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 qualified 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. Obtain certification of ENERGY STAR qualification from a Certification Body recognized by EPA for commercial refrigerators and freezers prior to associating the ENERGY STAR name or mark with any product. As part of this certification process, products must be tested in a laboratory recognized by EPA to perform commercial refrigerator and freezer testing.

Using the ENERGY STAR Name and Marks

3. Comply with current ENERGY STAR Identity Guidelines, 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 Identity Guidelines are available at www.energystar.gov/logouse.
4. Use the ENERGY STAR name and marks only in association with qualified products. Partner may not refer to itself as an ENERGY STAR Partner unless at least one product is qualified and offered for sale.
5. Provide clear and consistent labeling of ENERGY STAR qualified commercial refrigerators and freezers. The ENERGY STAR mark must be clearly displayed on the front/inside of the product, on the product packaging, in product literature (i.e., user manuals, spec sheets, etc.), and on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed.

Verifying Ongoing Product Qualification

6. Participate in third-party verification testing through a Certification Body recognized by EPA for commercial refrigerators and freezers.
7. Comply with tests that EPA/DOE may conduct at its discretion on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at the government's request.

Providing Information to EPA

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

    8.1. Partner must submit the total number of ENERGY STAR qualified 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).

8.2. Partner must provide unit shipment data segmented by meaningful product characteristics (e.g., type, capacity, presence of additional functions) as prescribed by EPA.

8.3. 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. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;

9. Report to EPA any attempts by laboratories or Certification Bodies (CBs) to influence testing or certification results or to engage in discriminatory practices.

10. 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 qualified 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 qualified 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 qualified 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 qualified 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 qualified 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, communicate, and/or promote 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 qualified 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 qualified 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 Climate Leaders Partnership to inventory and reduce greenhouse gas emissions. Through participation, companies create a credible record of their accomplishments and receive EPA recognition as corporate environmental leaders. For more information on Climate Leaders, visit www.epa.gov/climateleaders.
- 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
DRAFT Version 2.1

Following is the **Version 2.1** product specification for ENERGY STAR qualified commercial refrigerators and freezers. A product shall meet all of the identified criteria if it is to earn the ENERGY STAR.

1) Definitions: Below are definitions of the relevant terms in this document.

A. Commercial Food-grade Refrigerator: A refrigeration cabinet designed for storing food products at temperatures above 32 degrees Fahrenheit (F) but no greater than 40 degrees F and intended for commercial use. For purposes of ENERGY STAR qualification, set-point temperatures must represent as shipped conditions.

B. Commercial Food-grade Freezer: A refrigeration cabinet designed for storing food products at temperatures of 0 degrees F and intended for commercial use. For purposes of ENERGY STAR qualification, set-point temperatures must represent as shipped conditions.

C. Refrigeration Cabinet: A refrigerator or freezer used for storing food products at specified temperatures, with the condensing unit and compressor built into the cabinet, and designed for use by commercial or institutional facilities, other than laboratory settings. These units may be vertical or chest configurations and may contain a worktop surface.

D. Closed Refrigerator: A display or holding refrigerator where product is accessible for removal by opening or moving doors or panels[1].

E. Solid Door Cabinet: A commercial food-grade refrigerator or freezer in which all outer doors on all sides of the unit are solid doors. These doors may be sliding or hinged.

F. Glass Door Cabinet: A commercial food-grade refrigerator or freezer in which all outer doors on at least one side of the unit are glass doors. These doors may be sliding or hinged.

G. Mixed Solid/Glass Door Cabinet: A commercial food-grade refrigerator or freezer in which all outer doors on at least one side of the unit are a combination of solid and glass doors. A unit which has all glass doors on one side and a combination of solid and glass doors on another is considered a glass door cabinet.

H. Solid Door: Less than 75% of the front surface area is glass.

I. Glass Door: Greater than, or equal to, 75% of the front surface area is glass.

J. Worktop Surface: A solid working surface. The working surface may be a cutting board, a stainless steel work surface, or a stone slab. This surface cannot add to the total energy consumption of the unit.

K. Chest Configuration: An enclosed refrigeration cabinet to which access is gained only through a top-opening door.

[1] Definition from ANSI/ASHRAE Standard 72-2005, Method of Testing Commercial Refrigerators and Freezers, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. 2005.

L. Product Family: Variations of one model are offered within a single product line with differences in aesthetics only. Individual models represented by a product family must be based on the same basic engineering design and have the same energy consumption. Examples of acceptable aesthetic differences include external finish, color, or door opening orientation (left-opening versus right-opening).

2) Scope:

A. Included Products: Products that meet the definitions of a Commercial Food-grade Refrigerator and Commercial Food-grade Freezer as specified herein are eligible for ENERGY STAR qualification, with the exception of products listed in Section 2.B.

Examples of product types that may be eligible for qualification include: reach-in, roll-in, or pass-through units; merchandisers; undercounter units; milk coolers; back bar coolers; bottle coolers; glass frosters; deep well units; beer-dispensing or direct draw units; and bunker freezers.

To be eligible for this specification, solid and glass door refrigerators and freezers shall be commercial-grade and therefore, third-party certified to applicable requirements set forth in the following quality and safety standards:

a. ANSI/NSF International Standard for Food Equipment – Commercial Refrigerators and Freezers (ANSI/NSF 7-2007); and

b. UL Standard for Commercial Refrigerators and Freezers (UL-471).

Note: ANSI/NSF 7-2007 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 7-2007 to determine the applicable requirements for a specific equipment type.

B. Excluded Products: Drawer cabinets, prep tables, deli cases, open air units and laboratory-grade refrigeration equipment are not eligible for ENERGY STAR.

3) Qualification Criteria:

A. Maximum Daily Energy Consumption Requirements:

Table 1: ENERGY STAR Requirements for Commercial Food-grade Refrigerators and Freezers		
Product Volume (in cubic feet)	**Refrigerator**	**Freezer**
Vertical Configuration		
Solid Door Cabinets		
0 < V < 15	≤ 0.089V + 1.411	≤ 0.250V + 1.250
15 ≤ V < 30	≤ 0.037V + 2.200	≤ 0.400V – 1.000
30 ≤ V < 50	≤ 0.056V + 1.635	≤ 0.163V + 6.125
50 ≤ V	≤ 0.060V + 1.416	≤ 0.158V + 6.333
Glass Door Cabinets		
0 < V < 15	≤ 0.118V + 1.382	≤ 0.607V + 0.893
15 ≤ V < 30	≤ 0.140V + 1.050	≤ 0.733V – 1.000
30 ≤ V < 50	≤ 0.088V + 2.625	≤ 0.250V + 13.500
50 ≤ V	≤ 0.110V + 1.500	≤ 0.450V + 3.500
Chest Configuration		
Solid or Glass Door Cabinets	≤ 0.125V + 0.475	≤ 0.270V + 0.130

B. AHAM Volume: The interior volume (V) of a refrigerator or freezer shall be calculated by AHAM Standard Household Refrigerators/Household Freezers (ANSI/AHAM HRF-1-2004)[2].

C. Determining Maximum Daily Energy Consumption for Mixed Solid/Glass Door Cabinets: This section applies to mixed solid/glass door cabinets designed with two or more compartments contained in a single cabinet with different exterior door types (i.e., one is glass and one is solid) on the same side of the cabinet. The maximum daily energy consumption (MDEC) of mixed solid/glass door cabinets shall be the sum of all individual compartment MDEC values. For purposes of mixed solid/glass door cabinets, compartments are defined by the volume associated with the different exterior door types. The interior of these compartments may or may not be physically separated.

The 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 AHAM volume of the cabinet.

Example: Consider a vertically-configured refrigeration cabinet with a total volume of 50 cubic feet with one glass half door and one solid half door on the same side. The maximum daily energy consumption (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:

Glass Door MDEC: (25 cu. ft. X 0.140) + 1.050 = 4.55 kWh/day
Solid Door MDEC: (25 cu. ft. X 0.037) + 2.200 = 3.13 kWh/day

MDEC for entire cabinet: 4.55 kWh/day + 3.13 kWh/day = 7.68 kWh/day

[2] Definition from ANSI/ASHRAE Standard 72-2005, Method of Testing Commercial Refrigerators and Freezers, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. 2005.

C. Significant Digits and Rounding:

a. All calculations shall be carried out with actual measured or observed values. Only the final result of a calculation shall be rounded. Calculated results shall be rounded to three significant digits.

b. Unless otherwise specified, compliance with specification limit shall be evaluated using exact values without any benefit from rounding.

4) Test Requirements:

A. Representative Models shall be selected for testing per the following requirements:

a. For qualification of an individual product model, the representative model shall be equivalent to that which is intended to be marketed and labeled as ENERGY STAR.

b. For qualification of a product family, any model within that product family can be tested and serve as the representative model.

B. When testing commercial refrigerators and freezers, the following test methods shall be used to determine ENERGY STAR qualification:

Table 2: Test Methods for ENERGY STAR Qualification	
ENERGY STAR Requirement	**Test Method Reference**
MDEC	ANSI/ASHRAE Standard 72-2005 "*Method of Testing Commercial Refrigerators and Freezers*"

Note: Only those test procedures in ANSI/ASHRAE 72-2005 relevant to *closed refrigerators* are applicable to this specification. Total energy consumption of the product shall be measured, which includes both the auxiliary energy and refrigeration energy consumption.

C. Testing Temperature: The following integrated average temperatures, based on ANSI/ASHRAE Standard 72-2005, shall be used when testing commercial refrigerators and freezers for ENERGY STAR qualification:

Table 3: Required Integrated Average Temperatures for Testing	
Product Type	**Integrated Average Product Temperature**
Commercial food-grade refrigerator	38 degrees ± 2 degrees F
Commercial food-grade freezer	0 degrees ± 2 degrees F

D. Additional Testing Conditions: In addition to the testing conditions presented in ANSI/ASHRAE Standard 72-2005, equipment shall be tested:

- With all standard, factory-installed accessories (lighting, perimeter heat, pan heater, etc.) in the "ON" position, if manually-controlled.
- With all accessories, such as electric condensate pans, that come standard with equipment, but not necessarily factory-installed, installed and in the "ON" position.
- With power management device disabled if power management capabilities can vary upon shipment to customer.

E. Power Management Devices: Equipment with energy management devices permanently installed, such that the operator is not able to adjust the settings, may be operational during the test period, if the energy management device will never change to a new integrated average product temperature during the test period. Manufacturers can refer to ANSI/ASHRAE Standard 72-2005 and its official interpretations for further guidance on power management devices.

Note: It was brought to EPA's attention that a new interpretation was issued by ASHRAE earlier this year (i.e., Interpretation IC 72-2005-3) and is inconsistent with the power management device requirement included in the existing Version 2.0 specification. The Version 2.0 text includes a requirement that the device *never change to a new integrated average product temperature after the test has been concluded*. Per the interpretation, it is not ASHRAE's intention to govern how the equipment will be used after testing but rather how the equipment behaves during the test period.

Specifically, the interpretation states that "The results of the tests of the standard are good and valid, regardless of how the commercial refrigerator is used in the trade or what is done to the machine in the field in enabling or disabling features, provided that the test results are applied to machines comparatively tested by the standard". Therefore, EPA has changed the language above to simply imply that the integrated average product temperature should not change *during the test period*. A statement has also been added in Section B that requires testing and qualification in the worst case scenario (power management features turned off) in cases where subsequent products shipped may perform differently than tested and qualified model due to varying degrees of power management enabling. In these cases the models shipped must perform better, not worse, than the representative model.

To review Interpretation IC 72-2005-3 visit: http://www.ashrae.org/technology/page/345. Stakeholders are encouraged to comment on this proposed change.

5) **Effective Date:** The ENERGY STAR Commercial Refrigerator and Freezer specification shall take effect on **January 1, 2010**. To qualify for ENERGY STAR, a product model must 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.

   Glass Door Cabinets: Glass door cabinets, as defined in Section 1 above, that meet the requirements of this specification may begin qualifying for ENERGY STAR on **April 1, 2009.**

6) **Future Specification Revisions:** 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 arrived at through stakeholder discussions. In the event of a specification revision, please note that ENERGY STAR qualification is not automatically granted for the life of a product model.

   A. Drawer Cabinets: EPA will monitor industry efforts to develop a test procedure to measure and compare the energy performance of refrigerated drawer cabinets. Based on the availability of an industry accepted test procedure and performance data, EPA may consider adding this product category in future versions of this specification.

   B. Laboratory Grade Refrigerators and Freezers: EPA is currently working with manufacturers of laboratory grade refrigerators and freezers to develop separate requirements for equipment designed for and used in laboratory environments. Once these requirements are finalized, EPA may amend this specification to include laboratory grade refrigerators and freezers.