Carrier

Guide to the European EcoDesign and Energy Labeling Regulations

Natural Leader
in Sustainability and Energy-Efficiency

THE ECODESIGN REGULATION

The implementation of the EcoDesign directive for "refrigerated display cabinets with a direct sales function" was adopted by the European Union Commission in October 2019. The application date for the requirements is the **1st of March 2021**. The directive applies to newly produced refrigerated cabinets only – the systems, racks and condensing units are covered by other regulations. The compliance is declared by the manufacturer with the declaration of conformity and with providing technical data to a European database called EPREL and the CE-mark. A verification procedure will applied by the member states.

EcoDesign: An initiative led by the European Union

The objective of the EcoDesign directive is to bring manufacturers to design energy efficient products so as to reduce their environmental impact throughout their life cycle.

This EU directive (Directive 2009/125/EC) is a framework for defining requirements regarding the product life cycle for products placed into the market. It covers all energy-related products (ErP) sold in the domestic, commercial and industrial sectors.

It has evolved over the years by adding new product categories, with the aim to encourage sustainable solutions, from design to service and recyclability.

The requirements

The directive is setting guidelines relating to:

Energy labeling	Product design	Product life cycle	Customer information

Energy Labeling

The objective of Energy Labeling is two-fold: give clear, easy-to-understand label information on the product energy efficiency, and classify products according to their level of efficiency (from G to A), with an overall effect of pulling the market towards more energy efficient products.

All Carrier products will be EcoDesign ready when the regulation enters into application in March 2021.

Both EcoDesign and Energy Labeling regulations will be enforced beginning in March 2021. Products marketed prior to this date are not affected. The next regulations upgrade will come into effect in 2023.

ENERGY EFFICIENCY CLASS	EEI	
A	EEI < 10	
B	10 ≤ EEI < 20	
C	20 ≤ EEI < 35	
D	35 ≤ EEI < 50	
E	50 ≤ EEI < 65	
F	65 ≤ EEI < 80	2023
G	100 > EEI ≥ 80	2021

The Label

Each new refrigerating appliance will be supplied with a printed label gathering energy related information:

Supplier's name

Annual energy consumption in kWh

Sum of the display areas with chilled operating temperatures in m²

Sum of the display areas with frozen operating temperatures in m²

Supplier's model identifier

Determined energy efficiency class

The highest / lowest temperature of the warmest / coldest M-package of the compartment(s) with chilled operating temperatures

The highest / lowest temperature of the warmest / coldest M-package of the compartment(s) with frozen operating temperatures

Product Design

Energy Efficiency Index

To be able to calculate the energy efficiency levels of the various equipment, an Energy Efficiency Index (EEI) has been introduced.

This Energy Efficiency Index is a ratio between measured laboratory energy consumption[1] and a standard energy consumption per cabinet category[2].

[1] Measured at ISO 23953 rating conditions
[2] This standard energy consumption is based on data collection from various sources (manufacturer data, Top Ten list, catalogues…) and are not all based on ISO test standard.

Minimum performance thresholds are established and products that are not meeting these EEI thresholds can no longer be placed on the market.
The Energy Efficiency Index has been defined into two steps to plan further energy performance improvements:
From 01.03.2021: EEI ≤ 100%
From 01.09.2023: EEI ≤ 80%

The formula of the Energy Efficiency Index (EEI) is set as follows:

$$\textbf{EEI=AE/SAE} \quad \text{Where} \quad AE = E_{daily} \times 365$$

AE is the annual energy consumption, E_{daily} is the energy consumption measured over 24 hours
SAE is Standard Annual Energy consumption determined through a benchmark of existing equipment, defined by Category, Type, Temperature class, Total Display Area

Categories were defined as:
- Vertical and combined supermarket refrigerator cabinets
- Horizontal supermarket refrigerator cabinets
- Vertical and combined supermarket freezer cabinets
- Horizontal supermarket freezer cabinets
- Roll-in cabinets
- Beverage coolers
- Ice-cream freezers
- Refrigerated vending machines
- Gelato-scooping cabinets

Types were defined as:
- Remote and integral (plug-ins) cabinets

Parameters were defined as:
- 25°C ambient conditions with 60% RH (humidity)
- Categories & Temperature classes:
  > refrigerator cabinets (chilled conditions) – M1 and M2, H1 and H2
  > freezer cabinets (frozen conditions) – L1, L2 and L3
- E_{daily} and TDA (total display area) determined according to ISO 23953 (standard, methodology of test)

Product life cycle

In addition to requirements set at the product design level, the directive has set requirements to follow the life of products once in operation:

- Availability of spare parts until 8 years after the last unit is put in operation with list available on website of the manufacturer
- Delivery time of spare parts in maximum 15 working days
- Access to repair and maintenance information on the manufacturer website starting maximum 2 years after the first unit being put in operation
- Requirements for dismantling for material recovery and recycling while avoiding pollution (equipment design according to WEEE – Waste Electrical and Electronic Equipment)

CARRIER, NATURALLY THINKING

Carrier Commercial Refrigeration has earned a reputation as a world leader in the design, manufacturing and installation of turnkey refrigeration systems. We are recognized for our commitment to deliver energy efficient installations with a lesser impact on the environment.

Natural leaders in sustainability

At Carrier, we incorporate sustainability into all that we do. To us, it's only natural.

From innovative solutions to green factories and services developed to increase efficiency, Carrier is a leader in sustainability. We pioneered the use of natural refrigerants in food retail, and continuously invest in research and development to improve the efficiency of our products and processes while protecting the natural environment.

GWP =1

Pioneer and leader in CO_2 natural refrigerant refrigeration

-30%

Energy savings with $CO_2OLtec^®$ EVO

-45%

Energy consumption reduced up to 45% with BREEZtec air circulation system

Did you know?

Carrier sustainability efforts are applied from the product design to the end of their life in the field to further reduce their environmental footprint:

- **Choice of refrigerant:** Carrier is proposing its whole product range with natural refrigerants, propane for plug-in cabinets and CO_2 across the range. Carrier has been pioneering the use of CO_2 for commercial and industrial refrigeration, and has reached more than 13 000 systems produced in 2019.

- **Energy savings in operation:** when designing its products, Carrier thinks about their efficiency at all levels: LED lighting set as standard, EC efficient motors for ventilation, glass doors and lids.

- **Quality material:** by carefully selecting the material used in production, quality is making a difference in the field with products lasting for an average of 10 years in operation.

- **Extensive testing:** Carrier follows strict technical specifications and applies robust qualification testing of components to guarantee a sustainable lifetime (e.g. 300.000 cycle door opening test, compressor qualification tests, 50.000 hour life time for LED lighting…).

- **Green factories:** through the careful use of water, electricity and waste treatment, Carrier sites are making a sensible use of natural resources to produce the refrigeration range.

- **Re-cycling of old cabinets:** the design of Carrier cabinets is made in a way that the recycling by sorting steel, copper, aluminum, glass and plastic of the cabinets that have ended their lives is easily possible.

Leading the way
with advanced solutions

100% of Carrier's product range will be compliant in 2021. For years, Carrier has designed products with energy efficiency and sustainability in mind.

BREEZtec, Next Generation of Carrier's Highly Effcient Air Circulation System

Carrier is introducing BREEZtec. This technology allows energy consumption savings by 30 to 45% compared to conventional EC fans. This new technology allows cost savings per cabinet from 50 to 70 Euros per year. The Carrier patented fan housing geometry and fan blade design also enable a reduced sound pressure by up to 4dBA.

The new Carrier Air Circulation System is optimized for all remote E6 Multidecks and E6 Semi-Verticals with back evaporator design.

Evolution 6 refrigerated cabinets now optimized with $CO_2OLtec^{®}$ EVO

To strengthen its efforts towards innovative energy-saving products, Carrier has optimized its Evolution 6 cabinets with $CO_2OLtec^{®}$ Evo, which leverages and combines several innovations to increase the cabinet's overall CO_2 system efficiency. These include energy saving heat exchangers, ejector operation optimized expansion valves, as well as extended operation flexibility. All Carrier's 60 bar CO_2 evaporators now operate with 90 bar expansion valves and 90 bar liquid lines.
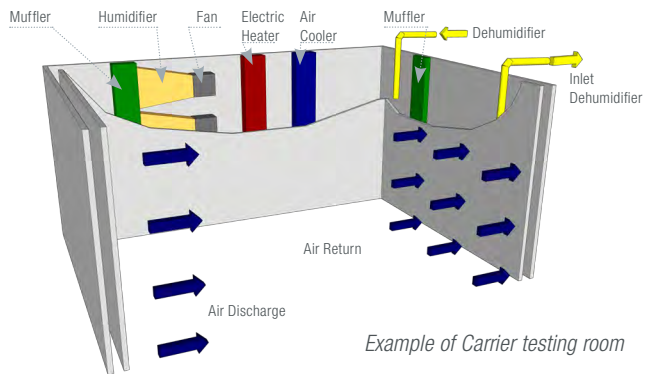
The right technology for efficiency

Carrier is constantly working on improving its evaporator technology to achieve better energy efficiency. This goes hand in hand with selecting the right accessories on each cabinet: LED lighting, wide choice of glass doors and lids.

Ultra modern laboratories

Carrier benefits from unique facilities, that allow products to be tested following the ISO 23953 standard. This standard defines the test conditions for representative refrigerated display cabinets including the minimum size of the test room, side air-flow, light intensity, temperature and humidification control, calibrated measurements etc.

Muffler Humidifier Fan Electric Heater Air Cooler Muffler Dehumidifier Inlet Dehumidifier

Air Return

Air Discharge

Example of Carrier testing room

Carrier Digital Solutions

Our digital teams are connected to the installations to further optimize the energy consumption of the installations through Carrier's energy consultancy services:

• From one time energy audits to long-term projects for sustainability
• Operational optimization combining remote and onsite
• Full transparency on results
• Stability and food safety remains guaranteed

A new service, Energy Management Services powered by EcoEnergy Insights

This advanced management service offers a frictionless, proactive optimization of any installation's performance. The solution retrieves data from multiple energy consumption sources within the store (heating, ventilation, lighting, air-conditioning) combined with another set of criteria (business goals, operating conditions, weather patterns and more) and examines them to help design and prioritize corrective action.

Level analytics are performed via the EcoEnergy CORTIX™ platform (an AI-driven Building IoT platform) and acted upon by a team of data scientists and analysts.

The platform provides insights on the equipment's performance and delivers optimization scenarios. Carrier teams then take over, and based on this input and their cutting-edge refrigeration expertise, advise the retailers on how to optimize the equipment's operations accordingly. This self-learning platform is able to adjust part of the equipment's performance on its own, while Carrier's centralized teams can also take corrective actions remotely – offering a seamless, intelligent system optimization.

Service, we care everyday, everywhere

To ensure our installations have minimum environmental impact, they must run and be maintained at optimum capability levels.

For Carrier, that means having customers covered on the field, ensuring its products are environmentally responsible for their entire life in operation.

Whether it's on-site or remotely, analysis, maintenance or repairs, new installation or modernization, you can rely on Carrier to get the most from your refrigeration systems.

Preventive
Maintenance

Preventive
Maintenance
+ Repairs

Preventive
Maintenance
+ Spare Parts

Full Services
Option

Remote
Services

Energy
Consultancy

24
countries

24/7
on-site
service

700+
top-trained
technicians

22,000+
sites maintained

8,000+
connected stores

TRUE OR FALSE
Check your knowledge!

Do these Regulations apply to condensing units and refrigeration systems (piping, condenser, etc….)?
Condensing units and refrigeration systems are part of other phases of the Ecodesign regulation and are not covered by the labeling.

Does the energy label need to be visible for the consumers in the shops?
Refrigerated cabinets need to be delivered with the energy label by the supplier. The Regulation directive doesn't mention the need for shops to have it visible or sticked on the product.

What will happen to products with EEI > 100%?
If products have EEI > 100%, they cannot be put on the market in EU after 01.03.2021, products rated G (EEI >= 80%) can no longer be put on the market in EU after 01.09.2023.

Are cabinets already installed in the field within the scope of these Regulations?
No, these Regulations are applicable only for cabinets delivered after the entry into force, 01.03.2021. Cabinets put into the market before are excluded by these Regulations.

Can an energy label be improved by any means (doors, lids, lighting, fans…) in the field?
No, the energy label has to correspond to the status of the cabinets as delivered by the supplier out of the factory. Measures adopted in the field will not improve the cabinet's classification and energy labeling.

Are there cabinets which are excluded from these regulations?
Yes, corner cabinets, saladettes, serve-over counters for fish with flaked ice, cabinets for live foodstuff (living fish and shellfish) are excluded by these regulations.

Will all refrigerated cabinets be available in A as we can see for home appliances?
At the time of collection of the benchmark data (2014), the Regulation was defined in a way that no products should be rated in A & B – for the top 10 list definition.

Will each country need to apply further actions to implement these regulations?
No, the regulations become immediately enforced as a law in all member states in the European Union simultaneously. Yes, member states will have to set up an organization for the market surveillance.

Carrier

Carrier Commercial Refrigeration is a leading supplier of high-efficiency turnkey refrigeration systems and services in the food retail industry.

www.carrier-refrigeration.com
www.carrier.com