

# ENERGY STAR<sup>®</sup> Qualified Imaging Equipment Revised Terminology and Definitions

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## Products

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- 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. This definition is intended to cover products that are marketed and sold as copiers.
- B. Digital Duplicator – A commercially available imaging product that is sold in the market as full-auto duplicator system through the method of stencil duplicating with digital reproduction functionality. The unit must be capable of being powered from a wall outlet. This definition is intended to cover products that are marketed and sold as digital duplicators.
- C. Label Printer – A commercially available imaging product that serves as a hard copy output device, designed primarily for the production of various sized labels, and is capable of receiving information from single-user or networked computers. The unit must be capable of being powered from a wall outlet. This definition is intended to cover products that are marketed and sold as label printers.
- D. Facsimile Machine (Fax) – A commercially available imaging product that serves as a hard copy output device whose primary function is sending and receiving information. The unit must be capable of being powered from a wall outlet. This definition is intended to cover products that are marketed and sold as fax machines.
- E. 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. This definition is intended to cover products that are marketed and sold as mailing machines.
- F. Multifunction Device (MFD) – A commercially available imaging product, which is a physically-integrated device or a combination of functionally-integrated components that perform two or more of the core functions of copying, printing, scanning, 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. This definition is intended to cover products that are marketed and sold as MFDs.
- G. 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. The unit must be capable of being powered from a wall outlet. This definition is intended to cover products that are marketed and sold as printers including printers that can be upgraded into an MFD.
- H. Scanner – A commercially available imaging product that functions as an electro-optical device for converting information into electronic images that can be stored, edited, converted, or transmitted, primarily in a personal computing environment. This definition is intended to cover products that are marketed and sold as Scanners.

## Marking Technologies

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- A. Ink Jet – A marking technology where images are formed by depositing colorant in small drops directly to the print media in a matrix manner. Color Ink Jet is distinguished from monochrome Ink Jet in that more than one colorant is available in a product at any one time. Several forms of Ink Jet are defined below.
- a. PE Ink Jet – PE (Piezo-electric) Ink Jet technology is a marking technology where an ink droplet is forced out of the head of the pen by the mechanical flexing of the crystal due to current flowing in the crystal. The ink in PE Ink Jet technology does not have to be heated and cooled.
  - b. Ink Jet Sublimation – In the Ink Jet sublimation process, a digital image is printed with special sublimation inks onto paper. Once the image is on the paper, it is placed under a heat transfer press on top of a substrate, and the paper is heated until the inks turn into a gas, transferring the image onto another substrate.
- B. Electrophotography (EP) – Various types of EP products are defined below.
- a. Monochrome 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 using 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. Monochrome EP is distinguished from color EP in that toner with a single color is available in a product at any one time.
  - b. Serial Color EP – A marking technology similar to monochrome EP, except that toners of at least two different colors are available in a given product at one time. Serial color EP is distinguished from parallel color EP in that a single photoconductor is used in a serial fashion with one or multiple light sources to achieve the multi-color hard copy output.
  - c. Parallel Color EP – A marking technology similar to serial color EP, except that multiple light sources and multiple photoconductors are used to increase the maximum color printing speed.
  - d. LED – LED technology can be found in printers, label printers, copiers, and MFDs. LED printer technology differs from Laser Jet only in the manner light (and possibly the light frequency) is applied to the drum for image exposure. There is a matrix of small LEDs, which individually deliver the exposure light. Since the light frequency is directly related to the amount of energy imparted per photon applied to the drum, the power level of the LED may need to increase to produce the required effect.
  - e. LCD – LCD technology can be found in printers, label printers, copiers, and MFDs. The LCD theory of operation is very similar to that of the LED printer; however, an LCD panel is used instead of the matrix of LEDs. This makes LCD units page printers rather than units that print line-by-line.
- C. Thermal Transfer –
- a. Color Thermal Transfer – 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. Color Thermal Transfer is distinguished from monochrome and color Ink Jet in that the ink is solid at room temperature and is made fluid by heat.

- b. Monochrome Thermal Transfer – A marking technology where the desired hard copy image is produced by means of changing the color of the hard copy media or by transferring material to the hard copy media based on selective localized heating. Thermal Ink Jet technology is not included in this definition.
- D. Dye Sublimation – 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.
- E. Impact –
  - a. Dot Formed 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. The image is formed in a matrix arrangement by small dots that can be addressed uniformly and selectively transferred. This technology is commonly called wire matrix, dot matrix, and dot band technology.
  - b. Fully-formed 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. The image is formed through transferring fully formed shapes (characters) to the media. This technology is commonly called Wheel, Ball, or type-bar printing.

## **Operational Modes and Activities**

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- A. Automatic Duplex Mode – The mode in which a copier, printer, or fax machine automatically places images on both sides of an output sheet, by automatically sending both the output sheet and the graphic original through the product model. Examples of this are one-sided to two-sided copying, or two-sided to two-sided copying. A product is considered to have an automatic duplex mode only if the model includes all accessories needed to satisfy the above conditions, i.e., an automatic document feeder and accessories for automatic duplexing capabilities.
- B. Recovery Time from Off (Warm Up Time) – The amount of time it takes to reach the state where the machine is ready for operation after turning on the power switch.
- C. Recovery Time from Sleep – The amount of time needed to bring a product out of power management in response to a signal from the user (either physically or through a network) into a state where the product is ready to produce output. Per the Copier of the Future initiative, referred to in Section 2.2 of the ENERGY STAR Imaging Equipment Directional Draft, dated February 10, 2004, Recovery Time from Sleep is equivalent to the difference between the time required to complete a job from Sleep mode and the time it takes to complete the same job from Ready mode. This period of time is referred to as Incremental Recovery Time in the revised TEC Test Procedure, dated February 16, 2005. For a product capable of color operation, the recovery time must include the time required to begin performing the appropriate primary function with color support.
- D. Default Delay Time – The time set by the manufacturer prior to shipping that determines when the product will enter its power management modes.
- E. 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 additional functions. This mode is entered when stimulated by an external input or manipulation. The power requirement in this mode is typically greater than the power requirement in all other modes.

- F. Ready – The condition that exists when the product is not producing output, has reached operating conditions and is ready to produce an output with no delay, but has not yet entered into any energy saving modes. When the product is in this mode, there will be virtually no delay before it is capable of producing the next output.
- G. Sleep – The reduced power state that the product automatically enters, without actually turning off, after a period of inactivity. The product returns to Active mode within a predetermined period of time in response to various external stimuli (e.g., telephone rings as a fax is polling, operator lifts the scanner cover prior to making a copy, etc.). The product must maintain full network connectivity (the ability to respond to ordinary network traffic) while in Sleep, waking up only as necessary.
- H. Standby – The lowest power consumption condition when the product is connected to the mains electricity supply and used in accordance with the manufacturer's instructions. Standby mode should not be confused with Sleep mode or other reduced power modes that may be automatically initiated by the product. Standby is generally different (and consumes less power than self-initiated modes). Certain devices are not equipped with power switches but employ power management to reduce power use during periods of inactivity. For these devices, the Standby and Sleep modes are the same.
- I. Off – The power state that the product enters when it has been manually or automatically switched off but still connected to the mains. This mode is exited when stimulated by an external input or manipulation, typically by using a manual power switch to bring the unit into Ready mode. When this state is resultant from an automatic or predetermined stimuli it is referred to as Auto-off.
- J. Disconnect – The product has been unplugged from the mains and therefore is disconnected from all external power sources.

## **Additional Terms**

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- A. 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 new functionality. An accessory may be sold separately under its own model number, or sold with a base unit as part of a copier package or configuration.
- B. 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 and is AC-mains connected.
- C. Print Controller – An internal, embedded print controller that draws its DC power from the imaging equipment with which it operates.
- D. Reproduction speed – Product speed, as determined and advertised by the manufacturer.
- E. Duplex speed – Product speed while in duplex mode, as determined and advertised by the manufacturer.
- F. Media size –
  - a. Small Format – Products categorized as Small Format include media sizes smaller than those defined as Standard (e.g., 4" x 6", microfilm).

- b. Standard – Products categorized as Standard include the following - Letter, Legal, Ledger, A3, A4, and US C size.
- c. Large Format – Products categorized as Large Format include A2 and larger.