SUSTAINABILITY OR FORCE?

AQUAFORCE® WITH PURETEC™ REFRIGERANT, BECAUSE YOU SHOULD NOT HAVE TO CHOOSE.

Air and water-cooled screw chillers
Water-sourced screw heat pumps with PUREtec refrigerant
Carrier, committed to environmental responsibility

The challenge raised by the European Union’s F-gas regulation means the entire industry must move to a new generation of refrigerants, that will not only protect the ozone layer but also have a very low global warming impact. Carrier is facing this challenge and proposes PUREtec, a family of long-term refrigerant solutions.

Carrier can continuously investing in research and development, helps international markets meet new non-ozone-depleting requirements, while focusing on the next chapter of refrigerant evolution to reduce the direct greenhouse gas effect. Many of today’s refrigerants are based on hydrofluorocarbon (HFC) chemicals because they do not deplete the ozone layer and, compared to chlorofluorocarbon (CFC) chemicals, have reduced the greenhouse impact by as much as 80 percent. Nonetheless, HFCs remain a greenhouse gas and Carrier is committed to finding lower global-warming alternatives. With its PUREtec low Global Warming Potential (GWP) refrigerants, Carrier is dedicated to designing next-generation HVAC systems which have minimal impact on the environment while serving customer needs for every application.

The PUREtec extensive research program

The evaluation of century-old refrigerants was performed on more than 320 candidates, which was evaluated on the following criteria:

- Technology impact
- Applied cost impact
- Performances
- Flammability
- Ozone depleting potential (ODP) and GWP

With its PUREtec low Global Warming Potential (GWP) refrigerants, Carrier is dedicated to designing next-generation HVAC systems which have minimal impact on the environment while serving customer needs for every application.

Key components testing and qualification

- Identification of the best candidate to replace HFC-R134a for all screw units: HFO R-1234ze
- Limited impact on global warming GWP < 1 (similar to natural substances: CO2 GWP = 1)
- Not affected by the F-gas 2014 phase down plan
- Highly efficient: supporting low primary energy consumption
- Extended operating envelope allowing new application opportunities

System level testing and qualification

- Extended run tests in Carrier’s laboratory for air and water-sourced screw chiller and heat-pumps
- Notified bodies involved in the unit quality certification
- Dedicated control algorithm to optimize machine operation

Approximately 330 refrigerants evaluated on:

- Ozone Depletion Potential (ODP)
- Global Warming Potential (GWP)
- Toxicity
- Pammability
- Performances
- Applied cost impact
- Technology impact

Ozone Depletion Potential (ODP)

- R410A GWP 2086
- R134a GWP 1430
- R513a GWP 850
- CO2 GWP = 1
- R1234ze GWP < 1

Global Warming Potential of Greenhouse Gases

HFCs HFOs

- High ODP and GWP ODP = 0 but high GWP
- ODP = 0, nearly zero GWP

Sustainability

PUREtec: the environmental excellence solution

- A family of long-term refrigerant solutions
- Selection of the HFO R-1234ze for screw units (GWP < 1)
- A full HFO range of chillers and heat-pumps
- An extended operating range: up to 85°C

Force

Heritage and innovation

- Experience
  - Launched in 2006, the AquaForce range now counts thousands of installations worldwide. The next generation of AquaForce chillers and heat-pumps benefit from this unique experience and improved performance, especially at part load, and control capability. They also offer the robust core technology and unrivalled reliability of this famous range, with its extended qualification process, surge-free technology and ~0.1% compressor failure rate.
- Complete HFO Range
  - Carrier now offers a complete range of AquaForce PUREtec chillers and heat-pumps with screw compressor using HFO R-1234ze, a new generation refrigerant with zero ozone layer impact and nearly zero GWP. AquaForce PUREtec chillers and heat-pumps offer both variable and fixed speed technology.
- Regulation compliance
  - Carrier has made the strategic decision to choose a long-term solution for its new chiller and heat-pump ranges using screw compressors: HFO R-1234ze, with a GWP<1, is not impacted by the F-gas Regulation.
- Up to 85°C
  - The combination of PUREtec refrigerant and Carrier technology redines heat pump operating limits to provide hot water of up to 85°C. This incredibly extended operating range allows AquaForce PUREtec 61XWH-ZE heat-pumps to meet all high temperature heating applications, such as district heating, space heating, sanitary hot water production or process heating.
Air-cooled liquid chillers with PURetec refrigerant

30XA-ZE & 30XAV-ZE

NOVATION® MICROCHANNEL
- Latest generation of Carrier Microchannel Heat Exchangers (MCHE) with new aluminium alloy
- Up to 50% refrigerant charge reduction vs. traditional Cu/Al coils*
- Better thermal performance, improved efficiency and lower air pressure drop vs. Cu/Al coils
- Enviro-Shield® and Super Enviro-Shield® coatings, as options, for mild and severe corrosive environments

SHELL AND TUBE HEAT EXCHANGER
- High efficiency flooded technology

SCREW COMPRESSOR
- Carrier 06T screw model
- High efficiency motor
- Variable slide valve for capacity control
- Specific POE oil, new gaskets for use with HFO R-1234ze

KEY BENEFITS
- High performance and full efficiency at full and partial load, reaching class A energy efficiency
- Advanced control: precise capacity matching of building load, easy management, increased computing capabilities, web server connectivity and enhanced system integration
- Adaptability: wide operating envelope from -22°C to 55°C and robust core technology suitable for various applications and installation in different climates
- High reliability: resulting from intensive research, combined with the highest quality standards
- From design to delivery at your site, AquaForce delivers guaranteed long-term optimised performance

TOUCH PILOT™ CONTROL
- User-friendly touch screen
- All main parameters displayed on one screen
- Direct access to the unit’s technical drawings and main service documents
- Easy remote monitoring via the internet
- Easy and secure access to unit parameters

PURetec REFRIGERANT
- Long-term refrigerant solution
- Selection of HFO R-1234ze
- GWP < 1
- ODP = 0

GREEN BUILDING CERTIFICATION
Designed with a green building approach, AquaForce with PURetec refrigerant participates to green building certifications.

BREEAM EXAMPLE
- 2 credits if refrigerant GWP < 10
- 3 credits with the DELC CO2 (Direct Effect Life Cost) calculate from TEWI

PHYSICAL DATA

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Cooling mode conditions: Water heat exchanger, entering/leaving water temperature 12°C/7°C, fouling factor 0 m² K/W. Outside air temperature 35°C.

Preliminary product data for information only. Final product data will be submitted by Carrier to Eurovent company in 2016.

AQUAFORCE WITH PURTEC REFRIGERANT
Water-cooled liquid chillers with PUREtec refrigerant

**30XWP-ZE & 30XWV-ZE**

**AQUAFORCE CHILLERS**
- Compact sizes (below 1200 mm wide) for handling and installation flexibility
- Easy access to critical components for facilitation of maintenance
- Compactness: reduced size (1m wide) offering more handling and installation flexibility. Maintenance facilitated by allowing fast and easy access to critical components.
- Efficiency: AquaForce chiller is more affordable to operate and environmentally responsible, contributing to the reduction of building energy consumption and CO2 emissions.
- Reliability: AquaForce chillers undergo extensive testing in Carrier’s laboratories. Each unit is tested at the very end of the production line.

**SHELL AND TUBE HEAT EXCHANGER**
- High efficiency flooded technology
- Specific POE oil, new gaskets for use with HFO R-1234ze

**SCREW COMPRESSOR**
- Carrier 06T screw model
- High efficiency motor
- Variable slide valve for capacity control
- Specific POE oil, new gaskets for use with HFO R-1234ze

**PUREtec REFRIGERANT**
- Long-term refrigerant solution
- Selection of HFO R-1234ze
- GWP<1
- ODP = 0

**TOUCH PILOT ™ CONTROL**
- User-friendly touch screen
- All main parameters displayed on one screen
- Direct access to the unit’s technical drawings and main service documents
- Easy remote monitoring via the internet
- Easy and secure access to unit parameters

**PRESSURIZED ELECTRICAL BOX (30XWP-ZE MODELS ONLY)**
- Integrated fan blowing (outside to inside)
- Interface to receive inlet duct for fresh air
- Hermetic closure (new box, new doors)
- Fan operation detection prior unit startup

**KEY BENEFITS**
- Flexibility: one product family that can satisfy the different requirements of every sector in the market - commercial and industry
- Compactness: reduced size (1m wide) offering more handling and installation flexibility. Maintenance facilitated by allowing fast and easy access to critical components.
- Efficiency: AquaForce chiller is more affordable to operate and environmentally responsible, contributing to the reduction of building energy consumption and CO2 emissions.
- Reliability: AquaForce chillers undergo extensive testing in Carrier’s laboratories. Each unit is tested at the very end of the production line.

**Physical data**

**WATER-SOURCED CHILLERS WITH FIXED-SPEED SCREW COMPRESSOR**

**30XWP-ZE**

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*In accordance with standard EN14511-3:2013.
Cooling mode conditions: evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, condenser and evaporator fouling factor 0 m².K/W.
Eurovent certified data

**WATER-SOURCED CHILLERS WITH VARIABLE-SPEED SCREW COMPRESSOR**

**30XWV-ZE**

<table>
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<th>PERFORMANCE INFORMATION</th>
<th>kW</th>
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*In accordance with standard EN14511-3:2013.
Cooling mode conditions: evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, condenser and evaporator fouling factor 0 m².K/W.
Eurovent certified data
Water-sourced heat pumps with PUREtec refrigerant

### 30XWHP/HV-ZE & 61XWH-ZE

**AQUAFORCE HEAT PUMPS**
- Compact sizes (below 1200 mm wide) for handling and installation flexibility
- Easy access to critical components for facilitation of maintenance

**SHELL AND TUBE HEAT EXCHANGER**
- High efficiency flooded technology

**SCREW COMPRESSOR**
- Carrier Otto screw model
- High efficiency motor
- Variable slide valve for capacity control
- Specific POE oil, new gaskets for use with HFO R-1234ze

**PUREtec REFRIGERANT**
- Compactness
- Flexibility: a large range of heat pumps that can satisfy the different requirements of every sector in the market - commercial and industry.
- Compactness: reduced size (1m wide) offering more handling and installation flexibility. Maintenance facilitated by allowing fast and easy access to critical components.
- Efficiency: the AquaForce PUREtec heat pump is more affordable to operate and environmentally responsible, contributing to the reduction of building energy consumption and CO2 emissions.
- Reliability: the AquaForce PUREtec heat-pump undergo extensive testing in Carrier’s laboratories.

**Technical Insight**

Durability: future ready. Designed for a sustainable future, the AquaForce heat pumps aim to ensure a long-lasting service life that satisfies the changing and growing requirements of each sector.

### MEDIUM TEMPERATURE WATER-SOURCED HEAT- PUMPS WITH FIXED-SPEED SCREW COMPRESSOR

**30XWHP-ZE**

**PERFORMANCE INFORMATION**

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<th>kW 350</th>
<th>kW 390</th>
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<th>kW 470</th>
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<td>53 dBA</td>
<td>53 dBA</td>
<td>53 dBA</td>
<td>53 dBA</td>
<td>53 dBA</td>
<td>53 dBA</td>
<td>53 dBA</td>
</tr>
<tr>
<td>SOUN DR POWER LEVEL</td>
<td>96 dB(A)</td>
<td>96 dB(A)</td>
<td>96 dB(A)</td>
<td>96 dB(A)</td>
<td>96 dB(A)</td>
<td>96 dB(A)</td>
<td>96 dB(A)</td>
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</tr>
<tr>
<td>OPERATING WEIGHT</td>
<td>1731 kg</td>
<td>2156 kg</td>
<td>2581 kg</td>
<td>2926 kg</td>
<td>3261 kg</td>
<td>3596 kg</td>
<td>3931 kg</td>
<td>4266 kg</td>
</tr>
<tr>
<td>HEAT EXCHANGER</td>
<td>1087 mm</td>
<td>1137 mm</td>
<td>1165 mm</td>
<td>1255 mm</td>
<td>1255 mm</td>
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<td>1255 mm</td>
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<tr>
<td>ELECTRICAL BOX</td>
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<td>950 mm</td>
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<td>970 mm</td>
<td>970 mm</td>
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<tr>
<td>PRESSURIZED ELECTRICAL BOX</td>
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<td>867 mm</td>
<td>867 mm</td>
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**HIGH TEMPERATURE WATER-SOURCED HEAT PUMPS WITH VARIABLE-SPEED SCREW COMPRESSOR**

**61XWH**

**CAPACITY INFORMATION**

<table>
<thead>
<tr>
<th></th>
<th>kW 222</th>
<th>kW 360</th>
<th>kW 506</th>
<th>kW 654</th>
<th>kW 794</th>
<th>kW 932</th>
<th>kW 1072</th>
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<tbody>
<tr>
<td>HEATING CAPACITY</td>
<td>222 kcal/h</td>
<td>360 kcal/h</td>
<td>506 kcal/h</td>
<td>654 kcal/h</td>
<td>794 kcal/h</td>
<td>932 kcal/h</td>
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<td>SEASONAL EFFICIENCY (SCOP)**</td>
<td>4.50</td>
<td>4.40</td>
<td>4.30</td>
<td>4.20</td>
<td>4.10</td>
<td>4.00</td>
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<td>HEATING EFFICIENCY (COP)**</td>
<td>5.08</td>
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<td>4.85</td>
<td>4.74</td>
<td>4.63</td>
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<td>53 dBA</td>
<td>53 dBA</td>
<td>53 dBA</td>
<td>53 dBA</td>
</tr>
<tr>
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<td>96 dB(A)</td>
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<td>HEAT EXCHANGER</td>
<td>1087 mm</td>
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<td>970 mm</td>
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<td>970 mm</td>
</tr>
<tr>
<td>PRESSURIZED ELECTRICAL BOX</td>
<td>867 mm</td>
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<td>867 mm</td>
<td>928 mm</td>
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**UNIT INFORMATION**

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<tr>
<th>MANUFACTURING SOURCE</th>
<th>MONTAÑOL, FRANCE</th>
<th>MONTAÑOL, FRANCE</th>
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</thead>
<tbody>
<tr>
<td>REFRIGERANT</td>
<td>HFO R-1234ze</td>
<td>HFO R-1234ze</td>
<td>HFO R-1234ze</td>
<td>HFO R-1234ze</td>
<td>HFO R-1234ze</td>
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<td>MINIMUM CAPACITY</td>
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<td>50%</td>
<td>50%</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
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<tr>
<td>OPERATING WEIGHT</td>
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<td>4010 kg</td>
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<td>HEAT EXCHANGER</td>
<td>2370 mm</td>
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</tr>
<tr>
<td>WEIGHT</td>
<td>1000 kg</td>
<td>1650 kg</td>
<td>2300 kg</td>
<td>2950 kg</td>
<td>3600 kg</td>
<td>4250 kg</td>
<td>4900 kg</td>
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</table>

For preliminary product data for information only. Final product data will be submitted by Carrier to Eurovent company during 2026.
Carrier has set a new milestone with Europe’s first district heating project based on heat pumps using the low GWP refrigerant HFO R-1234ze. Two of its AquaForce 30XWH-ZE screw water-to-water heat pumps with PUREtec refrigerant are powering a pioneering district heating program near Geneva, Switzerland. This ambitious project in Plan-les-Ouates re-uses waste heat recovered from an onsite data-center to provide heating to local offices and other facilities and, in a second phase, to 3000 residential apartments.

The Carrier solution combines extremely low GWP and high efficiency with a heating capacity of 2.5 megawatts and high water temperature of up to 65°C. With its PUREtec very low GWP refrigerants, Carrier is dedicated to designing new generation heating, ventilation and air conditioning (HVAC) systems with minimal impact on the environment.

CUSTOMER’S REQUIREMENT
Environmentally responsible solutions combining heating and brine chilling applications.

CARRIER’S SOLUTION
Carrier installed 2 AquaForce 30XW-P chillers using HFC refrigerant for very low temperature application and 2 AquaForce 30XWH-ZE heat pumps using PUREtec refrigerant for heating and air conditioning.

It achieved a cost-effective as well environmentally responsible solution in comparison to other solutions using ammonia.

HUG, Geneva • Switzerland
Geneva teaching hospital laboratory facilities

CUSTOMER’S REQUIREMENT
Cooling solution offering both low noise performance and minimal impact on the environment.

CARRIER’S SOLUTION
Carrier installed 1 AquaForce 30XA-ZE chiller with PUREtec refrigerant and low noise level package.

The low GWP of the PUREtec refrigerant and the low dB(A) level met all customer’s requirements.

Swisscom, Zürich • Switzerland
Computing and data centre

CUSTOMER’S REQUIREMENT
Replacement of fossil energy equipment

CARRIER’S SOLUTION
Carrier installed 1 AquaForce 30XWHP with PUREtec refrigerant, providing heating temperature up to 65°C

The solution contributes to the reduction of the building’s energy consumption and CO₂ emissions.
Carrier teams are committed to ensuring your peace of mind while supporting your business objectives throughout the lifecycle of your equipment.

To meet your expectations, Carrier Service offers:

■ **Proximity & Responsiveness**
Carrier expert technicians are there to take action, quickly. The company’s comprehensive and highly efficient maintenance processes mean your equipment works at peak performance level. If necessary, you can rely on Carrier Rental Systems and readily available spare parts to avoid extended downtime.

■ **Expertise & Consultancy**
Carrier has experienced teams, an extensive network of branches, top grade logistics and powerful information systems. These industry-leading resources come together to deliver a best-in-class service. Carrier developed specific educational sessions for you and its technicians to adapt to HFO service requirements. Carrier experts will help you to find the right balance between enhancing energy efficiency and maximising your investments.

■ **Proactivity**
As your preferred partner, Carrier designs tailored maintenance programmes to meet your goals and optimise your business performance. Carrier supports you with HFO from installation guidelines to every service procedure through commissioning.

**Presence in more than 60 countries / 24/7 availability**

More than 110 years of experience

Carrier proposes an advanced monitoring service offer based on secure connectivity: it allows you to monitor your equipment in real time and receive recommendations from Carrier experts.