

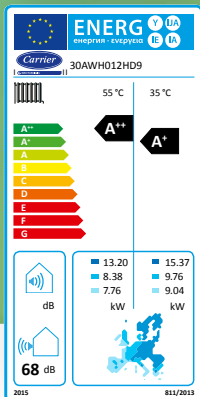


DESIGNING INNOVATIVE SOLUTIONS

United Technologies

HEATING, VENTILATION & AIR CONDITIONING SOLUTIONS

# CARRIER, COMMITTED TO ENVIRONMENTAL RESPONSIBILITY

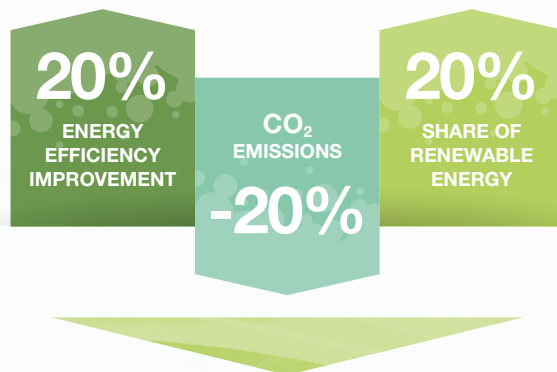


European Ecodesign and Energy Labelling regulations for heat pumps

# Carrier committed to environmental responsibility

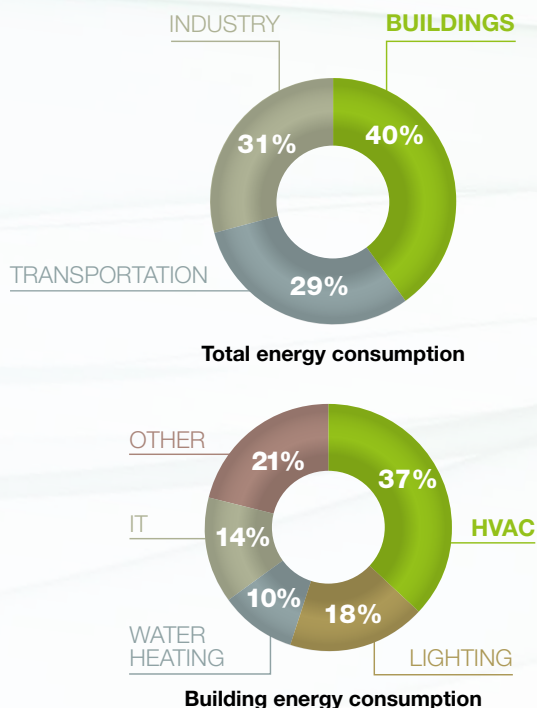


Carrier is committed to limiting the environmental impact of its products and solutions and reducing energy consumption. This commitment is in line with the targets of the European climate and energy package for 2020:



The energy efficiency improvement target strongly influences the heating, ventilation and air conditioning (HVAC) market.

Indeed buildings are the largest consumers of energy today and, of that consumption, HVAC systems account for considerably more than other equipment. Providing its customers with energy efficient solutions is therefore now a key sustainable development opportunity for the HVAC industry.



In order to achieve these objectives, the European Union has developed two regulations on equipment consumption, including lighting, IT, water heating and HVAC:

## Ecodesign and Energy Labelling regulations

# Ecodesign regulation

Ecodesign is an approach to product design that encourages manufacturers to consider the environmental impact of the product over its entire lifecycle.

In the European Union, the Ecodesign Directive 2009/125/EC establishes a framework for the setting of mandatory energy efficiency requirements for all energy-related products (ERPs), including heat pumps up to 400 kW.

## New energy efficiency metric: SCOP

### Because buildings have a thermal load depending on outdoor air temperature

The Seasonal Coefficient of Performance (SCOP) is a new European parameter to evaluate the energy efficiency of heat pumps. It replaces the Coefficient of Performance (COP), which measured the ratio of power consumed to power produced in the heating mode on a single operating point. Unlike its predecessor, the SCOP is representative of operation during the heating season as it includes seasonal variations by defining several realistic measurement points. Together, these contribute to classification in the correct energy efficiency class.

### SCOP versus COP efficiency (for heat pumps)

TEMPERATURE		CAPACITY (KW)		AUXILIARY MODES (KWH)		HOURS	
COP	SCOP	COP	SCOP	COP	SCOP	COP	SCOP
1 temperature condition: 7°C	Several rating temperatures: -10°C to 16°C (average climate)	Full load	Partial load + Full load	No auxiliary power modes taken into consideration	Includes consumption auxiliary modes: - Standby mode - Off mode - Thermostat off...	N/A	Number of hours occurring at each air temperature (bin hours)

### SCOP Calculation

SCOP is the ratio between annual heating demand and annual energy input over an entire heating season.

$$\text{SCOP} = \frac{\text{ANNUAL HEATING DEMAND}}{\text{ANNUAL ENERGY INPUT}^*}$$

\* Annual energy input:  
 - Compressor running (SCOPon)  
 - Compressor not running: thermostat OFF, standby, OFF mode & crankcase heater  
 - Backup heater to supplement heat pump capacity

### $\eta_s$ : seasonal primary energy efficiency metrics:

In order to compare the energy efficiency of products using different sources of energy, such as boilers (gas, fuel) and electric heat pumps, the Ecodesign regulation introduces a new measurement expressed in primary energy:  $\eta_s$  (eta s).

$$\eta_s = \text{SCOP} / 2.5^* \times 100 - i^{**}$$

#### Primary energy



#### Primary energy



In Europe, on average, 2.5 kW\*\*\* of primary energy is required to generate 1 kW of electricity.

\*\*Air source heat pump  $i = 3$   
 Water source heat pump:  $i = 8$

\*\*\*Source: EU Regulation 813/2013

# Energy Labelling regulation

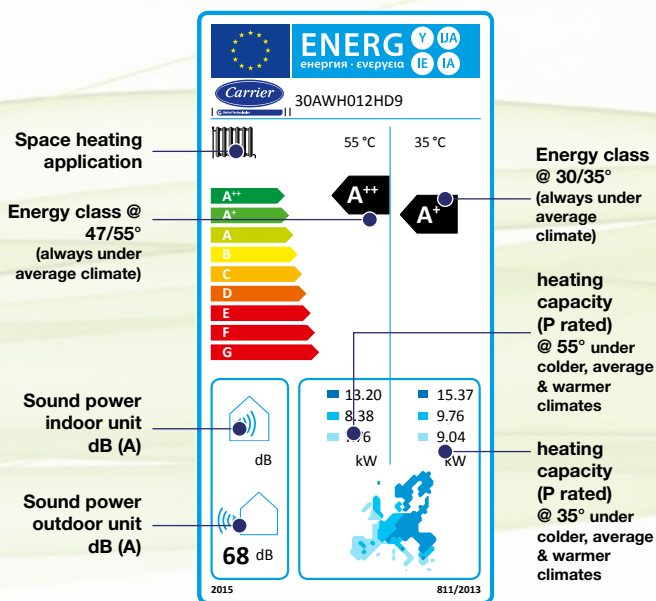
The aim of the Energy Labelling regulation is to provide end users with easy to understand information on product energy efficiency.

In addition, the European Energy Labelling regulation classifies products from G to A, according to their efficiency. This pulls the market towards more energy-efficient products by improving consumer information.

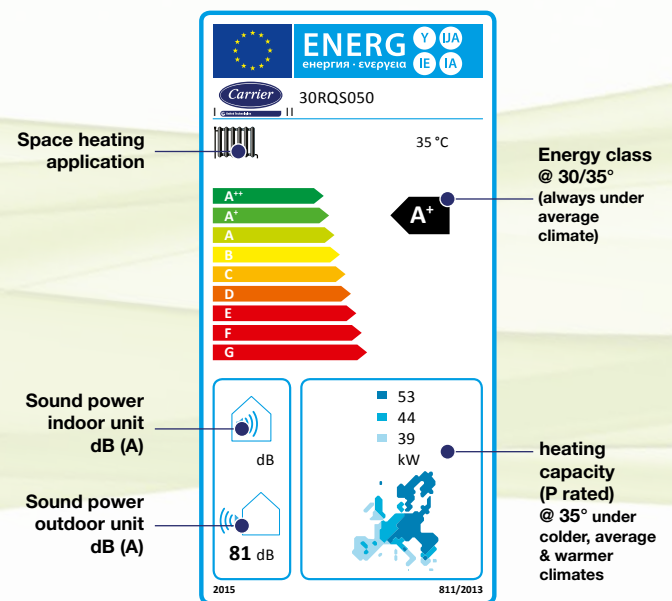
Starting September 26, 2015, heat pumps up to 70 kW will become the first commercial heat pump products to be covered by the Ecodesign and Energy Labelling regulations. Products placed on the market before this date will not be affected. Conformity is mandatory for a product to obtain the CE marking.

Carrier heat pumps are all in the classes A to A ++.

Example of energy label for mid temperature heat pumps



Example of energy label for low temperature heat pumps



## Energy efficiency classes, according to the European Energy Labelling regulation

Energy Efficiency Class	Boilers and mid-temperature heat pumps 47/55°	Low temperature heat pumps 30/35°
*A***	$\eta_s \geq 150$	$\eta_s \geq 175$
A**	$125 \leq \eta_s < 150$	$150 \leq \eta_s < 175$
A*	$98 \leq \eta_s < 125$ <span style="border: 1px solid black; padding: 2px;">100</span> <span style="border: 1px solid black; padding: 2px;">110</span>	$123 \leq \eta_s < 150$ <span style="border: 1px solid black; padding: 2px;">125</span>
A	$90 \leq \eta_s < 98$	$115 \leq \eta_s < 123$ <span style="border: 1px solid black; padding: 2px;">115</span>
B	$82 \leq \eta_s < 90$	$107 \leq \eta_s < 115$
C	$75 \leq \eta_s < 82$	$100 \leq \eta_s < 107$
D	$36 \leq \eta_s < 75$	$61 \leq \eta_s < 100$
E	$34 \leq \eta_s < 36$	$59 \leq \eta_s < 61$
F	$30 \leq \eta_s < 34$	$55 \leq \eta_s < 59$
G	$\eta_s < 30$	$\eta_s < 55$

\*A\*\*\* energy class will be implemented from September 2019.

100 110 Minimum energy efficiency level from September 2017  
125 115 Minimum energy efficiency level from September 2015

# High-level expertise and forward-looking solutions

Carrier's Research & Development team and its laboratory, one of the largest such facilities dedicated to HVAC in Europe, are an important part of what makes the company a natural leader. As a result, many Carrier products already meet the demands of the new Ecodesign and Energy Labelling regulations.

## A unique laboratory

Carrier's laboratory is unique in Europe, both in terms of cooling capacity coverage, measurement accuracy and EN 14511 and EN 14825 compliance.

### Testing capabilities

- 16 individual test stations with 11 individual test rooms
- Ambient control from -20°C to 55°C
- Individual unit test capacity up to 3,000 kW

### Cofrac certification for third-party testing

The laboratory is accredited for ISO 17025 by the French Committee for Accreditation (Cofrac), an independent organisation that audits all activities related to customer tests, the laboratory's quality system and organisation. Carrier is certified to perform tests for customers, acting as a third-party laboratory.

## Carrier solutions, already compliant

Carrier's heat pumps are in line with the European Ecodesign regulation requirements on energy savings and reduced carbon footprint. All Carrier's ranges will be compliant with the 2015 Ecodesign regulation.

Ranges like the new AquaSnap® generation go beyond the requirements of the 2015 Ecodesign regulation and actually already meet the criteria for the 2017 version. The reversible air-to-water heat pumps (30AWH) and the air-to-water scroll heat pumps with Greenspeed® intelligence (30RQP) offer Class A or B energy efficiency ratings.

### Reliable and accurate results

Carrier engineers carry out extensive tests on all products in real-life conditions, in compliance with the European standards EN 14511 and EN 14825, which specify the testing procedures. These testing standards are used by Eurovent for the certification of heat pump performance. This body's challenging quality criteria ensures that measurements taken during the tests are accurate and reliable.

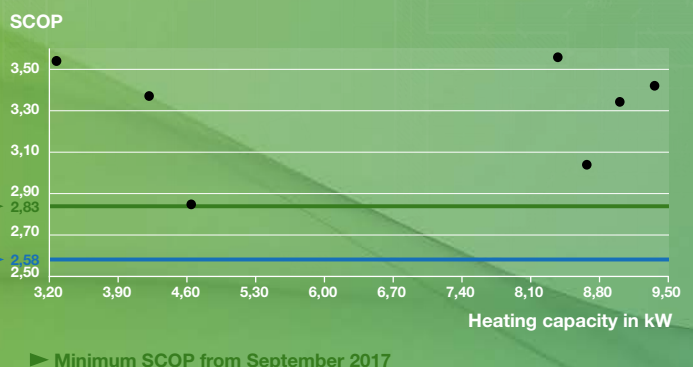
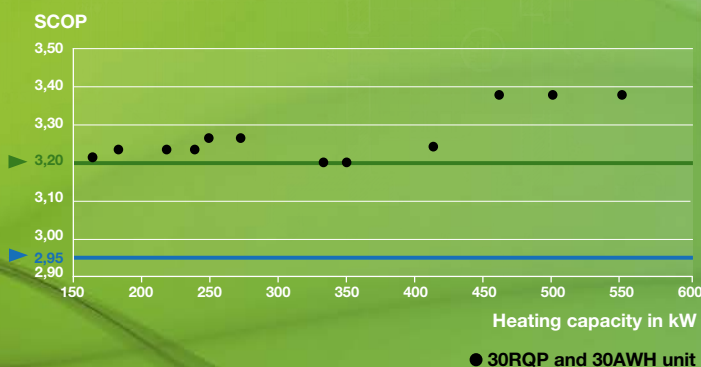
### Eurovent certification

Eurovent, the European Committee of Air Handling & Refrigeration Equipment Manufacturers, is the representative body for the European refrigeration, air conditioning, air handling, heating and ventilation industry and represents trade associations from European and non-European countries. Carrier actively participates in developing Eurovent certifications to help establish standards and achieve global compatibility.



AQUASNAP 30RQP - LOW TEMPERATURE

AQUASNAP 30AWH - MID-TEMPERATURE



For more information visit:

[www.ecodesign.hvac.carrier.com](http://www.ecodesign.hvac.carrier.com)

# Carrier a natural leader

Introduced in 2010, the Carrier CO<sub>2</sub>NSERVATION Meter calculates avoided greenhouse gas emissions as a result of the installation of high-efficiency Carrier air conditioning, heating and refrigeration systems by customers around the world since 2000. In 2014, the Carrier CO<sub>2</sub>NSERVATION Meter reached **160 million metric tonnes** of greenhouse gases saved, the equivalent of:



**More than 33 000 000 vehicles** removed from the road for one year\*



**22 000 000 home electricity use** saved for one year\*

\* According to the United States Environmental Protection Agency Green Power Equivalency Calculator. The model compares the projected GHG emissions from select Carrier products to emissions from comparable baseline products, with the difference representing the avoided emissions. The meter also incorporates energy savings as measured from energy service contracts. Learn more on <http://naturalleader.com/>

## Carrier Service

To ensure an air conditioning system has minimum environmental impact, it must be run and maintained at optimum capability levels.

For Carrier, that means ensuring its products are environmentally responsible for their entire life on site and that's why Carrier undertakes all refurbishment activities on machines that have already been installed.

To bring peace of mind to its customers, Carrier provides service offerings tailored to their specific requirements, including:

- Comprehensive and efficient preventive maintenance programs
- Advanced service offer based on secure connectivity, allowing real-time monitoring of equipment and transfer of information from Carrier experts
- Continuous internal training
- On-site inspection
- Control solutions for low energy and high-performance systems

Presence in more than

**60**  
countries

**24/7**  
availability

More than

**110** years of experience



[www.carrier.com](http://www.carrier.com)

The materials and information referenced in this brochure are for informational purposes only and not for the purpose of providing legal or other professional advice. You should contact your attorney to obtain advice with respect to any particular issue or problem. Use of this brochure and access to any of the websites or e-mail links contained within this brochure do not create an attorney-client, advisory, fiduciary or other relationship between UTC Building & Industrial Systems, its parent, subsidiaries and affiliates, and any person accessing or otherwise using this brochure or any of the websites and/or e-mail links contained herein.

Low global warming refrigerant for screw chillers and heat pumps - English - September 2015. © Carrier 2015. All rights reserved. Carrier reserves the right to change certain information and specifications contained in this document at any time and without prior notice. Since standards, specifications and designs are subject to occasional change, please ask for confirmation of the information given in this publication.

