

1 **IEEE P1680.1™/D2**
2 **Draft Standard for Environmental**
3 **Assessment of Personal Computer**
4 **Products, Including Notebook Personal**
5 **Computers, Desktop Personal**
6 **Computers, and Personal Computer**
7 **Displays**

8 Prepared by the 1680.1 Working Group of the
9 **Environmental Assessment Standards Committee**

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22 IEEE Standards Activities Department
23 445 Hoes Lane
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25

1 **Abstract:** IEEE Std. 1680.1 provides a clear and consistent set of performance criteria for the
2 design of personal computer products including notebook computers, desktop computers, and
3 computer displays thereby providing an opportunity to secure market recognition for efforts to
4 reduce the environmental impact of electronic products. This standard is intended to provide a
5 tool for government, institutional and corporate purchasers. Product manufacturers may also use
6 this tool to earn recognition in the consumer market, recognizing that certain criteria may not be
7 applicable to all types of purchasers. There are three levels of conformance with this Standard.
8 To achieve the first level, the product shall conform to all of the 23 required environmental criteria.
9 To achieve the second level, the product shall conform to all of the required criteria plus at least
10 50% of the 28 optional criteria, and to achieve the third level the product shall conform to all the
11 required criteria and at least 75% of the optional criteria. This Standard shall be updated and
12 revised on a periodic basis to continue to set a higher performance standard for leadership
13 products.
14 **Keywords:** computer, computer display, electronic product, electronic product design,
15 environment, environmental leadership, environmental performance, notebook computer,
16 personal computer
17

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1 Introduction

2
3 This introduction is not part of IEEE Std 1680.1/D2, Draft Standard for Environmental Assessment of
4 Personal Computer Products, Including Notebook Personal Computers, Desktop Personal Computers, and
5 Personal Computer Displays.
6

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

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

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17

1 **Participants**

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

4 **Holly Elwood, *Co-Chair***

5 **Wayne Rifer, *Co Chair***

- | | | | | | | |
|---|---|--------------|----|--------------|----|--------------|
| 6 | 7 | Participant1 | 10 | Participant4 | 13 | Participant7 |
| | 8 | Participant2 | 11 | Participant5 | 14 | Participant8 |
| | 9 | Participant3 | 12 | Participant6 | 15 | Participant9 |

16
17 The following members of the **[individual/entity]** balloting committee voted on this standard. Balloters
18 may have voted for approval, disapproval, or abstention.

19
20 (to be supplied by IEEE)

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1 Draft Standard for Environmental 2 Assessment of Personal Computer 3 Products, Including Notebook Personal 4 Computers, Desktop Personal 5 Computers, and Personal Computer 6 Displays

7 1. Overview

8 1.1 Scope

9 This Standard defines environmental performance criteria for personal computer products, including desktop
10 computers, notebook computers, and computer displays. The environmental performance criteria relate to
11 reduction or elimination of environmentally sensitive materials, materials selection, design for end of life, life
12 cycle extension, energy conservation, end of life management, corporate performance and packaging.
13 Guidelines and implementation procedures for this standard are included in the umbrella standard, IEEE
14 1680.

15 1.2 Purpose

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

21
22 The environmental performance criteria of this Standard are intended to define a measure of environmental
23 leadership in: the design and manufacture of personal computer products; the delivery of specified services
24 that are associated with the sale of the product; and in associated corporate performance characteristics.

25
26 This Standard is defined with the intention that the criteria are technically feasible to achieve, but that only
27 products demonstrating the leading environmental performance currently available in the marketplace would

1 meet them at the time of their adoption. As the environmental performance of products that are available in
 2 the marketplace improves, it is intended that the criteria will be updated and revised to set a higher
 3 performance standard for leadership products.

4 **1.3 Application**

5 The environmental performance criteria in Clause 4 apply to notebook personal computers, desktop personal
 6 computers, and personal computer displays. The principles and procedures identified in Clause 1 in the 1680
 7 umbrella standard apply to personal computer products. For further information on application see section
 8 1.3 of IEEE Standard 1680.

9 **1.4 Conformance with this Standard**

10 See section 1.4 of IEEE Standard 1680.

11 **1.5 Product Registration Entity and Market Surveillance Entity**

12 See section 1.5 of IEEE Standard 1680.

13 **1.6 Verification of conformance with this Standard**

14 See section 1.6 of IEEE Standard 1680.

15 **1.7 Qualified Verifier**

16 See section 1.7 of IEEE Standard 1680.

17 **2. Normative references**

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

24
 25 ASTM D256-05, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.¹

26
 27 CONEG, Model Legislation for Toxics in Packaging.²

28
 29 European Union, European Commission Directive 2006/66/EC of 6 September 2006 on batteries and
 30 accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC.³

31
 32 European Union, European Council Directive 2002/95/EC of the European Parliament and of the Council on
 33 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/>.

1
2 European Union, European Council Directive 2002/96/EC of the European Parliament and of the Council on
3 waste electrical and electronic equipment (WEEE).

4
5 European Union, European Council Directive 67/548/EEC of the European Council of 27 June 1967 on the
6 approximation of laws, regulations and administrative provisions relating to the classification, packaging and
7 labelling of dangerous substances.

8
9 European Union. The Eco-Management and Audit Scheme (EMAS).⁴

10
11 GRI, Sustainability Reporting Guidelines, 2002.⁵

12
13 ISO 11469:2000, Plastics—Generic identification and marking of plastics products.⁶

14
15 ISO 14001, Environmental management systems—Requirements with guidance for use.

16
17 U.S. EPA, Comprehensive Procurement Guidelines.⁷

18
19 U.S. EPA, ENERGY STAR®.⁸

20
21 U.S. EPA, National Environmental Performance Track Annual Performance Report.⁹

22
23 U.S. EPA, National Environmental Performance Track Application (7 March 2006).¹⁰

24
25 U.S. EPA, Plug-In To eCycling: Guidelines for Materials Management (May 2004).¹¹

26
27 U.S. Executive Order 13101, Greening the Government Through Waste Prevention, Recycling, and Federal
28 Acquisition.¹²

29 **3. Definitions, special terms, and acronyms**

30 For the purposes of this standard, the following terms and definitions apply. *The Authoritative Dictionary of*
31 *IEEE Standards* [B4]¹³ should be referenced for terms not defined in this clause.

32 **3.1 Definitions**

33 **3.1.1 biobased:** A material that is composed, in whole or in significant part, of biological materials or
34 renewable agricultural (including plant, animal, and marine materials) or forestry materials.

⁴ EMAS publications of the European Union are available from the Environment section of the portal Web site of the European Union at http://www.eu.int/comm/environment/emas/index_en.htm.

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/>).

⁷ This document is available from the IEEE Standards World Wide Web site, at <http://standards.ieee.org/downloads/1680/1680-2006/>.

U.S. EPA publications are available at: <http://www.epa.gov/cpg/>.

⁸ U.S. EPA Energy Star publications are available at: <http://www.energystar.gov/>.

⁹ This document is available from the IEEE Standards World Wide Web site, at <http://standards.ieee.org/downloads/1680/1680-2006/>.

U.S. EPA National Environmental Performance Track publications are available at <http://www.epa.gov/performance/track/index.htm>.

¹⁰ This document is available from the IEEE Standards World Wide Web site, at <http://standards.ieee.org/downloads/1680/1680-2006/>.

¹¹ This document is available from the IEEE Standards World Wide Web site, at <http://standards.ieee.org/downloads/1680/1680-2006/>.

U.S. EPA Plug-In publications are available at <http://www.epa.gov/epaoswer/osw/conserved/plugin/index.htm>

¹² U.S. Executive Order publications are available at: <http://www.ofee.gov/eo/eo.htm>.

¹³ The numbers in brackets correspond to those of the bibliography in Annex A.

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

11 **3.1.3 computer display:** A display screen and its associated electronics encased in a single housing, or within
12 the computer housing (e.g., notebook or integrated desktop computer), that is capable of displaying output
13 information from a computer via one or more inputs, such as a VGA, DVI, Display Port, and/or IEEE 1394.
14 Examples of computer display technologies are the cathode-ray tube (CRT) and liquid crystal display (LCD).

15 **3.1.4 desktop computer:** A computer where the main unit is intended to be located in a permanent location,
16 often on a desk or on the floor. Desktops are not designed for portability and utilize an external computer
17 display, keyboard, and mouse. Desktops are designed for a broad range of home and office applications.

18 **3.1.5 electronic products:** Products that are dependent on electric currents or electromagnetic fields in order
19 to work properly.

20 **3.1.6 environmental management system:** Part of an organization's management system used to develop
21 and implement its environmental policy and manage its environmental aspects.

22 **3.1.7 environmentally preferable:** Products or services that have a lesser or reduced effect on human health
23 and the environment when compared with competing products or services that serve the same purpose; the
24 product or service comparison may consider raw materials acquisition, production, manufacturing, packaging,
25 distribution, reuse, operation, maintenance, or disposal. (as defined in Executive Order 13101, Section 201.)

26 **3.1.8 homogeneous:** Of uniform composition throughout.

27 **3.1.9 incidental presence:** The presence of a regulated metal as an unintended or undesired ingredient of a
28 package or packaging component. (As specified in the Model Toxics in Packaging legislation developed by
29 the CONEG.)

30 **3.1.10 integrated desktop computer:** A desktop system in which the computer and computer display
31 function as a single unit which receives its ac power through a single cable. Integrated desktop computers
32 come in one of two possible forms: (1) a system where the computer display and computer are physically
33 combined into a single unit; or (2) a system packaged as a single system where the computer display is
34 separate but is connected to the main chassis by a dc power cord and both the computer and computer display
35 are powered from a single power supply. As a subset of desktop computers, integrated desktop computers are
36 typically designed to provide similar functionality as desktop systems.

37 **3.1.11 notebook and tablet computer:** A computer designed specifically for portability and to be operated
38 for extended periods of time either with or without a direct connection to an ac power source. Notebooks
39 must utilize an integrated computer display and be capable of operation off of an integrated battery or other
40 portable power source. In addition, most notebooks use an external power supply and have an integrated
41 keyboard and pointing device. Notebook computers are typically designed to provide similar functionality to
42 desktops, including operation of software similar in functionality as that used in desktops. For the purposes of
43 this standard, docking stations are considered accessories for notebook computers and therefore this standard
44 does not include them. Tablet PCs, which may use touch-sensitive screens along with or instead of other input
45 devices, are considered Notebook Computers in this standard.

1 **3.1.12 postconsumer:** A material or finished product that has served its intended use and has been discarded
 2 for disposal or recovery, having completed its life as a consumer item; part of the broader category of
 3 “recovered” items.

4 **3.1.13 product:** A marketing model and chassis type (and all its peripherals) versus a singular configuration
 5 of the product.

6 **3.1.14 recovered:** Waste materials and by-products reclaimed or diverted from solid waste, not including
 7 those materials and by-products generated from, and commonly reused within, an original manufacturing
 8 process.

9 **3.1.15 recyclable:** Materials or components that can be removed or recovered from the whole product or
 10 package and put back into productive use as a material, not including energy recovery, using standard
 11 technologies, or as otherwise demonstrated.

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

14 **3.1.16 recyclable resin stream:** A group of identifiable plastics that, mixed together, can be processed back
 15 into productive use as a material, not including energy recovery.

16 **3.1.17 recycled content:** A percentage number calculated by dividing the weight of recycled material of the
 17 type of material being measured, divided by the full weight of the material in the part or product. For
 18 example, if filler materials or additives are used in recycled plastics, the calculation of the recycled plastic
 19 content shall be made by dividing the weight of the recycled plastic in the part by the full weight of the plastic
 20 material, including additives and fillers, in the part or product. Additives or fillers shall not be considered
 21 recycled plastic, except in the case where the additives or fillers are derived from a recycled plastic feedstock.

22 **3.1.18 recycling:** A process by which materials or components are processed to be put back into productive
 23 use as a material or component, not including energy recovery.

24 **3.1.19 renewable/biobased plastic content:** A percentage number calculated by dividing the weight of
 25 renewable/biobased plastic material, divided by the full weight of the plastic material in the part or product.
 26 For example, if filler materials or additives are used in renewable/biobased plastics, the calculation of the
 27 renewable/biobased plastic content shall be made by dividing the weight of the renewable/biobased plastic
 28 resin in the part or product by the full weight of the plastic material, including additives, fillers and other
 29 plastics, in the part or product.

30 **3.1.20 renewable energy:** Resources that constantly renew themselves or that are regarded as practically
 31 inexhaustible.

32 **3.1.21 reusable:** Components or systems of components that can be removed or recovered from the whole
 33 product or package and put back into productive use as a component or system of components, not including
 34 energy recovery, using standard technologies, or as otherwise demonstrated.

35 **3.1.22 thin client:** An independently-powered computer that relies on a connection to remote computing
 36 resources to obtain primary functionality. Main computing (e.g., program execution, data storage, interaction
 37 with other Internet resources, etc.) takes place using the remote computing resources. Thin Clients covered by
 38 this standard are limited to devices with no rotational storage media integral to the computer. The main unit
 39 of a Thin Client covered by this standard must be intended for location in a permanent location (e.g. on a
 40 desk) and not for portability.

41 NOTE—See Section 260.7(d) of the FTC Guides for the Use of Environmental Marketing Claims [B12].
 42
 43

44 **3.1.23 workstation:** A high-performance, single-user computer typically used for graphics, CAD, software
 45 development, financial and scientific applications among other compute intensive tasks. To qualify as a
 46 workstation, a computer must:

- 1 • Be marketed as a workstation;
- 2 • Have a mean time between failures (MTBF) of at least 15,000 hours based on either Bellcore TR-
- 3 NWT-000332, issue 6, 12/97 or field collected data; and
- 4 • Support error-correcting code (ECC) and/or buffered memory.

5 In addition, a workstation must meet three of the following six optional characteristics:

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

16 **3.2 Special terms**

17 **3.2.1 compatible:** Paints and coatings on plastic parts are proven to be compatible with recycling processes
 18 if they do not significantly impact the physical/mechanical properties of the recycled resin. “Significant
 19 impact” is defined as >25% reduction in notched Izod impact at room temperature as measured using
 20 ASTM D256. This definition is based on a criterion developed by the Federal Electronics Challenge Plastics
 21 Task Force.

22 **3.2.2 first, second, and third tier recyclers:** first tier recycler is the organization that contracts with, or
 23 otherwise works directly with, the manufacturer, to receive and tear down product; second tier recycler is an
 24 organization that receives material from the first tier recycler and performs further processing, but has no
 25 direct relationship with the manufacturer; and third tier recycler is an organization that receives material from
 26 the second tier recycler and generally produces a commodity for sale and use, but has no direct relationship
 27 with the first tier recycler.

28 **3.2.3 homogeneous material:** European Union documentation [B2] provides the following guidance for
 29 homogeneous material: homogeneous material refers to a material that can not be mechanically disjointed
 30 into different materials. Examples of “homogeneous material” are individual types of: plastics, ceramics,
 31 glass, metals, alloys, paper, board, resins, and coatings. The term “mechanically disjointed” means that the
 32 materials can, in principle, be separated by mechanical actions such as: unscrewing, cutting, crushing,
 33 grinding, and abrasive processes.

1 **3.2.4 intentionally added:** The act of deliberately utilizing a regulated restricted substance in the formation
 2 of a product, component, package, or packaging component where its continued presence is desired in the
 3 final product, component, package, or packaging component to provide a specific characteristic, appearance,
 4 or quality. The use of recycled material as feedstock in the manufacture of a product, component or package,
 5 where some portion of the recycled material may contain residual amounts of a restricted substance, is not
 6 considered intentionally added, unless the restricted substance in the recycled material is used for the express
 7 purpose of imparting a specific characteristic, appearance or quality to the final product. The exclusion of
 8 recycled feedstock shall not apply to any cadmium, lead, mercury, or hexavalent chromium that has been
 9 recovered and/or separated from other materials for use as a metal or metallic compound.

10 **3.2.5 on average:** The term “on average” as used in the Standard in the phrase “product shall contain on
 11 average” shall mean that the desired material (e.g., recycled or biobased plastic) shall be present at the
 12 designated percentage in the total weight of like material (e.g., all plastic) within each unit for each product
 13 declared to the criterion.

14 **3.2.6 take-back:** A service provided by, or caused to be provided by, the manufacturer by which the product
 15 or packaging can be returned for reuse or recycling with no more than 10% of the returned material going to
 16 disposal or incineration.

17 **3.2.7 weighted average:** An average that takes into account the proportional relevance of each component,
 18 rather than treating each component equally.

19 3.3 Acronyms

20 **ASTM:** American Society of Testing and Materials

21 **CONEG:** Council of Northeast Governors

22 **CPG:** Comprehensive Procurement Guidelines

23 **CPU:** Central Processing Unit

24 **DIN:** Deutsches Institut für Normung (German Institute of Standardization)

25 **DVD:** Digital Versatile Disc

26 **EMAS:** Eco-Management and Audit Scheme

27 **EMS:** Environmental Management System

28 **EPEAT:** Electronic Product Environmental Assessment Tool

29 **EPS:** Expanded Polystyrene

30 **FTC:** Federal Trade Commission

31 **IEEE:** Institute of Electrical and Electronics Engineers, Inc.

32 **ISO:** International Organization for Standardization

33 **GRI:** Global Reporting Initiative

34 **OEM:** Original Equipment Manufacturer

35 **PCB:** Printed Circuit Board

36 **PVC:** Polyvinyl Chloride

37 **RBRC:** Rechargeable Battery Recycling Corporation

38 **RoHS:** Restriction on the use of certain hazardous substances in electrical and electronic equipment

39 **SCCP:** Short Chain Chlorinated Paraffins

40 **SPI:** Society of the Plastics Industry

41 **U.S. EPA:** United States Environmental Protection Agency

42 **USB:** Universal Serial Bus

43 **WEEE:** Waste electrical and electronic equipment

44

45

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

References and Details: The European RoHS Directive, formally known as Directive 2002/95/EC of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment, in its latest edition, stipulates the following thresholds for the presence of each substance within homogeneous materials.

| | |
|---|-----------|
| — 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.

1
2 **Applies to:** All covered products excluding batteries.

3
4 **Verification Requirements:**

- 5
6 a) Declaration from the manufacturer
7 b) Evidence of certification from component manufacturers that is based on either empirical data
8 demonstrating compliance or analytical test data demonstrating compliance

9
10 **References and Details:** None available.

11 **4.1.3 Mercury**

12 **4.1.3.1 Required—Reporting on amount of mercury used in light sources**

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

- 16 — 0 mg to 5 mg
17 — 5 mg to 10 mg
18 — 10 mg to 50 mg
19 — 50 mg to 100 mg
20 — 100 mg to 1000 mg
21 — Greater than 1000 mg
22

23
24 Optional reporting: maximum average mercury content per lamp.

25
26 **Applies to:** All computer displays, including stand-alone and integrated systems (i.e., flat panel displays,
27 notebook computers, CRTs).

28
29 **Verification Requirements:**

- 30 a) Declaration from manufacturer
31 b) Evidence of certification from component manufacturers that is based on either empirical data
32 demonstrating compliance or analytical test data demonstrating compliance
33

34
35 **References and Details:** None available.
36

37 **4.1.3.2 Optional—Low threshold for amount of mercury used in light sources**

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

39
40 **Applies to:** All flat panel computer displays.

41
42 **Verification Requirements:**

- 43 a) Declaration from manufacturer
44

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

3
4 **References and Details:** None available.

5 **4.1.3.3 Optional—Elimination of intentionally added mercury used in light sources**

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

8
9 **Applies to:** All flat panel computer displays.

10 **Verification Requirements:**

- 11
12
13 a) Declaration from manufacturer
14 b) Evidence of certification from component manufacturers that is based on either empirical data
15 demonstrating compliance or analytical test data demonstrating compliance

16
17 **References and Details:** None available.

18 **4.1.4 Lead**

19 **4.1.4.1 Optional—Elimination of intentionally added lead in certain applications**

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

23
24 **Applies to:** Computer displays only, including stand-alone units and those components of an integrated unit,
25 e.g., a notebook computer, that are directly used to generate an image. This does not apply to European RoHS
26 Directive exemptions.

27 **Verification Requirements:**

- 28
29
30 a) Declaration from manufacturer
31 b) Evidence of certification from component manufacturers that is based on either empirical data
32 demonstrating compliance or analytical test data demonstrating compliance

33
34 **References and Details:** None available.

35 **4.1.5 Hexavalent chromium**

36 **4.1.5.1 Optional—Elimination of intentionally added hexavalent chromium**

37
38 **Product Criterion:** Traces of hexavalent chromium shall not exceed 500 ppm in homogeneous materials
39 unless it can be shown that the hexavalent chromium is present above this threshold due to the use of recycled
40 content.

41
42 **Applies to:** All covered products.
43

1 **Verification Requirements:**
2

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

6
7 **References and Details:** None available.

8 **4.1.6 Flame retardants and plasticizers**

9 **4.1.6.1 Required—Elimination of intentionally added SCCP¹⁴ flame retardants and**
10 **plasticizers in certain applications**

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

15
16 **Applies to:** All covered products.

17
18 **Verification Requirements:**

- 19 a) Declaration from manufacturer
20
21 b) Evidence of certification from component manufacturers that is based on either empirical data
22 demonstrating compliance or analytical test data demonstrating compliance

23
24 **References and Details:** None available.

25 **4.1.6.2 Optional—Large plastic parts free of certain flame retardants classified under**
26 **European Council Directive 67/548/EEC**

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

29
30 **Applies to:** All covered products.

31
32 **Verification Requirements:**

- 33 a) Declaration from manufacturer
34
35 b) Evidence of certification from component manufacturers that is based on either empirical data
36 demonstrating compliance or analytical test data demonstrating compliance

37
38 **References and Details:** European Council Directive 67/548/EEC of 27 June 1967 on the approximation of
39 laws, regulations and administrative provisions relating to the classification, packaging and labeling of
40 dangerous substances. Chemicals classified under European Council Directive 67/548/EEC as the following
41 may not be used as flame retardants in plastic parts:

- 42
43 — R45 may cause cancer

¹⁴ Chemical Abstracts Service number 63449-39-8.

- 1 — R46 may cause heritable genetic damage
- 2 — R50-R51-R52 are very toxic to aquatic organisms
- 3 — R60 may impair fertility
- 4 — R61 may cause harm to an unborn child

5
6 NOTE—Many flame retardants may not have these classifications because they have not been tested. To gain this
7 optional point, equipment manufacturers and suppliers would have to request that the materials be tested if they are not
8 currently classified. As a result, this criterion provides an incentive for chemical companies to run the necessary tests in
9 order to satisfy demand by equipment manufacturers and suppliers. It also ensures that any alternatives to current flame
10 retardants would have to meet minimum requirements for hazard evaluation.

11 4.1.7 Batteries

12 4.1.7.1 Optional—Batteries free of lead, cadmium, and mercury

13 **Product Criterion:** With the exemption of technically unavoidable impurities, batteries and accumulators
14 (internal to the computer system) shall not contain any lead, cadmium, or mercury. Such impurities shall not
15 exceed the limiting values as specified in the European Council and Commission Directive (2006/66/EC).

16
17 **Applies to:** All covered products.

18 19 **Verification Requirements:**

- 20 a) Declaration from manufacturer
- 21 b) Evidence of certification from component manufacturers that is based on either empirical data
22 demonstrating compliance or analytical test data demonstrating compliance
23

24
25 **References and Details:** European Commission Directive 2006/66/EC of 6 September 2006 on batteries and
26 accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC.
27

28 4.1.8 Polyvinyl chloride and chlorinated plastics

29 4.1.8.1 Optional—Large plastic parts free of PVC

30 **Product Criterion:** Eliminate PVC in parts >25 g.

31
32 **Applies to:** All covered products. Cables and interconnect parts are exempt. Examples of interconnect parts
33 are plugs and sockets.

34 35 **Verification Requirements:**

- 36 a) Declaration from manufacturer
- 37 b) Evidence of certification from component manufacturers that is based on either empirical data
38 demonstrating compliance or analytical test data demonstrating compliance
39

40
41 **References and Details:** None available.

42 4.2 Materials selection

1 **4.2.1 Total recycled plastics content**

2 **4.2.1.1 Required—Declaration of postconsumer recycled plastic content**

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

5
6 **Applies to:** All covered products that contain plastics, excluding PCB and packaging.

7
8 **Verification Requirements:**

- 9
10 a) Declaration from manufacturer
11 b) Supplier letter
12 c) Documentation of calculation

13
14 **References and Details:** None available.

15 **4.2.1.2 Optional—Minimum content of postconsumer recycled plastic**

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

18
19 **Applies to:** All covered products that contain plastics, excluding PCB.

20
21 **Verification Requirements:**

- 22
23 a) Declaration from manufacturer
24 b) Supplier letter
25 c) Documentation of calculation

26
27 **References and Details:** None available.

28 **4.2.1.3 Optional—Higher content of postconsumer recycled plastic**

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

31
32 **Applies to:** All covered products that contain plastics, excluding PCB.

33
34 **Verification Requirements:**

- 35
36 a) Declaration from manufacturer
37 b) Supplier letter
38 c) Documentation of calculation

39
40 **References and Details:** None available.

41 **4.2.2 Renewable/biobased plastic materials**

42 **4.2.2.1 Required—Declaration of renewable/biobased plastic materials content**

1 **Product Criterion:** Manufacturer declares percentage of renewable/biobased plastic materials measured as a
 2 percentage of total plastic (by weight) in each product.

3
 4 **Applies to:** All plastic parts, excluding packaging.

5
 6 **Verification Requirements:**

- 7
 8 a) Declaration from manufacturer
 9 b) Supplier letter
 10 c) Documentation of calculation

11
 12 **References and Details:** The percent of biobased/renewable plastic will be calculated by taking a weighted
 13 average of the percent biobased/renewable plastic in all plastics in the product.

14
 15 Under Section 9002 of the Farm Security and Rural Investment Act of 2002 [B9], biobased products are
 16 defined as a product “that is composed, in whole or in significant part, of biological products or renewable
 17 agricultural materials (including plant, animal, and marine materials) or forestry materials.”

18
 19 The U.S. Department of Agriculture’s framework rule for Federal purchasing of biobased products, 70 FR
 20 1792, 11 January 2005 [B10], cites the intent of the Farm Security and Rural Investment Act is “to stimulate
 21 the production of new biobased products and to energize emerging markets for those products.”

22
 23 Verification of biobased content is determined using the ASTM D6866-04a [B1].

24 **4.2.2.2 Optional—Minimum content of renewable/biobased plastic material**

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

27
 28 **Applies to:** All plastic parts, excluding packaging.

29
 30 **Verification Requirements:**

- 31
 32 a) Declaration from manufacturer
 33 b) Supplier letter
 34 c) Documentation of calculation

35
 36 **References and Details:** Refer to Section 9002 of the Farm Security and Rural Investment Act of 2002 [B9];
 37 the U.S. Department of Agriculture’s framework rule for Federal purchasing of biobased products, 70 FR
 38 1792, 11 January 2005 [B10]. Verification of biobased content is determined using ASTM D6866-04a [B1].

39 **4.2.3 Dematerialization**

40 **4.2.3.1 Required—Declaration of product weight**

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

42
 43 **Applies to:** All covered products, excluding packaging.

44
 45 **Verification Requirements:**

- 46
 47 — Declaration of product weight $\pm 5\%$

1
2 **References and Details:** None available.

3 **4.3 Design for end of life**

4 **4.3.1 Design for recovery through recycling systems that utilize shredding**

5 **4.3.1.1 Required—Identification of materials with special handling needs**

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

9
10 **Applies to:** All covered products.

11
12 **Verification Requirements:**

13
14 — Declaration by manufacturer as to how information is provided to reuse and recycling facilities or
15 web link to where information is available

16
17 **References and Details:** “Nonstandard or new” substances or technologies shall refer to substances or
18 technologies that are rarely encountered in the end-of-life stream of products such that recycling and reuse
19 enterprises would not develop methods to deal with them. If a new substance or technology is introduced and
20 in time becomes commonplace such that recycling and reuse enterprises develop methods of dealing with
21 them, then they shall no longer meet this definition.

22 **4.3.1.2 Required—Elimination of paints or coatings that are not compatible with recycling or 23 reuse**

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

26
27 **Applies to:** All covered products.

28
29 **Verification Requirements:**

30
31 a) Declaration from manufacturer
32 b) Documentation showing manufacturer test, or supplier verification if paints or coatings are used
33 on plastic parts >100 g

34
35 **References and Details** “Compatible,” as defined in 3.2, is based on a criterion developed by the Plastics
36 Task Force of the U.S. Federal Electronics Challenge [B8].

37 **4.3.1.3 Required—Easy disassembly of external enclosure**

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

40
41 **Applies to:** All covered products.

42
43 **Verification Requirements:**

- 1
2 a) Declaration from manufacturer
3 b) Supporting documentation that the external enclosure design does not unreasonably obstruct the
4 disassembly process. Examples of documentation include:
5
6 i) A list of the commonly available tools required to disassemble the external enclosure,
7 and instructions for disassembly that show how the external enclosure can be easily
8 removed, or
9 ii) A statement from a minimum of three recyclers individually, or at least one recycler
10 working under an independent entity with electronics recycling expertise that is not a
11 trade organization, confirming that the product design meets requirements of 4.3.1.3.

12
13 **References and Details:** None available.

14 **4.3.1.4 Required—Marking of plastic components**

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

17
18 **Applies to:** All plastic components >100 g in the product

19 **Verification Requirements:**

- 20
21 a) Declaration from manufacturer
22 b) Record of visual inspection

23
24 **References and Details:** ISO 11469:2000 specifically applies to parts weighing 25 g or more. However, this
25 criterion only applies to parts of 100 g or more, with the assumption that only those larger parts will be
26 separated in most current recycling processes that rely on shredding.

27 **4.3.1.5 Required—Identification and removal of components containing hazardous materials**

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

30
31 **Applies to:** All covered products.

32 **Verification Requirements:**

- 33
34 a) Declaration from manufacturer
35 b) Supporting documentation that the design assures the safe and easy identification and removal of
36 components containing hazardous materials. Examples of documentation could be:
37
38 i) A list of the commonly available tools required to remove components containing
39 hazardous materials, and instructions for disassembly that show how the components
40 containing hazardous materials can be easily identified and removed, or
41 ii) A statement from a minimum of three recyclers individually, or at least one recycler
42 working under an independent entity with electronics recycling expertise that is not a
43 trade organization, confirming that the product design meets requirements of 4.3.1.5.

1 **References and Details:** Hazardous materials are those materials defined under Annex II of the European
 2 WEEE Directive, Directive 2002/96/EC of the European Parliament and of the Council on waste electrical
 3 and electronic equipment (WEEE).

4 **4.3.1.6 Optional—Reduced number of plastic material types**

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

6
 7 **Applies to:** Enclosures for all covered products.

8 9 **Verification Requirements:**

- 10
 11 a) Declaration from manufacturer
 12 b) Supplier letter

13
 14 **References and Details:** None available.
 15

16 **4.3.1.7 Optional—Molded/glued in metal eliminated or removable**

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

19
 20 **Applies to:** All covered products.

21 22 **Verification Requirements:**

- 23
 24 a) Declaration from manufacturer
 25 b) Supporting documentation demonstrating that the plastic enclosures do not incorporate adhesives
 26 or molding for metal inserts or that they are easily removable. Examples of documentation that
 27 they are easily removable could be:
 28
 29 i) A list of the commonly available tools required to remove metal inserts, and
 30 instructions for disassembly that show how the metal inserts can be easily removed, or
 31 ii) A statement from a minimum of three recyclers individually, or at least one recycler
 32 working under an independent entity with electronics recycling expertise that is not a
 33 trade organization, confirming that the product design meets requirements of 4.3.1.7.

34
 35 **References and Details:** None available.

36 **4.3.1.8 Required—Minimum 65% reusable/recyclable**

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

39
 40 **Applies to:** All covered products.

41 42 **Verification Requirements:**

- 43
 44 a) Declaration from manufacturer
 45 b) Description of demonstrated recycling technologies

- 1 c) Demonstration that material is normally recyclable or, if not, that there exists a market/use
2

3 **References and Details:** Declaration by manufacturer of the material and components and how they can be
4 recycled or reused within the existing infrastructure and demonstrated technologies.
5

6 For further explanation of when a product or packaging can be claimed to be reusable or recyclable see
7 definitions in 3.1.
8

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

11 **4.3.1.9 Optional—Minimum 90% reusable/recyclable**

12 **Product Criterion:** 90% or greater of materials and components by weight shall be reusable or recyclable
13 within the current infrastructure and using demonstrated technologies.
14

15 **Applies to:** All covered products.
16

17 **Verification Requirements:**

- 18 a) Declaration from manufacturer
19
20 b) Description of demonstrated recycling technologies
21
22 c) Demonstration that material is normally recyclable or, if not, that there exists a market/use
23

24 **References and Details:** Declaration by manufacturer of the material and components and how they can be
25 recycled or reused within the existing infrastructure and demonstrated technologies.
26

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

29 **4.3.2 Design for recovery through disassembly**

30 **4.3.2.1 Optional—Manual separation of plastics**

31 **Product Criterion:** All plastic parts >25 g used in product shall be manually separable by one person alone
32 with commonly available tools into recyclable resin streams.
33

34 **Applies to:** All covered products.
35

36 **Verification Requirements:**

- 37 a) Declaration from manufacturer
38
39 b) Supporting documentation demonstrating that qualifying plastic components are manually
40 separable with commonly available tools into recyclable resin streams and identifying the plastic
41 composition of each recyclable resin stream. Examples of documentation include:
42
43 i) A list of the commonly available tools required to separate plastic components, and
44 instructions for disassembly that show how the resin streams can be separated, or

- 1 ii) A statement from a minimum of three recyclers individually, or at least one recycler
2 working under an independent entity with electronics recycling expertise that is not a
3 trade organization, confirming that the product design meets requirements of 4.3.2.1.

4
5 **References and Details:** None available.

6 **4.3.2.2 Optional—Marking of plastics**

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

9
10 **Applies to:** All plastic components >25 g.

11 **Verification Requirements:**

- 12
13
14 a) Declaration from manufacturer
15 b) Record of visual inspection

16
17 **References and Details:** ISO 11469:2000.
18

19 **4.4 Product longevity/life cycle extension**

20 **4.4.1 Manufacturer warranty/service agreement**

21 **4.4.1.1 Required—Availability of additional three year warranty or service agreement**

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

24
25 **Applies to:** All covered products.

26 **Verification Requirements:**

- 27
28 a) Declaration from manufacturer
29 b) Documentation of warranty or service contract
30

31
32 **References and Details:** None available.

33 **4.4.2 Upgradeability**

34 **4.4.2.1 Required—Upgradeable with common tools**

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

- 36 — Hard disk, digital versatile disc (DVD), floppy drive can be changed or extended [e.g., by a high
37 performance serial bus (IEEE Std 1394™ [B5]) or universal serial bus (USB)]
38 — Memory and cards can be changed or extended [e.g., by a high performance serial bus (IEEE
39 Std 1394)].
40

1 **Applies to:** Desktop personal computers and notebook personal computers only.
2

3 **Verification Requirements:**
4

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

13
14 **References and Details:** Upgrading of product may be limited to designated service entities or manufacturer.
15

16 **4.4.2.2 Optional—Modular design**

17 **Product Criterion:** Product shall have a modular design; for example, major components/processor can be
18 changed.
19

20 **Applies to:** Desktop personal computers and notebook personal computers only.
21

22 **Verification Requirements:**
23

- 24 a) Declaration from manufacturer
25 b) Description of product modules
26 c) Description of module change method
27

28 **References and Details:** None available.

29 **4.4.3 Product life extension**

30 **4.4.3.1 Optional—Availability of replacement parts**

31 **Product Criterion:** Spare parts and/or compatible replacement parts shall be available five years after end of
32 production. Information on how to obtain replacement parts shall be provided to user.
33

34 **Applies to:** All covered products.
35

36 **Verification Requirements:**
37

- 38 a) Declaration from manufacturer
39 b) Description of how product user is informed about how to obtain replacement parts
40

41 **References and Details:** None available.

42 **4.5 Energy conservation**

1 4.5.1 Power management system

2 4.5.1.1 Required—ENERGY STAR®

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

6
7 **Applies to:** All covered products.

8 9 **Verification Requirements:**

- 10
11 a) Declaration from manufacturer
12 b) Demonstration of ENERGY STAR qualification or compliance with all applicable eligibility
13 criteria of the US ENERGY STAR program requirements.

14
15 **References and Details:** All products shall either be qualified to or comply with the eligibility criteria of the
16 US ENERGY STAR program requirements that are applicable for the declared product at the time of
17 declaration to the Standard. If ENERGY STAR eligibility criteria are modified, all products must be declared
18 to the new eligibility criteria of the ENERGY STAR program requirements.

19
20 “Qualified to” or “qualification” is ENERGY STAR’s term for products that are listed with ENERGY STAR
21 as meeting all of ENERGY STAR’s “program requirements”, including all partner commitments for labeling,
22 marketing, etc., and all eligibility criteria.

23
24 “Compliant with the eligibility criteria of the ENERGY STAR program requirements” relative to IEEE
25 1680.1 means the product meets the technical specifications for energy efficiency (including relevant test
26 procedures) as listed in the “eligibility requirements” provided by the ENERGY STAR program, but the
27 product is not necessarily listed as a qualified product with the ENERGY STAR program.

28 4.5.1.2 Optional—Early adoption of new ENERGY STAR specification

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

31
32 **Applies to:** All covered products.

33 34 **Verification Requirements:**

- 35
36 a) Declaration from manufacturer
37 b) Demonstration of ENERGY STAR qualification, or compliance with the ENERGY STAR
38 eligibility criteria

39
40 **References and Details:** Product may receive this optional early adopter point for compliance with any new
41 tier or new version of the eligibility criteria of the ENERGY STAR program requirements. The product will
42 retain that optional point after the new tier or version becomes effective, but a single product can only receive
43 one early adopter point.

44
45 For instance, a new tier or new version of ENERGY STAR implements through adopting new specifications,
46 and a period of time is defined before they go into effect. Product must be compliant with all applicable
47 product specifications of a new tier or new version of the ENERGY STAR program after the product
48 specifications have been adopted but before they go into effect.

1 4.5.2 Use of renewable energy

2 4.5.2.1 Optional—Renewable energy accessory available

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

6
7 **Applies to:** All covered products.

8 9 **Verification Requirements:**

- 10
11 a) Declaration from manufacturer
12 b) Commercial documentation of product availability

13
14 **References and Details:** Renewable energy includes solar, fuel cells, wind, geothermal, hydro and biomass.
15 Although particular geothermal formations can be depleted, the natural heat in the earth is a virtually
16 inexhaustible reserve of potential energy. Renewable resources also include some experimental or less-
17 developed sources such as tidal power, sea currents, and ocean thermal gradients.

18 4.5.2.2 Optional—Renewable energy accessory standard

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

22
23 **Applies to:** All covered products.

24 **Verification Requirements:**

- 25
26 a) Declaration from manufacturer
27 b) Commercial documentation of product availability

28
29 **References and Details:** Renewable energy includes solar, fuel cells, wind, geothermal, hydro, and biomass.
30 Although particular geothermal formations can be depleted, the natural heat in the earth is a virtually
31 inexhaustible reserve of potential energy. Renewable resources also include some experimental or less-
32 developed sources such as tidal power, sea currents, and ocean thermal gradients.

33 4.6 End of life management

34 4.6.1 Product take-back

35 4.6.1.1 Required—Provision of product take-back service

36 **Annual Corporate Declaration Criterion:** Manufacturer shall provide a take-back or recycling service at a
37 competitive price that meets U.S. EPA's "Plug-In To eCycling: Guidelines for Materials Management,"
38 published May 2004. This criterion is applicable only in those regions or countries for which the product is
39 declared on the Registry.
40

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

3
 4 **Verification Requirements:**

- 5
 6 a) Declaration from manufacturer
 7 b) Documentation of take-back service
 8 c) Documentation of notification of user of take-back service
 9 d) Documentation of service certification to the U.S. EPA's Plug-In To eCycling: Guidelines for
 10 Materials Management.
 11 e) Documentation that demonstrates the service is offered at a competitive price

12
 13 **References and Details:** "Plug-In To eCycling: Guidelines for Materials Management" refers to the U.S.
 14 EPA document published in May 2004.

15
 16 Purchaser is not obligated to contract with OEM for end of life management service.

17
 18 End of life management services may be provided via contracts.

19 **4.6.1.2 Optional—Auditing of recycling vendors**

20 **Annual Corporate Declaration Criterion:** An annual audit is performed of all first, second, and third tier
 21 recyclers' facilities; this ensures that the recycler is complying in full with all Plug-In Guidelines, as
 22 published in May 2004, and with any and all applicable regulations and laws. This criterion is dependent on
 23 the region or country and may be declared by a manufacturer differently in different regions or countries.
 24

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

27
 28 **Verification Requirements:**

- 29
 30 a) Declaration by manufacturer
 31 b) Documentation of on-site visits
 32 c) Documentation of all facilities' compliance with environmental, health, and safety and
 33 import/export laws
 34

35 **References and Details:** None available.

36 **4.6.2 Rechargeable battery recycling**

37 **4.6.2.1 Required—Provision of a rechargeable battery take-back service**

38 **Annual Corporate Declaration Criterion:** Manufacturers shall provide a rechargeable battery take-back
 39 service at a competitive price that is equivalent to or better than that provided by the RBRC [B6]. In the
 40 annual corporate declaration manufacturers must explain how the service applies to products declared to this
 41 Standard, and must provide information about that service. A manufacturer may provide different information
 42 for different regions or countries regarding the service and how it applies to declared products. This criterion
 43 is applicable only in those regions or countries for which the product is declared on the Registry.
 44

45 **Applies to:** The marketing and sale to institutions of batteries in products that are declared to conform to this
 46 Standard.

1
2 **Verification Requirements:**
3

- 4 a) Declaration from manufacturer
5 b) Documentation of battery take-back service
6 c) Documentation of notification of user of battery take-back service
7 d) If a take back service other than RBRC is provided, the manufacturer shall provide the following:
8 i) Documentation of amounts returned
9 ii) Demonstration that, in comparison to RBRC, it is equivalent in cost or less expensive
10 to the user and is equivalently convenient for the user
11

12 **References and Details:** Covers Lithium-ion batteries used in notebook personal computers. Affix RBRC
13 seal, or appropriate recycling system notification, to battery and make information available on Web site or
14 product literature. Information on RBRC is available online.
15

16 Participating in the RBRC Program as a Licensee qualifies for this criterion for the geographic regions within
17 which RBRC services are provided. If a program other than RBRC is provided, it must report amounts
18 returned and demonstrate that in comparison to RBRC it is equivalent or less expensive in cost to the user and
19 is equivalently convenient for the user.
20

21 **4.7 Corporate performance**

22 **4.7.1 Corporate environmental policy**

23 **4.7.1.1 Required—Demonstration of corporate environmental policy consistent with**
24 **ISO 14001**

25 **Annual Corporate Declaration Criterion:** Manufacturer shall demonstrate the existence and public
26 availability of a written corporate environmental policy consistent with all aspects of the requirements laid
27 out in the environmental policy section of ISO 14001.
28

29 **Applies to:** All manufacturers with products that are declared to conform to this Standard.
30

31 **Verification Requirements:**
32

- 33 a) Declaration from manufacturer
34 b) Copy of environmental policy indexed to ISO 14001 requirements
35

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

38 **4.7.2 Environmental management system**

39 **4.7.2.1 Required—Self-certified environmental management system for design and**
40 **manufacturing organizations**

1 **Annual Corporate Declaration Criterion:** OEM shall have self-certified, with or without independent
 2 assessment, that the OEM-owned organizations that have significant responsibility for the design and
 3 manufacture of the declared product have an operational EMS that meets either:

- 4
- 5 — The requirements of ISO 14001 or EMAS; or
- 6 — The EMS requirements of the U.S. EPA National Environmental Performance Track program.
 7 This does not require participation in the Performance Track program.

8

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

10

11 **Verification Requirements:**

- 12
- 13 a) Declaration from manufacturer
- 14 b) Documentation of self-certification to the specified standard

15

16 **References and Details:** ISO 14001 and EMAS are available online. The EMS requirements of the U.S. EPA
 17 Performance Track program are described in the Performance Track Application (questions 1 through 10) and
 18 the corresponding EMS Worksheet section of its Application Help instructions document.
 19

20 **4.7.2.2 Optional—Third-party certified environmental management system for design and**
 21 **manufacturing organizations**

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

- 23
- 24 — All OEM-owned design and manufacturing organizations have registered ISO 14001 or EMAS
 25 EMSs; or
- 26 — Its EMS meets EMS requirements of the U.S. EPA National Environmental Performance Track
 27 program, including a successful independent assessment by a qualified lead auditor.

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

29

30

31 **Verification Requirements:**

- 32
- 33 a) Declaration from manufacturer
- 34 b) Documentation of registration to ISO or EMAS, or documentation of third-party certification to
 35 Performance Track

36

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

40 **4.7.3 Corporate reporting**

41 **4.7.3.1 Required—Corporate report consistent with Performance Track or GRI**

42 **Annual Corporate Declaration Criterion:** OEM shall produce an annual report that meets the first three
 43 reporting requirements of the U.S. EPA National Environmental Performance Track program or the GRI
 44 Sustainability Reporting Guidelines (2002). The word “corporation” may be substituted for “facility” in the
 45 requirements.

1
2 **Applies to:** All manufacturers with products that are declared to conform to this Standard.

3
4 **Verification Requirements:**

- 5
6 a) Declaration from manufacturer
7 b) Copy of annual report
8 c) Index to report showing reports compliance with first three Performance Track requirements
9 (listed below in References and Details) and/or GRI.

10
11 **References and Details:** The Performance Track Annual Performance Report requirements applicable to this
12 criterion include the following:

- 13
14 — A summary of the facility's EMS assessment activities and progress towards meeting EMS
15 objectives and targets, including brief descriptions of audits conducted and improvements made
16 — A brief report on progress made in meeting the facility's environmental performance
17 commitments
18 — A summary of the facility's public outreach activities

19
20 Manufacturers may meet the reporting criteria on the corporate level, rather than the facility level as specified
21 in the Performance Track requirements.

22
23 An Annual Performance Report format and preparation instructions are available from the U.S. EPA Web
24 site.

25 **4.7.3.2 Optional—Corporate report based on GRI**

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

30
31 **Applies to:** All manufacturers with products that are declared to conform to this Standard.

32
33 **Verification Requirements:**

- 34
35 a) Declaration from manufacturer
36 b) Copy of annual report
37 c) Index to report showing how report is based on GRI
38

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

40 **4.8 Packaging**

41 **4.8.1 Toxics in packaging**

42 **4.8.1.1 Required—Reduction/elimination of intentionally added toxics in packaging**

1 **Product Criterion:** Heavy metals shall not be intentionally added to any packaging or packaging component,
 2 with the exception of the recycled content exemption cited in References and Details. For incidental presence,
 3 the sum of the concentration levels of lead, cadmium, mercury, and hexavalent chromium present in any
 4 package or packaging component shall not exceed 100 ppm by weight (0.01%).
 5

6 **Applies to:** Packaging of products that are declared to conform to this Standard.
 7

8 **Verification Requirements:**
 9

- 10 a) Declaration from manufacturer
 11 b) Supplier letter
 12

13 **References and Details:** This criterion is drawn from the Model Toxics in Packaging legislation (referred to
 14 as “Act” below) developed by CONEG, which is available online.
 15

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

23 **4.8.2 Recyclable packaging materials**

24 **4.8.2.1 Required—Separable packing materials**

25 **Product Criterion:** Non-reusable packaging components larger than 25 grams shall be separable. All the
 26 packaging materials shall be able to be segregated into like materials without the use of tools (i.e., need to be
 27 able to have all the cardboard separable from the foams that are separable from the plastic bags).
 28

29 **Applies to:** Packaging of products that are declared to conform to this Standard.
 30

31 **Verification Requirements:**
 32

- 33 a) Declaration from manufacturer
 34 b) Documentation stating that dissimilar materials are not glued together.
 35

36 **References and Details:** None available.

37 **4.8.2.2 Optional—Packaging 90% recyclable and plastics labeled**

38 **Product Criterion:** All plastics shall be identified by material type (SPI, DIN, or country specific) and 90%
 39 of the packaging (by weight) consists of readily recyclable materials that are commonly accepted in most
 40 recycling programs (and for which, on a regional basis, a recycling infrastructure is present) or can be
 41 composted or disposed of in municipal sewage programs. This includes: cardboard, boxboard, newsprint, and
 42 cornstarch. Pallets are excluded from the weight calculation.
 43

44 **Applies to:** Packaging of products that are declared to conform to this Standard. Labeling requirement does
 45 not apply to plastic parts weighing less than 25g or with surface area less than 50 cm²; plastic protective and
 46 stretch wraps and labels; or plastic pieces when due to shape affixing a label is not possible.
 47

1 **Verification Requirements:**

- 2
- 3 a) Declaration from manufacturer
- 4 b) Demonstration that material is normally recyclable or, if not, that there exists a market/use
- 5 c) Record of visual inspections

6

7 **References and Details:** For the definition of “recyclable” as applied to packaging refer to Section 260.7(d)

8 of the FTC Guides for the Use of Environmental Marketing Claims [B12].

9

10 For some specific packaging materials, the presence or lack of an infrastructure at a regional level will need

11 to be considered by the manufacturer wishing to demonstrate compliance with this criterion. Since this

12 Standard will be used without regional variations, if a product is declared to this criterion, the manufacturer

13 will need to provide a recycling vendor option in certain areas if the recycling infrastructure is not generally

14 available in a region where the product will be used.

15 **4.8.3 Recycled content**

16 **4.8.3.1 Required—Declaration of recycled content**

17 **Product Criterion:** Manufacturer declares whether packaging contains recycled content, or does not.

18 Manufacturer also declares approximate recycled content (by weight or volume specified by manufacturer) in

19 the packaging materials used, with the approximate range of recycled content in each material.

20

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

22 **Verification Requirements:**

- 23
- 24 a) Declaration from manufacturer
- 25 b) Supplier letter
- 26 c) Declaration of recycled content

27

28 **References and Details:** Manufacturer declares whether or not packaging contains any recycled content *and*

29 must list each packaging material with the approximate range of recycled content that is in that material.

30

31 For example:

| | | |
|----|------------------------|-----------------------------------|
| 32 | — Corrugated Cardboard | Between 15% and 40% |
| 34 | — EPS Foam | Between 2% and 5% |
| 35 | — Molded Pulp | Between 60% and 100% postconsumer |

36 **4.8.3.2 Optional—Minimum postconsumer content guidelines**

37 **Product Criterion:** Packaging shall meet or exceed the minimum postconsumer content for respective

38 packaging in the U.S. EPA CPG over the course of a year using a weighted average.

39

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

41

42 **Verification Requirements:**

- 43
- 44 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

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

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

1 **Product Criterion:** Manufacturer shall provide a reusable packaging process that reuses the packaging for
2 the same or similar product, at a competitive price. Manufacturer designs packaging for a minimum of five
3 reuses. This criterion is dependent on the region or country and may be declared by a manufacturer differently
4 in different regions or countries.
5

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

- 8 a) Any individual packaging item < 25 grams
- 9 b) Palletization material (stretch wrap, banding, and corner boards and edge protectors)
- 10 c) Labels
- 11 d) Security Seals, Straps, and Bands
- 12 e) Protective bags, tapes, and films applied to the product or accessories
- 13 f) Twist ties and small plastic fixtures $\leq 25\text{g}$
- 14 g) Accessory and media packaging that is intended to stay with the customer (e.g. CD
15 cases/envelopes, "getting started" kits containing accessories, spare batteries, user guides)
- 16 h) Desiccant packs

17
18 **Verification Requirements:**

- 19 a) Declaration from manufacturer
- 20 b) Documentation of packaging reuse system

21
22
23 **References and Details:** None available.
24

1 **Annex A**

2 (informative)

3 **Bibliography**4 [B1] ASTM, D6866-04a, Test Methods for Determining the Biobased Content of Natural Range Materials
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15 *Federal procurement of biobased products*. Pub. L. 107-171.²³16 [B10] U.S. Department of Agriculture, *Guidelines for Designating Biobased Products for Federal*
17 *Procurement*. Federal Register, 11 Jan 2005: 1792-1812.²⁴18 [B11] U.S. Department of Energy, Federal Energy Management Program, How to Buy Products with Low
19 Standby Power.²⁵20 [B12] U.S. FTC, *Guides for the Use of Environmental Marketing Claims*.²⁶

21

22

23

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/>.

¹⁷ Information available online at: <http://www.blauer-engel.de/>.

¹⁸ The IEEE standards referred to in this annex are trademarks of the Institute of Electrical and Electronics Engineers, Inc.

¹⁹ IEEE publications are available from the Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piscataway, NJ 08855-1331, USA (<http://standards.ieee.org/>).

²⁰ Information available online at: <http://www.rbrc.org/>.

²¹ RoHS publications are available online from the U.K. Department of Agriculture Available online at: <http://www.dti.gov.uk/>.

²² Information available online at <http://www.federalelectronicschallenge.net/>.

²³ Information available online at <http://www.ers.usda.gov/>.

²⁴ This Federal Register document is available online at: <http://www.gpoaccess.gov/fr/index.html>.

²⁵ U.S. Department of Energy publications are available at: <http://www.eere.energy.gov/femp/>.

²⁶ U.S. FTC publications are available online at: <http://www.ftc.gov/>.