



ENERGY STAR® Program Requirements for Commercial Refrigerators and Freezers

Partner Commitments

Following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacture and labeling of ENERGY STAR certified products. The ENERGY STAR Partner must adhere to the following partner commitments:

Qualifying Products

1. **Comply with current ENERGY STAR Eligibility Criteria**, which define performance requirements and test procedures for Commercial Refrigerators and Freezers. A list of eligible products and their corresponding Eligibility Criteria can be found at www.energystar.gov/specifications.
2. **Prior to associating the ENERGY STAR name or mark with any product**, obtain written certification of ENERGY STAR certification from a Certification Body recognized by EPA for Commercial Refrigerators and Freezers. As part of this certification process, products must be tested in a laboratory recognized by EPA to perform Commercial Refrigeration testing. A list of EPA-recognized laboratories and certification bodies can be found at www.energystar.gov/testingandverification.

Using the ENERGY STAR Name and Marks

3. Comply with current ENERGY STAR Brand Book, which define how the ENERGY STAR name and marks may be used. Partner is responsible for adhering to these guidelines and ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance. The ENERGY STAR Brand Book are available at www.energystar.gov/logouse.
4. Use the ENERGY STAR name and marks only in association with certified products. Partner may not refer to itself as an ENERGY STAR Partner unless at least one product is certified and offered for sale in the U.S. and/or ENERGY STAR partner countries.
5. Provide clear and consistent labeling of ENERGY STAR certified Commercial Refrigerators and Freezers. The ENERGY STAR mark must be clearly displayed on the Commercial Refrigeration Equipment top/front of the product, in product literature (i.e., user manuals, spec sheets, etc.), on product packaging, and on the manufacturer's Internet site where information about ENERGY STAR certified models is displayed.

Verifying Ongoing Product Certification

6. Participate in third-party verification testing through a Certification Body recognized by EPA for Commercial Refrigerators and Freezers, providing full cooperation and timely responses. EPA/DOE may also, at its discretion, conduct tests on products that are referred to as ENERGY STAR certified. These products may be obtained on the open market, or voluntarily supplied by Partner at the government's request.

Providing Information to EPA

7. Provide unit shipment data or other market indicators to EPA annually to assist with creation of ENERGY STAR market penetration estimates, as follows:

- 7.1. Partner must submit the total number of ENERGY STAR certified Commercial Refrigerators and Freezers shipped in the calendar year or an equivalent measurement as agreed to in advance by EPA and Partner. Partner shall exclude shipments to organizations that rebrand and resell the shipments (unaffiliated private labelers).
- 7.2. Partner must provide unit shipment data segmented by meaningful product characteristics (e.g., type, capacity, presence of additional functions) as prescribed by EPA.
- 7.3. Partner must submit unit shipment data for each calendar year to EPA or an EPA-authorized third party, preferably in electronic format, no later than March 1 of the following year.

Submitted unit shipment data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner.

8. Report to EPA any attempts by recognized laboratories or Certification Bodies (CBs) to influence testing or certification results or to engage in discriminatory practices.
9. Notify EPA of a change in the designated responsible party or contacts within 30 days using the My ENERGY STAR Account tool (MESA) available at www.energystar.gov/mesa.

Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures, and should keep EPA informed on the progress of these efforts:

- Provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR certified products, and to promote awareness of ENERGY STAR and its message.
- Consider energy efficiency improvements in company facilities and pursue benchmarking buildings through the ENERGY STAR Buildings program.
- Purchase ENERGY STAR certified products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR certified product information to employees for use when purchasing products for their homes.
- Feature the ENERGY STAR mark(s) on Partner website and other promotional materials. If information concerning ENERGY STAR is provided on the Partner website as specified by the ENERGY STAR Web Linking Policy (available in the Partner Resources section of the ENERGY STAR website), EPA may provide links where appropriate to the Partner website.
- Ensure the power management feature is enabled on all ENERGY STAR certified displays and computers in use in company facilities, particularly upon installation and after service is performed.
- Provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR certified products.
- Provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate and communicate Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR website, etc. The plan may be as simple as providing a list of planned activities or milestones of which Partner would like EPA to be aware. For example, activities may include: (1) increasing the availability of ENERGY STAR certified products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrating the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) providing information to users (via the website and user's manual) about

energy-saving features and operating characteristics of ENERGY STAR certified products; and (4) building awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event.

- Join EPA's SmartWay Transport Partnership to improve the environmental performance of the company's shipping operations. The SmartWay Transport Partnership works with freight carriers, shippers, and other stakeholders in the goods movement industry to reduce fuel consumption, greenhouse gases, and air pollution. For more information on SmartWay, visit www.epa.gov/smartway.
- Join EPA's Green Power Partnership. EPA's Green Power Partnership encourages organizations to buy green power as a way to reduce the environmental impacts associated with traditional fossil fuel-based electricity use. The partnership includes a diverse set of organizations including Fortune 500 companies, small and medium businesses, government institutions as well as a growing number of colleges and universities. For more information on Green Power, visit www.epa.gov/greenpower



ENERGY STAR® Program Requirements Product Specification for Commercial Refrigerators and Freezers

Eligibility Criteria Version 5.0 (Rev. Nov – 2022)

Following is the **Version 5.0** ENERGY STAR product specification for commercial refrigerators and freezers. A product shall meet all of the identified criteria if it is to earn ENERGY STAR certification.

1 Definitions

Below are the definitions of the relevant terms in this document. Where applicable, the cited definitions are aligned with the definitions in the U.S. Department of Energy's (DOE) Code of Federal Regulations (CFR) found in 10 CFR Part 431ⁱ. When in conflict, the definitions in the CFR take precedence.

A) Product Types:

- 1) Commercial Refrigerator: A unit of commercial refrigeration equipment in which all refrigerated compartments in the unit are capable of operating at or above 32°F (±2°F).
- 2) Commercial Freezer: A unit of commercial refrigeration equipment in which all refrigerated compartments in the unit are capable of operating below 32°F (±2°F).
- 3) Commercial Refrigerator-Freezer: A unit of refrigeration equipment consisting of two or more refrigerated compartments where at least one refrigerated compartment is capable of operating at or above 32°F (±2°F) and at least one refrigerated compartment is capable of operating below 32°F (±2°F).
- 4) Commercial Refrigerator, Freezer, and Refrigerator-Freezer: Refrigeration equipment that: (a) is not a consumer product (as defined in §430.2 of 10 CFR Part 430); (b) is not designed and marketed exclusively for medical, scientific, or research purposes; (c) operates at a chilled, frozen, combination chilled and frozen, or variable temperature; (d) displays or stores merchandise and other perishable materials horizontally, semi-vertically, or vertically; (e) has transparent or solid doors, sliding or hinged doors, a combination of hinged, sliding, transparent, or solid doors, or no doors; (f) is designed for pull-down temperature applications or holding temperature applications; and (g) is connected to a self-contained condensing unit or to a remote condensing unit.
- 5) Commercial Hybrid: A unit of commercial refrigeration equipment that: (a) consists of two or more thermally separated refrigerated compartments that are in two or more different equipment families; and (b) is sold as a single unit.
- 6) Horizontal Closed: Equipment with hinged or sliding doors and a door angle greater than or equal to 45°.
- 7) Horizontal Open: Equipment without doors and an air-curtain angle greater than or equal to 80° from the vertical.
- 8) Vertical Closed: Equipment with hinged or sliding doors and a door angle less than 45°.
- 9) Vertical Open: Equipment without doors and an air-curtain angle greater than or equal to 0° and less than 10° from the vertical.
- 10) Closed Solid: Equipment with doors, and in which more than 75 percent of the outer surface area of all doors on a unit are not transparent.
- 11) Closed Transparent: Equipment with doors, and in which 25 percent or more of the outer surface area of all doors on the unit are transparent.

ⁱ 10 CFR Part 431, Subpart C, §431.62

- 12) Self-Contained Condensing Unit: A factory-made assembly of refrigerating components designed to compress and liquefy a specific refrigerant that is an integral part of the refrigerated equipment and consists of 1 or more refrigerant compressors, refrigerant condensers, condenser fans and motors, and factory supplied accessories.
- 13) Ice Cream Freezer: A commercial freezer that is designed to operate at or below -5°F (±2°F) (- 21°C ±1.1°C) and that the manufacturer designs, markets, or intends for the storing, displaying, or dispensing of ice cream.
- 14) Convertible Temperature Equipment: Commercial refrigeration equipment that is capable of operating as a refrigerator (Section 1.A.1.) and as a freezer (Section 1.A.2) with a user adjustable application temperature.
- 15) Chef Base or Griddle Stand: Commercial refrigeration equipment that is designed and marketed for the express purpose of having a griddle or other cooking appliance placed on top of it that is capable of reaching temperatures hot enough to cook food.
- 16) Preparation or Buffet Table: A commercial refrigerator, freezer, or refrigerator-freezer with a food condiment rail designed to hold open perishable food and may or may not be equipped with a lower compartment that may or may not be refrigerated.
- 17) Semivertical Open: Equipment without doors and an air curtain angle greater than or equal to 10° and less than 80° from the vertical.
- 18) Service Over Counter: Equipment that has sliding or hinged doors in the back intended for use by sales personnel, with glass or other transparent material in front for displaying merchandise, and that has a height not greater than 66 inches and is intended to serve as a counter for transactions between sales personnel and customers.
- 19) Undercounter: A vertical closed commercial refrigerator or freezer that has no surface intended for food preparation. The equipment is intended for installation under a separate counter or workspace. This equipment may have doors or drawers and shall have a minimum height of 32-inches, including legs or casters.
- 20) Worktop: A vertical closed commercial refrigerator or freezer that has a surface intended for food preparation that is incapable of supporting cooking equipment. This equipment may have doors or drawers and shall have a minimum height of 32-inches, including legs or casters.
- 21) Basic Model: All commercial refrigeration equipment manufactured by one manufacturer within a single equipment class, having the same primary energy source, and that have essentially identical electrical, physical, and functional characteristics that affect energy consumption.
- 22) Equipment Family: Classification determined by equipment geometry and door orientation, including: Vertical Open (VOP), Semi-Vertical Open (SVO), Horizontal Open (HZO), Vertical Closed Transparent (VCT), Vertical Closed Solid (VCS), Horizontal Closed Transparent (HCT), Horizontal Closed Solid (HCS), Service Over Counter (SOC), and Chef Base (CB).
- 23) Door: A movable panel that separates the interior volume of a unit of commercial refrigeration equipment from the ambient environment and is designed to facilitate access to the refrigerated space for the purpose of loading and unloading product. This includes hinged doors, sliding doors, and drawers. This does not include night curtains.

2 SCOPE

2.1 Included Products

- 2.1.1 Products that (1) meet the definitions of a Commercial Refrigerator, Freezer, and Refrigerator-Freezer, Commercial Hybrid; or Convertible Temperature Equipment and (2) fall under the eligible equipment class designations in Section 2.1.1 i-xi., or a combination of equipment classes (see Section 1.A.4) herein, are eligible for ENERGY STAR certification:
 - i. Horizontal Closed Solid Self-Contained Low Temperature (HCS.SC.L),
 - ii. Horizontal Closed Solid Self-Contained Medium Temperature (HCS.SC.M),

- iii. Horizontal Closed Transparent Self-Contained Low Temperature (HCT.SC.L),
- iv. Horizontal Closed Transparent Self-Contained Medium Temperature (HCT.SC.M),
- v. Vertical Closed Solid Self-Contained Low Temperature (VCS.SC.L),
- vi. Vertical Closed Solid Self-Contained Medium Temperature (VCS.SC.M),
- vii. Vertical Closed Transparent Self-Contained Low Temperature (VCT.SC.L),
- viii. Vertical Closed Transparent Self-Contained Medium Temperature (VCT.SC.M),
- ix. Chef Base Self-Contained Medium Temperature (CB.SC.M)
- x. Chef Base Self-Contained Low Temperature (CB.SC.L), and/or
- xi. Service Over Counter Self-Contained Medium Temperature (SOC.SC.M).

Examples of product types that are eligible for certification include: convertible temperature equipment, reach-in, roll-in, or pass-through units; merchandisers; under-counters; worktops; hybrid units; milk coolers; back bar coolers; bottle coolers; deep well units; beer-dispensing or direct draw units; and bunker freezers.

Notes: For convertible temperature equipment to be listed as a medium and low temperature certified product, it must meet both medium and low temperature criteria if applicable.

2.1.2 To be eligible for this specification, commercial refrigeration equipment shall be commercial-grade and third-party certified to the applicable requirements set forth in the following quality and safety standards:

- i. ANSI/NSF International Standard for Food Equipment – Commercial Refrigerators and Freezers (ANSI/NSF 7-2019); and
- ii. UL Standard for Commercial Refrigerators and Freezers (UL-471) and/or (UL/CAS 60335-2-89).

Notes: ANSI/NSF 7-2019 exempts equipment from some temperature performance requirements based on the type of food that is intended to be stored in the unit. Examples of equipment that would be exempt from the temperature performance requirements of this Standard include: refrigerators intended only for the storage or display of non-potentially hazardous bottled or canned products and refrigerators intended only for the display of unprocessed produce. Please refer to ANSI/NSF 7-2019 to determine the applicable requirements for a specific equipment type.

UL/CSA 60335-2-89 may be used to satisfy the UL-471 requirement for ENERGY STAR certification. Upon the UL/CSA 60335-2-89 effective date of September 29, 2024, all new certifications must use UL/CSA 60335-2-89.

2.2 Excluded Products

2.2.1 Refrigerated buffet tables and preparation tables, walk-in coolers, blast chillers and freezers, horizontal open equipment, vertical open equipment, semi-vertical open equipment, remote condensing equipment, ice cream freezers, and equipment rated at the lowest application product temperature (LAPT, see 10 CFR Part 431, Subpart C, §431.62 and section 2.2 of Appendix B to Subpart C) are not eligible for ENERGY STAR. Products that are covered under other ENERGY STAR product specifications (e.g., Residential Refrigerators and Freezers) are not eligible for certification under this specification.

3 CERTIFICATION CRITERIA

3.1 Significant Digits and Rounding

3.1.1 All calculations shall be carried out with directly measured (unrounded) values. Final ratings for daily

energy consumption shall be rounded to 0.01 kWh increments in accordance with the DOE test procedure provisions.

- 3.1.2 Directly measured or calculated values that are submitted for reporting on the ENERGY STAR website shall be calculated in accordance with the requirements for determining certified ratings for DOE.

3.2 General Requirements

3.2.1 Maximum Daily Energy Consumption (MDEC) Requirements:

Table 1: ENERGY STAR Requirements for Commercial Refrigerators, Freezers, and Refrigerator-Freezerⁱⁱ

Product Volume (in cubic feet)	Refrigerator	Freezer
Vertical Closed		
Solid	VCS.SC.M*	VCS.SC.L
0 < V < 15	0.0267V+0.8	0.21V+0.9
15 ≤ V < 30	0.05V+0.45	0.12V+2.248
30 ≤ V < 50		0.2578V-1.8864
50 ≤ V	0.025V+1.6991	0.14V+4.0
Transparent	VCT.SC.M	VCT.SC.L
0 < V < 15	0.095V+0.445	0.232V+2.36
15 ≤ V < 30	0.05V+1.12	
30 ≤ V < 50	0.076V+0.34	
50 ≤ V	0.105V-1.111	
Horizontal Closed		
Solid or Transparent	HCT.SC.M, HCS.SC.M	HCT.SC.L, HCS.SC.L
All volumes	0.05V+0.28	0.057V+0.55
Chef Bases**		
	CB.SC.M	CB.SC.L
All volumes	0.05V+2.1	0.22V+6.0
Service Over Counter		
Total Display Area (in square feet)	SOC.SC.M	N/A
0 < TDA < 20	0.32TDA+0.6	
20 ≤ TDA < 40	0.65TDA-6.0	
40 ≤ TDA	0.4667TDA+1.3333	

* DOE Equipment Class designations relevant to ENERGY STAR eligible product scope

- (1) Equipment family code (HCS= horizontal closed solid, HCT=horizontal closed transparent, VCS= vertical closed solid, VCT=vertical closed transparent, SOC= service over counter),
- (2) Operating mode (SC=self-contained), and
- (3) Rating Temperature (M=medium temperature (38 °F), L=low temperature (0 °F)).

** CB = chef base or griddle stand as defined in Section 1.A.15.

3.2.2 Determination of Refrigerated Volume: The refrigerated volume (V) of a refrigerator or freezer shall be calculated in accordance with the DOE test procedure at 10 CFR Part 431, Subpart C, Appendix B.

3.2.3 Determination of Total Display Area: The total display area (TDA) of a refrigerator or freezer shall be calculated in accordance with the DOE test procedure at 10 CFR Part 431, Subpart C, Appendix B.

ⁱⁱ The operating temperature range for commercial refrigerators and freezers is located at 10 CFR Part 431, Subpart C, §431.66(e)

3.2.4 **Determining Maximum Daily Energy Consumption for Commercial Hybrid:** This section applies to Commercial Hybrid Refrigerators, Freezers, and Refrigerator-Freezers. The maximum daily energy consumption (MDEC) of hybrid equipment shall be the sum of all individual compartment MDEC values. For purposes of hybrid equipment, the refrigerated volume associated with the different equipment families defines compartments. The refrigerated volume of each individual compartment shall be measured, and its MDEC limit determined, based on the compartment's volume and door type, as listed in Table 1 above. The sum of the volumes of each compartment shall be equivalent to the total volume of the cabinet.

Example: Consider a vertical closed refrigerator with a total volume of 50 cubic feet with one 25 cu. ft. compartment having a transparent door and the other 25 cu. ft. compartment having a solid door. The MDEC of the equipment would be the sum of the MDEC for the two compartments. The requirement used to calculate the MDEC for each compartment is based on the compartment's volume and door type:

Transparent Door MDEC: $(25 \text{ cu. ft.} \times 0.05) + 1.12 = 2.37 \text{ kWh/day}$

Solid Door MDEC: $(25 \text{ cu. ft.} \times 0.05) + 0.45 = 1.70 \text{ kWh/day}$

MDEC for entire cabinet: $2.37 \text{ kWh/day} + 1.70 \text{ kWh/day} = 4.07 \text{ kWh/day}$

3.3 Additional Reporting Requirements

3.3.1. Report the type of refrigerant used in the commercial refrigerator and freezer, for example: R-290, R-600a, or R-134a.

4 TESTING

4.1 Test Methods

4.1.1 When testing commercial refrigerators and freezers, the following test methods shall be used to determine ENERGY STAR certification:

Table 2: Test Methods for ENERGY STAR Certification

ENERGY STAR Requirement	Test Method Reference
Daily Energy Consumption (DEC), Refrigerated Volume (V) and Total Display Area (TDA)	10 CFR Part 431, Subpart C, Appendix B

4.2 Number of Units Required for Testing

4.2.1 One of the following sampling plans shall be used for purposes of testing for ENERGY STAR certification:

- i. A single unit is selected, obtained, and tested. The measured performance of this unit and of each subsequent unit manufactured must be equal to or better than the ENERGY STAR specification requirements. Results of the tested unit may be used to certify additional individual model variations within a basic model group as long as the definition for basic model group provided in Section 1 above is met; or

- ii. Units are selected for testing and results calculated according to the sampling requirements defined in 10 CFR Part 429, Subpart B § 429.42. The certified rating must be equal to or better than the ENERGY STAR specification requirements. Results of the tested unit may be used to certify additional model variations within a basic model group as long as the definition for basic model group provided in Section 1, above, is met. Further, all individual models within a basic model group must have the same certified rating based on the applicable sampling criteria this rating must be used for all manufacturer literature, the qualified product list, and certification of compliance to DOE standards.

5 EFFECTIVE DATE

- 5.1.1 The ENERGY STAR Commercial Refrigerator and Freezer Version 5.0 specification shall take effect on **December 22, 2022**. To be certified for ENERGY STAR, a product model shall meet the ENERGY STAR specification in effect on the model's date of manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.

6 FUTURE SPECIFICATION REVISIONS

- 6.1.1 EPA reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are achieved through market research and industry discussions. In the event of a specification revision, please note that ENERGY STAR certification is not automatically granted for the life of a product model.