



# ENERGY STAR® Program Requirements for Residential Refrigerators and/or Freezers

## Partner Commitments

### Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified refrigerators and/or 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 refrigerators and/or freezers and specifying the testing criteria. DOE 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 DOE's request;
- Comply with current ENERGY STAR Logo Use 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 refrigerator and/or freezer model within one year of activating the appliances portion of the agreement. When PARTNER qualifies the product, it must meet the specification in effect at that time;
- Provide clear and consistent labeling of ENERGY STAR qualified refrigerators and/or freezers. The ENERGY STAR label must be clearly displayed on the top/front of the product (by placement of the ENERGY STAR logo on the Federal Trade Commission's (FTC) EnergyGuide label, on product labels, and/or as a permanent mark), on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed, and in product literature (i.e., user manuals, spec sheets, etc.). It is also recommended that the label appear on product packaging;
- Provide to DOE, on an annual basis, an updated list of ENERGY STAR qualifying refrigerator and/or freezer models. Once the PARTNER submits its first list of ENERGY STAR qualified models, the PARTNER's company name will be listed as an ENERGY STAR PARTNER. PARTNER must provide annual product updates in order to remain on the list of participating product manufacturers. All product submissions must include:
  - All required information submitted to the FTC, as part of the compliance with the EnergyGuide label; and
  - The adjusted volume of each refrigerator/freezer model, and annual energy consumption, if different than that provided to FTC, with supporting documentation verifying that the additional ENERGY STAR testing requirements outlined in Section 4 of this criteria are followed.
- Notify DOE of a change in the designated responsible party or contacts for refrigerators and/or freezers within thirty days.

## Performance for Special Distinction

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

- Consider energy efficiency improvements in company facilities and pursue the ENERGY STAR label for buildings;
- Purchase ENERGY STAR labeled products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to DOE for periodic updates and coordination. Circulate general ENERGY STAR labeled product information to employees for use when purchasing products for their homes;
- Ensure the power management feature is enabled on all ENERGY STAR qualified monitors 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 labeled product models;
- Feature the ENERGY STAR label(s) on PARTNER web site and in other promotional materials. If information concerning ENERGY STAR is provided on the PARTNER web site, DOE may provide links where appropriate to the PARTNER web site;
- Provide a simple plan to DOE outlining specific measures PARTNER plans to undertake beyond the program requirements listed above. By doing so, DOE may be able to coordinate, communicate, and/or promote PARTNER's activities, provide a DOE representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that PARTNER would like DOE to be aware of. For example, activities may include:
  - (1) Increase the availability of ENERGY STAR labeled products by converting the entire product line within two years to meet ENERGY STAR guidelines;
  - (2) Demonstrate the economic and environmental benefits of energy efficiency through special in-store displays twice a year;
  - (3) Provide information to users (via the web site and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products;
  - (4) Build awareness of the ENERGY STAR Partnership and brand identity by collaborating with DOE on one print advertorial and one live press event;
- Provide quarterly, written updates to DOE 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.



## ENERGY STAR<sup>®</sup> Program Eligibility Criteria for Residential Refrigerators and/or Freezers

Below are the product criteria for ENERGY STAR qualified refrigerators and/or freezers. A product must meet all of the identified criteria if it is to be labeled as ENERGY STAR by its manufacturer.

### 1) **Definitions:**

- a) **National Appliance Energy Conservation Act (NAECA):** signed into law in 1987, this act gave the US Department of Energy the power to set federal standards for maximum energy consumption on household appliances. The ENERGY STAR criteria for residential refrigerators and freezers are based on the NAECA appliance standards.
- b) **Adjusted Volume (AV):** the sum of the fresh food compartment volume in cubic feet, and the product of an adjustment factor and the net freezer compartment volume. AV is used to determine the federal energy conservation standards for refrigerators and freezers. Refrigerator Adjusted Volume = Fresh Volume + (1.63 x Freezer Volume). Freezer Adjusted Volume = 1.73 x Freezer Volume.
- c) **Compact:** this term refers to refrigerators, refrigerator-freezers, and freezers with a total volume of less than 7.75 cubic feet and 36 inches or less in height.

- 2) **Qualifying Products:** All sizes and configurations of refrigerators and freezers are eligible for ENERGY STAR. On January 1, 2003, the ENERGY STAR refrigerator criteria expanded to include all sizes and configurations of residential refrigerators and/or freezers. This expansion allowed the qualification of the previously ineligible products in the following categories: chest freezers, upright freezers, manual defrost freezers and refrigerators, partial automatic defrost refrigerators, single door refrigerators, and compact refrigerators and/or freezers.

To qualify a product, PARTNERS must submit reports that include the following **completed** test information:

- o All required FTC information compliant with the EnergyGuide label requirements; and
- o The adjusted volume of each refrigerator/freezer model, and annual energy consumption, if different than that provided to FTC, with supporting documentation verifying that the additional ENERGY STAR testing requirements outlined in Section 4 of this criteria are followed.

### 3) **ENERGY STAR Criteria:**

The ENERGY STAR criteria for residential refrigerators and freezers are set at a percentage below the federal maximum energy consumption standard by product class. The table below lists the definition of each product class and the corresponding NAECA maximum energy consumption level.

As of April 28, 2008, all refrigerators and refrigerator-freezers 7.75 cubic feet or greater in volume must be 20% more efficient than required by the minimum federal standard in order to meet the ENERGY STAR criteria.

Residential freezers 7.75 cubic feet or greater must be 10% more efficient than required by the minimum federal standard in order to meet the ENERGY STAR criteria.

All refrigerators and/or freezers less than 7.75 cubic feet in volume and 36 inches or less in height must be 20% more efficient than required by the minimum federal standard in order to meet the ENERGY STAR criteria.

These ENERGY STAR criteria do not apply to commercial models or refrigerators and refrigerator-freezers with total refrigerated volume exceeding 39 cubic feet or freezers with total refrigerated volume exceeding 30 cubic feet.

**NAECA Criteria for Refrigerators and/or Freezers:** To calculate the NAECA criteria, the equations are given in the following table:

| Product Class  | NAECA energy use (kWh/year) | Previous ENERGY STAR Criteria      | Current ENERGY STAR Criteria (as of January 1, 2004) | ENERGY STAR Criteria (as of April 28, 2008) |
|--|-----------------------------|------------------------------------|--|---|
| 1) Refrigerator & Refrigerator-Freezer with manual defrost                       | $\leq 8.82 AV + 248.4$      | 10% less energy than NAECA maximum | 15% less energy than NAECA maximum                   | 20% less energy than NAECA maximum          |
| 2) Refrigerator-Freezer with partial automatic defrost                           |                             |                                    |  |   |
| 3) Top Mount Freezer without through-the-door ice                                | $\leq 9.80*AV + 276.0$      |                                    |  |   |
| 4) Side Mount Freezer without through-the-door ice                               | $\leq 4.91*AV + 507.5$      |                                    |  |   |
| 5) Bottom Mount Freezer without through-the-door ice                             | $\leq 4.60*AV + 459.0$      |                                    |  |   |
| 6) Top Mount Freezer with through-the-door ice                                   | $\leq 10.2*AV + 356.0$      |                                    |  |   |
| 7) Side Mount Freezer with through-the-door ice                                  | $\leq 10.1*AV + 406.0$      |                                    |  |   |
| 8) Upright freezer with manual defrost   | $\leq 7.55*AV + 258.3$      |                                    | 10% less energy than NAECA maximum                   |   |
| 9) Upright freezer with automatic defrost  | $\leq 12.43*AV + 326.1$     |                                    |  |   |
| 10) Chest Freezers   | $\leq 9.88*AV + 143.7$      |                                    |  |   |
| 11) Compact Refrigerator and Refrigerator-Freezer with manual defrost            | $\leq 10.7*AV + 299.0$      | 20% less energy than NAECA maximum |  |   |
| 12) Compact Refrigerator and Refrigerator-Freezer with partial automatic defrost | $\leq 7.0*AV + 398.0$       |                                    |  |   |
| 13) Compact Refrigerator-Freezer-automatic defrost with top freezer              | $\leq 12.7*AV + 355.0$      |                                    |  |   |
| 14) Compact Refrigerator-side mounted freezer with automatic defrost             | $\leq 7.6*AV + 501.0$       |                                    |  |   |
| 15) Compact Refrigerator-bottom mount Freezer with automatic defrost             | $\leq 12.1*AV + 367.0$      |                                    |  |   |
| 16) Compact Upright Freezers with manual defrost                                 | $\leq 9.78*AV + 250.8$      |                                    |  |   |
| 17) Compact upright freezers with automatic defrost                              | $\leq 11.4*AV + 391.0$      |                                    |  |   |
| 18) Compact Chest Freezer  | $\leq 10.45*AV + 152.0$     |                                    |  |   |

AV = Adjusted Volume

Refrigerators Adjusted Volume = Fresh Volume + (1.63 x Freezer Volume)

Freezers Adjusted Volume = 1.73 x Freezer Volume

**ENERGY STAR Criteria for Refrigerators and/or Freezers:** To calculate the ENERGY STAR criteria, the equations are given in the following table:

| Product Class  | Current ENERGY STAR energy use (kWh/year) (as of January 1, 2004) | ENERGY STAR energy use (kWh/year) (as of April 28, 2008) |
|--|---|--|
| 1) Refrigerator & Refrigerator-Freezer with manual defrost                       | $\leq 7.497*AV + 211.14$  | $\leq 7.056*AV + 198.72$                                 |
| 2) Refrigerator-Freezer with partial automatic defrost                           |   |  |
| 3) Top Mount Freezer without through-the-door ice                                | $\leq 8.33*AV + 234.6$  | $\leq 7.84*AV + 220.8$                                   |
| 4) Side Mount Freezer without through-the-door ice                               | $\leq 4.1735*AV + 431.375$  | $\leq 3.928*AV + 406$                                    |
| 5) Bottom Mount Freezer without through-the-door ice                             | $\leq 3.91*AV + 390.15$   | $\leq 3.68*AV + 367.2$                                   |
| 6) Top Mount Freezer with through-the-door ice                                   | $\leq 8.67*AV + 302.6$  | $\leq 8.16*AV + 284.8$                                   |
| 7) Side Mount Freezer with through-the-door ice                                  | $\leq 8.585*AV + 345.1$   | $\leq 8.08*AV + 324.8$                                   |
| 8) Upright freezer with manual defrost   | $\leq 6.795*AV + 232.47$  | $\leq 6.795*AV + 232.47$                                 |
| 9) Upright freezer with automatic defrost  | $\leq 11.187*AV + 293.49$   | $\leq 11.187*AV + 293.49$                                |
| 10) Chest Freezers   | $\leq 8.892*AV + 129.33$  | $\leq 8.892*AV + 129.33$                                 |
| 11) Compact Refrigerator and Refrigerator-Freezer with manual defrost            | $\leq 8.56*AV + 239.2$  | $\leq 8.56*AV + 239.2$                                   |
| 12) Compact Refrigerator and Refrigerator-Freezer with partial automatic defrost | $\leq 5.6*AV + 318.4$   | $\leq 5.6*AV + 318.4$                                    |
| 13) Compact Refrigerator-Freezer-automatic defrost with top freezer              | $\leq 10.16*AV + 284$   | $\leq 10.16*AV + 284$                                    |
| 14) Compact Refrigerator-side mounted freezer with automatic defrost             | $\leq 6.08*AV + 400.8$  | $\leq 6.08*AV + 400.8$                                   |
| 15) Compact Refrigerator-bottom mount Freezer with automatic defrost             | $\leq 10.48*AV + 293.6$   | $\leq 10.48*AV + 293.6$                                  |
| 16) Compact Upright Freezers with manual defrost                                 | $\leq 7.824*AV + 200.64$  | $\leq 7.824*AV + 200.64$                                 |
| 17) Compact upright freezers with automatic defrost                              | $\leq 9.12*AV + 312.8$  | $\leq 9.12*AV + 312.8$                                   |
| 18) Compact Chest Freezer  | $\leq 8.36*AV + 121.6$  | $\leq 8.36*AV + 121.6$                                   |

AV = Adjusted Volume

Refrigerators Adjusted Volume = Fresh Volume + (1.63 x Freezer Volume)

Freezers Adjusted Volume = 1.73 x Freezer Volume

- 4) **Test Criteria:** Residential refrigerator manufacturers must self-test their equipment according to DOE's test procedure defined in 10 CFR 430, Subpart B, Appendix A1. Residential freezer manufacturers must self-test their equipment according to DOE's test procedure defined in 10 CFR 430, Subpart B, Appendix B1. When determining energy performance for purposes of ENERGY STAR certification, the following principles of interpretation should be applied to the existing DOE test procedures. The energy test procedure simulates typical room conditions (approximately 70°F) with door openings, by testing at 90°F without door openings. Except for operating characteristics that are affected by ambient temperature (for example, compressor percent run time), the unit, when tested under the DOE test procedure, shall operate equivalent to the unit in typical room conditions. Energy consuming components that operate in typical room conditions (including as a result of door openings, or in response to humidity levels), and that are not exempted by this standard, shall operate in an equivalent manner during energy testing under the DOE test procedure, or be accounted for by all calculations as provided for in the standard. Examples: (i) energy saving features that are designed to operate when there are no door openings for long periods of time shall not be functional during the energy test; (ii) the defrost heater should not either function or turn off differently during the energy test than it would when in typical room conditions; (ii) electric heaters that would normally operate at typical room conditions with door openings should also operate during the energy test; and (iv) energy used during adaptive defrost shall continue to be tested and adjusted per the calculation provided for in this standard.

- 5) **Effective Date:** The effective date of this criterion is April 28, 2008. A manufacturer has one year after signing the Partnership Agreement to ensure that the ENERGY STAR label appears directly on at least one ENERGY STAR qualified refrigerator and/or freezer model.
  
- 6) **Future Criteria Revisions:** ENERGY STAR reserves the right to change the criteria should technological and/or market changes affect its usefulness to consumers, industry, or the environment. Keeping with current policy, industry/stakeholder discussions determine revisions to the criteria.