# Healthy Carpet criteria

Environmental attributes for healthy carpet in health care.

**April 2023**

This document provides guidance for manufacturers wishing to meet Health Care Without Harm's Healthy Carpet criteria. The criteria apply to carpet tile, broadloom carpet, and carpet padding. The criteria do not apply to area rugs and outdoor carpet and rugs.

## Guidance for manufacturers

This chart summarizes the Healthy Carpet criteria. Criteria details and a rationale for their inclusion are included below the chart. Manufacturers can achieve either a Silver or Gold Healthy Carpet rating.

"Product" means every part of the carpet, including the face fiber, backing, and adhesives.

| SILVER LEVEL CRITERIA | | | |
|---|---|---|---|
| **CHEMICAL AND MATERIAL CRITERIA** | **DETAILS** | **SILVER** | **GOLD** |
| **Alkylphenols** | The product does not contain total alkylphenols, alkylphenol ethoxylates, or related compounds above 100 ppm. | x | x |
| **Antimicrobial agents** | The product does not contain any added antimicrobials, including antimicrobials or preservatives used to preserve or protect the final product. | x | x |
| **Bisphenol A and its analogs** | The product does not contain total bisphenol A or its structural analogs above 1000 ppm. | x | x |
| **Bitumen** | The product does not contain bitumen. | x | x |
| **Caprolactam** | The product meets the Carpet and Rug Institute Green Label Plus Emission Factor (EF) level for caprolactam. | x | x |

| SILVER LEVEL CRITERIA | | | |
|---|---|---|---|
| **CHEMICAL AND MATERIAL CRITERIA** | **DETAILS** | **SILVER** | **GOLD** |
| **Dyes and pigments** | The product does not contain dyes and pigments that are prohibited in Appendix A of the Blue Angel Low-Emission Textile Floor Coverings, DE-UZ 128. | x | x |
| **Epichlorohydrin** | The product does not contain epichlorohydrin-based formulations. | x | x |
| **Face fiber** | At least 95% of the face fiber must be made of a single synthetic polymer. | x | x |
| **Flame retardants** | The product does not contain flame retardants above 100 ppm. | x | x |
| **Fly ash** | The product does not contain fly ash. | x | x |
| **Formaldehyde** | The product does not contain added formaldehyde or formaldehyde-based formulations. | x | x |
| **Metals** | The product does not contain total lead, mercury, cadmium, hexavalent chromium (chromium VI), nickel, or organotins above 50 ppm. | x | x |
| **Nanomaterials** | The product does not contain deliberately engineered nanomaterials. | x | x |
| **Ortho-phthalates** | The product does not contain total ortho-phthalates above 50 ppm. | x | x |
| **PFAS** | The product does not contain per- or poly-fluorinated alkyl substances. | x | x |
| **PBT chemicals** | The product does not contain persistent, bioaccumulative, and toxic chemicals (PBTs) above 1000 ppm. | x | x |
| **PAHs** | The product does not contain polycyclic aromatic hydrocarbons (PAHs) above 0.5 ppm. | x | x |
| **Polyurethane** | The product does not contain polyurethane. | x | x |
| **Proposition 65 chemicals** | The product does not contain intentionally added chemicals listed on Proposition 65 at levels that would require a warning in the State of California. | x | x |
| **PVC and other chlorinated polymers** | The product does not contain polyvinyl chloride (PVC) or other chlorinated polymers. | x | x |
| **Recycled content** | Carpet tile must contain a minimum of 40% recycled content by weight of the entire product, of which at least 5% of the recycled content shall be post-consumer. | x | x |
| **Recycled tires** | The product does not contain recycled tires. | x | x |

| SILVER LEVEL CRITERIA | | | |
|---|---|---|---|
| **CHEMICAL AND MATERIAL CRITERIA** | **DETAILS** | **SILVER** | **GOLD** |
| **Siloxanes** | The product does not contain volatile methylcyclosiloxanes D4, D5, or D6 above 100 ppm. | x | x |
| **Solution-dyed** | The face fiber must be solution-dyed. | x | x |
| **SBR** | Carpet tile does not contain styrene-butadiene rubber (SBR)-based formulations. | x | x |

| **OTHER CRITERIA** | **DETAILS** | **SILVER** | **GOLD** |
|---|---|---|---|
| **Multi-attribute standard** | The product must be certified to the NSF/ANSI 140 Gold level or Cradle to Cradle Silver level. | x | x |
| **Product content transparency** | The product must have either 1) a complete Health Product Declaration with all substances characterized and screened at or above 1000 ppm, or 2) a fully disclosed Declare label that is Red List Free at 100 ppm, and with no proprietary information claimed for any ingredient above 1000 ppm. | x | x |
| **Recyclable** | The major components of the product must be recyclable. | x | x |
| **Take-back program** | Manufacturer must have an active take-back program for its products and must publicly report on the effectiveness of the effort on an annual basis. | x | x |
| **VOC certification** | The product must be certified as meeting Carpet and Rug Institute Green Label Plus, Blue Angel, or Cradle to Cradle Gold or Platinum. | x | x |
| **VOC certification if contains SBR** | Broadloom carpet that contains SBR must meet Carpet and Rug Institute Green Label Plus. | x | x |

| **GOLD LEVEL CRITERIA**<br>*(ALL SILVER LEVEL REQUIREMENTS APPLY IN ADDITION TO THE FOLLOWING)* | | | |
|---|---|---|---|
| **CRITERIA** | **DETAILS** | **SILVER** | **GOLD** |
| **Multi-attribute standard** | The product must be Cradle to Cradle Gold or Platinum level certified (full certification) or Living Product Challenge certified. Living Product Challenge certification is acceptable if it includes certification under the Water, Energy, and Material Health Petals. The LPC Material Health Petal certification must cover 100% assessment of all chemicals present at the 100 ppm level in the final product formulation. | | x |
| **Product content transparency** | The product must have a complete Health Product Declaration with all substances characterized, screened, and identified to 100 ppm. | | x |

| **GOLD LEVEL CRITERIA**<br>*(ALL SILVER LEVEL REQUIREMENTS APPLY IN ADDITION TO THE FOLLOWING)* | | | |
|---|---|---|---|
| **CRITERIA** | **DETAILS** | **SILVER** | **GOLD** |
| **Recyclable** | Both the face fiber and backing must be able to demonstrate a viable regional market for recycling. | | x |
| **Recycled content** | The product must contain a minimum of 45% recycled content by weight of the entire product, of which at least 5% of the **face fiber** shall be post-consumer recycled content. | | x |
| **SBR** | The product does not contain styrene-butadiene rubber (SBR)-based formulations. | | x |

**NOTE: The Healthy Carpet criteria are part of a broader initiative in health care.** Institutions incorporating the criteria into their specifications must commit to install the carpet using adhesives as described below.

| **ADHESIVE INSTALLATION REQUIREMENT** | |
|---|---|
| **CRITERIA** | **DETAILS** |
| **Installation adhesive** | The adhesive used to install the carpet must be certified as meeting Carpet and Rug Institute Green Label Plus, or the carpet must be attached mechanically without a chemical adhesive.<br><br>If an adhesive is used, a peel-and-stick adhesive is preferred over a wet-applied (full-spread) adhesive. If a wet adhesive is used, it also must meet South Coast Air Quality Management District (SCAQMD) Rule 1168 (2005). |

**SILVER LEVEL CRITERIA**

# Chemical and material criteria details

### Alkylphenols

The product does not contain total alkylphenols, alkylphenol ethoxylates, or related compounds above 100 ppm.

**Definition:** An alkylphenol is a phenol derivative wherein one or more of the ring hydrogens have been replaced by one or more alkyl groups. An alkyl group is a functional group or side-chain that consists solely of single-bonded carbon and hydrogen atoms.

**Scope:** The alkylphenol restriction applies to alkylphenols or AP ethoxylates with carbon chain lengths of eight or greater; 2,4,6-tri-*tert*-butylphenol, which is included in the OSPAR list of priority substances; and 4-*tert*-butylphenol.

**Rationale:** The breakdown products of alkylphenol ethoxylates include a variety of alkylphenols, some of which are estrogenic, and some are restricted due to persistence and bioaccumulation. When released into the environment, alkylphenol ethoxylates are particularly toxic to aquatic organisms.

### Antimicrobial agents

The product does not contain any added antimicrobials, including antimicrobials or preservatives used to preserve or protect the final product.

**Definition:** Antimicrobials are substances or mixtures of substances designed to destroy or suppress the growth of harmful microorganisms whether bacteria, viruses, or fungi on inanimate objects or surfaces. These products are typically used for two purposes: 1) Disinfect, sanitize, reduce, or mitigate growth of microbiological organisms; 2) Protect inanimate objects (floors, walls, and/or furniture), industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

**Rationale:** Human toxicity and ecotoxicity profiles differ among antimicrobial agents, but none are entirely benign. The addition of antimicrobials can also contribute to more widespread antibiotic resistance. Although carpets can be a reservoir for a variety of pathogens, there is no evidence that antimicrobials added to carpet confers any health benefit, including reduction in health care-associated infections.

### Bisphenol A (BPA) and its analogs

The product does not contain total bisphenol A or its structural analogs above 1000 ppm.

**Scope:** Structural analogs to be avoided include bisphenol AP, bisphenol AF, bisphenol B, bisphenol C, bisphenol Cl2, bisphenol E, bisphenol F, bisphenol G, bisphenol M, bisphenol S, bisphenol P, bisphenol PH, bisphenol TMC, bisphenol Z, and 4-cumylphenol (HPP). A more extensive list of structural analogs to be avoided includes any compound with the following characteristics:

1. All compounds with a Tanimoto Coefficient of 0.9-1.0 (compared to Bisphenol-A CASRN 80-05-7) are restricted. For these purposes, Tanimoto Coefficients are obtained at EPA's CompTox Dashboard.

2. Any compound with a Tanimoto Coefficient of 0.8-0.9 is restricted until there are publicly-available, valid in vitro or in vivo hazard data that enable evaluation of estrogen and androgen receptor agonism and antagonism. If a compound does not have significant endocrine-disrupting potential, it would be not be included.

3. Chemicals with a Tanimoto Coefficient <0.8 would be considered restricted if either of the following are true:

a) the compound has demonstrated endocrine-disrupting potential (estrogen and/or androgen receptor agonism and/or antagonism) and is used as a functional substitute for BPA, **or**

b) the compound is detected in environmental media or human biomonitoring studies **and** it is used as a functional substitute for BPA **and** publicly available hazard data to evaluate endocrine-disrupting potential (estrogen and/or androgen receptor agonism and/or antagonism) are lacking.

Note: If the compound is detected in environmental media or human biomonitoring studies **and** it is used as a functional substitute for BPA, but has sufficient publicly available hazard data to demonstrate that it does not have endocrine-disrupting potential (estrogen and/or androgen receptor agonism and/or antagonism), it is not restricted.

**Rationale:** Bisphenol A (BPA) is a reproductive and developmental toxicant and endocrine disruptor. Emerging evidence finds an association between prenatal or postnatal exposure to BPA and a variety of adverse health outcomes. Listed BPA structural analogs are also prohibited because virtually all currently studied have some evidence of toxic profiles similar to BPA.

**Bitumen**

The product does not contain bitumen.

**Definition:** Any of various mixtures of hydrocarbons (such as tar) often together with their nonmetallic derivatives that occur naturally or are obtained as residues after heat-refining petroleum.

**Rationale**: Bitumen is listed as a carcinogen under CA Proposition 65 and is persistent according to the Canadian Environmental Protection Act. Bitumen contains polycyclic aromatic hydrocarbons (see Polycyclic aromatic hydrocarbons below) and can contain traces of poisonous hydrogen sulphide. During combustion, bitumen will emit various alkanes and alkenes; additionally, it's sulphur content will contribute to SOx emissions. The inclusion of bitumen in carpet can be a barrier to recycling because it can hinder carpet reprocessing in some cases as it can melt during granulation.

**Caprolactam**

The product meets the Carpet and Rug Institute Green Label Plus Emission Factor level for caprolactam.

**Definition:** Caprolactam is the monomer used in the polymerization process to manufacture synthetic fibers and resins, known as Nylon-6. The polymerization process of caprolactam to nylon polymer is not 100% efficient, thus allowing some of the un-polymerized caprolactam to remain in the final product.

**Scope**: For products containing nylon, product does not emit caprolactam above the Carpet and Rug Institute Green Label Plus Emission Factor of 131 µg/m²·hr and a concentration of 70 µg/m³ for the 24-hour test.

**Rationale:** Measurable levels of caprolactam have been found primarily in indoor air as a result of the release of vapor or particulate from carpeting containing Nylon-6. In industrial processes, exposure can occur during various stages of the production of the caprolactam monomer. Exposure also may occur during recycling of waste carpets, which can be reprocessed back to its raw material. Acute (short-term) exposure to caprolactam may result in irritation and burning of the eyes, nose, throat, and skin in humans. Headaches, malaise, confusion, and nervous irritation have been observed in workers exposed to caprolactam by inhalation. Chronic (long-term) exposure of workers to caprolactam has been observed to cause peeling of the hands and some eye, nose, and throat irritation, but no other effects on general health. EPA has not classified caprolactam for carcinogenicity.

**Dyes and pigments**

The product does not contain dyes and pigments that are prohibited in Appendix A of the Blue Angel Low-Emission Textile Floor Coverings, DE-UZ 128.

**Definition:** Pigments are particles of color that are insoluble in water, oils, and resins. They need a binder or to be suspended in a dispersing agent to impart or spread their color. Dyes are usually water-soluble and depend on physical and/or chemical reactions to impart their color. There are thousands of different dye and pigment substances used in the dyeing process for carpet.

**Rationale**: Of concern are some azo dyes, which are a large class of industrial colorants used in the dyeing process for both natural and synthetic textiles. Many azo dyes are not hazardous, but a small group of azo dyes break down into more hazardous aromatic amines that are mutagenic and carcinogenic. In the EU, azo dyes that break down into any of 22 specific aromatic amines are restricted under REACH above 30 ppm in any textile that comes into contact with the skin. Azo dyes that may break down into aromatic amines resulting from residues of previously dyed fibres of recycled materials are restricted in concentrations above 70 ppm. Blue Angel restricts the azo dyes targeted in the EU.

Another concern with both dyes and pigments are toxic metals that can be part of the formulation. Many of the metals used in carpets can be toxic to human and environmental health. Toxic metals are natural components and cannot be degraded or destroyed. Some metals can bioaccumulate in organisms and consequently up the food chain. Many toxic metals have known neurotoxic, carcinogenic, and developmental effects.

In addition, dyes discharged into waterways from textile operations can present a hazard as it decreases the availability of sunlight to enter the water, creating a lack of oxygen and consequently negatively impacting aquatic biota.

**Epichlorohydrin**

The product does not contain epichlorohydrin-based formulations.

**Rationale:** Epichlorohydrin is listed as a carcinogen and reproductive toxicant, according to the State of California (Proposition 65). It is used in some adhesive formulations.

### Face fiber

At least 95% of the face fiber must be made of a single synthetic polymer.

**Definition:** Face fiber is the carpet pile (not the backing).

**Rationale:** Restricting face fiber to a single synthetic polymer increases the likelihood that a carpet will be recycled. Avoiding blended materials is an important strategy when designing for recycling.

Natural fibers have a host of different environmental considerations that were beyond the scope of this criteria development process. Natural fibers used in carpet, such as wool, can contain hazardous preservatives and processing agents, for example.

### Flame retardants

The product does not contain flame retardants above 100 ppm.

**Exemption:** Where flammability standards require the use of flame retardants, inorganic flame retardants approved under the Blue Angel Low-Emission Textile Floor Coverings, DE-UZ 128, criteria are allowed. In particular, the following compounds may be used: inorganic ammonium phosphates (for example, diammonium phosphate or ammonium polyphosphate), other dehydrating minerals (for example, aluminium hydroxide), or expandable graphite. Antimony oxides may not be used.

**Definition:** Flame retardants are designed to inhibit, suppress, or delay the production of flames to prevent the spread of fire. For example, see the list of Flame Retardants in the Chemical Hazard Data Commons.

**Rationale:** Flame retardants can be persistent and have a variety of toxic properties depending on the specific flame retardant. Non-polymeric flame retardants can migrate out of products into the environment, resulting in human exposure.

### Fly ash

The product does not contain fly ash.

**Definition:** Fine solid particles of ashes, dust, and soot waste released from the combustion of coal, oil, trash, or other fuel sources.

**Rationale:** Fly ash has been commonly used as a filler in carpet backing. Residual fly ash can contain toxic pollutants, including toxic metals such as mercury, PAHs, dioxins, and furans.

### Formaldehyde

The product does not contain added formaldehyde or formaldehyde-based formulations.

Many formaldehyde-based formulations are listed in Chemical Hazard Data Commons Formaldehyde-Based Binders and Urea formaldehyde-based compounds.

**Rationale**: Formaldehyde is classified as a known human carcinogen by the National Toxicology Program. It is also a sensitizing agent and can cause asthma.

### Metals

The product does not contain total lead, mercury, cadmium, hexavalent chromium (chromium VI), nickel, or organotins above 50 ppm.

**Scope:** Metals include lead, mercury, cadmium, hexavalent chromium (chromium VI), nickel, organotins, and compounds that contain those metals. For example, see the list of Toxic Heavy Metals in the Chemical Hazard Data Commons and list of Organotin Compounds in the Chemical Hazard Data Commons.

**Rationale:** A wide variety of health and ecosystem concerns are associated with the toxic metals prioritized in this criterion, including neurotoxicity, cancer, reproductive and developmental effects, and aquatic toxicity.

### Nanomaterials

The product does not contain deliberately engineered nanomaterials.

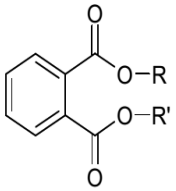
**Definition:** Materials engineered to a very small scale are often referred to as engineered nanomaterials (ENMs), which can take on unique optical, magnetic, electrical, and other properties. For a more complete definition, see the European Commission definition of a nanomaterial.

**Rationale:** There are growing concerns about the lack of testing of nanomaterials and emerging toxicity concerns for common nanomaterials. Most nanomaterials have not been extensively studied for health and environmental impacts. Far more information is needed, especially on physicochemical properties of nanomaterials, their behavior in different environments, and interactions with biological systems.

### Ortho-phthalates

The product does not contain total ortho-phthalates above 50 ppm.

**Definition**: Ortho-phthalates have the general chemical structure shown below:




(R, R' groups can be linear, branched, or linear/branched or cyclic ring)

**Scope:** For more details on the compounds considered ortho-phthalates, please see the list of Ortho-Phthalates in the Chemical Hazard Data Commons.

**Rationale:** The hazard profile of ortho-phthalates varies with side-chain lengths. Adverse effects include hormone disruption, reproductive and developmental impacts, and kidney toxicity. Exposure to some ortho-phthalates is associated with an increased risk of asthma. The National Research Council reports the importance of looking at cumulative exposure from multiple phthalates; exposure routes include ingestion, inhalation, intravenous injection, and skin absorption.

### Per- or poly-fluorinated alkyl substances (PFAS)

The product does not contain per- or poly-fluorinated alkyl substances.

No intentionally added fluorine compounds are allowed. Initial screening for the presence or absence of per- or poly-fluorinated alkyl substances can be accomplished by measuring total fluorine content. Total fluorine must be

less than 100 ppm, as determined by an approved lab with analysis using approved, validated test methods other than extraction.

**Definition:** PFAS are a large group of compounds that contain a carbon-fluorine bond. PFAS include long- and short-chain per- and poly-fluorinated alkyl substances and fluorinated polymers. This includes any substance that meets any one of the definitions:

- Perfluoroalkyl substances: Substances for which all hydrogen atoms on all carbon atoms (except for carbons associated with functional groups) have been replaced by fluorine atoms.
- Polyfluoroalkyl substances: Substances for which all hydrogen atoms on at least one (but not all) carbon atom have been replaced by fluorine atoms.
- Fluoropolymers: Carbon-only polymer backbone with fluorine atoms directly bound.
- Perfluoropolyethers: Carbon and oxygen polymer backbone with fluorine atoms directly bound to carbon atoms.
- Side-chain fluorinated polymers: Variable composition non-fluorinated polymer backbone with fluorinated side chains.

For a list of some of the specific chemicals included in these categories, see Per- and Polyfluorinated Alkyl Substances (PFAS) / Perfluorinated Compounds (PFCs) in the Chemical Hazard Data Commons.

**Rationale:** PFAS compounds are generally highly persistent chemicals or break down into highly persistent chemicals. They have been nicknamed “forever chemicals” because of their extreme persistence. Some but not all bioaccumulate. They are regularly found in people and animals in all areas of the planet. Because of their persistence, continued use will inevitably lead to increasing environmental concentrations of PFAS compounds. The health effects of the most well studied include high cholesterol, thyroid disorders, pregnancy-induced hypertension and preeclampsia, cancer (testicular and kidney), and altered metabolism, among others. Many of these compounds have not been adequately evaluated.

**Persistent, bioaccumulative, and toxic (PBT) chemicals**

The product does not contain persistent, bioaccumulative, and toxic chemicals (PBTs) above 1000 ppm.

**Definition**: PBTs are a class of compounds that have high resistance to degradation from abiotic and biotic factors, high mobility in the environment, and high toxicity. Because of these factors, PBTs have been observed to have a high order of bioaccumulation and biomagnification, very long retention times in various media, and widespread distribution across the globe.

PBTs include chemicals on any of the following lists:

- US EPA –Priority PBTs and US EPA – Priority PBTs (NWMP)
- UNEP Stockholm Conv – Persistent Organic Pollutants
- US EPA – Toxics Release Inventory PBTs
- ECHA- Candidate List of substances of very high concern

**Rationale:** These four lists are authoritative government lists that include chemicals known to be persistent, bioaccumulative, and toxic. This combination of properties makes PBTs particularly hazardous. PBTs are long-lasting substances that can build up in the food chain to levels that are harmful to human and ecosystem health. Because of their persistence and bioaccumulative properties, they do not break down easily and are particularly difficult to clean up.

**Polycyclic aromatic hydrocarbons (PAHs) amenities**

The product does not contain polycyclic aromatic hydrocarbons (PAHs) above 0.5 ppm.

**Definition:** Polycyclic aromatic hydrocarbons (PAHs) are a large class of naturally occurring substances found in coal, crude oil, and gasoline. They also can be produced through incomplete combustion of organic matter such as wood, coal, or oil (including combustion of plastics). Some PAHs may be found as impurities in textile dyes.

**Rationale**: Many PAHs are known carcinogens in addition to having other hazards. For example, benzo[a]pyrene is a well-known carcinogen, mutagen, and reproductive toxicant (CMR) as well as persistent and bioaccumulative. The European Chemicals Agency and US EPA regulate concentrations of specific PAHs in air, water, and soil.

In the EU, eight PAHs have been restricted in rubber or plastic components that come into contact with skin or oral cavities under normal conditions of use at >1 ppm. For toys and childcare articles, the PAH concentration limit is 0.5 ppm. During the manufacturing of plastic carpet fibers and backing materials, workers likely have the highest potential for exposure.

**Polyurethane**

The product does not contain polyurethane.

**Definition:** Polyurethane is a polymer derived from the reaction of isocyanates with polyols. Polyurethane may be used in carpet backing, and polyurethane foam may be used as carpet padding.

**Rationale:** Some chemicals used in the production of polyurethane, including isocyanates and anilines, are hazardous. The two most common isocyanates used in the production of polyurethane are methylene diphenyl diisocyanate (MDI) and toluene diphenyl diisocyanate (TDI). Isocyanates are a leading cause of workplace asthma, and present a significant concern during manufacturing. MDI and TDI are known skin and respiratory sensitizers as well as suspected carcinogens. Additionally, diisocyanates are a major cause of occupational asthma. Free, unreacted isocyanates are commonly present in polyurethane consumer products. Polyurethane carpet backings also commonly contain persistent, bioaccumulative, and toxic tin catalysts.

**Proposition 65 chemicals**

The product does not contain intentionally added chemicals listed on Proposition 65 at levels that would require a warning in the State of California.

Restrictions established by other criteria in this document supersede this criterion to the extent they conflict.

**Definition:** Proposition 65 requires California to publish a list of chemicals known to cause cancer, birth defects, or other reproductive harm. It requires businesses to provide warnings to Californians about significant exposures to these chemicals. The Proposition 65 list, which must be updated at least once a year, has grown to include approximately 900 chemicals since it was first published in 1987.

**Rationale:** Proposition 65 chemicals are chemicals known to the State of California to cause cancer or adverse impacts on reproduction or development.

### Polyvinyl chloride (PVC) and other chlorinated polymers

The product does not contain polyvinyl chloride (PVC) or other chlorinated polymers.

**Definition:** PVC, or vinyl, is a synthetic thermoplastic material made by polymerizing vinyl chloride. The properties of the material depend on the additives, including plasticizers.

**Rationale:** This plastic (PVC) is particularly problematic because of the toxicity of the monomers required to make the polymer and the generation and release of hazardous compounds during manufacture and disposal. PVC also generally requires more additives, many with their own toxic properties, when compared to other polymers. The diverse additives can also make PVC difficult to recycle.

### Recycled content

Carpet tile must contain a minimum of 40% recycled content by weight of the entire product, of which at least 5% of the recycled content shall be post-consumer.

**Scope:** Applies to carpet tile, **not** to broadloom carpet.

**Rationale:** Four billion pounds of used carpet are sent to landfills every year. Using virgin materials to make carpet requires more energy, materials, and chemicals. To achieve a circular economy, carpet materials will eventually need to become increasingly recyclable and contain recycled content. Buying recycled-content products ensures that the materials collected in recycling programs will be used again in the manufacture of new products. According to the EPA, recommending post-consumer recycled content levels for products will have the largest impact on reducing the amount of solid waste requiring disposal. The United States is the largest market in the world for carpet and home to some of the largest carpet producers, resulting in 11 billion square feet of carpet sold per year. Approximately 3.5% of all waste disposed of in U.S. landfills is carpet discard – equivalent to four billion pounds. Less than 5% of carpet discard is recycled, and less than 1% is turned back into carpet.

### Recycled tires

The product does not contain recycled tires.

**Rationale:** Recycled tires can contain contaminants of concern, including metals, polycyclic aromatic hydrocarbons, and other hazards.

### Siloxanes

The product does not contain volatile methylcyclosiloxanes D4, D5, or D6 above 100 ppm.

**Scope**: Methylcyclosiloxanes D4, D5, and D6 include Octamethylcyclotetrasiloxane (D4) (CAS #'s 556-67-2, 104986-37-0, 117563-66-3, 1257661-59-8, and 83874-62-8); Decamethylcyclopentasiloxane (D5) (CAS # 541-02-6); and Dodecamethylcyclohexasiloxane (D6) (CAS #75-78-5).

**Rationale**: Siloxanes are a large family of chemicals with different toxicities. A limited number have been found to have aquatic and/or mammalian toxicity and are restricted. The restricted siloxanes D4 and D5 are persistent in the environment and have the potential to bioaccumulate in aquatic organisms. D4 and D5 have a variety of toxic properties at fairly high levels of exposure, and D6 is presumed to share many of them although D6 is less well studied.

### Solution-dyed

The face fiber must be solution-dyed.

**Definition:** Face fiber is the carpet pile (not the backing). Solution dyeing, used only for synthetic fibers, is the process by which the polymer used to make the carpet fiber is melted and the dyes are dispersed directly into the polymer to impart the desired color.

**Rationale**: According to the World Bank, twenty percent of global organic water pollution is linked to the textile dyeing processes from all products. The use of synthetic dyes can have an adverse effect on all forms of life. Solution-dyed products reduce the use of hazardous dyes. Solution-dyed products are better able to withstand wear and tear, in addition to chemical cleaners, when compared to other dyeing methods. Colorfastness and color uniformity are improved with solution-dyed methods. In addition, the solution-dyeing process requires significantly less energy and water usage.

Moreover, dyes discharged into waterways from textile operations can present a hazard as it decreases the availability of sunlight to enter the water, creating a lack of oxygen and consequently negatively impacting aquatic biota.

### Styrene-butadiene rubber (SBR)

Carpet tile does not contain styrene-butadiene rubber (SBR)-based formulations.

**Definition**: Styrene-butadiene rubber (SBR) is a family of synthetic rubbers, produced from a copolymer of styrene and butadiene and includes styrene-butadiene latex.

**Scope:** Applies to carpet tile, **not** to broadloom carpet.

**Rationale**: The styrene and butadiene raw materials used to create the SBR polymer are particularly hazardous. 1,3-butadiene is a known carcinogen and reproductive and developmental toxicant. Many but not all studies find an increased risk of leukemia in workers engaged in rubber manufacture. 1,3 butadiene is often released into the environment from rubber manufacturing facilities. Styrene is listed as reasonably anticipated to be a carcinogen by the National Toxicology Program and as a known carcinogen by the International Agency for Research on Cancer. Styrene is also a neurotoxicant. SBR contains varying amounts of styrene in the finished product and can off-gas to interiors. 4-phenylcyclohexene (4-PCH) is a byproduct from the polymerization of styrene and butadiene. 4-PCH is a semi-volatile compound and a suspected carcinogen. 4-PCH has historically been known as the chemical creating the “new carpet smell” as it has a strong odor even in small amounts. 4-PCH also may react with ozone to create formaldehyde, and may contain PAHs. Additionally, SBR is a major obstacle to recycling. Several combustion products from SBR are highly toxic, and require both high temperature and excess oxygen environments in order to decompose completely.

# Other criteria

**Multi-attribute standard**

The product must be certified to the NSF/ANSI 140 Gold level or Cradle to Cradle Silver level.

**Rationale**: Cradle to Cradle Silver Certified Products Standard and the NSF/ANSI 140 Gold, while not equivalent, are multi-attribute certifications that evaluate products, systems, and operations in order to improve human and environmental health. NSF/ANSI 140 Sustainable Carpet Assessment Standard provides a minimum set of basic requirements for commercial carpet manufacturers. Cradle to Cradle is a continuous improvement product certification that addresses material reutilization, renewable energy and carbon management, water stewardship, and social fairness.

**Product content transparency**

The product must have either 1) a complete Health Product Declaration with all substances characterized and screened at or above 1000 ppm, or 2) a fully disclosed Declare label that is Red List Free at 100 ppm, and with no proprietary information claimed for any ingredient above 1000 ppm.

**Definition**: A Health Product Declaration (HPD) can provide disclosure of the potential chemicals of concern in products. HPDs provide a framework for manufacturers to inventory and disclose the contents of their products and any associated human and environmental hazards. Through the standardized HPD form, manufacturers provide information on both intentional content and impurities within their products. The framework is maintained and updated by the Health Product Declaration Collaborative. Declare is an ingredient label and transparency tool for building products. Declare requires reporting on product content, origin, and end of life.

**Rationale**: Product ingredient transparency is critical to understanding potential occupational and environmental risks of products and their life cycle, and to assessing potential exposures during use.

**Recyclable**

The major components of the product must be recyclable.

**Definition**: The major components of carpet are the face fiber and backing. Recyclable means turning any manufacturer's old carpet or carpet components into new carpet or other consumer products. Recycling does not include:

- Carpet As Alternative Fuel (CAAF)
- Burning carpet in cement kilns
- Waste-to-energy (WTE)
- Any high-temperature material destruction or conversion
- Carpet used as alternative daily cover (ADC)

**Rationale**: Four billion pounds of carpet are sent to landfills every year. Using virgin materials to make carpet requires more energy, materials, and chemicals. To achieve a circular economy, carpet materials will need to be designed for recycling.

**Take-back program**

Manufacturer must have an active take-back program for its products and must publicly report on the effectiveness of the effort on an annual basis.

**Scope**: An effective program may include both quantitative and qualitative measures. It could include, for example: pounds or square yards of institutional carpet that have been taken back, the disposition of product by percentage, or other quantitative measures that manufacturers find appropriate. Documentation of extended producer responsibility efforts might include data on the amount of carpet recycled after return to the manufacturer.

**Rationale:** Four billion pounds of carpet are sent to landfills every year. To achieve a circular economy, carpet materials will need to not only be designed for recycling, and to contain recycled content, but recycling take-back programs will need to be in place in order to create the infrastructure for wide-scale recycling throughout the country.

**VOC certification**

The product must be certified as meeting Carpet and Rug Institute Green Label Plus, Blue Angel, or Cradle to Cradle Gold or Platinum.

**Definition**: Volatile organic compounds (VOCs) are carbon containing compounds released as gases into the air from products at ambient temperatures. Some VOCs are released quickly and others more slowly over time from solid products. VOCs are numerous, varied, and ubiquitous.

**Rationale**: Most VOCs have hazardous properties and adversely impact the quality of indoor air for building occupants. Each of these certification programs require the testing of products for VOC emissions under specified conditions and for specific compounds. Blue Angel and Cradle to Cradle Gold and Platinum are multi-attribute standards, one portion of which includes a VOC emissions requirement.

**VOC certification required if the product contains styrene-butadiene rubber (SBR)**

Broadloom carpet that contains SBR must meet Carpet and Rug Institute Green Label Plus.

**Rationale:** Styrene-butadiene rubber (SBR)-containing carpets are a possible source of exposure to styrene and 4-phenylcyclohexene (4-PCH), which is a toxic byproduct from the polymerization of styrene and butadiene and can be emitted as well. 4-PCH is a semi-volatile compound and a suspected carcinogen. 4-PCH has historically been known as the chemical creating the “new carpet smell” as it has a strong odor even in small amounts. 4-PCH may also react with ozone to create formaldehyde. Styrene is listed as reasonably anticipated to be a carcinogen by the National Toxicology Program and as a known carcinogen by the International Agency for Research on Cancer. Styrene is also a neurotoxicant. SBR contains varying amounts of styrene in the finished product that can off-gas to interiors.

## GOLD LEVEL CRITERIA

### Multi-attribute standard

The product must be Cradle to Cradle Gold or Platinum level certified (full certification) or Living Product Challenge certified. Living Product Challenge certification is acceptable if it includes certification under the Water, Energy, and Material Health Petals. The LPC Material Health Petal certification must cover 100% assessment of all chemicals present at the 100 ppm level in the final product formulation.

**Scope:** Cradle to Cradle Gold or Platinum level certification meets the requirement. Living Product Challenge certification must include certification under the Water, Energy, and Material Health Petals. The LPC Material Health Petal certification must cover 100% assessment of all chemicals present at the 100 ppm level in the final product formulation.

**Rationale:** Cradle to Cradle Certified Products Standard and the Living Product Challenge, while not equivalent, are multi-attribute certifications that evaluate products, systems, and operations in order to improve human and environmental health. Cradle to Cradle is a continuous improvement product certification that addresses material reutilization, renewable energy and carbon management, water stewardship, and social fairness. LPC addresses materials, water, and energy, among others.

### Product content transparency

The product must have a complete Health Product Declaration with all substances characterized, screened, and identified to 100 ppm.

**Definition**: A Health Product Declarations (HPD) can provide disclosure of the potential chemicals of concern in products. It provides a framework for manufacturers to inventory and disclose the contents of their products and any associated human and environmental hazards. Through the standardized HPD form, manufacturers provide information on both intentional content and impurities within their products.

**Rationale**: Product ingredient transparency is critical to understanding potential occupational and environmental risks of products and their life cycle, and to assessing potential exposures during use.

### Recyclable

Both the face fiber and backing must be able to demonstrate a viable regional market for recycling.

**Definition**: Recyclable means turning any manufacturer's old carpet or carpet components into new carpet or other consumer products. Recycling does not include:

- Carpet as alternative fuel (CAAF)
- Burning carpet in cement kilns
- Waste-to-energy (WTE)
- Any high-temperature material destruction or conversion
- Carpet used as alternative daily cover (ADC)

See the Federal Trade Commission's Green Guides for information on recyclable marketing claims.

**Rationale**: Four billion pounds of carpet are sent to landfills every year. Using virgin materials to make carpet requires more energy, materials, and chemicals. To achieve a circular economy, carpet materials will need to be designed for recycling and to contain recycled content. Currently, less than 5% of carpet is recycled, and less than 1% is turned back into carpet.

**Recycled content**

---

The product must contain a minimum of 45% recycled content by weight of the entire product, of which at least 5% of the **face fiber** shall be post-consumer recycled content.

**Definition**: Face fiber is the carpet pile (not including the backing).

**Rationale:**
**Rationale:** Four billion pounds of used carpet are sent to landfills every year. Using virgin materials to make carpet requires more energy, materials, and chemicals. To achieve a circular economy, carpet materials will eventually need to become increasingly recyclable and contain recycled content. Buying recycled-content products ensures that the materials collected in recycling programs will be used again in the manufacture of new products. According to the EPA, recommending post-consumer recycled content levels for products will have the largest impact on reducing the amount of solid waste requiring disposal. The United States is the largest market in the world for carpet and home to some of the largest carpet producers, resulting in 11 billion square feet of carpet sold per year. Approximately 3.5% of all waste disposed of in U.S. landfills is carpet discard – equivalent to four billion pounds. Less than 5% of carpet discard is recycled, and less than 1% is turned back into carpet.

**Styrene-butadiene rubber (SBR)**

---

The product does not contain styrene-butadiene rubber (SBR)-based formulations.

**Definition**: Styrene-butadiene rubber (SBR) is a family of synthetic rubbers, produced from a copolymer of styrene and butadiene and includes styrene-butadiene latex. SBR is used widely as a bonding layer in broadloom carpets.

**Rationale**: The styrene and butadiene raw materials used to create the SBR polymer are particularly hazardous. 1,3-butadiene is a known carcinogen and reproductive and developmental toxicant. Many but not all studies find an increased risk of leukemia in workers engaged in rubber manufacture. 1,3 butadiene is often released into the environment from rubber manufacturing facilities. Styrene is listed as reasonably anticipated to be a carcinogen by the National Toxicology Program and as a known carcinogen by the International Agency for Research on Cancer. Styrene is also a neurotoxicant. SBR contains varying amounts of styrene in the finished product and can off-gas to interiors. 4-phenylcyclohexene (4-PCH) is a byproduct from the polymerization of styrene and butadiene. 4-PCH is a semi-volatile compound and a suspected carcinogen. 4-PCH has historically been known as the chemical creating the “new carpet smell” as it has a strong odor even in small amounts. 4-PCH also may react with ozone to create formaldehyde, and may contain PAHs. Additionally, SBR is a major obstacle to recycling. Several combustion products from SBR are highly toxic, and require both high temperature and excess oxygen environments in order to decompose completely.

## ADHESIVE INSTALLATION REQUIREMENT

**NOTE: The Healthy Carpet criteria are part of a broader initiative in health care.** Institutions incorporating the criteria into their specifications must commit to install the carpet using adhesives as described below.

---

The adhesive used to install the carpet must be certified as meeting Carpet and Rug Institute Green Label Plus, or the carpet must be attached mechanically without a chemical adhesive.

If an adhesive is used, a peel-and-stick adhesive is preferred over a wet-applied (full-spread) adhesive. If a wet adhesive is used, it also must meet South Coast Air Quality Management District (SCAQMD) Rule 1168 (2005).

**Rationale**: Adhesives can be an important source of VOCs in the indoor environment. Most VOCs have hazardous properties and can adversely impact the quality of indoor air for building occupants.

## VERIFICATION

Greenhealth Approved reviews products against the criteria outlined in this document. We encourage suppliers to apply for the Greenhealth Approved seal.

For more information on how to apply for the Greenhealth Approved seal, please visit Greenhealth Approved Healthy Carpet.

Vetting disclosures and documentation reviewed during vetting for the seal include:

- Completion of the Healthy Carpet product information form, which includes full chemical inventory disclosure and confirmation that products meet the Healthy Carpet criteria.
- Health Product Declaration or Declare label, as required by the criteria herein. Meeting the silver level criteria requirements is a requirement for use of the Greenhealth Approved seal and only products that have been reviewed by Greenhealth Approved and passed vetting can use the seal.
    - When a Health Product Declaration or other transparency tool does not identify the chemical name of every ingredient,a non-disclosure agreement (NDA) can be entered into to meet the full chemical inventory requirement. Laboratory testing data from an accredited lab, verifying compliance for those criteria that do not reference third party certifications.
- A signed affidavit stating that the information provided during the vetting process is true and accurate.

  Recycled material is sometimes used in carpets. That material can inadvertently contain chemicals of concern. Purchasers may want to find out from suppliers if there is recycled content in the flooring, and if so, may request additional testing or documentation to ensure the prioritized chemicals have been evaluated and that the final product meets the criteria.