ENERGY STAR® Qualified Imaging Equipment
Revised Terminology and Definitions

October 28, 2005

1) **Definitions**: Below is a brief description of terms as relevant to ENERGY STAR.

Products

A. Copier – A commercially available imaging product whose sole function is the production of hard copy duplicates from graphic hard copy originals. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as copiers or upgradeable digital copiers (UDCs).

B. Digital Duplicator – A commercially available imaging product that is sold in the market as a fully-automated duplicator system through the method of stencil duplicating with digital reproduction functionality. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as digital duplicators.

C. Facsimile Machine (Fax Machine) – A commercially available imaging product whose primary functions are scanning hard copy originals for electronic transmission to remote units and receiving similar electronic transmissions to produce hard copy output. Electronic transmission is primarily over a public telephone system, but may also be via computer network or the Internet. The product may also be capable of producing hard copy duplicates, sometimes referred to as "convenience copying." The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as fax machines.

D. Mailing Machine – A commercially available imaging product that serves to print postage onto mail pieces. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as mailing machines.

E. Multifunction Device (MFD) – A commercially available imaging product, which is a physically-integrated device or a combination of functionally-integrated components, that performs two or more of the core functions of copying, printing, scanning, or faxing. The copy functionality as addressed in this definition is considered to be distinct from single sheet convenience copying offered by fax machines. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as MFDs.

F. Printer – A commercially available imaging product that serves as a hard copy output device, and is capable of receiving information from single-user or networked computers, or other input devices (e.g., digital camera). The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as printers, including printers that can be upgraded into MFDs.

G. Scanner – A commercially available imaging product that functions as an electro-optical device for converting physical images into electronic images that can be stored, edited, converted, or transmitted, primarily in a personal computing environment. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as scanners.

Marking Technologies

H. Direct Thermal (DT) – A marking technology that transfers an image by burning dots onto coated media as it passes over a heated print head. DT printers do not use ribbons.

I. Dye Sublimation (DS) – A marking technology where images are formed by depositing (subliming) dye onto the print media based upon the amount of energy delivered by the heating elements.

J. Electrophotography (EP) – A marking technology characterized by illumination of a photoconductor in a pattern representing the desired hard copy image via a light source, development of the image with particles of toner using the latent image on the photoconductor to define the presence or absence of toner at a given location, transfer of the toner to the final hard copy medium, and fusing to cause the desired hard copy to become durable. Types of EP include Laser, LED, and LCD. Color EP is distinguished from monochrome EP in that toners of at least three different colors are available in a given product at one time. Two types of color EP technology are defined below:

   a. Parallel Color EP – A marking technology that uses multiple light sources and multiple photoconductors to increase the maximum color printing speed.

   b. Serial Color EP – A marking technology that uses a single photoconductor in a serial fashion and one or multiple light sources to achieve the multi-color hard copy output.

K. Impact – A marking technology characterized by the formation of the desired hard copy image by transferring colorant from a "ribbon" to the media via an impact process. Two types of impact technology are Dot-formed Impact and Fully-formed Impact.

L. Ink Jet (IJ) – A marking technology where images are formed by depositing colorant in small drops directly to the print media in a matrix manner. Color IJ is distinguished from monochrome IJ in that more than one colorant is available in a product at any one time. Types of IJ include Piezo-electric (PE) IJ, IJ Sublimation, and Thermal IJ.

M. Solid Ink (SI) – A marking technology where the ink is solid at room temperature and liquid when heated to the jetting temperature. Transfer to the media can be direct, but is most often made to an intermediate drum or belt and then offset printed to the media.

N. Thermal Transfer (TT) – A marking technology where the desired hard copy image is formed by depositing small drops of solid colorant (usually colored waxes) in a melted/fluid state directly to the print media in a matrix manner. TT is distinguished from IJ in that the ink is solid at room temperature and is made fluid by heat.

Operational Modes and Activities

O. Active – The power state in which the product is connected to a power source and is actively producing output, as well as performing any of its other primary functions.

P. Automatic Duplexing – The capability of a copier, fax machine, MFD, or printer to automatically place images on both sides of an output sheet, without manual manipulation of originals or output as an intermediate step. Examples of this are one-sided to two-sided copying, or two-sided to two-sided copying. A product is considered to have automatic duplexing capability only if the model includes all accessories needed to satisfy the above conditions (e.g., an automatic document feeder).

Q. Default Delay Time – The time set by the manufacturer prior to shipping that determines when the product will enter a lower-power mode (e.g., Sleep, Off) following image output.

R. Disconnect – The condition where the product has been unplugged and is physically disconnected from its power source.

S. Off – The power state that the product enters when it has been manually or automatically switched off but is still plugged into and connected to the mains. This mode is exited when stimulated by an input, such as a manual power switch or clock timer to bring the unit into Ready mode. When this state is resultant from a manual intervention by a user, it is often referred to as Manual Off, and when it is resultant from an automatic or predetermined stimuli (e.g., a delay time or clock), it is often referred to as Auto-off.

T. Ready – The condition that exists when the product is not producing output, has reached operating conditions, has not yet entered into any lower-power modes, and can enter Active mode with minimal delay. All product features can be enabled in this mode, and the product must be able to enter Active mode by responding to any potential input options designed into the product. Potential inputs include external electrical stimulus (e.g., network stimulus, fax call, or remote control) and direct physical intervention (e.g., activating a physical switch or button).

U. Sleep – The reduced power state that the product enters 1.) automatically after a period of inactivity, 2.) at a user set time-of-day, or 3.) immediately in response to user manual action, without actually turning off. All product features can be enabled in this mode and the product must be able to enter Active mode by responding to any potential input options designed into the product; however, there may be a delay. Potential inputs include external electrical stimulus (e.g., network stimulus, fax call, remote control) and direct physical intervention (e.g., activating a physical switch or button). The product must maintain network connectivity while in Sleep, waking up only as necessary.

V. Standby – The lowest power consumption mode which cannot be switched off (influenced) by the user and that may persist for an indefinite time when the product is connected to the main electricity supply and used in accordance with the manufacturer's instructions[1]. Standby usually occurs in Off mode, but can occur in Ready or Sleep.

Product Size Formats

W. Continuous Form – Products categorized as Continuous Form include those which do not use a cut-sheet media size, and are designed for commercial or industrial applications such as printing of bar codes, labels, receipts, waybills, invoices, airline tickets or retail tags.

X. Large Format – Products categorized as Large Format include those designed for A2 media and larger.

Y. Small Format – Products categorized as Small Format include those designed for media sizes smaller than those defined as Standard (e.g., A6, 4" x 6", microfilm).

Z. Standard – Products categorized as Standard include those designed for standard-sized media (e.g., Letter, Legal, Ledger, A3, A4, and B4).

Additional Terms

AA. Accessory – An optional piece of peripheral equipment that is not necessary for the operation of the base unit, but that may be added before or after shipment in order to add functionality. An accessory may be sold separately under its own model number, or sold with a base unit as part of a package or configuration.

BB. Digital Front-end (DFE) – A physically separate but functionally integrated computer that acts as an interface to imaging equipment, which uses its own dc power supply.

CC. Operational Mode (OM) Approach – A method of testing and comparing the energy performance of imaging equipment products, which focuses on product energy consumption in various low-power modes. The key criteria used by the OM approach are values for low-power modes, measured in watts. Detailed information can be found in the "ENERGY STAR Qualified Imaging Equipment Operational Mode Test Procedure" available at www.energystar.gov/products.

1 IEC 62301 – Measurement of standby power. 2005.

DD. Print Controller – An internal, embedded controller, which communicates with the host computer(s) or other input device(s) (e.g., digital camera), when receiving a print job. A print controller draws its dc power from the imaging equipment with which it operates.

EE. Product Speed – In general, for Standard-size products, a single A4 or 8.5" x 11" sheet printed/copied/scanned on one side in a minute is equal to one image-per-minute (ipm). If the maximum claimed speeds differ when producing images on A4 or 8.5" x 11" paper, the higher of the two shall be used.

For mailing machines, one piece of mail processed in a minute is equal to one mail-piece-per-minute (mppm).

For Small-format products, a single A6 or 4" x 6" sheet printed/copied/scanned on one side in a minute is equal to 0.25 ipm.

For Large-format products, a single A2 sheet is 4 ipm and one A0 sheet is equivalent to 16 ipm.

Other page sizes may be converted similarly. For products that do not print on the media sizes defined above, print speed is based on the method established in ISO 10561. In all cases, the converted speed in ipm should be rounded to the nearest integer (e.g., 14.4 ipm rounds to 14.0 ipm; 14.5 ipm rounds to 15 ipm).

For qualification purposes, manufacturers should report the speed of the product according to the prioritization of functions outlined below:

- **Print Speed**, unless the product cannot perform the print function, in which case,
- **Copy Speed**, unless the product cannot perform the print or copy function, in which case,
- **Scan Speed**.

(Note: additional clarification regarding product speed is provided in the test procedures, which are referenced in Section 4 of the program requirements.)

FF. Typical Electricity Consumption (TEC) Approach – A method of testing and comparing the energy performance of imaging equipment products, which focuses on the typical electricity consumed by a product while in normal operation during a representative period of time. The key criteria of the TEC approach for imaging equipment is a value for typical weekly electricity consumption, measured in kilowatt-hours (kWh). Detailed information can be found in the "ENERGY STAR Qualified Imaging Equipment Typical Electricity Consumption Test Procedure" available at www.energystar.gov/products.