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ENERGY STAR® Program Requirements for Imaging Equipment – **Draft 2**

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ENERGY STAR® Program Requirements for Imaging Equipment – Draft 2

Partner Commitments

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Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified imaging equipment. 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 imaging equipment and specifying the testing criteria for imaging equipment. 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 Identity Guidelines and Web-Based Tools for Partners document, describing how the ENERGY STAR name and mark 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 qualified imaging equipment model within six months of activating the imaging equipment 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 imaging equipment. The ENERGY STAR mark must be clearly displayed:
 1. Either on the top/front of product or through electronic messaging that is pre-approved by EPA;
 2. On the manufacturer’s Internet site where information about ENERGY STAR qualified models is displayed. Specific guidance on using the ENERGY STAR mark on Internet sites is provided in the Web-Based Tools for Partners document;
 3. Either in product literature (i.e., user manuals, specification sheets, etc.) or in a separate box insert that provides educational language about the product’s ENERGY STAR settings; and
 4. On product packaging/boxes, particularly for products sold at retail.

Note: EPA is willing to entertain new ideas as alternatives to physical labeling of packaging/boxes, particularly in cases where generic boxes are used to ship multiple product models, some of which may not meet the ENERGY STAR specification.

- Update the list of ENERGY STAR qualified imaging equipment models through the Online Product Submittal tool (OPS) on an annual basis at a minimum. Once the Partner submits its first list of ENERGY STAR qualified imaging equipment models, the Partner will be listed as an ENERGY STAR Partner on www.energystar.gov. Partner must provide annual updates in order to remain on the list of participating product manufacturers. If no new models are introduced during a particular year, Partner should notify EPA to ensure its partnership status is maintained.

Note: Stakeholders suggested that quarterly updates, which EPA proposed in Draft 1, were too frequent. EPA concurs, and has changed this to an annual requirement.

- 65 • Provide to EPA, on an annual basis, unit shipment data or other market indicators to assist in
66 determining the market penetration of ENERGY STAR. Specifically, Partner must submit the total
67 number of ENERGY STAR qualified imaging equipment products shipped (in units) or an
68 equivalent measurement as agreed to in advance by EPA and Partner. Partner is encouraged to
69 provide unit shipment data segmented by meaningful product characteristics (e.g., product type,
70 size, speed, marking technology, or other as relevant) for both the United States (US) and outside
71 of the United States (non-US). Partner is also encouraged to provide total unit shipments for each
72 model in its product line, and the percent of total unit shipments that qualify as ENERGY STAR.
73 The data for each calendar year should be submitted to EPA, preferably in electronic format, no
74 later than the following March and may be provided directly from the Partner or through a third
75 party. The data will be used by EPA only for program evaluation purposes and will be closely
76 controlled. Any information used will be masked by EPA so as to protect the confidentiality of the
77 Partner.
- 78
- 79 • Notify EPA of a change in the designated responsible party or contacts for imaging equipment
80 within 30 days.
- 81

82 **Performance for Special Distinction**

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

- 86 • Consider energy efficiency improvements in company facilities and pursue the ENERGY STAR
87 label for buildings.
- 88
- 89 • Purchase ENERGY STAR qualified products. Revise the company purchasing or procurement
90 specifications to include ENERGY STAR. Provide procurement officials' contact information to
91 EPA for periodic updates and coordination. Circulate general ENERGY STAR qualified product
92 information to employees for use when purchasing products for their homes.
- 93
- 94 • Ensure the power management feature is enabled for all ENERGY STAR qualified monitors in use
95 in company facilities, particularly upon installation and after service is performed.
- 96
- 97 • Provide general information about ENERGY STAR to employees whose jobs are relevant to the
98 development, marketing, sales, and service of current ENERGY STAR qualified product models.
- 99
- 100 • Feature the ENERGY STAR mark on Partner Web site and in other promotional materials. If
101 information concerning ENERGY STAR is provided on the Partner Web site as specified by the
102 ENERGY STAR Web-Based Tools for Partners (available in the Partner Resources section on the
103 ENERGY STAR Web site at www.energystar.gov), EPA may provide links where appropriate to
104 the Partner Web site.
- 105
- 106 • Provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the
107 program requirements listed above. By doing so, EPA may be able to coordinate, communicate,
108 and/or promote Partner's activities, provide an EPA representative, or include news about the
109 event in the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may
110 be as simple as providing a list of planned activities or planned milestones that Partner would like
111 EPA to be aware of. For example, activities may include: (1) increase the availability of ENERGY
112 STAR qualified products by converting the entire product line within two years to meet ENERGY
113 STAR guidelines; (2) demonstrate the economic and environmental benefits of energy efficiency
114 through special in-store displays twice a year; (3) provide information to users (via the Web site
115 and user's manual) about energy-saving features and operating characteristics of ENERGY STAR
116 qualified products, and (4) build awareness of the ENERGY STAR Partnership and brand identity
117 by collaborating with EPA on one print advertorial and one live press event.
- 118
- 119 • Provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase
120 availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR
121 and its message.
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ENERGY STAR® Program Requirements for Imaging Equipment – Draft 2

Eligibility Criteria (Version 1.0)

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Below is the Version 1.0 product specification for ENERGY STAR qualified Imaging Equipment. A product must meet all of the identified criteria if it is to be qualified as ENERGY STAR by its manufacturer.

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 or multifunction products (MFPs).
- 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 cameras). 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 in the field.
- G. **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. 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.

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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 products 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. Stencil – A marking technology that transfers images onto the print media from a stencil that is fitted around an inked drum.
- O. 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, Activities, and Power States

- P. 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.
- Q. 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 and two-sided to two-sided copying. A product is considered to have an automatic duplexing capability only if the model includes all accessories needed to satisfy the above conditions (e.g., an automatic document feeder).
- R. 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 completion of its primary function.

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- S. Disconnect – The condition where the product has been unplugged and is physically disconnected from its power source.
- T. 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.
- U. 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 return to 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).
- V. 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.
- W. 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 instructions¹. Standby usually occurs in Off mode, but can occur in Ready or Sleep.

Product Size Formats

- X. Continuous Form – Products categorized as Continuous Form include those which do not use a cut-sheet media size, and are designed for key industrial applications such as printing of bar codes, labels, receipts, waybills, invoices, airline tickets, or retail tags.
- Y. Large Format – Products categorized as Large Format include those designed for A2 media and larger. Large-format products may also be capable of printing on standard-size or small-format media.
- Z. 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).
- AA. Standard – Products categorized as Standard include those designed for standard-sized media (e.g., Letter, Legal, Ledger, A3, A4, and B4). Standard-size products may also be capable of printing on small-format media.

Additional Terms

- BB. 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.
- CC. Base Product – A base product is the standard model shipped by the manufacturer. When product models are offered in different configurations, the base product is the most fundamental

¹ IEC 62301 – Household electrical appliances – Measurement of standby power. 2005.

- 298 configuration of model, which possesses the minimum number of functional adders available.
 299 Functional components or accessories offered as optional, rather than standard, are not
 300 considered part of the base product.
 301
- 302 DD. Digital Front-end (DFE) – A functionally-integrated computer that acts as an interface to imaging
 303 equipment and uses its own dc power supply or draws its dc power from the imaging equipment
 304 product with which it operates. A DFE provides greater functionality to the imaging product, but is
 305 not necessarily required for the imaging product to operate.
 306
- 307 EE. Functional Adder – A functional adder is a standard product feature that adds functionality to the
 308 base marking engine of an imaging equipment product. The OM portion of this specification
 309 contains additional power allowances for certain functional adders. Examples of functional adders
 310 include wireless interfaces and fax capability.
 311
- 312 FF. Operational Mode (OM) Approach – A method of testing and comparing the energy performance
 313 of imaging equipment products, which focuses on product energy consumption in various low-
 314 power modes. The key criteria used by the OM approach are values for low-power modes,
 315 measured in watts (W). Detailed information can be found in the “ENERGY STAR Qualified
 316 Imaging Equipment Operational Mode Test Procedure” available at www.energystar.gov/products.
 317
- 318 GG. Marking Engine – The very basic engine of an imaging product, which drives the image
 319 processing of that product. Without additional functional components, a print engine cannot
 320 acquire image data to process and is, therefore, non-functional. A print engine is reliant on
 321 functional adders for communication ability and image processing.
 322
- 323 HH. Product Speed – In general, for Standard-size products, a single A4 or 8.5” x 11” sheet
 324 printed/copied/scanned on one side in a minute is equal to one image-per-minute (ipm). If the
 325 maximum claimed speeds differ when producing images on A4 or 8.5” x 11” paper, the higher of
 326 the two shall be used.
 327
- 328 ▪ For mailing machines, one piece of mail processed in a minute is equal to one mail-piece-
 329 per-minute (mppm).
 - 330 ▪ For Small-format products, a single A6 or 4” x 6” sheet printed/copied/scanned on one
 331 side in a minute is equal to 0.25 ipm.
 - 332 ▪ For Large-format products, a single A2 sheet is 4 ipm and one A0 sheet is equivalent to
 333 16 ipm.
 - 334 ▪ For Continuous Form products, print speed in ipm should be obtained from the product’s
 335 maximum marketed imaging speed in meters per minute according to the conversion
 336 below:
 337
- 338 ***X ipm = 16 x [Maximum media width (meters) x Maximum imaging speed (length-
 339 meters/minute)]***
 340
- 341 In all cases, the converted speed in ipm should be rounded to the nearest integer (e.g., 14.4 ipm
 342 rounds to 14.0 ipm; 14.5 ipm rounds to 15 ipm).
 343
- 344 For qualification purposes, manufacturers should report the speed of the product according to the
 345 prioritization of functions outlined below:
- 346 ▪ **Print Speed**, unless the product cannot perform the print function, in which case,
 - 347 ▪ **Copy Speed**, unless the product cannot perform the print or copy functions, in which
 348 case,
 - 349 ▪ **Scan Speed**.
- 350
- 351 II. Typical Electricity Consumption (TEC) Approach – A method of testing and comparing the energy
 352 performance of imaging equipment products, which focuses on the typical electricity consumed by
 353 a product while in normal operation during a representative period of time. The key criteria of the
 354 TEC approach for imaging equipment is a value for typical weekly electricity consumption,
 355 measured in kilowatt-hours (kWh). Detailed information can be found in the “ENERGY STAR

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Qualified Imaging Equipment Typical Electricity Consumption Test Procedure” available at www.energystar.gov/products.

- 2) **Qualifying Products:** In order to qualify as ENERGY STAR, an imaging equipment product must be defined in Section 1 and meet one of the product descriptions in Table 1 or 2, below.

Qualifying Products: Table 1 - TEC Approach

Product Area	Marking Technology	Size Format	Color Capability	TEC Table	Page
Copiers	Direct Thermal	Standard	Monochrome	TEC 1	11
	Dye Sublimation	Standard	Color	TEC 2	11
	Dye Sublimation	Standard	Monochrome	TEC 1	11
	EP	Standard	Monochrome	TEC 1	11
	EP (Parallel)	Standard	Color	TEC 2	11
	EP (Serial)	Standard	Color	TEC 2	11
	Solid Ink	Standard	Color	TEC 2	11
	Thermal Transfer	Standard	Color	TEC 2	11
	Thermal Transfer	Standard	Monochrome	TEC 1	11
Digital Duplicators	Stencil	Standard	Color	TEC 2	11
	Stencil	Standard	Monochrome	TEC 1	11
Fax Machines	Direct Thermal	Standard	Monochrome	TEC 1	11
	Dye Sublimation	Standard	Monochrome	TEC 1	11
	EP	Standard	Monochrome	TEC 1	11
	EP (Parallel)	Standard	Color	TEC 2	11
	EP (Serial)	Standard	Color	TEC 2	11
	Solid Ink	Standard	Color	TEC 2	11
	Thermal Transfer	Standard	Color	TEC 2	11
	Thermal Transfer	Standard	Monochrome	TEC 1	11
Multifunction Devices (MFDs)	Direct Thermal	Standard	Monochrome	TEC 1	11
	Dye Sublimation	Standard	Color	TEC 2	11
	Dye Sublimation	Standard	Monochrome	TEC 1	11
	EP	Standard	Monochrome	TEC 1	11
	EP (Parallel)	Standard	Color	TEC 2	11
	EP (Serial)	Standard	Color	TEC 2	11
	Solid Ink	Standard	Color	TEC 2	11
	Thermal Transfer	Standard	Color	TEC 2	11
Printers	Direct Thermal	Standard	Monochrome	TEC 3	12
	Dye Sublimation	Standard	Color	TEC 4	12
	Dye Sublimation	Standard	Monochrome	TEC 3	12
	EP	Standard	Monochrome	TEC 3	12
	EP (Parallel)	Standard	Color	TEC 4	12
	EP (Serial)	Standard	Color	TEC 4	12
	Solid Ink	Standard	Color	TEC 4	12
	Thermal Transfer	Standard	Color	TEC 4	12
	Thermal Transfer	Standard	Monochrome	TEC 3	12

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Note: Solid Ink and Parallel Color EP marking technologies were added for fax machines to address possible future development in this product area.

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Qualifying Products: Table 2 – Operational Mode Approach

Product Area	Marking Technology	Size Format	Color Capability	OM Table	Page
Copiers	Direct Thermal	Large	Monochrome	OM 1	13
	Dye Sublimation	Large	Color & Monochrome	OM 1	13
	EP	Large	Monochrome	OM 1	13
	EP (Parallel)	Large	Color	OM 1	13
	EP (Serial)	Large	Color	OM 1	13
	Solid Ink	Large	Color	OM 1	13
	Thermal Transfer	Large	Color & Monochrome	OM 1	13
Fax Machines	Ink Jet	Continuous Form & Standard	Color & Monochrome	OM 2	14
Mailing Machines	Direct Thermal	N/A	Monochrome	OM 4	14
	EP	N/A	Monochrome	OM 4	14
	Ink Jet	N/A	Monochrome	OM 4	14
	Thermal Transfer	N/A	Monochrome	OM 4	14
Multifunction Devices (MFDs)	Direct Thermal	Large	Monochrome	OM 1	13
	Dye Sublimation	Large	Color & Monochrome	OM 1	13
	EP	Large	Monochrome	OM 1	13
	EP (Parallel)	Large	Color	OM 1	13
	EP (Serial)	Large	Color	OM 1	13
	Ink Jet	Continuous Form & Standard	Color & Monochrome	OM 2	14
	Ink Jet	Large	Color & Monochrome	OM 3	14
	Solid Ink	Large	Color	OM 1	13
Thermal Transfer	Large	Color & Monochrome	OM 1	13	
Printers	Direct Thermal	Continuous Form	Monochrome	OM 5	14
	Direct Thermal	Large	Monochrome	OM 5	14
	Dye Sublimation	Continuous Form	Color & Monochrome	OM 5	14
	Dye Sublimation	Large	Color & Monochrome	OM 5	14
	Dye Sublimation	Small	Color & Monochrome	OM 5	14
	EP	Continuous Form	Color & Monochrome	OM 5	14
	EP	Large	Monochrome	OM 5	14
	EP (Parallel)	Large	Color	OM 5	14
	EP (Parallel)	Small	Color	OM 5	14
	EP (Serial)	Large	Color	OM 5	14
	EP (Serial)	Small	Color	OM 5	14
	Impact	Continuous Form & Standard	Color & Monochrome	OM 6	14
	Ink Jet	Large	Color & Monochrome	OM 3	14
	Ink Jet	Continuous Form, Small & Standard	Color & Monochrome	OM 2	14
	Solid Ink	Continuous Form, Large & Small	Color	OM 5	14
	Thermal Transfer	Continuous Form	Color & Monochrome	OM 5	14
	Thermal Transfer	Large	Color & Monochrome	OM 5	14
Thermal Transfer	Small	Color & Monochrome	OM 5	14	
Scanners	N/A	Large & Standard	N/A	OM 7	15

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Note: Based on 1) stakeholder feedback supporting further consolidation of criteria categories, and 2) a lack of data supporting the differentiation of certain product types and technologies, such as Large Format and Continuous Form high-heat printers, the nine OM energy-efficiency specification criteria tables provided in Draft 1 have been condensed into seven tables in Draft 2.

375 3) **Energy-Efficiency Specifications for Qualifying Products:** Only those products listed in Section 2
 376 above that meet the following criteria may qualify as ENERGY STAR. Effective dates are provided in
 377 Section 6 of this specification.
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379 Products Sold with an External Power Adapter: To qualify, imaging equipment products using a single-
 380 voltage external ac-dc or ac-ac power adapter must use an ENERGY STAR qualified adapter, or one
 381 that meets the ENERGY STAR specification when tested to the ENERGY STAR test method. The
 382 ENERGY STAR specification and test method for single voltage external ac-dc and ac-ac power
 383 supplies may be found at www.energystar.gov/products.
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385 Products Designed to Operate with an External DFE: To qualify, an imaging equipment product that is
 386 sold with an externally-powered DFE must use an ENERGY STAR qualified DFE, or one that meets
 387 the ENERGY STAR specification when tested to the ENERGY STAR test method. The ENERGY
 388 STAR specification and test method for computers may be found at www.energystar.gov/products.
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390 Products Sold with an Additional Cordless Handset: To qualify, fax machines or MFDs with fax
 391 capability that are sold with additional cordless handsets must use an ENERGY STAR qualified
 392 handset, or one that meets the ENERGY STAR specification when tested to the ENERGY STAR test
 393 method. The ENERGY STAR specification and test method for telephony products may be found at
 394 www.energystar.gov/products.
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396 Duplexing: Standard-size EP copiers, printers, and MFDs must meet the following duplexing
 397 requirements, based on product speed:
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Copiers and MFDs

Product Speed	Duplexing Requirement
≤ 19 ipm	N/A
20 – 29 ipm	Automatic duplexing must be offered as an optional accessory at the time of purchase.
≥ 30 ipm	Automatic duplexing is required as a standard feature at the time of purchase.

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Color Printers

Product Speed	Duplexing Requirement
≤ 19 ipm	N/A
20 – 39 ipm	Automatic duplexing must be offered as an optional accessory at the time of purchase.
≥ 40 ipm	Automatic duplexing is required as a standard feature at the time of purchase.

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Monochrome Printers

Product Speed	Duplexing Requirement
≤ 24 ipm	N/A
25 – 44 ipm	Automatic duplexing must be offered as an optional accessory at the time of purchase.
≥ 45 ipm	Automatic duplexing is required as a standard feature at the time of purchase.

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Note: The original duplexing-requirement levels EPA suggested in its response to Draft 1 comments raised concerns among some stakeholders. Therefore, EPA has reexamined how these levels would impact products' ability to earn the ENERGY STAR and has revised the program requirements accordingly.

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Note: One stakeholder has cautioned EPA that meeting the above duplexing requirements could be complicated, as a product may leave the manufacturing facility before it has been determined if an optional duplexer will be installed. EPA is committed to including duplexing requirements in this specification, and invites feedback on: 1) whether other stakeholders share this concern; and 2) ways to overcome potential difficulties associated with manufacturing processes that may not be completed at a single facility.

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- A. **ENERGY STAR Eligibility Criteria – TEC.** To qualify as ENERGY STAR, the TEC value obtained for imaging equipment outlined in Section 2, Table 1 above must not exceed the corresponding criteria below.

Manufacturers who have products with a functionally-integrated DFE should subtract the DFE's energy consumption in Ready mode from the product's total TEC result before comparing the product's TEC to the criteria limits below. In order to take advantage of this allowance, the DFE must be a separate processing unit that is capable of initiating activity over the network. The imaging equipment product should be capable of performing some core functions without the DFE present, although the DFE would enhance speed and functionality.

Example: A printer's total TEC result is 24.5 kWh/week and its internal DFE consumes 50W in Ready mode. $50W \times 168 \text{ hours/week} = 8.4 \text{ kWh/week}$, which is then subtracted from the tested TEC value: $24.5 \text{ kWh/week} - 8.4 \text{ kWh/week} = 16.1 \text{ kWh/week}$. 16.1 kWh/week is then compared to the following criteria.

TEC Table 1

Product(s): Copiers, Digital Duplicators, Fax Machines, MFDs		
Size Format(s): Standard-size		
Marking Technologies: DT, Mono DS, Mono EP, Mono Stencil, Mono TT		
	Tier I	Tier II
Product Speed (ipm)	Maximum TEC (kWh/week)	Maximum TEC (kWh/week)
≤ 55	0.15 kWh/ipm + 3 kWh	Tier 1 levels remain unchanged
> 55	0.90 kWh/ipm – 38.25 kWh	0.50 kWh/ipm – 16.25 kWh

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TEC Table 2

Product(s): Copiers, Digital Duplicators, Fax Machines, MFDs		
Size Format(s): Standard-size		
Marking Technologies: Color DS, Color Stencil, Color TT, Parallel Color EP, Serial Color EP, SI		
	Tier I	Tier II
Product Speed (ipm)	Maximum TEC (kWh/week)	Maximum TEC (kWh/week)
≤ 55	0.15 kWh/ipm + 6 kWh	Tier 1 levels remain unchanged
> 55	0.90 kWh/ipm – 35.25 kWh	0.50 kWh/ipm – 13.25 kWh

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Note: Serial and Parallel color EP products have been combined for eligibility within the applicable product groupings in this Draft 2 specification. The test data EPA received did not show a correlation between total TEC value and Serial or Parallel EP technology. This data will be made available for review on the ENERGY STAR Web site at www.energystar.gov/productdevelopment.

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TEC Table 3

Product(s): Printers		
Size Format(s): Standard-size		
Marking Technologies: DT, Mono DS, Mono EP, Mono TT		
	<u>Tier I</u>	<u>Tier II</u>
Product Speed (ipm)	Maximum TEC (kWh/week)	Maximum TEC (kWh/week)
≤ 55	0.15 kWh/ipm	Tier 1 levels remain unchanged
> 55	0.90 kWh/ipm – 41.25 kWh	0.50 kWh/ipm – 19.25 kWh

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TEC Table 4

Product(s): Printers		
Size Format(s): Standard-size		
Marking Technologies: Color DS, Color TT, Parallel Color EP, Serial Color EP, SI		
	<u>Tier I</u>	<u>Tier II</u>
Product Speed (ipm)	Maximum TEC (kWh/week)	Maximum TEC (kWh/week)
≤ 55	0.15 kWh/ipm + 3 kWh	Tier 1 levels remain unchanged
> 55	0.90 kWh/ipm – 38.25 kWh	0.50 kWh/ipm – 16.25 kWh

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Note: The product test data and detailed methodology used to determine eligibility criteria provided in TEC Tables 1 through 4 will be made available to stakeholders for review in early January. In general, when developing the TEC criteria, EPA strives to develop smooth lines that allow an increase in total TEC as product speed increases.

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- B. **ENERGY STAR Eligibility Criteria – OM.** To qualify as ENERGY STAR, the power consumption values for imaging equipment outlined in Section 2, Table 2 above must not exceed the corresponding criteria below. For products that meet the Sleep mode power requirements in Ready mode, no further automatic power reductions are required to meet the Sleep criterion. Additionally, for products that meet the Standby power requirements in Ready or Sleep mode, no further power reductions are required to earn the ENERGY STAR.

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The eligibility criteria provided in OM Tables 1 through 7 below address the marking engine of the product. Since products are expected to be shipped with one or more functions beyond a basic marking engine, the corresponding allowances below should be added to the marking engine criteria for Sleep. The total value for the base product with applicable “functional adders” should be used to determine eligibility. An example of this approach is provided below:

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Example: Consider a Standard-size IJ printer with a USB 2.0 connection and a memory card connection. The printer model would receive a functional-adder allowance of 0.5 W for USB and 0.1 for the memory card reader, for a total of 0.6 W of total functional-adder allowances. Assuming OM Table 2 provides a Sleep mode marking-engine criterion of X, then to determine qualification under ENERGY STAR, the manufacturer would sum the Sleep mode marking-engine criterion with the applicable functional-adder allowances to determine the maximum power consumption permitted for qualification of the base product: X W + 0.6 W. If the power consumption of the printer in Sleep mode measures at or below X + 0.6 W, then the printer would meet the ENERGY STAR Sleep criterion.

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Note: Stakeholders who believe that there are functional adders that should apply to Standby as well as Sleep are encouraged to forward documentation about these to EPA (e.g., identification of specific adders and supporting rationale, test data).

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Qualifying Products: Table 3 – OM Functional Adders

Type	Details	Functional Adder Allowances (W)	
		Primary	Secondary
Interfaces	A. Wired < 20 MHz, e.g. USB 1.x, IEEE488, RS232	0.3	0.2
	B. Wired < 500 MHz, e.g. USB 2.x, IEEE 1394/FireWire, 100Mb Ethernet	0.5	0.2
	C. Wired > 500 MHz, e.g. 1G Ethernet	1.5	0.5
	D. Wireless, e.g. Bluetooth, 802.11	-	0.7
	E. Wired card/camera/storage, e.g. memory card / smart card readers, camera interfaces	-	0.1
	F. Fax	0.4	0.2
	G. Infrared	-	0.25
Other	Storage (e.g. disk drives, DVD drives)	-	0.2
	Scanners with CCFL lamps	-	2.0
	Scanners with non-CCFL lamps	-	0.5
	Enhanced Display/Control Panels (backlit, graphic, color LCD, etc.)	-	0.5
	PC-based system (cannot print/copy without being connected to a PC)	-	-0.5

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For the adder allowances shown in Table 3, a distinction is made for the “primary” network interface type of the product, which is the data connectivity maintained during the OM test procedure. It is assumed that only one such connection is maintained during the test.

Note: The functional adders and corresponding allowances provided in Table 3 were derived primarily from the European Code of Conduct and stakeholder feedback. EPA has determined it is necessary to finalize the specific functional adders and corresponding allowances before the marking-engine criteria for OM Tables 1 through 7 below can be accurately determined. EPA is currently working to analyze existing ENERGY STAR qualified product data to confirm the functional-adder types present on each model as standard. Once these adders are confirmed, EPA will strip each model’s reported Sleep value to its “base” marking-engine value, excluding any power used while in Sleep for these functional adders. The resultant marking-engine dataset will then be analyzed to obtain the top 25% criteria for each of the seven OM tables. EPA invites stakeholder feedback on the types of adders provided in Table 3 above and the proposed Sleep power allowances for each. In addition, to ensure that the analysis is as accurate as possible, EPA would appreciate feedback from partners regarding how they tested their products under the existing ENERGY STAR Memoranda of Understanding (MOUs). Of particular importance, EPA would like to know whether the products were tested with a USB data-connection active.

OM Table 1

Product(s): Copiers, MFDs				
Size Format(s): Large Format				
Marking Technologies: Color DS, Color TT, DT, Mono DS, Mono EP, Mono TT, Serial Color EP, Parallel Color EP, SI				
	Sleep (W)	Default Time to Sleep (min.)	Auto-off (W)	Standby (W)
Marking Engine	TBD	TBD	TBD	1

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OM Table 2

Product(s): Fax Machines, MFDs, Printers			
Size Format(s): Continuous Form, Small Format, Standard-size			
Marking Technologies: Color IJ, Mono IJ			
	Sleep (W)	Default Time to Sleep (min.)	Standby (W)
Marking Engine	TBD	TBD	1

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OM Table 3

Product(s): MFDs, Printers			
Size Format(s): Large Format			
Marking Technologies: Color IJ, Mono IJ			
	Sleep (W)	Default Time to Sleep (min.)	Standby (W)
Marking Engine	TBD	TBD	1

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OM Table 4

Product(s): Mailing Machines			
Size Format(s): N/A			
Marking Technologies: DT, Mono EP, Mono IJ, Mono TT			
	Sleep (W)	Default Time to Sleep (min.)	Standby (W)
Marking Engine	TBD	TBD	N/A

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Note: Standby requirements are not intended to be included for mailing machines in this Version 1.0 specification, although EPA reserves the right to consider adding this criterion in future specification iterations.

OM Table 5

Product(s): Printers			
Size Format(s): Continuous Form, Large Format, Small Format			
Marking Technologies: Color DS, Color TT, DT, Mono DS, Mono EP, Mono TT, Parallel Color EP, Serial Color EP, SI			
	Sleep (W)	Default Time to Sleep (min.)	Standby (W)
Marking Engine	TBD	TBD	1

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OM Table 6

Product(s): Printers			
Size Format(s): Continuous Form, Standard-size			
Marking Technologies: Color Impact, Mono Impact			
	Sleep (W)	Default Time to Sleep (min.)	Standby (W)
Marking Engine	TBD	TBD	1

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Note: Some stakeholders have asked EPA to create a category for Continuous Form printers. As this media size is not currently included in the ENERGY STAR MOUs, EPA has very limited data on these products' energy performance. Interested parties should submit any relevant test data with the corresponding Product Speed, as defined in Section 1, to EPA for consideration by the comment deadline specified in Draft 2 cover letter. EPA will continue to consider the appropriateness of including these products within ENERGY STAR based on data received.

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OM Table 7

Product(s): Scanners			
Size Format(s): Large Format, Standard-size			
Marking Technologies: N/A			
	Sleep (W)	Default Time to Sleep (min.)	Standby (W)
Scanning Engine	TBD	TBD	1

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4) **Test Procedures**

Product Testing Set-up, Procedures, and Documentation: The specific instructions for testing the energy efficiency of imaging equipment products are outlined in three separate documents entitled:

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- “ENERGY STAR Qualified Imaging Equipment Typical Electricity Consumption Test Procedure;”
- “ENERGY STAR Qualified Imaging Equipment Operational Mode Test Procedure;” and
- “Test Conditions and Equipment for Determining the ENERGY STAR Qualification Status of Imaging Equipment Products.”

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The test results produced by these procedures shall be used as the primary basis for determining ENERGY STAR qualification.

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Manufacturers are required to perform tests and self-certify those product models that meet the ENERGY STAR guidelines. Families of imaging equipment models that are built on the same chassis and are identical in every respect except for housing and color may be qualified through submission of test data for a single, representative model. Likewise, models that are unchanged or that differ only in finish from those sold in a previous year may remain qualified without the submission of new test data, assuming the specification remains unchanged.

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If a product’s electrical power comes from Mains, USB, IEEE1394, Power-over-Ethernet, telephone system, or any other means or combinations of means, the net AC electrical power consumed by the product (taking into account ac-to-dc conversion losses, as specified in the OM test procedure) must be used for qualification.

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Additional testing and reporting requirements are provided below.

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- A. Number of Units Required for Test: Testing shall be conducted by the manufacturer or its authorized representative on a single unit of a model.
- a. For products outlined in Section 2, Table 1 of this specification, if the TEC test results fall within 10% of the eligibility criteria level, one additional unit of the same model must also be tested. Manufacturers shall report values for both units. To qualify as ENERGY STAR, both units must meet the ENERGY STAR specification.
 - b. For products outlined in Section 2, Table 2 of this specification, if the OM test results fall within 15% of the eligibility criteria in any of the specified operating modes for that product type, then two more units shall be tested. To qualify as ENERGY STAR, all three units must meet the ENERGY STAR specification.

Note: Based on stakeholder feedback and the length of the TEC test, EPA has refined the guidance for addressing unit accuracy for TEC products.

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- B. Submittal of Qualified Product Data to EPA: Partners are required to self-certify those product models that meet the ENERGY STAR guidelines and report information to EPA. The information to be reported for products shall be outlined upon publication of the final specification.

589 In addition, partners must submit to EPA excerpts from product literature that explain to
590 consumers the recommended default delay-times to power management settings. The intent of
591 this requirement is to support that products are being tested as shipped and recommended for
592 use.

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594 C. Models Capable of Operating at Multiple Voltage/Frequency Combinations: Manufacturers shall
595 test their products based on the market(s) in which the models will be sold and promoted as
596 ENERGY STAR qualified. EPA and its ENERGY STAR Country Partners have agreed upon a
597 table with three voltage/frequency combinations for testing purposes. Please refer to the Imaging
598 Equipment **Test Conditions** for details regarding international voltage/frequency and paper sizes
599 for each market.

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601 For products that are sold as ENERGY STAR in multiple international markets and therefore rated
602 at multiple input voltages, the manufacturer must test at and report the required power
603 consumption or efficiency values at all relevant voltage/frequency combinations. For example, a
604 manufacturer that is shipping the same model to the United States and Europe must measure,
605 meet the specification, and report test values at both 115 Volts/60 Hz and 230 Volts/50 Hz in order
606 to qualify the model as ENERGY STAR in both markets. If a model qualifies as ENERGY STAR
607 at only one voltage/frequency combination (e.g., 115 Volts/60 Hz), then it may only be qualified
608 and promoted as ENERGY STAR in those regions that support the tested voltage/frequency
609 combination (e.g., North America and Taiwan).

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611 5) **User Interface**: Manufacturers are strongly recommended to design products in accordance with
612 IEEE P1621: Standard for User Interface Elements in Power Control of Electronic Devices Employed
613 in Office/Consumer Environments. This standard was developed to make power controls more
614 consistent and intuitive across all electronic devices. For details on the development of this standard,
615 see <http://eetd.lbl.gov/controls>.

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617 6) **Effective Date**: The date that manufacturers may begin to qualify products as ENERGY STAR, under
618 the Version 1.0 specification, will be defined as the *effective date* of the agreement. Any previously
619 executed agreement on the subject of ENERGY STAR qualified imaging equipment shall be
620 terminated effective February 28, 2007.

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622 A. Qualifying and Labeling Products under Version 1.0: The Version 1.0 specification shall
623 commence on March 1, 2007, with the exception of digital duplicators. All products, including
624 models originally qualified under previous imaging equipment specifications, with a **date of**
625 **manufacture** on or after the effective date, must meet the new (Version 1.0) requirements in
626 order to qualify for ENERGY STAR (including additional manufacturing runs of models originally
627 qualified under previous specifications). The **date of manufacture** is specific to each unit and is
628 the date (e.g., month and year) on which a unit is considered to be completely assembled.

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630 *Note: Partners are encouraged to test and report their qualified products earlier than the official*
631 *effective date(s) to ensure that qualified products are included on the ENERGY STAR Web site*
632 *for consumers to reference once the specification becomes effective.*

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635 a. Tier I – Tier I shall commence on **March 1, 2007**. Tier I applies to all products described
636 in Section 2 of this specification.
637 b. Tier II – Tier II shall commence on **March 1, 2009**. Tier II only applies to products with
638 speeds faster than 55 ipm, which are addressed by the TEC method.
639 c. Digital Duplicators – Tier I of the Version 1.0 specification becomes effective for digital
640 duplicators on **March 1, 2006**, which is one year earlier than the effective date for all other
641 imaging equipment product categories.

642
643 *Note: EPA is proposing two tiers for high-speed products tested to the TEC method. This*
644 *additional tier has been added to recognize product classes where remanufacturing is a common*
645 *business practice. This was done to avoid creating a disincentive for this government-supported,*
646 *environmentally-beneficial policy.*

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648 B. Elimination of Grandfathering: EPA will not allow grandfathering under this Version 1.0 ENERGY
649 STAR specification. **ENERGY STAR qualification under previous Versions is not**
650 **automatically granted for the life of the product model.** Therefore, any product sold,
651 marketed, or identified by the manufacturing partner as ENERGY STAR must meet the current
652 specification in effect at the time of manufacture of the product.

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654 7) Future Specification Revisions: EPA reserves the right to change the specification should
655 technological and/or market changes affect its usefulness to consumers, industry, or the environment.
656 In keeping with current policy, revisions to the specification are arrived at through stakeholder
657 discussions. EPA will periodically assess the market in terms of energy efficiency and new
658 technologies. As always, stakeholders will have an opportunity to share their data, submit proposals,
659 and voice any concerns. EPA will strive to ensure that the specification recognizes the most energy-
660 efficient models in the marketplace and reward those manufacturers who have made efforts to further
661 improve energy efficiency.

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663 A. Color Testing: Based on submitted test data, future consumer preferences, and engineering
664 advancements, EPA may modify this specification at some point in the future to include color
665 imaging in the test method.

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667 B. Recovery Time: EPA will closely monitor incremental and absolute recovery times as reported by
668 partners testing to the TEC method, as well as partner-submitted documentation regarding
669 recommended default delay settings. EPA will consider modification of this specification to
670 address recovery time should it become apparent that manufacturer practices are resulting in user
671 disabling of power management modes.

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