



ENERGY STAR® Program Requirements for Computer Monitors

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Partner Commitments

Commitment

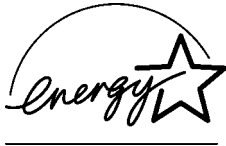
The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified computer monitors. The ENERGY STAR Partner must adhere to the following program requirements:

- comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on computer monitors and specifying the testing criteria for computer monitors. 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 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 computer monitor model within six months of activating the computer monitor 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 computer monitors. The ENERGY STAR label must be clearly displayed on the top/front 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 computer monitor models. Once the Partner submits its first list of ENERGY STAR labeled computer monitor 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 computer monitors 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 computer monitors within 30 days.

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:

- 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 EPA 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 as specified by the ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on the ENERGY STAR Web site at www.energystar.gov), EPA may provide links where appropriate to the Partner Web site;
- 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 Web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that Partner would like EPA 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, and (4) build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event;
- 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.



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DRAFT 1 Eligibility Criteria (Version 4.0)

Below is the DRAFT 1 product specification for ENERGY STAR qualified Computer Monitors (Version 4.0). A product must meet all of the identified criteria to be labeled as ENERGY STAR by its manufacturer.

- 1) Definitions: Below is a brief description of Computer Monitors and other terms as relevant to ENERGY STAR.
 - A. Computer Monitor: A commercially available electronic product with a display screen and its associated electronics encased in a single housing that is capable of displaying output information from a computer via one or more inputs, such as VGA, DVI, and/or IEEE 1394. The monitor usually relies upon a cathode-ray tube (CRT), liquid crystal display (LCD), or other display device. This definition is intended primarily to cover standard monitors designed for use with computers. To qualify, the monitor must be capable of being powered from either a wall outlet or a battery unit that is sold with an AC adapter. Computer monitors with a tuner/receiver may qualify as ENERGY STAR under this specification as long as they are marketed and sold to consumers as computer monitors (i.e., focusing on computer monitor as the primary function) or as dual function computer monitors and televisions. However, products with a tuner/receiver and computer capability that are marketed and sold as televisions are not included in this specification.

Note to Industry: It is ENERGY STAR's intent to allow computer monitors and dual function computer monitor/television products to qualify for the label under this specification. Consistent with the latest draft of the TV specification and discussions with EIA/CEA and manufacturers, we have attempted to differentiate products based on how they are marketed and sold to consumers. Our preference, however, would be for a more definitive delineation, based on resolution, for example. ENERGY STAR welcomes industry comments and suggestions on an appropriate computer monitor definition.
 - B. Sleep Mode/Low Power: The reduced power state that the monitor model enters after receiving instructions from a computer or via other functions. A blank screen and reduction in power consumption characterize this mode. The monitor returns to "on" mode upon sensing a request from a user.
 - C. Off Mode/Standby Power: The lowest power-consuming state of the monitor. Specifically, for this specification, off mode is defined as the power being used when the product is connected to a power source, produces no images, and is waiting to be switched to "on" mode by a direct signal from a user (e.g., user pushes power switch).
 - D. On Mode/Active Power: The product is connected to a power source and produces an image. The power requirement in this mode is typically greater than the power requirement in sleep and off modes.
 - E. Disconnect: The product has been unplugged from the mains and therefore is disconnected from all external power sources.
- 2) Qualifying Products: Any computer monitor that is marketed to the consumer as such and meets the definition in Section 1 is eligible for the ENERGY STAR label. As explained in Section 1, this specification does not cover products with computer capability that are marketed and sold as

televisions.

- 3) **Energy-Efficiency Specifications for Qualifying Products:** Only those products listed in Section 2 that meet the following criteria may qualify as ENERGY STAR.

- A. **On Mode/Active Power:** To qualify as ENERGY STAR, monitor models must not exceed the following maximum active power consumption equation: $Y = 30 + 20X$. Y is expressed in watts and rounded up to the nearest whole number and X is the number of megapixels in decimal form (e.g., 1,920,000 pixels = 1.92 megapixels). For example, the maximum power consumption for a monitor with 1800 x 1440 resolution would be: $30 + 20(2.592) = 81.84$ or 82 watts when rounded up. Under this metric, allowed power consumption for monitors with various standard resolutions is provided below in Table 1.

Table 1: Sample On Mode Maximum Power Levels

Resolution	Video Display Category	Total Pixels	Maximum Power Use
640 x 480	VGA	307,200	37 watts
800 x 600	SVGA	480,000	40 watts
1024 x 768	XGA	786,432	46 watts
1280 x 1024	SXGA	1,310,720	57 watts
1600 x 1200	UXGA	1,920,000	69 watts
1800 x 1440		2,592,000	82 watts
2048 x 1536		3,145,728	93 watts

To qualify a computer monitor as ENERGY STAR, it must be tested according to the protocol outlined in Section 5, Test Criteria.

- B. **Sleep and Off Modes:** Maximum power consumption levels for sleep and off modes are provided in Table 2. Monitors capable of multiple sleep modes (i.e., sleep and deep sleep) shall meet the sleep mode requirement below in all such modes.

Table 2: Energy-Efficiency Criteria for Sleep and Off Modes

Sleep Mode	Sleep Mode Default Time (to be defined in Computer Agreement)	Off Mode
≤ 4 watts	≤ 15 minutes	≤ 2 watts

- C. **Brightness (Luminance):** ENERGY STAR qualifying monitors shall provide a minimum brightness or luminance of 100 nits (candelas/square meter) with a full screen, pure white test image at the manufacturer default settings for brightness and contrast. These are the settings at which the monitor operates when first connected to a power source, before any user adjustment.
- D. **Contrast Ratio:** To qualify as ENERGY STAR, monitors shall provide a minimum contrast ratio of 200:1. Contrast ratio shall be measured according to VESA Standard: Display Specifications and Test Procedures, Version 1.0, Rev. 1.0, October 3, 1994, Section 6.3, which allows adjustment by the testing engineer to the particular combination of contrast and brightness that yields maximum contrast ratio.
- E. **Defective Pixels:** Monitors with discrete, individual pixels (e.g., LCDs) shall meet ISO 13406-2 Class I or II, having no more than five sub-pixel faults per million sub-pixels.
- F. **Warranty:** Qualifying models shall provide a warranty of at least two years.
- 4) **Power Measurement:** Manufacturers are required to perform tests and self-certify those product models that meet the ENERGY STAR guidelines. The power requirement shall be measured from the

outlet or power supply source to the product under test. The Partner shall measure the average true power (in watts) of the product. When performing measurements to self-certify a product model, the products under test must be in the condition (e.g., configuration and settings) shipped to the customer. VESA Section 8.1.3 specifies that the measurements be made on at least five randomly chosen units from the production line and at three different voltage/frequency combinations (i.e., 100 Volts AC at 50 Hz, 117 Volts AC at 60 Hz, and 230 Volts AC at 50 Hz), with the mean value reported as power use.

- 5) Test Criteria: In order to reduce confusion and increase consistency, the following protocol must be followed when measuring power consumption levels and qualifying monitors as ENERGY STAR.

The monitor shall be tested as shipped. If it includes any USB hub/port(s), no devices or an upstream cord shall be connected to the hub/ports when the monitor is being tested.

To ensure comparable results, LCDs shall be measured at their native panel resolution, while CRTs shall be measured at their highest non-interlaced resolution that can maintain a refresh rate of 85 Hz or higher. Refresh rate settings shall be 60 Hz for LCD screens and 85 Hz for CRTs.

Brightness and contrast settings shall be placed at their power-on defaults, as set by manufacturers at the factory. All other color controls (e.g., hue, saturation, gamma, etc.) shall be placed at their power-on defaults. CRTs shall be adjusted so that the image fills the maximum displayable screen area, according to VESA Section 5.3. Any built-in speakers, TV tuners, USB ports, etc. may be powered down during such tests to minimize power use not associated with the display itself.

Power consumption shall be measured according to VESA Section 8.1.3, with the screen allowed to warm up for 20 minutes before the measurement is made. A standardized test image of alternating black and white lines, each with a width of one pixel, and filling the entire screen, shall be displayed during the warm-up and measurement procedure. As per VESA Section 8.1.3, the tests shall be conducted on at least five randomly chosen units, with the mean being the reported value.

- 6) User Interface: Manufacturers are strongly recommended to design products in accordance with the user interface standards being developed by the Power Management Controls project to make power controls more consistent and intuitive across all electronic devices. For details, see <http://eetd.LBL.gov/Controls>.
- 7) Effective Date: The date that manufacturers may begin to qualify products as ENERGY STAR will be defined as the *effective date* of the agreement. Any previously executed agreement on the subject of ENERGY STAR labeled computer monitors shall be terminated effective December 31, 2002. The Version 4.0 specification shall commence on January 1, 2003. All products, including models originally qualified under Version 3.0, shipped after this date must meet Version 4.0 requirements in order to bear the ENERGY STAR label (including additional shipments of models originally qualified under Version 3.0).
- 8) Future Specification Revisions: ENERGY STAR 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 industry discussions.