



PRODUCT SELECTION DATA

AIR-COOLED SCROLL CHILLERS AND HEAT PUMPS WITH GREENSPEED® INTELLIGENCE



Low environmental impact

High full and part load efficiency

Compact and simple to install

Low refrigerant charge

Superior reliability

30RB/30RQ 040R-160R

Cooling capacity 40-160 kW

Heating capacity 40-160 kW

Aquasnap® liquid chillers and heat pumps are the best solution for commercial and industrial applications where installers, engineering and design departments and building owners require reduced installation costs, optimal performances and maximum quality.

- AquaSnap® (30RB-30RQ) is a compact all-in-one package optimised for applications where reduced investment and installation cost (low CapEx) is required.
- The large options panel allows for configurations that suit user requirements.
- The pump and variable-speed fan options with Greenspeed® intelligence Carrier control logic makes it a product optimised for part load applications where a high SEER, SEPR, SCOP or IPLV value is required.

In this configuration AquaSnap® offers a premium part load efficiency to reduce maintenance costs over the lifespan of the chiller. In addition, the sound levels achieved under the part load conditions are particularly low. Besides operating efficiently and quietly, the AquaSnap® range with Greenspeed® intelligence operates from -20 °C up to +46 °C as standard.



* The availability of sizes and options depends on the country. Please contact your local commercial dealer for more information.



CARRIER participates in the ECP programme for LCP/HP
Check ongoing validity of certificate:
www.eurovent-certification.com

R-32: THE BEST SOLUTION FOR SCROLL LIQUID CHILLERS AND HEAT PUMPS



Carrier was the first to introduce the R-1234ze HFO with ultra-low GWP in screw chillers, as far back as early 2016. Today, having examined its main properties, Carrier has chosen R-32 refrigerant to replace high-GWP R-410A refrigerant in its Scroll liquid chillers and heat pumps, for its lower environmental impact, high energy efficiency, good availability and ease of use.

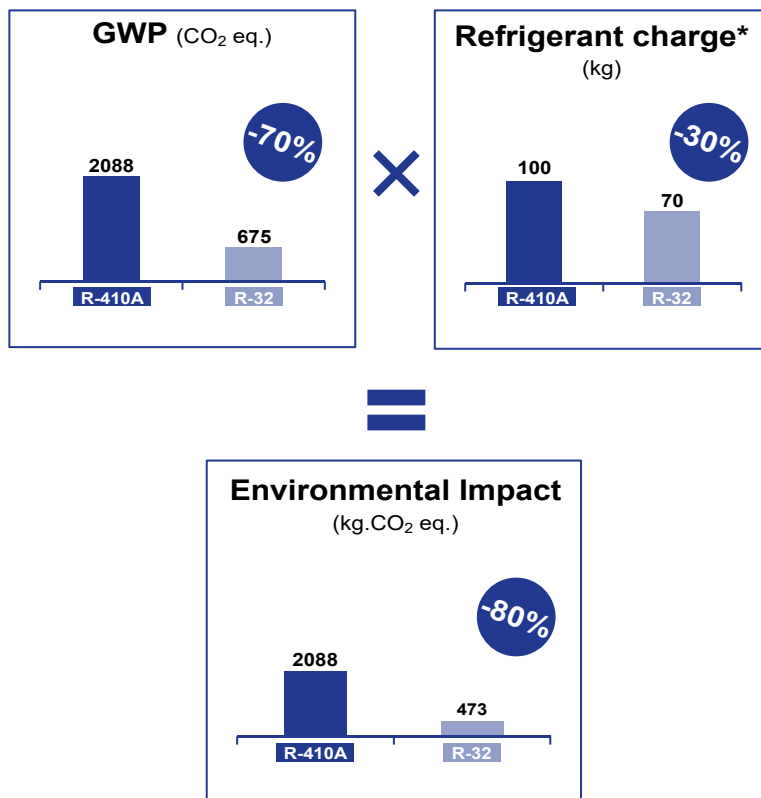
R-32 is currently the ideal refrigeration solution for units equipped with Scroll compressors. By using R-32 refrigerants, Carrier has reduced the carbon footprint of its AquaSnap® range of liquid chillers and heat pumps by 80%. This is the result of a much lower GWP and a significant reduction in the system's cooling charge compared to the previous generation that used R-410A.

R-32 is also the right choice economically, reducing the locally imposed tax burden on HFCs based on the CO₂ impact.



Lower environmental impact (-80% compared to R410A)

- R-32 has zero ozone depletion potential (ODP)
- The Global Warming Potential (GWP) of R-32 is 675, i.e. approximately one third of that of R-410A (PRP 2088)
- The AquaSnap® R-32 cooling charge is reduced by 30% compared to the previous version using R-410A*
- The carbon footprint of AquaSnap® R-32 is therefore 473 (675 x 0.7), i.e. 80 % lower than the version using R-410A (2088 x 1)



* Reduced refrigerant charge in Carrier heat pumps thanks to the use of R-32 and a new coil design.

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R-32: THE BEST SOLUTION FOR SCROLL LIQUID CHILLERS AND HEAT PUMPS

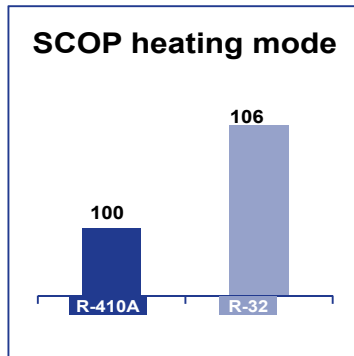
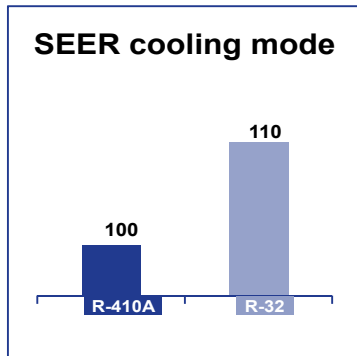


SEER up to **+10%**
SCOP up to **+6%**

High energy efficiency

The seasonal efficiency of AquaSnap® R-32 is higher than that of the previous R-410A version by:

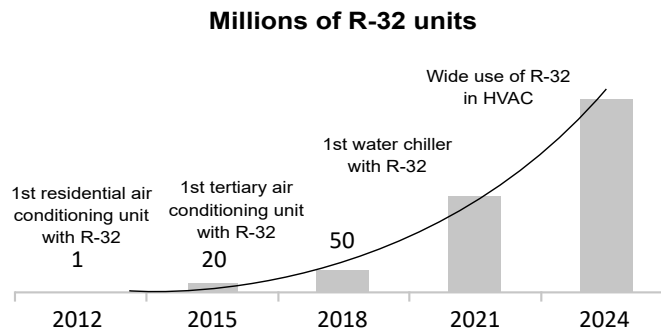
- approximately 10% in cooling mode
- approximately 6% in heating mode



SIMPLICITY

Widely available and easy to use

More than 50 million R-32 air conditioning units are in circulation on the global market. While R-32 has been used for some time in residential and commercial air conditioning units, most manufacturers now use R-32 in VRF systems, liquid chillers and heat pumps, which means R-32 is widely available around the world.



R-32 has been widely available for over 15 years, as it comprises 50% of the composition of R-410A.

R-32 is easy to use: It is a pure refrigerant, therefore it is not necessary to drain the entire circuit in the event of a leak.



SAFETY

R-32 is an A2L classified refrigerant thanks to its low flammability.

- **No specific safety requirements** for transporting chillers by road or for outdoor installation.
- The service tools must be **certified** for **A2L** refrigerants in accordance with standard ISO 817 or EN378.
- Service technicians **must be qualified for brazing components** on PED 2 fluid units.

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AQUASNAP® - CUSTOMER BENEFITS

■ Outstanding performance

Equipped with variable-speed fans (VSD or EC optional) and optional variable-speed pumps, Carrier's AquaSnap® 30RB/RQ range with Greenspeed® intelligence automatically adjusts the cooling capacity and water flow to perfectly adapt to the building's requirements or load variations. The result is optimum operation at both full load and part load (SEER up to 4.6). The 30RB/RQ offers energy efficiency up to 10% higher than the previous range with the same or a smaller footprint. The range is already fully compliant with the 2021 Ecodesign regulations.



SEER up to **4.6**

■ Intelligence and connectivity

The advanced SmartVu™ intelligent control system displays operating parameters in real time, making it intuitive and particularly user-friendly. The AquaSnap® 30RB/RQ range is also characterised by a brand new smart energy monitoring function which provides users with smart data such as electrical energy consumption in real time, supplied cooling and heating energy and instantaneous and average seasonal energy efficiency values. For even greater energy savings, the AquaSnap® 30RB/RQ can be monitored remotely by Carrier experts to further optimise the energy consumption level.



SMART ENERGY
MONITORING

■ Extensive field of application

The AquaSnap® range is suitable for a very wide range of applications from tertiary to industrial processes. The range can operate at outdoor temperatures from -20 °C to +44 °C (Optional 46 °C) and with negative water temperatures (-8 °C). From high-end office buildings and hotels to healthcare facilities, data centers and industrial projects, AquaSnap® 30RB/RQ units meets the most demanding expectations in terms of energy efficiency and savings, whatever the climate or application.



BETWEEN
-20 °C
and **46 °C**

■ Easy installation & maintenance

Thanks to the variable-speed pumps, automatic adjustment of the nominal water flow rate via electronic control and automatic measurement of the unit's energy performance under real conditions, pumping energy consumption is reduced by almost two thirds: These new features guarantee peace of mind for installers and maintenance companies and lower energy bills for users.



Pumping energy
reduced by
up to **66%**

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AQUASNAP® - CUSTOMER BENEFITS

AquaSnap® liquid chillers and heat pumps are designed to meet current and future Ecodesign and F-Gas European regulation requirements in terms of energy efficiency and reduced CO₂ emissions. They use the best technologies available today:

- Reduced refrigerant charge of non-ozone depleting R-32A refrigerant with low GWP
- Scroll compressors
- Greenspeed® variable-speed fans (optional)
- NOVATION™ micro-channel heat exchangers with a new aluminium alloy (30RB)
- Brazed-plate heat exchangers with reduced pressure drops
- Self-regulating microprocessor control with Greenspeed® intelligence
- Colour touch screen with web connectivity options

AquaSnap® can be equipped with a built-in hydraulic module, limiting the installation to conventional operations such as connection of the power supply and the supply and return piping (plug & play), according to the dimensions of the standard unit.

Recommended by Carrier, the AquaSnap® can be equipped with one or two Greenspeed® variable-speed pumps to significantly reduce energy costs linked to pumping (reduction of more than two-thirds), ensure optimum water flow rate control, and improve overall system reliability.



Very economical operation

- High unit full- and part-load energy efficiency and efficient design of the water side:
 - SEER_{12/7°C} up to 4.6 in line with the new Ecodesign 2016/2281 regulations.
 - Multiple scroll compressors equipped with a high-efficiency motor which can exactly match the cooling capacity to the load required
 - Electronic expansion valve enabling operation at a lower condensing pressure and improved use of the evaporator heat exchange surface (superheat control)
 - Condenser with high-efficiency NOVATION™ (30RB) aluminium micro-channel heat exchangers and Greenspeed® variable-speed fans (optional)
 - Low pressure drop brazed plate heat exchangers (< 45 kPa under Eurovent conditions).

- Specific control functions to reduce unit cooling energy use during occupied and unoccupied periods:
 - Internal timer: Switches the chiller on/off and controls operation at a second setpoint
 - Setpoint automatically offset based on the outdoor air temperature or room air temperature (via an option)
 - Floating high pressure (HP) management
 - Variable-speed fan control
 - Cooling demand limitation.

Refer to the control chapter for more information.

- Greenspeed® variable-speed pump to reduce pumping energy consumption by up to two-thirds (option recommended by Carrier):
 - Eliminate energy losses through the water flow rate control valve by electronically setting the nominal water flow rate
 - Save energy during stand-by periods or part-load operation by automatically reducing the water pump speed. The energy consumption of the pump motor varies according to the cube of the speed, so that a reduction in speed of just 40% can reduce energy consumption by 80%
 - Improved unit part-load performance (increased SEER/SCOP value with variable water flow according to standard EN14825).

Refer to the hydraulic option chapter for more information.

- Extra energy savings through multiple options:
 - Carrier drycooler Free cooling mode management
 - Partial heat recovery.
- Reduced maintenance costs:
 - Fast diagnosis of possible incidents and their history via the control
 - Programmable maintenance alert
 - Programmable F-Gas leak monitoring alert

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AQUASNAP® - CUSTOMER BENEFITS

Low noise level

- Condenser with fixed-speed fans (30RB-30RQ):
 - Optional low-speed and variable-speed fans (700 rpm) and compressor enclosure to reduce full-load noise level by up to -9 dB(A)
 - Low noise 6th generation Flying Bird™ fans, made of a composite material (Carrier patent)
 - Rigid fan installation for reduced noise (Carrier patent).
- Condenser with Greenspeed® variable-speed fans (optional) recommended by Carrier for even quieter operation:
 - Optional factory setting of the fan at low speed, with compressor enclosure to reduce full-load noise level by up to -9 dB(A)
 - Exceptional acoustic signature during part-load operation through smooth fan speed variation.
- Specific control functions or features to reduce noise level during the night or unoccupied periods:
 - Night-time sound control with cooling capacity and fan speed limitation
 - Low-noise scroll compressors with low vibration level
 - The compressor assembly is installed on an independent chassis and supported by flexible anti-vibration mountings
 - Dynamic suction and discharge piping support, minimising vibration transmission (Carrier patent)
 - Acoustic compressor enclosure, reducing radiated noise emissions (optional).

Easy and fast installation

- Compact design:
 - AquaSnap® units are designed with compact dimensions for easy installation.
 - With a length of approximately 4.8 m for 550 kW and a width of 2.25 m, the units require minimal floor space.
- Integrated hydraulic module (optional):
 - Low or high-pressure water pump (as required)
 - Single or dual pump (as required) with runtime balancing and automatic changeover to the back-up pump if a fault develops

- Integrated variable-speed pumps with automatic adjustment of nominal water flow rate via the electronic control on the user's screen.
- Water filter protects the water pump against circulating debris
- Pressure sensors for direct numerical display of the water flow rate and water pressures
- Thermal insulation and frost protection down to -20 °C, using a heater (optional)
- High-capacity membrane expansion tank (optional).
- Built-in hydraulic module with Greenspeed® variable-speed pump (option recommended by Carrier):
 - Quick and easy electronic setting of the nominal water flow rate when the unit is commissioned, thus eliminating the need to adjust the water flow rate control valve
 - Automatic control of the pump speed based on constant speed, constant pressure difference or constant temperature difference.
- Simplified electrical connections
 - A single power connection point without neutral
 - Main disconnect switch with high trip capacity
 - 24 V control circuit using an integrated transformer.
- Simplified hydraulic connections:
 - Victaulic type couplings on the exchanger;
 - clearly identified and practical reference marks for entering and leaving water connections;
- Fast unit commissioning
 - Systematic factory test before shipment
 - Quick-test function for step-by-step verification of the sensors, electrical components and motors.

Reduced installation costs

- Optional Greenspeed® variable-speed pump with hydraulic module (option recommended by Carrier)
 - Cut costs relating to the water flow control valve
 - The design of the water system with variable primary flow (VPF) can provide significant installation cost savings compared with traditional constant primary systems with variable secondary circuits; elimination of the secondary distribution pump, etc.
 - Water system design with fan coils fitted with 2-way valves instead of 3-way valves.
- No buffer tank required thanks to Carrier's advanced control algorithm
 - Minimum water loop volume reduced to 2.5 l/kW.

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AQUASNAP® - CUSTOMER BENEFITS

Environmental responsibility

AquaSnap® liquid chillers with Greenspeed® intelligence (With optional variable-speed fans and pumps) are a boost for green cities and contribute to a sustainable future. Combining a refrigerant charge up to 30% lower, with R-32 refrigerant with a GWP 70% lower than that of the previous version using R410A, and exceptional energy efficiency, this chiller significantly reduces energy consumption while reducing carbon dioxide emissions throughout its life cycle.

- Pumping energy consumption can be reduced by up to 2/3 using Greenspeed® variable-speed pumps
- 40% lower refrigerant charge: The micro-channel technology used for condenser coils optimises heat transfer while minimising the refrigerant volume.
- Sealed refrigerant circuits:
 - Reduction of leaks thanks to the absence of capillary tubes and the use of flare connections
 - verification of pressure transducers and temperature sensors without transferring refrigerant charge;
 - discharge line shut-off valve and liquid line service valve for simplified maintenance
 - Qualified Carrier maintenance personnel to provide refrigerant servicing
 - ISO 14001 production plant

Superior reliability

- State-of-the-art concept
 - Two independent refrigerant circuits; the second one automatically takes over if the first one develops a fault, maintaining partial cooling in all circumstances
 - All compressor components are easily accessible on site, minimising downtime
 - All-aluminium Novation™ micro-channel heat exchanger (MCHE) (30RB) with higher corrosion resistance than a conventional coil. The all-aluminium construction eliminates the formation of galvanic currents between aluminium and copper which can corrode the coil in saline or corrosive atmospheres
 - V-coil design to protect the coils against hail impact

- Optional Enviro-shield® anti-corrosion coil coating for use in moderately corrosive environments. Coating applied through conversion process which modifies the surface of the aluminium producing a coating that is integral to the coil. Immersion in a bath to ensure 100% coverage. No heat transfer variation, tested for 4000 hours in salt spray per ASTM B117
- Optional Super Enviro-shield® anti-corrosion coil coating for use in extremely corrosive environments. Extremely durable and flexible epoxy polymer coating applied on micro-channel heat exchangers by electro coating process with a final UV protective topcoat. Minimal heat transfer variation, tested for 6000 hours in salt spray per ASTM B117, superior impact resistance per ASTM D2794
- Electronic flow switch. Auto-setting according to cooler size and fluid type.
- Self-regulating control
 - The control algorithm prevents excessive compressor cycling and reduces the quantity of water in the water loop (Carrier patent)
 - Automatic compressor unloading in case of abnormally high condensing pressure
 - Automatic fan speed adjustment in case of coil fouling (30RB models)
 - Smooth fan start to increase unit lifetime (optionals include variable-speed fans).
- Exceptional endurance tests:
 - To design critical components and sub-assemblies to minimise the risk of failure on site, Carrier uses specialised laboratories and advanced dynamic simulation tools.
 - To ensure that the units reach customer sites in the same condition as they are when tested in the factory, Carrier tests the machine behaviour during transportation over 250 km. The road test is based on a military standard and is the equivalent to 5000 km by truck on a normal road.
 - To guarantee the coil corrosion resistance, salt spray corrosion resistance tests are performed in the group's laboratory.
 - In addition, to maintain the unit's performance throughout its operating life whilst minimising maintenance costs, end users can access the "Connected Services" remote monitoring service.

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AQUASNAP® - CUSTOMER BENEFITS

Designed to support Green Building Design

A green building is a building that is environmentally sustainable and is designed, constructed and operated to minimise the total impact on the environment.

The resulting building will be economical to operate, offer increased comfort and create a healthier environment for the people who live and work there, increasing productivity.

The air conditioning system can use between 30 and 40% of the annual building energy consumption. Choosing the right air conditioning system is one of the main considerations when designing a green building. For buildings with a load that varies throughout the year, the AquaSnap® 30RB/30RQ unit offers a solution to this important challenge.

A number of green building certification programmes exist in the market and offer third-party assessment of green building measures for a wide variety of building types.

The following example looks at how Carrier's new AquaSnap® range helps customers affected by LEED® building certification.

Energy saving certificate

The AquaSnap® 30RB/RQ unit is eligible for energy saving certificates in France (CEE) in comfort, industrial and agriculture applications:

- Floating High pressure control (by modulating the air flow through fan activation and speed)
- Floating Low pressure control
- Variable speed on asynchronous fan motor (optional)
- Variable speed on asynchronous pump motor (optional)

For more details about financial incentives in France, please refer to the "CEE product sheet".

The AquaSnap® range and LEED® certification

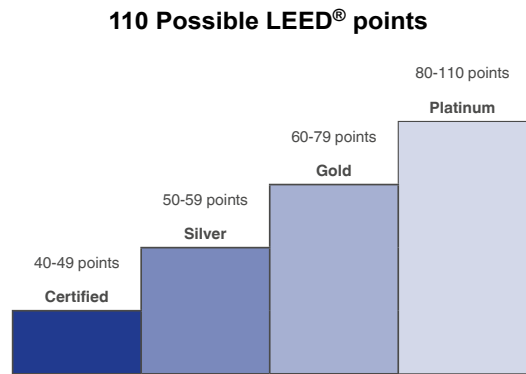
The LEED® (Leadership in Energy and Environmental Design) green building certification programme is a pre-eminent programme to rate the design, construction and operation of green buildings with points assigned in seven credit categories:

- sustainable Sites (SS)
- water efficiency (WE)
- energy and atmosphere (EA)
- materials and resources (MR)
- indoor environmental quality (IEQ)
- innovation in design (ID)
- Regional Priority (RP).

There are a number of different LEED® products.

While the strategies and categories assessed remain the same, the point distribution varies to address different building types and application needs, for example according to New Construction, Schools, Core & Shell, Retail and Healthcare.

All programmes now use the same point scale:



The majority of credits in LEED® rating systems are performance-based and achieving them is dependent on the impact of each component or sub-system on the building as a whole.

While the LEED® green building certification programmes do not certify products or services, choosing the right products, systems or service programmes is critical to obtain LEED® certification for a registered project, because the right products or service programmes can help meet the goals of green construction and ongoing operation and maintenance.

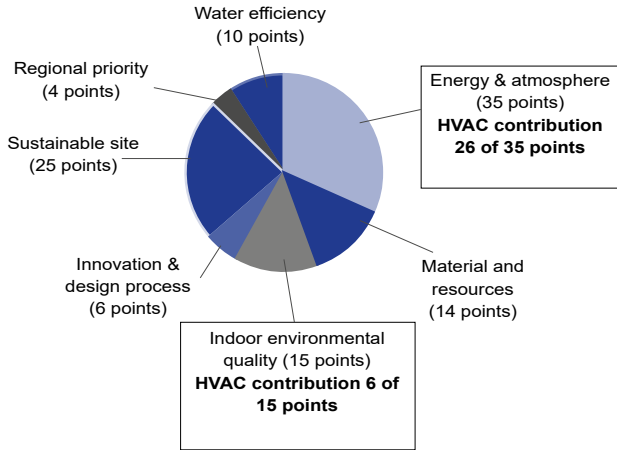
The choice of heating, ventilating and air conditioning (HVAC) products in particular can have a significant impact on LEED® certification, as the HVAC system directly impacts two categories that together influence 40% of the available points.

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AQUASNAP® - CUSTOMER BENEFITS

Designed to support Green Building Design

Overview of LEED® for new construction and major renovations



NOTE: This section describes the prerequisites and credit requirements in LEED® for New Construction and is directly related to the 30RB/30RQ units. Other prerequisites and credit requirements are not directly and purely related to the air-conditioning unit itself, but more to the control of the HVAC system as a whole.

i-Vu®, Carrier’s open control system, has features that can be valuable for:

- EA prerequisite 1: fundamental commissioning of energy management systems;
- EA credit 3: enhanced commissioning (2 points);
- EA credit 5: measurements and verification (3 points).

NOTE: Products are not reviewed or certified under LEED®. LEED® credit requirements cover the performance of materials in aggregate, not the performance of individual products or brands. For more information on LEED®, visit www.usgbc.org.

The new AquaSnap® units from Carrier can help building owners to earn LEED® points in particular in the Energy & Atmosphere (EA) credit category and help address the following prerequisites and credit requirements:

- EA prerequisite 2: Minimum energy performance
- 30RB/RQ units exceed the energy efficiency requirements of ASHRAE 90.1-2007; therefore they satisfy the prerequisites.
- EA prerequisite 3: Fundamental refrigerant management
30RB/RQ units do not use chlorofluorocarbon (CFC) refrigerants, thus satisfying the prerequisites.
- EA credit 1: Optimise energy performance (1 to 19 points)
Points for this credit are assigned depending on the energy cost reduction virtually achievable by the new building, compared to ASHRAE 90.1-2007 reference. 30RB/RQ units, which are designed for high performance especially during part load operation, help to reduce the building's energy consumption and therefore to gain points for this credit. In addition, the Carrier HAP (Hourly Analyses Program) can be used to analyse energy. It meets the modelling requirements for this credit and produces reports which can be easily transferred to LEED® charts.
- EA credit 4: Enhanced refrigerant management (2 points)
With this credit, LEED® awards systems that minimise the installed system's Ozone Depletion Potential (ODP) and Global Warming Potential (GWP). 30RB/30RQ units use a reduced R-32 charge and therefore help satisfy the requirements of this LEED® credit.

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