** (12 / 7°C)

Applications: Commercial and industrial. Operation from -20°C up to 55°C air ambient temperature.

COMFORT & PROCESS CHILLERS	From 01/2021		
	SEPR -2/-8°	SEPR 12 / 7	SEER 12 / 7
Air-cooled < 400 kW	2,32	5,00	4,10
Air-cooled 400 to 2000 kW	2,90	5,50	4,55

Note: for medium temperature process chillers intended to be charged with a refrigerant fluid with a GWP<150, SEPR values can be lowered by a maximum of 10%

Eurovent certified range according to the ECP LCP/HP programme.

AquaForce® PUREtec 30XBEZE

SmartVu™
Touch screen

“V” shape Novation®
micro channels

Flooded shell and
tube evaporator

HFO R-1234ze(E)

PUREtec

Flying Bird™ fans

Variable-speed AC

Two fixed-speed
pumps

Fixed-speed twin rotor
screw compressor

AquaForce® PUREtec 30XBPZE

SmartVu™
Touch screen

“V” shape Novation®
micro channels

Flooded shell and
tube evaporator

HFO R-1234ze(E)

PUREtec

Flying Bird™ fans

Variable-speed EC

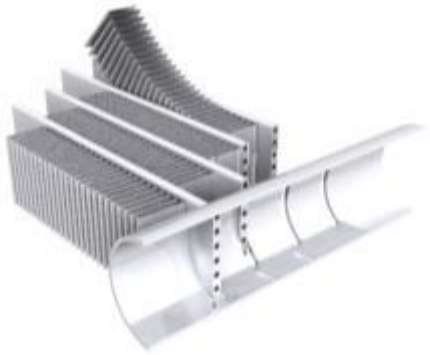
Two fixed-speed
pumps

Fixed-speed twin rotor
screw compressor

AquaForce® PUREtec 30XBE/PZE

2nd generation of “V” shape Novation® micro channel heat exchangers

- Exclusive Carrier design
- High reliability with long-life aluminum alloy
- Significant reduction in refrigerant load (-40% vs Cu/Al coils)
- Enviro-shield™ coating for mildly corrosive environments (option 262)
- Super Enviro-shield™ coating for highly corrosive environments (industry or marine applications – option 263)



AquaForce® PUREtec 30XBE/PZE

6th generation Flying Bird™ variable-speed fans

- Exclusive Carrier design
- Fan blade design inspired by nature
- EC fans available as standard on 30XBPZE premium version
- Variable-speed AC fans available as standard on the 30XBEZE

AquaForce® PUREtec 30XBE/PZE

Carrier fixed-speed twin rotor screw compressor with AC motor

- Exclusive Carrier design
- Fixed-speed twin rotor screw compressor
- Sliding valve control (30%-100%)
- Bearing life exceeding 100,000 hours
- 99.7% of units without a compressor failure

AquaForce® PUREtec 30XBE/PZE

Two fixed-speed pumps with AC motor

- Low static pressure (~100 kPa) or high static pressure (~180 kPa) available
- Available up to 400 kW

AquaForce® PUREtec 30XBE/PZE

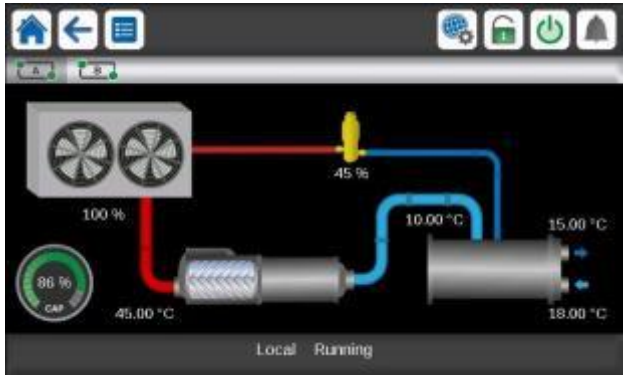
Flooded shell and tube evaporator

- Exclusive Carrier design
- Flooded evaporator for high energy efficiency
- New generation of copper tubes with specific profile to reduce pressure drops when operating with glycol
- Compatible with variable water flow
- Operation down to -12 °C leaving water temperature with glycol

AquaForce® PUREtec 30XBE/PZE

State-of-the-art 7-inch colour SmartVu™ Touch screen

- Exclusive Carrier design
- 10 languages available: DE, EN, ES, FR, IT, NL, PT, TR, RU + one additional customer choice
- Touch screen user interface
- BACnet, J-Bus or LON communication interfaces
- Optional wireless connectivity



AquaForce® PUREtec 30XBE/PZE

Heat recovery (options 50 - 50C)

- Total heat recovery (option 50)
- Total heat recovery on a single refrigerant circuit (option 50C)
- SIMULTANEOUSLY generates hot water up to 55 °C for domestic hot water, pre-heating and heater, etc.

61XWHZE

Water-source heat pump for district heating

AquaForce® PUREtec 61XWHZE

AQUAFORCE
PUREtec

UP TO
85°C

COP
up to
3.9*

- **RANGE:** High-temperature water sourced heat-pump with HFO refrigerant.
- **CAPACITY:** 200 kW to 2500 kW
- **REFRIGERANT:** HFO R-1234ze(E) with GWP < 1
- **APPLICATIONS:** Commercial and industrial process heating, and district heating.

61XWHZE	Model L / - / H*	Size 3	5	7	10	14	15	17
HEATING CAPACITY*	kW	300	484	727	967	1453	1468	1570
LENGTH	m	2.7	3.1	3.3	4.7	4.7	4.8	4.8
WIDTH	m	0.9	1.1	1.1	1.1	1.2	1.4	1.4
HEIGHT	m	1.6	1.8	2.0	2.0	2.1	2.3	2.3

In accordance with standard EN14511-3:2013. Heating performances of model H based on condenser hot water temperature 70°C/75°C and evaporator water temperature 20°C/15°C.
*Each model is available in three versions to optimize system efficiency and offer multiple combinations: "L" for low heat source temperatures, "-" for medium heat source temperatures and "H" for high heat source temperatures.

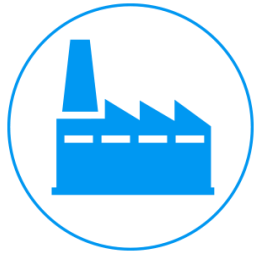
*in a single unit configuration / Up to +40% in series counter flow arrangement

AquaForce® PUREtec 61XWHZE

Heat recovery potential for smart cities

VALUE NATURAL HEAT SOURCE

- Ground water
- Lake water
- Sea water
- Geothermal probes

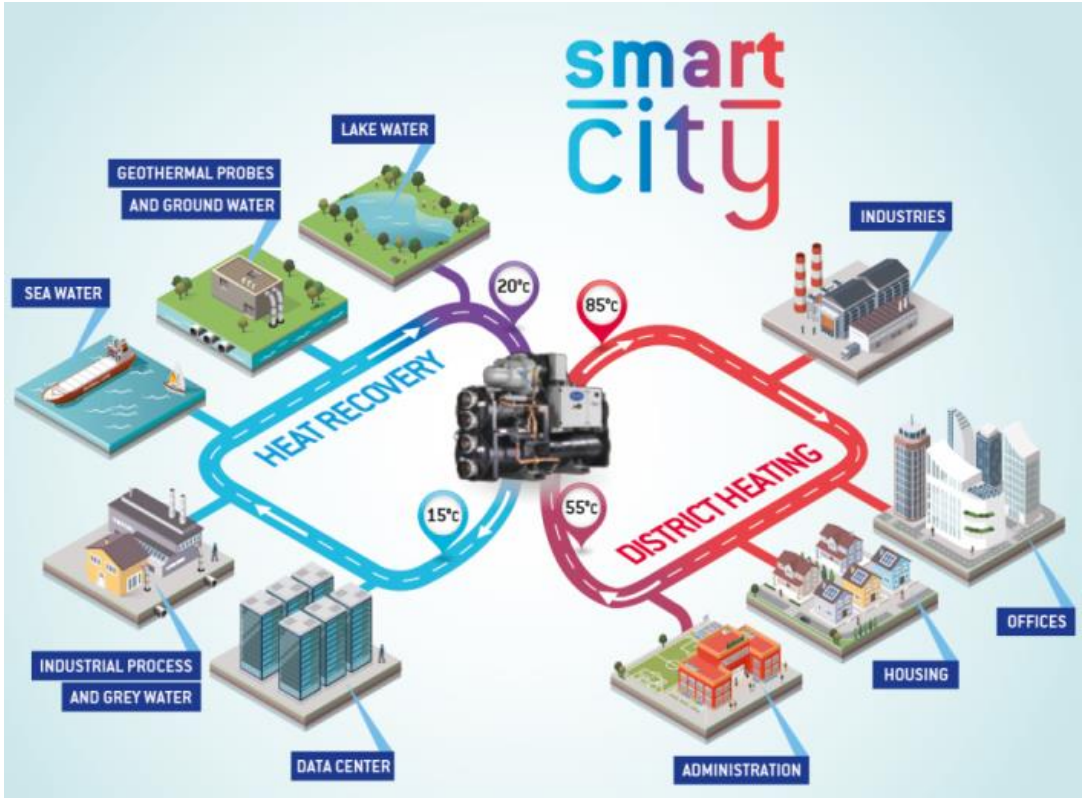


VALUE WASTED HEAT SOURCE

- Waste heat from data centres
- Waste heat from grey waters
- Waste heat from industrial process
- Waste heat from boilers (wood, gas...)
- Waste heat from chillers

AquaForce® PUREtec 61XWHZE

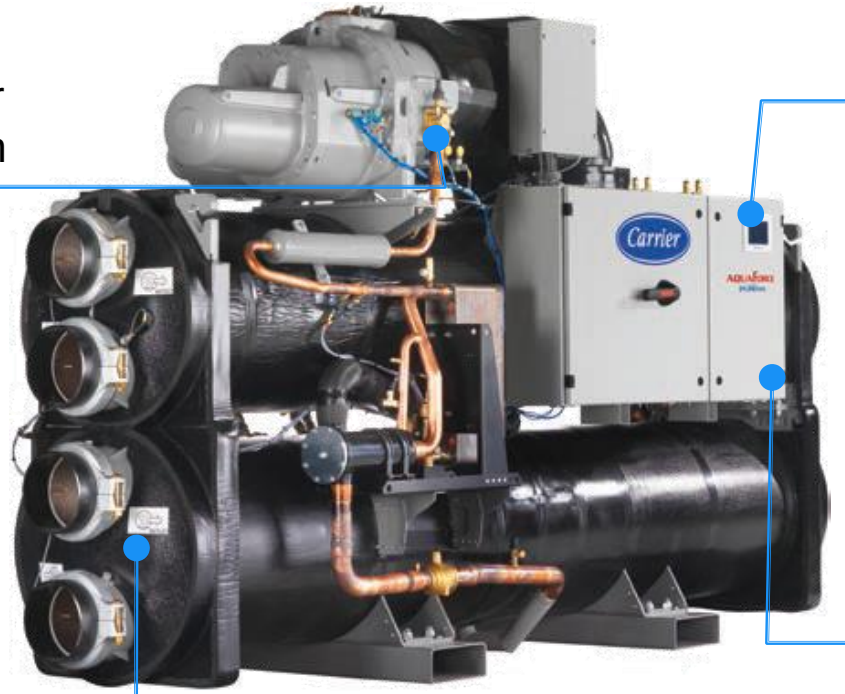
AquaForce®, at the heart of smart city



AquaForce® PUREtec 61XWHZE

Technical features

Screw compressor
with liquid injection



Touch pilot™ control

Pressurized
electrical box

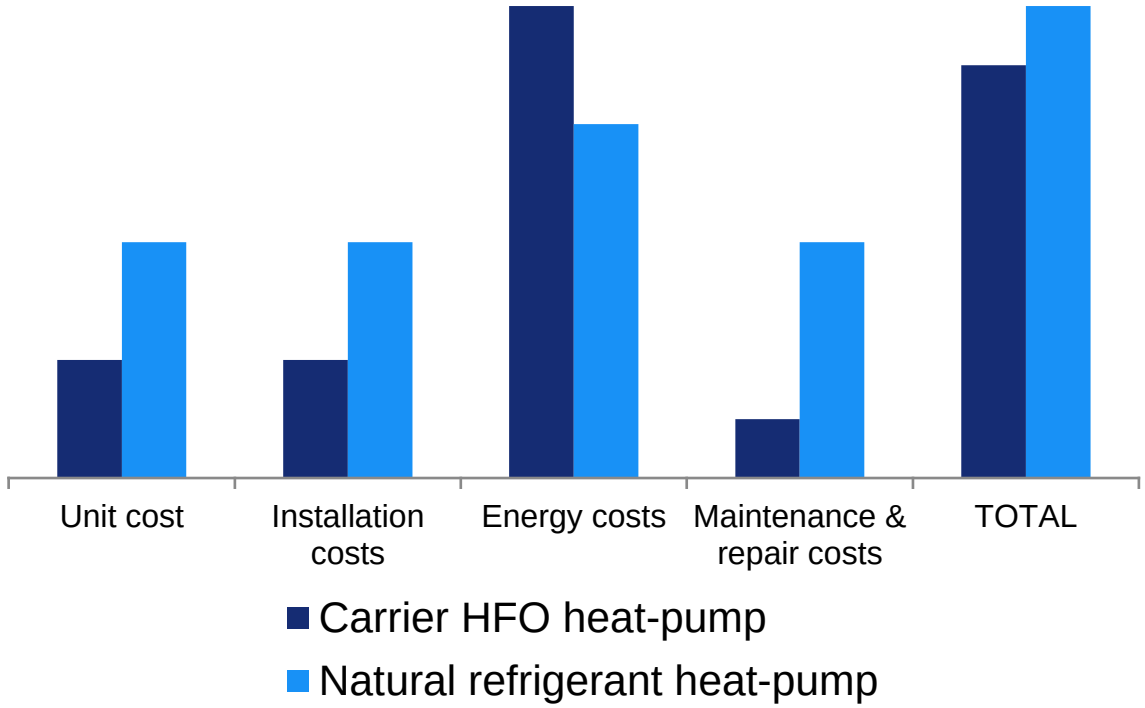
Flooded shell and tube
heat exchangers

PUREtec

AquaForce® PUREtec 61XWHZE

Low total cost of ownership

Up to -20%
compared to natural refrigerant



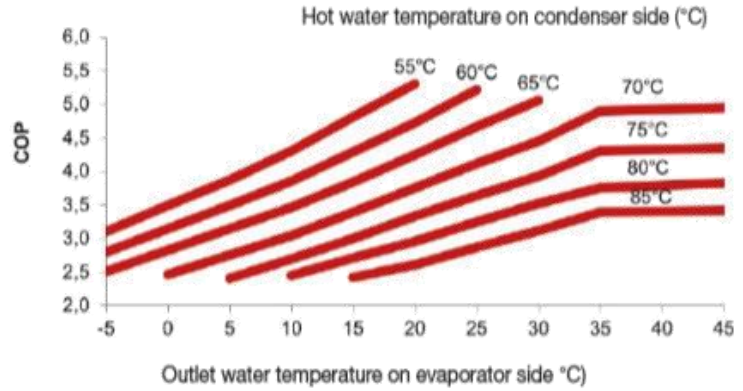
AquaForce® PUREtec 61XWHZE

COP single unit & multiple units

COP from 2.5

up to 5.0

in a single unit configuration



COP up to

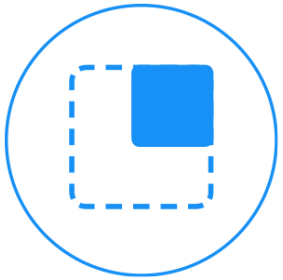
+40%

in series counter flow arrangement

ΔT on the condenser side	One unit	Two units	Three units	Four units
ΔT 10K	0%	4-7%	5-9%	6-10%
ΔT 20K	0%	9-15%	11-19%	14-23%
ΔT 30K	0%	15-24%	19-31%	23-40%

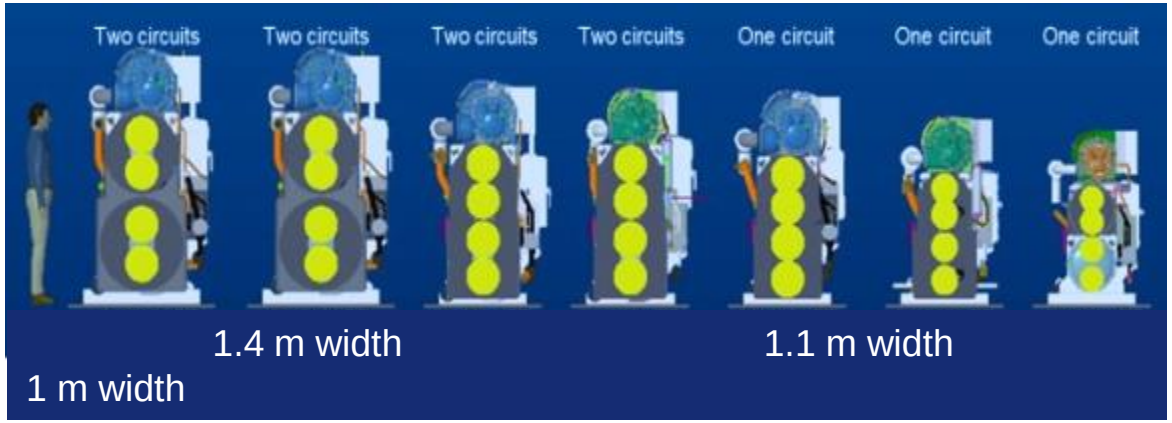
AquaForce® PUREtec 61XWHZE

Flexibility



<1,4m
width

Compact design (from 1000 mm wide) to save space into technical rooms.
Multiple water connection arrangements for flexible installation in existing technical rooms.
High entering water temperature on condenser side (up to 60°C) to connect multiple units in series counterflow arrangement.



AquaForce® PUREtec 61XWHZE

Governmental support

Financial incentives

Many government environmental programs provide **financial incentives for heat pumps to support renewable heat production** in the industry, the district heating sector and at multi-family buildings.

AquaForce® PUREtec 61XWHZE

Customer reference

CORIANCE, Le-Blanc-Mesnil • France

District heating

CUSTOMER'S REQUIREMENT

Heating capacity of 4.5 MW with a heat pump system connected to a geothermal heat source, located at 2 km depth.
Condenser leaving water temperature of up to 85°C.
Evaporator entering water temperature of 55°C.

CARRIER'S SOLUTION

2 AquaForce 61XWHZE heat pumps in cascade counterflow system with smart monitoring.

⊕ Carrier was ready to provide an innovative solution due to its leadership in HFO implementation. Beyond the high coefficient of performance (COP >4), the 61XWHZE heat pump offers an environmentally responsible solution with a very low GWP and non-toxic refrigerant (HFO R1234ze). Its compact dimensions allow for a simplified installation in existing buildings.

AquaForce® PUREtec 61XWHZE

Customer reference

BJÖLSEN ENERGY, Oslo • Norvège

District heating for student housing

CUSTOMER'S REQUIREMENT

Environmentally responsible solutions able to deliver up to 71°C at brine temperature of 1°C.

CARRIER'S SOLUTION

2 AquaForce 61XWHZE heat pumps with PUREtec HFO refrigerant, recovering heat from geothermal source and from a nearby supermarket.

⊕ Carrier ensures the full reliability of the plant and experts close at hand. The smart algorithms of the control allows for a perfect management and monitoring of the heat pumps with the bio boiler in place.

AquaForce® PUREtec 61XWHZE

Customer reference

YGEO, Rosny sous bois, Noisy le sec, Montreuil • France

District heating

CUSTOMER'S REQUIREMENT

Heating capacity of 12 MW with a heat pump system connected to a geothermal heat source, located at 1.8 km depth. Condenser leaving water temperature of up to 80°C. Evaporator entering water temperature of 52°C.

CARRIER'S SOLUTION

6 AquaForce 61XWHZE heat pumps in cascade counterflow system with smart monitoring.

The 61XWHZE range offers full modularity due to the cascade system and smart monitoring management. The combination of full reliability and low maintenance ensure a high level of availability. Smart Carrier algorithms have been designed to optimize cascade system efficiency.

AquaForce® PUREtec 61XWHZE

Customer testimonial

Cadziplo Project – First HFO heat-pump installation in Europe (2015)

61WG

Water-source heat pump for process heating

AquaSnap® 61WG

AQUASNAP

Jusqu'à
65°C

COP
up to
3*

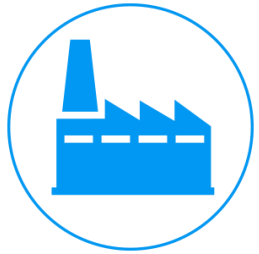
- **RANGE:** High-temperature water sourced heat-pump.
- **CAPACITY** : 20 kW to 190 kW
- **REFRIGERANT:** R-410A
- **APPLICATIONS:** Commercial and industrial process heating, and district heating.

AquaSnap® 61WG

Heat recovery potential for smart cities

VALUE NATURAL HEAT SOURCE

- Ground water
- Lake water
- Sea water
- Geothermal probes



VALUE WASTED HEAT SOURCE

- Waste heat from data centres
- Waste heat from grey waters
- Waste heat from industrial process
- Waste heat from boilers (wood, gas...)
- Waste heat from chillers

AquaSnap® 61WG

Technical features

Touch Pilot™ Control

Scroll compressors

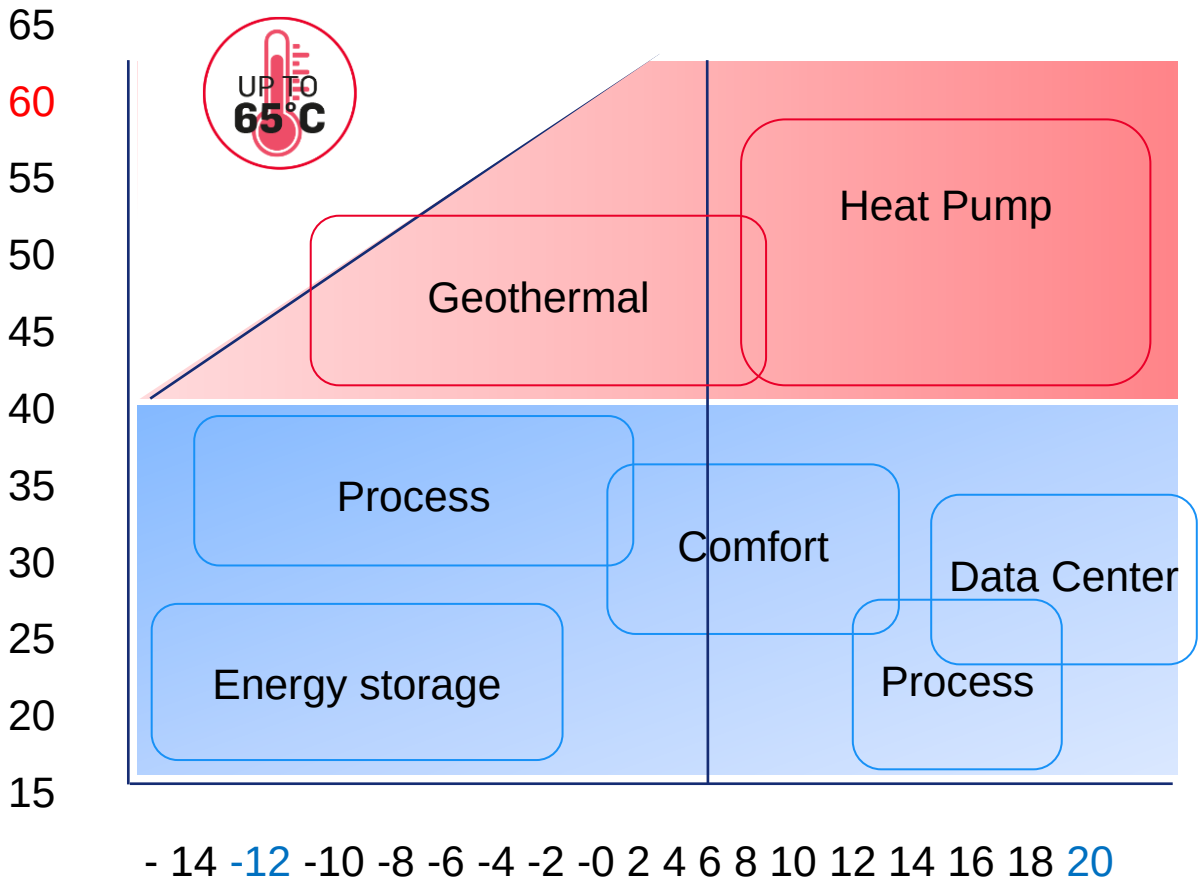
Hydraulic module (option)
Evap. & Cond.
FS or VS pump

Brazed plate heat exchanger

Electronic expansion valve

AquaSnap® 61WG

Large applications range



- **SOURCES:** Ground water, lake water, sea water, geothermal probes.
- **APPLICATIONS:** Cooling and Heating, floor heating, fan coils & AHU, radiators, process.

Hot water

Cold Water

19DV

Water-cooled centrifugal chiller for process cooling

AquaEdge® Greenspeed® PUREtec™ 19DV

COP
up to 7

- **RANGE:** Water-cooled centrifugal chiller
- **REFRIGERANT:** HFO R-1233zd(E) with GWP < 1

greenspeed AQUAEDGE PUREtec

- IPLV.IP rating 11.8
- 30s swift restart
- 10% low load
- THD≤ 5% harmonic filter
- EquiDrive™ compressor
- Ceramic bearings
- SmartVu™ control

AquaEdge® Greenspeed® PUREtec 19DV

Customers are seeking

A **high-performance** building

- Large buildings choose centrifugal chillers for more comfortable indoor climates.
- Including luxury hotels, high-end offices, hospitals, data centers and industrial cooling processes.

A more **efficient** building

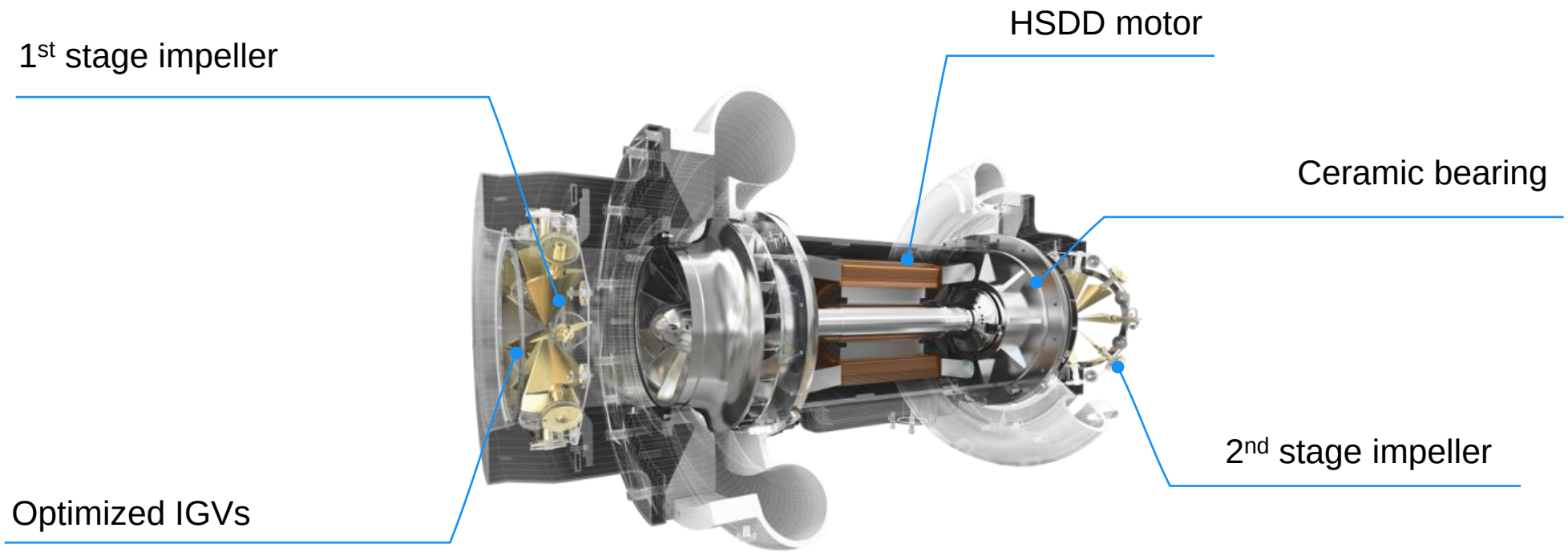
- HVAC systems are a key contributor to the reduction of energy consumption.
- Accounting for 45% of a building's energy consumption, chiller plants have a high usage variability compared to building design. This not only requires a high full-load efficiency (COPR) but also a constant and efficient part load (IPLV.IP) operation with precise control.

A more **sustainable** building

- The chiller plant is closely tied to the refrigerant used, which impacts the environment.
- There is a worldwide consensus on reducing the impact of the refrigerants that cause global warming.

AquaEdge® Greenspeed® PUREtec 19DV

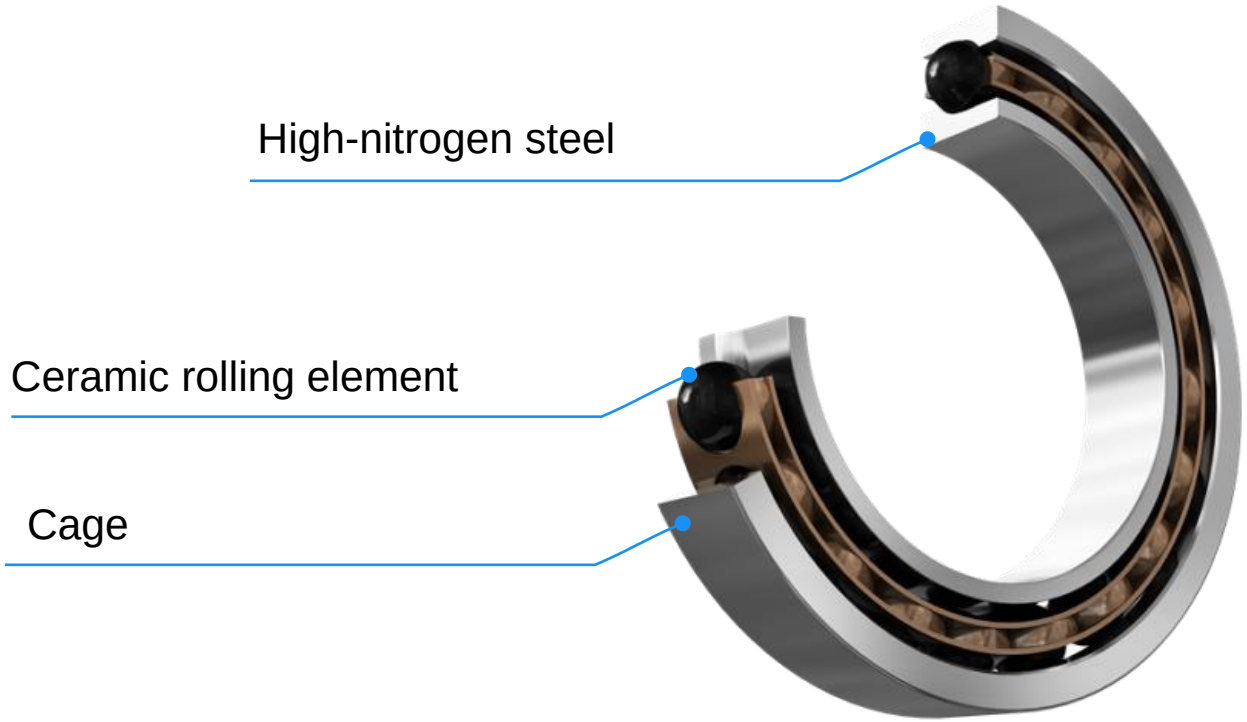
EquiDrive™ compressor



Higher efficiency and more reliable operation with broader range

AquaEdge® Greenspeed® PUREtec 19DV

EquiDrive™ compressor - Ceramic bearings



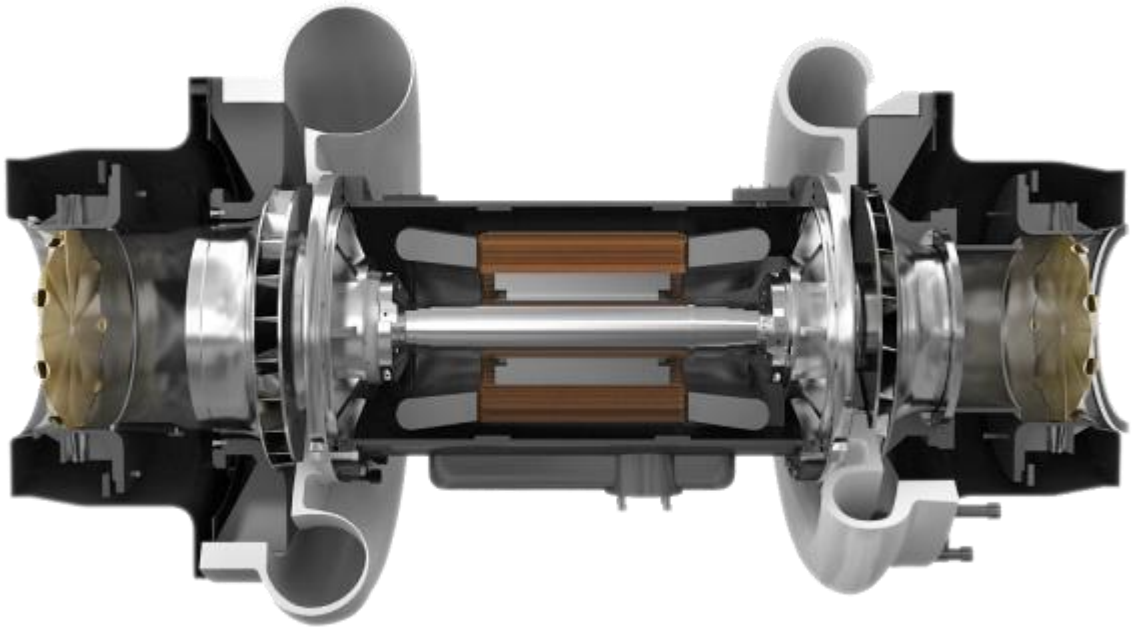
Refrigerant lubricated bearing system

- No risk of oil leakage
- No oil related maintenance
- Improved heat transfer
- Simpler insulation method

Proven safe operation >150,000 hours test

AquaEdge® Greenspeed® PUREtec 19DV

EquiDrive™ compressor - Two-stage design



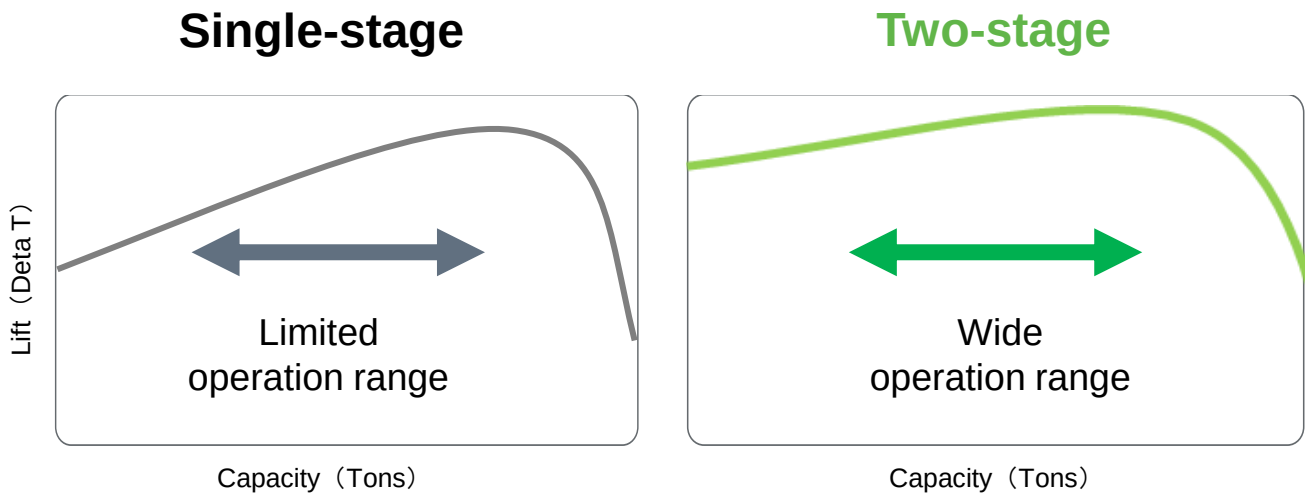
Higher efficiency and reliability

- Balanced axial and radial thrust on shafts
- 30% less aero parts.
- Motor supported at both ends for higher rotor dynamics robustness.
- Optimized IGV for better part load efficiency.
- One IGV for each of stage improves reliability and efficiency at part load.

AquaEdge® Greenspeed® PUREtec 19DV

EquiDrive™ compressor - Two-stage design

Higher efficiency and broader operation range

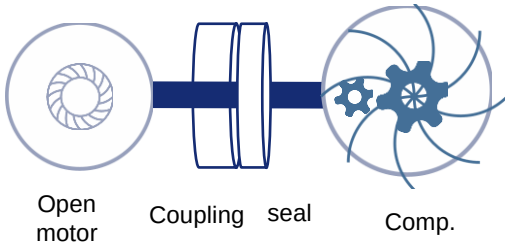


- Economizer for better capacity and efficiency.
- Optimized aero design by Computational Fluid Dynamics simulation for up to 85% compressor efficiency.

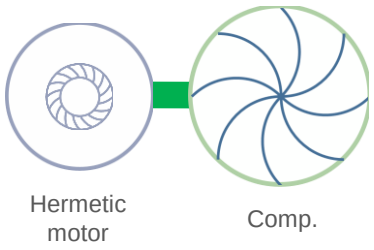
AquaEdge® Greenspeed® PUREtec 19DV

EquiDrive™ compressor - Hermetic HSDD motor

Open type compressor



Semi-hermetic compressor



Replacement
Leakage problem

None

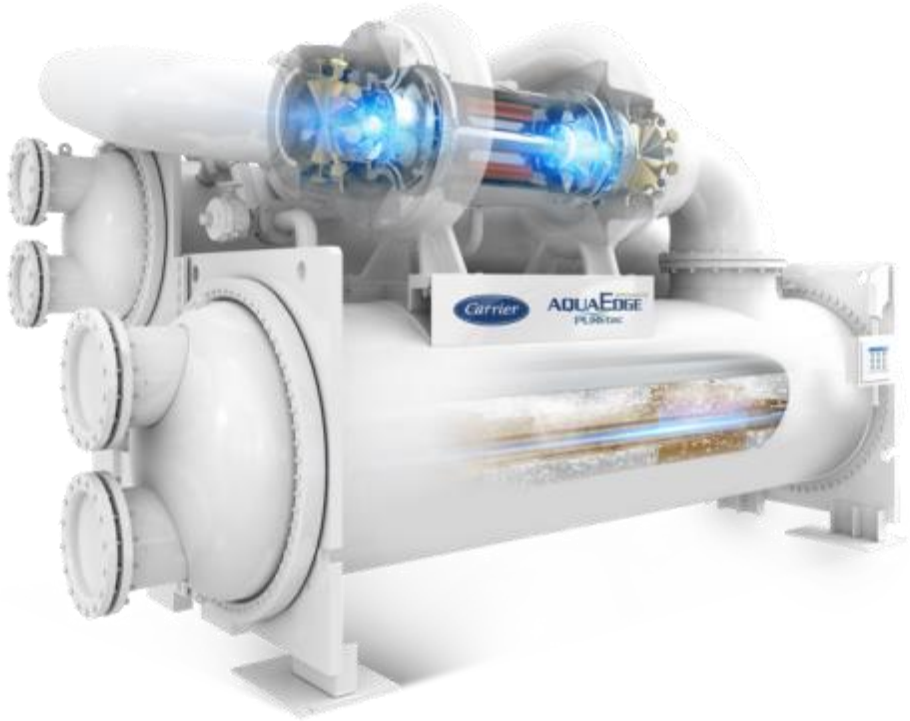
Expensive	Maintenance cost	None
$10,000 / set, every 5 years	Shaft seal/Coupling replacement	$0
Year by year	Supplement of refrigerant & oil	$0

Higher efficiency and lower maintenance cost

- No gear transmission
- No refrigerant leakage risk
- Longer operation life
- Lower inrush current
- Reduced maintenance cost

AquaEdge® Greenspeed® PUREtec 19DV

Falling film evaporator - in low-pressure system

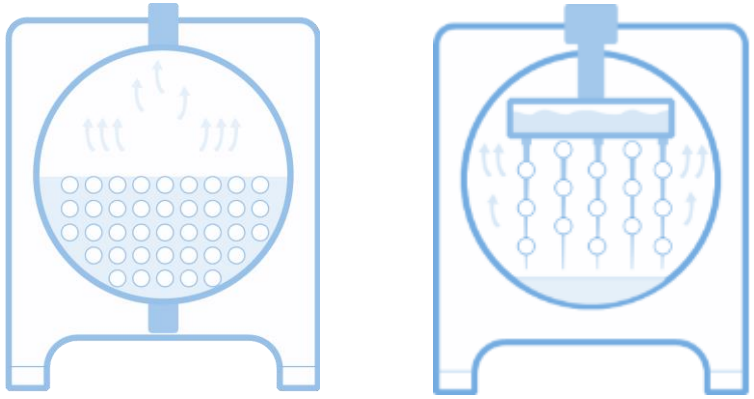


Better heat transfer efficiency

Lower refrigerant charge

AquaEdge® Greenspeed® PUREtec 19DV

Falling film evaporator - in low-pressure system



Flooded

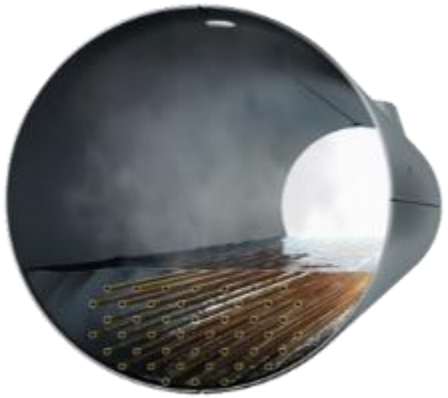
Falling film

Better heat transfer efficiency

- Easy escape for vapor bubbles
- No submerge effect
- Unique structure minimizes aero losses

AquaEdge® Greenspeed® PUREtec 19DV

Falling film evaporator - in low-pressure system



Flooded

Falling film

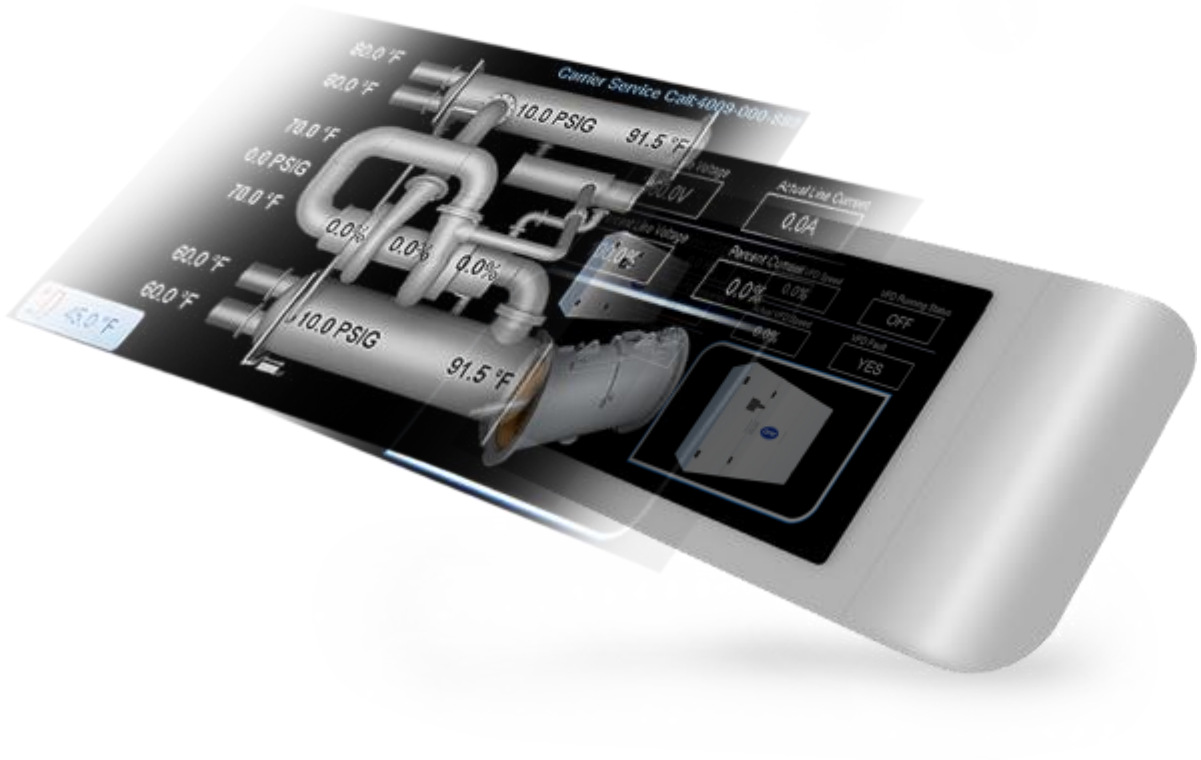
LESS
refrigerant
charge

Lower refrigerant charge

- Avoiding the use of deep pool of refrigerant in the evaporator

AquaEdge® Greenspeed® PUREtec 19DV

SmartVu™ controls



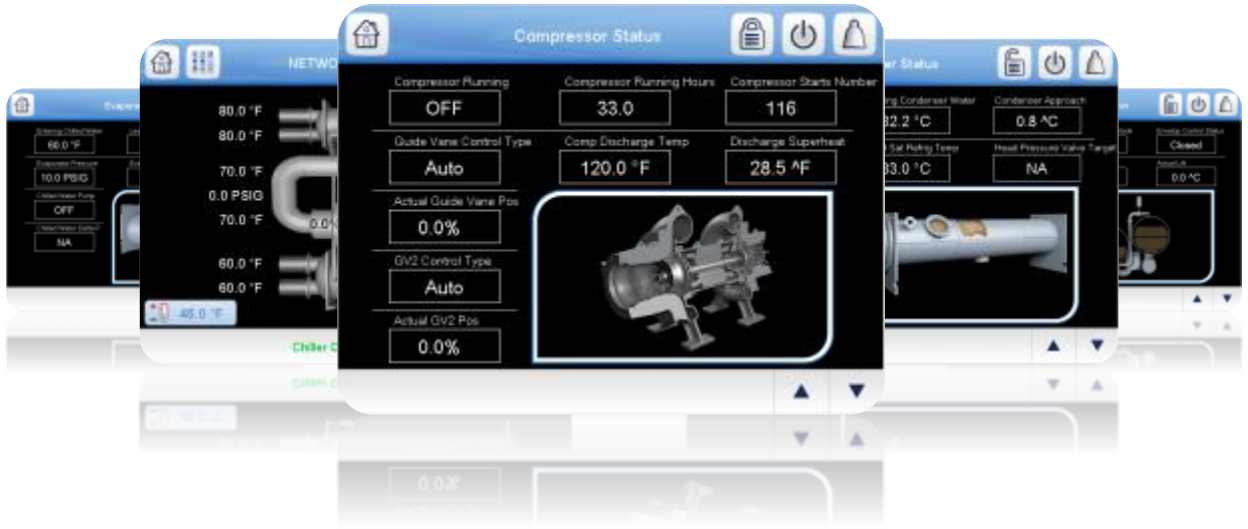
User-friendly interface

Custom-positioned panel

Quick remote connectivity

AquaEdge® Greenspeed® PUREtec 19DV

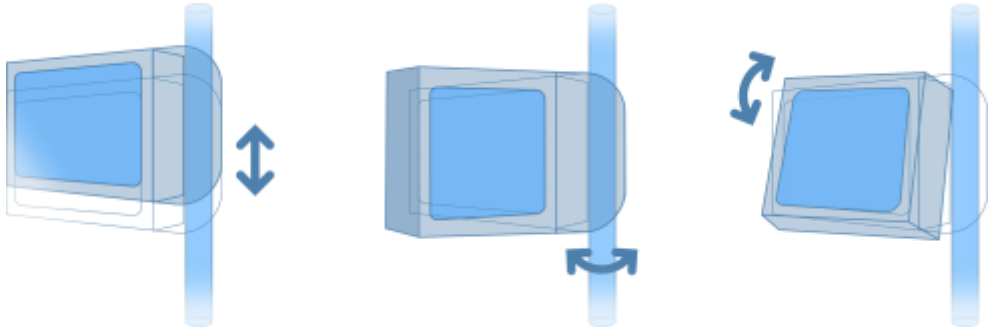
User-friendly interface



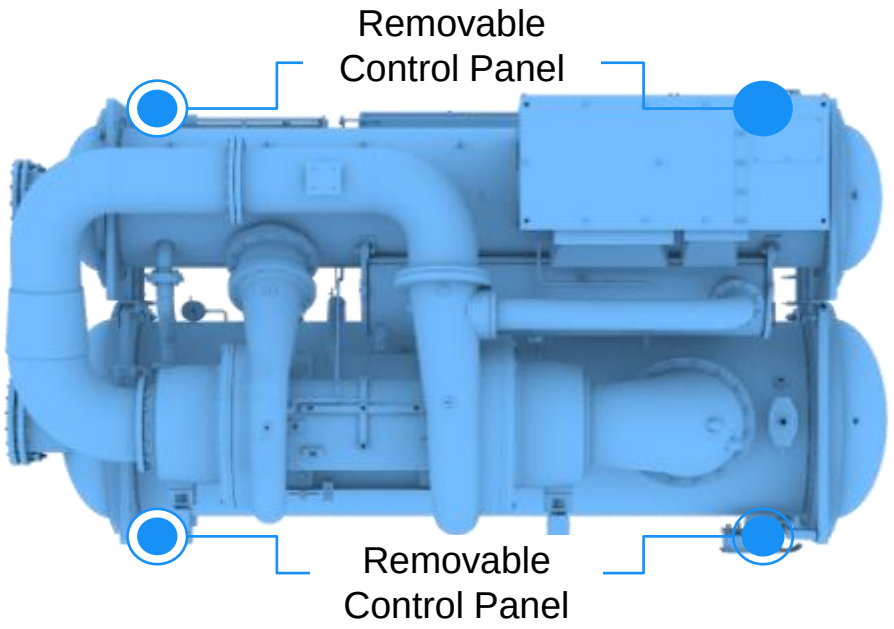
- 10.4” color touch screen
- Easy-to-access menu design
- 10 languages for choice
- Real-time graphic trending of performance
- Quick connectivity with BAS
- Auto alarm and black box

AquaEdge® Greenspeed® PUREtec 19DV

Custom-positioned panel



Fully adjustable in 3 dimensions of motion



Flexibility to attach in any of the 4 corners

AquaEdge® Greenspeed® PUREtec 19DV

Quick remote connectivity

- Diverse communication protocols
- Modbus gateway
- BACnet gateway
- LonWorks gateway

AquaEdge® Greenspeed® PUREtec 19DV

PUREtec™ application

- Low GWP~1
- 5% higher efficiency than R134a system
- A1: Low toxicity / Non-flammability
- Compliance with Kigali deal

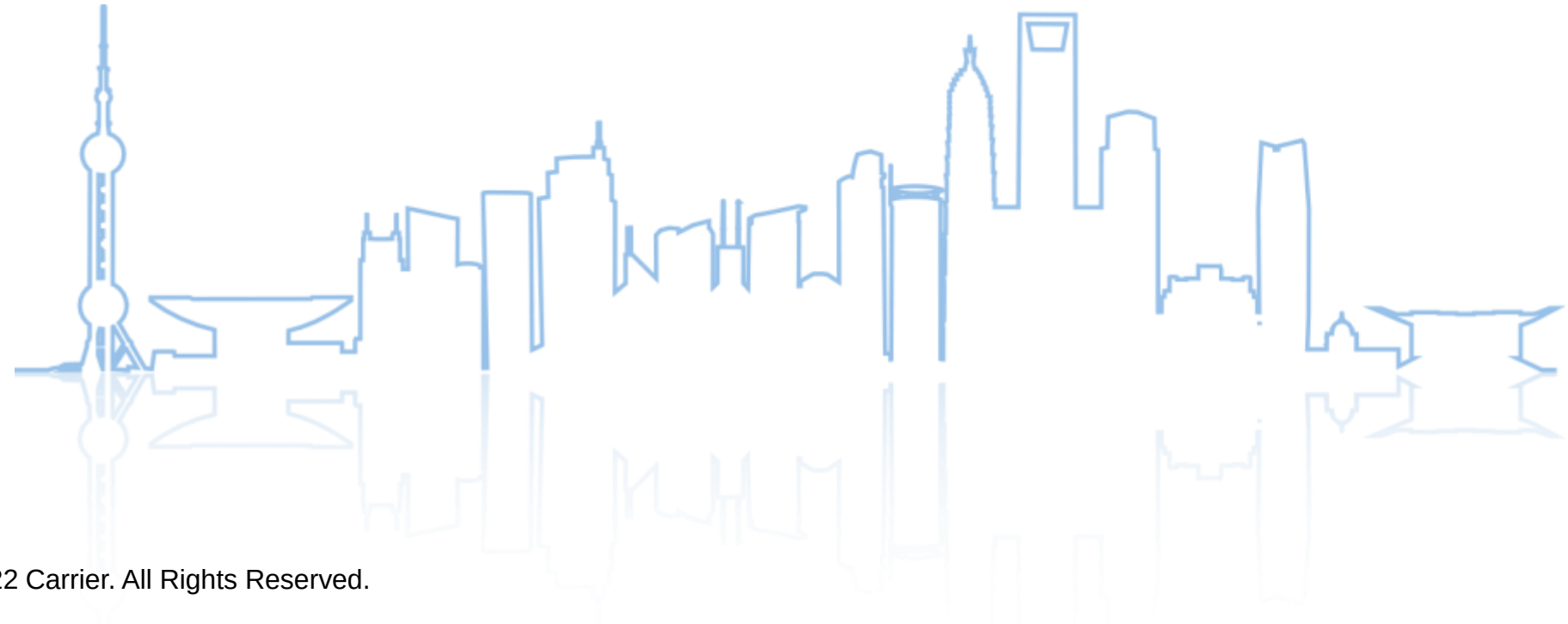
Innovative technology features

Note: GWP according to AR4 from the IPCC, excluding HFOs: AR5 from the IPCC (International Panel on Climate Change)

AquaEdge® Greenspeed® PUREtec 19DV

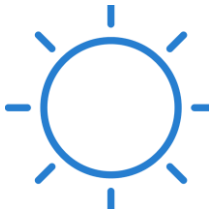
Have you been troubled by unexpected chiller failures?

- Chiller surges when in extremely hot weather
- Takes long time to restart once power goes off
- Unexpected oil-related issues
- Serious electromagnetic interference



AquaEdge® Greenspeed® PUREtec 19DV

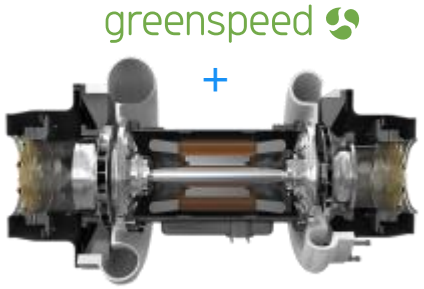
Robust and optimized chiller operation

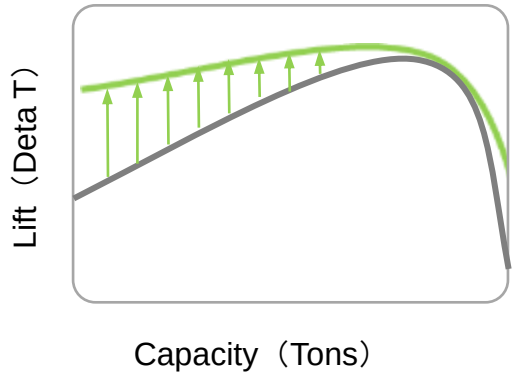


Stabilized operation

Surge control

- VFD and 2-stage IGV in back-to-back compressor design extends the operation range and control points
- Smart envelope stability control to ensure stable chiller operation at low load and harsh operating conditions





AquaEdge® Greenspeed® PUREtec 19DV

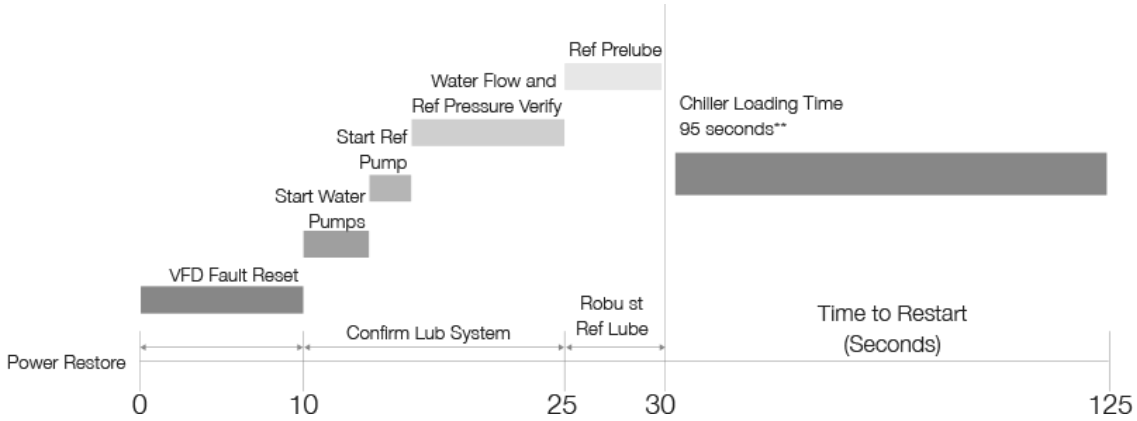
Robust and optimized chiller operation

30s

Swift restart

30s swift restart

- Swift restart of data center application to improve system reliability
- 30s compressor restart and quick capacity recovery



AquaEdge® Greenspeed® PUREtec 19DV

Robust and optimized chiller operation

Refrigerant lubrication

Lubrication without oil

- Robust materials
- Ultra-smooth ceramic balls
- Lower bearing thrusts

AquaEdge® Greenspeed® PUREtec 19DV

Robust and optimized chiller operation

THD ≤ 5%

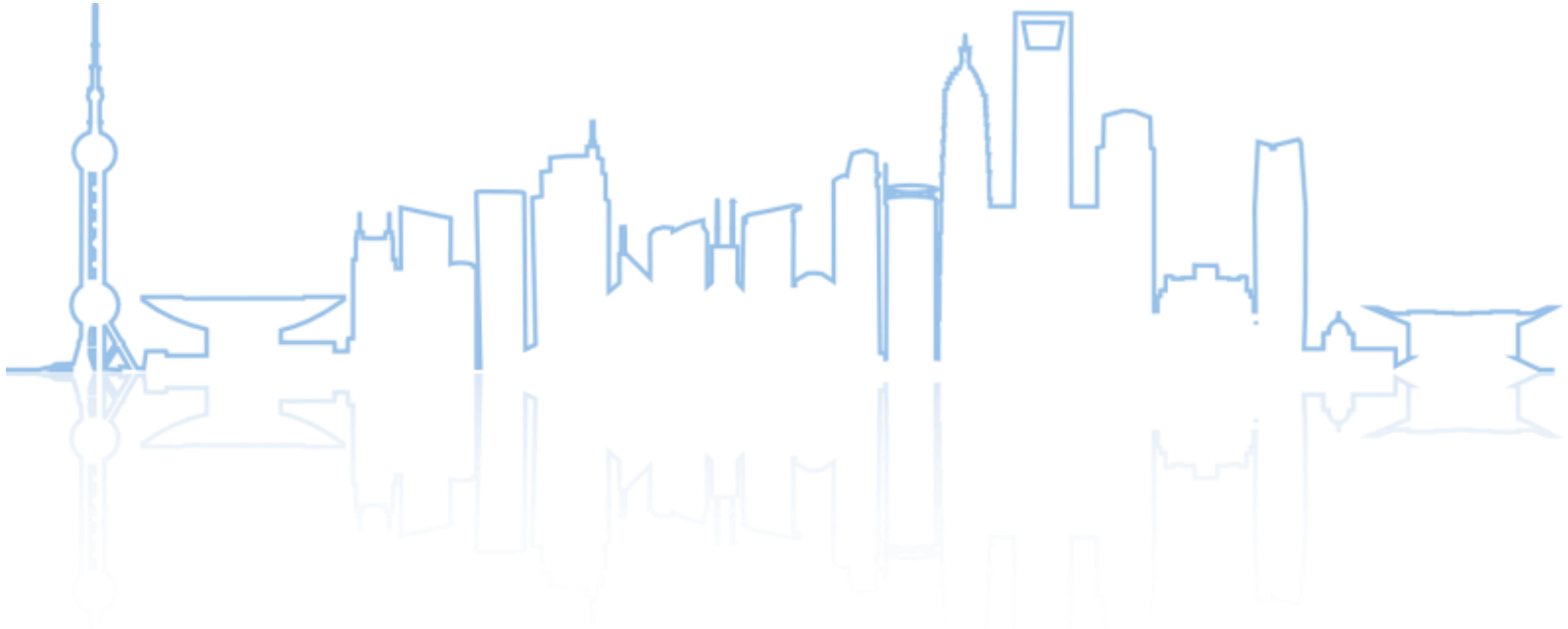
Unit mounted harmonic filter

- Ideal for Data Centers, Hospitals, High-end establishments and Laboratories
- Greenspeed® intelligence
- Unit mounted harmonic filter THD≤5%
- Compliance of IEEE519

AquaEdge® Greenspeed® PUREtec 19DV

Robust and optimized chiller operation

- Surge control
- 30s swift restart
- Refrigerant lubrication
- ≤5% THD options



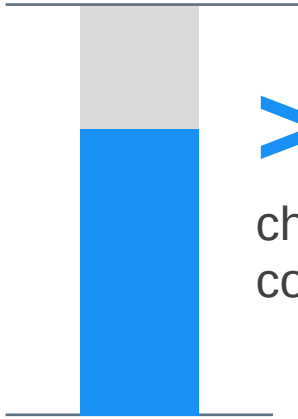
AquaEdge® Greenspeed® PUREtec 19DV

Expect more from less

19DV with industry leading efficiency

- Better compressor efficiency
- Better heat transfer efficiency
- No additional ventilation which reduces 5% COP_R
- VFD control

COP_R 7.0 / IPLV.IP 11.8



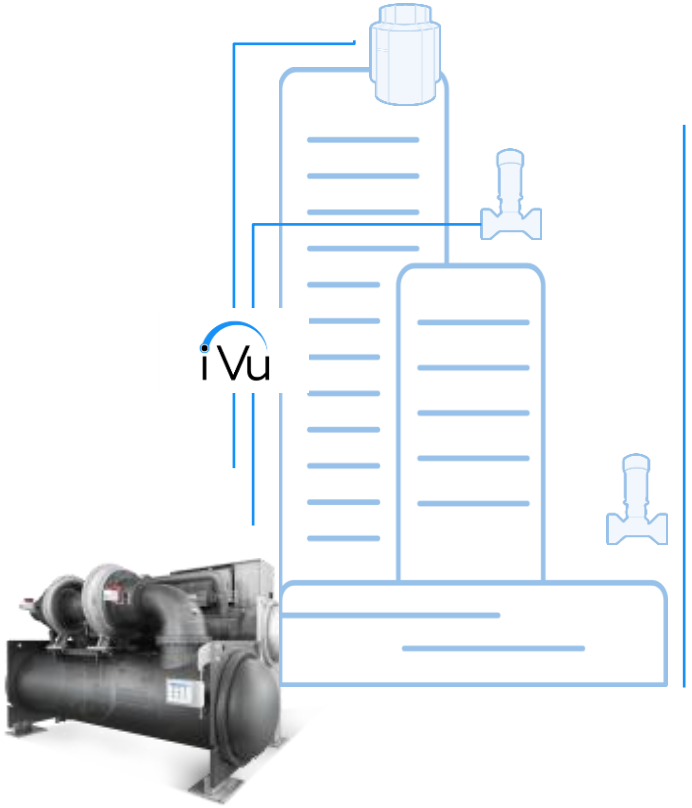
>30%

chiller operation cost reduction

* compared to fixed speed

AquaEdge® Greenspeed® PUREtec 19DV

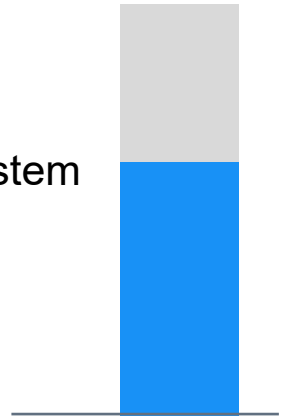
Expect more from less



Compatible with integrated chiller system solutions

- Supports connection to HVAC and BMS systems
- Improved system operation solution
- Compatible with Carrier® i-Vu® platform
- Compatible with Carrier® ChillerVu™ plant system manager solution

AdvanTEC



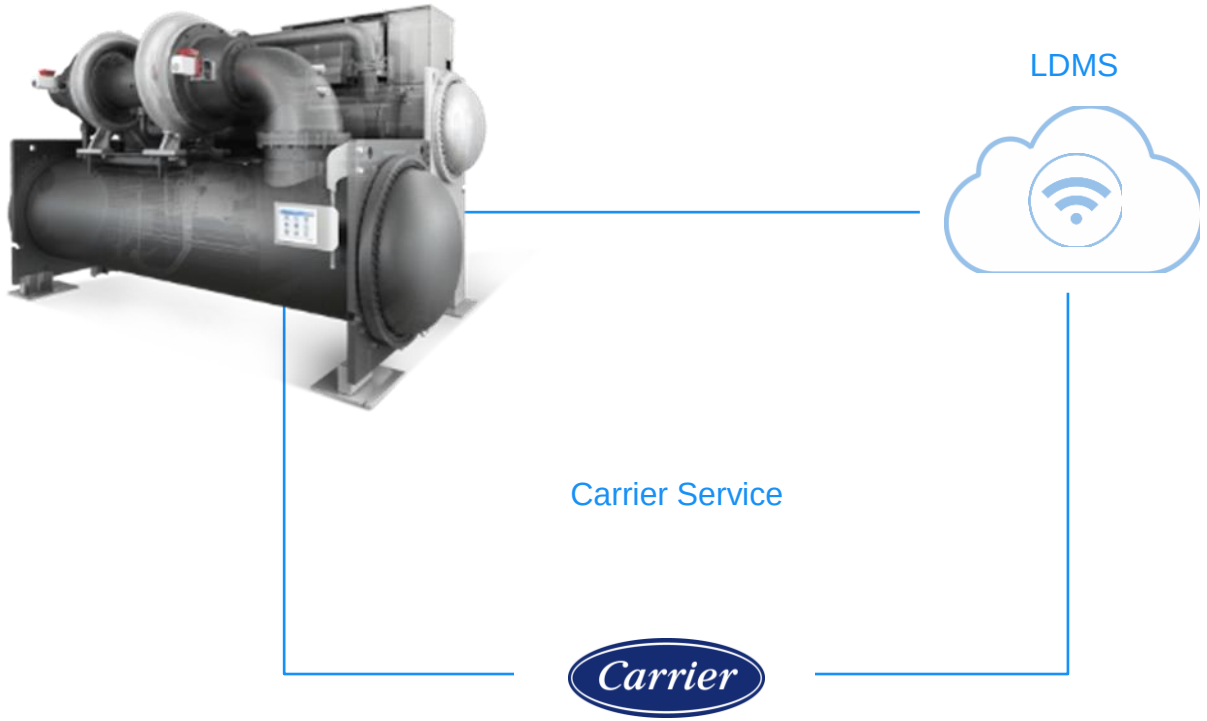
up to **35%** system operation cost reduction

AdvanTE^{3}C **PLANT SYSTEM MANAGER**

* compared to fixed speed system

AquaEdge® Greenspeed® PUREtec 19DV

Everything at your fingertips



Support continuous HVAC system upgrade

Carrier Lifecycle Data Management System

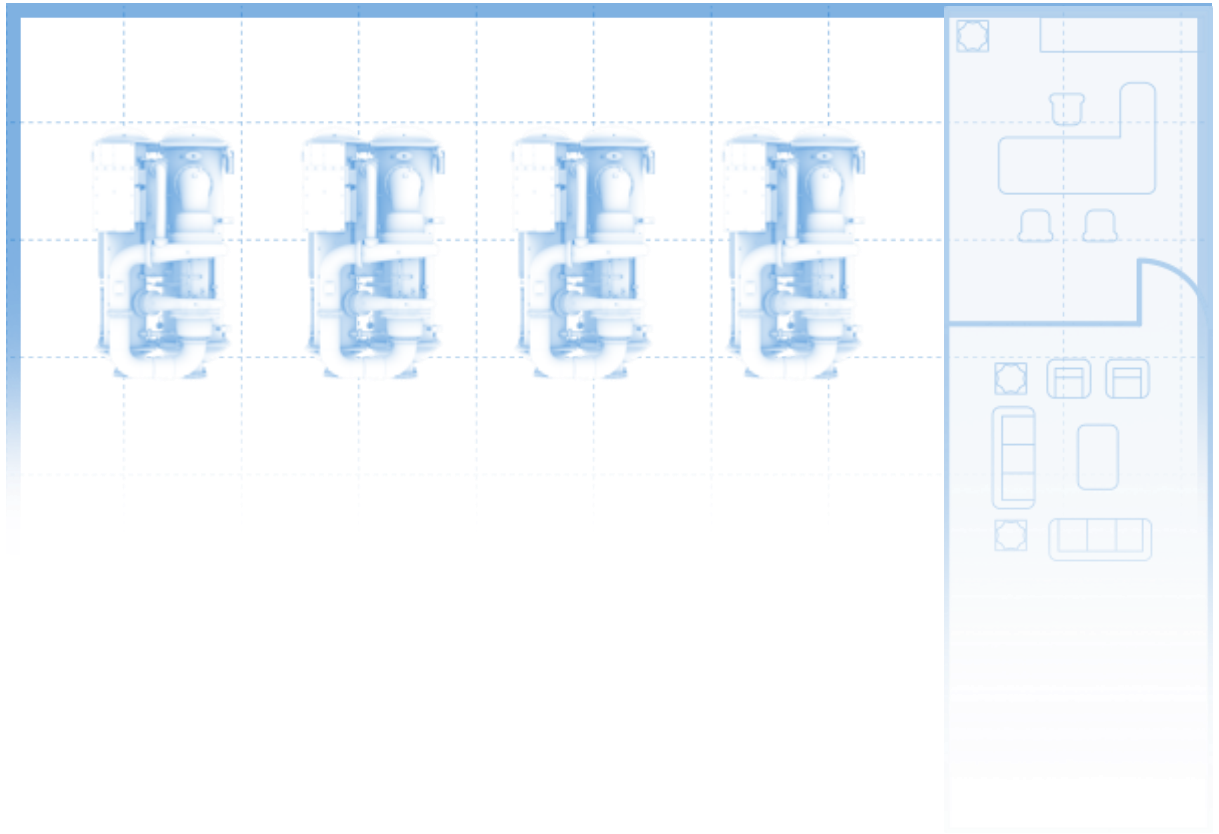
- Cloud storage
- Big data management
- Historic data analysis
- More specific diagnosis

AquaEdge® Greenspeed® PUREtec 19DV

Enlarge your floor space

Smaller footprint and flexible installation

- Optimized falling film evaporator size
- Optimized system layout
- Crescent economizer design

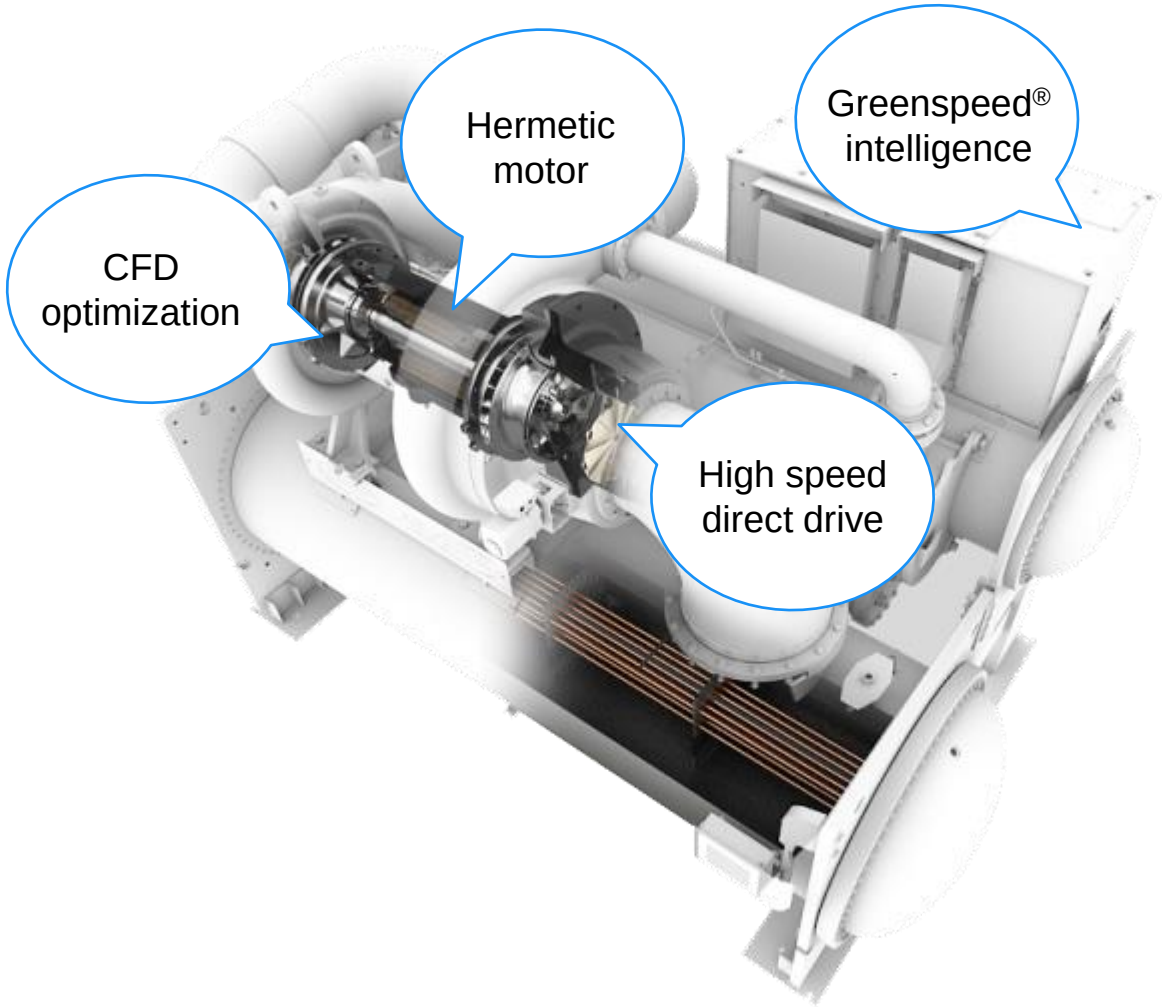


AquaEdge® Greenspeed® PUREtec 19DV

Work in a quieter environment

Smaller footprint and flexible installation

- Advanced aerodynamic design
- Optimized compressor design
- Improved part-load operation noise



AquaEdge® Greenspeed® PUREtec 19DV

Assisting you in achieving your environmental goals

Applies R-1233zd(E) GWP~1

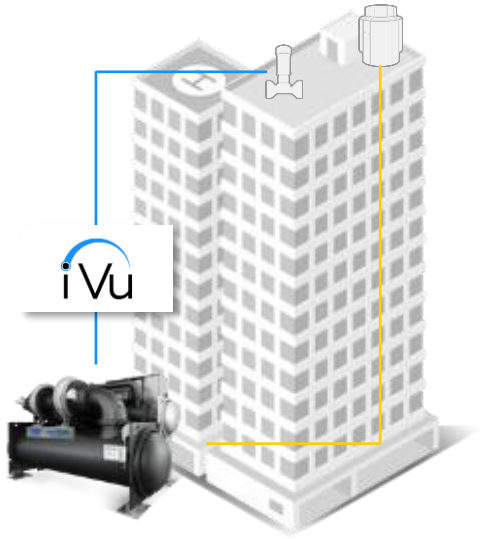
PUREtec

Carrier low GWP refrigerants

Leading efficiency reduces carbon emission

COP_R 7.0 IPLV.IP 11.8

Supports system upgrade for energy efficiency



30RB RANGE

Air-cooled scroll chiller for process cooling

AquaSnap® 30RBP

SEER
4.4

EER
2.9

- **RANGE:** Air-cooled scroll liquid chiller
  - Variable-speed pumps
  - Variable-speed fans
- **CAPACITY:** 160 kW – 530 kW
- **REFRIGERANT:** R-410A
- **APPLICATIONS:** Commercial and industrial. Operation from -20°C up to 48°C air ambient temperature.

greenspeed AQUASNAP

AquaSnap ® 30RBP

Fan variable-speed drive

Variable-speed pump

Variable-speed Flying Bird™ fans

Heat recovery option

Pump variable-speed drive

Medium or low-brine application

AquaSnap® 30RBP

Key features

Medium or Low temperature brine solution

- Water production down to **-6°C** (medium) and to **-12°C** (low)
- Covers specific applications such as **ice storage and industrial process cooling.**

DX and Hydronic free-cooling

- **DX free-cooling : integrated** in the unit. Operates without glycol or an extra free-cooling **drycooler** and provides **energy savings**.
- **Hydronic free-cooling :** adapted for **industrial process cooling** application in cold climate regions. Provides significant **energy savings** by reducing the number of compressor running hours during the colder seasons.

Partial heat recovery

- Produce free hot water, **up to 80°C**, and chilled water simultaneously.
- Units can be equipped with one **desuperheater** on each refrigerant circuit.

AquaSnap® with R-32 refrigerant

AQUASNAP®

SEER
5.3

SCOP
3.5

- **RANGE:** Air-Cooled Scroll Chiller and Air-to-Water Heat Pump
  - **30RB & 30RBP**

    170kW – 940kW cooling
  - **30RQ & 30RQP**

    160 kW – 520 kW cooling

    170 kW – 540 kW heating
- **REFRIGERANT:** R-32 with GWP = 675

AquaSnap® with R-32 refrigerant

30RBP with Greenspeed® intelligence

165 kW – 940 kW

Variable speed fans (Drive or EC motors)
Multiple stage scroll compressors

SEER Up to **5.3**

SEPR Up to **6.6**

30RB

165 kW – 400 kW

Fixed-speed AC fans
Multiple stage scroll compressors

SEER Up to **4.6**

SEPR Up to **5,9**

SEER Up to 20%
above Ecodesign 2021 requirements

30RQP with Greenspeed® intelligence

175 kW – 530 kW

Variable speed fans (Drive or EC motors)
Multiple stage scroll compressors

SCOP Up to **3.7**

30RQ

175 kW –530 kW

Fixed speed AC fans
Multiple stage scroll compressors

SCOP Up to **3.5**

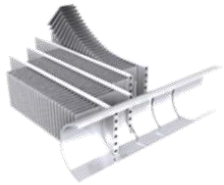
Industry-leading Carrier technologies

Fixed speed
Flying Bird™ VI fan

SmartVu™ touch Screen

Brazed plate
heat exchanger

Novation® Microchannel (30RB)
Copper/aluminum RTPF coil (30RQ)



R-32 optimized
multiple stage
scroll compressors

R-32 refrigerant

R-32

Upgraded technologies 30RBP & 30RQP

Variable speed Flying Bird™ VI fan
(Variable speed drive with EC motors option)

Drive (fans & pump)
integrated in electrical box

Variable speed pump (option)
Up to 940 kW

39CP

Air handling units suitable for clean room applications and larger industrial premises air conditioning

AiroVision® 39CP

ECO DESIGN READY

AIROVISION®

RANGE: The 39CP range includes 9 sizes, with airflow ranging from 1,000 m3/h (0,28 m3/s) to 25,000 m3/h (6,94 m3/s), and is available in two levels of casing:

- **39CP-L**: for basic applications
- **39CP-H**: for stringent applications with low thermal bridge

	39CP-L	39CP-H
Casing strength	D2	D1
Casing air leakage class	L1	L1
Thermal transmittance	T3*	T2
Thermal bridging factor	TB3*	TB1

*T2/TB2 as option

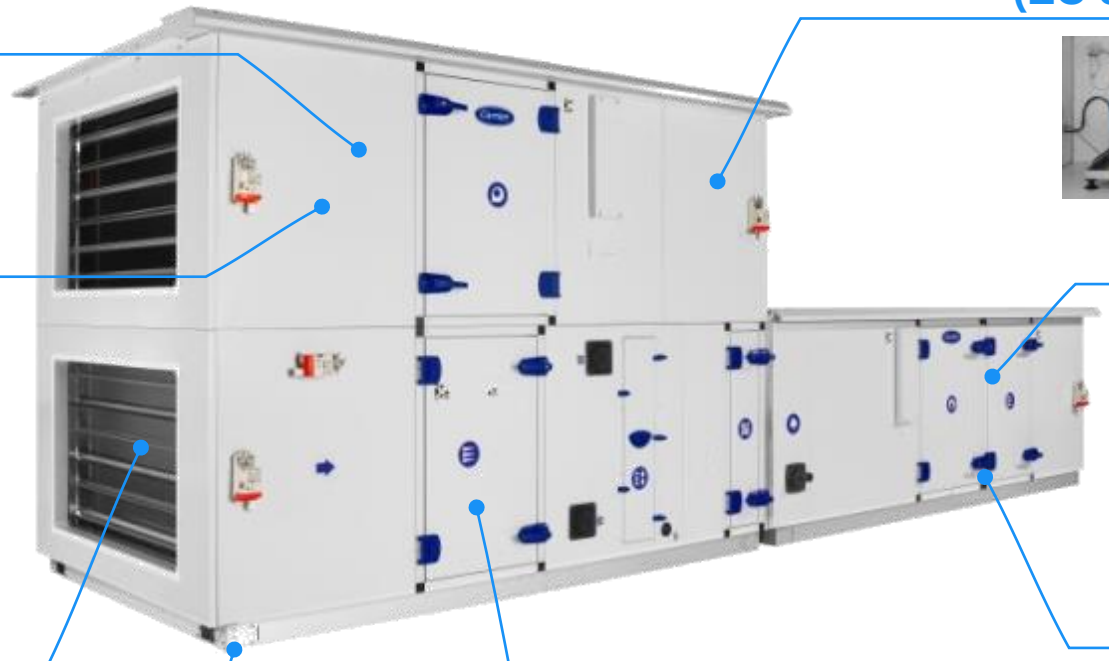
AiroVision® 39CP

Sound attenuators

Heat recovery

G2 to H14 filters

Simplified handling and positioning



High-efficiency fan (EC or AC motor)

Class 1, 3, 4, ATEX damper*

Double thermal bridge

Factory fitted control

*on request only

AiroVision® 39CP

Significant **energy savings** through EC plug fan motors, accurate control and heat recovery devices

Enhanced **air quality control** via suitable filtration options

Tailor-made solutions and design versatility

Plug and play concept

Quick and **easy installation** and **commissioning**

Best-in-class technologies

High-quality components

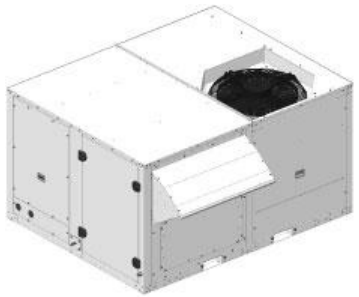
Fully compliant with the **2018 Ecodesign** requirements

Components incorporated in our units are suitable for recycling

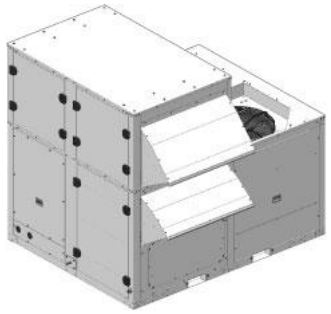
50FC/FF- 50EN/EH

Rooftop units for workshop and warehouse air-conditioning

50FF/FC (20-90kW)



Single-duct configuration



Double-duct configuration

- **HIGH-EFFICIENCY ROOFTOP**
  50FC - heat pump version
  50FF - cooling only

SEER up to **4.9**

SCOP up to **3.6**

- **ASSEMBLIES**

Single flow configurations	Double flow configurations
Facilities with low air tightness & low fresh air ratios	Facilities with overpressure control requirements (energy recovery recommended in case of high fresh airflow ratios)

- **SPECIFIC OPTIONS**
  - Up to 4 ambient sensors (large open areas)
  - Heat recovery water coil
  - Energy meter
  - Anti-corrosion options
  - 100% fresh air assembly
  - Supervision offer

50FF/FC (20-90kW)

Easy access
to indoor components

Isolation
A2-s1,
d0 (M0)

EC or AC 2 speed
axial outdoor fans

Heat recovery
systems

Assemblies
with free-cooling

Scroll tandem compressors
Electronic expansion valve

Different mixing
section configurations

Configurable
airflow directions

High-quality
locking system

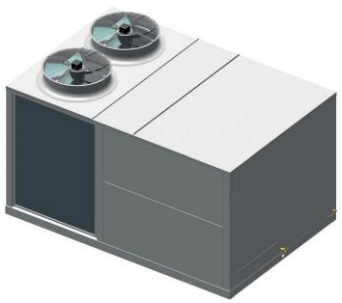
EC plug fan motors

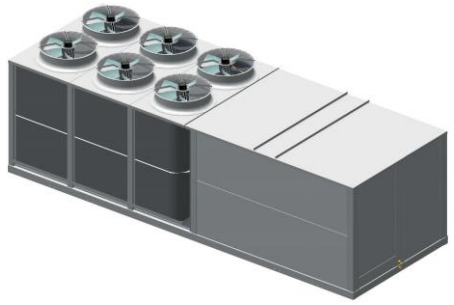
Indoor air quality
with different filters

Double-wall insulated panels

Removable drain pan

50EN/EH (90-280kW)





Eurovent certified
up to 200kW

- **LARGE CAPACITY ROOFTOP**
  50EH - heat pump version
  50EN - cooling only

- **ASSEMBLIES**

Single flow configurations	Double flow configurations
Facilities with low air tightness & low fresh air ratios	Facilities with overpressure control requirements (energy recovery recommended in case of high fresh airflow ratios)

- **SPECIFIC OPTIONS**
  - Up to 4 ambient sensors (large open areas)
  - Heat recovery water coil
  - Energy meter
  - Anti-corrosion options
  - 100% fresh air assembly
  - Supervision offer

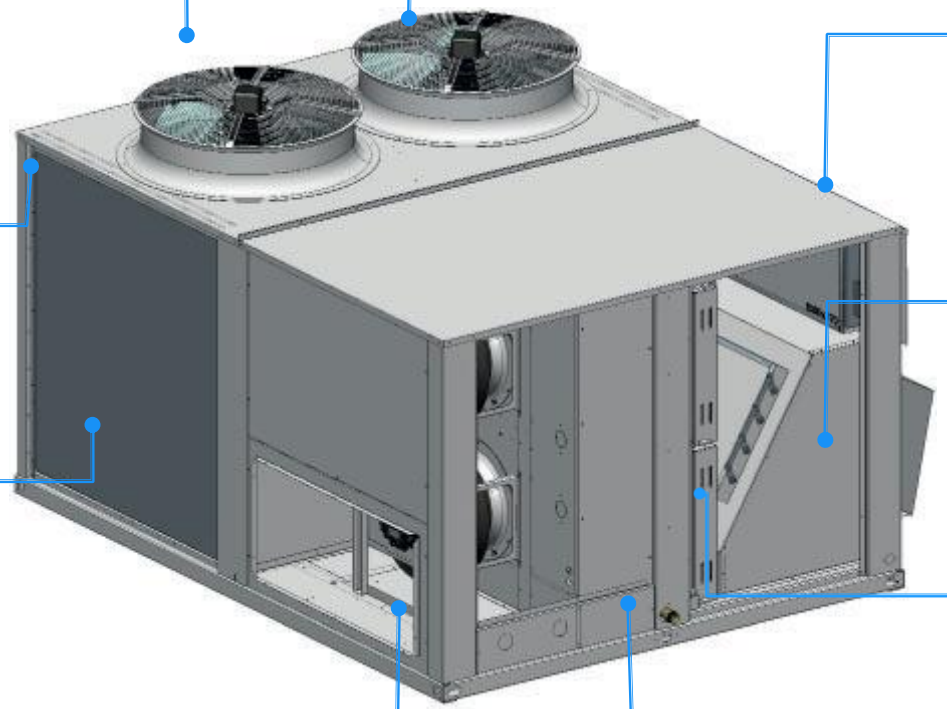
50EN/EH (90-280kW)

High-efficiency cooling circuits for R-410A

Electronic axial fans for low noise level

Possibility of cooling recovery needs for renewal of air (higher EER and COP)

Possibility of thermal and acoustic insulation A2-s1,d0 (M0)



Assemblies with mixing box and free-cooling management

Intelligent defrosting of outdoor coils

Indoor air quality using different combinations of gravimetric and opacimetric filters

Plug-fans (free wheel) with EC motors

Comfort / heating options: electrical heaters, hot water coil, gas burner...

42AM

Air heaters for workspace heating

42AM – Air Heater

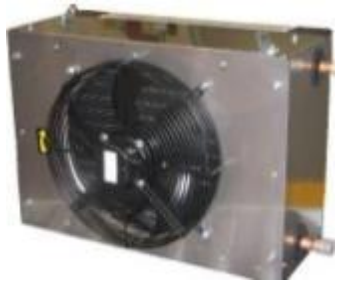
- **RANGE:**
  - Hot water :
    - Heating capacity: 5 to 133 kW
    - Air flow: 1400 to 11,500 m^3/h
  - Superheated water / Steam: 32 to 150 kW
    - Heating capacity: 32 to 150 kW
    - Airflow: 2600 to 10,500 m^3/h

- **APPLICATIONS:**
  - Greenhouses
  - Agricultural breeding
  - Wastewater treatment plant
  - Refinery / chemistry
  - Dairy / cheese factory

42AM – Air Heater

The 42AM air heater unit can be provided with special options to fulfill specific needs in industrial facilities.

ATEX unit



Stainless steel casing

Corrobloc fan motor

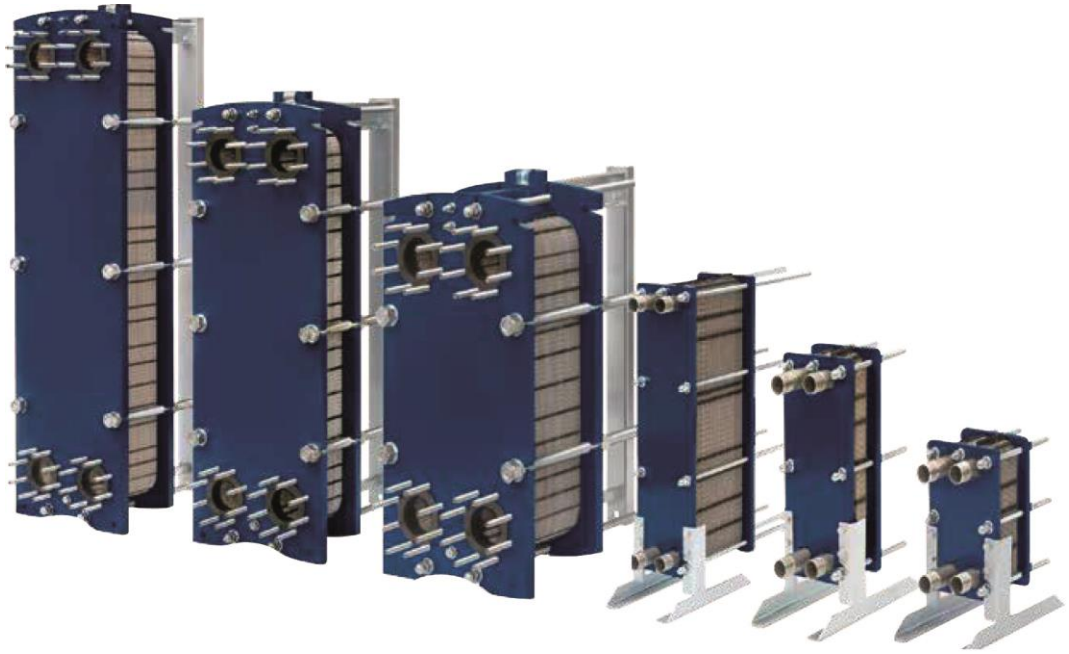
SPECIFIC KEY OPTIONS FOR INDUSTRIAL APPLICATIONS

- Corrobloc fan motor with IP 55 or 65.
- 304L stainless steel casing.
- ATEX construction (motor, impeller and frame assembly).
- 316L stainless steel tube coils (corrosive fluid or more than 200°C).
- Heresite-coated coils.

10TE

Heat exchanger for process

10TE



- **RANGE:** large range capable of handling water flow rates up to 8003/h
- **APPLICATIONS:**
  - Water source heat pump and water-cooled chillers
  - Heat recovery
  - Space heating
  - Domestic hot water production
  - Recovery of corrosive waste
  - Geothermal energy recovery
  - General industrial processes

10TE

- Excellent heat transfer coefficient
- Low-capacity circuits and fluid retention volume
- Very low pinch point temperatures possible
- High-corrosion resistance
- Compact footprint
- Possibility of heat transfer area extension
- Easy to install and to maintain
- Maximum differential pressure equal to maximum operating pressure

10TE

Small size

- 8 models with heat transfer area per unit from 1,6 up to 63 m^2
- Maximum water flow rate from 19 up to 83 m^3/h

MODEL	10TE020+	10TE040+	10TE080+	10TE070+	10TE160+	10TE260+	10TE125+	10TE180+
Connection Size	DN 32 (1"¼)			DN 50 (2")			DN 65 (2"1/2)	
Max. Flow Rate [m^3/h]	19			63			80	83
Heat Transfer Area [m^2]	1,6	3,1	8,2	12	41	63	19	27
Height [mm]	320	470	755	720	1050	1395	819	996
Width [mm]	200			310			300	392

10TE

Large units

- 8 models with heat transfer area per unit from 108 up to 631 m^2
- Maximum water flow rate from 240 up to 800 m^3/h

MODEL	10TE300+	10TE450+	10TE700+	10TE400+	10TE600+	10TE900+	10TE650+	10TE990+
Connection Size	DN 100 (4'')			DN 150 (6'')			DN 200 (8'')	
Max. Flow Rate [m^3/h]	240			380			800	730
Heat Transfer Area [m^2]	108	193	280	215	355	631	334	534
Height [mm]	1124	1569	2014	1372	1819	2272	1657	2206
Width [mm]	530			609			810	790

Your service partner a solution for every situation

MODERNISATION
Complete replacement and upgrade of units at the end of their life cycle

CONSULTANCY
Expertise on site assessment and regulatory topics

RENTAL
As an insurance program

COMMISSIONING
On-site start up

MAINTENANCE
Regular upkeep of installations

BLUEDGE DIGITAL*
Diagnosis, data analysis

REPAIRS
Punctual breakdown repair, parts direct from manufacturer

*BUEDGE DIGITAL is the new name for Connected Services – Technology remains the same.

BluEdge - Your service partner

Customer focus

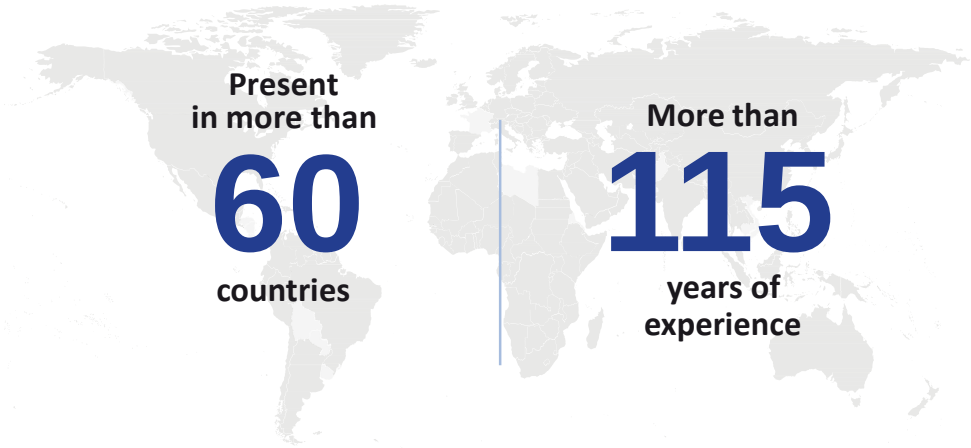
As your preferred partner, Carrier designs tailored Service programs to meet your goals and optimize your business performance.
Our BluEdge service platform is designed to meet your requirements and keep your equipment running efficiently. We can help you create a customized program that is suited to your specific goals and needs.

Proximity & responsiveness

Expert Carrier technicians are there to take action quickly. Our comprehensive and highly efficient maintenance processes mean your equipment will soon be back in action.

Expertise & consultancy

Your Carrier experts can help you find the right balance between energy efficiency and your investments' optimization with our wide choice of technologies and solutions. Thanks to the data analyzed via BluEdge Digital* and the expertise of our internal team, we are able to offer the highest level of consultancy.



BLUEDGE

*BluEdge Digital is the new name for Connected services

BluEdge Digital*

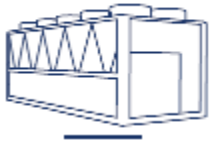
Solutions that empower your team to visualise, advise, and optimise the lifecycle and outcomes of your HVAC system.

- **Remote monitoring**
- **Proactivity to anticipate breakdowns**
- **Precision monitoring**
- **Effective maintenance**
- **Easy, secured access**

- Performance monitored 24/7, 365 days a year
- Up to 5 connected units
- Real-time data
- Analysis of the data log to improve diagnostics and correctly define the maintenance requirements
- Digitally connected Carrier technicians for quick on-site intervention
- Advice from Carrier experts on the actions to be undertaken to optimise performance

*BluEdge Digital is the new name for Connected services

Carrier rental systems



+8,000
Available units

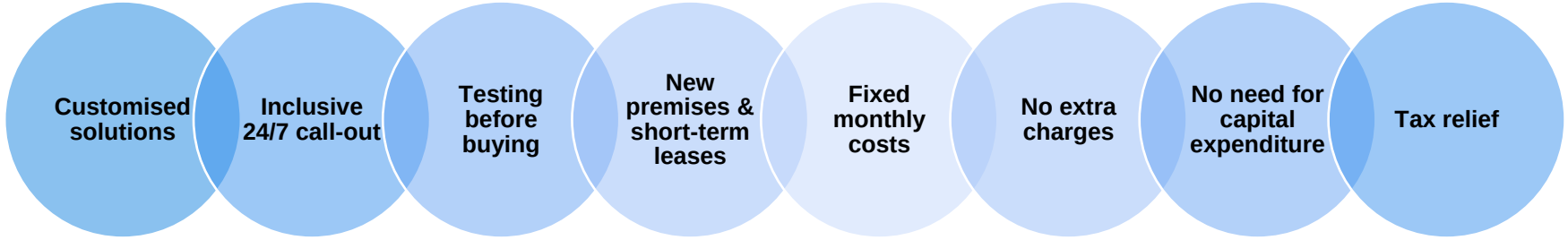
+34
Depots

24/7
Availability

Temporary short, medium and long-term cooling and heating solutions for various customer needs:

- Seasonal capacity requirements
- Breakdown emergencies
- Planned service work
- Facility refurbishment
- Special events
- Contingency planning...

On-time and on-budget delivery, from system design to installation and decommissioning.



Plant room management

Carrier PlantCTRL™

The PlantCTRL™ system regulates, controls & optimizes the operation and energy consumption of your heating and cooling production plant. Available for all applications, this system is able to manage and pilot all cooling & heating production components and all associated hydraulic devices.

Thanks to its remote monitoring capabilities, we can provide support from a distance.

The PlantCTRL™ system reduces your operating & maintenance costs while guaranteeing a quick return on investment:

Optimize energy consumption of the installation

Decrease equipment down-time

Secure connection to the industrial facility

CARRIER

Carrier was founded by Willis Carrier, the inventor of modern air conditioning, in 1902. Over time Carrier has been recognized as the leading global provider of healthy, safe, sustainable and intelligent building and cold chain solutions. We continue to innovate in order to offer market-leading products and solutions.

At Carrier, sustainability leadership is something that comes naturally. Willis Carrier was an inventor, his brand pioneered the industry, and his products changed the world. Along the way, a focus on sustainability and preserving natural resources has endured as a guiding principle.

As a result, Carrier experts provide sustainable solutions, integrating energy-efficient products, building controls and energy services for residential, commercial, retail, transport and food service customers.

Montluel Site (France)

800
employees

7,500 m²
Largest European HVAC laboratory

Chillers & Heat pumps
Center of Excellence

32,000 m²
Largest European chiller plant

Culoz Site (France)

780

employees

6

platforms dedicated to airside applications

Airside

Center of Excellence

94,000 m²

Montilla Site (Spain)

305

employees

Specialized

rooftop laboratory

Rooftop & package

Center of Excellence

40,000 m²

Largest Spain HVAC plant

Vence Site (France)

+ 3000

customers

Smart services

development

& Thermal Energy storage

worldwide player

+ 65

countries

Pool of engineers with dual **cooling, heating & automation expertise**

Customer presentation Industry– English – January - 2022