Desktop Computers

Qualifying Products Definitions

***Proposed Desktop Definition*:** A computer where the main unit is intended to be located in a permanent location often on a desk or on the floor. Desktops often share some of the following characteristics: not designed for portability; use an internal power supply; utilize an external monitor, keyboard and mouse. Desktops are designed for typical home and office applications and, as such, typically contain one processor, one hard drive, and one video card.

Integrated Computer Definition: Systems in which the computer and visual display are combined into a single unit. Integrated computers must meet all of the following criteria: (1) it is not possible to measure the power consumption of the two components separately by disconnecting external cables or using mechanical switches; and (2) the system receives its Ac power through a single cable.

Hardware Requirements

Internal Power Supply Tier I Requirement: 80% minimum efficiency at 20%, 50%, and 100% of rated output.

Power Factor Requirement: TBD

Note: EPA is continuing to conduct research on whether an 80% efficiency level is appropriate and also contemplating different implementation dates for this requirement. In addition, EPA is considering adding a Power Factor (PF) requirement for the following reasons: (1) to ensure that ENERGY STAR qualified products support high quality power in addition to offering energy-efficient performance; (2) to provide additional utility savings; and (3) to harmonize with PF requirements in Europe and Japan ensuring that ENERGY STAR qualified models can meet global requirements. Specifically, EPA is considering a PF of 0.9 in addition to the proposed 80% efficiency level. Manufacturers can view the Internal Power Supply test procedure at www.efficientpowersupplies.org.

External Power Supply Tier I Requirement: If an external power supply is included with the computer, that power supply must meet the ENERGY STAR External Single Voltage Ac-Ac and Ac-Dc Power Supply Specification.

Modes of Operation

Note: When revising the computer specification, EPA would like to recognize those computers that are energy-efficient in multiple modes of operation. In the long term the hope is that some form of computer benchmarking metric that recognizes whole machine energy performance can be developed. Realizing that this will take some time and significant energy savings can be captured in the short term, EPA will continue to work with industry stakeholders to identify appropriate energy efficiency levels for each individual operational mode under Tier I until a benchmark can be identified and tested.

Active Mode Definition: The mode in which the computer, while connected to a power source, is producing useful work; for example, running application software. To clarify, the low end or minimum power draw of active mode is idle. The high end of active mode would be the maximum power draw capable by the computer.

Idle State Definition: For purposes of testing under this specification, this is the state in which the operating system and other software have completed loading, the machine is not asleep, and activity is limited to those basic applications that the system starts by default. Idle state is considered a subset of Active Mode.

Proposed Tier I Levels: *TBD*

Note: EPA continues to believe that addressing idle state within the computer specification has merit as most computers spend a significant amount of time in this mode of operation. EPA will work closely with stakeholders to determine the appropriate method in which to test idle and further develop a more robust definition for idle state stemming from this test procedure.

While preliminary testing of various desktops in Europe indicated actual idle levels slightly higher than the initially proposed 50-60 W idle requirement, testing in the U.S. has shown that these levels are achievable with efficient power supplies. EPA believes that these levels continue to be appropriate at least for a subset of desktop models. It is also EPA's understanding, based on preliminary research and discussions with industry stakeholders, that processor power levels will drop significantly in the near future. However, EPA is open to considering varying levels and ranges based on different energy consumption needs and will work closely with stakeholders to determine the appropriate levels for different system architectures.

Sleep Mode Definition: A low power state that a computer enters automatically after a period of inactivity or by manual selection. A computer with sleep capability can quickly "wake" in response to inputs from network connections or user interface devices. Computers may have more than one sleep mode, but the lowest power sleep mode is the one to which these criteria apply.

Proposed Tier I Levels: Desktops ≤ 5 W
Integrated Computers ≤ 7 W

Note: There is general agreement that the levels above are achievable for most desktops. However, there is some concern regarding the increased power needs of high performance computers, such as workstations. While EPA does recognize a need to address the energy consumption of these computers separately from desktops it has not yet been determined how they will specifically be addressed. To date EPA is considering two options: (1) develop a separate workstation definition and performance level or (2) provide allowances (Watts) for specific features or functions that require additional energy. For now, EPA is separating workstations from desktops until a method to address them can be determined.

Off Mode Definition: The lowest power consumption mode which cannot be switched off (influenced) by the user and that may persist for an indefinite time when the appliance is connected to the main electricity supply and used in accordance with the manufacturer's instructions.

Proposed Tier I Levels: Desktops ≤ 2 W
Integrated Computers ≤ 3 W

Note: The recent finalization of IEC 62301 provides EPA and stakeholders with a consistent and internationally recognized method to measure standby power. For purposes of the computer specification, EPA is using "off" mode to define standby as most systems have their standby power level in this mode. There is some interest in requiring a minimum 1 Watt requirement for desktops. However, EPA feels a 1W off mode level could preclude power management enabling. For EPA to consider a 1W requirement it would need to be assured that power management functionality will not be diminished.

Power Management Requirements

Manufacturers must set the default to activate the display's low-power or sleep mode within 15 minutes of user inactivity. Products may have more than one sleep mode, but these criteria address only the single lowest power consumption sleep mode. **Shipment Requirement:** Systems shall be shipped with Wake On LAN (WOL) enabled from both Sleep (S3) and Off (S4, S5) modes. Any directed packet filters shall be enabled and set to an industry standard default configuration. All bundled and optional hardware and software shall be stable after transitions through low-power (S3,S4) modes and work within a larger power managed environment.

Note: EPA feels that WOL is a presently available and viable technology. Reliable WOL should increase power management enabling, and could keep the majority of computers from remaining in active mode most of the time. Furthermore, based on numerous discussions with stakeholders EPA believes that a power management requirement by itself does not ensure that these features will be implemented once the computer is installed. Therefore, EPA is considering developing a consumer education requirement that would include additional outreach efforts such including a power management Help Desk on the manufacturer Web site or a box insert that provides power management facts and/or instructions to be shipped with the qualified model. EPA believes that a stronger educational campaign that targets the end user will be beneficial to the overall power management initiative.

Tier 2: In addition to Tier I requirements, computer shall be capable of retaining full network connectivity while in sleep.

Proposed Effective Dates

Effective Date Definition: The date that manufacturers may begin to qualify products as ENERGY STAR is defined as the *effective date*. The dates provided below represent the date of manufacture, which is specific to each unit and is the date (e.g., month and year) on which a unit is considered to be completely assembled. Any previously executed agreement (e.g., MOU) on the subject of ENERGY STAR will be terminated as of the effective date and all computer models manufactured as of this date will be required to meet the new specification requirements.

Specification Requirements	Tier I: January 1, 2007	Tier II: TBD
External Power Supplies	X	
Internal Power Supplies	X	
Sleep Mode	X	
Off Mode	X	
Idle State	X	
Power Management	X	X
Efficiency Benchmark		X
Interim Testing and Reporting Requirements		
Benchmarking Testing and Reporting	X	X

Note: EPA's goal is to finalize all effective dates and levels for Tier I requirements by the end of 2005 and any subsequent tiered requirements shortly thereafter. The intent of developing a tiered approach is to include those requirements EPA believes are feasible in the near term (Tier I) and allow for a longer lead time for those requirements that are likely to require additional analysis and/or manufacturing lead time before they can be implemented (Tier II). **EPA may be willing to consider alternative effective dates for a subset of these requirements that may require additional time to verify performance and implement.** Please note that once the specification is finalized EPA will allow manufacturers a minimum of 9 months or more to phase out models that do not meet the new Tier 1 requirements.

Idle Test Procedure and Benchmarking: It is EPA's goal to develop an idle test procedure over the next several months to allow manufacturers time to review and comment. Once completed, EPA will then require participating partners to begin testing and reporting product data for qualified models using the agreed upon test method to determine the appropriate specification levels before Tier I goes into effect. EPA will begin discussions in early 2006 with all interested stakeholders regarding the development of a computer efficiency benchmark test.

Please note that the table presented above may change based on additional discussions with EPA's international ENERGY STAR counterparts. EPA will inform stakeholders of any changes to this proposal by mid-September.