IEEE P1680.1™/D2

Prepared by the 1680.1 Working Group of the Environmental Assessment Standards Committee

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Abstract: IEEE Std. 1680.1 provides a clear and consistent set of performance criteria for the
design of personal computer products including notebook computers, desktop computers, and
computer displays thereby providing an opportunity to secure market recognition for efforts to
reduce the environmental impact of electronic products. This standard is intended to provide a
tool for government, institutional and corporate purchasers. Product manufacturers may also use
this tool to earn recognition in the consumer market, recognizing that certain criteria may not be
applicable to all types of purchasers. There are three levels of conformance with this Standard.
To achieve the first level, the product shall conform to all of the 23 required environmental criteria.
To achieve the second level, the product shall conform to all of the required criteria plus at least
50% of the 28 optional criteria, and to achieve the third level the product shall conform to all the
required criteria and at least 75% of the optional criteria. This Standard shall be updated and
revised on a periodic basis to continue to set a higher performance standard for leadership
products.

Keywords: computer, computer display, electronic product, electronic product design,
environment, environmental leadership, environmental performance, notebook computer,
personal computer
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Introduction


This Standard has been developed due to a growing demand by government, institutional, and corporate purchasers for an easy-to-use evaluation tool that allows the comparison and selection of electronic products based on environmental performance.

This Standard is intended to be used by government, institutional, and corporate purchasers in the selection of electronics products based on environmental performance, and by product designers and manufacturers who wish to sell products that meet environmental performance standards to institutional purchasers. Product manufacturers may also use this tool to earn recognition in the consumer market.

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Participants

At the time this draft standard was submitted to the IEEE-SA Standards Board for approval, the 1680.1 Working Group had the following membership:

Holly Elwood, Co-Chair

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The following members of the [individual/entity] balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

(to be supplied by IEEE)
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1. Overview

1.1 Scope

This Standard defines environmental performance criteria for personal computer products, including desktop computers, notebook computers, and computer displays. The environmental performance criteria relate to reduction or elimination of environmentally sensitive materials, materials selection, design for end of life, life cycle extension, energy conservation, end of life management, corporate performance and packaging. Guidelines and implementation procedures for this standard are included in the umbrella standard, IEEE 1680.

1.2 Purpose

This Standard provides a clear and consistent set of performance criteria for the design of personal computer products thereby providing an opportunity to secure market recognition for efforts to reduce the environmental impact of electronic products. This standard is intended to provide a tool for government, institutional and corporate purchasers. Product manufacturers may also use this tool to earn recognition in the consumer market, recognizing that certain criteria may not be applicable to all types of purchasers.

The environmental performance criteria of this Standard are intended to define a measure of environmental leadership in: the design and manufacture of personal computer products; the delivery of specified services that are associated with the sale of the product; and in associated corporate performance characteristics.

This Standard is defined with the intention that the criteria are technically feasible to achieve, but that only products demonstrating the leading environmental performance currently available in the marketplace would
meet them at the time of their adoption. As the environmental performance of products that are available in
the marketplace improves, it is intended that the criteria will be updated and revised to set a higher
performance standard for leadership products.

1.3 Application
The environmental performance criteria in Clause 4 apply to notebook personal computers, desktop personal
computers, and personal computer displays. The principles and procedures identified in Clause 1 in the 1680
umbrella standard apply to personal computer products. For further information on application see section
1.3 of IEEE Standard 1680.

1.4 Conformance with this Standard
See section 1.4 of IEEE Standard 1680.

1.5 Product Registration Entity and Market Surveillance Entity
See section 1.5 of IEEE Standard 1680.

1.6 Verification of conformance with this Standard
See section 1.6 of IEEE Standard 1680.

1.7 Qualified Verifier
See section 1.7 of IEEE Standard 1680.

2. Normative references
The following referenced documents are indispensable for the application of this document. For dated
references, only the edition cited applies. For undated references, the latest edition of the referenced
document (including any amendments or corrigenda) applies. In the case of EU Directives, which contain an
adoption date in their title, when the EU repeals a directive and replaces it with a new directive, or otherwise
edits and updates a directive, the new directive will apply as the referenced directive upon its enforcement
date, unless otherwise explicitly stated in the normative reference.

ASTM D256-05, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.¹

CONEG, Model Legislation for Toxics in Packaging.²

accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC.³

the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

¹ ASTM publications are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken,
PA 19428-2959, USA (http://www.astm.org/).
² This compilation was developed by CONEG and is administered by the Toxics in Packaging Clearinghouse (TPCH). TPCH
publications are available online at: http://www.toxicsinpackaging.org/
³ European Union Directives are available from the portal Web site of the European Union at: http://www.europa.eu.int/


European Union. The Eco-Management and Audit Scheme (EMAS). 

GRI, Sustainability Reporting Guidelines, 2002.


ISO 14001, Environmental management systems—Requirements with guidance for use.


U.S. EPA, ENERGY STAR®.


U.S. EPA, National Environmental Performance Track Application (7 March 2006).


U.S. Executive Order 13101, Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition.

3. Definitions, special terms, and acronyms

For the purposes of this standard, the following terms and definitions apply. The Authoritative Dictionary of IEEE Standards [B4] should be referenced for terms not defined in this clause.

3.1 Definitions

3.1.1 biobased: A material that is composed, in whole or in significant part, of biological materials or renewable agricultural (including plant, animal, and marine materials) or forestry materials.

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5 GRI guidelines are available from the Global Reporting Initiative at: http://www.globalreporting.org/.

6 ISO publications are available from the ISO Central Secretariat, Case Postale 56, 1 rue de Varembe, CH-1211, Genève 20, Switzerland/Suisse (http://www.iso.ch/). ISO publications are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (http://www.ansi.org/).


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3.1.2 computer: A device which performs logical operations and processes data. Computers are composed of, at a minimum: (1) a central processing unit (CPU) to perform operations; (2) user input devices such as a keyboard, mouse, digitizer or game controller; and (3) a computer display screen to output information. For the purposes of this standard, computers include both stationary and portable units, including desktop computers, integrated desktop computers, notebook computers, thin clients, and workstations. Although computers must be capable of using input devices and computer displays, as noted in numbers 2 and 3 above, computer systems do not need to include these devices on shipment to meet this definition. This standard is not intended to include server computers, gaming consoles, mobile telephones, portable hand-held calculators, portable digital assistants (PDA), MP3 players, or any other mobile computing device with displays less than 4 inches measured diagonally.

3.1.3 computer display: A display screen and its associated electronics encased in a single housing, or within the computer housing (e.g., notebook or integrated desktop computer), that is capable of displaying output information from a computer via one or more inputs, such as a VGA, DVI, Display Port, and/or IEEE 1394. Examples of computer display technologies are the cathode-ray tube (CRT) and liquid crystal display (LCD).

3.1.4 desktop computer: A computer where the main unit is intended to be located in a permanent location, often on a desk or on the floor. Desktops are not designed for portability and utilize an external computer display, keyboard, and mouse. Desktops are designed for a broad range of home and office applications.

3.1.5 electronic products: Products that are dependent on electric currents or electromagnetic fields in order to work properly.

3.1.6 environmental management system: Part of an organization’s management system used to develop and implement its environmental policy and manage its environmental aspects.

3.1.7 environmentally preferable: Products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose; the product or service comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal. (as defined in Executive Order 13101, Section 201.)

3.1.8 homogeneous: Of uniform composition throughout.

3.1.9 incidental presence: The presence of a regulated metal as an unintended or undesired ingredient of a package or packaging component. (As specified in the Model Toxics in Packaging legislation developed by the CONEG.)

3.1.10 integrated desktop computer: A desktop system in which the computer and computer display function as a single unit which receives its ac power through a single cable. Integrated desktop computers come in one of two possible forms: (1) a system where the computer display and computer are physically combined into a single unit; or (2) a system packaged as a single system where the computer display is separate but is connected to the main chassis by a dc power cord and both the computer and computer display are powered from a single power supply. As a subset of desktop computers, integrated desktop computers are typically designed to provide similar functionality as desktop systems.

3.1.11 notebook and tablet computer: A computer designed specifically for portability and to be operated for extended periods of time either with or without a direct connection to an ac power source. Notebooks must utilize an integrated computer display and be capable of operation off of an integrated battery or other portable power source. In addition, most notebooks use an external power supply and have an integrated keyboard and pointing device. Notebook computers are typically designed to provide similar functionality to desktops, including operation of software similar in functionality as that used in desktops. For the purposes of this standard, docking stations are considered accessories for notebook computers and therefore this standard does not include them. Tablet PCs, which may use touch-sensitive screens along with or instead of other input devices, are considered Notebook Computers in this standard.
3.1.12 postconsumer: A material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item; part of the broader category of “recovered” items.

3.1.13 product: A marketing model and chassis type (and all its peripherals) versus a singular configuration of the product.

3.1.14 recovered: Waste materials and by-products reclaimed or diverted from solid waste, not including those materials and by-products generated from, and commonly reused within, an original manufacturing process.

3.1.15 recyclable: Materials or components that can be removed or recovered from the whole product or package and put back into productive use as a material, not including energy recovery, using standard technologies, or as otherwise demonstrated.

NOTE—See Section 260.7(d) of the Federal Trade Commission (FTC) Guides for the Use of Environmental Marketing Claims [B12].

3.1.16 recyclable resin stream: A group of identifiable plastics that, mixed together, can be processed back into productive use as a material, not including energy recovery.

3.1.17 recycled content: A percentage number calculated by dividing the weight of recycled material of the type of material being measured, divided by the full weight of the material in the part or product. For example, if filler materials or additives are used in recycled plastics, the calculation of the recycled plastic content shall be made by dividing the weight of the recycled plastic in the part by the full weight of the plastic material, including additives and fillers, in the part or product. Additives or fillers shall not be considered recycled plastic, except in the case where the additives or fillers are derived from a recycled plastic feedstock.

3.1.18 recycling: A process by which materials or components are processed to be put back into productive use as a material or component, not including energy recovery.

3.1.19 renewable/biobased plastic content: A percentage number calculated by dividing the weight of renewable/biobased plastic material, divided by the full weight of the plastic material in the part or product. For example, if filler materials or additives are used in renewable/biobased plastics, the calculation of the renewable/biobased plastic content shall be made by dividing the weight of the renewable/biobased plastic resin in the part or product by the full weight of the plastic material, including additives, fillers and other plastics, in the part or product.

3.1.20 renewable energy: Resources that constantly renew themselves or that are regarded as practically inexhaustible.

3.1.21 reusable: Components or systems of components that can be removed or recovered from the whole product or package and put back into productive use as a component or system of components, not including energy recovery, using standard technologies, or as otherwise demonstrated.

3.1.22 thin client: An independently-powered computer that relies on a connection to remote computing resources to obtain primary functionality. Main computing (e.g., program execution, data storage, interaction with other Internet resources, etc.) takes place using the remote computing resources. Thin Clients covered by this standard are limited to devices with no rotational storage media integral to the computer. The main unit of a Thin Client covered by this standard must be intended for location in a permanent location (e.g. on a desk) and not for portability.

NOTE—See Section 260.7(d) of the FTC Guides for the Use of Environmental Marketing Claims [B12].

3.1.23 workstation: A high-performance, single-user computer typically used for graphics, CAD, software development, financial and scientific applications among other compute intensive tasks. To qualify as a workstation, a computer must:
• Be marketed as a workstation;
• Have a mean time between failures (MTBF) of at least 15,000 hours based on either Bellcore TR-NWT-000332, issue 6, 12/97 or field collected data; and
• Support error-correcting code (ECC) and/or buffered memory.

In addition, a workstation must meet three of the following six optional characteristics:
• Have supplemental power support for high-end graphics (i.e., PCI-E 6-pin 12V supplemental power feed);
• System is wired for greater than x4 PCI-E on the motherboard in addition to the graphics slot(s) and/or PCI-X support;
• Does not support Uniform Memory Access (UMA) graphics;
• Includes 5 or more PCI, PCIe or PCI-X slots;
• Capable of multi-processor support for two or more processors (must support physically separate processor packages/sockets, i.e., not met with support for a single multi core processor); and/or
• Be qualified by at least 2 Independent Software Vendor (ISV) product certifications; these certifications can be in process, but must be completed within 3 months of qualification.

3.2 Special terms

3.2.1 compatible: Paints and coatings on plastic parts are proven to be compatible with recycling processes if they do not significantly impact the physical/mechanical properties of the recycled resin. “Significant impact” is defined as >25% reduction in notched Izod impact at room temperature as measured using ASTM D256. This definition is based on a criterion developed by the Federal Electronics Challenge Plastics Task Force.

3.2.2 first, second, and third tier recyclers: first tier recycler is the organization that contracts with, or otherwise works directly with, the manufacturer, to receive and tear down product; second tier recycler is an organization that receives material from the first tier recycler and performs further processing, but has no direct relationship with the manufacturer; and third tier recycler is an organization that receives material from the second tier recycler and generally produces a commodity for sale and use, but has no direct relationship with the first tier recycler.

3.2.3 homogeneous material: European Union documentation [B2] provides the following guidance for homogeneous material: homogeneous material refers to a material that can not be mechanically disjointed into different materials. Examples of “homogeneous material” are individual types of: plastics, ceramics, glass, metals, alloys, paper, board, resins, and coatings. The term “mechanically disjointed” means that the materials can, in principle, be separated by mechanical actions such as: unscrewing, cutting, crushing, grinding, and abrasive processes.
3.2.4 **intentionally added:** The act of deliberately utilizing a regulated restricted substance in the formation of a product, component, package, or packaging component where its continued presence is desired in the final product, component, package, or packaging component to provide a specific characteristic, appearance, or quality. The use of recycled material as feedstock in the manufacture of a product, component or package, where some portion of the recycled material may contain residual amounts of a restricted substance, is not considered intentionally added, unless the restricted substance in the recycled material is used for the express purpose of imparting a specific characteristic, appearance or quality to the final product. The exclusion of recycled feedstock shall not apply to any cadmium, lead, mercury, or hexavalent chromium that has been recovered and/or separated from other materials for use as a metal or metallic compound.

3.2.5 **on average:** The term “on average” as used in the Standard in the phrase “product shall contain on average” shall mean that the desired material (e.g., recycled or biobased plastic) shall be present at the designated percentage in the total weight of like material (e.g., all plastic) within each unit for each product declared to the criterion.

3.2.6 **take-back:** A service provided by, or caused to be provided by, the manufacturer by which the product or packaging can be returned for reuse or recycling with no more than 10% of the returned material going to disposal or incineration.

3.2.7 **weighted average:** An average that takes into account the proportional relevance of each component, rather than treating each component equally.

### 3.3 Acronyms

- **ASTM:** American Society of Testing and Materials
- **CONEG:** Council of Northeast Governors
- **CPG:** Comprehensive Procurement Guidelines
- **CPU:** Central Processing Unit
- **DIN:** Deutsches Institut für Normung (German Institute of Standardization)
- **DVD:** Digital Versatile Disc
- **EMAS:** Eco-Management and Audit Scheme
- **EMS:** Environmental Management System
- **EPEAT:** Electronic Product Environmental Assessment Tool
- **EPS:** Expanded Polystyrene
- **FTC:** Federal Trade Commission
- **IEEE:** Institute of Electrical and Electronics Engineers, Inc.
- **GRI:** Global Reporting Initiative
- **OEM:** Original Equipment Manufacturer
- **PCB:** Printed Circuit Board
- **PVC:** Polyvinyl Chloride
- **RBRC:** Rechargeable Battery Recycling Corporation
- **RoHS:** Restriction on the use of certain hazardous substances in electrical and electronic equipment
- **SCCP:** Short Chain Chlorinated Paraffins
- **SPI:** Society of the Plastics Industry
- **U.S. EPA:** United States Environmental Protection Agency
- **USB:** Universal Serial Bus
- **WEEE:** Waste electrical and electronic equipment
4. Environmental performance criteria for desktop personal computers, notebook personal computers, and personal computer displays

4.1 Reduction/elimination of environmentally sensitive materials

4.1.1 Reduction of use of hazardous substances

4.1.1.1 Required—Compliance with provisions of European RoHS Directive

**Product Criterion:** All products shall comply with the final requirements developed under the European RoHS Directive.

**Applies to:** All covered products, except for European RoHS Directive exemptions.

**Verification Requirements:**

a) Declaration from manufacturer

b) Demonstration of European RoHS Directive compliance according to European RoHS Directive requirements

c) Evidence of certification from component manufacturers that is based on either empirical data demonstrating compliance or analytical test data demonstrating compliance


- Cadmium <100 ppm
- Mercury <1000 ppm
- Lead <1000 ppm
- Hexavalent Chromium <1000 ppm
- Polybrominated Biphenyls (PBB) <1000 ppm
- Polybrominated Diphenyl Ethers (PBDE) <1000 ppm

The list of materials, thresholds, and possible exemptions are currently under development by the European Union.

4.1.2 Cadmium

4.1.2.1 Optional—Elimination of intentionally added cadmium

**Product Criterion:** Traces of cadmium shall not exceed 50 ppm in homogeneous materials unless it can be shown that the cadmium is present above this threshold due to the use of recycled content.
Applies to: All covered products excluding batteries.

Verification Requirements:

a) Declaration from the manufacturer

b) Evidence of certification from component manufacturers that is based on either empirical data demonstrating compliance or analytical test data demonstrating compliance

References and Details: None available.

4.1.3 Mercury

4.1.3.1 Required—Reporting on amount of mercury used in light sources

Product Criterion: Manufacturer shall report on how many lamps used and the mercury content per lamp, except if mercury-free lamps are used, reporting the number of lamps is optional, in accordance with the ranges of the following list:

- 0 mg to 5 mg
- 5 mg to 10 mg
- 10 mg to 50 mg
- 50 mg to 100 mg
- 100 mg to 1000 mg
- Greater than 1000 mg

Optional reporting: maximum average mercury content per lamp.

Applies to: All computer displays, including stand-alone and integrated systems (i.e., flat panel displays, notebook computers, CRTs).

Verification Requirements:

a) Declaration from manufacturer

b) Evidence of certification from component manufacturers that is based on either empirical data demonstrating compliance or analytical test data demonstrating compliance

References and Details: None available.

4.1.3.2 Optional—Low threshold for amount of mercury used in light sources

Product Criterion: Maximum average of 3.0 mg mercury per lamp.

Applies to: All flat panel computer displays.

Verification Requirements:

a) Declaration from manufacturer
b) Evidence of certification from component manufacturers that is based on either empirical data demonstrating compliance or analytical test data demonstrating compliance

References and Details: None available.

4.1.3.3 Optional—Elimination of intentionally added mercury used in light sources

Product Criterion: No intentionally added mercury in light sources. Light source employs a technology that is documented not to require the presence of mercury.

 Applies to: All flat panel computer displays.

Verification Requirements:

 a) Declaration from manufacturer
 b) Evidence of certification from component manufacturers that is based on either empirical data demonstrating compliance or analytical test data demonstrating compliance

References and Details: None available.

4.1.4 Lead

4.1.4.1 Optional—Elimination of intentionally added lead in certain applications

Product Criterion: The computer display, including housing, batteries, cables, adapters and other peripheral equipment used to generate an image, shall not contain lead greater than 50 ppm by weight per listed part unless it can be shown that the lead is present above this threshold due to the use of recycled content.

 Applies to: Computer displays only, including stand-alone units and those components of an integrated unit, e.g., a notebook computer, that are directly used to generate an image. This does not apply to European RoHS Directive exemptions.

Verification Requirements:

 a) Declaration from manufacturer
 b) Evidence of certification from component manufacturers that is based on either empirical data demonstrating compliance or analytical test data demonstrating compliance

References and Details: None available.

4.1.5 Hexavalent chromium

4.1.5.1 Optional—Elimination of intentionally added hexavalent chromium

Product Criterion: Traces of hexavalent chromium shall not exceed 500 ppm in homogeneous materials unless it can be shown that the hexavalent chromium is present above this threshold due to the use of recycled content.

 Applies to: All covered products.
Verification Requirements:

a) Declaration from manufacturer

b) Evidence of certification from component manufacturers that is based on either empirical data demonstrating compliance or analytical test data demonstrating compliance

References and Details: None available.

4.1.6 Flame retardants and plasticizers

4.1.6.1 Required—Elimination of intentionally added SCCP\textsuperscript{14} flame retardants and plasticizers in certain applications

Product Criterion: Paints, coatings, plastics, rubbers and seals shall be free from flame retardants and / or softeners containing SCCPs (not more than 0.1\% by weight), 10 carbon atoms to 13 carbon atoms, minimum 48\% chlorine by weight, unless it can be shown that the SCCPs are present above this threshold due to the use of recycled content.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer

b) Evidence of certification from component manufacturers that is based on either empirical data demonstrating compliance or analytical test data demonstrating compliance

References and Details: None available.

4.1.6.2 Optional—Large plastic parts free of certain flame retardants classified under European Council Directive 67/548/EEC

Product Criterion: Plastic parts >25 g shall be free from flame retardants (not more than 0.1\% of total weight) that are classified as dangerous substances under European Council Directive 67/548/EEC.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer

b) Evidence of certification from component manufacturers that is based on either empirical data demonstrating compliance or analytical test data demonstrating compliance


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\textsuperscript{14} Chemical Abstracts Service number 63449-39-8.
— R46 may cause heritable genetic damage
— R50-R51-R52 are very toxic to aquatic organisms
— R60 may impair fertility
— R61 may cause harm to an unborn child

NOTE—Many flame retardants may not have these classifications because they have not been tested. To gain this
optional point, equipment manufacturers and suppliers would have to request that the materials be tested if they are not
currently classified. As a result, this criterion provides an incentive for chemical companies to run the necessary tests in
order to satisfy demand by equipment manufacturers and suppliers. It also ensures that any alternatives to current flame
retardants would have to meet minimum requirements for hazard evaluation.

4.1.7 Batteries

4.1.7.1 Optional—Batteries free of lead, cadmium, and mercury

Product Criterion: With the exemption of technically unavoidable impurities, batteries and accumulators
(internal to the computer system) shall not contain any lead, cadmium, or mercury. Such impurities shall not

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer
b) Evidence of certification from component manufacturers that is based on either empirical data
demonstrating compliance or analytical test data demonstrating compliance

References and Details: European Commission Directive 2006/66/EC of 6 September 2006 on batteries and
accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC.

4.1.8 Polyvinyl chloride and chlorinated plastics

4.1.8.1 Optional—Large plastic parts free of PVC

Product Criterion: Eliminate PVC in parts >25 g.

Applies to: All covered products. Cables and interconnect parts are exempt. Examples of interconnect parts
are plugs and sockets.

Verification Requirements:

a) Declaration from manufacturer
b) Evidence of certification from component manufacturers that is based on either empirical data
demonstrating compliance or analytical test data demonstrating compliance

References and Details: None available.

4.2 Materials selection
4.2.1 Total recycled plastics content

4.2.1.1 Required—Declaration of postconsumer recycled plastic content

**Product Criterion:** Manufacturer declares percentage of postconsumer recycled plastic content, measured as a percentage of total plastic (by weight) in each product.

**Applies to:** All covered products that contain plastics, excluding PCB and packaging.

**Verification Requirements:**

- a) Declaration from manufacturer
- b) Supplier letter
- c) Documentation of calculation

**References and Details:** None available.

4.2.1.2 Optional—Minimum content of postconsumer recycled plastic

**Product Criterion:** Product shall contain on average a minimum of 10% postconsumer recycled plastic, measured as a percentage of total plastic (by weight) in the product.

**Applies to:** All covered products that contain plastics, excluding PCB.

**Verification Requirements:**

- a) Declaration from manufacturer
- b) Supplier letter
- c) Documentation of calculation

**References and Details:** None available.

4.2.1.3 Optional—Higher content of postconsumer recycled plastic

**Product Criterion:** Product shall contain on average a minimum of 25% postconsumer recycled plastic, measured as a percentage of total plastic (by weight) in the product.

**Applies to:** All covered products that contain plastics, excluding PCB.

**Verification Requirements:**

- a) Declaration from manufacturer
- b) Supplier letter
- c) Documentation of calculation

**References and Details:** None available.

4.2.2 Renewable/biobased plastic materials

4.2.2.1 Required—Declaration of renewable/biobased plastic materials content
**Product Criterion:** Manufacturer declares percentage of renewable/biobased plastic materials measured as a percentage of total plastic (by weight) in each product.

**Applies to:** All plastic parts, excluding packaging.

**Verification Requirements:**

a) Declaration from manufacturer

b) Supplier letter

c) Documentation of calculation

**References and Details:** The percent of biobased/renewable plastic will be calculated by taking a weighted average of the percent biobased/renewable plastic in all plastics in the product.

Under Section 9002 of the Farm Security and Rural Investment Act of 2002 [B9], biobased products are defined as a product “that is composed, in whole or in significant part, of biological products or renewable agricultural materials (including plant, animal, and marine materials) or forestry materials.”

The U.S. Department of Agriculture’s framework rule for Federal purchasing of biobased products, 70 FR 1792, 11 January 2005 [B10], cites the intent of the Farm Security and Rural Investment Act is “to stimulate the production of new biobased products and to energize emerging markets for those products.”

Verification of biobased content is determined using the ASTM D6866-04a [B1].

### 4.2.2.2 Optional—Minimum content of renewable/biobased plastic material

**Product Criterion:** Product shall contain on average a minimum of 10% renewable/biobased plastic, measured as a percentage of total plastic (by weight) in the product.

**Applies to:** All plastic parts, excluding packaging.

**Verification Requirements:**

a) Declaration from manufacturer

b) Supplier letter

c) Documentation of calculation

**References and Details:** Refer to Section 9002 of the Farm Security and Rural Investment Act of 2002 [B9]; the U.S. Department of Agriculture’s framework rule for Federal purchasing of biobased products, 70 FR 1792, 11 January 2005 [B10]. Verification of biobased content is determined using ASTM D6866-04a [B1].

### 4.2.3 Dematerialization

#### 4.2.3.1 Required—Declaration of product weight

**Product Criterion:** Manufacturer declares product weight.

**Applies to:** All covered products, excluding packaging.

**Verification Requirements:**

— Declaration of product weight ±5%

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4.3 Design for end of life

4.3.1 Design for recovery through recycling systems that utilize shredding

4.3.1.1 Required—Identification of materials with special handling needs

**Product Criterion:** Manufacturer shall provide treatment information to reuse and recycling facilities that identifies the presence and location of materials that require special handling, especially nonstandard or new substances or new technologies, and including components such as batteries.

**Applies to:** All covered products.

**Verification Requirements:**

- Declaration by manufacturer as to how information is provided to reuse and recycling facilities or web link to where information is available

**References and Details:** “Nonstandard or new” substances or technologies shall refer to substances or technologies that are rarely encountered in the end-of-life stream of products such that recycling and reuse enterprises would not develop methods to deal with them. If a new substance or technology is introduced and in time becomes commonplace such that recycling and reuse enterprises develop methods of dealing with them, then they shall no longer meet this definition.

4.3.1.2 Required—Elimination of paints or coatings that are not compatible with recycling or reuse

**Product Criterion:** Plastic parts >100 g on a product shall not contain paints or coatings that are not compatible with recycling or reuse, including metal coatings.

**Applies to:** All covered products.

**Verification Requirements:**

a) Declaration from manufacturer

b) Documentation showing manufacturer test, or supplier verification if paints or coatings are used on plastic parts >100 g

**References and Details** “Compatible,” as defined in 3.2, is based on a criterion developed by the Plastics Task Force of the U.S. Federal Electronics Challenge [B8].

4.3.1.3 Required—Easy disassembly of external enclosure

**Product Criterion:** External enclosures shall be easily removable by one person alone with commonly available tools.

**Applies to:** All covered products.

**Verification Requirements:**
a) Declaration from manufacturer

b) Supporting documentation that the external enclosure design does not unreasonably obstruct the disassembly process. Examples of documentation include:

i) A list of the commonly available tools required to disassemble the external enclosure, and instructions for disassembly that show how the external enclosure can be easily removed, or

ii) A statement from a minimum of three recyclers individually, or at least one recycler working under an independent entity with electronics recycling expertise that is not a trade organization, confirming that the product design meets requirements of 4.3.1.3.

References and Details: None available.

4.3.1.4 Required—Marking of plastic components

Product Criterion: Plastic components >100 g shall be marked with a material code in accordance with the identification and marking requirements of ISO 11469:2000.

Applies to: All plastic components >100 g in the product

Verification Requirements:

a) Declaration from manufacturer

b) Record of visual inspection

References and Details: ISO 11469:2000 specifically applies to parts weighing 25 g or more. However, this criterion only applies to parts of 100 g or more, with the assumption that only those larger parts will be separated in most current recycling processes that rely on shredding.

4.3.1.5 Required—Identification and removal of components containing hazardous materials

Product Criterion: Circuit boards >10 cm² (measured on the largest face), batteries, and other components—any of which contain hazardous materials—shall be safely and easily identifiable and removable.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer

b) Supporting documentation that the design assures the safe and easy identification and removal of components containing hazardous materials. Examples of documentation could be:

i) A list of the commonly available tools required to remove components containing hazardous materials, and instructions for disassembly that show how the components containing hazardous materials can be easily identified and removed, or

ii) A statement from a minimum of three recyclers individually, or at least one recycler working under an independent entity with electronics recycling expertise that is not a trade organization, confirming that the product design meets requirements of 4.3.1.5.

4.3.1.6 Optional—Reduced number of plastic material types

Product Criterion: Only one plastic material type shall be used in each plastic enclosure part >100 g.

Applies to: Enclosures for all covered products.

Verification Requirements:

a) Declaration from manufacturer
b) Supplier letter

References and Details: None available.

4.3.1.7 Optional—Molded/glued in metal eliminated or removable

Product Criterion: Plastic enclosures shall not contain molded-in or glued-on metal unless metal inserts are easy to remove by one person alone with commonly available tools.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer
b) Supporting documentation demonstrating that the plastic enclosures do not incorporate adhesives or molding for metal inserts or that they are easily removable. Examples of documentation that they are easily removable could be:

i) A list of the commonly available tools required to remove metal inserts, and instructions for disassembly that show how the metal inserts can be easily removed, or

ii) A statement from a minimum of three recyclers individually, or at least one recycler working under an independent entity with electronics recycling expertise that is not a trade organization, confirming that the product design meets requirements of 4.3.1.7.

References and Details: None available.

4.3.1.8 Required—Minimum 65% reusable/recyclable

Product Criterion: 65% or greater of materials and components by weight shall be reusable or recyclable within the current infrastructure and using demonstrated technologies.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer
b) Description of demonstrated recycling technologies
c) Demonstration that material is normally recyclable or, if not, that there exists a market/use

References and Details: Declaration by manufacturer of the material and components and how they can be recycled or reused within the existing infrastructure and demonstrated technologies.

For further explanation of when a product or packaging can be claimed to be reusable or recyclable see definitions in 3.1.

The definition of reusable and recyclable is in accord with Article 7, paragraph 2 of the European WEEE Directive, which includes component, material and substance reuse but excludes reuse of whole products.

4.3.1.9 Optional—Minimum 90% reusable/recyclable

Product Criterion: 90% or greater of materials and components by weight shall be reusable or recyclable within the current infrastructure and using demonstrated technologies.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer

b) Description of demonstrated recycling technologies

c) Demonstration that material is normally recyclable or, if not, that there exists a market/use

References and Details: Declaration by manufacturer of the material and components and how they can be recycled or reused within the existing infrastructure and demonstrated technologies.

The definition of reusable and recyclable is in accord with Article 7, paragraph 2 of the European WEEE Directive that includes component, material and substance reuse but excludes reuse of whole products.

4.3.2 Design for recovery through disassembly

4.3.2.1 Optional—Manual separation of plastics

Product Criterion: All plastic parts >25 g used in product shall be manually separable by one person alone with commonly available tools into recyclable resin streams.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer

b) Supporting documentation demonstrating that qualifying plastic components are manually separable with commonly available tools into recyclable resin streams and identifying the plastic composition of each recyclable resin stream. Examples of documentation include:

i) A list of the commonly available tools required to separate plastic components, and instructions for disassembly that show how the resin streams can be separated, or
ii) A statement from a minimum of three recyclers individually, or at least one recycler working under an independent entity with electronics recycling expertise that is not a trade organization, confirming that the product design meets requirements of 4.3.2.1.

References and Details: None available.

4.3.2.2 Optional—Marking of plastics

Product Criterion: Plastic components >25 g shall be marked with a material code in accordance with the identification and marking requirements of ISO 11469:2000.

Applies to: All plastic components >25 g.

Verification Requirements:

a) Declaration from manufacturer
b) Record of visual inspection


4.4 Product longevity/life cycle extension

4.4.1 Manufacturer warranty/service agreement

4.4.1.1 Required—Availability of additional three year warranty or service agreement

Product Criterion: Additional product warranty or service contract of at least three years shall be available for customer purchase.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer
b) Documentation of warranty or service contract

References and Details: None available.

4.4.2 Upgradeability

4.4.2.1 Required—Upgradeable with common tools

Product Criterion: Product shall be upgradeable with commonly available tools:

— Hard disk, digital versatile disc (DVD), floppy drive can be changed or extended [e.g., by a high performance serial bus (IEEE Std 1394™ [B5]) or universal serial bus (USB)]
— Memory and cards can be changed or extended [e.g., by a high performance serial bus (IEEE Std 1394)].
Applies to: Desktop personal computers and notebook personal computers only.

Verification Requirements:

a) Declaration from manufacturer
b) Supporting documentation demonstrating that the product is upgradeable with commonly available tools. Examples of documentation include:
   i) A list of the commonly available tools required to upgrade product, and instructions for upgrading the product, or
   ii) A statement from a minimum of three recyclers individually, or at least one recycler working under an independent entity with electronics recycling expertise that is not a trade organization, confirming that the product design meets requirements of 4.4.2.1.

References and Details: Upgrading of product may be limited to designated service entities or manufacturer.

4.4.2.2 Optional—Modular design

Product Criterion: Product shall have a modular design; for example, major components/processor can be changed.

Applies to: Desktop personal computers and notebook personal computers only.

Verification Requirements:

a) Declaration from manufacturer
b) Description of product modules
c) Description of module change method

References and Details: None available.

4.4.3 Product life extension

4.4.3.1 Optional—Availability of replacement parts

Product Criterion: Spare parts and/or compatible replacement parts shall be available five years after end of production. Information on how to obtain replacement parts shall be provided to user.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer
b) Description of how product user is informed about how to obtain replacement parts

References and Details: None available.

4.5 Energy conservation
4.5.1 Power management system

4.5.1.1 Required—ENERGY STAR®

Product Criterion: All products shall be qualified to or comply with the eligibility criteria of the US ENERGY STAR program requirements for the declared product at the time of declaration to the Standard. Manufacturer shall declare the version of ENERGY STAR to which the product is qualified or compliant.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer

b) Demonstration of ENERGY STAR qualification or compliance with all applicable eligibility criteria of the US ENERGY STAR program requirements.

References and Details: All products shall either be qualified to or comply with the eligibility criteria of the US ENERGY STAR program requirements that are applicable for the declared product at the time of declaration to the Standard. If ENERGY STAR eligibility criteria are modified, all products must be declared to the new eligibility criteria of the ENERGY STAR program requirements.

“Qualified to” or “qualification” is ENERGY STAR’s term for products that are listed with ENERGY STAR as meeting all of ENERGY STAR’s “program requirements”, including all partner commitments for labeling, marketing, etc., and all eligibility criteria.

“Compliant with the eligibility criteria of the ENERGY STAR program requirements” relative to IEEE 1680.1 means the product meets the technical specifications for energy efficiency (including relevant test procedures) as listed in the “eligibility requirements” provided by the ENERGY STAR program, but the product is not necessarily listed as a qualified product with the ENERGY STAR program.

4.5.1.2 Optional—Early adoption of new ENERGY STAR specification

Product Criterion: Qualified to ENERGY STAR, or compliant with the eligibility criteria of the US ENERGY STAR program requirements, in advance of the effective date.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer

b) Demonstration of ENERGY STAR qualification, or compliance with the ENERGY STAR eligibility criteria

References and Details: Product may receive this optional early adopter point for compliance with any new tier or new version of the eligibility criteria of the ENERGY STAR program requirements. The product will retain that optional point after the new tier or version becomes effective, but a single product can only receive one early adopter point.

For instance, a new tier or new version of ENERGY STAR implements through adopting new specifications, and a period of time is defined before they go into effect. Product must be compliant with all applicable product specifications of a new tier or new version of the ENERGY STAR program after the product specifications have been adopted but before they go into effect.
4.5.2 Use of renewable energy

4.5.2.1 Optional—Renewable energy accessory available

Product Criterion: Accessory for powering product using renewable energy shall be commercially available for purchase with the product. This criterion is dependent on the region or country and may be declared by a manufacturer differently in different regions or countries.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer
b) Commercial documentation of product availability

References and Details: Renewable energy includes solar, fuel cells, wind, geothermal, hydro and biomass. Although particular geothermal formations can be depleted, the natural heat in the earth is a virtually inexhaustible reserve of potential energy. Renewable resources also include some experimental or less-developed sources such as tidal power, sea currents, and ocean thermal gradients.

4.5.2.2 Optional—Renewable energy accessory standard

Product Criterion: Product shall be shipped with a standard component (either internal or external) that allows for use of renewable energy to power the product. This criterion is dependent on the region or country and may be declared by a manufacturer differently in different regions or countries.

Applies to: All covered products.

Verification Requirements:

a) Declaration from manufacturer
b) Commercial documentation of product availability

References and Details: Renewable energy includes solar, fuel cells, wind, geothermal, hydro, and biomass. Although particular geothermal formations can be depleted, the natural heat in the earth is a virtually inexhaustible reserve of potential energy. Renewable resources also include some experimental or less-developed sources such as tidal power, sea currents, and ocean thermal gradients.

4.6 End of life management

4.6.1 Product take-back

4.6.1.1 Required—Provision of product take-back service

Annual Corporate Declaration Criterion: Manufacturer shall provide a take-back or recycling service at a competitive price that meets U.S. EPA’s “Plug-In To eCycling: Guidelines for Materials Management,” published May 2004. This criterion is applicable only in those regions or countries for which the product is declared on the Registry.
Applies to: The marketing and sale to institutions of all products that are declared to conform to this Standard.

Verification Requirements:

a) Declaration from manufacturer
b) Documentation of take-back service
c) Documentation of notification of user of take-back service
d) Documentation of service certification to the U.S. EPA’s Plug-In To eCycling: Guidelines for Materials Management.
e) Documentation that demonstrates the service is offered at a competitive price


Purchaser is not obligated to contract with OEM for end of life management service.

End of life management services may be provided via contracts.

4.6.1.2 Optional—Auditing of recycling vendors

Annual Corporate Declaration Criterion: An annual audit is performed of all first, second, and third tier recyclers’ facilities; this ensures that the recycler is complying in full with all Plug-In Guidelines, as published in May 2004, and with any and all applicable regulations and laws. This criterion is dependent on the region or country and may be declared by a manufacturer differently in different regions or countries.

Applies to: The marketing and sale to institutions of all products that are declared to conform to this Standard.

Verification Requirements:

a) Declaration by manufacturer
b) Documentation of on-site visits
c) Documentation of all facilities’ compliance with environmental, health, and safety and import/export laws

References and Details: None available.

4.6.2 Rechargeable battery recycling

4.6.2.1 Required—Provision of a rechargeable battery take-back service

Annual Corporate Declaration Criterion: Manufacturers shall provide a rechargeable battery take-back service at a competitive price that is equivalent to or better than that provided by the RBRC [B6]. In the annual corporate declaration manufacturers must explain how the service applies to products declared to this Standard, and must provide information about that service. A manufacturer may provide different information for different regions or countries regarding the service and how it applies to declared products. This criterion is applicable only in those regions or countries for which the product is declared on the Registry.

Applies to: The marketing and sale to institutions of batteries in products that are declared to conform to this Standard.
Verification Requirements:

a) Declaration from manufacturer
b) Documentation of battery take-back service
c) Documentation of notification of user of battery take-back service
d) If a take back service other than RBRC is provided, the manufacturer shall provide the following:
   i) Documentation of amounts returned
   ii) Demonstration that, in comparison to RBRC, it is equivalent in cost or less expensive to the user and is equivalently convenient for the user

References and Details: Covers Lithium-ion batteries used in notebook personal computers. Affix RBRC seal, or appropriate recycling system notification, to battery and make information available on Web site or product literature. Information on RBRC is available online.

Participating in the RBRC Program as a Licensee qualifies for this criterion for the geographic regions within which RBRC services are provided. If a program other than RBRC is provided, it must report amounts returned and demonstrate that in comparison to RBRC it is equivalent or less expensive in cost to the user and is equivalently convenient for the user.

4.7 Corporate performance

4.7.1 Corporate environmental policy

4.7.1.1 Required—Demonstration of corporate environmental policy consistent with ISO 14001

Annual Corporate Declaration Criterion: Manufacturer shall demonstrate the existence and public availability of a written corporate environmental policy consistent with all aspects of the requirements laid out in the environmental policy section of ISO 14001.

Applies to: All manufacturers with products that are declared to conform to this Standard.

Verification Requirements:

a) Declaration from manufacturer
b) Copy of environmental policy indexed to ISO 14001 requirements

References and Details: This criterion references the requirements of the environmental policy section of ISO 14001.

4.7.2 Environmental management system

4.7.2.1 Required—Self-certified environmental management system for design and manufacturing organizations
**Annual Corporate Declaration Criterion:** OEM shall have self-certified, with or without independent assessment, that the OEM-owned organizations that have significant responsibility for the design and manufacture of the declared product have an operational EMS that meets either:

- The requirements of ISO 14001 or EMAS; or
- The EMS requirements of the U.S. EPA National Environmental Performance Track program.

This does not require participation in the Performance Track program.

**Applies to:** All manufacturers with products that are declared to conform to this Standard.

**Verification Requirements:**

a) Declaration from manufacturer

b) Documentation of self-certification to the specified standard

**References and Details:** ISO 14001 and EMAS are available online. The EMS requirements of the U.S. EPA Performance Track program are described in the Performance Track Application (questions 1 through 10) and the corresponding EMS Worksheet section of its Application Help instructions document.

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### 4.7.2.2 Optional—Third-party certified environmental management system for design and manufacturing organizations

**Annual Corporate Declaration Criterion:** OEM shall certify that either:

- All OEM-owned design and manufacturing organizations have registered ISO 14001 or EMAS EMSs; or
- Its EMS meets EMS requirements of the U.S. EPA National Environmental Performance Track program, including a successful independent assessment by a qualified lead auditor.

**Applies to:** All manufacturers with products that are declared to conform to this Standard.

**Verification Requirements:**

a) Declaration from manufacturer

b) Documentation of registration to ISO or EMAS, or documentation of third-party certification to Performance Track

**References and Details:** ISO 14001 and EMAS are available online. There are three ways to get this point, all of which require independent assessment—through the ISO or EMAS process, or through the more flexible requirements of Performance Track.

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### 4.7.3 Corporate reporting

#### 4.7.3.1 Required—Corporate report consistent with Performance Track or GRI

**Annual Corporate Declaration Criterion:** OEM shall produce an annual report that meets the first three reporting requirements of the U.S. EPA National Environmental Performance Track program or the GRI Sustainability Reporting Guidelines (2002). The word “corporation” may be substituted for “facility” in the requirements.
Applies to: All manufacturers with products that are declared to conform to this Standard.

Verification Requirements:

a) Declaration from manufacturer
b) Copy of annual report
c) Index to report showing reports compliance with first three Performance Track requirements (listed below in References and Details) and/or GRI.

References and Details: The Performance Track Annual Performance Report requirements applicable to this criterion include the following:

— A summary of the facility's EMS assessment activities and progress towards meeting EMS objectives and targets, including brief descriptions of audits conducted and improvements made
— A brief report on progress made in meeting the facility’s environmental performance commitments
— A summary of the facility’s public outreach activities

Manufacturers may meet the reporting criteria on the corporate level, rather than the facility level as specified in the Performance Track requirements.

An Annual Performance Report format and preparation instructions are available from the U.S. EPA Web site.

4.7.3.2 Optional—Corporate report based on GRI

Annual Corporate Declaration Criterion: Manufacturer shall produce an annual public report that is based on, but not limited to, certain elements of the GRI Sustainability Reporting Guidelines. An index shall be provided to indicate which portions of the GRI Sustainability Reporting Guidelines are covered and not covered in the report.

Applies to: All manufacturers with products that are declared to conform to this Standard.

Verification Requirements:

a) Declaration from manufacturer
b) Copy of annual report
c) Index to report showing how report is based on GRI

References and Details: Information on the GRI is available online.

4.8 Packaging

4.8.1 Toxics in packaging

4.8.1.1 Required—Reduction/elimination of intentionally added toxics in packaging
Product Criterion: Heavy metals shall not be intentionally added to any packaging or packaging component, with the exception of the recycled content exemption cited in References and Details. For incidental presence, the sum of the concentration levels of lead, cadmium, mercury, and hexavalent chromium present in any package or packaging component shall not exceed 100 ppm by weight (0.01%).

Applies to: Packaging of products that are declared to conform to this Standard.

Verification Requirements:

a) Declaration from manufacturer

b) Supplier letter

References and Details: This criterion is drawn from the Model Toxics in Packaging legislation (referred to as “Act” below) developed by CONEG, which is available online.

“Incidental presence,” as defined in 3.1, is specified in CONEG’s Model Legislation for Toxics in Packaging. “Recycled content exemption” is specified in CONEG’s Model Legislation for Toxics in Packaging as the following: packages and packaging components that would not exceed the maximum contaminant levels set forth in subsection c of Section 4 of this Act but for the addition of recycled materials; and provided that the exemption for this subparagraph shall expire 1 January 2010. This exemption shall not apply to any cadmium, lead, mercury, or hexavalent chromium that has been recovered and/or separated from other materials for use as a metal or metallic compound.

4.8.2 Recyclable packaging materials

4.8.2.1 Required—Separable packing materials

Product Criterion: Non-reusable packaging components larger than 25 grams shall be separable. All the packaging materials shall be able to be segregated into like materials without the use of tools (i.e., need to be able to have all the cardboard separable from the foams that are separable from the plastic bags).

Applies to: Packaging of products that are declared to conform to this Standard.

Verification Requirements:

a) Declaration from manufacturer

b) Documentation stating that dissimilar materials are not glued together.

References and Details: None available.

4.8.2.2 Optional—Packaging 90% recyclable and plastics labeled

Product Criterion: All plastics shall be identified by material type (SPI, DIN, or country specific) and 90% of the packaging (by weight) consists of readily recyclable materials that are commonly accepted in most recycling programs (and for which, on a regional basis, a recycling infrastructure is present) or can be composted or disposed of in municipal sewage programs. This includes: cardboard, boxboard, newsprint, and cornstarch. Pallets are excluded from the weight calculation.

Applies to: Packaging of products that are declared to conform to this Standard. Labeling requirement does not apply to plastic parts weighing less than 25g or with surface area less than 50 cm²; plastic protective and stretch wraps and labels; or plastic pieces when due to shape affixing a label is not possible.
Verification Requirements:

a) Declaration from manufacturer
b) Demonstration that material is normally recyclable or, if not, that there exists a market/use
c) Record of visual inspections

References and Details: For the definition of “recyclable” as applied to packaging refer to Section 260.7(d) of the FTC Guides for the Use of Environmental Marketing Claims [B12].

For some specific packaging materials, the presence or lack of an infrastructure at a regional level will need to be considered by the manufacturer wishing to demonstrate compliance with this criterion. Since this Standard will be used without regional variations, if a product is declared to this criterion, the manufacturer will need to provide a recycling vendor option in certain areas if the recycling infrastructure is not generally available in a region where the product will be used.

4.8.3 Recycled content

4.8.3.1 Required—Declaration of recycled content

Product Criterion: Manufacturer declares whether packaging contains recycled content, or does not. Manufacturer also declares approximate recycled content (by weight or volume specified by manufacturer) in the packaging materials used, with the approximate range of recycled content in each material.

Applies to: Packaging of products that are declared to conform to this Standard.

Verification Requirements:

a) Declaration from manufacturer
b) Supplier letter
c) Declaration of recycled content

References and Details: Manufacturer declares whether or not packaging contains any recycled content and must list each packaging material with the approximate range of recycled content that is in that material.

For example:

- Corrugated Cardboard Between 15% and 40%
- EPS Foam Between 2% and 5%
- Molded Pulp Between 60% and 100% postconsumer

4.8.3.2 Optional—Minimum postconsumer content guidelines

Product Criterion: Packaging shall meet or exceed the minimum postconsumer content for respective packaging in the U.S. EPA CPG over the course of a year using a weighted average.

Applies to: Packaging of products that are declared to conform to this Standard.

Verification Requirements:

a) Declaration from manufacturer
b) Supplier letter

c) Designation of CPG guideline that is met

References and Details: The CPG is available online.

Table 1—U.S. EPA’s recommended recovered fiber content levels for paperboard and packaging products

<table>
<thead>
<tr>
<th>Item</th>
<th>Postconsumer fiber (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrugated Containers &lt;300 psi</td>
<td>25 to 50</td>
</tr>
<tr>
<td>Corrugated Containers 300 psi</td>
<td>25 to 30</td>
</tr>
<tr>
<td>Solid Fiber Boxes</td>
<td>40</td>
</tr>
<tr>
<td>Folding Cartons</td>
<td>40 to 80</td>
</tr>
<tr>
<td>Industrial Paperboard (e.g., tubes, cores, drums, and cans)</td>
<td>45 to 100</td>
</tr>
<tr>
<td>Miscellaneous (e.g., pad backs, covered binders, book covers, mailing tubes, protective packaging)</td>
<td>75 to 100</td>
</tr>
<tr>
<td>Padded Mailers</td>
<td>5 to 15</td>
</tr>
<tr>
<td>Carrierboard</td>
<td>10 to 15</td>
</tr>
<tr>
<td>Brown Papers (wrapping paper and bags)</td>
<td>5 to 20</td>
</tr>
</tbody>
</table>

4.8.4 Take-back option

4.8.4.1 Optional—Provision of take-back program for packaging

Product Criterion: Manufacturer shall offer a take-back program for free where the packaging material can be collected/returned to manufacturer or recycler for reuse or recycling. This criterion is dependent on the region or country and may be declared by a manufacturer differently in different regions or countries.

Applies to: The marketing and sale to institutions of packaging of products that are declared to conform to this Standard.

Verification Requirements:

a) Declaration from manufacturer

b) Documentation of take-back service

c) Documentation of notification of user of take-back service

References and Details: None available.

4.8.5 Reuse option

4.8.5.1 Optional—Documentation of reusable packaging

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**Product Criterion:** Manufacturer shall provide a reusable packaging process that reuses the packaging for the same or similar product, at a competitive price. Manufacturer designs packaging for a minimum of five reuses. This criterion is dependent on the region or country and may be declared by a manufacturer differently in different regions or countries.

**Applies to:** Packaging of products that are declared to conform to this Standard. The following packaging elements are exempt from reusable criteria:

- Any individual packaging item < 25 grams
- Palletization material (stretch wrap, banding, and corner boards and edge protectors)
- Labels
- Security Seals, Straps, and Bands
- Protective bags, tapes, and films applied to the product or accessories
- Twist ties and small plastic fixtures ≤25g
- Accessory and media packaging that is intended to stay with the customer (e.g. CD cases/envelopes, "getting started" kits containing accessories, spare batteries, user guides)
- Desiccant packs

**Verification Requirements:**

- Declaration from manufacturer
- Documentation of packaging reuse system

**References and Details:** None available.
Annex A

(informative)

Bibliography

[B1] ASTM, D6866-04a, Test Methods for Determining the Biobased Content of Natural Range Materials Using Radiocarbon and Isotope Ratio Mass Spectrometry Analysis.\(^{15}\)

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[B5] IEEE Std 1394\(^{\text{TM}}\), IEEE Standard for High Performance Serial Bus Bridges\(^{18},^{19}\)

[B6] Rechargeable Battery Recycling Corporation, Battery Recycling Program.\(^{20}\)


[B8] U.S. Federal Electronics Challenge.\(^{22}\)


[B12] U.S. FTC, \textit{Guides for the Use of Environmental Marketing Claims}.\(^{26}\)

\(^{15}\) ASTM publications are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA (http://www.astm.org/).

\(^{16}\) European Union Directives are available from the portal Web site of the European Union at: http://europa.eu.int/.

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