

IEEE Standard for Environmental and Social Responsibility Assessment of Computers and Displays

IEEE Computer Society

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IEEE Std 1680.1™-2018
(Revision of
IEEE Std 1680.1-2009)

IEEE Standard for Environmental and Social Responsibility Assessment of Computers and Displays

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Abstract: A clear and consistent set of environmental and social responsibility performance criteria for the design of computers (including notebook computers, desktop computers, integrated desktop computers, portable all-in-one computers, slates/tablets, small-scale servers, thin clients and workstations) and displays (including monitors and signage displays) is established, providing an opportunity for manufacturers to secure market recognition for their efforts. This standard is also intended to provide a tool for government, institutional, corporate, and consumer purchasers to identify products that demonstrate environmental and social responsibility leadership. This standard is intended to be updated and revised on a periodic basis to continue to set a higher performance standard for leadership products.

Keywords: computer, desktop, display, electronic product, electronic product design, environment, environmental impact, environmental leadership, environmental performance, IEEE Std 1680.1™, integrated desktop computer, monitor, notebook, portable all-in-one computer, slate/tablet, small-scale server, social responsibility, sustainability, thin client, workstation

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Introduction

This introduction is not part of IEEE Std 1680.1-2018, IEEE Standard for Environmental and Social Responsibility Assessment of Computers and Displays.

IEEE Std 1680.1-2017 is a revision to existing IEEE Std 1680.1-2009, which was developed due to a growing demand by purchasers for an easy-to-use evaluation tool that allows the comparison and selection of electronic products based on environmental and social responsibility performance. The standard was reviewed in its entirety in this revision process and criteria updated or added to reflect environmental and social responsibility leadership across performance categories at the time of publication. This revision places additional emphasis on the supply chain and the growing importance to manufacturers and purchasers of corporate social responsibility.

This standard is intended to be used by government, institutional, corporate, and consumer purchasers in the selection of electronic products based on environmental and social responsibility performance, and by product designers and manufacturers who wish to sell products that meet environmental and social responsibility performance standards.

Grateful Acknowledgements

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Contents

1. Overview	10
1.1 Scope	10
1.2 Purpose	10
1.3 Application	10
1.4 Conformance with this standard	11
1.5 Geographic applicability.....	12
2. Normative references.....	12
3. Definitions, abbreviations, and acronyms	17
3.1 Definitions	17
3.2 Acronyms and abbreviations	25
4. Environmental and social responsibility performance criteria	27
4.1 Substance management.....	27
4.2 Materials selection	45
4.3 Design for end of life.....	49
4.4 Product longevity/life-cycle extension	53
4.5 Energy conservation	59
4.6 End-of-life management	63
4.7 Packaging	70
4.8 Life cycle assessment and carbon footprint.....	76
4.9 Corporate environmental performance	81
4.10 Corporate social responsibility	96
Annex A (informative) Criteria and sections.....	106
Annex B (normative) Equations and assumptions for F-GHG emission reduction (for 4.1.10.1).....	109
Annex C (normative) Examples and assumptions for F-GHG emission reduction (for 4.1.10.2).....	112
Annex D (normative) Calculations for assessing average energy/power limits (for 4.5.1.5)	113
Annex E (normative) Auditor competency for end-of-life processing (for 4.6.3.1).....	114
Annex F (normative) Self-declared environmental management system (EMS): Option for small and medium sized enterprises (SME) (for 4.9.1.1)	116
Annex G (normative) Auditor credentials for energy management system/energy performance criteria (for 4.9.3.1 and 4.9.3.2).....	117
Annex H (informative) Bibliography	119

IEEE Standard for Environmental and

Social Responsibility Assessment of Personal Computer

Products, Including Notebook

Personal Computers, Desktop

Personal Computers and Personal Computer Displays

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1. Overview

1.1 Scope

This standard defines environmental [and social responsibility](#) performance criteria for [computers](#) (~~i.e. personal computer products, including~~ desktop computers, notebook computers, [integrated desktop computers, portable all-in-one computers, slates/tablets, small scale servers, thin clients, and workstations](#)) and ~~computer~~ displays ([i.e. monitors and signage displays](#)). The environmental [and social responsibility](#) performance criteria relate to [substance management](#) ~~reduction or elimination of environmentally sensitive materials~~, materials selection, design for end of life, [product longevity](#)/life-cycle extension, energy conservation, end-of-life management, [packaging, life cycle assessment and carbon footprint](#), corporate [environmental](#) performance, and [corporate social responsibility](#) ~~packaging. Guidelines and implementation procedures for this standard are included in the umbrella standard, IEEE Std 1680™.~~

1.2 Purpose

This standard ~~is part of the IEEE 1680 family of standards that~~ provides a clear and consistent set of performance criteria ~~aimed for the design of personal computer products, thereby providing an opportunity to secure market recognition for efforts~~ to reduce the environmental impact ~~and improve social responsibility associated with~~ ~~of~~ electronic products, ~~and provides an opportunity to secure market recognition for conformant products.~~ This standard is intended to provide a tool for government, institutional, ~~and~~ corporate ~~and consumer~~ 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 ~~and social responsibility~~ performance criteria of this standard are intended to define a measure of environmental ~~and social responsibility attributes controlled or influenced by the manufacturer throughout the product life cycle leadership~~ in: the design and manufacture of ~~the product~~ ~~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 ~~an environmental and corporate responsibility leadership standard,~~ defined with the intention that ~~the criteria are technically feasible to achieve, but that only products demonstrating the leading~~ ~~products, i.e., approximately 25% to 35% of the market, environmental performance currently available in the marketplace~~ would ~~be able to qualify to the base or Bronze level, meet them~~ at the ~~date of publication of this standard~~ ~~time of their adoption~~. As the environmental ~~and social responsibility~~ performance of products that are available in the marketplace improves, ~~it is intended that~~ the ~~standard~~ ~~criteria~~ will be updated and revised to set a higher performance standard for leadership products.

1.3 Application

The environmental [and social responsibility](#) performance criteria in Clause 4 apply to ~~notebook~~ ~~personal~~ computers ([i.e., desktop ~~personal~~ computers, notebook computers, integrated desktop computers, portable all-in-one computers, slates/tablets, small-scale servers, thin clients and workstations](#)) and ~~and personal computer~~ displays ([i.e., monitors and signage displays](#)). ~~The principles and procedures identified in the umbrella standard apply to personal computer products. For further information on application, see IEEE Std 1680.~~ This standard is not applicable to ~~servers,~~ [computer servers defined in the ENERGY STAR server specification,¹](#) game consoles, or mobile computing devices with displays less than [6.5 inches \(16.51 cm\)](#) ~~4-in~~ measured diagonally.

[For the purposes of this standard, a product is a marketing model and external components integral to its operation unless that function is achieved by the device \(e.g., an external keyboard for a tablet is not integral to the operation of that device\). The following external components are considered integral to the operation of products, in accordance with the product definitions in 3.1: keyboard, mouse or alternate pointing device, external power supply \(EPS\), ac or dc power cord, video cables, dc power cord used to connect EPS to device, and stand \(for display and integrated desktop computer\).](#)

[Different configurations of a product may include options for processors, memory, data storage, etc. If specific configurations do not meet the criteria as declared, then the manufacturer shall clearly identify which configurations do not meet the criteria as declared.](#)

See [product ~~computer~~](#) and [relevant product type definitions such as computer, electronic display \(~~computer-display~~\) and monitor](#) in 3.1.

¹ [ENERGY STAR Program Requirements for Computer Server.](#)

1.4 Conformance with this standard

The environmental and social responsibility performance criteria in this standard are of two types, as follows:

- Required criteria that all products shall meet in order to be considered conformant to this standard.
- Optional criteria that products may meet in order to gain additional points so as to be rated at a higher level of environmental and social responsibility performance.

All criteria, including the optional criteria, use the “shall” construct since the defined criterion shall be met if the manufacturer wishes to receive the optional point(s). Optional criteria are worth one point each, unless the criterion states a higher point value. Optional criteria may also be tiered; for example, one point is awarded for achieving a specified threshold and additional points awarded for attaining higher thresholds. A list of criteria and optional point values in ~~See~~ IEEE Std 1680.1-2018 is in Annex A.

There shall be three levels of conformance to this standard: Bronze, Silver, and Gold:

- 1) To achieve the first level (Bronze), the product shall conform to all of the required criteria.
- 2) To achieve the second level (Silver), the product shall conform to all of the required criteria, plus at least 50% of the available optional points.
- 3) To achieve the third level (Gold), the product shall conform to all of the required criteria, plus at least 75% of the available optional points.

If an optional criterion is “Not Applicable” to the product (for a product criterion) or manufacturer (for a corporate criterion) as specified in the criterion, the point(s) associated with that criterion are removed from both the numerator and denominator when calculating the percent of optional points awarded (i.e., shall not be counted toward available optional points).

Each criterion in the standard is designated as either:

- Product criterion that applies to the specific product or its packaging.
- Corporate criterion that applies to a program or an offering of the manufacturer in general and are not exclusive to the specific product or its packaging.

The environmental and social responsibility performance criteria in Clause 4 are applicable to the product if the product or its packaging falls within the scope of products or packaging defined by the “applies to” section of the criterion. The criterion is satisfied if the product, or its packaging (as applicable) meets the requirements shown in the “product criterion” or if the manufacturer meets the “corporate criterion” section of the subclause. The “additional details” section of the subclause provides critical information that is valuable for interpreting the requirements of the criterion. The “verification requirements” section of the subclause specifies the data and information that a manufacturer shall supply to demonstrate conformance to each criterion.

Where a criterion includes a numerical threshold or calculation, conformance shall be evaluated using calculated values without any benefit from rounding.

1.5 Geographic applicability

A manufacturer may designate one or more specific geographic regions, or countries, for which a product conforms to this standard. All criteria in Clause 4 of this standard are applicable only in countries or regions for which the product is declared to conform to this standard. Each criterion shall specify either of the following statements on geographic applicability:

- “This criterion shall be declared the same in all countries or regions for which the product is declared to conform to this standard. The approach used to conform to this criterion may vary by country or region”; or
- “This criterion may be declared differently in each country or region for which the product is declared to conform to this standard.”

NOTE—Region means countries and territories whose independence may not be recognized by all countries (e.g., Taiwan).

~~1.5 Product Registration Entity and Market Surveillance Entity~~

~~See IEEE Std 1680.~~

~~1.6 Verification of conformance with this standard~~

~~See IEEE Std 1680.~~

~~1.7 Qualified Verifier~~

~~See IEEE Std 1680.~~

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

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40 U.S. Code of Federal Regulations (CFR) part 98; Subpart A and Subpart I.

80 Plus® performance specification for power supplies.²

² Available at: <https://www.plugloadsolutions.com/80PlusPowerSupplies.aspx#>.

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

[ASTM D7611, Standard Practice for Coding Plastic Manufactured Articles for Resin Identification.](#)

[ASTM D883-12, Standard Terminology Relating to Plastics.](#)

[ASTM E23, Standard Test Methods for Notched Bar Impact Testing of Metallic Materials.](#)

[Braslawsky et al. \(April 2016\). Making Credible Renewable Electricity Usage Claims. RE100 Technical Advisory Group Briefing.](#)³

[BS/EN 15343:2007, Plastics. Recycled plastics. Plastics recycling traceability and assessment of conformity and recycled content.](#)

[CEN EN 16258, Methodology for Calculation and Declaration of Energy Consumption and GHG Emissions of Transport Services \(Freight and Passengers\).](#)

[CEN EN 50564, Electrical and electronic household and office equipment—Measurement of low power consumption.](#)

[CEN EN 50581, Technical documentation of electrical and electronic products with respect to the restriction of hazardous substances.](#)

[Clean Cargo Working Group, GHG emissions assessment methodology.](#)⁴

[DIN 6120-1: Marking of Packaging and Packaging Materials for Recycling Purposes—Plastics Packaging and Packaging Materials—Part 1: Graphical Symbols.](#)

[Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 1502.](#)⁵

³ Available at: [http://there100.org/reports-briefings.](http://there100.org/reports-briefings)

⁴ Available at: [https://www.bsr.org/collaboration/groups/clean-cargo-working-group.](https://www.bsr.org/collaboration/groups/clean-cargo-working-group)

⁵ Available at: [https://www.sec.gov/spotlight/dodd-frank/speccorpdisclosure.shtml.](https://www.sec.gov/spotlight/dodd-frank/speccorpdisclosure.shtml)

[e-Stewards, Standard for Responsible Recycling and Reuse of Electronic Equipment.](#)⁶

[ECMA-341, Environmental Design Considerations for ICT and CE Products, Annex C, 4th Edition, December 2010.](#)

[EcoTransport Information Tool Worldwide \(EcoTransIT World\), GHG emissions calculation.](#)⁷

[Efficiency Valuation Organization \(EVO\), International Performance Measurement and Verification Protocol, September 2010.](#)⁸

[Electronics Industry Citizenship Coalition \(EICC\), Validated Audit Process.](#)⁹

[ENERGY STAR Computers Specification.](#)

[ENERGY STAR Displays Specification.](#)

[EPRI/ecova, Generalized Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc and Dc-Dc Power Supplies.](#)¹⁰

[EU 'Blue Guide' on the Implementation of EU Product Rules.](#)¹¹

⁶ Available at: http://e-stewards.org/wp-content/uploads/2014/09/eStewards_Standard_Review_Version.pdf.

⁷ Available at: <http://www.ecotransit.org/>.

⁸ Available at: <http://evo-world.org/en>.

⁹ Available at: <http://www.eiccoalition.org/>.

¹⁰ Available at:

[http://www.plugloadsolutions.com/docs/collatrl/print/Generalized Internal Power Supply Efficiency Test Protocol R6.7.pdf](http://www.plugloadsolutions.com/docs/collatrl/print/Generalized_Internal_Power_Supply_Efficiency_Test_Protocol_R6.7.pdf).

¹¹ Available at: <http://ec.europa.eu/DocsRoom/documents/16210>.

~~EU European Union, European Council~~ Directive ~~2011/65/EU 2002/95/EC~~ of the European Parliament and of the Council ~~of 8 June 2011~~ on the restriction of the use of certain hazardous substances in electrical and electronic equipment; ~~and amendments.~~¹² ~~(RoHS).~~

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

~~EU Directive 2013/56/EU EU Battery Directive of the European Parliament and of the Council of 20 November 2013 amending European Union, European Commission~~ Directive 2006/66/EC of ~~the European Parliament and Council 6 September 2006~~ on batteries and accumulators and waste batteries and accumulators ~~as regards the placing on the market of portable batteries and accumulators containing cadmium intended for use in cordless power tools, and of button cells with low mercury content, and repealing Commission Decision 2009/603/EC. and repealing Directive 91/157/EEC.~~⁶

~~EU European Union~~ Eco-Management and Audit Scheme (EMAS).⁵

~~EU Regulation (EC) No 1907/2006, REACH Annex XIV, Authorization List.~~¹³

~~EU European Union, European Council~~ Directive ~~2012/19/EU 2002/96/EC~~ of the European Parliament and of the Council ~~of 4 July 2012~~ on waste electrical and electronic equipment (WEEE), ~~and amendments.~~

~~European Chemical Agency, Guidance on Requirements for Substances in Articles.~~¹⁴

¹² EU Directives and Regulation are available at: <https://europa.eu/>.

¹³ Available at: <http://echa.europa.eu/addressing-chemicals-of-concern/authorisation/recommendation-for-inclusion-in-the-authorisation-list/authorisation-list>.

¹⁴ Available at: <http://echa.europa.eu/>.

⁵ 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/comm/environment/emas/index_en.htm.

⁶ European Union Directives are available from the portal Web site of the European Union at <http://europa.eu>.

[Forest Stewardship Council Chain of Custody Certification standard \(FSC-STD-40-004\).](#)

[Global Logistics Emissions Council Framework for Logistics Emissions Methodologies \(GLEC Framework\).](#)

[Global Slavery Index Report.](#)¹⁵

[Green-e National Energy Standard.](#)

[GreenScreen® for Safer Chemicals.](#)¹⁶

[IATA RP 1678, Recommended Practices for Airlines to Calculate CO₂ Emissions from Freight Transport.](#)¹⁷

[IEC 61960, Secondary cells and batteries containing alkaline or other non-acid electrolytes—Secondary lithium cells and batteries for portable applications.](#)

[IEC 62301, Household electrical appliances—Measurement of standby power.](#)

[IEC 62321:2008, Electro technical products – Determination of levels of six regulated substances \(lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers\).](#)

[IEC 62474, Material Declaration for Products of and for the Electrotechnical Industry.](#)

[IEC 62623 \(EN 62623\), Desktop and Notebook Computers—Measurement of Energy Consumption.](#)

[IEC 63000, Technical Documentation for the Assessment of Electrical and Electronic Products with respect to the Restriction of Hazardous Substances.](#)

[IEC TR 62921, Quantification Methodology for Greenhouse Gas Emissions for Computers and Monitors.](#)

¹⁵ Available at: <https://www.globalslaveryindex.org/findings/>.

¹⁶ Available at: <http://www.greenscreenchemicals.org>.

¹⁷ Available at: http://www.cofret-project.eu/Latest-Info/News/IATA-Recommended-Practice-RP-1678:-CO2-Emissions-Measurement-Methodology_47.htm.

[IEEE 1874 Standard for Documentation Schema for Repair and Assembly of Electronic Devices.](#)

[International Accreditation Forum \(IAF\), Multilateral Recognition Arrangement for the Scope of Accreditation.](#)¹⁸

[International Efficiency Marking Protocol for External Power Supplies, Version 3.0.](#)¹⁹

[International Laboratory Accreditation Cooperation \(ILAC\) Mutual Recognition Arrangement \(MRA\).](#)²⁰

[International Labor Standards \(ILO\), Declaration on Fundamental Principles and Rights at Work.](#)

[International Maritime Organization \(IMO\), GHG calculation.](#)²¹

[International SEMATECH, Manufacturing Initiative \(ISMI\) Guideline for Environmental Characterization of Semiconductor Process Equipment.](#)

[IPCC, \(2006\) Guidelines for National Greenhouse Gas Inventories.](#)²²

[IPCC, Tier 2a, 2b or 3 methodology.](#)

[IPCC, Fourth Assessment Report \(IPCC AR4\).](#)

[IPCC, Fifth Assessment Report \(IPCC AR5\).](#)

[ISO 179-1, Plastics—Determination of Charpy Impact Properties—Part 1: Non-Instrumental Impact Test.](#)

¹⁸ Available at: www.iaf.nu.

¹⁹ Available at: <http://www.regulations.gov/#!documentDetail;D=EERE-2008-BT-STD-0005-0218>.

²⁰ Available at: <http://ilac.org/>.

²¹ Available at: <http://www.imo.org/en/OurWork/environment/pollutionprevention/airpollution/pages/ghg-emissions.aspx>.

²² Available at: <https://www.ipcc.ch/>.

[ISO 180, Plastics—Determination of Izod Impact Strength.](#)

[ISO 1043, Plastics—Symbols and Abbreviated Terms.](#)

ISO 11469:~~2000~~, Plastics—Generic identification and marking of [plastic](#) ~~plastics~~ products.⁸

ISO 14001, Environmental Management Systems—Requirements with Guidance for Use.

[ISO 14025, Environmental Labels and Declarations—Type III Environmental Declarations—Principles and Procedures.](#)

[ISO 14040, Environmental management—Life cycle Assessment Principles and Framework.](#)

[ISO 14044, Environmental management—Life cycle Assessment—Requirements and Guidelines.](#)

[ISO 14064-1, Greenhouse gases—Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.](#)

[ISO 14064-2, Greenhouse gases—Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.](#)

[ISO 14064-3, Greenhouse gases—Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions.](#)

[ISO 14065, Greenhouse gases—Requirements for Greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition.](#)

[ISO 14066, Competence Requirements for Greenhouse Gas Validation Teams and Verification Teams.](#)

~~*ISO publications are available from the ISO Central Secretariat, 1, ch. de la Voie Creuse, Case Postale 56, CH 1211, Geneva 20, Switzerland (<http://www.iso.org/>). ISO publications are also available in the United States from the Sales Department, American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036, USA (<http://www.ansi.org/>).~~

[ISO 14067, Greenhouse Gases—Carbon Footprint of Products—Requirements and Guidelines for Quantification and Communication.](#)

[ISO 45001, Occupational Health and Safety.](#)

[ISO 50001, Energy Management Systems—Requirements with Guidance for Use.](#)

[ISO/IEC 17020, Conformity Assessment—Requirements for the Operation of Various Types of Bodies Performing Inspection.](#)

[ISO/IEC 17021, Conformity Assessment—Requirements for Bodies Providing Audit and Certification of Management Systems.](#)

[ISO/IEC 17024, Conformity Assessment—General Requirements for Bodies Operating Certification of Persons.](#)

[ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories.](#)

[ISO/IEC 17065, Conformity Assessment—Requirements for bodies certifying products, processes and services.](#)

[ISO/IEC Guide 21-1:2005 Regional or national adoption of International Standards and other International Deliverables—Part 1: Adoption of International Standards Adoption.](#)

[Low Impact Hydropower Institute \(LIHI\) Standard.](#)²³

[OECD, Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.](#)²⁴

[OECD Due Diligence Guidance for Sourcing from Conflict and High-Risk Areas.](#)²⁵

²³ Available at: <http://lowimpacthydro.org/low-impact-criteria/>.

²⁴ Available at: <https://mneguidelines.oecd.org/mining.htm>.

²⁵ Available at: <http://www.oecd.org/corporate/mne/mining.htm>.

OECD Guidelines for Multinational Enterprises.²⁶

OHSAS 18001, Occupational Health and Safety Management Systems, Requirements.

PAS 2050, Specification for the Assessment of the life cycle greenhouse gas emissions of goods and services.

Programme for the Endorsement of Forest Certification® (PEFC), Sustainable Forestry Initiative program.

SCS Services Recycled Content Standard V7.0.²⁷

SERI, The Responsible Recycling (R2) Standard for Electronics Recyclers.

~~U.S. EPA, *Comprehensive Procurement Guidelines (CPG)*.⁹~~

Toxics in Packaging Clearinghouse ~~CONEC~~, Model Toxics in Packaging legislation.^{28 2}

Trafficking Victims Protection and Reporting Act, Tier 2, Tier 2 Watchlist or Tier 3.

UL 2809, 3rd edition, Environmental claim validation procedure for recycled content.

United Nations (UN), The Protocol to Prevent, Suppress and Punish Trafficking in Persons Especially Women and Children, supplementing the United Nations Convention against Transnational Organized Crime.

²⁶ Available at: <http://www.oecd.org/corporate/mne/>.

²⁷ Available at <https://www.scsglobalservices.com>.

²⁸ Available at: www.toxicsinpackagingclearinghouse.org.

~~2 This compilation was developed by CONEC and is administered by the Toxics in Packaging Clearinghouse (TPCH). TPCH publications are available at <http://www.toxicsinpackaging.org/>~~

~~*This document is available from the IEEE Web site at <http://standards.ieee.org/downloads/1680/1680-2006/>. U.S. EPA publications are available at <http://www.epa.gov/cpg/>.~~

[U.S. DOE, External Power Supplies Energy Conservation Standard Final Rule, 79 \(February 10, 2018\), 83 FR 784614\).](#)²⁹

[U.S. DOE Superior Energy Performance \(SEP\).](#)³⁰

[U.S. EPA SmartWay GHG emissions assessment.](#)³¹

[U.S. EPA Greenhouse Gas Reporting Rule, Subpart I.](#)

[U.S. EPA Protocol for Measuring Destruction or Removal Efficiency \(DRE\) of Fluorinated Greenhouse Gas Abatement Equipment in Electronics Manufacturing, March 2010.](#)

[U.S. Securities and Exchange Act of 1934, Rule 13p-1, Conflict Minerals Report.](#)

[WEEELABEX, Normative Document on Treatment, V 10.0.](#)³²

[WRI Greenhouse Gas Protocol, Corporate Accounting and Reporting Standard.](#)

[WRI Greenhouse Gas Protocol, Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard.](#)

[WRI Greenhouse Gas Protocol, Product Life Cycle Accounting and Reporting Standard.](#)

[WRI GHG Protocol Scope 2 Guidance.](#)

~~U.S. EPA, National Environmental Performance Track Annual Performance Report.¹⁰~~

~~U.S. EPA, National Environmental Performance Track Application (7 March 2006).¹¹~~

²⁹ Available at: <https://www.regulations.gov/document?D=EERE-2008-BT-STD-0005-0219>.

³⁰ Requirements available at: www.energy.gov/isosep.

³¹ Available at: <https://www.epa.gov/smartway/resource-pages-current-smartway-partners-and-affiliates>.

³² This standard will be replaced by the EN 50625-series.

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

~~¹¹ See Footnote 10.~~

~~U.S. EPA, *Plug-In to eCycling: Guidelines for Materials Management* (May 2004).¹²~~

~~U.S. Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management (and any Executive Order that abrogates this current Executive Order).¹³~~

3. Definitions, abbreviations ~~special terms~~, and acronyms

3.1 Definitions

For the purposes of this document, the following terms and definitions apply. The *IEEE Standards Dictionary Online* ~~: *Glossary of Terms & Definitions*~~ should be consulted ~~referenced~~ for terms not defined in this clause. ³³ ~~14~~

acoustic component: An individual part or combination of parts that are used in the creation, transmission, or detection of sound.

bio based: 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.

~~¹⁴ The IEEE Standards Dictionary: Glossary of Terms & Definitions is available at <http://shop.ieee.org/>.~~

biodegradable plastic: A degradable plastic in which the degradation results from the action of naturally-occurring micro-organisms such as bacteria, fungi, and algae. (Adapted from ASTM D883-12).

NOTE—For the purpose of this standard, biodegradable plastics include compostable plastics, which may be labeled with ASTM D6400 or other regional markings.

bulk packaging: Single primary package used to ship more than one product.

~~¹² This document is available from the IEEE Web site <http://standards.ieee.org/downloads/1680/1680-2006/>. U.S. EPA Plug-In publications are available at <http://www.epa.gov/epawaste/index.htm>.~~

~~¹³ U.S. Executive Order publications are available at <http://www.epa.gov/oaintmt/practices/ee13423.htm>.~~

³³ IEEE Standards Dictionary Online is available at: <http://dictionary.ieee.org>.

conformance assurance process: Process used by the manufacturer to manage compliance of the product to a restricted substance requirement. The process includes:

- a) A description of how suppliers, materials, parts, and/or subassemblies risk factors are evaluated and allocated.
- b) The utilization of risk rating (or high-risk status) to determine what evidence is required for suppliers, materials, parts, and/or subassemblies, as determined to be applicable by the manufacturer.
- c) The collection and evaluation of the evidence determined necessary for applicability, quality and accuracy, and associated action taken for a negative result.
- d) A procedure to refresh the evidence as appropriate based on the manufacturer's evaluation of risk.

certification: The provision by an independent body of written assurance (a certificate) that the product, service or system in question meets specific requirements.³⁴

commonly available tool: A tool which is publicly available for purchase by any individual or business without restriction.

NOTE—Suction devices to remove display panels are considered a commonly available tool.

computer: A device which ~~that~~ 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.~~

³⁴ ISO 17000.

NOTE—For the purposes of this standard, computers include both stationary and portable units, including desktop computers, integrated desktop computers, notebook computers, slates/tablets, portable all-in-one computers, small-scale servers, thin clients, and work stations. Although computers ~~are must be~~ capable of using input devices and ~~computer~~ displays, ~~such as noted in (2) and (3) above, computer systems do not need to include these~~ devices are not required to be included with the computer upon ~~on~~ shipment. Computers are composed of, at a minimum: (a) a central processing unit (CPU) to perform operations (if no CPU ~~meet this definition. This standard~~ is present, then the device must function as a client gateway to a ~~not intended to include~~ server that acts as a computational CPU); (b) user input devices, such as a keyboard, mouse ~~computers, gaming consoles, mobile telephones, portable handheld calculators, portable digital assistants (PDAs), MP3 players,~~ or touch pad; and (c) an integrated display screen, and/or the ability to support an external display screen to output information.³⁵ ~~any other mobile computing device with displays less than 4 in measured diagonally.~~

conflict-affected and high-risk areas: Areas identified by the presence of armed conflict, widespread violence or other risks of harm to people. Armed conflict may take a variety of forms, such as a conflict of international or non-international character, which may involve two or more states, or may consist of wars of liberation, or insurgencies, civil wars, etc. High-risk areas may include areas of political instability or repression, institutional weakness, insecurity, collapse of civil infrastructure and widespread violence. Such areas are often characterized by widespread human rights abuses and violations of national or international law.

conflict minerals: (i) Columbite-tantalite (coltan), cassiterite, gold, wolframite, or their derivatives (presently tantalum, tin, and tungsten); or (ii) any other mineral or its derivatives determined by the United States Secretary of State to be financing conflict in the Democratic Republic of the Congo (the “DRC”) or an adjoining country.

connector: An electrical or mechanical coupling device employed to connect one element with those of another element.

³⁵ Definition from ENERGY STAR Program Requirements for Computers, Version 6.1, June 2014.

corporate criterion: A set of requirements that is applicable to a program or an offering of the manufacturer in general and is not exclusive to the product declared to conform to the standard.

covered countries: The DRC and countries that share an internationally recognized border with the DRC, which presently includes Angola, Burundi, Central African Republic, the Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda, and Zambia.

~~**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, USB, and/or those described in IEEE Std 1394TM. Examples of computer display technologies are the cathode ray tube (CRT) and liquid crystal display (LCD).~~

desktop computer: A computer ~~whose~~ where the main unit is designed ~~intended~~ to be located in a permanent location, often on a desk or on the floor.

NOTE—Desktop computers ~~Desktops~~ are not designed for portability and are designed for use with ~~utilize~~ an external ~~computer~~ display, keyboard, and mouse. Desktop computers ~~Desktops~~ are intended ~~designed~~ for a broad range of home and office applications, including point of sale applications.³⁶

directly contracted supplier: A supplier that contracts with the manufacturer to provide material inputs for products, even if materials are not directly conveyed to the manufacturer.

display: See: electronic display.

due diligence: Refers to the steps companies should take to identify and address actual or potential risks in order to prevent or mitigate adverse impacts associated with their activities or sourcing decisions.

³⁶ Definitions from ENERGY Star Program Requirements for Computers, Version 6.1, June 2014.

electromagnetic interference (EMI) component: Components designed to mitigate or manage the effects of conducted or radiated electromagnetic energy that may interfere, interrupt, obstruct, or otherwise degrade or limit the performance of telecommunication or other electrical and electronic products.

electronic component: An individual part or combination of parts that, when together, perform a design function(s) and are typically directly attached to a printed circuit board.

electrostatic discharge (ESD) component: Components designed to mitigate or manage the effects of electrical discharges of static electricity that can build up on personnel or equipment, generated by interaction of dissimilar materials.

NOTE—Examples include cables, wires, connectors, sockets, discrete printed circuit board components, and integrated circuits.

electronic display (display): A product with a display screen and associated electronics, often encased in a single housing, that as its primary function produces visual information from the following:

- a) A computer, workstation, or server via one or more inputs (e.g., VGA, DVI, HDMI, Display Port, IEEE 1394, USB).
- b) External storage (e.g., USB flash drive, memory card), or
- c) A network connection.³⁷

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

elemental chlorine free (ECF): Packaging material produced with pulp that has been bleached using a chlorine derivative such as chlorine dioxide (ClO₂), but without the use of elemental chlorine (Cl).

³⁷ Definition from ENERGY STAR Program Requirements for Displays, Version 7.1, April 2017.

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

external enclosure: Outer product casing or product housing that protects the internal parts of the product from environmental effects and prevents the user from coming into contact with moving, radiating, or current-carrying components.

NOTE— The LCD panel and other optical components accessible to the user and other external components (e.g., keyboards) are not included in this definition.

fan: A device for producing a current of air, including:

- a) An impeller, or assembly of blades attached to an integral hub; and
- b) An enclosure that surrounds the blades and hub and attaches to the hub.

government-approved program: Program that is authorized, approved, sanctioned or recognized by the government as fulfilling a government-established requirement for the collection and processing of end-of-life electronic equipment.

~~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 13423, Section 201 and any Executive Order that abrogates the referenced section of this current Executive Order.¹⁵)

homogeneous material: One material of uniform composition throughout or a material, consisting of a combination of materials, that cannot be disjointed or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding, and abrasive processes.³⁸

³⁸ Directive 2011/65/EU of the European Parliament and of the Council.

¹⁵ ~~Information on references can be found in Clause 2.~~

NOTE—Examples of homogeneous material include a plastic cover to a computer screen, a copper wire inside a cable, and the solder part of a solder joint.

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

initial service provider: The first party to perform one or more recycling and/or refurbishment services for product/equipment/components; and that contracts directly with the manufacturer, or indirectly through a manufacturer's agent.

integrated desktop computer: A desktop computer ~~system~~ in which the computing hardware ~~computer~~ and ~~computer~~-display are integrated into function as a single housing, and which is connected to unit that receives its ac mains power through a single cable. Integrated desktop computers come in one of two possible forms: ~~(1)~~

- a) A system where the ~~computer~~-display and computer are physically combined into a single unit; or
- b) 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.³⁹

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

~~**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.~~

³⁹ Definition from ENERGY STAR Program Requirements for Computers, Version 6.1, June 2014.

~~**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* [B11].^{16, 17}~~

~~**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.~~

~~**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.~~

~~**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.~~

~~3.2 Special terms~~

~~**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 D256-05. This definition is based on a criterion developed by the Federal Electronics Challenge Plastics Task Force.~~

¹⁶~~The numbers in brackets correspond to those of the Bibliography in Annex A.~~

¹⁷~~Notes in text, tables, and figures of a standard are given for information only and do not contain requirements needed to implement this standard.~~

~~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 dismantle or shred 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.~~

~~**homogeneous material:** European Union documentation (see European Union Electrical and Electronic Equipment Directives [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.~~

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.~~

NOTE—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.~~

ITE derived post-consumer recycled plastic: Materials that are derived from discarded products listed under IT and Telecommunications Equipment category in Annex II, Part 3 of EU Directive 2012/19/EU (the WEEE Directive)⁴⁰ and televisions.

NOTE— *See also*: post-consumer.

label: Piece of paper, plastic, metal, or other material affixed to a component or product, on which is printed information.

monitor: An electronic display intended for one person to view in a desk based environment.⁴¹

notebook computer: (A) A computer designed specifically for portability and to be operated for extended periods of time ~~both~~ ~~either~~ with ~~and~~ ~~or~~ without a direct connection to an ac mains power source. It includes ~~Notebooks must utilize~~ an integrated ~~computer~~ display, a non-detachable, mechanical ~~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 (using physical, moveable keys), and pointing device. (B) Mobile thin client: A computer meeting the definition of a Thin Client. ~~Notebook computers are typically~~ designed specifically ~~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 portability, and meeting (A).~~ (C) Two-in-one notebook: ~~A computer computers and therefore this standard does not include them. Tablet PCs,~~ which resembles a traditional ~~may use touch sensitive screens along with or instead of other input devices, are considered~~ notebook computer with a clam shell form factor (A), but has a detachable display which can act as an independent Slate/Tablet when disconnected. The keyboard and display portions of the product must be shipped as an integrated unit. ~~computers in this standard.~~

⁴⁰ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0019&from=EN>.

⁴¹ Definition from ENERGY STAR Program Requirements for Displays, Version 7.1, April 2017. 

NOTE 1—Notebook computers are typically designed to provide similar functionality to desktops, including operation of software similar in functionality as that used in desktops. For purposes of this standard, notebook computers include models with touch-sensitive screens.

NOTE 2—It is recognized that this definition is intended to include the same set of products as included under notebook computer in the ENERGY STAR computer specification. Due to a circular reference and other considerations in the ENERGY STAR computer specification, the definition has been modified for use in this standard.

on average: ~~The term on average~~ As used ~~in this standard~~ in the phrase “product shall contain on average,” a calculation of the percentage of a “~~shall mean that the~~ desired material (e.g., recycled or bio-based plastic) ~~shall be present at the designated percentage~~ in the total weight of like material (e.g., all plastic) within each unit for a product. ~~each declared to the criterion.~~

optical component: An individual part or combination of parts that are used in the creation, transmission, manipulation, or detection of light.

NOTE—Examples include lasers, light sources, optoelectronics, fiber optics, lenses, polarizers, mirrors, beam splitters, windows, and prisms.

packaging: All materials of any nature to be used for the containment, protection, handling, delivery and presentation of products from the manufacturer to the user or the consumer.

NOTE—This standard only applies to sales packaging or primary packaging, i.e., packaging that contains and protects and is designed to deliver a sales unit to the final user or consumer. This excludes secondary and tertiary packaging as defined by the EU packaging [Directive] definition. The following items are excluded: accessory carrying cases, printed materials such as user guides and safety or warranty information, and packaging of printed material.

plastic: A material that contains, as an essential ingredient, one or more organic polymeric substances of large molecular weight, is solid in its finished state, and, at some stage in its manufacture or processing into finished articles, can be shaped by flow. DISCUSSION-Rubber, textiles, adhesives, and paint, which may in some cases meet this definition are not considered plastics. (Adapted from ASTM D883-12) ⁴²

NOTE—Thermoset plastic and 3-D printed plastic are within the scope of this definition.

plastic part: The plastic portion of a component's construction.

NOTE—This includes plastic pieces that are bonded together or connected in some manner (i.e., ultrasonically welded), except in cases which specify “discrete” which indicates that the part was originally formed as an individual plastic piece.

portable all-in-one computer: Computing device designed for limited portability that meets all of the following criteria:

- a) Includes an integrated display with a diagonal size greater than or equal to 17.4 inches (44.2 cm);
- b) Lacking keyboard integrated into the physical housing of the product in its as-shipped configuration;
- c) Includes and primarily relies on touchscreen input; (with optional keyboard);
- d) Includes wireless network connection (e.g., Wi-Fi, 3G, etc.); and
- e) Includes an internal battery, but is primarily powered by connection to the ac mains. ⁴³

post-consumer: 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-~~

⁴² Definition from ASTM D883-12 Standard Terminology Related to Plastics.

⁴³ Definition from ENERGY STAR Program Requirements for Computers, Version 6.1, June 2014.

printed circuit board: A non-conductive substrate on to which a pattern of copper traces has been etched or deposited, which mechanically supports and electrically connects components (e.g., capacitors, resistors) that are generally soldered to the substrate, but not including the components attached to it.

processed chlorine free: Packaging material produced with pulp from virgin and/or recycled content that has been bleached without any type of chlorine, or that has not been bleached at all. Recycled content may have originally been bleached with chlorine or chlorine derivatives.

product: A marketing model and external components integral to its operation. The following external components are considered integral to the operation of specific product types: keyboard, mouse or alternate pointing device, external power supply (EPS), wires and cables including ac or dc power cord, video cables, dc power cord used to connect EPS to device, and stand (for display and integrated desktop computer).

NOTE 1—For the purposes of this standard a “product” does not include separate individual sales of external components.

NOTE 2—See also definitions of specific product types: desktop computer, notebook computer, integrated desktop computer, portable all-in-one computer, slate/tablet, small-scale server, thin client, workstation, electronic display (display), monitor and signage display.

product criterion: A set of requirements that is applicable to the product declared to conform to the standard.

Reasonable Country of Origin Inquiry (“RCOI”): A good faith inquiry regarding the origin of a company's conflict minerals that is reasonably designed to determine whether any of the company's conflict minerals originated in the covered countries or are from recycled or scrap sources. What constitutes a reasonable inquiry for a particular company will depend on factors, such as the company's size, its products and its relationship with suppliers and supply chain visibility.

recovered fiber: Post-consumer fiber such as (A1) paper, paperboard, and fibrous materials from retail stores, office buildings, homes, and so forth, after they have passed through their end-usage as a consumer item, including used corrugated boxes, old newspapers and magazines, mixed waste paper, tabulating cards, and used cordage; and (A2) all paper, paperboard, and fibrous materials that enter and are collected from municipal solid waste, and (B1) manufacturing wastes such as dry paper and paperboard waste generated after completion of the papermaking process (that is, those manufacturing operations up to and including the cutting and trimming of the paper machine reel into smaller rolls or rough sheets) including, envelope cuttings, bindery trimmings, and other paper and paperboard waste resulting from printing, cutting, forming, and other converting operations; bag, box, and carton manufacturing wastes; and butt rolls, mill wrappers, and rejected unused stock; and (B2) re-pulped finished paper and paperboard from obsolete in inventories of paper and paperboard manufacturers, merchants, wholesalers, dealers, printers, converters, or others. Mill broke means any paper waste generated in a paper mill prior to completion of the papermaking process. It is usually returned directly to the pulping process. Mill broke is excluded from the definition of recovered fiber.

recycled content: Proportion, by weight, of recycled material in the part, product or packaging.

NOTE—If post-consumer or post-industrial is not specified, either source meets the definition of recycled content.

recycling: A process by which materials or components are diverted from the waste stream and processed to be put back into productive use as a material ~~or component~~, not including energy recovery.

refurbishment: The process by which a used electronic product or component is restored to a defined condition in function and form that is comparable to, or better than, a new unit, while not significantly changing the unit's composition and design.

renewable energy: Energy generated from a source that is not depleted when used or that is ~~Resources that constantly renew themselves or that are~~ regarded as practically inexhaustible.

repair: The process by which the faults in a unit preventing its specified operation are corrected, including parts replacement, while not significantly changing the unit's composition and design.

reuse: Using an object (that is not waste) again, for its original purpose or as repurposed, without significantly altering the physical form of the object although the object may be cleaned, repaired, or refurbished between uses.

ruggedized device: A mobile device (tablet, slate or notebook) that is primarily designed to withstand significant shock, wear or use; and marketed for applications requiring enhanced durability such as for military, police, construction, and similar demanding environments.

signage display: An electronic display intended for multiple people to view in non-desk based environments, such as retail or department stores, restaurants, museums, hotels, outdoor venues, airports, conference rooms or classrooms.

NOTE—For the purposes of this standard, a display is classified as a signage display if it meets two or more following criteria listed: (a) diagonal screen size is greater than 30 inches (76.2 cm); (b) maximum reported luminance is greater than 400 candelas per square meter; (c) Pixel density is less than or equal to 5 500 pixels per square inch; or (d) ships without a mounting stand.⁴⁴

slate/tablet: A computing device designed for portability that meets all of the following criteria:

- a) Includes an integrated display with a diagonal size greater than 6.5 inches (16.51 cm) and less than 17.4 inches (44.2 cm);
- b) Lacks an integrated, physical attached keyboard in its as-shipped configuration;
- c) Includes and primarily relies on touchscreen input(although may include an optional external keyboard);
- d) Includes and primarily relies on a wireless network connection (e.g., Wi-Fi, 3G, etc.); and

⁴⁴ Definition from ENERGY STAR Program Requirements for Displays, Version 7.1, April 2017.

- e) Includes and is primarily powered by an internal battery (with connection to the mains for battery charging, not primary powering of the device).⁴⁵

small-scale server: A computer that typically uses desktop components in a desktop form factor, but is designed primarily to be a storage host for other computers. Small-scale servers are designed to perform functions such as providing network infrastructure services (e.g., archiving) and hosting data/media. These products are not designed to process information for other systems or run web servers as a primary function. A small-scale server has the following characteristics:

- a) Designed in a pedestal, tower, or other form factor similar to those of desktop computers such that all data processing, storage, and network interfacing is contained within one box/product;
- b) Designed to operate 24 hours/day, seven days/week, with minimal unscheduled downtime (on the order of hours/year);
- c) Capable of operating in a simultaneous multi-user environment serving several users through networked client units; and
- d) Designed for an industry accepted operating system for home or low-end server applications (e.g., Windows Home Server®, Mac® OS X Server, Linux™, UNIX™, Solaris).⁴⁶

spare part: A component of a product that is kept in reserve for possible use to replace a similar or identical component in the product.

⁴⁵Definition from ENERGY STAR Program Requirements for Computers, Version 6.1, June 2014.

⁴⁶Definition from ENERGY STAR Program Requirements for Computers, Version 6.1, June 2014.

take-back service: Any collection ~~A service provided by;~~ or initiated ~~caused to be provided by;~~ the manufacturer, by which either the product, or packaging, or designated items produced by or recommended by the manufacturer for use in or with the product, can be returned to the manufacturer or their collection service for reuse, repair, refurbishment, remanufacturing, and/or recycling. This collection occurs at the end of customer use or when the product or designated item is damaged beyond repair. ~~for reuse or recycling with no more than 10% of the returned material going to disposal or incineration.~~

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

thin client: An independently-powered computer that relies on a connection to remote computing resources (e.g., computer server, remote workstation) to obtain primary functionality. Main computing functions (e.g., program execution, data storage, interaction with other Internet resources) are provided by ~~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—Thin clients covered by this standard are (a) limited to devices with no rotational storage media integral to the computer and (b) designed for use in a permanent location (e.g., on a desk) and not for portability.⁴⁷

~~See Section 260.7(d) of the FTC Guides for the Use of Environmental Marketing Claims [B11].~~

totally chlorine free (TCF): Packaging material produced with pulp from virgin content that has been bleached without any type of chlorine, or that has not been bleached at all.

voluntary collective scheme: A system or program organized by one or more manufacturers to perform a take-back service; for example, a system for collecting used batteries for recycling.

⁴⁷ Definition from ENERGY STAR Program Requirements for Computers, Version 6.1, June 2014.

workstation: A high-performance, single-user computer typically used for graphics, CAD, software development, financial and scientific applications among other compute ~~computing~~ intensive tasks.

~~To qualify as a workstation, a computer must:~~

NOTE—Workstations covered by this standard (a) are ~~—Be~~ marketed as a workstation; (b) provide ~~—~~ ~~Have a~~ mean time between failures (MTBF) of at least 15 000 hours ~~(h—~~ based on either Bellcore TR-NWT-000332⁴⁸, issue 6, 12/97, or field collected data); and (c) support error-correcting code (ECC) and/or buffered memory. In addition, a workstation ~~meets must meet~~ three or more of the following criteria ~~six optional characteristics~~:

- a) Provide ~~—Have~~ supplemental power support for high-end graphics (~~i.e.g.,~~ PCIe[®] 6-pin 12V supplemental power feed);
- b) ~~System is~~ Wired for greater than x4 PCIe on the motherboard in addition to the graphics slot(s) and/or PCI-X support;
- c) Do ~~Does~~ not provide support for Uniform Memory Access (UMA) graphics;
- d) Provide ~~Includes~~ five or more PCI[™], PCIe, or PCI-X[™] slots;
- e) Provide ~~Capable of~~ multi-processor support for two or more processors (supporting ~~must support~~ physically separate processor packages/sockets, i.e., requirement cannot be ~~not~~ met with support for a single multi-core processor); and/or
- f) ~~Be~~ Qualification by ~~at least~~ two or more Independent Software Vendor (ISV) product certifications; these certifications can be in process, but must be completed within three ~~3~~ months of qualification.⁴⁸

⁴⁸ Definition from ENERGY STAR Program Requirements for Computers, Version 6.1, June 2014.

3.2 Acronyms and abbreviations

3G third generation

AICPA American Institute of Certified Public Accountants

ASTM American Society of Testing and Materials

CAP conformance assurance process

CAD computer aided design

CCF corporate carbon footprint

CCWG Clean Cargo Working Group

CDP Carbon Disclosure Project

CFR Code of Federal Regulations

~~CONEG~~ ~~Coalition of Northeast Governors~~

~~CPG~~ ~~Comprehensive Procurement Guidelines~~

CPU central processing unit

CVD chemical vapor deposition

DOE Department of Energy

DRE destruction and removal efficiency

DVI digital visual interface ECCerror correcting code

ECF elemental chlorine free

EEDI Energy Efficiency Design Index

~~DIN~~ ~~Deutsches Institut für Normung (German Institute of Standardization)~~

~~DVD~~ ~~digital versatile disc~~

EMAS Eco-Management and Audit Scheme

EMI electromagnetic interference

EMS environmental management system

EPA Environmental Protection Agency

EPS external power supply

ESD electrostatic discharge

EU European Union

EVCP environmental validation claim procedure

F-GHG fluorinated greenhouse gas

F-HTF fluorinated heat transfer fluid

GHG greenhouse gas

GLEC Global Logistics Emissions Council

~~EPEAT~~ ~~Electronic Product Environmental Assessment Tool~~

~~EPS~~ ~~expanded polystyrene~~

~~FTC~~ ~~Federal Trade Commission~~

~~IEEE~~ ~~Institute of Electrical and Electronics Engineers, Inc.~~

~~ISO~~ ~~International Organization for Standardization~~

GRI Global Reporting Initiative

<u>GWP</u>	<u>global warming potential</u>
<u>HDMI</u>	<u>High-Definition Multimedia Interface</u>
<u>HTML</u>	<u>Hyper Text Markup Language</u>
<u>IAF</u>	<u>International Accreditation Forum</u>
<u>IATA</u>	<u>International Air Transportation Association</u>
<u>I/O</u>	<u>input/output</u>
<u>ILO</u>	<u>International Labor Standards</u>
<u>IMO</u>	<u>International Maritime Organization</u>
<u>IPCC</u>	<u>Intergovernmental Panel on Climate Change</u>
<u>ITE</u>	<u>information technology and telecommunications equipment</u>
<u>LCA</u>	<u>life cycle assessment</u>
<u>LCD</u>	<u>liquid crystal display</u>
<u>MLA</u>	<u>Multilateral Arrangement</u>
<u>MTBF</u>	<u>mean time between failures</u>
<u>OECD</u>	<u>Organization for Economic Cooperation and Development</u>
<u>OHS</u>	<u>Occupational, health and safety</u>
<u>ODM</u>	<u>original design manufacturer</u>
<u>PCF</u>	<u>product carbon footprint</u>
<u>PCR</u>	<u>post-consumer recycled</u>
<u>PDF</u>	<u>Portable Document Format</u>

PPA power purchase agreement

PPC product performance category

RCOI Reasonable Country of Origin Inquiry

REC renewable energy certificate

SEP Superior Energy Performance

SME small and medium-size enterprises

TCF totally chlorine free

TEC typical energy consumption

USB Universal Serial Bus

VAP Validated Audit Process

VGA Video Graphics Array

~~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~~