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ENERGY STAR® Program Requirements for Commercial Refrigerators and Freezers

Partner Commitments Version 2.0 - DRAFT 2

7

8 **Commitment**

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The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified commercial refrigerators and freezers. The ENERGY STAR Partner must adhere to the following program requirements:

- comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on commercial refrigerators and freezers and specifying the testing criteria for commercial refrigerators and freezers. EPA may, at its discretion, conduct tests 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 EPA's request;
- comply with current ENERGY STAR Identity Guidelines, describing how the ENERGY STAR labels and name may be used. Partner is responsible for adhering to these guidelines and for ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance;
- qualify at least one ENERGY STAR labeled commercial refrigerator or freezer model within one year of activating the commercial refrigerators and freezers portion of the agreement. When Partner qualifies the product, it must meet the specification (e.g., Tier 1 or 2) in effect at that time;
- provide clear and consistent labeling of ENERGY STAR qualified commercial refrigerators and freezers. The ENERGY STAR label 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;
- provide to EPA, on an annual basis, an updated list of ENERGY STAR qualifying commercial refrigerators and freezers. Once the Partner submits its first list of ENERGY STAR labeled commercial refrigerator and freezer models, the Partner will be listed as an ENERGY STAR Partner. Partner must provide annual updates in order to remain on the list of participating product manufacturers;
- provide to EPA, on an annual basis, unit shipment data or other market indicators to assist in determining the market penetration of ENERGY STAR. Specifically, Partner must submit the total number of ENERGY STAR qualified commercial refrigerators and freezers shipped (in units by model) or an equivalent measurement as agreed to in advance by EPA and Partner. Partner is also encouraged to provide ENERGY STAR qualified unit shipment data segmented by meaningful product characteristics (e.g., capacity, size, speed, or other as relevant), total unit shipments for each model in its product line, and percent of total unit shipments that qualify as ENERGY STAR. The data for each calendar year should be submitted to EPA, preferably in electronic format, no later than the following March and may be provided directly from the Partner or through a third party. The 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;
- notify EPA of a change in the designated responsible party or contacts for commercial refrigerators and freezers within 30 days.

54 Performance for Special Distinction

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

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- 59 ▪ consider energy efficiency improvements in company facilities and pursue the ENERGY STAR label
60 for buildings;
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- 62 ▪ purchase ENERGY STAR labeled products. Revise the company purchasing or procurement
63 specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA
64 for periodic updates and coordination. Circulate general ENERGY STAR labeled product information
65 to employees for use when purchasing products for their homes;
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- 67 ▪ ensure the power management feature is enabled on all ENERGY STAR qualified monitors and
68 computers in use in company facilities, particularly upon installation and after service is performed.
69 For assistance in doing so, go to www.energystar.gov/powermanagement;
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- 71 ▪ provide general information about the ENERGY STAR program to employees whose jobs are relevant
72 to the development, marketing, sales, and service of current ENERGY STAR labeled product models;
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- 74 ▪ feature the ENERGY STAR label(s) on Partner Web site and in other promotional materials. If
75 information concerning ENERGY STAR is provided on the Partner Web site as specified by the
76 ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on
77 the ENERGY STAR Web site at www.energystar.gov). EPA may provide links where appropriate to
78 the Partner Web site;
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- 80 ▪ provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the
81 program requirements listed above. By doing so, EPA may be able to coordinate, communicate,
82 and/or promote Partner's activities, provide an EPA representative, or include news about the event
83 in the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may be as
84 simple as providing a list of planned activities or planned milestones that Partner would like EPA to be
85 aware of. For example, activities may include: (1) increase the availability of ENERGY STAR labeled
86 products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2)
87 demonstrate the economic and environmental benefits of energy efficiency through special in-store
88 displays twice a year; (3) provide information to users (via the Web site and user's manual) about
89 energy-saving features and operating characteristics of ENERGY STAR qualified products, and (4)
90 build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on
91 one print advertorial and one live press event;
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- 93 ▪ provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase
94 availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and
95 its message;
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- 97 ▪ join EPA's SmartWay Transport Partnership to improve the environmental performance of the
98 company's shipping operations. SmartWay Transport works with freight carriers, shippers, and other
99 stakeholders in the goods movement industry to reduce fuel consumption, greenhouse gases, and air
100 pollution. For more information on SmartWay, visit www.epa.gov/smartway;
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- 102 ▪ join EPA's Climate Leaders Partnership to inventory and reduce greenhouse gas emissions. Through
103 participation, companies create a credible record of their accomplishments and receive EPA
104 recognition as corporate environmental leaders. For more information on Climate Leaders, visit
105 www.epa.gov/climateleaders;
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- 107 ▪ join EPA's Green Power partnership. EPA's Green Power Partnership encourages organizations to
108 buy green power as a way to reduce the environmental impacts associated with traditional fossil fuel-
109 based electricity use. The partnership includes a diverse set of organizations including Fortune 500

110 companies, small and medium businesses, government institutions as well as a growing number of
111 colleges and universities, visit <http://www.epa.gov/grnpower/>.



ENERGY STAR® Program Requirements for Commercial Refrigerators and Freezers

Eligibility Criteria Version 2.0 - DRAFT 2

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Below is the **DRAFT 2** Version 2.0 product specification for ENERGY STAR qualified commercial refrigerators and freezers. A product must meet all of the identified criteria if it is to earn the ENERGY STAR.

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

Note: Some definitions previously listed under Section 2: Qualifying Products have been moved to this section for purposes of consistency.

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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 which is intended for commercial use.

B. Commercial Food-Grade Freezer: A refrigeration cabinet designed for storing food products at temperatures of 0 degrees F which is intended for commercial use.

Note: EPA is proposing to exclude commercial food-grade refrigerator-freezer, or dual-temperature, units from this specification. The new dataset, as detailed in the note box on page 7, used by EPA to derive the specification equations in Table 1 includes only four refrigerator-freezer products. EPA decided that there were not enough representative models to determine appropriate performance levels for this product type. Furthermore, based on industry discussions it appears that refrigerator-freezers are considered niche products. Stakeholders interested in retaining refrigerator-freezers are encouraged to provide EPA with proposals on how to address them in this specification.

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C. Refrigeration Cabinet: A refrigerator or freezer used for storing food products at specified temperatures, with the condensing unit 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.

Note: Based on stakeholder interest and available performance data, EPA is proposing to include chest units, in addition to upright units, in this specification. Chest units may be refrigerators or freezers, with sliding or hinged doors. References to chest units are provided in the definition above and found throughout the specification.

Based on the limited data available for self-contained commercial ice cream freezers, and limited stakeholder interest in having a separate category for these units, EPA is proposing to exclude ice cream freezers as a separate category. EPA understands that there are ice cream freezers designed to operate at a number of set-point temperatures ranging from -15°F to 0°F. As such, ice cream freezers that meet the definition of a commercial food-grade freezer and operate at the integrated average product testing temperature for commercial food-grade freezer cabinets (0°F ± 2°F), would be eligible to qualify for ENERGY STAR. Stakeholders are encouraged to provide feedback on this approach of addressing ice cream freezers under the general freezer category.

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144 D. Closed Refrigerator: A display or holding refrigerator where product is accessible for removal by
145 opening or moving doors or panels¹.
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147 E. Solid Door Cabinet: A refrigeration cabinet in which 50% or greater of the total surface area of all
148 outer doors is solid. These doors may be sliding or hinged.
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150 F. Glass Door Cabinet: A refrigeration cabinet in which greater than 50% of the total surface area of
151 all outer doors is glass. These doors may be sliding or hinged.

Note: Based on stakeholder discussions during the May meeting, EPA has modified definitions for solid and glass door units to specifically address models that include some combination of glass and solid doors. Limited data has made it difficult to draft separate requirements for this type of equipment, which manufacturers suggest serve a niche role in the market. EPA will consider a unit a “glass door cabinet” if the total surface area of all its outer doors is greater than 50% glass. Products with less than 50% of glass coverage would be considered a “solid door cabinet”.

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153 G. Worktop Surface: A solid working surface and backsplash. The working surface may be a
154 cutting board, a stainless steel work surface, or a stone slab. This surface may not add to the total
155 energy consumption of the unit.
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157 **Test Procedure Requirements**

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159 H. AHAM Volume: The interior volume of a refrigerator as calculated by AHAM Standard Household
160 Refrigerators/Household Freezers (ANSI/AHAM HRF-1-2004).¹

Note: During the May stakeholder meeting, manufacturers suggested that EPA require manufacturers to use gross volume, instead of trace lines, when calculating interior volume using ANSI/AHAM HRF-1-2004 (i.e., the AHAM volume). According to EPA’s review of the standard, interior volume measurement using the AHAM volume calculates only the gross volume of a unit. There does not appear to be any reference of calculating volume based on trace lines. Therefore, EPA has not made any changes to the AHAM volume definition provided above. Stakeholders are encouraged to provide feedback if further clarification is necessary.

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163 I. Integrated Average Product Temperature: The integrated average of all test package
164 temperatures, recorded at 15-minute intervals, as determined using the test method prescribed in
165 Section 4, Test Criteria.
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167 **Testing/Standards Organizations**

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169 J. AHAM: Association of Home Appliance Manufacturers.
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171 K. ANSI: American National Standards Institute.
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173 L. ASHRAE: American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.
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175 M. UL: Underwriters Laboratories, Inc.
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- 177 2) Qualifying Products: For the purposes of ENERGY STAR, only those products that meet definitions
178 1.A through 1.G, above, are eligible for qualification. Examples of product types that may be eligible

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

179 for qualification include: reach-in, roll-in, or pass-through units; merchandisers; undercounter units;
180 milk coolers; back bar coolers; bottle coolers; glass frosters; deep well units; beer-dispensing or direct
181 draw units; and bunker freezers.

182 Drawer cabinets, prep tables, and open air units are **not** eligible for ENERGY STAR under this
183 Version 2.0 specification.

184 **Note:** This specification is intended for commercial food-grade refrigeration equipment only. At this
185 time, laboratory-grade refrigeration equipment cannot qualify for ENERGY STAR.

Note: The list of eligible product categories was developed based on review of manufacturer Web sites and product catalogues. This list represents typical product offerings that also meet the definitions in Section 1.

Based on the fact that the test procedure referenced in this specification, ASHRAE 72-2005, does not currently apply to testing drawer cabinets, EPA has excluded these product types from this Version 2.0 specification. Once a test procedure is made available that can accurately test the energy consumed by these product types, EPA will revisit adding them to this specification.

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187 Solid and glass door refrigerators and freezers qualifying under this Version 2.0 specification must
188 also meet the requirements set forth in the following quality and safety standards:

189 (1) ANSI/NSF International Standard for Food Equipment – Commercial Refrigerators and
190 Freezers (ANSI/NSF 7-2007) and

191 (2) UL Standard for Commercial Refrigerators and Freezers (UL-471)

Note: Based on discussions during the May stakeholder meeting, EPA is proposing that products also meet ANSI/NSF-7 and UL 471 standards to qualify for ENERGY STAR under this specification, further delineating commercial food-grade equipment, which is eligible for ENERGY STAR under this specification, from laboratory-grade equipment, which is not. If laboratory grade refrigerators and freezers are incorporated into this specification at a later date, this section will be revised to more clearly define laboratory- versus food-grade units.

Stakeholders noted that beer-dispensing refrigeration units using galvanized liners may not be able to meet ANSI/NSF-7. EPA received the following clarification on this issue from NSF International: Beer dispensing refrigerators designed to hold kegs would be considered as packaged products only and be permitted to have a galvanized liner. A galvanized liner would not be permitted under ANSI/NSF-7 if the refrigerator is intended to store unpackaged foods.

One stakeholder suggested that qualifying products be required to meet NFPA 70. However, EPA decided not to reference this standard because it includes installation requirements. Equipment installation is out of manufacturers' control and outside the scope of this specification. Furthermore, stakeholder input during the May meeting indicated that referencing the ANSI/NSF and UL standards, above, was sufficient for ensuring only those units intended for use in commercial foodservice settings would qualify under this specification.

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- 3) Energy-Efficiency Specifications for Qualifying Products: Commercial food-grade refrigerators and freezers must meet the requirements provided in Table 1, below, to qualify as ENERGY STAR.

Table 1: Maximum Daily Energy Consumption Requirements (kWh/d) for ENERGY STAR Qualified Commercial Food-Grade Refrigerators and Freezers		
Product Volume (in cubic feet)	Refrigerator	Freezer
Vertical Configuration		
<i>Solid Door Cabinets</i>		
$0 < V < 15$	$\leq 0.05V + 1.75$	$\leq 0.32V + 1.18$
$15 \leq V < 30$	$\leq 0.07V + 1.50$	$\leq 0.27V + 2.00$
$30 \leq V < 50$	$\leq 0.03V + 2.53$	$\leq 0.23V + 3.25$
$50 \leq V$	$\leq 0.08V + 0.07$	$\leq 0.15V + 7.00$
<i>Glass Door Cabinets</i>		
$0 < V < 15$	$\leq 0.14V + 1.06$	$\leq 0.36V + 0.64$
$15 \leq V < 30$	$\leq 0.13V + 1.10$	$\leq 0.60V - 3.00$
$30 \leq V < 50$	$\leq 0.10V + 2.25$	$\leq 0.50V$
$50 \leq V$	$\leq 0.11V + 1.50$	$\leq 0.83V - 16.67$
Chest Configuration		
<i>Solid or Glass Door Cabinets</i>	$\leq 0.07V + 0.93$	$\leq 0.14V + 0.86$

Note: V = AHAM volume (see definition in Section 1) in cubic feet (ft³).

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Note: Stakeholders voiced concerns about the quality and consistency of data used in the analysis for the Draft 1 specification. Based on further discussions, EPA discovered that the initial data set included equipment tested with all accessories turned on as well as equipment tested with these same accessories disabled. During the May stakeholder meeting, it was suggested that EPA use the Natural Resources Canada's (NRCAN) product database to base proposed levels. Products that are registered with NRCAN have been tested with all optional accessories (e.g., lighting, perimeter heat) turned to the "ON" position. In the interest of consistency, EPA used the NRCAN database to derive levels proposed in Table 1, above. Furthermore, these test results have been certified by one of several testing certification bodies, which further ensures quality reporting. This new dataset also includes limited data submitted by manufactures for products tested under similar conditions but not yet listed with NRCAN.

Typically manufacturers offer several design options for a base model that have no impact on energy performance (e.g., options for exterior finish). Stakeholders suggested that EPA treat these models as one data point. Based on this suggestion, EPA filtered the product data by excluding multiple model numbers under the same manufacturer with identical volume and energy consumption results to the representative model. In addition, models that do not meet the Federal minimum efficiency standard scheduled to take effect in January, 2010 were also removed from the dataset. This ensures that the new ENERGY STAR specification is representative of only those models available for sale in the United States in 2010. As a result of this filtering, a total of 998 models were removed leaving 399 for the Draft 2 analysis.

Products were then categorized based on door type, configuration, and application. All sub-categories of equipment with a vertical configuration must meet the same requirements listed in Table 1 based on product type (i.e., refrigerator or freezer), door type (glass or solid), and internal volume. EPA also did not consider setting more specific requirements based on other equipment attributes (i.e., defrost cycle, sliding doors) since this did not result in functional differences between units.

Notes, cont.

Based on stakeholder suggestion, EPA is proposing separate requirements for equipment with chest configurations. It is EPA's understanding that chest units are used in different applications than vertically configured units.

The volume ranges listed for vertically configured equipment in Table 1 were based on stakeholder discussions and available data. Some stakeholders suggested EPA consider an additional volume category for units that measure greater than 70 cubic feet. However, the limited amount of data available for equipment this size prevented EPA from considering this as a separate volume category. Instead, EPA grouped all models 50 cubic feet and greater in one category.

It was suggested by stakeholders that EPA consider using the same methodology in the ENERGY STAR specification for addressing small volume freezers as NRCan used in their minimum efficiency standard. That is, create a straight line requirement, or "floor", that is not dependent on volume (e.g. kWh/day less than or equal to 6). However the U.S. minimum efficiency standard, scheduled to go into effect in 2010, is dependent upon volume. In addition, upon further examination of the data, EPA noted that by setting a straight line requirement, there would be instances where the ENERGY STAR specification would be less stringent than the US minimum efficiency standard. Therefore, EPA retained the sloped line requirement for all volumes and types of equipment to ensure both consistency with the upcoming US minimum efficiency standard and that in all instances the ENERGY STAR specification is more stringent than the minimum standard.

The performance levels proposed in Table 1 represent approximately the top 25% of models by subcategory that will be available on the market once the specification takes effect, using the latest data set. When choosing levels, EPA also made sure that multiple manufacturers were represented to allow for adequate choice for purchasers.

In instances where few or no models meet the specification within a certain volume range (e.g., solid door vertical refrigerators of approximately 9-15 cubic feet), EPA identified several models with performance results close enough to the proposed levels such that small improvements in equipment design would likely allow these models to qualify.

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- 4) Test Criteria: Manufacturers are required to perform tests to self-certify those product models that meet the ENERGY STAR guidelines. The test results must be reported to EPA using the Commercial Refrigerator and Freezer Version 2.0 QPI form. In addition to test results, product specification sheets (i.e. cut sheets) are required to be submitted for each qualifying product model.

In performing the tests, manufacturers must use ANSI/ASHRAE Standard 72-2005, "Method of Testing Commercial Refrigerators and Freezers", to measure the daily energy consumption of commercial refrigerators and freezers with the temperature specifications listed in Table 2.

Table 2: Temperature Specifications 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

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216 Only those test procedures in ANSI/ASHRAE 72-2005 relevant to closed refrigerators are applicable
217 to this specification. In addition, manufacturers **must** test equipment according to ANSI/ASHRAE 72-
218 2005 with all optional accessories (lighting, perimeter heat, pan heater, etc.) in the "ON" position.

Note: EPA is requiring that all accessories be turned to the "ON" position during testing for the following reasons: (1) the data used to derive the proposed levels in Table 1 was collected using this method; and (2) because these accessories may be enabled on-site, end users should be assured that their ENERGY STAR qualified unit meets Version 2.0 requirements even with these accessories enabled (i.e., the worst case scenario).

The integrated average product temperature requirement specific to ice cream freezers has been removed. As previously noted, only those ice cream freezers that meet the definition of a commercial food-grade freezer in Section 1, and are tested/used at the appropriate integrated average product temperature (0 degrees ± 2 degrees F), can qualify for ENERGY STAR under this specification.

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221 5) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR will be
222 defined as the *effective date* of the agreement. Any previously executed agreement on the subject of
223 ENERGY STAR qualified commercial refrigerators and freezers shall be terminated effective **August**
224 **31, 2009**.

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226 A. **Qualifying and Labeling Products under Version 2.0:** The ENERGY STAR for Commercial
227 Refrigerators and Freezers Specification Version 2.0 shall go into effect on **September 1,**
228 **2009**. All products, including models originally qualified under the previous commercial
229 refrigerator and freezer specification, with a date of manufacture on or after September 1,
230 2009, must meet the new Version 2.0 requirements in order to qualify for ENERGY STAR
231 (including additional manufacturing runs of models originally qualified under the previous
232 specification). The date of manufacture is specific to each unit and is the date (e.g., month
233 and year) on which a unit is considered to be completely assembled. **Note:** glass door
234 cabinets, as defined in Section 1 above, may begin qualifying for ENERGY STAR on January
235 1, 2009.

Note: When revising ENERGY STAR specifications, EPA typically allows manufacturers at least 9 months to transition to the new specification requirements. EPA's goal is to finalize this Version 2.0 specification by the end of this year (i.e., December 2008). In the case where product categories are eligible for qualification for the first time, such as glass door cabinets, EPA allows manufacturers to qualify and promote ENERGY STAR units immediately upon finalization of the specification.

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238 6) **Future Specification Revisions:** ENERGY STAR reserves the right to revise the specifications should
239 technological and/or market changes affect its usefulness to purchasers, industry, or the environment.
240 In keeping with current policy, revisions to the specification are arrived at through discussions with
241 industry. In the event of a specification revision, please note that the ENERGY STAR qualification is
242 not automatically granted for the life of a product model. To qualify with the energy efficiency criteria
243 of ENERGY STAR, a product model must meet the ENERGY STAR specification in the effect on the
244 date of manufacture.

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246 **Drawer Cabinets:** EPA will monitor industry efforts to develop a test procedure to measure and
247 compare the energy performance of refrigerated drawer cabinets. Based on the availability of an
248 industry accepted test procedure and performance data, EPA may consider adding this product
249 category in future versions of this specification.
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251 **Laboratory Grade Refrigerators and Freezers:** EPA is currently working with manufacturers of
252 laboratory grade refrigerators and freezers to develop separate requirements for equipment designed
253 for and used in laboratory environments. Once these requirements are finalized, EPA may amend
254 this Version 2.0 specification to include laboratory grade refrigerators and freezers.
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Note: Due to continued stakeholder interest and increasing market share, EPA may consider including drawer cabinets in future versions of this specification based on availability of an industry accepted test procedure and performance data. In addition, EPA is continuing to work with manufacturers of laboratory grade refrigerators and freezers to develop separate requirements for for this equipment for potential future inclusion in this specification.

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