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Sustainability Assessment for Carpet



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NSF International Standard/
American National Standard
for Sustainability —

Sustainability assessment for carpet

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Foreword²

This American National Standard, NSF/ANSI 140 Sustainability Assessment for Carpet Standard, has been developed as part of the ongoing efforts of a number of interested parties to document and improve the sustainability profile of carpet and rug products using established and/or advanced scientific principles, practices, materials, and standards. Stakeholders involved in developing the Standard included carpet and rug manufacturers, end users such as interior design professionals, state agencies responsible for environmentally preferable product procurement practices, academics, and non-governmental organizations.

The purpose of the Sustainability Assessment for Carpet Standard is to establish consistent requirements for sustainable carpet products. These requirements are intended to form the basis of conformity assessment programs, such as third-party certification or registration.

The Sustainability Assessment for Carpet Standard has been designed, in part, to satisfy the following criteria:

- Demonstrate how carpet and rug products can conform to the environmental, economic, and social principles of sustainability throughout the supply chain.
- Demonstrate conformance with ISO Type 1 (ISO 14024) and Type 2 (ISO 14021) environmental labelling and declaration requirements.
- Demonstrate conformance with the Federal Trade Commission (FTC) Guides for the Use of Environmental Marketing Claims.
- Engender confidence in the various stakeholders (manufacturers, suppliers, regulators, and consumers) that products labeled with a third party certification mark consistently meet the requirements of this program.
- Encourage participation by all manufacturers of carpets and rugs to maximize impact reductions and enhance environmental accomplishments.

This Standard does not address carpet packaging or the adhesives and padding that may be used in the installation of carpet products. This Standard does not address the cleanability of carpet products. Consideration will be given to the inclusion of these components of carpeting systems in this Standard as sustainability criteria are developed for these adjunct products and processes.

This version contains the following revisions:

Issue 25

This issue updated changes to 3.4, section 9, and deleted Annex D.

Issue 26

This issue updated the reference in 6.3.2 and 6.3.5.1 to the most current version for VOCs.

Interpretations issued for this document have been included in the Interpretations Annex.

Suggestions for improvement of this Standard are welcome. This Standard is maintained on a Continuous Maintenance schedule and can be opened for comment at any time. Comments should be sent to Chair,

² The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. Therefore, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

Joint Committee on Sustainable Carpet Assessment, NSF International, National Center for Sustainability Standards at ncss@nsf.org, or P.O. Box 130140, Ann Arbor, Michigan 48113-0140, USA.

NSF/ANSI Standard for Sustainability —

Sustainability assessment for carpet

1 General

1.1 Purpose and goals

The purpose of this Standard is to provide a market-based definition for a path to sustainable carpet, to establish performance requirements for public health and environment, and to address the triple bottom line, economic-environmental-social, throughout the supply chain.

The goals of this Standard are to:

- increase the economic value of sustainable carpet throughout the supply chain by enhancing market demand for sustainable carpet products;
- provide information that enables specifiers to sort out the complex information on sustainability attributes;
- identify other consensus-based standards relevant to sustainable carpet;
- educate and instruct all stakeholders in the carpet supply chain; and
- encourage competition between manufacturers and their suppliers to seek out or develop environmentally preferable processes, practices, power sources, and materials.

This Standard is intended to help raw material suppliers, converters, manufacturers, and end-users. Adherence to this Standard and achievement of high levels of sustainable attribute performance can or should result in:

- credits from LEED (Leadership in Energy and Environmental Design) for Commercial Interiors, e.g., Indoor Environmental Quality credit 4.3, Materials and Resources credit 4, Innovation and Design credit 1);
- design innovation;
- product differentiation;
- improved customer satisfaction;
- product innovation;
- improved indoor air quality and lower emissions;
- ecological restoration;

- enhanced health and safety for workers and consumers; and
- measurable reductions in total environmental impact.

1.2 Scope

This Standard is intended to enable organizations throughout the carpet supply chain to apply performance requirements to achieve sustainable attributes and demonstrate compliance with levels of achievement through quantifiable metrics. The Standard is inclusive, is based on life cycle assessment (LCA) principles, and provides benchmarks for continuous improvement and innovation.

This Standard is intended to allow inclusive participation and encourage the progressive movement of the carpet industry toward sustainability. This Standard identifies requirements of sustainable attribute performance and three levels of achievement by which carpet materials and products can be measured with respect to specific attributes that indicate progress toward sustainability.

While this Standard can be used on any carpet product, it is intended to be used for evaluation of commercial carpet products by providing a product evaluation methodology that is additive to emerging commercial green building standards.

This Standard does not apply to the packaging of sustainable carpets or to the adhesive or padding products used in the installation of carpet products.

This Standard is voluntary, but emphasizes disclosure of information on both impacts and benefits of a carpet or carpet product from an environmental and sustainability perspective.

All products or processes can be found compliant to this Standard if they are able to achieve all prerequisites and score the minimum required for compliance as specified in 4.

2 Normative references and tools

The following documents contain provisions that, through reference, constitute provisions of this NSF/ANSI Standard. At the time this Standard was balloted, the editions listed below were valid. All documents are subject to revision, and parties are encouraged to investigate the possibility of applying the recent editions of the documents indicated below. The most recent published edition of the document shall be used for undated references.

2.1 Normative references

American Association of Textile Chemists and Colorists (AATCC) Test Method 134-2006, Electrostatic Propensity of Carpets³

American Association of Textile Chemists and Colorists (AATCC) Test Method 16-2004 Colorfastness to Light³

ASTM International (ASTM) D5252-05, Standard Practice for the Operation of the Hexapod Drum Tester⁴

ASTM International (ASTM) D1335-05, Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings⁴

³ American Association of Textile Chemists and Colorists, PO Box 12215, Research Triangle, NC 27709-2215 <www.aatcc.org>.

⁴ ASTM International, 100 Bar Harbor Dr., W. Conshohocken, PA 19428-2951 <www.astm.org>

ASTM International (ASTM) D3936-05, Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering⁴

ASTM International (ASTM) E648-06a, Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source⁴

ASTM International (ASTM) E662-06, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials⁴

British Standards Institute (BS EN 1307). Textile floor coverings - Classification⁵

Carpet America Recovery Effort (CARE)⁶

Carpet and Rug Institute (CRI) Carpet Installation Standard 104⁷

Carpet and Rug Institute (CRI) Carpet Maintenance Guidelines for Commercial Applications⁷

Carpet and Rug Institute (CRI) Green Label Plus Program⁸

Carpet and Rug Institute (CRI) Test Method – 101 Technical Bulletin, Assessment of Carpet Surface Appearance Change using the CRI Reference Scales, Revision 7-03⁷

Department of Commerce (DOC) FF 1-70, Surface Flammability of Carpets and Rugs-Methenamine Pill Test, 16 CFR Part 1630⁹

Federal Trade Commission (FTC) Environmental Marketing Guides¹⁰

Federal Trade Commission (FTC) Guides for the Use of Environmental Marketing Claims, 16 CFR 260¹⁰

Green-e Renewable Electricity Certification Program¹¹

International Organization for Standardization (ISO) 139: Textiles – Standard atmospheres for conditioning and testing¹²

International Organization for Standardization (ISO) 1957: Machine made textile floor coverings – Sampling and cutting of specimens for physical tests.¹²

International Organization for Standardization (ISO) 9001: 2000, Quality management systems – Requirements¹²

⁵ British Standards Institute (BSI), 389 Chiswick High Road, London, W4 4AL, UK <www.bsigroup.com>

⁶ Carpet America Recovery Effort, 100 S. Hamilton St., Dalton, GA 30720 <www.carpetrecovery.org>.

⁷ The Carpet and Rug Institute, PO Box 2048, Dalton, GA 30722-2048 <www.carpet-rug.org>.

⁸ The Carpet and Rug Institute, PO Box 2048, Dalton, GA 30722-2048 <www.carpet-rug.org/about-cri/crisignature-programs>.

⁹ U.S. Government Printing Office, 710 N. Capitol St., N.W. Washington, DC 20401 <www.access.gpo.gov/nara/cfr/waisidx_04/16cfr1630_04.html>.

¹⁰ Federal Trade Commission, 600 Pennsylvania Ave., N.W. Washington, DC 20580 <www.ftc.gov>.

¹¹ Green-e, Center for Resource Solutions, 1012 Torney Ave., Second Floor, San Francisco, CA 94129 <www.green-e.org>.

¹² International Organization for Standardization, ISO Central Secretariat, 1, ch. De la Voie-Cruese, CP 56, CH-1211 Geneva 20, Switzerland <www.iso.org>

International Organization for Standardization (ISO) 14001: 2004, Environmental management systems – Requirements with guidance for use¹²

International Organization for Standardization (ISO) 14021:1999, Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)¹²

International Organization for Standardization (ISO) 14040:2006, Environmental management – Life cycle assessment – Principles and framework¹²

International Organization for Standardization (ISO) 14041: 1998, Environmental management – Life cycle assessment – Goal and scope definition and inventory analysis¹²

International Organization for Standardization (ISO) 14042: 2000, Environmental management – Life cycle assessment – Life cycle impact assessment¹²

International Organization for Standardization (ISO) 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines¹²

International Organization for Standardization (ISO) 14047: 2003, Environmental management – Life cycle impact assessment – Examples of application of ISO 14042¹²

International Organization for Standardization (ISO) 14048: 2002, Environmental management – Life cycle assessment – Data documentation format¹²

National Institute of Standards and Technology (NIST), Building for Environmental and Economic Sustainability (BEES)¹³

State of California CA/DHS/EHLB/R-174, Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers¹⁴

State of California Office of Environmental Health Hazard Assessment (OEHHA), Indoor Reference Exposure Levels (REL)¹⁵

Stockholm Convention on Persistent Organic Pollutants (POPs)¹⁶

U.S. Environmental Protection Agency (USEPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)¹⁷

U.S. Environmental Protection Agency (USEPA), Great Lakes Pollution Prevention and Toxics Reduction, Level I Substances¹⁸

¹³ National Institute of Standards and Technology, 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070 <www.nist.gov>.

¹⁴ The California Department of Public Health, PO Box 997377, MS 0500, Sacramento, CA 95899-7377 <www.cdph.ca.gov>

¹⁵ Office of Environmental Health Hazard Assessment, 1001 I Street, PO Box 2815, Sacramento, CA 95812-2815 <www.oehha.ca.gov>.

¹⁶ United Nations Environment Programme, Division of Technology, Industry and Economic, Chemicals Branch, United Nations Ave, Gigiri, PO Box 30552, 00100, Nairobi, Kenya <www.chem.unep.ch/Default.htm>.

¹⁷ U.S. Environmental Protection Agency, Superfund, Ariel Rios Building, 1200 Pennsylvania Ave., N.W., Washington, DC 20460 <<http://www.epa.gov>>.

¹⁸ U.S. Environmental Protection Agency, Great Lakes Binational Toxics Strategy, 77 W. Jackson Blvd. (G17J), Chicago, IL 60604-3511 <www.epa.gov>.

U.S. Environmental Protection Agency (USEPA) National Environmental Performance Track¹⁹

U.S. Environmental Protection Agency (USEPA) Resource Conservation and Recovery Act (RCRA)²⁰

U.S. Environmental Protection Agency (USEPA), Superfund Amendments and Reauthorization Act (SARA) Title III Toxic Release Inventory (TRI) Emissions²¹

U.S. Environmental Protection Agency (USEPA) Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI)²²

2.2 Informational references

Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.²³

Executive Order 13101, Greening the Government through Waste Prevention, Recycling and Federal Acquisition, September 14, 1998²⁰

Global Reporting Initiative (GRI) Social Indicators²⁴

Humane Society of the United States²⁵

National Campaign for Sustainable Agriculture²⁶

Purdue University and Conservation Technology Information Center²⁷

State of Minnesota Design for Environment Toolkit²⁸

U.S. Department of Agriculture (USDA) Farm Security and Rural Investment Act (FSRIA) 9001, 2002²⁹

U.S. Department of Agriculture (USDA) Food, Agriculture, Conservation, and Trade Act of 1990²⁹

¹⁹ U.S. Environmental Protection Agency, Performance Track, Office of Strategic Environmental Management, 1200 Pennsylvania Ave., N.W., Mail Code 1807T, Washington, DC 20460 <www.epa.gov/performance-track>.

²⁰ U.S. Environmental Protection Agency, Ariel Rios Building, 1200 Pennsylvania Ave., N.W., Washington, DC 20460 <www.epa.gov>.

²¹ U.S. Environmental Protection Agency, National Center for Environmental Assessment, Office of Research and Development, Washington, DC 20460 <www.epa.gov>

²² U.S. Environmental Protection Agency, PA Office of Research and Development National Risk Management Research Laboratory, Sustainable Technology Division – Systems Analysis Branch (MS-466), 26 West Martin Luther King Drive, Cincinnati, OH 45268 <www.epa.gov>

²³ Environment Directorate-General of the European Commission, B - 1049 Brussels Belgium <ec.europa.eu>.

²⁴ Global Reporting Initiative, PO Box 10039, 1001 EA, Amsterdam, The Netherlands, <www.globalreporting.org>.

²⁵ The Human Society of the United States, 2100 L Street, N.W., Washington, DC 20037 <www.hsus.org>.

²⁶ National Sustainable Agriculture Coalition, 110 Maryland Ave., N.E., Washington, DC 20002 <www.sustainableagriculture.net>.

²⁷ U.S. Environmental Protection Agency, Watershed Academy Web, Office of Wetlands, Oceans, and Watersheds (4501T), 1200 Pennsylvania Ave., N.W., Washington, DC, 20460 <www.epa.gov/watertrain/agmodule>.

²⁸ Minnesota Pollution Control Agency, 520 Lafayette Rd. N, St. Paul, MN 55155-4194 <www.pca.state.mn.us/oea/p2/design.cfm>.

²⁹ U.S. Department of Agriculture, 1400 Independence Ave., SW, Washington, DC 20250 <www.usda.gov>.

U.S. Environmental Protection Agency (USEPA), Identification and Listing of Hazardous Waste, 40 CFR 261.4(a)(8)³⁰

U.S. Environmental Protection Agency (USEPA) Introduction to Environmental Accounting as a Business Management Tool³¹

U.S. Environmental Protection Agency (USEPA), Municipal Solid Waste²⁰

U.S. Environmental Protection Agency (USEPA) Final Environmentally Preferable Purchasing Guidance¹⁹

U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) Rating System³²

Additional information on use of this Standard is provided in Annex A.

3 Definitions

3.1 best management practices (BMPs) for soil erosion and runoff control: Practices that improve soil productivity and prevent water pollution that adversely affects biota including spawning grounds. BMPs provide a basis for measuring the environmental impact of corn production for extraction of polylactic acid (PLA). Use of PLA fiber is recognized in this Standard. Many carpet materials may be bio-based in the future and therefore developed from agricultural products.

BMPs provide benefits at the raw materials extraction stage. These practices, developed by EPA, Purdue University, and Conservation Technology Information Center, can be viewed at www.epa.gov/watertrain/agmodule/ with detailed descriptions, manuals, and photos of practices. They allow for local variables (e.g., weather, pests, soil, and type of farm) and are summarized and slightly modified as follows:

- **Animal feeding operations (AFO) management where manure is used as fertilizer:** minimizing impacts of animal feeding operations and waste discharges through runoff controls, waste storage, waste utilization, and nutrient management;
- **Conservation buffers:** barriers of protection added by capturing potential pollutants that might otherwise move into surface waters. Examples are grassed waterways and riparian conservation areas;
- **Grazing management where manure is used for fertilizer:** minimizing the water quality impacts of grazing and browsing activities on pasture and range lands; and
- **Pest management:** varied organic methods for keeping insects, weeds, disease, and other pests below economically harmful levels while protecting soil, water, and air quality.

3.2 bio-based: Composed, in whole or significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine animals) or forestry materials (USDA Farm Security and Rural Investment Act (FSRIA) 9001, 2002).

NOTE – For the purposes of this Standard, products originating outside the U. S. that meet this definition are also considered to be bio-based.

³⁰ U.S. Department of the Interior, Bureau of Land Management, 1849 C Street NW, Rm. 5665, Washington, DC 20240 <www.blm.gov>.

³¹ U.S. Environmental Protection Agency, EPA National Library Network, Room 3340, EPA West Building, 1301 Constitution Ave. NW, Washington, DC 20004 <www.epa.gov/libraries/hqchem.html>.

³² U.S. Green Building Council, 2101 L Street NW, Suite 500, Washington, DC 20037 <www.usgbc.org>.

3.3 biodegradable: Predicted by reliable scientific evidence to break down (the entire product or package) completely and return to nature, i.e., decompose into elements found in nature within a reasonably short period of time after customary disposal, such as landfilling (16 CFR 260.7 (b)).

3.4 carpet: Heavy functional and ornamental floor coverings consisting of pile yarns or fibers and a backing system. May be tufted, flopped or woven.

3.5 closed loop process: A process of material reclamation and return that is neither classified as, defined as, nor operated as, a waste, i.e., any discarded material. Materials in a closed loop process are treated as commodities in a manner designed to avoid loss or release to the environment (See generally, 40 CFR 261.4(a)(8)).

3.6 continual improvement: A process used in total quality management, in which a manufacturer continually improves its products and processes through its routine course of business.

3.8 dematerialization: The process by which the amount of material or material form used to produce a carpet or rug is reduced.

3.7 design for the environment (DfE): An umbrella “intelligent design” term describing techniques used to incorporate pollution prevention, resource conservation, and other environmental components into products and services before they enter the production phase. DfE techniques help product design teams consider environmental implications or stages of a product: energy and materials used; manufacture and packaging; transportation; consumer use, reuse, or recycling; and disposal. All life cycle stages are analyzed including a full assessment of all inputs to the product, the company's operations related to the product, how the product is used, and final product disposition (whether it is reused, taken back, or disposed of). More information regarding DfE can be found in the EPA DfE partnership program, State of Minnesota DfE Toolkit (www.moea.state.mn.us/p2/dfe.cfm), or University of Washington Mechanical Engineering Department Design for Environment Lab.

3.9 environmentally preferable product (EPP): A product that has a lesser or reduced effect on human health and the environment when compared with competing products and services that serve the same purpose. This comparison applies to raw materials, manufacturing, packaging, distribution, use, reuse, operation, maintenance, and disposal. Environmentally preferable products may possess more than one environmentally friendly attribute.

3.10 first tier supplier: one step upstream of the manufacturing facility (see Annex B, Figure B1).

3.11 life cycle: Consecutive and interlinked stages of a product system, from raw material acquisition or to final disposition or reuse (ISO 14040).

3.11.1 life cycle assessment (LCA): Compilation and evaluation of the inputs, outputs, and potential environmental impacts of a product system throughout its life cycle (see Annex A, Figure A1) (ISO 14040).

3.11.2 life cycle design: An approach for designing more ecologically and economically sustainable product systems, integrating environmental requirements into the earliest stages of design. In life cycle design, environmental, performance, cost, cultural and legal requirements are balanced (EPA Introduction to Environmental Accounting as a Business Management Tool, June 1995).

3.11.3 life cycle impact assessment: A phase of life cycle assessment aimed at understanding and evaluating the magnitude and significance of the potential environmental impacts of a product system. (ISO 14040)

3.12 reclamation: The act or process of recovering a product at the end of its useful life for the purpose of recycling.

3.13 recycled content: The amount of material by weight "collected, separated or otherwise recovered from the solid waste stream for use in the form of raw materials, in the manufacture or assembly of a new package or product" (16 CFR 260.7 (d)). See background in Annex A, A.3. Coal fly ash used as filler or binding agent qualifies as postindustrial content only, as do all other postindustrial content fillers and binders. Manufacturer's scrap that would have, in any case, been incorporated into the product does not qualify as recycled under the Federal Trade Commission Guides (16 CFR 260.7(e)).

3.13.1 post-consumer recycled content: A material or finished product that has served its intended use and has been diverted or recovered from waste destined for disposal.

3.13.2 post-industrial/pre-consumer recycled content: Materials generated by manufacturers or product converters, such as trimming, overruns, and obsolete products, that are incorporated back into the manufacturing process of the same or a different product (See Annex A, A3).

3.14 recycling: The intentional introduction of a material that has been reprocessed from reclaimed material by means of a manufacturing process for further use in a man-made material cycle.

NOTE – Waste to energy does not constitute recycling for the purposes of this definition.

3.15 renewable energy: Includes solar electric (photovoltaic), solar thermal, wind, geothermal, biogas, biomass, hydro and renewable cogeneration on site or off site, on or off grid. Off-site renewable energy can be displaced with renewable energy meeting Green-e requirements or equivalent. As used in this Standard, the terms "Green-e" and "Green-e or equivalent" refer to Green-e or equivalent forms of energy that meet the same specifications as Green-e but may not be specifically labeled this way. Renewable energy sources may be generated by the same owner on a different site, or Green-e power in the form of renewable energy certificates, that are purchased on the open market from sources that are certified through the Green-e Renewable Electricity Certification Program.

The criteria for the Renewable Electricity Certification Program require that at least 50% of the supply be generated from the sun, water, wind, burning of wastes (biomass), or geothermal heat from the earth. In addition, in the use of any traditional fuel, emissions of sulfur dioxide (which causes acid rain), nitrogen oxide (which causes smog) and carbon dioxide (which causes climate change) shall be lower than average.

3.16 reuse: (verb) "Use a product more than once, either for the same purpose or for a different purpose. Reusing, where possible, is preferable to recycling because the item does not need to be reprocessed before it can be used again" (www.epa.gov/epaoswer/non-hw/muncpl/reduce.htm#reuse).

3.17 reusability: The potential of a product for reuse as defined in 3.15, and the possibility that facilities exist to make such reuse economically feasible.

3.18 supply chain: the all-inclusive set of links from raw materials to customer, including extraction, transportation, fuels, manufacturing, and use, i.e., the network of retailers, distributors, transporters, storage facilities, and suppliers that participate in the sale, delivery, and production of a particular product (www.investorwords.com).

3.19 sustainable agriculture: An integrated system of plant and animal production practices having site-specific application that will, over the long term:

- satisfy human food and fiber needs;
- enhance environmental quality and the natural resource base on which the agricultural economy depends;
- make efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;