

THIRD EDITION

GREEN FLOORING

*A Step-by-Step
Comprehensive Guide
for Members of the
World Floor Covering
Association*



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LEED A.P.

MAKE IT ENVIRONMENTALLY FRIENDLY FROM THE GROUND FLOOR UP

“GREEN” FLOORING
A Primer for Members of the World Floor Covering Association

Third Edition

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PURPOSE AND ORGANIZATION OF THIS DOCUMENT

Increasing public awareness and government attention has led to a growing market demand for environmentally friendly or “green” building design, construction practices, and products. Manufacturers are promoting their “green” products, homeowners are demanding green construction and renovations, and certain local governments are encouraging or requiring environmentally friendly building practices. But what is green construction, and what flooring products will meet green standards and consumer demand?

The term “green” itself is so overused to render it meaningless. The key is to identify construction practices and products that meet objective standards and confirming they are environmentally friendly and sustainable. To avoid any confusion, the term “green” will not generally be used in this document to describe practices or products that meet the accepted standards or definitions for what is environmentally sustainable. Rather “environmentally friendly” will be used for construction *practices* that meet accepted standards for buildings, and “sustainable” will be used to describe *products* that meet accepted standards.

There is no single, universal system for determining whether any particular product or construction practice is environmentally friendly or sustainable. Rather, a variety of rating systems and programs for assessing whether construction practices and products are environmentally friendly have developed over time. These programs have widely varying degrees of third-party oversight and stringency, and many have been criticized as being subject to manipulation by those who simply want a green “seal of approval” for marketing or public relations purposes. The area of environmentally friendly building is further complicated by the fact that there are different standards for commercial and residential construction, separate standards for renovations, and special standards for schools and healthcare facilities. There are also countless claims that various products are eco-friendly, many with little or no explanation or verification.

The purpose of this primer is to provide an introduction to the current relevant environmentally friendly assessment programs so that members of the World Floor Covering Association (WFCA) can better understand which of their products and practices may be characterized as environmentally friendly or sustainable. New products claiming to be “green” are introduced almost every day. This book is designed to help flooring dealers and contractors understand the current systems and to provide the information needed to assess new products that claim to be sustainable. Armed with this information, WFCA members will be better able to capitalize on the demand for sustainable products and pursue contracts on environmentally friendly construction projects.

This document is organized as follows:

- Section I provides a general introduction to how the various construction rating systems work—what types of construction are covered and what aspect of construction and products the systems tend to focus on to be considered environmentally friendly and sustainable.

- Section II introduces the current leading environmentally friendly rating systems for commercial building projects and shows how flooring can contribute points toward certification under each system. The section focuses on the two best-known rating systems—the seven applicable LEED® rating programs developed by the US Green Building Council (USGBC) and the three alternative rating systems that comprise Green Globes®, introduced by the Green Building Initiative (GBI). Both LEED and Green Globes systems apply to entire building projects, not to individual components such as flooring. Because flooring can contribute points toward the certification of the entire building project, section II included checklists for each rating program that identifies particular flooring-related products, installation practices, and waste management practices that can generate points under these systems.
- Section III explains the International Green Construction Code™ (IgCC) developed by the International Code Council®, its adoption by states and local jurisdictions, and its impact on commercial construction costs. It is essential that flooring contractors and dealers in states and local jurisdictions that have adopted, or will adopt, the IgCC understand the Code’s requirements and potential impact in costs imposed by the requirements in the Code.
- Section IV is similar to section II, but with a focus on the two currently available residential standards: LEED for Homes and the National Green Building Standard developed by the National Association of Home Builders (NAHB). A checklist for each rating program is included to identify the products and practices that generate points under the two standards. In addition, a summary of the ReGreen Residential Remodeling Guidelines, a set of “best practices” developed by the American Society of Interior Designers (ASID) Foundation for a wide range of home renovation projects, is also explained.
- Section V explains the Federal Trade Commission’s (FTC’s) revised Guides for the Use of Environmental Marketing Claims, established to prevent deception in environmental marketing claims. An understanding of the Guides is essential to ensure that flooring retailers and contractors neither violate these standards nor are victims of improper claims that products are sustainable.
- Section VI provides guidance on how to verify that a particular flooring product meets environmentally friendly standards. The section includes an explanation various flooring-specific rating systems, including: the SMaRT Sustainable Flooring Standard, FloorScore® for hard-surface flooring and flooring adhesive, NSF/ANSI 140 Sustainability Assessment for Carpet standard, and the Green Label® programs for carpet products. The section also identifies other means of verifying that a product is environmentally friendly, such as third-party certification systems for wood.
- Section VII summarizes some of the possible benefits of employing (and being recognized as using) environmentally friendly construction and sustainable products. Examples include tax credits for environmentally friendly buildings and lower interest rates through “energy-efficient mortgages.” Although it would be virtually impossible to catalog all of the benefits and incentives available in all jurisdictions, this section

describes sources through which a WFCA member can determine if tax credits, “energy-efficient mortgages,” and other benefits are available.

- Worksheets in the appendixes are provided for the LEED, Green Globes, and National Green Building standards. They can be downloaded and used on projects to identify environmentally friendly practices under each system. The worksheets identify the applicable standard and number of points available; the worksheets also provide columns to identify the points actually earned and space for any additional information or comments. These worksheets can be provided to the general contractor or the building owners/homeowners for their records and to assist them in obtaining the appropriate certification.

I. INTRODUCTION TO GREEN RATING SYSTEMS

The last two decades have seen the rapid development of environmentally friendly rating systems designed and marketed to measure the environmental impact of particular products, processes, and building techniques. Sustainable construction has grown in popularity from the introduction by some local governments of the need for environmentally friendly construction practices, such as the 1991 Green Building Program in Austin, the EarthCraft House established in Atlanta, Georgia in 1999, and the current nationally recognized programs and requirements. To date, there are more than 30 local environmentally friendly building programs affiliated with state or local governments and building associations. Like rating systems for other products and processes, these building programs include some that are self-certifying and some that rely on a system of third-party verification.

In 2000, the US Green Building Council (USGBC) developed its first Leadership in Energy and Environmental Design system (commonly referred to as LEED). The LEED® system has grown to a family of standards for different types of construction projects and buildings. In 2004, the Green Building Initiative® (GBI) developed an alternative rating system called Green Globes®. Both the LEED and the Green Globes systems rate construction practices and products by assigning points for construction practices that they determine are environmentally friendly and for the use of products they designate as sustainable. Both systems apply to entire building projects, not to individual components such as flooring, although flooring can contribute points toward the rating of the entire project under both rating systems.

Other national systems have been developed, including the National Green Building (NGB) Standard®, a comprehensive residential rating system by the National Association of Home Builders. Like the LEED and Green Globes systems, the NGB Standard awards points for employing environmentally friendly construction practices and using sustainable products. This standard can be used for single-family homes; low-, mid-, and high-rise multifamily buildings; and residential remodeling projects.

One of the most significant recent developments is the release of the International Green Construction Code™ (IgCC or Code). The IgCC establishes a “model” construction code for states and local jurisdictions to adopt. It imposes minimum sustainable construction requirements, such as the amount of building materials that must include salvaged or recycled material. The IgCC applies to commercial, mixed-use, and residential occupancy classifications. It does not apply to single-family homes, low-rise residential buildings, or systems used primarily for industrial or manufacturing processes. As a model code, the IgCC is not mandatory or enforceable unless a jurisdiction formally adopts it. Several states and municipalities have already adopted the IgCC, and it is anticipated that other states and local jurisdictions will follow in making the Code mandatory.

All these rating systems and construction codes address the same basic areas to assess a building’s level of sustainability. These common areas of assessment are: (1) site selection and development, (2) water conservation, (3) energy efficiency and/or renewable energy, (4) environmentally preferred materials and resources, and (5) indoor environmental quality. The systems reward the design, construction, and operation of the building. The first factor, site

selection, primarily involves the designing of the project and selecting a building location that has the least impact on the environment, for example, selecting a site close to public transportation, designing a building with minimum “heat island effect,” and developing environmentally friendly areas in the project. The second factor, water conservation, deals with topics such as waste-water management and water-efficient landscaping. The last three factors—energy efficiency, sustainable materials, and indoor air quality—have the largest impact on the actual construction of the building. Of these factors, the ones most relevant to flooring are the last two: environmentally preferred materials (e.g., bio-based materials, third-party certified wood, materials with recycled content, and rapidly renewable materials) and indoor air quality (e.g., low emissions of volatile organic compounds [VOCs]). Certain flooring products or installation practices may, to a lesser extent, also implicate the areas of energy efficiency and water conservation.

II. COMMERCIAL BUILDING STANDARDS

The two best-known assessment systems for commercial building projects are the LEED[®] and Green Globes[®] rating systems. The LEED rating system is actually a collection of systems that applies to buildings depending on their type and the nature of the project. Similarly the Green Globes rating system consists of several rating systems that provide certification for new construction, existing buildings, and healthcare buildings. A brief overview of the LEED and Green Globes systems is provided here, followed by an explanation of how flooring can contribute to certification under these two standards.

A. LEED

Whose system is it? The LEED rating system, which has evolved into a series of specialized systems for different types of buildings and building projects, was originally developed by the nonprofit US Green Building Council (USGBC) in 2000. USGBC developed the LEED system using a consensus-based approach that included committees composed of practitioners and experts in the building and construction industries. Although once lacking in industry representation, USGBC now enjoys broad participation of more than 12,000 groups from across the building industry, including building owners and end users, real estate developers, facility managers, architects, designers, engineers, general contractors, subcontractors, product and building system manufacturers, government agencies, and nonprofit groups. In 2006, the American National Standards Institute (ANSI) accredited the USGBC as a standards-developing organization. This accreditation is a prerequisite to ANSI endorsement of any standard developed by USGBC, such as a LEED standard.¹ USGBC, however, has not subjected the LEED system to the rigorous ANSI review, and LEED is not currently ANSI certified.

1 ANSI’s accreditation programs are carried out in accordance with international guidelines and have been verified by government and peer-review assessments. Through accreditation, standards-developing organizations are recognized as having procedures that meet particular requirements for openness, balance, consensus, and due process. If a standards-developing organization wishes to establish a particular standard as an ANSI standard, it must first complete the rigorous review process that is set forth in the organization’s ANSI-approved procedures.

What is the general approach? The LEED system generally adopts a “whole-building” approach to environmentally friendly construction by assessing performance of the building as a system, not component parts or features. In 2009, USGBC released LEED Version 3 (LEED 2009), an updated version of the eight existing LEED commercial and institutional building rating systems: New Construction and Renovations; Core and Shell²; Existing Building: Operations and Maintenance; Commercial Interiors; New Retail Construction; Retail Interiors; Schools; and Health Care.³

The standard focuses on seven general areas of human and environmental health:

1. Sustainable Sites (SS credits): This category includes construction-related pollution prevention, avoidance of sensitive areas such as wetlands, transportation alternatives, post-construction storm water management, heat island effect, and light pollution.
2. Water Efficiency (WE credits): This category includes indoor and outdoor water conservation, such as use of water-conserving fixtures and landscaping.
3. Energy and Atmosphere (EA credits): Included in this category are installation and calibration of energy-related systems such as heating, ventilating, and air conditioning (HVAC) and lighting, whole-building energy-performance optimization, refrigerant management, renewable energy use, and energy-consumption measurement and verification.
4. Materials and Resources (MR credits): This category is directly impacted by flooring and includes such items as construction-waste management; post-construction recycling collection locations; reuse of existing features during renovations; and purchase of regionally manufactured materials, materials with recycled content, rapidly renewable materials, salvaged materials, and sustainably grown wood products.
5. Indoor Environmental Quality (IEQ credits): This category is also directly impacted by floor covering products that impact air quality such as use of low-emitting materials and indoor pollutant source control. These categories often include technical requirements on the limitations of levels of volatile organic compounds (VOCs). It is not practical for the floor covering dealer or contractor to determine and certify these levels. As a result, each LEED standard recognizes that products that are certified under the Carpet and Rug Institute’s (CRI’s) Green Label Plus[®] program for carpets and pads; Resilient Floor Covering Institute’s FloorScore[®] program for vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, and wall base; and the Indoor Air Quality Certification Green Seal Standard program for

² Flooring has little, if any, impact on LEED for Core and Shell and therefore is not included in this book.

³ The LEED for Homes and LEED for Neighborhood Development rating systems are not affected by LEED 2009. LEED projects that were registered under previous versions of the rating system can be upgraded to LEED 2009. For LEED systems that have been updated, no new projects can be registered under the older LEED rating systems.

commercial adhesives all meet the low-VOC emission standards. If a product is not certified, the manufacturer should provide the VOC levels for its materials to ascertain compliance with these requirements.

6. Innovation in Design (ID credits): This category encourages the use of LEED-accredited professionals and innovative strategies for sustainable design.
7. Regional Priority (RP credits): Points can be earned for buildings that address geographically specific environmental priorities, social equity, and public health priorities, such as water conservation and renovating rather than constructing a new building.

LEED 2009 uses a point-based system by which buildings earn LEED 2009 points for achieving specific practice or product criteria. Within each of the seven LEED 2009 credit categories listed above, building-related projects must meet a number of specified prerequisites and earn a minimum number of points. The total number of points earned determines the level of LEED 2009 certification that the building may receive. There are four main levels of certification: certified, silver, gold, and platinum. A project achieving 40 to 49 points can become LEED Certified, a project achieving 50 to 59 points can earn LEED Silver, a project achieving 60 to 79 points can earn LEED Gold, and a project achieving 80 points or above can earn LEED Platinum. Silver is the most commonly used standard. Certification under any of these standards requires independent, third party verification. Information on where to find a LEED 2009 provider who can provide technical, marketing, and verification support to builders is available <http://new.usgbc.org/profile>.

The following pages provide specific information about how flooring-related products and practices can earn points toward certification under each of these building systems. To better demonstrate how flooring may be used toward certification, the subsections below provide checklists identifying individual performance standards that may be applicable to flooring. There are imperfect and overlapping categories. For example, implementation of a construction waste management plan might fit within either the Installation and Construction Practices category or within the Waste Minimization and Management category. Reusing portions of previously existing buildings might fit as well within the Materials and Resource Selection category as within the Waste Minimization category. Nevertheless, the precision of these categories is less important than their goal, which is to make it easier for those in the flooring business to recognize the types of products and practices over which they may have control and that may be used to assist a building in gaining certification under these programs. Each checklist below provides a reference to the particular provision described, as well as the number of points available for each standard identified.

Although LEED 2009 certification depends entirely on the performance of the building as a whole, individual products and construction practices, such as those used in flooring, can earn points under the rating system. A checklist of the requirements most applicable to flooring is provided for each the following seven LEED systems: (1) New Construction and Major Renovations, (2) Existing Buildings: Operations and Maintenance, (3) Commercial Interiors, (4) Retail: New Construction and Major Renovations, (5) Retail: Commercial Interiors,

(6) Schools New Construction and Major Renovations, and (7) Healthcare (new construction and renovations of facilities).⁴ Many of requirements included in each of the seven standards are the same. To avoid any confusion and cross referencing, however, a checklist is included for each standard, and the corresponding appendix contains a separate worksheet for the standard.

To better explain how flooring can help a building earn LEED credits, the applicable standards are organized into four categories: (1) mandatory standards, which do not earn points, but must be met as a prerequisite to certification; (2) installation and construction practices, such as using vapor barriers, installing insulation between the floor and the subfloor, and not carpeting bathrooms; (3) material selection, which includes installing products that are approved by Forest Stewardship Council CRI's Green Label Plus program or the Resilient Floor Covering Institute's FloorScore program; and (4) recycling and minimizing waste, for example by using a separate dumpster to collect and recycle carpet.

1. Flooring under LEED for New Construction and Major Renovations

The LEED 2009 for New Construction and Major Renovations (LEED 2009-NC) rating system was designed primarily for new commercial office buildings, but it can be applied to many other types of buildings, such as libraries, museums, churches, hotels, and multiunit residential buildings of four or more habitable stories. In addition to new construction, LEED 2009-NC is recommended for use in major renovation projects, such as significant envelope modifications and major interior rehabilitation.

Flooring materials and products may implicate several of the LEED 2009-NC categories. Some of the standards specifically reference flooring products and installation. For example, points are awarded for carpet that meets the CRI's Green Label requirements, for hard-surface flooring certified by FloorScore, and for adhesives and sealants that meet the requirements of California's stringent South Coast Air Quality Management District Materials for VOC levels. Other standards specifically include flooring but also include other construction materials, such as using wood certified by the Forest Stewardship Council (FSC) or materials harvested within 500 miles of the project site. Flooring can impact other standards but cannot earn points on its own. For example, points are available for taking steps during building construction or renovation to divert a certain percentage of construction or demolition waste from landfills. Those installing flooring help earn LEED credits through implementing waste-minimization practices and pollution control plans, like setting up a separate waste container for carpet or putting framing waste in the wood-recycling bin.⁵

4 There are also LEED standards for Neighborhood Development and for Core and Shell Development, but neither is significantly impacted by flooring. LEED for Neighborhood Development deals with the location of a building, not the interior finishes. Similarly, LEED Core and Shell is designed for developers who are responsible for the core and shell of the building but have no responsibility for the interior. It provides performance criteria for certifying features such as building structure, envelope, and building-level systems, including central HVAC.

5 Most of the LEED 2009 credits that may implicate flooring processes or products are found in LEED's Materials and Resources (MR), Indoor Environmental Quality (IEQ), and Regional Priority (RP) categories. Flooring is able to contribute little, if anything, to achieving points under LEED's Sustainable

The following checklist describes the primary ways that flooring can contribute to earning points, and ultimately certification, under LEED 2009-NC. Items that are mandatory prerequisites are marked as “Prereq.” The recommended practices and available points are identified. Finally, a column is provided for the flooring dealer or contractor to complete for each project to calculate the points earned or describe the steps taken to earn points. The flooring contractor can submit these sheets to the customer or the general contractor.

LEED 2009 for New Construction and Major Renovations			
	Provision	Points Available	Points Earned
<i>Mandatory Prerequisites for Certification</i>			
<ul style="list-style-type: none"> • <u>Construction Activity Pollution Prevention.</u> Flooring dealers and contractors must adhere to an erosion and sedimentation control plan, created during the design phase of the project, which conforms to the erosion and sedimentation requirements of the 2003 EPA Construction General Permit or local erosion and sedimentation control standards and codes (whichever is more stringent). See http://cfpub.epa.gov/npdes/. The plan must be designed to prevent pollution of the air with dust and particulate matter, sedimentation of storm sewer or receiving streams, and loss of soil by storm water runoff or wind erosion during construction activity. 	SS Prereq. 1	A mandatory prerequisite	Identify steps taken to assist:
<ul style="list-style-type: none"> • <u>Storage and Collection of Recyclables.</u> The standard mandates require disposition of construction waste in a designated area for recyclable collection and storage. The waste binds must be: <ul style="list-style-type: none"> (1) Appropriately sized and located in a convenient area; (2) Separated by whether waste is to be disposed of, recycled, or reused; and (3) Designated by type of waste material. Flooring dealers and contractors should consider setting up their own waste disposal and recycling system to assist the general contractor. 	MR Prereq. 1	A mandatory prerequisite	Identify steps taken to assist:

Sites (SS), Water Efficiency (WE), Energy and Atmosphere (EA), Innovation in Design (ID), or Regional Priority (RP) credit categories.

<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan—During Construction</u>. Flooring dealers and contractors can contribute to an indoor air quality (IAQ) plan to control pollutant sources during construction/renovation. The plan must be designed to meet the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) <i>IAQ Guidelines for Occupied Buildings Under Construction</i> (2nd edition, 2007) and to protect stored-on-site or installed absorptive materials from moisture damage. LEED recommends that material installation be sequenced in a manner that avoids contamination by absorptive materials, such as insulation and carpeting. 	IEQ Credit 3.1	1 point	
<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan—Before Occupancy</u>. This standard addresses the IAQ after construction ends and prior to occupancy, with all interior finishes installed. It provides for such things as flushing out ventilation systems and testing air quality. Although it is unlikely that the flooring dealer or contractor will be ultimately responsible for this process, it does require all flooring to be installed and finished before occupancy of the building. 	IEQ Credit 3.2	1 point	
<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> • <u>Building Reuse—Maintain Existing Walls, Floors and Roof</u>. Points are awarded for maintaining the existing building structure and envelope. The flooring contractor can contribute to the requirement by keeping the structural floors and roof decking. Points are awarded based on the percentage of the building that is reused, not on new construction. If the project includes an addition that is more than two times the floor area of the existing building, this credit is not applicable. Note that hazardous materials that are remediated as part of the project are excluded from the calculation of the percentage maintained. 	MR Credit 1.1	1 point for 55% 2 points for 75%, 3 points for 95%	

<ul style="list-style-type: none"> • <u>Building Reuse—Maintain Interior Nonstructural Elements</u>. Points are awarded for reusing existing interior nonstructural elements such as interior walls, doors, floor coverings, and ceilings in at least 50% (by area) of the completed building, including additions. If the project includes an addition with floor area more than two times the floor area of the existing building, this credit is not applicable. 	MR Credit 1.2	1 point	
<ul style="list-style-type: none"> • <u>Materials Reuse</u>. The use of salvaged, refurbished, or reused materials can earn points toward certification. Specifically, points are available for use of these materials in an amount that constitutes at least 5 or 10% (based on cost) of the total value of materials in a project. Salvaged materials specifically include beams and posts, flooring, brick, and decorative items. 	MR Credit 3	1 point for 5% 2 points for 10%	
<ul style="list-style-type: none"> • <u>Recycled Content</u>. Installing building products that incorporate recycled materials earns a point if the sum of postconsumer recycled content plus one-half of pre-consumer recycled content of project materials equals or exceeds 10% (based on cost) of the total value of materials in a project. 	MR Credit 4	1 point for 10% 2 points for 20%	
<ul style="list-style-type: none"> • <u>Regional Materials</u>. Credits can be earned by installing products or materials that have been extracted, harvested, recovered, or manufactured within a 500-mile radius of the project site. To encourage environmentally friendly transportation, the standard discounts the mileage by the type of transportation. For example, 3 miles of train transportation or 15 miles by sea are calculated as only 1 mile. The formula for calculating transportation distances is by rail/3 <i>plus</i> inland waterway/2 <i>plus</i> sea/15 <i>plus</i> all other at true distance. 	MR Credit 5	1 point for 10% 2 points for 20%	

<ul style="list-style-type: none"> • Rapidly Renewable Materials. Installing at least 2.5 (based on total building material costs) materials and products made from rapidly renewable sources (plants that are typically harvested within a 10-year-or-shorter cycle) can earn a point. LEED encourages the use of bamboo, wool, cotton insulation, agrifiber, linoleum, wheatboard, strawboard, and cork. 	MR Credit 6	1 point	
<ul style="list-style-type: none"> • Certified Wood. Flooring can help earn credit by installing wood-based materials and products certified in accordance with Forest Stewardship Council (FSC) Principles and Criteria. In order to qualify for this credit, when using new wood-based products and materials, at least 50% of such materials must be FSC certified. The requirement includes both finished flooring and subflooring. 	MR Credit 7	1 point	
<ul style="list-style-type: none"> • Low-Emitting Materials—Adhesives and Sealants. All adhesives and sealants used in the building interior must meet the volatile organic compound (VOC) limitations in the South Coast Air Quality Management District (SCAQMD) Rule 1168. As applicable to flooring, the VOC limits (measured as g/L less water) are: <ol style="list-style-type: none"> 1. Indoor carpet adhesives.....50 2. Carpet pad adhesive.....50 3. Wood flooring adhesives..... 100 4. Rubber floor adhesives..... 60 5. Subfloor adhesives..... 50 6. Ceramic tile adhesives..... 65 7. VCT and asphalt adhesives.....50 8. Multipurpose construction adhesives..... 70 9. Contact adhesive..... 80 10. Special purpose contact adhesive.....250 11. Structural wood member adhesive.....140 12. Sheet applied rubber lining operations.... 850 13. Top and trim adhesive sealants..... 250 14. Architectural, nonporous sealants.....250 15. Architectural, porous sealants.....775 16. Other sealants..... 750 	IEQ Credit 4.1	1 point	

<p>Aerosol adhesives must meet the Green Seal Standard for Commercial Adhesives GS-36 requirements and have the following limits:</p> <ol style="list-style-type: none"> 1. General purpose mist spray 65% VOCs by weight 2. General purpose web spray 65% VOCs by weight 3. Special purpose aerosol adhesives (all types) 65% VOCs by weight <p>The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.</p>			
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Paints and Coatings.</u> Flooring contractors can contribute by using clear wood finishes, floor coatings, stains, shellacs, and paints that do not exceed the VOC limits established in SCAQMD Rule 1113 in the building interior. <p>The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.</p>	IEQ Credit 4.2	1 point	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Flooring Systems.</u> Flooring contractors need to install flooring that (1) meets the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of VOCs or (2) meets the following requirements, as applicable to the project scope: <ul style="list-style-type: none"> • <i>Carpets.</i> The carpet meets the testing and product requirements of the Carpet and Rug Institute’s (CRI’s) Green Label Plus program. • <i>Carpet Cushions.</i> All carpet cushions installed in the building interior must meet the requirements of the CRI’s Green Label program. • <i>Carpet Adhesives.</i> All carpet adhesives must meet the VOC requirements of IEQ Credit 4: Low-Emitting Materials, which lists a VOC limit of 50 g/L. • <i>Hard Surface Flooring.</i> All hard surface flooring must meet the FloorScore6 standard as 	IEQ Credit 4.3	1 point	

6 FloorScore is a voluntary, independent certification program that tests and certifies hard surface flooring and associated products for compliance with criteria adopted in California for indoor air emissions of

<p>tested by an independent third party. Flooring products covered by FloorScore include vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, and wall base.</p> <ul style="list-style-type: none"> • <i>Concrete, Wood, Bamboo, and Cork Floor Finishes.</i> All sealers, stains, and finishes must meet the requirements of the SCAQMD. • <i>Masonry, Tile, Cut Stone, Solid Wood.</i> These automatically qualify, but adhesives, grouts, finishes, and sealants must be compliant for a mineral-based or unfinished/untreated solid wood floor. • <i>Tile Setting Adhesives and Grout.</i> All must meet SCAQMD Rule 1168 VOC limits. <p>If a product is not certified under one of these programs, the manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.</p>			
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Composite Wood, and Agrifiber Products.</u> Installing composite wood and agrifiber products (particleboard, medium-density fiberboard, plywood, wheatboard, and strawboard) that contain no added urea-formaldehyde resins can earn points. <p>Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies must also contain no added urea-formaldehyde resins.</p>	IEQ Credit 4.4	1 point	

VOCs with potential health effects. See section VI.A.2 for further description of the FloorScore system.

<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> • <u>Construction Waste Management</u>. Recycling and/or salvaging nonhazardous construction and demolition debris, including wood and carpet, can earn points. Materials should be separated by type and diverted from disposal materials. Recycling efforts should be tracked throughout the construction process and construction haulers and recyclers should be identified to handle the designated material. <p>Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste.</p>	MR Credit 2	1 point for 50% 2 points for 75%	
Total Points			

2. Flooring under LEED for Existing Buildings

LEED 2009 for Existing Buildings: Operations and Maintenance (LEED 2009-EB) is a rating system that can be used for existing offices, retail and service establishments, libraries, schools, museums, churches, hotels, and residential buildings of at least four habitable stories. LEED 2009-EB is designed to encourage sustainable practices and reduced environmental impacts over a building's entire functional life. Only a building can be certified; individual tenant spaces within a building are not eligible to be certified under LEED 2009-EB.⁷ A building must file for recertification at least once every five years to maintain its LEED 2009-EB certification.

LEED 2009-EB provides existing buildings that have not been previously certified an entry point into the LEED certification.⁸ Although LEED 2009-EB focuses on building operations, it also covers alterations and additions. While the alterations can range from a complete gutting, major renovation, or large new wing to the replacement of an old window, a sheet of drywall, or a section of carpet, there are a minimal and maximum number of alterations that must be undertaken to qualify for LEED 2009-EB certification. The alterations must: (1) include construction activity by more than one trade specialty, (2) make substantial changes to at least one entire room in the building, (3) require isolation of the work site from regular building, (4) increase the total building floor area by at least 5 percent, (6) be no more than 50 percent of the total building floor area, (7) cause relocation of no more than 50 percent of regular

7 Individual retail space can achieve LEED certification under LEED 2009 for Retail: Commercial Interiors (see, §§ II.A.4 & 5, *infra.*).

8 LEED 2009-EB certification can also be sought for buildings previously certified under one of the other LEED standards to show ongoing sustainable performance.

building occupants, and (8) increase the total building floor area by no more than 50 percent. It is possible for renovation to fit under both LEED 2009-NC and LEED 2009-EB. The project team can decide which certification to pursue.

Like all LEED standards, flooring is just one aspect, albeit an important one, of the construction that earns points, and ultimately certification. The checklist below identifies the items that flooring can impact under LEED 2009-EB.

LEED 2009 for Existing Buildings: Operations and Maintenance			
	Provision	Points Available	Points Earned
<i>Mandatory Prerequisites for Certification</i>			
<ul style="list-style-type: none"> • <u>Sustainable Purchasing Policy</u>. The building must have in place an Environmentally Preferable Purchasing (EPP) policy addressing purchasing of sustainable products. A policy that ensures sustainable flooring and flooring products will assist in creating the required EPP (see MR Credit 3 below). 	MR Prereq. 1	Mandatory prerequisite	Identify steps taken to assist:
<ul style="list-style-type: none"> • <u>Solid Waste Management Policy</u>. The building must have in place a solid waste management policy for the building and site addressing the requirements of waste management, including Ongoing Consumables (MR Credit 7), Durable Goods (MR Credit 8), and Facility Alterations and Additions (MR Credit 9). The proper disposal of floor covering materials should be part of the policy. 	MR Prereq. 2	Mandatory prerequisite	Identify steps taken to assist:
<ul style="list-style-type: none"> • <u>Green Cleaning Policy</u>. The building must have in place a green cleaning policy for the building and site that include sustainable hard floor and carpet care products (see IEQ Credits 3.1, 3.3, and 3.4 below). 	IEQ Prereq. 3	Mandatory prerequisite	Identify steps taken to assist:

<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> • <u>Construction Activity Pollution Prevention</u>. This standard address the indoor air quality (IAQ) after construction ends and prior to occupancy, with all interior finishes installed. It provides for such things a flushing out ventilation systems and testing air quality. Although it is unlikely that the flooring dealer or contractor will be ultimately responsible for this process, it does requires all flooring to be installed and finished before occupancy of the building. 	SS Credit 3	1 Point	
<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> • <u>Sustainable Purchasing—Facility Alterations and Additions</u>. Points can be earned for a sustainable purchasing program covering materials for facility renovations, demolitions, refits, and new construction or additions. The requirement specifically includes carpet, adhesives, sealants, paints, coatings and other flooring material. To qualify, the material must meet one of the following criteria: <ul style="list-style-type: none"> ○ Purchases contain at least 10% postconsumer recycled material. ○ Purchases contain at least 20% postindustrial recycled material. ○ Purchases contain at least 70% material salvaged off-site. ○ Purchases contain at least 70% material salvaged on-site through an internal organization material- and equipment-reuse program. ○ Purchases contain at least 50% rapidly renewable material. ○ Purchases contain at least 50% Forest Stewardship Council certified wood. ○ Purchases contain at least 50% material harvested and processed or extracted and processed within a 500-mile (800-kilometer) radius of the project. To encourage environmentally friendly transportation, the standard discounts the mileage by the type of transportation. For example, three miles of train transportation counts as only one mile. The formula for calculating transportation distances is by rail/3 plus inland waterway/2 plus sea/15 plus all other at true distance. 	MR Credit 3	1 point	

<ul style="list-style-type: none"> ○ Adhesives and sealants have a volatile organic compound (VOC) content less than the current VOC content limits of South Coast Air Quality Management District (SCAQMD) Rule 1168, or sealants used as fillers meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51. ○ Paints and coating have VOC emissions not exceeding the VOC and chemical component limits of Green Seal's Standard GS-11 requirements. ○ Non-carpet finished flooring is FloorScore certified.⁹ ○ Non-carpet finished flooring has less than the maximum VOC concentration as specified in the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions. ○ Carpet meets the Carpet Research Institute's (CRI's) Green Label Plus Carpet Testing Program. ○ Carpet has less than the maximum VOC concentrations as specified in the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions. ○ Carpet cushion meets the requirements of the CRI Green Label Testing Program. ○ Composite panels and agrifiber¹ products contain no added urea-formaldehyde resins. <p>The manufacturers should provide the certification or verification that the materials meet the standards.</p>			
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⁹ FloorScore is a voluntary, independent certification program that tests and certifies hard surface flooring and associated products for compliance with criteria adopted in California for indoor air emissions of VOCs with potential health effects. See section VI.A.2 for further descriptions of the FloorScore system.

<ul style="list-style-type: none"> • <u>High-Performance Green Cleaning Program</u>. The building needs to have in place a high-performance cleaning program, including a training program on how to use and dispose of hazardous cleaning materials including sustainable care products for cleaning hard floor and carpet that meet the IEQ Credit 3.3 below. <p>The manufacturers should provide the certification or verification that the materials meet the standards.</p>	IEQ Credit 3.1	1 point	
<ul style="list-style-type: none"> • <u>Green Cleaning Products</u>. One point is awarded if 30% of the total annual purchases of cleaning products (by cost) meet at least one of the specified sustainability criteria. Flooring cleaning products, floor finishes, stripping solutions, or similar products must meet one or more of the following standards: <ul style="list-style-type: none"> ○ The Green Seal GS-37 standard for carpet cleaners ○ Environmental Choice CCD-148 standard for hard surfaces ○ The Green Seal GS-40 standard ○ Environmental Choice CCD-147 ○ The California Code of Regulations maximum allowable VOC levels for the specific product category <p>The manufacturers should provide the certification or verification that the materials meet the standards.</p>	IEQ Credit 3.3	1 point	
<ul style="list-style-type: none"> • <u>Green Cleaning Equipment</u>. Credit can be earned by using environmentally preferable cleaning equipment. The preferred flooring products include the following: <ul style="list-style-type: none"> ○ Vacuum cleaners certified under the CRI Green Label Testing Program ○ Carpet extraction equipment used for restorative deep cleaning certified under the CRI Green Label Testing Program ○ Powered floor buffers and automatic scrubbers that operate with a sound level of less than 70 dBA ○ Propane-powered floor equipment that meet the California Air Resources Board or Environmental Protection Agency standards for the specific engine size and operate with a sound level of less than 90 dBA 	IEQ Credit 3.4	1 point	

<ul style="list-style-type: none"> ○ Battery-operated equipment ○ Other equipment that minimizes vibrations, noise, and damage to building surfaces <p>The manufacturers should provide the certification or verification that the materials meet the standards.</p>			
<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> ● Solid Waste Management. At least 70% of waste (by volume) generated by facility alterations and additions should be diverted from disposal to landfills and incineration facilities. The requirement specifically identifies carpet, adhesives, sealants, paints, coatings, and other flooring material as products that need to be diverted. <p>The flooring dealers or contactors should consider setting up their own waste disposal and recycling system to assist the general contractor.</p>	MR Credit 9	1 point	
Total Points			

3. Flooring under LEED for Commercial Interiors

LEED 2009 for Commercial Interiors (LEED 2009-CI), along with LEED 2009 for Retail: Commercial Interiors (described below), are the only LEED systems that are not limited to whole-building construction or renovations. Rather, LEED 2009-CI is for tenants and designers who may not have control over the operation of the whole building or lease a space to be improved. It covers tenant improvements of new or existing space in offices, retail, restaurants, healthcare facilities, hotels, and education buildings of all sizes, both public and private. USGBC recommends its use in conjunction with LEED 2009 for Core and Shell Development. If more than one rating system applies, the project team should decide which certification to pursue. For assistance in choosing the most appropriate LEED rating system, please e-mail leedinfo@usgbc.org.

Like LEED 2009-NC, LEED 2009-CI contains 100 base points with a possibility for an additional six Innovation in Design and four Regional Priority points. The checklist below identifies ways flooring can help earn points and eventual certification under LEED 2009-CI.

LEED 2009 for Commercial Interiors			
	Provision	Points Available	Points Earned
<i>Mandatory Prerequisites for Certification</i>			
<ul style="list-style-type: none"> • <u>Sorting and Storing Recyclables</u>. Those involved in flooring installation can help ensure certification by adhering to the building’s recycling procedures, including sorting recyclable materials and placing them in the appropriate collection and storage area. Flooring companies should consider setting up their own waste disposal and recycling system during construction. 	MR Prereq. 1	A mandatory prerequisite	Identify steps taken to assist:
<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> • <u>Site Selection</u>. Points are awarded to encourage tenants to select buildings that are already environmentally friendly and use sustainable strategies. Up to five points can be earned for selecting a building that includes at least one of the following: <ul style="list-style-type: none"> ○ Is LEED certified (5 points) ○ Is on a site classified as a brownfield (1 point) ○ Prior to its development, had more than 50% impervious to water and has implemented a storm water management plan (1 point) ○ Has site storm water treatment systems in place that are designed to remove at least 80% of the average annual site area’s total suspended solids and 40% of the average annual site area’s total phosphorus (1 point) ○ Has a minimum of 50% of parking spaces underground or covered by structured parking (1 point) or otherwise provides shade and building colors to reduced reflective heat and light (1 point) ○ Has roofing with a solar reflectance index for at least 75% of the roof surface or has a vegetated roof for at least 50% of the roof area (1 point) ○ Minimizes light pollution (1 point) ○ Employs high-efficiency irrigation technology OR uses harvested rainwater or recycled site 	SS Credit 1	1–5 points	

<p>water (2 points)</p> <ul style="list-style-type: none"> ○ Reduces the use of municipally provided potable water for building sewage conveyance by at least 50% OR treats 100% of wastewater on-site to tertiary standards (2 points) ○ Uses only harvested rainwater or recycled site water to eliminate all potable water use for site irrigation (except for initial watering to establish plants) OR does not have permanent landscaping irrigation systems (2 points) ○ Meets the 30% reduction in water use requirement for the entire building and has an ongoing plan to require future occupants to comply (1 point) ○ Supplies at least 2.5% (1 point) or 5% (2 points) of the building’s total energy use (expressed as a fraction of annual energy cost) from on-site renewable energy systems ○ Has at the time of selection other quantifiable environmental benefits (1 point) <p>The maximum number of points available is five, even if all the criteria are met.</p> <p>The building owner or leasing agent should be able to supply the information needed to determine if points are available under this standard.</p>			
<ul style="list-style-type: none"> • <u>Tenant Space—Long-Term Commitment</u>. A tenant can earn a point by committing to remain in the same location for a minimum of 10 years. This may impact the type of flooring selected given the need for 10 years of durability. 	MR Credit 1.1	1 point	
<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan—During Construction</u>. Those involved in flooring installation can help earn credit by adhering to an indoor air quality (IAQ) management plan to control pollutant sources during construction or renovation. This includes taking steps to protect stored-on-site or installed absorptive materials from moisture damage. <p>LEED recommends that material installation be sequenced in a manner that avoids contamination of absorptive materials, such as insulation and carpeting.</p>	IEQ Credit 3.1	1 point	

<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan—Before Occupancy</u>. This standard addresses the IAQ after construction ends and prior to occupancy, with all interior finishes installed. It provides for such things as flushing out ventilation systems and testing air quality. Although it is unlikely that the flooring dealer or contractor will be ultimately responsible for this process, it does requires all flooring to be installed and finished before occupancy of the building. 	IEQ Credit 3.2	1 point	
<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> • <u>Building Reuse—Maintain Interior Nonstructural Components</u>. Points are awarded for using existing interior nonstructural elements (e.g., interior walls, doors, floor coverings, and ceiling systems) in at least 40% (by area). 	MR Credit 1.2	1 point for 40% 2 points for 60%	
<ul style="list-style-type: none"> • <u>Materials Reuse</u>. The use of salvaged, refurbished, or reused materials can earn points toward certification. Specifically, points are available for use of these materials in an amount that constitutes at least 5% (based on cost) of the total of construction materials in a project. Salvaged materials specifically include beams and posts, flooring, brick, and decorative items. 	MR Credit 3.1	1 point for 5% 2 points for 10%	
<ul style="list-style-type: none"> • <u>Recycled Content</u>. Installing building products that incorporate recycled materials earns a point if the sum of postconsumer recycled content plus one-half of pre-consumer recycled content of project materials equals or exceeds 10% (based on cost) of the total value of materials in a project. An additional point is given for installation of materials with a recycled content (based on cost) in an amount that is equal to or exceeds 20% of the total value of materials in a project. Again, flooring can contribute substantially to this standard. 	MR Credit 4	1 point for 10% 2 points for 20%	
<ul style="list-style-type: none"> • <u>Regional Materials</u>. Credits can be earned by installing products or materials that have been extracted, harvested, recovered, or manufactured within 500 miles of the project site. Specifically, points are awarded where at least 20% of the combined value of materials and products in a project are extracted, harvested, recovered, and manufactured within a radius of 500 miles of the 	MR Credit 5	1 point for 20%	

<p>building site.</p> <p>To encourage environmentally friendly transportation, the standard discounts the mileage by the type of transportation. For example, three miles of train transportation counts as only one mile. The formula for calculating transportation distances is by rail/3 <i>plus</i> inland waterway/2 <i>plus</i> sea/15 <i>plus</i> all other at true distance.</p>			
<ul style="list-style-type: none"> • <u>Rapidly Renewable Materials</u>. Installing products made from rapidly renewable sources (plants that are typically harvested within a 10-year-or shorter cycle) can earn a point if the cost is at least 5% of total costs of the materials used in the project. <p>LEED encourages the use of bamboo, wool, cotton insulation, agrifiber, linoleum, wheatboard, strawboard, and cork.</p>	MR Credit 6	1 point	
<ul style="list-style-type: none"> • <u>Certified Wood</u>. Flooring can help earn credit by installing wood-based materials and products certified in accordance with Forest Stewardship Council (FSC) Principles and Criteria. In order to qualify for this credit, when using new wood-based products and materials, at least 50% of such materials must be FSC certified. <p>The requirement includes flooring and subflooring.</p>	MR Credit 7	1 point	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Adhesives and Sealants</u>. All adhesives and sealants used in the building interior must meet the volatile organic compound (VOC) limitations in South Coast Air Quality Management District (SCAQMD) Rule 1168. As applicable to flooring, the VOC limits (measured as g/L less water) are: <ol style="list-style-type: none"> 1. Indoor carpet adhesives.....50 2. Carpet pad adhesives.....50 3. Wood flooring adhesives.....100 4. Rubber floor adhesives.....60 5. Subfloor adhesives.....50 6. Ceramic tile adhesives.....65 7. VCT and asphalt adhesives.....50 8. Multipurpose construction adhesives.....70 9. Contact adhesive.....80 10. Special purpose contact adhesive..... 250 	IEQ Credit 4.1	1 point	

<p>11. Structural wood member adhesive..... 140 12. Sheet applied rubber lining operations.... 850 13. Top and trim adhesive sealants..... 250 14. Architectural, nonporous sealants..... 250 15. Architectural, porous sealants..... 775 16. Other sealants..... 750</p> <p>Aerosol adhesives must meet the Green Seal Standard for Commercial Adhesives GS-36 requirements OR meet the following limits:</p> <ol style="list-style-type: none"> 1. General purpose mist spray 65% VOCs by weight 2. General purpose web spray 65% VOCs by weight 3. Special purpose aerosol adhesives (all types) 65% VOCs by weight <p>The manufacturers should provide the required certifications or VOC levels of all the materials to ascertain compliance with these requirements.</p>			
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Paints and Coatings.</u> Flooring contractors can contribute by using clear wood finishes, floor coatings, stains, shellacs, and paints that do not exceed the VOC limits established in SCAQMD Rule 1113 in the building interior. 	IEQ Credit 4.2	1 point	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Flooring Systems.</u> Flooring contractors can contribute by installing flooring that (1) meets the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of VOCs or (2) meets the following requirements as applicable to the project scope: <ul style="list-style-type: none"> • <i>Carpets.</i> The carpet is certified under the Carpet and Rug Institute’s (CRI’s) Green Label Plus program. • <i>Carpet Cushions.</i> All carpet cushions installed in the building interior must meet the requirements of CRI’s Green Label program. • <i>Carpet Adhesives.</i> All carpet adhesives must meet the VOC requirements of IEQ Credit 4: Low-Emitting Materials, which lists a VOC limit of 50 g/L. • <i>Hard Surface Flooring.</i> All hard surface 	IEQ Credit 4.3	1 point	

<p>flooring must meet the FloorScore10 standard as tested by an independent third party. Flooring products covered by FloorScore include vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, and wall base.</p> <ul style="list-style-type: none"> • <i>Concrete, Wood, Bamboo, and Cork Floor Finishes.</i> All sealer, stain, and finishes must meet the requirements of SCAQMD. • <i>Masonry, Tile, Cut Stone, Solid Wood.</i> These materials automatically qualify, but any adhesives, grouts, finishes, and sealants must be compliant for a mineral-based or unfinished/untreated solid wood floor. ○ <i>Tile Setting Adhesives and Grout.</i> All must meet South Coast Air Quality Management District SCAQMD Rule 1168 VOC limits. <p>The manufacturers should provide the certification or verification that the materials meet the standards.</p>			
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Composite Wood and Agrifiber Products.</u> Installing composite wood and agrifiber products (particleboard, medium-density fiberboard, plywood, wheatboard, and strawboard) that contain no added urea-formaldehyde resins can earn points. <p>Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies must also contain no added urea-formaldehyde resins.</p>	IEQ Credit 4.4	1 point	

10 FloorScore is a voluntary, independent certification program that tests and certifies hard surface flooring and associated products for compliance with criteria adopted in California for indoor air emissions of VOCs with potential health effects. See section VI.A.2 for further descriptions of the FloorScore system.

<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> • <u>Construction Waste Management</u>. Recycling and/or salvaging nonhazardous construction and demolition debris, including wood and carpet, can earn points. Materials should be separated by type and designated to be diverted from disposal materials. Recycling efforts should be tracked throughout the construction process, and construction haulers and recyclers should be identified to handle the designated material. <p>Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste.</p>	MR Credit 2:	1 point for 50% 2 points for 75 %	
Total Points			

4. Flooring under LEED for Retail: New Construction and Major Renovations

LEED 2009 for Retail: New Construction and Major Renovations (LEED 2009-RNC) is very similar to LEED 2009-NC but recognizes the unique nature of the retail space. Compared with other commercial buildings, retail has different occupancy characteristics, hours of operation, foot traffic, and other distinctive needs. Accordingly, LEED 2009-RNC addresses the different types of spaces retailers need. Retail space can be a standalone building or be part of a larger multitenant retail complex. It is possible for renovation to fit under both LEED 2009-NC and LEED 2009-RNC. The project team can decide which certification to pursue.

Many, if not most, of the unique requirements for retail space involve items not impacted by flooring. These include different parking and transportation considerations, different process water and energy consumption, and different equipment needs, such as commercial kitchen equipment for restaurants or special refrigeration needs for food retailers. Nonetheless, flooring still has a notable impact on construction and major renovations of retail space.

LEED 2009 for Retail: New Construction and Major Renovations			
	Provision	Points Available	Points Earned
<i>Mandatory Prerequisites for Certification</i>			
<ul style="list-style-type: none"> • <u>Construction Activity Pollution Prevention.</u> Flooring contractors must adhere to an erosion and sedimentation control plan, created during the design phase of the project, which conforms to the erosion and sedimentation requirements of the 2003 EPA Construction General Permit or local erosion and sedimentation control standards and codes (whichever is more stringent). See http://cfpub.epa.gov/npdes/. The plan must be designed to prevent pollution of the air with dust and particulate matter, sedimentation of storm sewer or receiving streams, and loss of soil by storm water runoff or wind erosion during construction activity. 	SS Prereq. 1	A mandatory prerequisite	Identify steps taken to assist:
<ul style="list-style-type: none"> • <u>Storage and Collection of Recyclables.</u> The standard requires the determination of the top five recyclable wastes either by weight or volume and provision of an easily accessible storage for the top three. Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste. 	MR Prereq. 1	A mandatory prerequisite	Identify steps taken to assist:
<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan–During Construction.</u> Those involved in flooring installation can help earn credit by adhering to an indoor air quality (IAQ) management plan to control pollutant sources during construction/renovation. This includes taking steps to protect stored-on-site or installed absorptive materials from moisture damage. LEED recommends that material installation be sequenced in a manner that avoids contamination of absorptive materials, such as insulation and carpeting. 	IEQ Credit 3.1	1 point	

<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan—Before Occupancy</u>. This standard addresses the IAQ after construction ends and prior to occupancy, with all interior finishes installed. It provides for such things as flushing out ventilation systems and testing air quality. Although it is unlikely that the flooring dealer or contractor will be ultimately responsible for this process, it does requires all flooring to be installed and finished before occupancy of the building. 	IEQ Credit 3.2	1 point	
<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> • <u>Building Reuse—Maintain Existing Walls, Floors and Roof</u>. Points are awarded for maintaining the existing building structure and envelope. If the project includes an addition that is more than two times the floor area of the existing building, this credit is not applicable. The points are awarded based on the percentage of the building that is reused and not new construction. (Note that hazardous materials that are remediated as a part of the project are excluded from the calculation of the percentage maintained.) The flooring contractor can contribute to the requirement by keeping the structural floors and roof decking. 	MR Credit 1.1	1 point for 55% 2 points for 75%, 3 points for 95%	
<ul style="list-style-type: none"> • <u>Building Reuse—Maintain Interior Nonstructural Elements</u>. Points are awarded for using existing interior nonstructural elements (e.g., interior walls, doors, floor coverings and ceiling systems) in at least 50% (by area) of the completed building, including additions. If the project includes an addition with floor area more than two times the floor area of the existing building, this credit is not applicable. 	MR Credit 1.2	1 point	
<ul style="list-style-type: none"> • <u>Materials Reuse</u>. The use of salvaged, refurbished, or reused materials can earn points toward certification. Specifically, points are available for use of these materials in an amount that constitutes at least 5 or 10% (based on cost) of the total value of materials in a project. Salvaged materials specifically include beams and posts, flooring, brick, and decorative items. 	MR Credit 3	1 point for 5% 2 points for 10%	
<ul style="list-style-type: none"> • <u>Recycled Content</u>. Installing building products that incorporate recycled materials earns a point if the 	MR Credit 4	1 point for 10%	

<p>sum of postconsumer recycled content plus one-half of pre-consumer recycled content of project materials equals or exceeds 10% (based on cost) of the total value of materials in a project. An additional point is given for installation of materials with a recycled content (based on cost) in an amount that is equal to or exceeds 20% of the total value of materials in a project.</p>		<p>2 points for 20%</p>	
<ul style="list-style-type: none"> • <u>Regional Materials</u>. Credits can be earned by installing products or materials that have been extracted, harvested, recovered, or manufactured within 500 miles of the project site. Specifically, points are awarded where at least 20% of the combined value of materials and products in a project are extracted, harvested, recovered, and manufactured within a 500-mile radius of the building site. <p>To encourage environmentally friendly transportation, the standard discounts the mileage by the type of transportation. For example, three miles of train transportation counts as only one mile. The formula for calculating transportation distances is by rail/3 <i>plus</i> inland waterway/2 <i>plus</i> sea/15 <i>plus</i> all other at true distance.</p>	<p>MR Credit 5</p>	<p>1 point for 10% 2 points for 20%</p>	
<ul style="list-style-type: none"> • <u>Rapidly Renewable Materials</u>. Installing at least 2.5% (based on total building material costs) materials and products made from rapidly renewable sources (plants that are typically harvested within a 10-year-or shorter cycle) can earn a point. <p>LEED encourages the use of bamboo, wool, cotton insulation, agrifiber, linoleum, wheatboard, strawboard, and cork.</p>	<p>MR Credit 6</p>	<p>1 point</p>	
<ul style="list-style-type: none"> • <u>Certified Wood</u>. Flooring can help earn credit by installing wood-based materials and products certified in accordance with Forest Stewardship Council (FSC) Principles and Criteria. In order to qualify for this credit, when using new wood-based products and materials, at least 50% of such materials must be FSC certified. <p>The requirement includes flooring and subflooring.</p>	<p>MR Credit 7</p>	<p>1 point</p>	

<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Adhesives and Sealants.</u> All adhesives and sealants used in the building interior must meet the volatile organic compound (VOC) limitations in South Coast Air Quality Management District (SCAQMD) Rule 1168. As applicable to flooring, the VOC limits (measured as g/L less water) are: <ol style="list-style-type: none"> 1. Indoor carpet adhesives50 2. Carpet pad adhesives..... 50 3. Wood flooring adhesives.....100 4. Rubber floor adhesives..... 60 5. Subfloor adhesives..... 50 6. Ceramic tile adhesives..... 65 7. VCT and asphalt adhesives..... 50 8. Multipurpose construction adhesives.....70 9. Contact adhesive..... 80 10. Special purpose contact adhesive..... 250 11. Structural wood member adhesive..... 140 12. Sheet applied rubber lining operations....850 13. Top and trim adhesive sealants.....250 14. Architectural, nonporous sealants.....250 15. Architectural, porous sealants.....775 16. Other sealants..... 750 <p>Aerosol adhesives must meet the Green Seal Standard for Commercial Adhesives GS-36 requirements and have the following limits:</p> <ol style="list-style-type: none"> 1. General purpose mist spray 65% VOCs by weight 2. General purpose web spray 65% VOCs by weight 3. Special purpose aerosol adhesives (all types) 65% VOCs by weight <p>The manufacturers should provide the required certifications or VOC levels of all the materials to ascertain compliance with these requirements.</p> 	IEQ Credit 4	1 point	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Paints and Coatings.</u> Flooring dealers and contractors can contribute by using clear wood finishes, floor coatings, stains, shellacs, and paints that do not exceed the VOC limits established in SCAQMD Rule 1113 in the 	IEQ Credit 4	1 point	

<p>building interior.</p> <ul style="list-style-type: none"> The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements. 			
<ul style="list-style-type: none"> <u>Low-Emitting Materials—Flooring Systems.</u> Flooring contractors need to install flooring that (1) meets the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of VOCs or (2) meets the following requirements, as applicable to the project scope: <ul style="list-style-type: none"> <i>Carpets.</i> The carpet is certified under the Carpet and Rug Institute’s (CRI’s) Green Label Plus program. <i>Carpet Cushions.</i> All carpet cushions installed in the building interior must meet the requirements of the CRI’s Green Label program. <i>Carpet Adhesives.</i> All carpet adhesives must meet the VOC requirements of IEQ Credit 4: Low-Emitting Materials, which lists a VOC limit of 50 g/L. <i>Hard Surface Flooring.</i> All hard surface flooring must meet the FloorScore¹¹ standard as tested by an independent third party. Flooring products covered by FloorScore include vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, and wall base. <i>Concrete, Wood, Bamboo, and Cork Floor Finishes.</i> All sealer, stain, and finishes must meet the requirements of the SCAQMD. <i>Masonry, Tile, Cut Stone, Solid Wood.</i> These materials automatically qualify, but any adhesives, grouts, finishes, and sealants must be compliant for a mineral-based or unfinished/untreated solid wood floor. <i>Tile Setting Adhesives and Grout.</i> All must meet SCAQMD Rule 1168 VOC limits. 	IEQ Credit 4	1 point	

11 FloorScore is a voluntary, independent certification program that tests and certifies hard surface flooring and associated products for compliance with criteria adopted in California for indoor air emissions of VOCs with potential health effects. See section VI.A.2 for further descriptions of the FloorScore system.

The manufacturers should provide the certifications or verification that the materials meet the standards.			
<ul style="list-style-type: none"> <u>Low-Emitting Materials—Composite Wood and Agrifiber Products</u>: Installing composite wood and agrifiber products (particleboard, medium-density fiberboard, plywood, wheatboard, and strawboard) that contain no added urea-formaldehyde resins can earn points. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies must also contain no added urea-formaldehyde resins. 	IEQ Credit 4	1 point	
<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> <u>Construction Waste Management</u>. Recycling and/or salvaging nonhazardous construction and demolition debris, including wood and carpet, can earn points. Materials should be separated by type and designated to be diverted from disposal materials. Recycling efforts should be tracked throughout the construction process, and construction haulers and recyclers should be identified to handle the designated material. Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste. 	MR Credit 2	1 point for 50% 2 points for 75%	
Total Points			

5. Flooring under LEED for Retail: Commercial Interiors

LEED 2009 for Retail: Commercial Interiors (LEED 2009-RCI) is very similar to LEED 2009-CI but takes into account the unique nature of the retail environment. Like LEED 2009-CI, certification for individual retail space can be obtained even if the whole building is not certified. Many, if not most, of the unique requirements for retail space involve items not impacted by flooring. These include different water and energy consumption and different equipment needs, such as commercial kitchen equipment for restaurants or special refrigeration needs for grocery stores. Nonetheless, flooring still has a notable impact on construction and major renovations of retail space.

LEED 2009 for Retail: Commercial Interiors			
	Provision	Points Available	Points Earned
<i>Mandatory Prerequisites for Certification</i>			
<ul style="list-style-type: none"> • <u>Storage and Collection of Recyclables</u>. The standard requires the determination of the top five types of recyclable waste by either weight or volume and provision of an easily accessible storage for the top three. Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste. 	MR Prereq. 1	A mandatory prerequisite	Identify steps taken to assist:
<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> • <u>Site Selection</u>. Points are awarded to encourage tenants to select buildings that are already environmentally friendly and use sustainable strategies. Up to five points can be earned for selecting a building that includes one or more of the following: <ul style="list-style-type: none"> ○ Is a LEED-certified building (5 points) ○ Is on a site classified as a brownfield (1 point) ○ Prior to its development, had more than 50% impervious to water and has implemented a storm-water management plan (1 point) ○ Has in place site storm-water treatment systems that are designed to remove at least 80% of the average annual site area's total suspended solids and 40% of the average annual site area's total phosphorus (1 point) ○ Has placed a minimum of 50% of parking spaces underground or covered by structured parking (1 point) or has otherwise provided shade and building colors to reduced reflective heat and light (1 point) ○ Has roofing with a solar reflectance index for at least 75% of the roof surface or has a vegetated roof for at least 50% of the roof area (1 point) ○ Minimizes light pollution (1 point) ○ Employs high-efficiency irrigation technology OR uses harvested rainwater or recycled site 	SS Credit 1	1–5 points	

<p>water (2 points)</p> <ul style="list-style-type: none"> ○ Reduces the use of municipally provided potable water for building sewage conveyance by at least 50% OR treats 100% of wastewater on-site to tertiary standards (2 points) ○ Uses only harvested rainwater or recycled site water to eliminate all potable water use for site irrigation (except for initial watering to establish plants) OR does not have permanent landscaping irrigation systems (2 points) ○ Meets the 30% reduction in water use requirement for the entire building and has an ongoing plan to require future occupants to comply (1 point) ○ Supplies at least 2.5% (1 point) or 5% (2 points) of the building’s total energy use (expressed as a fraction of annual energy cost) from on-site renewable energy systems ○ Has other quantifiable environmental benefits in place at the time of selection (1 point) <p>The maximum number of points available is five, even if all the criteria are met.</p> <p>The building owner or leasing agent should be able to supply the information needed to determine if points are available under this standard.</p>			
<ul style="list-style-type: none"> • <u>Tenant Space—Long-Term Commitment</u>. A tenant can earn a point by committing to remain in the same location for a minimum of 10 years. This may impact the type of flooring selected given the need for 10 years of durability. 	MR Credit 1.1	1 point	
<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan—During Construction</u>. Those involved in flooring installation can help earn credit by adhering to an indoor air quality (IAQ) management plan to control pollutant sources during construction/renovation. This includes taking steps to protect stored-on-site or installed absorptive materials from moisture damage. LEED recommends that material installation be sequenced in a manner that avoids contamination of absorptive materials, such as insulation and carpeting. 	IEQ Credit 3.1	1 point	

<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan—Before Occupancy</u>. This standard addresses the IAQ after construction ends and prior to occupancy, with all interior finishes installed. It provides for such things as flushing out ventilation systems and testing air quality. <p>Although it is unlikely that the flooring dealer or contractor will be ultimately responsible for this process, it does requires all flooring to be installed and finished before occupancy of the building.</p>	IEQ Credit 3.2	1 point	
<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> • <u>Building Reuse—Maintain Interior Nonstructural Elements</u>. Points are awarded for using existing interior nonstructural elements (e.g., interior walls, doors, floor coverings, and ceiling systems) in at least 40% (by area). 	MR Credit 1.2	1 point for 40% 2 points for 60%	
<ul style="list-style-type: none"> • <u>Materials Reuse</u>. The use of salvaged, refurbished, or reused materials can earn points toward certification. Specifically, points are available for use of these materials in an amount that constitutes at least 5% (based on cost) of the total of construction materials in a project. <p>Salvaged materials specifically include beams and posts, flooring, brick, and decorative items.</p>	MR Credit 3.1	1 point for 5% 2 points for 10%	
<ul style="list-style-type: none"> • <u>Recycled Content</u>. Installing building products that incorporate recycled materials earns a point if the sum of postconsumer recycled content plus one-half of pre-consumer recycled content of project materials equals or exceeds 10% (based on cost) of the total value of materials in a project. An additional point is given for installation of materials with a recycled content (based on cost) in an amount that is equal to or exceeds 20% of the total value of materials in a project. 	MR Credit 4	1 point for 10% 2 points for 20%	
<ul style="list-style-type: none"> • <u>Regional Materials</u>. Credits can be earned by installing products or materials that have been extracted, harvested, recovered, or manufactured within 500 miles of the project site. Specifically, points are awarded where at least 20% of the combined value of materials and products in a project are extracted, harvested, recovered, and manufactured within a 500-mile radius of the building site. <p>To encourage environmentally friendly</p>	MR Credit 5	1 point for 10% 2 points for 20%	

<p>transportation, the standard discounts the mileage by the type of transportation. For example, three miles of train transportation counts as only one mile. The formula for calculating transportation distances is by rail/3 plus inland waterway/2 plus sea/15 plus all other at true distance.</p>			
<ul style="list-style-type: none"> • Rapidly Renewable Materials. Installing at least 5% (based on total building material costs) materials and products made from rapidly renewable sources (plants that are typically harvested within a 10-year-or shorter cycle) can earn a point. 	MR Credit 6	1 point	
<ul style="list-style-type: none"> • Certified Wood. Flooring can help earn credit by installing wood-based materials and products certified in accordance with Forest Stewardship Council (FSC) Principles and Criteria. In order to qualify for this credit, when using new wood-based products and materials, at least 50% of such materials must be FSC certified. The requirement includes flooring and subflooring. 	MR Credit 7	1 point	
<ul style="list-style-type: none"> • Low-Emitting Materials—Adhesives and Sealants. All adhesives and sealants used in the building interior must meet the volatile organic compound (VOC) limitations in South Coast Air Quality Management District (SCAQMD) Rule 1168. As applicable to flooring, the VOC limits (measured as g/L less water) are: <ol style="list-style-type: none"> 1. Indoor carpet adhesives.....50 2. Carpet pad adhesive.....50 3. Wood flooring adhesives.....100 4. Rubber floor adhesives..... 60 5. Subfloor adhesives.....50 6. Ceramic tile adhesives.....65 7. VCT and asphalt adhesives.....50 8. Multipurpose construction adhesives.....70 9. Contact adhesive..... 80 10. Special purpose contact adhesive..... 250 11. Structural wood member adhesive..... 140 12. Sheet applied rubber lining operations....850 13. Top and trim adhesive sealants.....250 14. Architectural, nonporous sealants.....250 	IEQ Credit 4.1	1 point	

<p>15. Architectural, porous sealants.....775</p> <p>16. Other sealants..... 750</p> <p>Aerosol adhesives must meet the Green Seal Standard for Commercial Adhesives GS-36 requirements and have the following limits:</p> <ol style="list-style-type: none"> 1. General purpose mist spray 65% VOCs by weight 2. General purpose web spray 65% VOCs by weight 3. Special purpose aerosol adhesives (all types) 65% VOCs by weight <p>The manufacturers should provide the required certifications or the VOC levels of all the materials to ascertain compliance with these requirements.</p>			
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Paints and Coatings.</u> Flooring contractors can contribute by using clear wood finishes, floor coatings, stains, shellacs, and paints that do not exceed the VOC limits established in SCAQMD Rule 1113 in the building interior. <p>The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements</p>	IEQ Credit 4.2	1 point	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Flooring Systems.</u> Flooring contractors need to install flooring that (1) meets the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of VOCs or (2) meets the following requirements, as applicable to the project scope: <ul style="list-style-type: none"> • <i>Carpets.</i> The carpet is certified under the Carpet and Rug Institute’s (CRI’s) Green Label Plus program. • <i>Carpet Cushions.</i> All carpet cushions installed in the building interior meet the requirements of CRI’s Green Label program. • <i>Carpet Adhesives.</i> All carpet adhesives meet the VOC requirements of IEQ Credit 4: Low-Emitting Materials, which lists a VOC limit of 	IEQ Credit 4.3	1 point	

<p>50 g/L.</p> <ul style="list-style-type: none"> • <i>Hard Surface Flooring.</i> All hard surface flooring meets the FloorScore¹² standard as tested by an independent third party. Flooring products covered by FloorScore include vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, and wall base. • <i>Concrete, Wood, Bamboo, and Cork Floor Finishes.</i> All sealer, stain, and finishes must meet the requirements of SCAQMD. • <i>Masonry, Tile, Cut Stone, Solid Wood.</i> These materials automatically qualify, but any adhesives, grouts, finishes, and sealants must be compliant for a mineral-based or unfinished/untreated solid wood floor. • <i>Tile Setting Adhesives and Grout.</i> All must meet SCAQMD Rule 1168 VOC limits. <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>			
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Composite Wood and Agrifiber Products.</u> Installing composite wood and agrifiber products (particleboard, medium-density fiberboard, plywood, wheatboard, and strawboard) that contain no added urea-formaldehyde resins can earn points. Only materials that qualify as base building elements—not furniture or furnishings—are included. <p>Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies must also contain no added urea-formaldehyde resins.</p>	IEQ Credit 4.4	1 point	

12 FloorScore is a voluntary, independent certification program that tests and certifies hard surface flooring and associated products for compliance with criteria adopted in California for indoor air emissions of VOCs with potential health effects. See section VI.A.2 for further description of the FloorScore system.

<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> <u>Construction Waste Management</u>. Recycling and/or salvaging nonhazardous construction and demolition debris, including wood and carpet, can earn points. Materials should be separated by type and designate those to be diverted from disposal materials. Recycling efforts should be tracked throughout the construction process and construction haulers and recyclers should be identified to handle the designated material. <p>Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste.</p>	MR Credit 2	1 point for 50% 2 points for 75%	
Total Points			

6. Flooring under LEED for Schools

The LEED for Schools New Construction and Major Renovations rating system addresses design and construction activities for both new school buildings and major renovations of existing school buildings. It is based on LEED for New Construction and Major Renovations (LEED 2009-NC) but takes into account the unique design and construction needs of schools. LEED for Schools provides a comprehensive tool for schools that wish to build green with measurable results by recognizing the uniqueness of school spaces and their occupants. All projects involving a full building dedicated to kindergarten to 12th grade instruction must use either LEED for Schools or LEED for Existing Buildings: Operations and Maintenance (LEED 2009-EB). Other projects (such as university educational buildings, K–12 athletic facilities, or interpretive centers) may choose to use either LEED for Schools or LEED 2009-NC.

The LEED for Schools rating system focuses on classroom acoustics, master planning, mold prevention, environmental site assessment, and other issues important to these buildings. As with other LEED standards, flooring has a notable impact on construction and major renovations of schools and cannot be ignored in any school construction seeking LEED certification.

LEED 2009 for Schools New Construction and Major Renovations			
	Provision	Points Available	Points Earned
<i>Mandatory Prerequisites for Certification</i>			
<ul style="list-style-type: none"> • Construction Activity Pollution Prevention. Flooring contractors must adhere to an erosion and sedimentation control plan, created during the design phase of the project, which conforms to the erosion and sedimentation requirements of the 2003 EPA Construction General Permit or local erosion and sedimentation control standards and codes (whichever is more stringent). See http://cfpub.epa.gov/npdes/. The plan must be designed to prevent pollution of the air with dust and particulate matter, sedimentation of storm sewer or receiving streams, and loss of soil by storm water runoff or wind erosion during construction activity. 	SS Prereq. 1	A mandatory prerequisite	Identify steps taken to assist:
<ul style="list-style-type: none"> • Storage and Collection of Recyclables. The standard mandates disposal of construction waste in a designated area for recyclable collection and storage. The waste bins must be: (1) appropriately sized and located in a convenient area; (2) separated by whether waste is to be disposed of, recycled, refurbished, or reused; and (3) designated by type of waste material. <p>The flooring dealers and contactors should consider setting up their own waste disposal and recycling system to assist the general contractor.</p>	MR Prereq. 1	A mandatory prerequisite	Identify steps taken to assist:
<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> • Construction Indoor Air Quality Management Plan—During Construction. Flooring contractors can contribute to an indoor air quality (IAQ) management plan to control pollutant sources during construction/renovation. The plan must be designed to meet the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) <i>IAQ Guidelines for Occupied Buildings Under Construction</i> (2nd edition, 2007) and to protect stored-on-site or installed absorptive materials from moisture damage. <p>LEED recommends that material installation be sequenced in a manner that avoids contamination</p>	IEQ Credit 3.1	1 point	

of absorptive materials, such as insulation and carpeting.			
<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan—Before Occupancy</u>. This standard addresses the IAQ after construction ends and prior to occupancy, with all interior finishes installed. It provides for such things as flushing out ventilation systems and testing air quality. Although it is unlikely that the flooring dealer or contractor will be ultimately responsible for this process, it does requires all flooring to be installed and finished before occupancy of the building. 	IEQ Credit 3.2	1 point	
<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> • <u>Building Reuse—Maintain Existing Walls, Floors and Roof</u>. Points are awarded for maintaining the existing building structure and envelope. The flooring contractor can contribute to the requirement by keeping the structural floors and roof decking. If the project includes an addition that is more than two times the floor area of the existing building, this credit is not applicable. The points are awarded based on the percentage of the building being reused and not new construction. (Note that hazardous materials that are remediated as a part of the project are excluded from the calculation of the percentage maintained.) 	MR Credit 1.1	1 point for 75% 2 points for 95%	
<ul style="list-style-type: none"> • <u>Building Reuse—Maintain Existing Interior Nonstructural Elements</u>. Points are awarded for using existing interior nonstructural elements (e.g., interior walls, doors, floor coverings, and ceiling systems) in at least 50% (by area) of the completed building, including additions. If the project includes an addition with floor area more than two times the floor area of the existing building, this credit is not applicable. 	MR Credit 1.2	1 point	
<ul style="list-style-type: none"> • <u>Materials Reuse</u>. The use of salvaged, refurbished, or reused materials can earn points toward certification. Specifically, points are available for use of these materials in an amount that constitutes at least 5% (based on cost) of the total value of materials in a project. Salvaged materials specifically include beams and posts, flooring, brick, and decorative items. 	MR Credit 3	1 point for 5% 2 points for 10%	

<ul style="list-style-type: none"> • Recycled Content. Installing building products that incorporate recycled materials earns a point if the sum of postconsumer recycled content plus one-half of pre-consumer recycled content of project materials equals or exceeds 10% (based on cost) of the total value of materials in a project. 	MR Credit 4	1 point for 10% 2 points for 20%	
<ul style="list-style-type: none"> • Regional Materials. Credits can be earned by installing products or materials that have been extracted, harvested, recovered, or manufactured within 500 miles of the project site. Specifically, points are awarded where at least 20% of the combined value of materials and products in a project are extracted, harvested, recovered, and manufactured within a 500-mile radius of the building site. To encourage environmentally friendly transportation, the standard discounts the mileage by the type of transportation. For example, three miles of train transportation counts as only one mile. The formula for calculating transportation distances is by rail/3 <i>plus</i> inland waterway/2 <i>plus</i> sea/15 <i>plus</i> all other at true distance. 	MR Credit 5	1 point for 10% 2 points for 20%	
<ul style="list-style-type: none"> • Rapidly Renewable Materials. Installing at least 2.5% (based on total building material costs) materials and products made from rapidly renewable sources (plants that are typically harvested within a 10-year-or shorter cycle) can earn a point. LEED encourages the use of bamboo, wool, cotton insulation, agrifiber, linoleum, wheatboard, strawboard, and cork. 	MR Credit 6	1 point	
<ul style="list-style-type: none"> • Certified Wood. Flooring can help earn credit by installing wood-based materials and products certified in accordance with Forest Stewardship Council (FSC) Principles and Criteria. In order to qualify for this credit, when using new wood-based products and materials, at least 50% of such materials must be FSC certified. The requirement includes flooring and subflooring. 	MR Credit 7	1 point	
<ul style="list-style-type: none"> • Low-Emitting Materials—Adhesives and Sealants. All adhesives and sealants installed in the building interior (defined as inside the weatherproofing system and applied on-site) must meet the testing and product requirements of the California Department of Health Services Standard Practice for 	IEQ Credit 4.1	1 point	

<p>the Testing of Volatile Organic Emissions.</p> <p>The manufacturers should provide the volatile organic compound (VOC) levels of all the materials to ascertain compliance with these requirements.</p>			
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Paints and Coatings.</u> Flooring contractors can contribute by using clear wood finishes, floor coatings, stains, shellacs, and paints that do not exceed the VOC limits established in the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions in the building interior. <p>The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.</p>	IEQ Credit 4.2	1 point	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Flooring Systems.</u> Flooring contractors need to install flooring that: <ul style="list-style-type: none"> (1) Meets the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions; or (2) Uses mineral-based finish flooring products such as tile, masonry, terrazzo, and cut stone without integral organic-based coatings and sealants and unfinished/untreated solid wood flooring qualify for credit without any testing requirements, BUT site-applied adhesives, grouts, finishes, and sealers must be compliant for a mineral-based or unfinished/untreated solid wood flooring system to qualify for credit. <p>The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.</p>	IEQ Credit 4.3	1 point	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Composite Wood and Agrifiber Products.</u> Installing composite wood and agrifiber products (particleboard, medium-density fiberboard, plywood, wheatboard, and strawboard) that contain no added urea-formaldehyde resins can earn points. Only materials that qualify as base building elements—not furniture or furnishings—are included. 	IEQ Credit 4.4	1 point	

<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> • <u>Construction Waste Management</u>. Recycling and/or salvaging nonhazardous construction and demolition debris, including wood and carpet, can earn points. The percentage calculations can be done by either weight or volume. Materials should be separated by type and designate those to be diverted from disposal materials. Recycling efforts should be tracked throughout the construction process, and construction haulers and recyclers should be identified to handle the designated material. <p>Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste.</p>	MR Credit 2	1 point for 50% 2 points for 75%	
Total Points			

7. Flooring under LEED for Healthcare

Prior to LEED for Healthcare, there were already guidelines for the construction of healthcare facilities: the Guidelines for Design and Construction Health Care Facilities published by the Facility Guidelines Institute (FGI). The Guidelines include recommended architectural detail, and surface and furnishing needs for clinical and support areas of hospitals, ambulatory care facilities, rehabilitation facilities, and nursing and other residential care facilities. Many federal agencies and authorities in 42 states use the Guidelines either as a code or a reference standard when reviewing, approving, and financing plans; surveying, licensing, certifying, or accrediting newly constructed facilities; or developing their own codes.¹³ The FGI Guidelines, however, does not specifically address environmentally friendly construction practices. As a result, LEED 2009 for Healthcare (LEED 2009-HC) was developed to address sustainability in healthcare facilities. LEED 2009-HC references Guidelines. It is beyond the scope of this book to address the FBI Guidelines.

LEED 2009-HC is the result of seven years of collaboration with Health Care Without Harm and the Center for Maximum Potential Building Systems. LEED for Healthcare is geared toward inpatient and outpatient care facilities and licensed long-term-care facilities. It can also be used for medical offices, assisted-living facilities, and medical education and research centers. Projects that meet certain criteria are required to use LEED 2009-HC.

¹³ The original Guidelines was part of regulations for a federal program to develop healthcare facilities. In 1984 the Department of Health and Human Services (DHHS) removed the regulation relating to the Guidelines. The American Institute of Architects then published the Guidelines. The FGI was ultimately formed as a nonprofit corporation to maintain and update the Guidelines.

LEED 2009-HC recognizes the unique needs of healthcare, including strict regulatory requirements and the fact that healthcare facilities are open 24 hour every day. These issues are not covered in LEED 2009-NC. Accordingly, LEED 2009-HC addresses these differences by both modifying existing credits and creating new, healthcare-specific credits. In LEED 2009-HC, as with other LEED standards, flooring has a notable impact on construction and operation of healthcare facilities that cannot be ignored.

LEED 2009 for Healthcare			
	Provision	Points Available	Points Earned
<i>Mandatory Prerequisites for Certification</i>			
<ul style="list-style-type: none"> <u>Construction Activity Pollution Prevention.</u> Flooring contractors must adhere to an erosion and sedimentation control plan, created during the design phase of the project, which conforms to the erosion and sedimentation requirements of the 2003 EPA Construction General Permit or local erosion and sedimentation control standards and codes (whichever is more stringent). See http://cfpub.epa.gov/npdes/. The plan must be designed to prevent pollution of the air with dust and particulate matter, sedimentation of storm sewer or receiving streams, and loss of soil by storm water runoff or wind erosion during construction activity. 	SS Prereq. 1	A mandatory prerequisite	Identify steps taken to assist:
<ul style="list-style-type: none"> <u>Storage and Collection of Recyclables.</u> The standard mandates an easily accessible area or areas for the collection and storage of materials for recycling for the entire building in accordance with section 2.1-5.4.1.2 (and appendix) of the 2010 Faculty Guidelines Institute Guidelines for Design and Construction of Health Care Facilities for the disposal of construction waste. A designated area for recyclable collection and storage must also be established with separate storage and collection, at a minimum, for paper, corrugated cardboard, glass, plastics, metals, batteries, and mercury-containing products and devices. The flooring dealers and contractors should consider setting up their own waste disposal and recycling system to assist the general contractor. 	MR Prereq. 1	A mandatory prerequisite	Identify steps taken to assist:
<ul style="list-style-type: none"> <u>Hazardous Material Removal or Encapsulation (Renovations Only).</u> This standard requires the development and implementation of a hazardous material management program for the construction 	IEQ Prereq. 3	A mandatory prerequisite	Identify steps taken to assist:

<p>and preoccupancy phases of the building to deal with hazardous materials, such as asbestos, mercury, lead, polychlorinated biphenyls (PCBs), and mold in existing buildings undergoing renovation. As applicable to flooring, the contractors may be required to assist in the following:</p> <ul style="list-style-type: none"> ○ Obtaining survey records that identify where hazardous materials are located in the building and on the site ○ Reporting and investigating suspect mold encountered in demolition ○ Identifying and remedying the source of water and/or moisture to prevent future mold development ○ Remediating contaminated materials with recognized procedures performed by licensed abatement contractors ○ Obtaining a letter from the licensed abatement contractor stating that all hazardous materials within the affected demolition or renovation areas have been removed or encapsulated, and that all sources of mold/mildew have been identified and remedied 			
<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan—During Construction.</u> Those involved in flooring installation can help earn credit by adhering to an indoor air quality (IAQ) management plan to control pollutant sources during construction/renovation. This includes taking steps to protect stored-on-site or installed absorptive materials from moisture damage. LEED recommends that material installation be sequenced in a manner that avoids contamination of absorptive materials, such as insulation and carpeting. 	IEQ Credit 3.1	1 point	
<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan—Before Occupancy.</u> This standard addresses the IAQ after construction ends and prior to occupancy, with all interior finishes installed. It provides for such things as flushing out ventilation systems and testing air quality. <p>Although it is unlikely that the flooring dealer or contractor will be ultimately responsible for this</p>	IEQ Credit 3.2	1 point	

<p>process, it does require all flooring to be installed and finished before occupancy of the building.</p>			
<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> • <u>Building Reuse—Maintain Existing Walls, Floors, and Roof.</u> Points are awarded for maintaining the existing building structure and envelope. The flooring contractor can contribute to the requirement by keeping the structural floors and roof decking. If the project includes an addition that is more than two times the floor area of the existing building, this credit is not applicable. The points are awarded based on the percentage of the building that is reused and not new construction. (Note that hazardous materials that are remediated as a part of the project are excluded from the calculation of the percentage maintained.) 	MR Credit 1.1	<p>1 point for 55%</p> <p>2 points for 75%</p> <p>3 points for 95%</p>	
<ul style="list-style-type: none"> • <u>Building Reuse—Maintain Existing Interior Nonstructural Elements.</u> Points are awarded for using at least 50% of the existing building’s nonstructural components including floor coverings. If the project includes an addition with square footage more than two times the square footage of the existing building, this credit is not applicable. 	MR Credit 1.2	1 point	
<ul style="list-style-type: none"> • <u>Sustainably Sourced Materials and Products.</u> One point and up to a maximum of four will be awarded for each 10% of the total value of all building materials and products used in the project (based on cost) that meet the established criteria. Those criteria, as applicable to flooring, are the following: <ol style="list-style-type: none"> 1. The cost of any individual material or product may be added for each of the following sustainability criteria that the material or product meets: <ul style="list-style-type: none"> ○ Salvaged, refurbished, or reused materials; or ○ Material with recycled content (calculated by cost of material times percentage of recycled content; or ○ Regionally sourced or manufactured materials that were extracted, harvested, or recovered, as well as manufactured within 500 miles (the formula for calculating transportation distances encourages the use of environmentally friendly transportation 	MR Credit 3	<p>1–4 points:</p> <p>A point for each 10% of sustainable materials used</p>	

<p>and is by rail/3 plus inland waterway/2 plus sea/15 plus all other at true distance); or</p> <ul style="list-style-type: none"> ○ Rapidly renewable materials; or ○ Wood certified in accordance with the Forest Stewardship Council; <p style="text-align: center;">and</p> <p>2. Flooring consisting of composite wood, agrifiber, or fiberglass products provided sealants, coatings, roofing, and waterproofing products meet the low-emitting-materials requirements set forth in IEQ Credit 4.</p> <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>			
<ul style="list-style-type: none"> • <u>PBT Source Reduction—Lead, Cadmium, and Copper</u>. This standard seeks to reduce the release of persistent, bioaccumulative, and toxic (PBT) chemicals associated with the life cycle of building materials by setting limits on products that contain lean cadmium and lead. <p>As it relates to flooring, the standard requires Green Seal certified paints and sealants.</p> <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>	MR Credit 4.2	2 points	
<ul style="list-style-type: none"> • <u>Resource Use—Design for Flexibility</u>. While not directly related to flooring, it is important to note that this standard includes the use of movable/modular casework for a minimum of 50% of casework and custom millwork. This, in turn, requires flooring under all movable/modular casework. 	MR Credit 6	1 point	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Adhesives and Sealants</u>. All adhesives and sealants installed in the building interior (defined as inside the weatherproofing system and applied on-site) must comply with either (1) the Green Seal Standard for Commercial Adhesives GS-36 or (2) South Coast Air Quality Management District (SCAQMD) Rule 1168 volatile organic compound (VOC) limits. <p>Adhesives and sealants shall contain no carcinogen or reproductive toxicant components at more than 1% of total mass of the product as defined in the California Office of Environmental Health Hazard Assessment.</p>	IEQ Credit 4	1 point	

<p>As applicable to flooring, the VOC limits (measured as g/L less water) are:</p> <ol style="list-style-type: none"> 1. Indoor carpet adhesives.....50 2. Carpet pad adhesive.....50 3. Wood flooring adhesives.....100 4. Rubber floor adhesives..... 60 5. Subfloor adhesives..... 50 6. Ceramic tile adhesives.....65 7. VCT and asphalt adhesives.....50 8. Multipurpose construction adhesives.....70 9. Contact adhesive..... 80 10. Special purpose contact adhesive..... 250 11. Structural wood member adhesive..... 140 12. Sheet applied rubber lining operations... 850 13. Top and trim adhesive sealants.....250 14. Architectural, nonporous sealants.....250 15. Architectural, porous sealants.....775 16. Other sealants..... 750 17. Substrate wood.....30 18. Clear wood finishes (varnish, lacquer, or sanding sealers).....275 19. Floor coatings..... 50 20. Primers and undercoaters..... 100 21. Stains..... 100 <p>Aerosol adhesives must meet the Green Seal Standard for Commercial Adhesives GS-36 requirements and have the following limits:</p> <ol style="list-style-type: none"> 1. General purpose mist spray 65% VOCs by weight 2. General purpose web spray 65% VOCs by weight 3. Special purpose aerosol adhesives (all types) 65% VOCs by weight <p>The manufacturers should provide the required certifications or the VOC levels of all the materials to ascertain compliance with these requirements.</p>			
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Flooring Systems.</u> Flooring contractors can contribute by installing 	IEQ Credit 4	1 point	

<p>flooring carpet and hard surfaces that meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of VOCs. To meet the requirements, the standard provides the following:</p> <ul style="list-style-type: none"> ○ <i>Titles etc.</i> Mineral-based finish flooring products, such as tile, masonry, terrazzo, and cut stone without integral organic-based coatings and sealants, and unfinished/untreated solid wood flooring, automatically qualify for credit. ○ <i>Carpet Cushions.</i> All carpet cushions installed in the building interior must meet the requirements of the Carpet and Rug Institute’s (CRI’s) Green Label program. ● <i>Adhesives.</i> All carpet adhesives must meet the VOC requirements of VOC calculated consistent with SCAQMD Rule 1113 and Rule 1168. ○ <i>Concrete, Wood, Bamboo, and Cork Floor Finishes.</i> These materials automatically qualify, but any adhesives, grouts, finishes, and sealants must meet the requirements of SCAQMD for mineral-based or unfinished/untreated solid wood floors. <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>			
<ul style="list-style-type: none"> ● <u>Low-Emitting Materials—Composite Wood and Agrifiber Products.</u> Those involved in flooring installation can help earn credit by installing composite wood and agrifiber products that contain no added urea-formaldehyde resins. <p>Composite wood and agrifiber products include particleboard, medium-density fiberboard, plywood, wheatboard, strawboard, panel substrates, and door cores.</p> <p>Batt insulation products shall contain no added formaldehyde, including urea formaldehyde, phenol formaldehyde, and urea-extended phenol formaldehyde.</p>	IEQ Credit 4	1 point	
<ul style="list-style-type: none"> ● <u>Low-Emitting Materials—Exterior Applied Products.</u> Adhesives, sealants, coatings, roofing, and waterproofing materials—defined as from the weatherproofing system out and applied on-site—shall comply with the VOC limits of the California 	IEQ Credit 4	1 point	

<p>Air Resources Board.</p> <ul style="list-style-type: none"> The manufacturers should provide the required certifications or VOC levels of all the materials to ascertain compliance with these requirements. 			
<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> <u>Construction Waste Management.</u> Recycling and/or salvaging nonhazardous construction and demolition debris, including wood and carpet, can earn points. The percentage calculations can be done by either weight or volume. Materials should be separated by type and designate those to be diverted from disposal materials. Recycling efforts should be tracked throughout the construction process, and construction haulers and recyclers should be identified to handle the designated material. <p>Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste.</p>	MR Credit 2	1 point for 50% 2 points for 75%	
Total Points			

B. GREEN GLOBES

Whose system is it? Green Globes® was developed and introduced in the United States in 2004 by the Green Building Initiative (GBI), a nonprofit organization governed by a board composed of representatives from industry, nongovernmental organizations, construction companies, architectural firms, and academic institutions. In 2005, GBI became the first environmentally friendly building organization to be accredited as a national standards developer by ANSI, but the Green Globes rating system is not an official ANSI standard.

What is the general approach? Green Globes is an assessment protocol, rating system, and guide for integrating environmentally friendly design into commercial buildings—including new construction, renovations of existing buildings, and health care facilities. Green Globes provides a web-based interface that facilitates immediate feedback, a feature that differentiates it from LEED’s predominantly paper-based system. The Green Globes system relies on self-assessments, but those who wish to obtain an official Green Globes rating must submit their assessments to a third-party verifier. Such verification, however, is often necessary to satisfy any requirements that the building meet environmentally friendly construction standards or receive other benefits from using environmentally friendly construction methods and sustainable products.

Green Globes uses a point-based system in which up to 1,000 total points may be awarded in seven key areas of assessment:

1. Project management (e.g., design process, environmental purchasing specifications, and emergency response plan)
2. Emissions and effluents (e.g., control of air and water pollution)
3. Energy (e.g., energy consumption, energy demand minimization, “right sized” energy efficient systems, renewable energy, and energy efficient transportation)
4. Indoor environment (e.g., ventilation, lighting design and integration of lighting systems, and thermal and acoustic comfort)
5. Site (e.g., site selection and project location, reduction in ecological impacts, enhancement of watershed features, and site ecology improvement)
6. Water (e.g., flow and flush fixtures, water-conserving features, and reduction in off-site treatment of water)
7. Resources (e.g., materials with low environmental impact; minimized consumption and depletion of material resources; reuse of existing structures; building durability; adaptability and disassembly; and reduction, reuse, and recycling of waste).

Like the LEED 2009 system, Green Globes is a performance-based standard that applies to buildings and building projects, not individual products or building components. Individual products can, however, contribute points according to the rating system. Selection of materials and resources accounts for approximately 10 percent of potentially available Green Globes points.

Once an individual performs a self-assessment and has that assessment verified by a third party, properties achieving a score of 35 percent or more receive a Green Globes rating based on the percentage of total points earned. There are four levels of achievement available through the Green Globes rating system, represented by one, two, three, or four globes.

Who uses it, and why? Green Globes is endorsed by the federal government, at least 23 states and many municipalities as an equivalent alternative to the LEED system. The Canadian government recognizes both the Green Globes and LEED systems. Some consider the Green Globes system preferable to competing systems because the overall process for certification is less costly and easier to apply to small structures. Moreover, because the Green Globes system provides early feedback to design teams during each phase of a project, it encourages building designers to consider elements of environmentally friendly design and sustainability early and promotes interaction between the building designers and their clients. Finally, those in the timber and wood industries sometimes advocate the use of Green Globes rather than the LEED rating system because the Green Globes system recognizes timber certified by several organizations in addition to the Forest Stewardship Council, which is the only source of third-party certified wood recognized by LEED. Green Globes also places more emphasis on “life-cycle assessment” of building materials and products than LEED.¹⁴

14 Life-cycle assessment generally refers to the evaluation of a product over its full commercial life by

Flooring materials and products may implicate several of the Green Globes categories. For example, flooring products that incorporate third-party certified wood may be used to earn credit under the Green Globes Resources category. Like the LEED standards, the VOC levels in products and material must also meet low-emission standards. It is not practical for the floor covering dealer or contractor to determine and certify these levels. Rather, manufacturers should provide the VOC levels of all materials to ascertain compliance with these requirements. Moreover, the installation of low-VOC-emitting carpet that meets the requirements of the CRI Green Label Plus Program may be used to earn credit under Green Globe's Indoor Environment category.

Material and product selection is not the only area in which flooring can contribute to certification of a building under Green Globes. Flooring installation decisions and practices may also implicate several Green Globes categories. Under the Green Globes Resources category, for example, points are available for installing raised floors because they promote building adaptability and serviceability. The Green Globes Indoor Environment category offers points for adherence to an indoor air quality (IAQ) management plan that encourages protection of building materials made of organic matter while in transit and while on site. Thus, those who install flooring may be in a position to ensure that Green Globes points are earned by installing raised floors and adhering to an air quality plan.

Although Green Globes certification depends entirely on the performance of the building as a whole, individual products and construction practices, such as those used in flooring, can earn points under the rating system. A checklist of the requirements most applicable to flooring is provided for each the three Green Globes systems: (1) New Construction, (2) Continual Improvement of Existing Buildings and (3) Continual Improvement of Existing Buildings for Healthcare. Many, if not most, of the requirements are included in all three standards. To avoid any confusion and cross referencing, a checklist is included for each standard.

As with the LEED programs, the standards are organized into categories that can better explain how flooring fits into each applicable standard. With Green Globes, however, flooring does not impact mandatory standards. Accordingly, the applicable standards are set out in the following three categories: (1) installation and construction practices, (2) material selection, and (3) recycling and minimizing waste.

1. Flooring under Green Globes for New Construction

Certification under Green Globes is possible for buildings that earn an assessment score of 35 percent or above. The following checklist identifies ways flooring may contribute to certification under Green Globes for New Construction.

looking at its environmental impacts at the stages of production, transportation and distribution, consumption, and disposal or recycling. For example, locally harvested and processed wood flooring has reduced transportation costs in addition to its long life cycle.

Green Globes for New Construction			
	Provision	Points Available	Points Earned
<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> • <u>Construction Indoor Air Quality Management Plan.</u> Points can be earned by adhering to a construction/renovation indoor air quality (IAQ) management plan. As it relates to flooring, the plan should: <ol style="list-style-type: none"> 1. Implement control ventilation or air cleaning system to deal with contaminants such as odors or irritants generated during renovations, including from flooring products; 2. Properly store and dispose of organic matter such as wood or materials that may collect organic matter; 3. Protect insulation and vapor retarders from dirt and moisture until installation; 4. Ensure that the building envelope is weather-tight before installing wood floors; 5. Ensure that the heating, ventilating, and air conditioning (HVAC) is not used for heating, cooling, or humidity control during construction; and 6. Include placement of airtight covers over diffusers, registers, grilles, and open ducts during construction. <p>Verification of this standard requires review of the IAQ management plan and records of implementation and system start up.</p> 	G.1.5	1–3 points	
<ul style="list-style-type: none"> • <u>Raised Floors.</u> Points are available points for installing raised floors. Verification of this standard requires a review of drawing references. 	E.4.3	5 points	
<ul style="list-style-type: none"> • <u>Disassembly Features.</u> Points can be earned by installing materials, such as wood/timber, finishes, and insulation that are easy to disassemble. Points are available where 1 to 50% of the following materials are of standard size and fastened using 	E.4.4	Maximum of 3 points	

<p>fastening systems that allow for easy disassembly:</p> <ul style="list-style-type: none"> ○ Masonry ○ Wood/timber ○ Insulation ○ Finishes ○ Specialty materials <p>Use of adhesives should be minimized to promote reuse.</p> <p>Verification of this standard requires review of drawings and specifications to verify that structural and fastening systems facilitate building disassembly.</p>			
<ul style="list-style-type: none"> ● <u>Floor Drains</u>. A point can be earned by ensuring the placement of floor drains where fixture or appliance failures may cause plumbing leaks. 	G.2.1	1 point	
<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> ● <u>Recycled Content</u>. Those involved in flooring installation may help earn available points by installing building components made up of recycled materials. Points are awarded where 1 to 20% of building material contains recycled content. The determination is based on the percentage cost of recycled materials compared to the total cost of all building materials. <p>Flooring is not considered in isolation but rather as part of other building components: thermal insulation, carpet, concrete, asphalt, gypboard, floor tiles, patio blocks, roofing materials, and metals. Postconsumer and postindustrial recycled materials are treated equally for purposes of this standard.</p> <p>Green Globes requires adherence to the recycling-content specifications in the Federal Recommended Recycled Content for Products Guidelines and the Environmental Protection Agency’s list of designated products at a minimum.</p> <p>Verification of the recycled content standard requires review of bills showing how much material that contains postconsumer recycled content was purchased.</p>	E.2.2	Maximum of 10 points	

<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Adhesives</u>. Two points are available for using construction adhesives that meet requirements adopted by the California Air Resources Board. <p>The manufacturers should provide the volatile organic compound (VOC) levels of all the materials to ascertain compliance with these requirements.</p>	G.2.9	2 points	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Contact Adhesives</u>. An additional two points are awarded for use of low-VOC-emitting contact adhesives that meet requirements adopted by the California Air Resources Board. <p>The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.</p>	G.2.9	2 points	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Sealants</u>. Low-VOC-emitting sealants that meet requirements adopted by the California Air Resources Board also earn points. <p>The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.</p>	G.2.9	2 points	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Paints</u>. The use of low-VOC-emitting paints that meet requirements of the Environmental Protection Agency’s Environmentally Preferable Purchasing Program earns points. <p>The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.</p>	G.2.9	2 points	
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Caulks</u>. Points are earned by the use of low-VOC-emitting caulks that meet requirements adopted by the California Air Resources Board. <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>	G.2.9	2 points	

<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Carpet Systems</u>. The installation of low-VOC-emitting carpets that meet the Carpet Research Institute’s Green Label Plus program standards earns points. <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>	G.2.9	2 points	
<ul style="list-style-type: none"> • <u>Certified Wood</u>. The standards encourage the use of wood flooring that is certified by one of the following third-party organizations: <ul style="list-style-type: none"> ○ Forest Stewardship Council ○ Sustainable Forestry Initiative ○ Canadian Standards Association ○ American Tree Farm System <p>Points are awarded based on the percentage cost of certified wood products versus the total cost of all wood products.</p> <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>	E.2.4	Maximum of 5 points	
<ul style="list-style-type: none"> • <u>Moisture-Tolerant Materials</u>. Flooring can help earn available points if using moisture-tolerant materials and finishes in areas that generate a lot of humidity. Materials must meet the following moisture standards: <ol style="list-style-type: none"> (1) Carpets must meet the American Association of Textile Chemists and Colorists (AATCC) 174 Parts II and III Standard. (2) Adhesives must meet the American Society for Testing and Materials (ASTM) G 21 Standard. (3) Fabrics must meet the requirements of AATCC Methods 30 and 100. (4) Polymeric surfaces (vinyl, epoxy, rubber flooring, and laminates) must meet the ASTM G 21 Standard. (5) Paints must meet the ASTM G 21 and D 3273 Standards. 	G.2.1	1 point	

<p>The manufacturers should provide verification that the materials meet the standards.</p>			
<ul style="list-style-type: none"> • <u>Bio-based Materials</u>. Flooring can earn available points if using bio-based building materials. Points are based on the percentage cost of bio-based materials versus the total cost of all materials. <p>Verification of this standard requires review of bills showing how much bio-based material was purchased. The manufacturers should provide verification that the materials meet the standards.</p>	E.2.3	Maximum of 5 points	
<ul style="list-style-type: none"> • <u>Life-Cycle Assessment for Materials</u>. Installing flooring that has a long life-cycle using the Athena Institute’s Environmental Impact Estimator or the National Institute for Standards Technology’s Building for Environmental and Economic Sustainability program assessment earns points. <p>The manufacturers should provide verification that the materials meet the standards.</p>	E.1.1	10 points	
<ul style="list-style-type: none"> • <u>Pest-Resistant Materials</u>. The use of pest-resistant materials and building assemblies (e.g., against rodents, termites, and carpenter ants) earns points. <p>Verification of this standard requires review of specifications to check that pest-resistant materials and building assemblies are used. The manufacturers should provide verification that the materials meet the standards.</p>	F.5.1	1 point	
<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> • <u>Construction Waste Management</u>. Flooring installation can help earn available points if construction-related waste is managed. Points are awarded for diverting anywhere from 1 to 100% of construction, demolition, and renovation waste from landfills. <p>Verification of this standard requires review of the final records of waste hauls and types.</p> <p>Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste.</p>	E.5.1	Maximum of 6 points	

<ul style="list-style-type: none"> • Building Reuse. Reusing portions of an existing building (where applicable) earns valuable points. Points are awarded where the new building design allows 10 to 100% reuse of existing major structure by gross building volume, <i>provided</i> that the volume of the existing building has a reasonable preservation value and is at least 10% of the volume of the new design. <p>Verification of this standard requires review of construction plans showing incorporation of the reused existing structure.</p> <p>Flooring companies can assist by setting up a recycling system during construction and keeping track of all material recycled.</p>	E.3.2	Maximum of 5 points	
<ul style="list-style-type: none"> • Materials Reuse. Incorporating reused materials into flooring can earn points. Points are awarded where 1 to 10% of all building materials are from reused sources. Flooring is considered in conjunction with other building materials, including paneling, fixtures and cabinetry, thermal insulation, asphalt paving, concrete, steel, beams and posts, sheet metal, bricks, doors and frames, and windows. Points are based on the percentage cost of reused materials versus the total cost of materials. <p>Verification of this standard requires review of bills showing how much bio-based material was purchased.</p> <p>Flooring companies can assist by setting up a reuse system during construction and keeping track of all material reused.</p>	E.2.1	Maximum of 10 points	
Total Points			

2. Flooring under Green Globes for the Continual Improvement of Existing Buildings

Green Globes for the Continual Improvement of Existing Buildings (CIEB) provides building owners and property managers with the tool to evaluate, document, and improve the environmental performance of their buildings. The standard establishes best practices, creates a benchmark of a building’s environmental performance, and rates the benefits of various building attributes and procedures. In addition, Green Globes CIEB provides information to improve the environmentally friendly operations of buildings. Green Globes CIEB provides an automatically

generated report that can help a building owner evaluate opportunities to benefit from energy savings, reduced environmental impacts, integrated corporate goals and practices, and lower costs for maintenance.

Green Globes CIEB is primarily for existing buildings and rating their performance under environmental criteria. The standard focuses on energy efficiency, water conservation, alternative transportation, ventilation, cleaning material purchase, and waste management. While flooring has a much less-significant impact on the Green Globes CIEB standards, it nonetheless can contribute to certification, as identified in the following checklist.

Green Globes for the Continual Improvement of Existing Buildings			
	Provision	Points Available	Points Earned
<i>Energy Performance 1.0</i>			
<ul style="list-style-type: none"> • <u>Other Energy Efficiency Features</u>. Points are awarded for taking energy efficient measures. Flooring that is insulated, uses barriers or sealers, or has sealing around openings, or installing floor drains and similar attributes, can all contribute to creating other energy efficient features. 	1.6	16 points	
<ul style="list-style-type: none"> • <u>Envelope</u>. A building’s envelope that effectively addresses condensation, moisture, and air leakage problems can earn points. The use of insulation and sealing around concrete slabs, for example, can help demonstrate an effective plan to deal with these issues. 	1.8	4 points	
<i>Resources 3.0</i>			
<ul style="list-style-type: none"> • <u>Waste Reduction Workplan</u>. A waste management policy during construction, renovation, and demolition earns points. Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste. 	3.2	5 points	
<i>Emissions, Effluents and Pollution Controls 4.0</i>			
<ul style="list-style-type: none"> • <u>Waste Water Effluents</u>. Installation of floor drains in areas where chemicals are stored can earn points. 	4.5	5 points	

<ul style="list-style-type: none"> • <u>Asbestos</u>. For buildings constructed before 1976, a survey and inventory that records the location and condition of all asbestos can earn points. 	4.6	15 points	
<ul style="list-style-type: none"> • <u>Radon</u>. For buildings in a high-risk area, conducting a survey to ensure levels are below 4 pCi/L can earn points. Flooring can help reduce the levels of radon by using barriers, etc., to remedy any significant levels. 	4.7	5 points	
<ul style="list-style-type: none"> • <u>Polychlorinated Biphenyl (PCB)</u>. The absence of any PCBs in a building or a management plan that identifies and locates all PCBs can earn five points. 	4.8	5 points	
<ul style="list-style-type: none"> • <u>Health & Safety and Management of Hazardous Products—Proper Storage</u>. The proper storage of all chemicals and hazardous materials, including floor cleaning and maintenance products, earns points. 	4.13	5 points	
<ul style="list-style-type: none"> • <u>Health & Safety and Management of Hazardous Products—Inventory</u>. Points are earned for keeping an inventory of all chemicals and hazardous materials, including floor cleaning and maintenance products, and a record of their removal and disposal. 	4.13	3 points	
<i>Indoor Environment 5.0</i>			
<ul style="list-style-type: none"> • <u>Control of Pollutants at Source—Musty Odors</u>. Dealing with potential mold or excessive moisture can earn points. 	5.6	3 points for dealing with musty odors	
<ul style="list-style-type: none"> • <u>Control of Pollutants at Source—Damp and Musty Carpets</u>. Dealing with potential mold or excessive moisture can earn points. 	5.6	2 points for dealing with damp or musty carpets	
<ul style="list-style-type: none"> • <u>Noise</u>. Reducing noise can earn points. This provides the flooring dealer and contractor with an opportunity to replace flooring with sound-absorbing products. 	5.10	5 points	

<i>Environmental Management System (EMS) 6.0</i>			
<ul style="list-style-type: none"> • <u>EMS Documentation—Waste and Recycling.</u> Creating documented goals for reducing waste and increasing recycling can earn points. Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste. 	6.1	2 point	
<ul style="list-style-type: none"> • <u>EMS Documentation—Reducing Pollution.</u> Creating documented goals for reducing potential pollution can earn points. The flooring dealer and contractor can help by identifying correct products. 	6.1	1 point	
<ul style="list-style-type: none"> • <u>EMS Documentation—Proper Purchasing of Hazardous Products.</u> Creating documented goals for reducing the purchase of and the proper handling of hazardous products can also earn points. The flooring dealer and contractor can help by identifying correct products and proper handling procedures. 	6.1	2 point	
<ul style="list-style-type: none"> • <u>Environmental Purchases—Written Environmental Purchasing Plan.</u> Creating a written environmental purchasing plan earns points. The flooring dealer and contractor can help by identifying correct flooring products to buy. 	6.2	6 points	
<ul style="list-style-type: none"> • <u>Environmental Purchases—Preferred Housekeeping and Building Maintenance Products.</u> Points are earned by creating a list of preferred housekeeping and building maintenance products. The flooring dealer and contractor can help by identifying correct flooring products to buy. 	6.2	7 points	
<ul style="list-style-type: none"> • <u>Environmental Purchases—Energy-Saving Equipment.</u> Points are earned by creating a policy to purchase energy-saving equipment. The flooring dealer and contractor can help by identifying floor cleaning and maintenance equipment. 	6.2	7 points	
Total Points			

3. Flooring under Green Globes for Healthcare Facilities

Green Globes for Continual Improvement of Existing Buildings for Healthcare (CIEB HC) supports the unique requirements of hospitals and extended care facilities. It includes an on-site assessment by a third party to evaluate sustainable operations and management of existing medical buildings, campuses, and nationwide building portfolios.

Like Green Globes CIEB, Green Globes CIEB HC is primarily for existing buildings and rating their performance under environmental criteria. The standard focuses on energy efficiency, water conservation, alternative transportation, ventilation, cleaning material purchases, and waste management. While flooring has a much less-significant impact on the Green Globes CIEB HC standards, it nonetheless can contribute to certification as identified in the following checklist.

Green Globes for Continual Improvement of Existing Buildings for Healthcare			
	Provision	Points Available	Points Earned
<i>Energy Performance 1.0</i>			
<ul style="list-style-type: none"> • <u>Other Energy Efficiency Features</u>. Points are awarded for taking energy-efficient measures. Flooring that is insulated or uses barriers or sealers, sealing around openings, installing floor drains, and using items with similar attributes can all contribute to creating other energy efficient features. 	1.6	16 points	
<ul style="list-style-type: none"> • <u>Envelope</u>. A building’s envelope that effectively addresses condensation, moisture, and air leakage problems can earn points. The use of insulation and sealing around concrete slabs, for example, can help demonstrate an effective plan to deal with these issues. 	1.8	4 points	
<i>Resources 3.0</i>			
<ul style="list-style-type: none"> • <u>Waste Reduction Workplan</u>. A waste management policy during construction, renovation, and demolition earns points. <p>Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste.</p>	3.2	5 points	

<i>Emissions, Effluents, and Pollution Controls 4.0</i>			
<ul style="list-style-type: none"> • <u>Waste Water Effluents</u>. Installation of floor drains in areas where chemicals are stored can earn points. 	4.5	5 points	
<ul style="list-style-type: none"> • <u>Asbestos</u>. For buildings constructed before 1976, a survey and inventory that records the location and condition of all asbestos can earn points. The flooring dealer and contractor needs to be aware of asbestos in paints, stains, glues, and other products when installing new floors. 	4.6	15 points	
<ul style="list-style-type: none"> • <u>Lead</u>. Institution of a lead management plan that takes precautions during repairs and renovations is recognized and earns points. The flooring dealer and contractor need to be aware of lead in paints and stains, including in molding that may be removed, when installing new floors. 	4.7	5 points	
<ul style="list-style-type: none"> • <u>Radon</u>. For buildings in a high-risk area, conducting a survey to ensure levels are below 4 pCi/L can earn points. Flooring can help reduce the levels of radon by using barriers, etc., to remedy any significant levels. 	4.7	5 points	
<ul style="list-style-type: none"> • <u>Polychlorinated Biphenyl (PCB)</u>. The absence of any PCBs in a building or a management plan that identifies and locates all PCBs can earn five points. 	4.8	5 points	
<ul style="list-style-type: none"> • <u>Health & Safety and Management of Hazardous Products—Proper Storage</u>. The proper storage of all chemicals and hazardous materials, including floor cleaning and maintenance products, earns points. The flooring dealer and contractor can help by identifying any potentially hazardous flooring products. 	4.13	5 points	
<ul style="list-style-type: none"> • <u>Health & Safety and Management of Hazardous Products—Education and Training</u>. Points are earned for education and training in handling all chemicals and hazardous materials. The flooring dealer and contractor can help by instructing on how to handle any potentially 	4.13	3 points	

hazardous flooring products.			
<ul style="list-style-type: none"> • <u>Health & Safety and Management of Hazardous Products—Keeping an Inventory.</u> Points are earned for keeping an inventory of all chemicals and hazardous materials, including floor cleaning and maintenance products, and a record of their removal and disposal. <p>The flooring dealer and contractor can help by identifying potentially hazardous flooring products.</p>	4.13	3 points	
<i>Indoor Environment 5.0</i>			
<ul style="list-style-type: none"> • <u>Control of Pollutants at Source.</u> Dealing with potential mold or excessive moisture can earn points. 	5.6	2 points for dealing with musty odors 2 points for dealing with damp or musty carpets	
<ul style="list-style-type: none"> • <u>Control of Pollutants at Source—Environmentally Preferable Cleaning Products.</u> Using environmentally preferable cleaning products, including floor cleaners, can earn points. 	5.6	5 points	
<ul style="list-style-type: none"> • <u>Noise Reduction.</u> Reducing noise can earn points. This provides the flooring dealer and contractor with an opportunity to replace flooring with sound-absorbing products. 	5.10	1 point for waiting areas 1 point for nursing stations 1 point for open office space 1 point for patient rooms 1 point for dining area 1 point for dining lobby/entrance	

<i>Environmental Management System (EMS) 6.0</i>			
<ul style="list-style-type: none"> • <u>EMS Documentation—Waste and Recycling.</u> Creating documented goals for reducing waste and increasing recycling can earn points. Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste. 	6.1	2 point	
<ul style="list-style-type: none"> • <u>EMS Documentation—Reducing Pollution.</u> Creating documented goals for reducing potential pollution can earn points. The flooring dealer and contractor can help by identifying correct products. 	6.1	1 point	
<ul style="list-style-type: none"> • <u>EMS Documentation—Proper Purchasing of Hazardous Products.</u> Creating documented goals for reducing the purchase of and the proper handling of hazardous products can also earn points. The flooring dealer and contractor can help by identifying correct products and proper handling procedures. 	6.1	2 points	
<ul style="list-style-type: none"> • <u>EMS Documentation—Education and Training.</u> Points are earned for education and training in handling all chemicals and hazardous materials. The flooring dealer and contractor can help by instructing on how to handle any potentially hazardous flooring products. 	6.1	2 points	
<ul style="list-style-type: none"> • <u>Environmental Purchases—Written Environmental Purchasing Plan.</u> Creating an written environmental purchasing plan earns points. The flooring dealer and contractor can help by identifying correct flooring products to buy. 	6.2	6 points	
<ul style="list-style-type: none"> • <u>Environmental Purchases—Preferred Housekeeping and Building Maintenance Products.</u> Points are earned by creating a list of preferred housekeeping and building maintenance products. The flooring dealer and contractor can help by identifying correct flooring products to buy. 	6.2	7 points	

<ul style="list-style-type: none"> • <u>Environmental Purchases—Energy-Saving Equipment</u>. Points are earned by creating a policy to purchase energy-saving equipment. <p>The flooring dealer and contractor can help by identifying floor cleaning and maintenance equipment.</p>	6.2	6 points	
Total Points			

III. INTERNATIONAL GREEN CONSTRUCTION CODE

A. Overview

One of the most significant recent standard developments is the release in May 2012 of the International Green Construction Code™ (IgCC) or Code. The IgCC establishes a model construction code for states and local jurisdictions to adopt. It imposes minimum sustainable construction requirements, such as the amount of building materials that must include salvaged or recycled materials. The IgCC applies to commercial, mixed-use, and residential occupancy classifications. It does not apply to single-family homes, low-rise residential buildings, or systems used primarily for industrial or manufacturing processes.

The IgCC was developed by the International Code Council (ICC), a membership association dedicated to building safety, fire prevention, and energy efficiency. The Council is the foremost building code-writing body and has developed model construction standards that have been adopted by most states and local jurisdictions. These codes serve as the basis for construction of federal properties around the world, and as a reference for many nations other than the United States. To develop the Code, the International Code Council worked with many stakeholders, including the US Green Building Council (which developed LEED®); the American Institute of Architects; the American Society of Heating, Refrigeration and Air Conditioning Engineers; ASTM International; and the Illuminating Engineering Society.

As a model code, the IgCC is not mandatory or enforceable unless a jurisdiction formally adopts it. Moreover, the IgCC is not a standalone construction code. Rather it is designed to be incorporated into the existing set of [International Codes](#), including provisions of the International Energy Conservation Code and ICC-700 National Green Building Standard. As has happened with the International Code Council’s other model codes, it is anticipated that states and local jurisdictions will similarly adopt the IgCC and make its requirements mandatory.

Adopting the IgCC allows local governments to exercise control over construction requirements and to avoid the oft-criticized approach taken by many jurisdictions that have required certain projects to obtain certification from third parties, such as the USGBC’s LEED or GBI’s Green Globes® rating systems. Local officials have the ability to customize its provisions to a jurisdiction’s particular climate—both environmental and political. It also has levels of compliance to address different uses and needs of the jurisdictions that adopt these guidelines. Maryland, Rhode Island, and Florida, as well as a host of local jurisdictions, have already

adopted the IgCC or parts of it, and other states and localities are expected to follow their lead. It is believed that the Code could fundamentally change how buildings are constructed and substantially increase the cost of construction.

B. Mandatory Requirements

The IgCC establishes very technical requirements for every aspect of environmentally friendly construction and building design. The Code establishes criteria for site development and land use, material resource conservation, energy efficiency and air quality, water resource conservation and efficiency, indoor environmental quality, and building operation and maintenance. For example, a minimum of 50 percent of construction waste must be diverted from landfills, and construction waste must be separated and stored in bins labeled according to the type of materials they hold, such as wood, paper, plastic, aluminum, steel, iron, gypsum board, carpet, mineral fiber, acoustical tile, glass, and concrete. The IgCC also establishes specific standards for flooring, including prohibiting the use of asbestos products, mandating specific types and sizes of barriers to deal with radon gases, setting limits on the amount of formaldehyde in glued wood products, and restricting the amount of volatile organic compounds (VOCs) allowed in flooring materials. In addition, the IgCC requires that a minimum of 50 percent of the total area of interior flooring be ceramic, concrete, clay, metal, or an organic-free, mineral-based material. As with similar technical requirements in the LEED and Green Globes standards, it is not practical for the floor covering dealer or contractor to determine and certify these levels. As a result, the IgCC recognizes that products that are certified under the Carpet and Rug Institute's (CRI's) Green Label Plus[®] program for carpets and pads; Resilient Floor Covering Institute's FloorScore[®] program for vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, and wall base; and the Indoor Air Quality Certification Green Seal Standard program for commercial adhesives all meet the low-VOC-emission standards. If a product is not certified, the manufacturer should provide the VOC levels for its materials to ascertain compliance with these requirements.

There are three major areas in which the IgCC applies to flooring: (1) recycling of construction waste, (2) selection of flooring materials, and (3) indoor air quality.

1. **Construction Material and Waste Management Plan.** At least 50 percent of nonhazardous construction waste must be diverted from landfills. The amount of materials to be diverted must be specified and calculated either by weight or volume, but not both. All recyclable construction waste must be separated and stored by type of materials, such as wood, paper, plastic, aluminum, steel, iron, gypsum board, carpet, mineral fiber, acoustical ceiling tile, glass, and concrete. Each waste bin must be labeled by the type of material and separated in accordance with the jurisdiction's laws or regulations.

2. **Material Selection.** At least 55 percent of building materials must be salvaged, recycled-content, recyclable, bio-based (e.g., wood or other plant products), or indigenous to the region where the construction is taking place. Flooring can substantially contribute to these mandates. In addition, the IgCC prohibits the use of asbestos products. Flooring companies should request that the manufacturers provide verification that the materials meet the standards.

3. **Indoor Air Quality.** The IgCC standards on indoor air quality are the requirements most directly related to flooring. The Code, as applied to flooring, primarily addresses the emission of chemicals from flooring products. The IgCC mandates radon mitigation, limits the amount of formaldehyde in glued wood products, and restricts the amount of VOCs allowed in flooring materials.

a. Radon Mitigation. The IgCC requirements differ depending on whether the building is located in EPA Radon Zone 1. Each location that adopts the IgCC will determine which requirements apply depending on its area's exposure to radon gas. The basic requirement is that a layer of gas-permeable material must be placed under all concrete slabs and other floor systems in direct contact with the ground. The IgCC establishes specific types and sizes of barriers to deal with radon gases. For example, the gas-permeable layer must consist of (1) a uniform layer of clean aggregate, a minimum of 4 inches (102 mm) thick retained by a 1/4-inch (6.4-mm) sieve; (2) a uniform layer of sand (native or fill), a minimum of 4 inches (102 mm) thick, overlain by a layer or strips of geo-textile drainage matting; or (3) other materials, systems, or floor designs with demonstrated capability to permit depressurization across the entire subfloor area.

In addition, a minimum 6-mil (0.15-mm) [or 3-mil (0.075-mm) cross-laminated] polyethylene or equivalent flexible sheeting material must be placed on top of the permeable layer prior to casting the slab or placing the floor assembly to serve as a soil-gas-retarder by bridging any cracks that develop in the slab or floor assembly and to prevent concrete from entering the void spaces in the aggregate base material. The sheeting must cover the entire floor area with separate sections of sheeting lapped at least 12 inches (305 mm). The sheeting must fit closely around any pipe, wire, or other penetrations of the material. All punctures or tears in the material must be sealed or covered with additional sheeting.

Similarly, all flooring openings, such as around bathtubs, showers, water closets, pipes, wires, or other objects that penetrate concrete slabs or other floor assemblies, must be filled with a polyurethane caulk or equivalent sealant applied in accordance with the manufacturer's recommendations. In any crawl space flooring, any openings through floors above crawl spaces shall be caulked or otherwise filled to prevent air leakage. All concrete joints must be sealed with a caulk or sealant. Condensate drains must be trapped or routed through nonperforated pipe to daylight.

b. Limits on Glued Wood Products. Unless made using adhesives that do not contain urea-formaldehyde resins or are sealed on all sides and edges, glued wood products used interior to the approved weather covering of the building must comply with particular emission limits as set forth in the California Code of Regulations for Airborne, Toxic Control Measure and shown in the following table. (The supplier should be able to provide the needed information for each product.)

EMISSION LIMITS

Product	Formaldehyde Limit (ppm)	Actual Amount Per Manufacture (ppm)
Hardwood plywood	0.05	
Particle board	0.09	
Medium density fiberboard	0.11	
Thin medium density fiberboard	0.13	

The manufacturers should provide the formaldehyde levels of all the materials to ascertain compliance with these requirements.

c. VOC Limits. The most extensive restrictions involve the maximum VOCs allowed. The IgCC devotes a whole section to flooring product. The Code limits the amount of VOCs allowed in adhesives and in flooring materials. The manufacturer/supplier should be able to provide the needed information for each product.

Adhesives and sealants. A minimum of 85 percent by weight or volume of site-applied adhesives and sealants shall comply with the VOC content limits in the following table.

SITE-APPLIED ADHESIVE AND SEALANT VOC LIMITS

Adhesive	VOC Limit	Actual Amount Per Manufacture
Indoor carpet adhesives	50	
Carpet pad adhesives	50	
Outdoor carpet adhesives	150	
Wood flooring adhesive	100	
Rubber floor adhesives	60	

Subfloor adhesives	50	
Ceramic tile adhesives	65	
Vinyl composition tile (VCT) and asphalt tile adhesives	50	
Multipurpose construction adhesives	70	
Structural glazing adhesives	100	
Other sealant primers	750	
CPVC solvent cement	490	
PVC solvent cement	510	
ABS solvent cement	325	
Plastic cement welding	250	
Adhesive primer for plastic	550	
Contact adhesive	80	
Special purpose contact adhesive	250	
Structural wood member adhesive	140	

The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.

VOC-Emission Limits of Flooring Products. A minimum of 85 percent of the total area of flooring installed within the interior of the building shall comply with the VOC limits in the following table.

VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS

Coating Category	Limit	Actual Amount Per Manufacture
Concrete curing compounds	350	
Concrete/masonry sealers	100	
Floor coatings	100	
Recycled coatings	250	
Specialty primers, sealers, and undercoaters	100	
Waterproofing membranes	250	
Wood coatings	275	
Wood preservatives	350	

Where flooring with more than one distinct product layer is installed, the emissions from each layer must comply with these requirements¹⁵. Again, the manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.

In addition, a minimum of 50 percent of the total area of flooring installed within the interior of the building must be one or more of the flooring materials listed in the following table, deemed to comply with the VOC emission limits:

Flooring Material	Percentage of Total Flooring
Ceramic and concrete tile	
Organic free, mineral based	

¹⁵ The test methodology used to determine compliance shall be from CDPH/EHLB/Standard Method V1.1 “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.1,” dated February 2010. The emissions testing must be performed by a laboratory that has the CDPH/EHLB/Standard Method V1.1 test methodology in the scope of its ISO 17025 accreditation. The manufacturer should be able to provide the emission information on its products.

Clay pavers	
Concrete pavers	
Concrete	
Metal	
Total Percentage	

If adopted by a state or local jurisdiction, the dealer or contractor will have to comply with the construction requirements set forth in the IgCC. Inasmuch as these requirements are likely to increase the costs of material and installation, the flooring dealer or contractor needs to take into account the requirements of any local or state construction codes to avoid costly mistakes. Given that the architects are likely to incorporate these requirements into the job specifications where they have been formally adopted, it is essential that the contractor have all requirements that are going to be imposed on it clearly defined and not just referred to by statute or a broad agreement to comply with all local rules and ordinances.

IV. RESIDENTIAL BUILDING STANDARDS

There are two national rating systems specifically applicable to residential building projects: LEED for Homes[®] and the National Green Building Standard. The following pages provide an overview of these systems, followed by a section on how flooring-related products and practices can earn points toward certification; the format is similar to the subsections above for commercial systems. Also included below is a summary of the ReGreen Residential Remodeling Guidelines, which is a guide to best practices for a variety of common home renovation projects but which does not include a certification process.

A. LEED for Homes

LEED for Homes addresses single-family and multifamily homes. LEED for Homes was originally developed in January 2008 and has been clarified and corrected several times. The current version was last modified in 2010. The rating system creates 18 prerequisites and makes available 136 points in eight categories: Innovation and Design Process (ID), Location and Linkages (LL), Sustainable Sites (SS), Water Efficiency (WE), Energy and Atmosphere (EA), Materials and Resources (MR), Indoor Environmental Quality (EQ), and Awareness and Education (AE). Certification under LEED for Homes is possible if an applicant demonstrates compliance with all 18 prerequisites, obtains the minimum number of points required in each of four categories (SS, WE, MR, and EQ), and earns a minimum of 45 points overall.

LEED for Homes seeks to maximize fresh air indoors and minimize exposure to airborne toxins and pollutants. It also has the potential to use 20 to 30 percent less energy—and some up to 60 percent less—than a home built to code. In addition, it rewards the design and construction of energy-efficient homes using sustainable building materials. The LEED for Homes standard

features a mechanism for adjusting award-level point thresholds based on home size—thresholds for larger-than-average homes are raised (making them harder to reach) and thresholds for smaller-than-average homes are lowered (making them easier to reach). This adjustment is made automatically based on the home size and number of bedrooms.

As with its commercial standards, LEED for Homes uses a point-based system through which homes earn LEED points for achieving specific practice or product criteria. There are four main levels of certification—certified, silver, gold, and platinum. Certification under any of these standards requires independent, third-party verification. An organization designated as a LEED for Homes Provider has formal responsibility for training, coordinating, and overseeing LEED-qualified inspectors.

1. Flooring under LEED for Homes

LEED for Homes is one of the most complicated standards. It allows for various alternatives. Obtaining points in one area may preclude points in another area. Moreover, many of the points awarded may depend on the standards being met for walls and roofs in addition to flooring. Accordingly, whether the points are actually earned may not be determined by the flooring alone. Nonetheless, failure to meet the standard for the flooring may cause the home to lose the points under a standard that was otherwise met. The standards are therefore provided for all aspects that impact flooring. The flooring dealer or contractor should take the necessary steps to ensure it has met the standards for LEED certification.

As with other LEED standards, flooring has a notable impact on construction of homes that cannot be ignored. Flooring may contribute to certification under LEED for Homes as identified in the following checklist.

LEED for Homes			
	Provision	Points Available	Points Earned
<i>Mandatory Prerequisites for Certification</i>			
<ul style="list-style-type: none"> • Durable Planning. Prior to construction, the project team must develop a durability plan, which includes indoor moisture control measures and durable materials. The flooring company needs to do all of the following: <ul style="list-style-type: none"> ○ Install water-resistant flooring in kitchens, bathrooms, laundry rooms, and spa areas. ○ Install water-resistant flooring within 3 feet of exterior doors. ○ Not install carpet within 3 feet of exterior doors ○ Help identify moisture-control measures and the durable products it will use. 	ID 2.1	Prerequisite to certification	

<ul style="list-style-type: none"> • Basic Insulation. As a prerequisite, all insulation must meet the R-value requirements in the 2004 International Energy Conservation Code and be installed to meet the Grade II specifications of the National Home Energy Rating Standards. <p>Points are available for insulation that exceeds these standards (see EA 2.2)</p> <p>The manufacturers should provide verification that the materials meet the standards.</p>	EA 2.1	Prerequisite to certification	
<ul style="list-style-type: none"> • Framing Waste Limits. Limit the amount of overall waste from framing, including flooring and decking to 10% or less. 	MR 1.1	Prerequisite to certification	
<ul style="list-style-type: none"> • Preferable Products—FSC Certified Tropical Wood. Unless reused or reclaimed materials are used, all tropical woods must be specified as Forest Stewart Council (FSC) certified with country of origin specified. 	MR 2.1	Prerequisite to certification	
<ul style="list-style-type: none"> • Construction Waste Management. As a prerequisite to certification, those involved in flooring installation may be required to document the amount of their construction-related waste diverted from landfills and incinerators along with the other contractors. 	MR 3.1	Prerequisite to certification	
<ul style="list-style-type: none"> • Radon Protection. All new construction in an EPA Radon Zone 1 must include the following radon protection requirement that may impact flooring: <ul style="list-style-type: none"> ○ A gas-permeable layer between ground and flooring ○ A heavy-gauge plastic sheeting ○ Sealing and caulking of all penetrations through the concrete slab ○ Vent piping that exhausts gases to outside ○ Avoiding electrical outlet near piping 	EQ 9.1	Prerequisite to certification	
<ul style="list-style-type: none"> • Operations Training. All homeowners must be provided with a completed checklist of LEED for Homes features. The flooring company must provide the information regarding the flooring. 	AE 1.1	Prerequisite to certification	

<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> • <u>Pest-Control Alternatives</u>. One-half point can be earned for each of the following pest management practices up to a maximum of two points: <ul style="list-style-type: none"> ○ Keep all wood at least 12 inches above the soil (½ point). ○ Seal all external cracks, joints, edges, and entry points (½ point). ○ Include no wood-to-concrete connection or separate external wood-to-concrete connection with metal or plastic dividers (½ point). ○ In areas of “moderate to heavy” or “very heavy” termite infestation, treat all wood framing with a borate product to a minimum of 3 feet above the foundation (½ point). 	SS 5	Maximum of 2 points	
<ul style="list-style-type: none"> • <u>Enhanced Insulation</u>. Points are available for insulation that exceeds the prerequisite standards (see EA 2.1). Specifically, as applicable to flooring: <ul style="list-style-type: none"> ○ Install an air barrier at any exposed insulation edges if slab-on-floor with a floor surface less than 12 inches below grade (i.e., not applicable to below-grade basement floors unless have walkout feature). ○ Install insulation so that it maintains permanent contact with subfloor. ○ Insulate floors above garage. ○ Insulate all cantilevered floors. 	EA 2.2	2 points	
<ul style="list-style-type: none"> • <u>Heating and Cooling Systems—Flooring Issues</u>. Minimizing leakage in system can earn three points. To earn the points, all air-handler and ductwork cannot be hidden in the floors, walls, ceilings, or chases. 	EA 5.3	3 points	
<ul style="list-style-type: none"> • <u>Preconstruction Framing Documents</u>. Developing a detailed framing plan that includes all floor framing prior to construction can earn a point. 	MR 1.2	1 point	

<ul style="list-style-type: none"> • <u>Preconstruction Framing Orders</u>. If a preconstruction framing plan is developed with a detail cut list and lumber orders that correspond to plan, an extra point can be earned. 	MR 1.3	1 point	
<ul style="list-style-type: none"> • <u>Salvaged Framing</u>. For gut-rehab projects, if 90% of the framing is salvaged or maintained, both points for MR 1.2 and 1.3 will be automatically awarded. 	MR 1.2 & 1.3	2 points	
<ul style="list-style-type: none"> • <u>Framing Efficiencies</u>. Project can be automatically awarded as many as three points for the following: <ul style="list-style-type: none"> ○ Precut framing packages (1 point) ○ Open-web trusses (½ point) ○ Structural insulated panel floors (1 point) ○ Stud spacing greater than 16 (½ point) ○ Floor joists greater than 16 (½ point) ○ Walls, flooring, and roofing components delivered to the job preframed (4 points) 	MR 1.4 & 1.5	Up to 4 points	
<ul style="list-style-type: none"> • <u>Construction Contamination</u>. Those involved in flooring installation can help earn credit by ensuring that all permanent ducts and vents are sealed to minimize contamination during construction. Seals must be removed after all phases of construction are complete. 	EQ 8.1	1 point	
<ul style="list-style-type: none"> • <u>Indoor Contamination</u>. A point can be earned for: <ul style="list-style-type: none"> ○ Installing permanent 4-foot long walk-off mats at each entry (1 point) ○ Designing a shoe storage area near primary entryway that is large enough for at least a bench and two pairs of shoe AND DOES NOT have wall-to-wall carpeting (1 point) 	EQ 8.2	1–2 points	
<ul style="list-style-type: none"> • <u>Radon Protection</u>. All new construction outside an EPA Radon Zone 1 can earn a point by following radon protection requirements that may impact flooring listed below: <ul style="list-style-type: none"> ○ A gas-permeable layer between ground and flooring ○ A heavy-gauge plastic sheeting ○ Sealing and caulking of all penetrations through the concrete slab 	EQ 9.2	1 point	

<ul style="list-style-type: none"> ○ Vent piping that exhausts gases to outside ○ No electrical outlet near piping 			
<ul style="list-style-type: none"> ● <u>Garage Pollutants</u>. To prevent pollution to areas above or beside a garage, certain precautions must be taken. As they relate to flooring, all connecting floors and ceiling joist bays must be sealed. 	EQ 10.2	2 points	
<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> ● <u>Preferable Products—Hard Surfaces</u>. Points can be earned if the flooring is linoleum, cork, bamboo, FSC-certified or reclaimed wood, sealed concrete, or recycled content, or a combination of these materials. An automatic half point is awarded if 100% of flooring is hard surface and a full point is automatically awarded if 100% of hard surfaces are SCS FloorScore certified. 	MR 2.2	½ point for 45% 1 point for 90%	
<ul style="list-style-type: none"> ● <u>Preferable Products—Carpet</u>. Points can be earned if the carpet and pad complies with the Carpet Research Institute’s (CRI’s) Green Label Plus program. 	MR 2.2	½ point for 45% 1 point for 90%	
<ul style="list-style-type: none"> ● <u>Preferable Products—Regional Materials</u>. Installing flooring components (e.g., flooring, sheathing, or framing) made up of products that were extracted, processed, and manufactured within 500 miles of the home earns points. 	MR 2.2	½ point for 45% 1 point 90%	
<ul style="list-style-type: none"> ● <u>Recycled Content—Flooring</u>. Points are awarded for installing recycled-content materials that contain a minimum of 25% postconsumer recycled content. (Postindustrial recycled content must be counted at half the rate of postconsumer content.) 	MR 2.2	½ point for 45% 1 point for 90%	
<ul style="list-style-type: none"> ● <u>Recycled Content—Sheathing</u>. Points are awarded for installing recycled-content floor sheathing that contains a minimum of 25% postconsumer recycled content, is FSC certified, or is reclaimed. (Postindustrial recycled content must be counted at half the rate of postconsumer content.) 	MR 2.2	½ point	
<ul style="list-style-type: none"> ● <u>Low-Emitting Materials—Adhesives and Sealants</u>. Adhesives used for indoor carpet, carpet pad, and subfloor and substrate-specific applications must meet the volatile organic compound (VOC) limitations in South Coast Air Quality Management District (SCAQMD) Rule 1168. As applicable to 	MR 2.2	½ point	

<p>flooring, the VOC limits (measured as g/L less water) are:</p> <ol style="list-style-type: none"> 1. Indoor carpet adhesives..... 50 2. Carpet pad adhesive..... 50 3. Wood flooring adhesives..... 100 4. Rubber floor adhesives..... 60 R 5. Subfloor adhesives..... 50 S 6. Ceramic tile adhesives..... 65 C 7. CT and asphalt adhesives..... 50 V 8. Multipurpose construction adhesives..... 70 M 9. Contact adhesive..... 80 C 10. Special purpose contact adhesive..... 250 S 11. Structural wood member adhesive..... 140 S 12. Heat applied rubber lining operations.... 850 S 13. Top and trim adhesive sealants..... 250 T 14. Architectural, nonporous sealants..... 250 A 15. Architectural, porous sealants..... 775 A 16. Other sealants..... 750 O <p>The manufacturers should provide the VOC levels of all the materials to ascertain compliance with these requirements.</p>			
<ul style="list-style-type: none"> • <u>Low-Emitting Materials—Paints and Coatings.</u> Flooring contractors can contribute by using the following: <ul style="list-style-type: none"> ○ Clear wood finishes, floor coatings, stains, shellacs, and paints that do not exceed the VOC limits established in SCAQMD Rule 1113 in the building interior 	MR 2.2	½ point	

<ul style="list-style-type: none"> ○ Anticorrosive and antirust paints applied to interior ferrous metal substrates that do not exceed the VOC limits established in Green Seal Standard GS-03 ○ Architectural paints, coatings, and primers that do not exceed the VOC limits established in Green Seal Standard GS-11 <p>Prefinished floors are assumed to satisfy the emissions limits.</p> <p>The manufacturers should provide the required certifications or VOC levels of all the materials to ascertain compliance with these requirements.</p>			
<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> ● <u>Construction Waste Reduction.</u> Flooring can help earn credit by reducing construction waste and increasing waste diversion by the following amounts: <ul style="list-style-type: none"> ○ 2 5%..... 0.5 point ○ 3 7.5%..... 1 point ○ 5 0%..... 1.5 points ○ 6 2.5%..... 2 points ○ 7 5%..... 2.5 points ○ 8 2.5%..... 3 points <p>Demolition waste is not included in this calculation.</p>	MR 3.2	Maximum of 3 points	
Total Points			

B. National Green Building Standard

Whose system is it? The National Green Building (NGB) Standards were developed by the National Association of Home Builders (NAHB), working with the International Code Council (ICC), the organization that developed the IgCC. The standards evolved from NAHB’s Model Green Home Building Guidelines, which were developed in 2004 with the participation of over 64 organizations representing varied interests. The NGB Standard was the first ANSI-approved standard for environmentally friendly home building practices. A standard was released in late 2008 and covered new home construction and major revisions.

NAHB released its new 2012 NGB Standards in January 2013. It was a major rewrite and added two new standards: one for remodeling a building and one for remodeling functional space such as kitchens, bathrooms and basements.

What is the general approach? Any governmental jurisdiction, environmentally friendly building program, or other third-party compliance assurance body can adopt the NGB Standard. Those entities are responsible for implementation and administration of the program, including the issuance of certification. Any homebuilder can seek certification for a project through an affiliated entity, such as a local home building association, or by working directly with the NAHB Research Center.

The NGB Standard provides criteria for assessing the environmental impact of a wide range of residential building projects, including new construction of single-family and multiunit dwellings, as well as renovations and additions to existing residential buildings. Under the NGB Standard, a minimum number of threshold points must be achieved in each of seven categories: (1) lot design, preparation, and development; (2) resource efficiency; (3) energy efficiency; (4) water efficiency; (5) indoor environmental quality; (6) operation, maintenance; and (7) building owner education. The mandatory requirements and a system of points are used to establish a performance level for which the project qualifies: Bronze (222 points), Silver (406 points), Gold (558 points), and Emerald (697 points).

The NAHB’s Research Center approves building products as being eligible to contribute points toward certification of a building under the Nation Green Building Standard. Approved products have the Green Approved Products logo on them.



In addition, NAHB recognizes most of the leading third party standard setting organizations and accept products certified by these organizations.

Material	Accepted Third Party Certification Program
Carpet	Carpet and Rug Institute’s Green Label Plus.
Hard-Surfaces	GREENGUARD Environmental Institute Certification; and Floor Covering Institute’s FloorScore program.
Architectural Coatings	GREENGUARD Environmental Institute Certification; Green Seal-11 Standard for Paints and Coatings; Scientific Certification Systems (SCS) Indoor Advantage Gold Program; and

	EcoLogo CCD=047
Adhesives and Sealants	GREENGUARD Environmental Institute Certification; Scientific Certification Systems (SCS) Indoor Advantage Gold Program; Carpet and Rug Institute’s Green Label Plus; Floor Covering Institute’s FloorScore program; and Green Seal-36 Standard for Adhesives for Commercial Use
Insulation	GREENGUARD Environmental Institute Certification; and Scientific Certification Systems (SCS) Indoor Advantage Gold Program;
Wood	American Forest Foundation’s American Tree Farm System; Forest Stewardship Council; Sustainable Forestry Initiative; Canadian Standards Association’s <i>Sustainable Forest Management System Standards</i> (CSA Z80-9); and Program for Endorsement of Forest Certification Systems (PEFC)

Who uses it, and why? According to analysis by the NAHB Research Center, the NGB Standard was developed for the “mainstream builder,” in contrast to the LEED for Homes standard, which is “an exclusive rating system on purpose.”¹⁶ Thus, the NGB Standard may find greater acceptance than LEED for Homes for the majority of residential builders, while LEED for Homes may be more appealing to high-end or custom projects, including those using unconventional materials and methods, such as grey water reuse and off-grid energy features.

Sources of additional information:

More information about development of NAHB’s National Green Building Standard is available at [NAHB National Green Building Program](#), where you will also find copies of the standard available for purchase.

I. Flooring under the New Home Standard

Flooring and flooring structural systems are considered “major components” of construction. As a result, flooring often has a significant impact on the points that can be earned. Flooring can directly earn points. For example, installing pre-finished hardwood floors earns one to five points. Flooring can also help earn points such as were it can be one of the needed two major components that include recycled material.

16 Green Home Building Rating Systems—A Sample Comparison, NAHB Research Center, Inc. (March 2008).

How flooring can contribute to certification under the NGB New Home Standard is identified in the following checklist.

National Green Building New Home Standard			
	Provision	Points Available	Points Earned
<i>Mandatory Prerequisites for Certification</i>			
<ul style="list-style-type: none"> • <u>Capillary Breaks</u>. All concrete slabs must have installed a capillary break and vapor retarder that meets the ICC International Residential Codes §§ 505.2.2 and 505.2.3 or the ICC International Building Code §§ 1901 and 1805.4.4. 	602.1.1.1	Mandatory	
<ul style="list-style-type: none"> • <u>Unconditioned Crawlspaces</u>. Crawlspace built as an unconditioned area must be sealed with minimum 6 mil vapor retarder extending at least 6 inches up the wall and sealed and attached to the wall. 	602.1.4.1	Mandatory and 6 points	
<ul style="list-style-type: none"> • <u>Conditioned Crawlspaces</u>. Crawlspace built as a conditioned area must be sealed with minimum 6 mil polyethylene sheet overlapped at least 6 inches and sealed at the seams. 	602.1.4.2	Mandatory and 8 points	
<ul style="list-style-type: none"> • <u>Moisture Control—Cavity</u>. Ensuring that insulation in cavities is dry is both a mandatory requirement and can earn 2 points. This standard applies to all building materials, not just flooring and floor framing. 	602.1.7(2)	Mandatory and 2 points	
<ul style="list-style-type: none"> • <u>Flashing</u>. To minimize water entry, flashing must be installed at all the building-to deck, -porch and -stair intersections. 	602.1.9(1)(c)	Mandatory	
<ul style="list-style-type: none"> • <u>Tile Backing Materials</u>. Tile backing must be installed on the back of tile and the backing must be in accordance with ASTM International standards C1178, C1278, C1288 or C1325. The manufacturers should provide verification that the materials meet the standards. 	602.1.11	Mandatory	
<ul style="list-style-type: none"> • <u>Air Barrier and Insulation</u>. Floors, including above garage and cantilevered floors, must have: 	701.4.3.2(2)	Mandatory	

<ul style="list-style-type: none"> ○ Insulation installed to maintain permanent contact with underside of subflooring decking; and ○ An air barrier installed at all exposed edges of insulation. 			
<ul style="list-style-type: none"> ● <u>Wood Materials</u>. A mandatory certification standard requires that 85% of any structural plywood used, including for floors, is compliant with Department of Commerce (DOC) PS 1 and/or DOC PS 2, and that any oriented strand board (OSB) is compliant with DOC PS 2. 	901.4(1)	Mandatory	
<ul style="list-style-type: none"> ● <u>Carpets</u>. There is also a mandatory certification requirement that wall-to-wall carpet is not installed adjacent to water closets and bathing fixtures. 	901.6(1)	Mandatory	
<ul style="list-style-type: none"> ● <u>Building Owner's Manual</u>. A building owner's manual must be provided which includes information on the buildings use, maintenance and green components. The manual must include: <ul style="list-style-type: none"> ○ The green building certification or completion documents; ○ List of all green building features; and ○ Product manufacturers' manuals and product data. <p>The worksheets provided in the Appendices can help provide the information needed for the flooring.</p> <p>Points can be earned by providing additional information.</p> 	1001.1	Mandatory	
<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> ● <u>Building Design</u>. Building design and layouts that minimize material cuts and waste. 	601.3	3 points if used for 80% of flooring	
<ul style="list-style-type: none"> ● <u>Framing and Structural Plans</u>. Credits are awarded for framing or structural plans, material quality lists and on-site cut lists are provided. 	601.4	4 points	
<ul style="list-style-type: none"> ● <u>Capillary Break</u>. A capillary break between the footing and the foundation to prevent moisture 	602.1.1.2	3 points	

migration into the foundation wall earns points.			
<ul style="list-style-type: none"> • <u>Foundation Waterproofing</u>. Points are earned for installing an enhanced foundation waterproofing by using a rubberized coating and/or drainage mat. 	602.1.2	4 points	
<ul style="list-style-type: none"> • <u>Unconditioned Crawlspace</u>s. Points are awarded for installing a minimum 6 mil vapor retarder on the crawlspace floors that extends at least 6 inches up outer wall and is attached and sealed to the wall. 	602.1.4.1	8 points	
<ul style="list-style-type: none"> • <u>Conditioned Crawlspace</u>s. Points are earned if the concrete slab in crawlspace that is built as a conditioned area has minimum 6 mil polyethylene sheet overlapped at least 6 inches and sealed at the seams. 	602.1.4.2	8 points	
<ul style="list-style-type: none"> • <u>Termite Barrier</u>. Credits can be earned by installing continuous physical foundation termite barriers with or without low toxicity treatment in areas of subterranean termite infestation potential. 	602.1.5	4 points	
<ul style="list-style-type: none"> • <u>Moisture Control—Mold</u>. Points are earned for not using, cleaning or encapsulating material with visible mold. This standard applies to all building materials, not just flooring and floor framing. 	602.1.7(1)	2 points	
<ul style="list-style-type: none"> • <u>Moisture Control—Lumber</u>. Sampling the moisture content of lumber to ensure it does not exceed 19% prior to cavity enclosure earns points. This standard applies to all building materials, not just flooring and floor framing. 	602.1.7(3)	4 points	
<ul style="list-style-type: none"> • <u>Moisture Control—Subfloors</u>. If the moisture content of subflooring, substrate, or concrete is in accordance within industry standards for the finished flooring, points are awarded. 	602.1.7.2	2 points	
<ul style="list-style-type: none"> • <u>Building Envelope—UA Improvement</u>. Points are earned for installing and insulating floors with a U-factor of 0.064 to 0.028, depending on the climate zone in which the home is built and the level of the UA improvement. There are seven climate zones. The general contractor should be able to provide the zone. It is key for the flooring 	703.1.1	1 to 18 points	

dealer or contractor to identify the U-factor of the insulation used.			
<ul style="list-style-type: none"> • <u>Insulation Installation</u>. Points are awarded for installing grade 1 or 2 insulation in the floors, band joists, rim joists, and conditioned attics, basements and crawlspaces. <ul style="list-style-type: none"> ○ Grade 1 is essentially insulation uniformly filling all cavities side-to-side and top-to-bottom with less than 2% compression and contact with framing. ○ Grade 2 is essentially insulation uniformly filling 98% of the cavities side-to-side and top-to-bottom with less than 10% compression; and, for floor insulation, the insulation must be enclosed on six side if over vented or ambient conditions, but not if over unconditioned basements. 	703.1.2	4 points for grade 2 7 points for grade 1	
<ul style="list-style-type: none"> • <u>Insulation</u>. Points are available if 85% of the wall, ceiling and floor insulation are in accordance with the California Air Resources Board Suggested Control Measure for Architectural Coating v1.1. 	901.11	4 points	
<ul style="list-style-type: none"> • <u>Building Entrance</u>. A point can be earned by installing either external or internal grilles or mats to control pollutants at a building's entrance. 	901.13	1 point	
<ul style="list-style-type: none"> • <u>Building Owner's Manual</u>. Points can be earned by providing additional information in the mandatory building owner's manual. As it relates to flooring, one point can be earned by adding the following two items: <ul style="list-style-type: none"> ○ A photograph record of the framing and electric installed taken prior to installation of insulation; and ○ List of common hazardous materials used around the building, like cleaning agents, and instructions for proper use. <p>The worksheets provided in the Appendices can help provide the information needed for the flooring.</p> 	1001.1	1 point	
<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> • <u>Material Usage</u>. Flooring dealers and contractors can help earn credit by using 	601.2	3 points for minimum	

building-code-compliant structural systems or advanced framing techniques that reduce and optimize the amount of material used.		framing used 6 points for higher grade or strength framing 9 points for performance based materials	
<ul style="list-style-type: none"> • <u>Prefabricated Components</u>. Flooring dealers and contractors earn points by using a floor system that consists of at least 90% precut or preassembled components, or panelized or precast assemblies. 	601.5	4 points	
<ul style="list-style-type: none"> • <u>Pre-Finished Materials</u>. Points can be earned for using materials that do not require on site applications of finishes. The points are earned for each type and the amount of prefinished materials used as set forth below. 	601.7		
<ul style="list-style-type: none"> ○ <u>Pre-Finished Concrete and Masonry</u>. Points are awarded for using pigmented, decorative or final finished concrete or masonry floor. 	601.7(a)	5 points for 90% 2 points for 50% 1 points for 35%	
<ul style="list-style-type: none"> ○ <u>Pre-Finished Interior Trim</u>. Using interior trim that does not require paint or stain earns points. While this includes other trim, flooring trim will be included in the percentage of trim used. 	601.7(b)	5 points for 90% 2 points for 50% 1 points for 35%	
<ul style="list-style-type: none"> ○ <u>Pre-Finished Hardwood Floor</u>. Installing pre-finished hardwood floors earns 1 to 5 points. 	601.7(g)	5 points for 90% 2 points for 50% 1 points for 35%	
<ul style="list-style-type: none"> • <u>Termite-Resistant Materials</u>. Flooring can help earn credit by installing termite-resistant materials in areas prone to slight to moderate termite infestation, moderate to heavy 	602.1.6	2 points in slight to moderate area 4 points in	

<p>infestation, or very heavy termite infestation. Areas with none to slight infestations are not awarded points for using termite-resistant materials.</p> <p>Points are awarded only if termite-resistant materials are used in all identified elements, including floors, foundations, structural walls, decks, etc.</p> <p>Areas that have slight, moderate, heavy or very heavy termite infestation are listed in the NAHB Standards at Table 6(3).</p> <ul style="list-style-type: none"> ○ <u>None to Slight</u>: Are the northern most region from Maine to parts of Oregon: ○ <u>Slight to Moderate</u>: Are parts of Northern states from lower northern New York to Oregon; ○ <u>Moderate to Heavy</u>: Are parts or all of the middle states from lower New Hampshire to most of Nevada to northern most part of California ○ <u>Very Heavy</u>: Includes most of the southern states and most of California. 		<p>moderate to heavy area</p> <p>6 points in a very heavy area</p>	
<ul style="list-style-type: none"> ● <u>Reused Materials</u>. Points can be earned for reusing, modifying or deconstructing for later use materials from major elements of existing buildings. Flooring is considered a major element. <p>One point is awarded for every 200 square feet of flooring area reused, modified or deconstructed up to a maximum of 12 points.</p>	603.1	1 to 12 Points	
<ul style="list-style-type: none"> ● <u>Salvaged Materials</u>. Using salvaged or reclaimed materials and components in flooring can help earn points. Points awarded under § 603.1 above cannot be used for points under this section. Points are awarded only if total material and labor cost of salvaged materials is at least 1% of the total construction cost. 	603.2	1 to 9 points	
<ul style="list-style-type: none"> ● <u>Recycled Content</u>. Flooring can contribute to earning points by using materials with recycled content. Points are awarded on a sliding scale and only if recycled-content materials are used in two minor and/or two major building components. Flooring could be one of these two major components. 	604.1	<p>1 point for 25-49%</p> <p>4 points for 50-74%</p> <p>6 points for 75-100%</p>	

<ul style="list-style-type: none"> • <u>Bio-based Products</u>. Using bio-based, renewable products earns points. Bio-based products include: <ul style="list-style-type: none"> ○ Certified solid wood, ○ Engineered wood, ○ Bamboo, ○ Cotton, or ○ Cork. <p>Three points are awarded for using two types of bio-based materials, each of which represents more than 0.5% of the project’s projected building material cost.</p> <p>Six points are awarded for using two types of bio-based materials, each of which represents more than 1% of the projected building material cost.</p> <p>An additional two points can be earned, with one point for each additional bio-based material that represents more than 0.5% of the projected building material cost.</p> 	606.1	3 to 8 points	
<ul style="list-style-type: none"> • <u>Wood-Based Products</u>. Four points are awarded if at least two certified wood-based products are used for the floors. To qualify the wood must be certified by: <ul style="list-style-type: none"> ○ American Forest Foundation’s American Tree Farm System; ○ Forest Stewardship Council; ○ Sustainable Forestry Initiative; ○ Canadian Standards Association’s <i>Sustainable Forest Management System Standards</i> (CSA Z80-9); ○ Program for Endorsement of Forest Certification Systems (PEFC); and ○ Other product certification programs recognized by PEFC. 	606.2(2)	4 points	
<ul style="list-style-type: none"> • <u>Manufacturing Energy</u>. Installation flooring materials that are manufactured using a minimum of 33% of the primary manufacturing process energy derived from renewable 	606.3	2 to 6 points	

<p>sources, combustible waste sources, or renewable energy credits (RECs) can earn points. Two points per material are awarded, up to six points maximum for the project.</p> <p>The manufacturers should provide verification that the flooring materials meet the standards.</p>			
<ul style="list-style-type: none"> • <u>Resource-Efficient Materials—Engineered Wood.</u> Flooring that contains fewer materials than conventional products by using engineered wood or engineered steel products earn 3 points. Three points are awarded per material, up to nine points maximum for the project. 	608.1(2)	3 points	
<ul style="list-style-type: none"> • <u>Resource-Efficient Materials—Floor Trusses.</u> Flooring that contains fewer materials than conventional products for floor trusses can earn 3 points. 	608.1(3)	3 points	
<ul style="list-style-type: none"> • <u>Regional Materials.</u> Installing products or materials that are grown within <ul style="list-style-type: none"> (1) 500 miles radius of the project site if transported by truck; or (2) 1500 miles if transported for at least 80% by rail or water. <p>If multiple raw materials are used in a product, then the transportation distance is determined by taking the percentage of each material’s weight times the distance. For example, if a product is made up of 10% material A that was transported 2,000 miles, 40% material B that was transported 700 miles and 50% from material C that was transported 100 miles, the total would be:</p> <p>Material A: 10% of 2000 = 200</p> <p>Material B: 40% of 500= 250 and</p> <p>Material C: 50% of 200= 50</p> <p>For a total of 500 miles</p> <p>Two points are awarded for each material type up to a maximum of 10 points</p> 	609.1	2 to 10 points	
<ul style="list-style-type: none"> • <u>Life-Cycle Analysis.</u> Selecting a more environmentally preferable product or assembly based upon the use of a life-cycle assessment (LCA) tool as determined under the International Organization for Standards (ISO) earns points. The LCA considers various factors such as manufacturing process, waste 	610.1	3 to 15 points	

<p>generated, longevity of the material, etc., and weighs these attributes to determine whether a product is preferable.</p> <p>Three points are awarded per product/system, up to 15 points maximum for the project.</p> <p>The manufacturers should provide the information needed to determine whether the flooring materials meet the standards.</p>			
<ul style="list-style-type: none"> • <u>Whole Building Life-Cycle Analysis</u>. Flooring can contribute to earning 15 points if it adds to the life cycle of the building. 	610.1.1	15 point	
<ul style="list-style-type: none"> • <u>Life-Cycle Analysis for Products or Assembly</u>. Based on the LCA tool, environmentally preferred products or assembly can earn points 	610.1.2.1	10 point	
<ul style="list-style-type: none"> • <u>Life Cycle for Products</u>. Using flooring products with an average of a 15% improvement in its environmental impact as compared to other products can contribute to earning points. <p>Environmental impact considers the following:</p> <ul style="list-style-type: none"> ○ Fossil fuel consumption; ○ Global warming potential; ○ Acidification potential; ○ Eutrophication potential; and ○ Ozone depletion potential. 	610.1.2.1	2-10 point	
<ul style="list-style-type: none"> • <u>Life Cycle for Intermediate Floors</u>. Using flooring materials with an assembly that has an average of a 15% improvement in its environmental impact as compared to other products can contribute to earning points. <p>Environmental impact considers the following:</p> <ul style="list-style-type: none"> ○ Fossil fuel consumption; ○ Global warming potential; ○ Acidification potential; ○ Eutrophication potential; and ○ Ozone depletion potential. <p>To earn points, there must be at least one other improved assembly for exterior wall, roof, ceiling or interior wall.</p>	610.1.2.2	3-10 point	

<ul style="list-style-type: none"> • <u>Manufacturer’s Environmental Management System Concepts</u>. Credit can be earned by using materials from ISO 14001 certified or equivalent production facilities. Points are awarded if the aggregate value of all such products for the project equals 1% or more of the estimated total building materials cost. The manufacturers should provide the verification that the materials meet the standards. 	611.1	10 points maximum 1 point per percent of total materials cost	
<ul style="list-style-type: none"> • <u>Sustainable Products</u>. Three points each, up to a maximum of nine points, can be earned if the following certified products are installed: <ul style="list-style-type: none"> ○ 50% or more of the carpet (by square feet) is certified to NFS 140; ○ 50% or more of the resilient floors (by square feet) are certified to NFS 332; ○ 50% or more of the tile (by square feet) is certified to Tile Council of North America’s Green Square standard; and ○ 50% or more of the insulation (by square feet) is certified to EcoLogo CCD-016. 	611.2	3-9 points	
<ul style="list-style-type: none"> • <u>Particle Board</u>. Points are awarded if 85% of the particle board complies with Composite Panel Association’s A208.1 standard. 	901.4(2)	2 points	
<ul style="list-style-type: none"> • <u>MDF</u>. Points are awarded if 85% of medium density fiberboard (MDF) complies with the Composite Panel Association’s A208.2 standard. 	901.4(2)	2 points	
<ul style="list-style-type: none"> • <u>Hardwood Plywood</u>. Points are awarded if 85% of the hardwood plywood complies with the Composite Panel Association’s 4 standard. 	901.4(3)	2 points	
<ul style="list-style-type: none"> • <u>Particle Board, MDF, Plywood</u>. Points are awarded if 85% of the particle board, MDF or hardwood plywood complies with the Hardwood Plywood Veneer HP-1 Association’s A208.2 standard. 	901.4(4)	3 points	
<ul style="list-style-type: none"> • <u>Composite Wood</u>. Points are awarded if 85% of the composite wood or agrifiber panels contain no added urea-formaldehyde or comply with the California Air Resources Board Composite Wood Air Toxic Contaminant Measure 	901.4(5)	4 points	

Standard.			
<ul style="list-style-type: none"> • <u>Non-Emitting Products</u>. Points are awarded if non-emitting products are used. 	901.4(6)	4 points	
<ul style="list-style-type: none"> • <u>Carpets</u>. A minimum of 10% of the flooring is carpeted and 85% of installed carpet area and /or carpet cushion (padding) are in accordance with the emission levels of CDPH 01350, as certified by a third-party program, such as the Carpet and Rug Institute’s (CRI’s) Green Label Plus Indoor Air Quality Program. The manufacturers should provide the certifications or verification that the materials meet the standards. 	901.6(2)	6 points for carpet 2 points for cushion	
<ul style="list-style-type: none"> • <u>Hard-Surface Flooring</u>. Installing pre-finished or accepted alternative hard-surface flooring on at least 10% of the conditioned floor space and at least 85% of the flooring is in accordance with the emission-concentration limits of DCPH 01350, as certified by a third-party program such as the Resilient Floor Covering Institute’s FloorScore Indoor Air Certification Program or the GREENGUARD Environmental Institute’s Children and School’s Certification Program earns points. The following flooring need not be pre-finished: <ul style="list-style-type: none"> ○ Ceramic tile; ○ Organic-free mineral-based flooring; ○ Clay masonry; ○ Concrete masonry; ○ Concrete flooring; and ○ Metal flooring. The manufacturers should provide the certifications or verification that the materials meet the standards. 	901.7	6 points	
<ul style="list-style-type: none"> • <u>Architectural Coatings</u>. Flooring can help earn credits by ensuring that site-applied interior products meet one or more of the following emission standards: <ul style="list-style-type: none"> ○ Green Seal GS-11 standard, or 	901.9.1	5 points	

<ul style="list-style-type: none"> ○ Meet the following VOC limits: <ul style="list-style-type: none"> Concrete curing compounds..... 350 Concrete/Masonry sealers.....350 Flooring coatings.....350 Primers, sealers, undercoatings.....100 Recycled coatings.....250 Stains.....250 Stone consolidants.....450 Waterproof membranes.....250 Wood coatings.....275 Wood preservatives.....350 <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>			
<ul style="list-style-type: none"> ● <u>Architectural Coatings Color Additives.</u> A point is available for ensuring that 85% of the site-applied interior color coating additives products are in accordance with the emission levels of CDPH 01350, as certified by a third-party program such as the GREENGUARD, Green Seal or the Scientific Certification Systems Indoor Advantage Gold Program. <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>	901.9.2	1 point	
<ul style="list-style-type: none"> ● <u>Adhesives and Sealants.</u> Credits can be earned by ensuring that 85% of the site-applied adhesives and sealants, including for the installation of floors, are in accordance with the California Air Resources Board Suggested Control Measure for Architectural Coating. 	901.10(1)	8 points	
<ul style="list-style-type: none"> ● <u>Adhesives and Sealants.</u> Credits can be earned by ensuring that 85% of the site-applied adhesives and sealants, including for the installation of floors, are in accordance with one of the following: <ul style="list-style-type: none"> ○ Green Seal GS-36 standard, or ○ Meet the following VOC limits: <ul style="list-style-type: none"> Indoor carpet adhesives.....50 Carpet pad adhesives.....50 	901.10(2)&(3).	5 points	

<p>Indoor carpet adhesives.....150</p> <p>Wood flooring adhesives.....100</p> <p>Rubber floor adhesives.....60</p> <p>Subfloor adhesives.....50</p> <p>Ceramic tile adhesives.....65</p> <p>Structural wood adhesive.....140</p> <p>VCT and Asphalt adhesives.....50</p> <p>Cove base adhesives.....50</p> <p>Multipurpose adhesives.....70</p> <p>Structural glazing adhesives.....100</p> <p>Architectural sealants.....250</p> <p>Architectural sealants primers</p> <p> a. Non-porous.....250</p> <p> b. Porous.....775</p> <p>CPVC solvent cement.....490</p> <p>PVC solvent cement.....510</p> <p>ABC solvent cement.....325</p> <p>Plastic cement welding.....250</p> <p>Adhesive primer for plastic.....550</p> <p>Contact adhesive.....80</p> <p>Special purpose contact adhesive.....250</p> <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>			
<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> • <u>Scrap Materials</u>. Flooring dealers and contractors can help earn points by facilitating the sorting and reusing of scrap building materials, such as bins dedicated to the various types of flooring material. 	603.3	4 points	
<ul style="list-style-type: none"> • <u>Construction Waste Management Plan</u>. Points can be earned by establishing posting a construction waste management plan with a goal of recycling or salvaging at least 50% (by weight) of construction waste. <p>Flooring companies can assist by setting up their own waste disposal and recycling system during</p>	605.2	6 points	

construction and keeping track of all waste.			
<ul style="list-style-type: none"> • <u>On-site Recycling</u>. Flooring companies can help earn credit by undertaking on-site recycling measures (such as grinding or otherwise safely applying materials on-site as fill or soil amendment). Points are awarded if a minimum of 50% (by weight) of construction and land-clearing waste is diverted from a landfill. Flooring companies can assist by setting up their own recycling system during construction and keeping track of all recycled material. 	605.3	7 points	
<ul style="list-style-type: none"> • <u>Recycled Construction Materials</u>. Participating in project-wide recycling of construction materials (e.g., wood, cardboard, metals, or concrete) for reuse offsite can earn points. Three points are awarded if a minimum of two types of materials are recycled, and one additional point is awarded for each additional type of material, up to a six-point maximum. Obviously, recycling flooring products can directly earn points. 	605.4	3-6 points	
Total Points			

II. Flooring under the Remodeling Standard

The 2012 version of NAHB’s standard completely revamped the scoring for renovations and remodeling projects. The revised standard includes an entirely new chapter devoted just to remodeling of existing building projects. The new standard provides criteria for remodeling the entire buildings. Flooring impacts the standards and under the criteria, flooring can earn points or influence the points earned.

Flooring’s contributions to certification under the NGB Remodeling Standard are identified in the following checklist:

National Green Building Remodeling Standard			
	Provision	Points Available	Points Earned
<i>Mandatory Prerequisites for Certification</i>			
<ul style="list-style-type: none"> • Capillary Breaks. All concrete slabs must have installed a capillary break and vapor retarder that meets the ICC International Residential Codes §§ 505.2.2 and 505.2.3 or the ICC International Building Code §§ 1901 and 1805.4.4. Note: This is not mandatory for existing slabs without apparent moisture problems. 	11.602.1.1.1	Mandatory	
<ul style="list-style-type: none"> • Conditioned Crawlspaces. All new foundations and at least 25% of the total crawlspace must be sealed with minimum 6 mil polyethylene sheet overlapped at least 6 inches and sealed at the seams. Note: This is not mandatory for existing foundations without apparent moisture problems. 	11.602.1.4.2	Mandatory and 8 points	
<ul style="list-style-type: none"> • Moisture Control—Cavity. Ensuring that insulation in cavities is dry is both a mandatory requirement and can earn 2 points. This standard applies to all building materials, not just flooring and floor framing. 	11.602.1.7(2)	Mandatory and 2 points	
<ul style="list-style-type: none"> • Tile Backing Materials. Tile backing must be installed on the back of tile and the backing must be in accordance with ASTM International standards C1178, C1278, C1288 or C1325. The manufacturers should provide verification that the materials meet the standards. 	11.602.1.11	Mandatory	
<ul style="list-style-type: none"> • Hazardous Waste. There must be a construction waste management plan for the proper handling and disposing of all hazardous waste, including any asbestos from flooring. 	11.605.1	Mandatory	
<ul style="list-style-type: none"> • Building Thermo Envelop. The building envelope exposed or created during remodeling must be sealed. As it possibly relates to flooring, the requirement includes: <ul style="list-style-type: none"> ○ All joints; and ○ Openings between doors and their jambs and 	11.701.4.3.1	Mandatory	

framing.			
<ul style="list-style-type: none"> • <u>Air Sealing and Insulation.</u> Floors, including above garage and cantilevered floors, must have: <ul style="list-style-type: none"> ○ Above grade 3 insulation installed to maintain permanent contact with underside of subflooring decking; and ○ An air barrier installed at all exposed edges of insulation. 	11.701.4.3.2	Mandatory	
<ul style="list-style-type: none"> • <u>Wood Materials.</u> A mandatory certification standard requires that 85% of any structural plywood used, including for floors, is compliant with Department of Commerce (DOC) PS 1 and/or DOC PS 2, and that any oriented strand board (OSB) is compliant with DOC PS 2. 	11.901.4(1)	Mandatory	
<ul style="list-style-type: none"> • <u>Carpets.</u> There is also a mandatory certification requirement that wall-to-wall carpet is not installed adjacent to water closets and bathing fixtures. 	11.901.6(1)	Mandatory	
<ul style="list-style-type: none"> • <u>Interior Architectural Coatings.</u> If the building is occupied during remodeling, at least 85% of the newly applied coatings must be Green Seal GS-11 certified or meet VOC maximum requirement set forth in § 11.901.91 or 11.901.3 below. 	11.901.9.4	Mandatory	
<ul style="list-style-type: none"> • <u>Lead Safety.</u> For buildings built before 1978, lead-safety work practices must be used.¹⁷ 	11.901.15	Mandatory	

17 It is important to note that asbestos may still be in flooring products sold in the U.S. With the exception of a few specific products, such as flooring felt, asbestos is not actually prohibited. Flooring products such as flooring tiles and glues may legally still contain asbestos, especially if they are imported. Accordingly, it is not safe to assume products installed after the mid-1990s are asbestos free. Removal of all resilient, tiles, glued down products and other products that may contain asbestos will require the contractor to test for asbestos before removal.

<ul style="list-style-type: none"> • <u>Building Owner’s Manual</u>. A building owner’s manual must be provided which includes information on the buildings use, maintenance and green components. The manual must include: <ul style="list-style-type: none"> ○ The green building certification or completion documents; ○ List of all green building features; and ○ Product manufacturers’ manuals and product data. <p>The worksheets provided in the Appendices can help provide the information needed for the flooring.</p> <p>Points can be earned by providing additional information.</p>	11.1001.1 & 11.1003.1	Mandatory	
<i>Installation and Construction Practices</i>			
<ul style="list-style-type: none"> • <u>Building Design and Layout</u>. Building layouts designed to reduce material cuts and waste for at least 80% off the flooring areas can earn three points; <u>provided</u> that the newly installed areas of the building comprise at least 25% of the total area the portion of the building being remodeled. 	11.601.3	3 points	
<ul style="list-style-type: none"> • <u>Framing and Structural Plans</u>. Credits are awarded for framing or structural plans, material quality lists and on-site cut lists are provided. 	11.601.4	4 points	
<ul style="list-style-type: none"> • <u>Capillary Break</u>. A capillary break between the footing and the foundation to prevent moisture migration into the foundation wall earns points 	11.602.1.1.2	3 points	
<ul style="list-style-type: none"> • <u>Foundation Waterproofing</u>. Points are earned for installing an enhanced foundation waterproofing by using a rubberized coating and/or drainage mat for at least 25% of total crawlspace. 	11.602.1.2	3 points	
<ul style="list-style-type: none"> • <u>Foundation Waterproofing—Rubber Coating or Mat</u>. Points are earned for installing an enhanced foundation waterproofing by using a rubberized coating and/or drainage mat. 	11.602.1.2	4 points	
<ul style="list-style-type: none"> • <u>Unconditioned Crawlspace</u>. For all new unconditioned crawlspace and at least 25% of the total crawlspace, points are awarded for installing a minimum 6 mil vapor retarder on the crawlspace floors that extends at least 6 inches up outer wall and is attached and sealed to the 	11.602.1.4.1	6 points	

wall.			
<ul style="list-style-type: none"> • <u>Termite Barrier</u>. Credits can be earned by installing continuous physical foundation termite barriers with low toxicity treatment in areas of subterranean termite infestation potential. 	11.602.1.5	4 points	
<ul style="list-style-type: none"> • <u>Moisture Control—Mold</u>. Points are earned for not using, cleaning or encapsulating material with visible mold. This standard applies to all building materials, not just flooring and floor framing. 	11.602.1.7(1)	2 points	
<ul style="list-style-type: none"> • <u>Moisture Control—Lumber</u>. Sampling the moisture content of lumber to ensure it does not exceed 19% prior to cavity enclosure earns points. This standard applies to all building materials, not just flooring and floor framing. 	11.602.1.7(3)	4 points	
<ul style="list-style-type: none"> • <u>Moisture Control—Subfloors</u>. If the moisture content of subflooring, substrate, or concrete is in accordance within industry standards for the finished flooring, points are awarded. 	11.602.1.7.2	2 points	
<ul style="list-style-type: none"> • <u>Insulation</u>. Points are available if 85% of the wall, ceiling and floor insulation are in accordance with the California Air Resources Board Suggested Control Measure for Architectural Coating v1.1. 	11.901.11	4 points	
<ul style="list-style-type: none"> • <u>Building Entrance</u>. A point can be earned by installing either external or internal grilles or mats to control pollutants at a building's entrance. 	11.901.13	1 point	
<ul style="list-style-type: none"> • <u>Building Owner's Manual</u>. Points can be earned by providing additional information in the mandatory building owner's manual. As it relates to flooring, one point can be earned by adding the following two items: <ul style="list-style-type: none"> ○ A photograph record of the framing and electric installed taken prior to installation of insulation; and ○ List of common hazardous materials used around the building, like cleaning agents, and instructions for proper use. <p>The worksheets provided in the Appendices can help provide the information needed for the flooring.</p> 	11.1001.1	1 point	

<i>Product and Materials Selection</i>			
<ul style="list-style-type: none"> • <u>Material Usage</u>. Flooring dealers and contractors can help earn credit by using building-code-compliant structural systems or advanced framing techniques that reduce and optimize the amount of material used. 	11.601.2	3 points minimum framing used 6 point higher grade or strength framing 9 points performance based materials	
<ul style="list-style-type: none"> • <u>Prefabricated Components</u>. Flooring dealers and contractors can earn points by using a floor system that consists of at least 90% precut or preassembled components, or panelized or precast assemblies. 	11.601.5	4 points	
<ul style="list-style-type: none"> • <u>Pre-Finished Materials</u>. Points can be earned for using materials that do not require on site applications of finishes. The points are earned for each type and the amount of prefinished materials used as set forth below. 	11.601.7		
<ul style="list-style-type: none"> ○ <u>Concrete and Masonry</u>. Points are awarded for using pigmented, decorative or final finished concrete or masonry floor. 	11.601.7(a)	1 points for 35% 2 points for 50% 5 points for 90%	
<ul style="list-style-type: none"> ○ <u>Interior Trim</u>. Using interior trim that does not require paint or stain earns points. While this includes other trim, flooring trim will be included in the percentage of trim used. 	11.601.7(b)	1 points for 35% 2 points for 50% 5 points for 90%	

<ul style="list-style-type: none"> ○ <u>Hardwood Floor</u>. Installing pre-finished hardwood floors earns 1 to 5 points. 	11.601.7(g)	5 points for 90% 2 points for 50% 1 points for 35%	
<ul style="list-style-type: none"> ● <u>Termite-Resistant Materials</u>. Flooring can help earn credit by installing termite-resistant materials in areas prone to slight to moderate termite infestation, moderate to heavy infestation, or very heavy termite infestation. Areas with none to slight infestations are not awarded points for using termite-resistant materials. Points are awarded only if termite-resistant materials are used in all identified elements, including floors, foundations, structural walls, decks, etc. Areas that have slight, moderate, heavy or very heavy termite infestation are listed in the NAHB Standards at Table 6(3). <ul style="list-style-type: none"> ○ <u>None to Slight</u>: Are the northern most region from Maine to parts of Oregon: ○ <u>Slight to Moderate</u>: Are parts of Northern states from lower northern New York to Oregon; ○ <u>Moderate to Heavy</u>: Are parts or all of the middle states from lower New Hampshire to most of Nevada to northern most part of California ○ <u>Very Heavy</u>: Includes most of the southern states and most of California. 	11.602.1.6	2 points in slight to moderate area 4 points in moderate to heavy area 6 points in a very heavy area	
<ul style="list-style-type: none"> ● <u>Reused Materials</u>. Points can be earned for reusing, modifying or deconstructing for later use materials from major elements of existing buildings. Flooring is considered a major element. One point is awarded for every 200 square feet of flooring area reused, modified or deconstructed up to a maximum of 12 points. 	11.603.1	1 to 12 Points	
<ul style="list-style-type: none"> ● <u>Salvaged Materials</u>. Using salvaged or reclaimed materials and components in flooring can help earn points. Salvaged materials that earned 	11.603.2	1 to 9 points	

<p>points awarded under § 603.1 above cannot be used to earn points under this section.</p> <p>Points are awarded only if total material and labor cost of salvaged materials is at least 1% of the total construction cost up to a maximum of 9 points.</p>			
<ul style="list-style-type: none"> • <u>Recycled Content</u>. Flooring can contribute to earning points by using materials with recycled content. Points are awarded on a sliding scale and only if recycled-content materials are used in two minor and/or two major building components. Flooring could be one of these two major components. 	11.604.1	<p>1 point for 25-49% recycled</p> <p>4 points for 50-74% recycled</p> <p>6 points for 75-100% recycled</p>	
<ul style="list-style-type: none"> • <u>Bio-based Products</u>. Using bio-based, renewable products earns points. Bio-based products include: <ul style="list-style-type: none"> ○ Certified solid wood, ○ Engineered wood, ○ Bamboo, ○ Cotton, or ○ Cork. <p>Three points are awarded for using two types of bio-based materials, each of which represents more than 0.5% of the project's projected building material cost.</p> <p>Six points are awarded for using two types of bio-based materials, each of which represents more than 1% of the projected building material cost.</p> <p>An additional two points can be earned, with one point for each additional bio-based material that represents more than 0.5% of the projected building material cost.</p> 	11.606.1	3 to 8 points	
<ul style="list-style-type: none"> • <u>Wood-Based Products</u>. Four points are awarded if at least two certified wood-based products are used for the floors. To qualify the wood must be certified by: <ul style="list-style-type: none"> ○ American Forest Foundation's American Tree Farm System; 	11.606.2(2)	4 points	

<ul style="list-style-type: none"> ○ Forest Stewardship Council; ○ Sustainable Forestry Initiative; ○ Canadian Standards Association’s <i>Sustainable Forest Management System Standards</i> (CSA Z80-9); ○ Program for Endorsement of Forest Certification Systems (PEFC); and ○ Other product certification programs recognized by PEFC. 			
<ul style="list-style-type: none"> ● <u>Manufacturing Energy</u>. Installation flooring materials that are manufactured using a minimum of 33% of the primary manufacturing process energy derived from renewable sources, combustible waste sources, or renewable energy credits (RECs) can earn points. Two points per material are awarded, up to six points maximum for the project. The manufacturers should provide verification that the flooring materials meet the standards. 	11.606.3	2 to 6 points	
<ul style="list-style-type: none"> ● <u>Resource-Efficient Materials—Engineered Wood</u>. Flooring that contains fewer materials than conventional products by using engineered wood or engineered steel products earn 3 points. Three points are awarded per material, up to nine points maximum for the project. 	11.608.1(2)	3 points	
<ul style="list-style-type: none"> ● <u>Resource-Efficient Materials—Floor Trusses</u>. Flooring that contains fewer materials than conventional products for floor trusses can earn 3 points. 	11.608.1(3)	3 points	
<ul style="list-style-type: none"> ● <u>Regional Materials</u>. Installing flooring products or materials that are grown within <ul style="list-style-type: none"> (3) 500 miles radius of the project site if transported by truck; or (4) 1500 miles if transported for at least 80% by rail or water. If multiple raw materials are used in a product, then the transportation distance is determined by taking the percentage of each material’s weight times the distance. For example, if a product is made up of 10% material A that was transported 2,000 miles, 40% material B that was transported 	11.609.1	2 to 10 points	

<p>700 miles and 50% from material C that was transported 100 miles, the total would be:</p> <p>Material A: 10% of 2000 = 200 miles plus</p> <p>Material B: 40% of 500= 200 miles plus</p> <p>Material C: 50% of 200= 100 miles,</p> <p>For a total of 500 miles</p> <p>Two points are awarded for each material type up to a maximum of 10 points</p>			
<ul style="list-style-type: none"> • <u>Life-Cycle Analysis</u>. Selecting a more environmentally preferable product or assembly based upon the use of a life-cycle assessment (LCA) tool as determined under the International Organization for Standards (ISO) earns points. The LCA considers various factors such as manufacturing process, waste generated, longevity of the material, etc., and weighs these attributes to determine whether a product is preferable. <p>Three points are awarded per product/system, up to 15 points maximum for the project.</p> <p>The manufacturers should provide the information needed to determine whether the flooring materials meet the standards.</p>	11.610.1	3 to 15 points	
<ul style="list-style-type: none"> • <u>Whole Building Life-Cycle Analysis</u>. Flooring can contribute to earning 15 points if it adds to the life cycle of the building. 	11.610.1.1	15 point	
<ul style="list-style-type: none"> • <u>Life-Cycle Analysis for Products or Assembly</u>. Based on the LCA tool, environmentally preferred products or assembly can earn points 	11.610.1.2	10 point	
<ul style="list-style-type: none"> • <u>Life Cycle for Products</u>. Using flooring products with an average of a 15% improvement in its environmental impact as compared to other products can contribute to earning points. <p>Environmental impact considers the following:</p> <ul style="list-style-type: none"> ○ Fossil fuel consumption; ○ Global warming potential; ○ Acidification potential; ○ Eutrophication potential; and ○ Ozone depletion potential. 	11.610.1.2.1	2-10 point	

<ul style="list-style-type: none"> • <u>Life Cycle for Intermediate Floors</u>. Using flooring materials with an assembly that has an average of a 15% improvement in its environmental impact as compared to other products can contribute to earning points. Environmental impact considers the following: <ul style="list-style-type: none"> ○ Fossil fuel consumption; ○ Global warming potential; ○ Acidification potential; ○ Eutrophication potential; and ○ Ozone depletion potential. To earn points, there must also be at least one other improved assembly for exterior wall, roof, ceiling or interior wall. 	11.610.1.2.2	3-10 point	
<ul style="list-style-type: none"> • <u>Manufacturer's Environmental Management System Concepts</u>. Credit can be earned by using materials from ISO 14001 certified or equivalent production facilities. Points are awarded if the aggregate value of all such products for the project equals 1% or more of the estimated total building materials cost. The manufacturers should provide the verification that the materials meet the standards. 	11.611.1	10 points maximum 1 point per percent of total materials cost	
<ul style="list-style-type: none"> • <u>Sustainable Products</u>. Three points each, up to a maximum of nine points, can be earned if the following certified products are installed: <ul style="list-style-type: none"> ○ 50% or more of the carpet (by square feet) is certified to NFS 140; ○ 50% or more of the resilient floors (by square feet) are certified to NFS 332; ○ 50% or more of the tile (by square feet) is certified to Tile Council of North America's Green Square standard; and ○ 50% or more of the insulation (by square feet) is certified to EcoLogo CCD-016. 	11.611.2	3 to 9 points	
<ul style="list-style-type: none"> • <u>Particle Board</u>. Points are awarded if 85% of the particle board complies with the Composite Panel Association's A208.1 standard. 	11.901.4(2)	2 points	

<ul style="list-style-type: none"> • <u>MDF</u>. Points are awarded if 85% of medium density fiberboard (MDF) complies with the Composite Panel Association’s A208.2 standard. 	11.901.4(2)	2 points	
<ul style="list-style-type: none"> • <u>Hardwood Plywood</u>. Points are awarded if 85% of the hardwood plywood complies with the Composite Panel Association’s 4 standard. 	11.901.4(3)	2 points	
<ul style="list-style-type: none"> • <u>Particle Board, MDF, Plywood</u>. Points are awarded if 85% of the particle board, MDF or hardwood plywood complies with the Hardwood Plywood Veneer HP-1 Association’s A208.2 standard. 	11.901.4(4)	3 points	
<ul style="list-style-type: none"> • <u>Composite Wood</u>. Points are awarded if 85% of the composite wood or agrifiber panels contain no added urea-formaldehyde or comply with the California Air Resources Board Composite Wood Air Toxic Contaminant Measure Standard. 	11.901.4(5)	4 points	
<ul style="list-style-type: none"> • <u>Non-Emitting Products</u>. Points are awarded if non-emitting products are used. 	11.901.4(6)	4 points	
<ul style="list-style-type: none"> • <u>Carpets</u>. A minimum of 10% of the flooring is carpeted and 85% of installed carpet area and /or carpet cushion (padding) are in accordance with the emission levels of CDPH 01350, as certified by a third-party program, such as the Carpet and Rug Institute’s (CRI’s) Green Label Plus Indoor Air Quality Program. The manufacturers should provide the certifications or verification that the materials meet the standards. 	11.901.6(2)	6 points for carpet 2 points for cushion	
<ul style="list-style-type: none"> • <u>Hard-Surface Flooring</u>. Installing pre-finished or accepted alternative hard-surface flooring on at least 10% of the conditioned floor space and at least 85% of the flooring is in accordance with the emission-concentration limits of DCPH 01350, as certified by a third-party program such as the Resilient Floor Covering Institute’s FloorScore Indoor Air Certification Program or the GREENGUARD Environmental Institute’s Children and School’s Certification Program earns points. The following flooring need not be pre-finished: <ul style="list-style-type: none"> ○ Ceramic tile; 	11.901.7	6 points	

<ul style="list-style-type: none"> ○ Organic-free mineral-based flooring; ○ Clay masonry; ○ Concrete masonry; ○ Concrete flooring; and ○ Metal flooring. <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>			
<ul style="list-style-type: none"> ● <u>Architectural Coatings</u>. Flooring can help earn credits by ensuring that site-applied interior products meet one or more of the following emission standards: <ul style="list-style-type: none"> ○ Green Seal GS-11 standard, or ○ Meet the following VOC limits: <ul style="list-style-type: none"> Concrete curing compounds..... 350 Concrete/Masonry sealers.....350 Flooring coatings.....350 Primers, sealers, undercoatings.....100 Recycled coatings.....250 Stains.....250 Stone consolidants.....450 Waterproof membranes.....250 Wood coatings.....275 Wood preservatives.....350 <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>	11.901.9.1	5 points	
<ul style="list-style-type: none"> ● <u>Architectural Coatings Color Additives</u>. A point is available for ensuring that 85% of the site-applied interior color coating additives are products are in accordance with the emission levels of CDPH 01350, as certified by a third-party program such as the GREENGUARD, Green Seal or the Scientific Certification Systems Indoor Advantage Gold Program. <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>	11.901.9.2	1 point	

<ul style="list-style-type: none"> • <u>Adhesives and Sealants</u>. Credits can be earned by ensuring that 85% of the site-applied adhesives and sealants, including for the installation of floors, are in accordance with the California Air Resources Board Suggested Control Measure for Architectural Coating. 	11.901.10(1)	8 points	
<ul style="list-style-type: none"> • <u>Adhesives and Sealants</u>. Credits can be earned by ensuring that 85% of the site-applied adhesives and sealants, including for the installation of floors, are in accordance with one of the following: <ul style="list-style-type: none"> ○ Green Seal GS-36 standard, or ○ Meet the following VOC limits: <ul style="list-style-type: none"> Indoor carpet adhesives.....50 <ul style="list-style-type: none"> Carpet pad adhesives.....50 Indoor carpet adhesives.....150 <ul style="list-style-type: none"> Wood flooring adhesives.....100 Rubber floor adhesives.....60 Subfloor adhesives.....50 Ceramic tile adhesives.....65 Structural wood adhesive.....140 VCT and Asphalt adhesives.....50 Cove base adhesives.....50 Multipurpose adhesives.....70 Structural glazing adhesives.....100 Architectural sealants.....250 Architectural sealants primers <ul style="list-style-type: none"> a. Non-porous.....250 b. Porous.....775 CPVC solvent cement.....490 PVC solvent cement.....510 ABC solvent cement.....325 Plastic cement welding.....250 Adhesive primer for plastic.....550 Contact adhesive.....80 Special purpose contact adhesive.....250 <p>The manufacturers should provide the</p>	11.901.10(2)&(3)	5 points	

certifications or verification that the materials meet the standards.			
<i>Waste Minimization and Management</i>			
<ul style="list-style-type: none"> • <u>Scrap Materials</u>. Flooring dealers and contractors can help earn points by facilitating the sorting and reusing of scrap building materials, such as bins dedicated to the various types of flooring material. 	11.603.3	4 points	
<ul style="list-style-type: none"> • <u>Construction Waste Management Plan</u>. Points can be earned by establishing and posting a construction waste management plan with a goal of recycling or salvaging at least 50% (by weight) of construction waste. Flooring companies can assist by setting up their own waste disposal and recycling system during construction and keeping track of all waste. 	11.605.2	6 points	
<ul style="list-style-type: none"> • <u>On-site Recycling</u>. Flooring companies can help earn credit by undertaking on-site recycling measures (such as grinding or otherwise safely applying materials on-site as fill or soil amendment). Points are awarded if a minimum of 50% (by weight) of construction and land-clearing waste is diverted from a landfill. Flooring companies can assist by setting up their own recycling system during construction and keeping track of all recycled material. 	11.605.3	7 points	
<ul style="list-style-type: none"> • <u>Recycled Construction Materials</u>. Participating in project-wide recycling of construction materials (e.g., wood, cardboard, metals, or concrete) for offsite reuse can earn points. Three points are awarded if a minimum of two types of materials are recycled, and one additional point is awarded for each additional type of material, up to a six-point maximum. Obviously, recycling flooring products can directly earn points. 	11.605.4	3-6 points	
Total Points			

3. Flooring under Remodeling of Functional Areas Standard

The new 2012 version provides for the first time a green protocol for the most common renovation and addition projects that focus on functional areas of a home such as a kitchen,

bathroom, basement, or addition under 400 square feet. Unlike NAHB’s other standards, remodeling of functional space does not assign points or provide for Bronze, Silver, Gold or Emerald performance levels. Rather, a remodel of a functional space that meets the Standard is designated as “Compliant.” Accordingly, a building can have several functional areas that can be designated Compliant when remodeled.

Flooring’s contributions to certifying a remodeled functional space as Compliant are identified in the following checklist:

National Green Building Remodeling of Functional Areas Standard		
	Provision	Satisfied
<i>Installation and Construction Practices</i>		
<ul style="list-style-type: none"> • <u>Moisture Control—Mold</u>. Flooring dealers and contractor either (1) must not use material with visible mold, or (2) must cleaning or encapsulating visible mold. This standard applies to all building materials, not just flooring and floor framing. 	12.602.1.7.1(1)	
<ul style="list-style-type: none"> • <u>Moisture Control—Cavity</u>. The insulation in cavities must be dry. This standard applies to all building materials, not just flooring and floor framing. 	12.602.1.7.1(2)	
<ul style="list-style-type: none"> • <u>Moisture Control—Subfloors</u>. The moisture content of subflooring, substrate, or concrete must be in accordance within industry standards for the finished flooring. 	12.602.1.7.2	
<ul style="list-style-type: none"> • <u>Building Thermo Envelop</u>. The building envelope exposed or created during remodeling must be sealed. As it possibly relates to flooring, the requirement includes: <ul style="list-style-type: none"> ○ All joints; and ○ Openings between doors and their jambs and framing. 	12.701.4.3.1	
<ul style="list-style-type: none"> • <u>Air Sealing and Insulation</u>. Floors, including above garage and cantilevered floors, must have: <ul style="list-style-type: none"> ○ Insulation must be installed to maintain permanent contact with underside of subflooring decking; and ○ An air barrier installed at all exposed edges 	12.701.4.3.2	

of insulation.		
<ul style="list-style-type: none"> • <u>Lead Safety</u>. For buildings built before 1978, lead-safety work practices must be used.* 	12.901.15	
<ul style="list-style-type: none"> • <u>Basement Remodel—Moisture</u>. Prior to any construction, the basement must be inspected for evidence of moisture problems and any moisture problems corrected prior to construction. 	12.4.1	
<ul style="list-style-type: none"> • <u>Additions—Capillary Breaks</u>. All concrete slabs must have installed a capillary break and vapor retarder that meets the ICC International Residential Codes §§ 505.2.2 and 505.2.3 or the ICC International Building Code §§ 1901 and 1805.4.4. 	12.5.602.1.1.1	
<ul style="list-style-type: none"> • <u>Additions—Crawlspaces</u>. Crawlspace built as an unconditioned area must be sealed with minimum a minimum 6 mil vapor retarder on the crawlspace floors that extends at least 6 inches up other wall and is attached and sealed to the wall. 	12.602.1.4.1	
<i>Product and Materials Selection</i>		
<ul style="list-style-type: none"> • <u>Material Usage</u>. Flooring dealers and contractors can help earn compliance by using building-code-compliant structural systems or advanced framing techniques that reduce and optimize the amount of material used. 	12.601.2	
<ul style="list-style-type: none"> • <u>Tile Backing Materials</u>. Tile backing must be installed on the back of tile and the backing must be in accordance with ASTM International standards C1178, C1278, C1288 or C1325. The manufacturers should provide verification that the materials meet the standards. 	12.602.1.11	
<ul style="list-style-type: none"> • <u>Prefabricated Components</u>. At least two of the following newly installed materials must come from the list below. 	12.1(A)	

* It is important to note that asbestos may still be in flooring products sold in the U.S. With the exception of a few specific products, such as flooring felt, asbestos is not actually prohibited. Flooring products such as flooring tiles and glues may legally still contain asbestos, especially if they are imported. Accordingly, it is not safe to assume products installed after the mid-1990s are asbestos free. Removal of all resilient, tiles, glued down products and other products that may contain asbestos will require the contractor to test for asbestos before removal.

<ul style="list-style-type: none"> ○ <u>Concrete and Masonry</u>—Pigmented, decorative or final finished concrete or masonry floor. 	12.1(A).601.7(a)	
<ul style="list-style-type: none"> ○ <u>Interior Trim</u>. Trim that does not require paint or stain earns points. While this includes other trim, flooring trim will be included. 	12.1(A).601.7(b)	
<ul style="list-style-type: none"> ○ <u>Hardwood Floor</u>. Installing pre-finished hard wood floors. 	12.1(A).601.7(g)	
<ul style="list-style-type: none"> ● <u>Reused and Salvaged Content</u>. Reclaimed and/or salvaged materials are used in the remodel. 	12.1(A).604.1	
<ul style="list-style-type: none"> ● <u>Recycled Content</u>. At least newly installed materials for two components must use 25% of must have recycled content. 	12.1(A).604.1	
<ul style="list-style-type: none"> ● <u>Bio-based Products</u>. Two or more of the following bio-based, renewable products must be used: <ul style="list-style-type: none"> ○ Certified solid wood, ○ Engineered wood, ○ Bamboo, ○ Cotton, or ○ Cork. 	12.1(A).606.1	

<ul style="list-style-type: none"> • <u>Wood-Based Products</u>. Wood or wood-based products must be certified by: <ul style="list-style-type: none"> ○ American Forest Foundation’s American Tree Farm System; ○ Forest Stewardship Council; ○ Sustainable Forestry Initiative; ○ Canadian Standards Association’s <i>Sustainable Forest Management System Standards</i> (CSA Z80-9); ○ Program for Endorsement of Forest Certification Systems (PEFC); or ○ Other product certification programs recognized by PEFC. 	12.1(A).606.2	
<ul style="list-style-type: none"> • <u>Resource-Efficient Materials</u>. One or more products that contain fewer materials are used in the remodeling. These include, but are not limited to: <ul style="list-style-type: none"> ○ Engineered wood or engineered steel products; and ○ Floor trusses using less material 	12.1(A).608.1	
<ul style="list-style-type: none"> • <u>Regional Materials</u>. One or more products must be regional, which is defined as products that were harvested: <ul style="list-style-type: none"> (5) 500 miles radius of the project site if transported by truck; or (6) 1500 miles if transported for at least 80% by rail or water. <p>If multiple raw materials are used in a product, then the transportation distance is determined by taking the percentage of each material’s weight times the distance. For example, if a product is made up of 10% material A that was transported 2,000 miles, 40% material B that was transported 700 miles and 50% from material C that was transported 100 miles, the total would be:</p> <p>Material A: 10% of 2000 = 200 miles plus Material B: 40% of 500= 200 miles plus Material C: 50% of 200= 100 miles,</p> 	12.1(A).609.1	

<p>For a total of 500 miles</p> <p>Two points are awarded for each material type up to a maximum of 10 points</p>		
<ul style="list-style-type: none"> • <u>Life-Cycle Analysis</u>. A life-cycle assessment (LCA) tool as determined under the International Organization for Standards (ISO) must be used. The LCA considers various factors such as manufacturing process, waste generated, longevity of the material, etc., and weights these attributes to determine whether a product is preferable. <p>The manufacturers should provide the information needed to determine whether the flooring materials meet the standards.</p>	12.1(A).610.1	
<ul style="list-style-type: none"> • <u>Functional Area Life-Cycle Analysis</u>. A life-cycle assessment (LCA) analysis must be made for the functional area and be in compliance with ISO's 14044 or other standards. 	12.1(A).610.1.1	
<ul style="list-style-type: none"> • <u>Life-Cycle Analysis for Products or Assembly</u>. Based on the LCA tool, environmentally preferred products or assembly can earn points 	12.1(A).610.1.2	
<ul style="list-style-type: none"> • <u>Life Cycle for Products</u>. Two or more products with an average of a 15% improvement in its environmental impact as compared to other products must be used. <p>Environmental impact considers the following:</p> <ul style="list-style-type: none"> ○ Fossil fuel consumption; ○ Global warming potential; ○ Acidification potential; ○ Eutrophication potential; and ○ Ozone depletion potential. 	12.1(A).610.1.2.1	
<ul style="list-style-type: none"> • <u>Life Cycle for Intermediate Floors</u>. Materials with an assembly that has an average of a 15% improvement in its environmental impact as compared to other products must be used, including for intermediate floors. <p>Environmental impact considers the following:</p> <ul style="list-style-type: none"> ○ Fossil fuel consumption; ○ Global warming potential; ○ Acidification potential; 	12.1(A).610.1.2.2	

<ul style="list-style-type: none"> ○ Eutrophication potential; and ○ Ozone depletion potential. <p>There must also be at least one other improved assembly for exterior wall, roof, ceiling or interior wall.</p>		
<ul style="list-style-type: none"> • <u>Manufacturer’s Environmental Management System Concepts</u>. One or more products must be made by a manufacture certified under ISO 14001 certified or equivalent production facilities. <p>The manufacturers should provide the verification that the materials meet the standards.</p>	1.12(A).611.1	
<ul style="list-style-type: none"> • <u>Sustainable Products</u>. One or more of the following certified products must be installed: <ul style="list-style-type: none"> ○ 50% or more of the carpet (by square feet) is certified to NFS 140; ○ 50% or more of the resilient floors (by square feet) are certified to NFS 332; ○ 50% or more of the tile (by square feet) is certified to Tile Council of North America’s Green Square standard; and ○ 50% or more of the insulation (by square feet) is certified to EcoLogo CCD-016. 	12.1(A).611.2	
<ul style="list-style-type: none"> • <u>Wood Materials</u>. A mandatory certification standard requires that 85% of any structural plywood used, including for floors, is compliant with Department of Commerce (DOC) PS 1 and/or DOC PS 2, and that any oriented strand board (OSB) is compliant with DOC PS 2. 	12.901.4	
<ul style="list-style-type: none"> • <u>Carpets</u>. To be certified Compliant, the carpet must: <ul style="list-style-type: none"> ○ Wall-to-wall carpet cannot be installed adjacent to water closets and bathing fixtures; and ○ A minimum of 85% of newly installed carpet area and or carpet cushion (padding) are in accordance with the emission levels of CDPH 01350, as certified by a third-party program, such as the Carpet and Rug Institute’s (CRI’s) Green Label Plus Indoor Air Quality Program. 	12.901.6	

<p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>		
<ul style="list-style-type: none"> • <u>Hard-Surface Flooring</u>. At least 85% of the newly installed hard surface flooring must be prefinished in accordance with the emission-concentration limits of DCPH 01350, as certified by a third-party program such as the Resilient Floor Covering Institute’s FloorScore Indoor Air Certification Program or the GREENGUARD Environmental Institute’s Children and School’s Certification Program earns points. <p>The following flooring need not be pre-finished:</p> <ul style="list-style-type: none"> ○ Ceramic tile; ○ Organic-free mineral-based flooring; ○ Clay masonry; ○ Concrete masonry; ○ Concrete flooring; and ○ Metal flooring. <p>The manufacturers should provide the certifications or verification that the materials meet the standards.</p>	<p>12.901.7</p>	
<ul style="list-style-type: none"> • <u>Architectural Coatings</u>. At least 85% of flooring site-applied interior products must meet one or more of the following emission standards: <ul style="list-style-type: none"> ○ Green Seal GS-11 standard, or ○ Meet the following VOC limits: <ol style="list-style-type: none"> 1. Concrete curing compounds..... 350 2. Concrete/Masonry sealers.....350 3. Flooring coatings.....350 4. Primers, sealers, undercoatings.....100 5. Recycled coatings.....250 6. Stains.....250 7. Stone consolidants.....450 8. Waterproof membranes.....250 9. Wood coatings.....275 10. Wood preservatives.....350 <p>The manufacturers should provide the</p>	<p>12.901.9.1</p>	

<p>certifications or verification that the materials meet the standards.</p>		
<ul style="list-style-type: none"> • <u>Adhesives and Sealants</u>. At least 85% of the site-applied adhesives and sealants, including for the installation of floors, are in accordance with one of the following: <ul style="list-style-type: none"> ○ Green Seal GS-36 standard, ○ The California Air Resources Board Suggested Control Measure for Architectural Coating, or ○ Meet the following VOC limits: <ul style="list-style-type: none"> Indoor carpet adhesives.....50 <ul style="list-style-type: none"> Carpet pad adhesives.....50 Indoor carpet adhesives.....150 <ul style="list-style-type: none"> Wood flooring adhesives.....100 Rubber floor adhesives.....60 Subfloor adhesives.....50 Ceramic tile adhesives.....65 Structural wood adhesive.....140 VCT and Asphalt adhesives.....50 Cove base adhesives.....50 Multipurpose adhesives.....70 Structural glazing adhesives.....100 Architectural sealants.....250 Architectural sealants primers <ul style="list-style-type: none"> a. Non-porous.....250 b. Porous.....775 CPVC solvent cement.....490 PVC solvent cement.....510 ABC solvent cement.....325 Plastic cement welding.....250 Adhesive primer for plastic.....550 Contact adhesive.....80 Special purpose contact adhesive.....250 <p>(1) The manufacturers should provide the certifications or verification</p>	<p>12.901.10.</p>	

that the materials meet the standards.		
<i>Waste Minimization and Management</i>		
<ul style="list-style-type: none"> • <u>Hazardous Waste</u>. There must be a construction waste management plan for the proper handling and disposing of all hazardous waste, including any asbestos from flooring. 	12.1.605.0	

C. ReGreen Residential Remodeling Guidelines

Whose system is it? ReGreen is a set of guidelines and educational resources for sustainable residential improvement projects developed by the American Society of Interior Designers (ASID) Foundation and the US Green Building Council (USGBC). The ASID Foundation is composed of designers, interior design industry representatives, and related trade associations, students, and others involved with interior design.

What is the general approach? The ReGreen guidelines offer best practices, strategies, and advice for 10 common types of residential remodeling projects:

- Kitchens
- Bathrooms
- Bedrooms
- Living and work spaces
- Finished basements
- Overall home energy performance improvements
- Major additions
- Gut rehab
- Deep energy retrofit
- Outdoor living spaces

The guidelines are designed similarly to LEED for Homes, although ReGreen is not itself a LEED-branded rating system. According to its authors, a best-practices guide is more appropriate than a rating program for residential remodeling because of the unique constraints associated with remodeling, such as working with existing conditions, scheduling projects in coordination with occupants, taking into account occupants' desires for a particular sequencing of projects, etc. Thus, the guidelines do not offer an opportunity to earn points or achieve certification levels.

The ReGreen guidelines take a "whole-house" approach to remodeling by considering such factors as (1) building location, (2) size, (3) design, (4) sustainable building materials (e.g., low-emitting and nontoxic materials and wood-based products that are third-party certified), (5) insulation (e.g., nontoxic materials with a high heat-resistance factor), (6) energy efficiency, (7) renewable energy, (8) water efficiency, (9) indoor air quality, and (10) landscaping. Finally, the ReGreen guidelines are primarily single-attribute product-selection guidelines, meaning that

they do not explicitly consider the full life cycle of products but rather use various proxies for reduced environmental impact.

Several strategies endorsed by the ReGreen guidelines are relevant to flooring and flooring products, including the following:

- The guidelines encourage the reuse of existing flooring and subflooring where appropriate (e.g., where existing flooring is made from a safe product like hardwood or concrete). They warn, however, that existing flooring should be assessed for lead or asbestos.
- The guidelines encourage refinishing wood floors using environmentally preferable processes and products. In particular, they advise the use of an active dust-collection system and sealing off adjoining parts of the house and any air-distribution registers when sanding and refinishing wood floors. Moreover, they encourage the use of low-VOC products, such as water-borne polyurethane, when finishing wood floors with coatings.
- The guidelines encourage the use of hard-surface flooring for kitchens and bathrooms.
- For bedrooms and living and working spaces, the ReGreen guidelines encourage the use of area rugs or carpet tile rather than wall-to-wall carpeting, as well as the use of products made from natural materials, such as wool, cotton, jute, or hemp; products that do not contain residues from dyes and finishes used in manufacturing; products that do not have surface treatments to repel stains; products with low-VOC off-gassing, documented through third-party testing such as CRI's Green Label Plus, GreenGuard, or FloorScore; products with high recycled content and made by companies that recycle old carpeting; and products that do not contain brominated flame retardants.
- The guidelines encourage the use of certified or reclaimed wood. They specifically encourage the use of Forest Stewardship Council (FSC) certified wood as a first option, third-party certified Sustainable Forestry Initiative (SFI) materials as a second option, and self-certified SFI materials as a third option. For subflooring, the guidelines encourage the use of FSC-certified products that comply with the California Air Resources Board's emissions standards.
- The guidelines encourage the use of natural or rapidly renewable materials (e.g., bamboo, cork, true linoleum, etc.).
- The guidelines encourage the avoidance of carpeting in high-moisture areas or where spills could occur, for indoor air-quality reasons.

Who uses them? The ReGreen guidelines are used by interior designers, remodeling contractors, and consumers seeking to incorporate environmental considerations into remodeling projects ranging from minor renovations to complete interior overhauls.

Sources of additional information:

More information about the ReGreen guidelines is available at: <http://www.regreenprogram.org/>, including a link to a copy of the guidelines.

V. THE FTC'S GUIDES FOR THE USE OF ENVIRONMENTAL MARKETING CLAIMS

With the rise in demand for sustainable goods, there is increasing concern that the marketing of environmental products or services can create consumer confusion about their true benefits. In 1990, the Federal Trade Commission (FTC) issued Guides for the Use of Environmental Marketing Claims to prevent deception in environmental marketing claims (16 C.F.R. Part 260). The FTC revised the Guides in October 2012. The Guides apply to labeling, advertising, promotional materials, and all other forms of marketing through words, symbols, logos, product names, or other means. Thus, a picture of a green symbol or a product named "sustainable" may be sufficient to constitute a claim that a product is sustainable. The Guides cover both consumer marketing and business-to-business transactions, and thus govern the claims manufacturers make to retail dealers, contractors, and distributors regarding the sustainability of products.

The Guides apply to claims regarding the environmental attributes of a product, package, or service, whether for personal, family, commercial, institutional, or industrial use. For example, they cover claims about recycling of products, the biodegradability of products, the effect of the products on the ozone, and claims concerning greenhouse gas reduction. The Guides even prohibit the use of brand names like "Eco-Safe" as deceptive "if, in the context of the product, so named, it leads consumers to believe that the product has environmental benefits which cannot be sustained by the manufacturer."

The FTC has significant authority to enforce its marketing Guides. The Commission has enforcement tools to reach the assets of, and proscribe claims against, those that violate its Guides. It can secure preliminary and permanent injunctions, mandate disgorgement profits from improperly label goods, and freeze defendants' assets to address violations. It can also impose civil penalties against any company that violates its rules.

A complete set of the environmental marketing Guides are available on the FTC's website at www.ftc.gov. In general, to minimize any risk that an environmental claim violates the FTC rules, retailers should take the following steps:

- Do not identify or advertise any product or construction process as sustainable unless the retailer can verify that it falls within a generally accepted standard.
- Do not to make broad, unqualified claims that a product is "environmentally friendly" or "eco-friendly" because the FTC's consumer perception study confirms that such claims are likely to suggest that the product has specific and far-reaching environmental benefits. Very few products, if any, have all the attributes consumers seem to perceive from such claims, making these claims nearly impossible to substantiate.

- If you include any limits on the claim, such disclosures should be clear, prominent, in plain language, in large type, and placed in close proximity to the qualified claim (e.g., an area rug labeled “50% more recycled content” than before when the increased recycled content of the rug went from 2 percent recycled fiber to 3 percent is misleading without a proper disclosure).
- An environmental claim should specify whether it refers to the product, the product’s packaging, a service, or just to a portion of the product, package, or service.
- Any certification or seal of approval should be from a recognized, independent, and accredited organization.
- For items destined for landfills, incinerators, or recycling facilities that will not degrade within a year, marketers should not make unqualified degradable claims.
- Any claim regarding the use of recycled material needs to specify what portion of the product is made from recycled materials.
- Any claims that a product such as bamboo floors is “made with renewable materials” should be distinguished from claims that the product is made using recycled material because consumers tend to interpret such claims to mean that the product is made of recycled material.

All environmental claims should be reviewed by appropriate experts to ensure that the FTC’s Guides are not violated.

A manufacturer’s claim or certification that a product is sustainable does not eliminate a floor covering dealer’s obligation to ensure that the claims are substantiated. To limit potential liability for false claims, the retailer or contractor must verify with the manufacturer or distributor that a product meets the standards to be labeled environmentally friendly. In verifying with a manufacturer or distributor a claim that the product is sustainable, the letter should state the following:

I am relying upon the information and verification that this product meets acceptable standards to be labeled and advertised as having environmental benefits and [Manufacturer or Distributor’s name] agrees to indemnify, defend and hold harmless me for any claims arising from such reliance. If this is not correct, please advise me without delay.

This will not eliminate the possibility of a claim being filed by a consumer if the sustainability claims are unsubstantiated but should limit the costs to the retailer or contractor.

VI. VERIFYING THAT PRODUCTS ARE SUSTAINABLE

A. Product-Specific Certification Systems

There are a variety of programs that certify products as environmentally friendly. Many of these programs, like the Carpet and Rug Institute's Green Label[®], Green Label Plus[®] programs and FloorScore[®], are recognized by a number of the certification standards as environmentally friendly products. The key is to look for the certification label or materials to verify that a product meets sustainability standards. The most common product certification programs likely to impact the floor covering dealer and installer are described below.

1. Third-Party Certified Wood

Several third-party organizations offer certification of products that are environmentally preferable within a particular product category. Wood-based products are one such category. The Forest Stewardship Council (FSC), Scientific Certification Systems (SCS), the American Tree Farm System (ATFS), and the Sustainable Forestry Initiative (SFI) have created certification programs for wood that comes from specially managed forests. The FSC, for example, uses criteria for forest management that cover such factors as forest ecosystems, water quality, wildlife habitats, and local communities. Many of these forest-certification programs have a chain of custody and labeling system for marking products that originate from certified acreage.



2. Low-Emitting Products

Other organizations certify products based on how they perform according to certain environmental criteria. The GREENGUARD Environmental Institute, through the GREENGUARD Indoor Air Quality Certification Program, developed the Green Seal. Similarly, the SMaRT Sustainable Flooring Standard was developed by the Institute for Market Transformation to Sustainability and SCS under its Indoor Advantage[™], Indoor Advantage Gold, and FloorScore programs. The NSF-140 was created by the CRI with the assistance of NSF International and TerraChoice (through its EcoLogo[™] program). Each of these programs uses third-party organizations that certify low-emitting products, including floor finishes, insulation, and paints and coatings. The tests check hazardous emissions such as volatile organic compounds (VOCs). Manufacturers can obtain certification of their products by paying an assessment fee and submitting to third-party inspections and tests.

Once certified, these products often carry a label or seal that makes it possible to identify their conformance with certification requirements. CRI offers certification, through its Green Label and Green Label Plus® program, of carpeting products (e.g., carpet, adhesives, and cushions) that meet the tests for low emissions of hazardous gasses. A carpet manufacturer may use the Green Label seal if its product is independently tested and the test results do not exceed CRI's emission criteria.

McDonough Braungart Design Chemistry's (MBDC's) Cradle to Cradle Design™ certification program may be used by manufacturers of floor covering products, such as carpet tiles and stone products, that have low emissions, are specially designed for material reutilization, use renewable energy and energy efficiency, and make efficient use of water during production.

The Resilient Floor Covering Institute's FloorScore program, developed in conjunction with SCS, is a certification system specifically for hard-surface flooring and flooring adhesives that meet California's VOC requirements. FloorScore certification requires independent testing and verification by SCS, and products that meet the FloorScore requirements are permitted to bear a FloorScore seal.

One of the most recent and needed developments was the Tile Council of North America (TCNA's) putting together a certification program to define "environmentally friendly" tile products. After five years of collaboration and development, the TCNA developed its Green Squared® standard, an ANSI standard (A138.1) reviewed and voted on by representatives of manufacturers, builders, installers, architects, LEED Accredited Professionals, and the public. Green Squared establishes criteria for determining whether tile is made using environmentally friendly manufacturing processes and incorporates sustainable materials. The standard addresses the inclusion of recycled materials, use of energy conservation methods in the manufacturing process, life cycle of the tile, and prohibition of using materials that leach lead or cadmium. To receive Green Squared certification, a tile must be reviewed by recognized third-party certifiers, including SCS, UL Environment, and the National Science Foundation (NSF).





More information about these certification programs is available at the following websites:

- www.greenseal.org
- www.greenguard.org
- www.scs-certified.com
- <http://greensquaredcertified.com/>
- www.carpet-rug.org
- www.mbdc.com/C2C
- [FloorScore](http://FloorScore.com)
- www.tcnatile.com

B. Multiple-Attribute, Flooring-Specific Certification Systems

1. SMaRT Sustainable Flooring Standard

Whose system is it? The SMaRT Sustainable Flooring Standard was developed by the Institute for Market Transformation to Sustainability (MTS). MTS represents a coalition of manufacturers, environmental groups, and state and local government leaders. Its charter members are Andersen Windows; Certified Cleaner and Greener; Certified Forest Products Council; the City of Portland, Oregon; the City of Santa Monica, California; Environmental Defense; Fenton Communications; Global Green USA; Forbo Linoleum; Nature Works Cargill Dow; Herman Miller; BASF/Dystar; McDonough Braungardt Design Chemistry; Interface Fabrics Group; Milliken; Organic Trade Association; SAE International; Think Energy; THINK Mobility; Utah Office of Energy Services; Zero Waste Alliance; and the Sustainable Products Corporation. MTS (like the US Green Building Council [USGBC] and Green Building Initiative [GBI]) is an ANSI-accredited standards developer, opening up the possibility of future ANSI endorsement of the SMaRT Sustainable Flooring Standard.

What is the general approach? The SMaRT Sustainable Flooring Standard works by identifying flooring materials and products that achieve a variety of specified performance-based sustainability criteria. It incorporates consideration of environmental, social, and economic benefits over a product's entire commercial life. It does not cover carpet or packaging of flooring.

Flooring products can be certified under the SMaRT Sustainable Flooring Standard provided that they meet certain prerequisites (which may simply entail inventorying and reporting) and score a minimum number of points within each of five categories: (1) safe for public health and environment (e.g., criteria for indoor VOC emissions and primary installation materials); (2) renewable energy and energy reduction; (3) bio-based and recycled materials;¹⁸ (4) facility and company-based environmental management and social indicator reporting; and (5) reclamation, sustainable reuse, and end-of-life management. Based on the sum of points earned from compliance with criteria in these categories, a manufacturer may certify that its flooring product achieves one of four levels: sustainable, silver, gold, or platinum. Flooring manufacturers are required to submit their certification documentation for auditing and approval. Manufacturers certifying compliance with the SMaRT Sustainable Flooring Standard may mark or label their product as being consistent with one of the flooring achievement levels.

Who uses it, and why? The SMaRT Sustainable Flooring Standard is designed for organizations throughout the flooring supply chain, including raw-material suppliers, manufacturers, installers, and building owners and operators. SMaRT has been accepted by USGBC for use in LEED buildings, meaning that SMaRT-certified products can be used to accumulate points toward LEED certification.

Sources of additional information:

Information on the MTS SMaRT Sustainable Flooring Standard is available at mts.sustainableproducts.com, including a complete copy of the standard in PDF format.

2. NSF-140

Whose system is it? The NSF/ANSI 140 Sustainability Assessment for Carpet (NSF-140) was created by the Carpet and Rug Institute (CRI) with the assistance of NSF International. CRI is a nonprofit trade association representing the manufacturers of more than 95 percent of all carpet made in the United States, as well as their suppliers and service providers. NSF International, The Public Health and Safety Company™, is a nonprofit, nongovernmental organization, widely recognized as a leader in standards development, product certification, education, and risk management for environment, public health, and safety. The NSF develops national standards and provides third-party assessment services.

What is the general approach? NSF-140 provides a method of identifying carpeting that offers environmental, economic, and social benefits and reduced adverse impacts over its entire commercial life cycle. The standard works by establishing performance and environmental requirements and a system of points in the following categories: (1) public health and environment, (2) renewable energy and energy efficiency, (3) bio-based materials (produced using sustainable agricultural practices or FSC-Certified Wood forest practices), (4) recycled

18 Bio-based materials are those produced by “sustainable agriculture” as defined in the Food, Agriculture, Conservation, and Trade Act of 1990 and those produced using FSC-Certified Wood forest practices. Recycled content is classified as pre-consumer/postindustrial or postconsumer materials in accordance with ISO 14021 and the FTC Guides for the Use of Environmental Marketing Claims.

content and other environmentally preferred materials¹⁹, (5) facility and company-based environmental management, and (6) reclamation and end-of-life management. Carpet manufacturers can seek certification of their products under one of three sustainable carpet achievement levels: silver, gold, or platinum.

Who uses it, and why? The NSF-140 standard is intended for use by raw material suppliers, manufacturers, and end users of carpeting. Architects, interior designers, and purchasing agents also look to NSF-140. CRI suggests that some of the benefits of using the standard include cost savings, liability reduction, product differentiation, enhanced market recognition, reduction in environmental impacts/carbon footprint, and contribution toward LEED certification. The standard was approved by ANSI in 2007, making it the first standard for environmentally friendly building materials to be approved—and the only flooring-related standard to be approved to date—by that national standards organization.

Sources of additional information:

More information about the NSF-140 standard is available at NSF-140 Standard including information on how to purchase a copy of the standard.

3. NAHB Green Approved Products

Whose system is it? Green Approved Products is a program of the National Association of Home Builders (NAHB). The association's Research Center approves building products as being eligible to contribute points toward certification of a building under the National Green Building Standard. The NAHB Research Center Green Approved mark is intended to facilitate the verification of the "green" practice incorporated into the building during field inspections by providing the accredited verifier with assurance that the product is eligible for the points claimed by the builder.

What is the general approach? The NAHB Research Center Green Approved mark is intended to assist builders, designers, and specifiers in identifying products that can contribute points toward building certification. The Research Center has verified that products bearing the NAHB Research Center Green Approved mark do indeed have the attributes required under the criteria in the National Green Building Standard.

The National Green Building Standard does not define criteria for certifying products as "green." A product bearing the NAHB Research Center Green Approved mark is not certified as being "green." Rather, the product has been approved as eligible for earning points under the National Green Building Standard toward green certification of a building. The NAHB Research Center Green Approved mark is not a representation, warranty, guarantee of product performance, or certification of code compliance. Products approved under the program should bear the following label:

19 The Standard accepts carpet made from natural animal fiber provided that sustainable agricultural best management practices are followed for grazing management, conservation buffers, and animal feeding operation management, organic feed is used, and the animal is not harmed to obtain the fiber.



Sources of additional information:

Details regarding which products have been approved for specific attributes, and any additional usage requirements for earning points, can be found by clicking on the Green Approved Products link in the [Green Scoring Tool](#). For a quick look at which products are currently approved, visit [GreenApprovedProducts.com](#). For details of the product warranty, consult the product manufacturer.

C. Ask—and Read the Fine Print

When a product bears a label or seal indicating that it conforms to the requirements of a third-party environmental standard, reliance on that label is most often reasonable if a consumer challenges the claim. Of course, certifications rarely cover all aspects of a product, so it is important to understand exactly what information a particular certification conveys. When no special label or logo exists, marketers should read representations provided by manufacturers and suppliers to understand the purported environmental features of a product. When in doubt, marketers should contact the manufacturer or supplier to confirm whether the product meets a particular environmental benefit.

VII. BENEFITS OF BEING ENVIRONMENTALLY FRIENDLY

A. Contract Compliance and Successful Bidding

Several US departments and federal agencies mandate or recommend that their building projects incorporate sustainable components and practices. Departments or agencies that encourage environmentally friendly construction include the Department of Interior, the Environmental Protection Agency, and the General Services Administration.

In addition, some states and cities require the incorporation of environmentally friendly features into their public construction or renovation projects. For example, the City of Austin, Texas, requires that city buildings meet the LEED Silver level or above. Similarly, mandates regarding green building standards have recently been implemented in Boston, New York, Dallas, and Los Angeles. The trend toward green building standards will continue to grow with more cities and states adopting mandates and incentives on construction. As cities throughout the United States begin to adopt various green building standards, it is essential that the floor covering retailer and commercial dealer understand these standards.

B. California Green Building Mandates

The State of California requires that construction and renovation of state buildings achieve standards equivalent to those necessary for a certification under the LEED rating system at the Silver level or above. In January 2010, California expanded its environmentally friendly building mandate, becoming the first state to pass mandatory environmentally friendly building regulations applicable to all new residential, commercial, and public buildings beginning January 1, 2011, without regard to ownership and the source of funds. The California Green Building Standards Code, which is also called the CALGreen code, was adopted by the California Building Standards Commission to advance the state's broader goals of reducing greenhouse gas emissions and energy consumption, as well as reducing waste, local pollutants, and water use. The CALGreen code requires that every new building constructed in California reduce water consumption by 20 percent; divert 50 percent of construction waste from landfills; and install low-pollutant-emitting materials, such as paints, carpet, vinyl flooring and particleboard. The CALGreen code also includes voluntary provisions to encourage achievements beyond the mandatory requirements (e.g., diversion of 65 and 75 percent of construction waste from landfills for new homes and 80 percent for commercial projects). Property owners need not have their buildings certified by a third party to demonstrate compliance with the new regulations. The mandatory CALGreen code provisions will be inspected and verified by local and state building departments, much the way the state's existing health, safety, fire, and structural buildings codes are enforced.

C. Local Green Building Mandates

Cities throughout the United States have also begun to adopt local ordinances encouraging or mandating environmentally friendly building construction standards. Mandates regarding environmentally friendly building have recently been implemented in Boston, New York, Dallas, Austin, and Los Angeles. The requirements under these local laws vary from city to city. For example, New York City's law, the Green City Building Act, requires most city-owned and city-funded buildings to be certified at the LEED Silver or higher level. Boston has amended its zoning regulations to require that all major new construction and rehabilitation projects exceeding 50,000 square feet be designed to meet minimum LEED certification standards. Similarly, Dallas recently adopted an ordinance that focuses on reducing energy and water consumption in new homes and commercial buildings. This requirement was added to the city's existing environmentally friendly building requirement for all city-owned buildings. Under the new Dallas ordinance, which is designed to be implemented in two phases, all new residential construction must be designed to meet the LEED for Homes standard, the Green Built North Texas standard, or an equivalent standard. Commercial construction must be designed to meet the minimum LEED certification standard, the Green Built North Texas standard, or an equivalent standard. Failure to meet these standards can result in fines of up to \$2,000.

While the State of California now requires that all construction and renovation of state buildings achieve standards equivalent to those necessary for a certification under the LEED standard, the City of Los Angeles recently adopted a requirement that all residential and nonresidential buildings over 50,000 square feet meet the LEED Certified level. The Beverly Hills City Council has adopted an even more stringent standard requiring that buildings between 10,000 square feet and 25,000 square feet meet the LEED Certification level and buildings over

25,000 square feet meet the LEED Silver level. These standards will continue to coexist with the new CALGreen code.

The growth in number and popularity of environmentally friendly building standards will continue as more cities and states adopt mandates and incentives on construction. As localities throughout the United States consider and adopt environmentally friendly building standards, floor covering retailers and commercial dealers who understand these standards will have an advantage in this new and growing marketplace.

D. Government Incentives

Tax Incentives. Some states and local governments provide tax incentives for commercial or residential buildings that meet environmentally friendly standards. For example, New Mexico and New York offer a personal and business tax credit applicable to both commercial and residential buildings. Baltimore County, Maryland, offers a property tax credit for commercial buildings that achieve at least a LEED Silver rating. Other jurisdictions that offer tax incentives for environmentally friendly buildings include Chatham County, Georgia; Cincinnati, Ohio; Honolulu, Hawaii; Howard County, Maryland; Monroe County, New York; and the states of Maryland and Oregon.

More information about these local and state tax programs and possibly others is available by contacting the relevant Department of State or local planning, zoning, or development department.

Grants and Loans. Some city and state governments offer grants or loans to private developers that incorporate environmentally friendly design standards into new or existing commercial or residential buildings. For example, through a pilot incentive program, the City of Seattle offers grants to developers that incorporate LEED design standards into new and existing commercial buildings. Other jurisdictions that make grants or loans available to environmentally friendly buildings are El Paso, Texas; King County, Washington; Los Angeles, California; Pasadena, California; Santa Monica, California; Washington, DC; and New York State. Two states—Illinois and Pennsylvania—offer grants specifically to environmentally friendly schools.

More information about these and other local and state grant programs is available by contacting the relevant Department of State or local planning, zoning, or development department.

Density and Height Bonuses. Several local governments provide incentives in the form of density or height bonuses for buildings that meet environmentally friendly standards. For example, Arlington County, Virginia, authorizes site developers to propose slightly larger residential or commercial buildings than would typically be allowed under the county's regulations if the developer seeks LEED certification at any of the four LEED rating levels. The extra space permitted varies according to the type of project and the LEED certification level sought. Comparable incentives are available in other jurisdictions, including Acton, Massachusetts; Bar Harbor, Maine; Cranford, New Jersey; Nashville, Tennessee; Pittsburgh, Pennsylvania; Portsmouth, New Hampshire; Seattle, Washington; and Sunnyvale, California.

More information about these programs and about other local jurisdictions where environmentally friendly buildings may be eligible for density and/or height bonuses is available by contacting the relevant local planning, zoning, or development department.

Technical Assistance, Expedited Processing, Fee Waivers, and Other Incentives. Select state and local governments offer a variety of special incentives for use of environmentally friendly design features in new or existing buildings. For example, the Minnesota Green Building Program offers free technical assistance to developers of commercial or residential projects that incorporate sustainable components or techniques into their construction. The city of Costa Mesa, California, offers inspection and other fee waivers to buildings that include environmentally friendly installations, such as solar panels and skylights. Costa Mesa also grants priority to environmentally friendly building proposals in permit processing. These and similar incentives are available in Babylon, New York; Gainesville, Florida; Issaquah, Washington; Los Angeles, California; Miami Lakes, Florida; Oakland, California; Pasadena, California; San Diego, California; San Francisco, California; Santa Monica, California; San Antonio, Texas; West Hollywood, California; Arlington County, Maryland; Hillsborough County, Florida; Howard County, Maryland; Mecklenburg County, North Carolina; Sarasota County, Florida; Washington, DC; and the states of Hawaii and North Carolina.

For more information about these environmentally friendly building incentives, or to find out if your locality offers similar incentives, contact the relevant state or local building, zoning, or planning department.

E. Long-Term Value

Green buildings have special benefits that set them apart from conventional buildings, particularly when it comes to their long-term value. Green buildings can provide enduring financial benefits linked to energy and water savings, as well as lower operations and maintenance costs. For example, because environmentally friendly buildings are generally more energy efficient than conventional buildings, they often see gains in the form of reduced consumption of electricity. This type of savings becomes more apparent over time.

Green buildings may also provide important long-term benefits related to improved indoor environmental quality and greater employee or resident comfort or productivity. In particular, generally environmentally friendly buildings are a lower source of emissions than conventional buildings, due to better citing and building material choices. This can lead to improved health among building occupants. While improved health is itself extremely valuable, it may also translate into substantial health- and medical-related dollars saved.

F. Financing Opportunities

Green buildings, particularly those that are highly energy efficient, provide special financing opportunities through a mechanism called “green mortgaging.” Green mortgages, also known as energy-efficient mortgages (EEMs), make it possible for consumers to buy a higher-priced home with a larger monthly mortgage payment because of the lower monthly operating costs associated with the home. In fact, EEMs are not just for homebuyers—they may be helpful to anyone selling, refinancing, or remodeling a home. EEMs exist in two basic forms: either the expected energy savings of the home can be added to the borrower’s income, which qualifies the

buyer for a larger loan, or for upgrades, which can increase the home's appraised value by up to 5 percent to reflect the value of energy-efficiency improvements.

G. Public Relations/Marketing

The demand for environmentally friendly buildings is part of a larger and growing demand—at home and abroad—for sustainable products and services. People are clamoring to know how the things they purchase stack up along particular environmental dimensions—carbon footprint, support for locally procured resources, water conservation, and more. Being able to market oneself as providing sustainable goods and services makes it possible for the flooring dealer and contractor to meet this growing demand and distinguish oneself as a market leader.

VIII. CONCLUSION

The increased focus and local mandates on environmentally friendly construction practices and the use of sustainable products provides the informed flooring dealer with a substantial opportunity. Knowledgeable dealers and contractors will have a competitive opportunity over their competitors. They will be able to effectively advise their customers, more efficiently sell sustainable flooring products, and provide real assistance to the general contractor. Moreover, the informed dealer and contractor will minimize the risks of incurring hidden costs of going “green” when bidding on a job. “Knowledge is power,”²⁰ and this book is designed to provide the basic knowledge regarding environmentally friendly construction and sustainable flooring products.

20 Francis Bacon.

APPENDIXES
Checklists for Certification

APPENDIX A—LEED® 2009 FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS

	Points Available	Points Earned	Comments
<i>Site Selection (SS Credit)</i>			
SS Prereq. 1 Construction Activity Pollution Prevention	A mandatory prerequisite	Identify steps taken to assist:	
<i>Materials and Resources (MR Credit)</i>			
MR Prereq. 1 Storage and Collection of Recyclables	A mandatory prerequisite	Identify steps taken to assist:	
IEQ Credit 3.1 Construction Indoor Air Quality Management Plan—During Construction	1 point		
IEQ Credit 3.2 Construction Indoor Air Quality Management Plan—Before Occupancy	1 point		
MR Credit 1.1 Building Reuse—Maintain Existing Walls, Floors and Roof	1 point for 55% 2 points for 75% 3 points for 95%		

MR Credit 1.2 Building Reuse—Maintain Interior Nonstructural Elements	1 point		
MR Credit 2 Construction Waste Management.	1 point for 50% and 2 points for 75%		
MR Credit 3 Materials Reuse	1 point for 5% and 2 points for 10%		
MR Credit 4 Recycled Content	1 point for 10% 2 points for 20%		
MR Credit 5 Regional Materials	1 point for 10 2 points for 20%		
MR Credit 6 Rapidly Renewable Materials	1 point		
MR Credit 7 Certified Wood (FSC certified)	1 point		
<i>Indoor Environmental Quality (IEQ Credit)</i>			
IEQ Credit 4.1 Low-Emitting Materials—Adhesives & Sealants	1 point		
IEQ Credit 4.2 Low-Emitting Materials—Paints & Coatings	1 point		

<p>IEQ Credit 4.3</p> <p>Low-Emitting Materials—Flooring Systems (CRI’s Green Label Plus/FloorScore and other standards)</p>	<p>1 point</p>		
<p>IEQ Credit 4.4</p> <p>Low-Emitting Materials—Composite Wood & Agrifiber Products</p>	<p>1 point</p>		
<p>Total Points</p>			

APPENDIX B—LEED® 2009 FOR EXISTING BUILDINGS: OPERATIONS AND MAINTENANCE

	Points Available	Points Earned	Comments
<i>Site Selection (SS Credit)</i>			
SS Credit 3 Construction Activity Pollution Prevention	1 point		
<i>Materials and Resources (MR Credit)</i>			
MR Prereq. 1 Sustainable Purchasing Policy	Mandatory prerequisite	Identify steps taken to assist:	
MR Prereq. 2 Solid Waste Management Policy	Mandatory prerequisite	Identify steps taken to assist:	
MR Credit 3 Sustainable Purchasing—Facility Alterations and Additions (Recycled, salvaged, rapidly renewable, FCS certified wood, regional, CRI’s Green Label Green Seal, and FloorScore materials)	1 point		
MR Credit 9 Solid Waste Management	1 point		
<i>Indoor Environmental Quality (IEQ Credit)</i>			
IEQ Prereq. 3 Green Cleaning Policy	Mandatory prerequisite	Identify steps taken to assist:	

IEQ Credit 3.1 High-Performance Green Cleaning Program	1 point		
IEQ Credit 3.3 Green Cleaning Products (Green Seal)	1 point		
IEQ Credit 3.4 Green Cleaning Equipment (CRI Green Label®)	1 point		
Total Points			

Appendix C—LEED® 2009 for Commercial Interiors

	Points Available	Points Earned	Comments
<i>Site Selection (SS Credit)</i>			
SS Credit 1 Site Selection (LEED-certified building)	1–5 points		
<i>Materials and Resources (MR Credit)</i>			
MR Prereq. 1 Sorting and Storing Recyclables	A mandatory prerequisite	Identify steps taken to assist:	
MR Credit 1.1 Tenant Space—Long-Term Commitment (10 years)	1 point		
MR Credit 1.2 Building Reuse—Interior Nonstructural Components	1 point for at least 40% retained 2 points for at least 60 % retained		
MR Credit 2 Construction Waste Management	1 point for 50% 2 points for 75 %		
MR Credit 3.1 Materials Reuse	1 point for 5% 2 points for 10%		
MR Credit 4 Recycled Content	1 point for 10% 2 points for 20%		

MR Credit 5 Regional Materials	1 point for 20%		
MR Credit 6 Rapidly Renewable Materials	1 point		
MR Credit 7 Certified Wood (FSC certified)	1 point		
<i>Indoor Environmental Quality (IEQ Credit)</i>			
IEQ Credit 3.1 Construction Indoor Air Quality Management Plan—During Construction	1 point		
IEQ Credit 3.2 Construction Indoor Air Quality Management Plan—Before Occupancy	1 point		
IEQ Credit 4.1 Low-Emitting Materials—Adhesives and Sealants	1 point		
IEQ Credit 4.2 Low-Emitting Materials—Paints and Coatings	1 point		
IEQ Credit 4.3 Low-Emitting Materials—Flooring Systems (CRI’s Green Label Plus, FloorScore)	1 point		
IEQ Credit 4.4 Low-Emitting Materials—Composite Wood and Agrifiber Products	1 point		
Total Points			

Appendix D—LEED® 2009 for Retail: NEW Construction and Major RenovationS

	Points Available	Points Earned	Comments
<i>Site Selection (SS Credit)</i>			
SS Prereq. 1 Construction Activity Pollution Prevention	A mandatory prerequisite	Identify steps taken to assist:	
<i>Materials and Resources (MR Credit)</i>			
MR Prereq. 1 Storage and Collection of Recyclables	A mandatory prerequisite	Identify steps taken to assist:	
MR Credit 1.1 Building Reuse—Maintain Existing Walls, Floors and Roof	1 point for 55% 2 points for 75% 3 points for 95%		
MR Credit 1.2 Building Reuse—Maintain Interior Nonstructural Elements	1 point		
MR Credit 2 Construction Waste Management	1 point for 50% 2 points for 75%		
MR Credit 3 Materials Reuse	1 point for 5% 2 points for 10%		
MR Credit 4 Recycled Content	1 point for 10% 2 points for 20%		

MR Credit 5 Regional Materials	1 point		
MR Credit 6 Rapidly Renewable Materials (at least 2.5%)	1 point		
MR Credit 7 Certified Wood (FSC certified)	1 point		
<i>Indoor Environmental Quality (IEQ Credit)</i>			
IEQ Credit 3.1 Construction Indoor Air Quality Management Plan—During Construction	1 point		
IEQ Credit 3.2 Construction Indoor Air Quality Management Plan—Before Occupancy	1 point		
IEQ Credit 4 Low-Emitting Materials—Adhesives and Sealants	1 point		
IEQ Credit 4 Low-Emitting Materials—Paints and Coatings	1 point		
IEQ Credit 4 Low-Emitting Materials—Flooring Systems (CRI’s Green Label, FloorScore)	1 point		
IEQ Credit 4 Low-Emitting Materials—Composite Wood and Agrifiber Products	1 point		
Total Points			

Appendix E—LEED® 2009 for Retail: Commercial Interiors

	Points Available	Points Earned	Comments
<i>Site Selection (SS Credit)</i>			
SS Credit 1 Site Selection (LEED certified building)	1–5 points		
<i>Materials and Resources (MR Credit)</i>			
MR Prereq. 1 Storage and Collection of Recyclables	A mandatory prerequisite	Identify steps taken to assist:	
MR Credit 1.1 Tenant Space—Long-Term Commitment (10 years)	1 point		
MR Credit 1.2 Building Reuse—Maintain Interior Nonstructural Elements	1 point for 40% 2 points for 60%		
MR Credit 2 Construction Waste Management	1 point for 50% 2 points for 75%		
MR Credit 3.1 Materials Reuse	1 point for 5% 2 points for 10%		
MR Credit 4 Recycled Content	1 point for 10% 2 points for 20%		
MR Credit 5 Regional Materials	1 point		

MR Credit 6 Rapidly Renewable Materials (at least 5%)	1 point		
MR Credit 7 Certified Wood (FSC certified)	1 point		
<i>Indoor Environmental Quality (IEQ Credit)</i>			
IEQ Credit 3.1 Construction Indoor Air Quality Management Plan—During Construction	1 point		
IEQ Credit 3.2 Construction Indoor Air Quality Management Plan—Before Occupancy	1 point		
IEQ Credit 4.1 Low-Emitting Materials—Adhesives and Sealants	1 point		
IEQ Credit 4.2 Low-Emitting Materials—Paints and Coatings	1 point		
IEQ Credit 4.3 Low-Emitting Materials—Flooring Systems (CRI's Green Label, FloorScore)	1 point		
IEQ Credit 4.4 Low-Emitting Materials—Composite Wood and Agrifiber Products	1 point		
Total Points			

APPENDIX F—LEED® 2009 FOR SCHOOLS NEW CONSTRUCTION AND MAJOR RENOVATIONS

	Points Available	Points Earned	Comments
<i>Site Selection (SS Credit)</i>			
SS Prereq. 1 Construction Activity Pollution Prevention	A mandatory prerequisite	Identify steps taken to assist:	
<i>Materials and Resources (MR Credit)</i>			
MR Prereq. 1 Storage and Collection of Recyclables Storage and Collection of Recyclables	A mandatory prerequisite	Identify steps taken to assist:	
MR Credit 1.1 Building Reuse—Maintain Existing Walls, Floors and Roof	1 point for 75% 2 points for 95%		
MR Credit 1.2 Building Reuse—Maintain Existing Interior Nonstructural Elements (at least 50%)	1 point		
MR Credit 3 Materials Reuse	1 point for 5% 2 points for 10%		
MR Credit 4 Recycled Content	1 point for 10% 2 points for 20%		
MR Credit 5 Regional Materials	1 point for 10% 2 points for 20%		
MR Credit 6 Rapidly Renewable Materials (at least 2.5%)	1 point		

MR Credit 7 Certified Wood (FSC certified)	1 point		
<i>Indoor Environmental Quality (IEQ Credit)</i>			
MR Credit 2 Construction Waste Management	1 point for 50% 2 points for 75%		
IEQ Credit 3.1 Construction IAQ Management Plan	1 point		
IEQ Credit 3.2 Construction Indoor Air Quality Management Plan—Before Occupancy	1 point		
IEQ Credit 4.1 Low-Emitting Materials—Adhesives and Sealants	1 point		
IEQ Credit 4.2 Low-Emitting Materials—Paints and Coatings	1 point		
IEQ Credit 4.3 Low-Emitting Materials—Flooring Systems	1 point		
IEQ Credit 4.4 Low-Emitting Materials—Composite Wood and Agrifiber Products	1 point		
Total Points			

Appendix G—LEED® 2009 for Healthcare

	Points Available	Points Earned	Comments
<i>Site Selection (SS Credit)</i>			
SS Prereq. 1 Construction Activity Pollution Prevention	A mandatory prerequisite	Identify steps taken to assist:	
<i>Materials and Resources (MR Credit)</i>			
MR Prereq. 1 Storage and Collection of Recyclables Storage and Collection of Recyclables (2010 FGI Guidelines for Design and Construction of Health Care Facilities)	A mandatory prerequisite	Identify steps taken to assist:	
MR Credit 1.1 Building Reuse—Maintain Existing Walls, Floors and Roof	1 point for 55% 2 points for 75% 3 points for 95%		
MR Credit 1.2 Building Reuse—Maintain Existing Interior Nonstructural Elements (at least 50%)	1 point		
MR Credit 2 Construction Waste Management	1 point for 50% 2 points for 75%		
MR Credit 3 Sustainably Sourced Materials and Products (Salvaged, refurbished, reused, regionally sourced, wood FCS certified, composite wood, agrifiber or fiberglass materials)	1–4 points: A point for each 10% of sustainable materials used		
MR Credit 4.2 PBT Source Reduction—Lead, Cadmium, and Copper (Green Seal certified paints and sealants)	2 points		

MR Credit 6 Resource Use—Design for Flexibility (requires flooring under all movable/modular casework)	1 point		
<i>Waste Minimization and Management</i>			
IEQ Credit 3 Hazardous Material Removal or Encapsulation (Abatement) (Renovations Only)	A mandatory prerequisite	Identify steps taken to assist:	
IEQ Credit 3.1 Construction Indoor Air Quality Management Plan—During Construction	1 point		
IEQ Credit 3.2 Construction Indoor Air Quality Management Plan—Before Occupancy	1 point		
IEQ Credit 4 Low-Emitting Materials—Adhesives and Sealants	1 point		
IEQ Credit 4 Low-Emitting Materials—Flooring Systems (CRI's Green Label)	1 point		
IEQ Credit 4 Low-Emitting Materials—Composite Wood and Agrifiber Products	1 point		
IEQ Credit 4 Low-Emitting Materials—Exterior Applied Products (Adhesives, sealants, coatings, roofing and waterproofing materials)	1 point		
Total Points			

APPENDIX H—GREEN GLOBES® FOR NEW CONSTRUCTION

	Points Available	Points Earned	Comments
<i>Installation and Construction Practices</i>			
G.1.5 Construction IAQ Management Plan	1–3 points		
E.4.3 Raised Floors	5 points		
E.4.4 Disassembly Features	Maximum of 3 points		
G.2.1 Floor Drains	1 point		
<i>Product and Materials Selection</i>			
E.2.2 Recycled Content	Maximum of 10 points		
G.2.9 Low-Emitting Materials—Adhesives & Sealants	2 points for adhesives 2 points for contact adhesives 2 points for sealants		
G.2.9 Low-Emitting Materials—Paints	2 points		
G.2.9 Low-Emitting Materials—Caulks	2 points		
G.2.9 Low-Emitting Materials—Carpet Systems	2 points		

E.2.4 Certified Wood (Forest Stewardship Council, the Sustainable Forestry Initiative, the Canadian Standards Association, or the American Tree Farm System)	Maximum of 5 points		
G.2.1 Moisture-Tolerant Materials	1 point		
E.2.3 Bio-based Materials	Maximum of 5 points		
E.1.1 Life-Cycle Assessment for Materials	10 points		
F.5.1 Pest-Resistant Materials	1 point		
<i>Waste Minimization and Management</i>			
E.5.1 Construction Waste Management	Maximum of 6 points		
E.3.2 Building Reuse	Maximum of 5 points		
E.2.1 Materials Reuse	Maximum of 10 points		
Total Points			

APPENDIX I—GREEN GLOBES® FOR THE CONTINUAL IMPROVEMENT OF EXISTING BUILDINGS

	Points Available	Points Earned	Comments
<i>Energy Performance 1.0</i>			
1.6 Other Energy Efficiency Features	16 points		
1.8 Envelope (condensation, moisture and air leakage)	4 points		
<i>Resources 3.0</i>			
3.2 Waste Reduction Workplan	5 points		
<i>Emissions, Effluents And Pollution Controls 4.0</i>			
4.5 Waste Water Effluents (floor drains)	5 points		
4.6 Asbestos	15 points		
4.7 Radon	5 points		
4.8 Polychlorinated Biphenyl (PCB)	5 points		

4.13 Health & Safety and Management of Hazardous Products—Proper Storage	5 points		
4.13 Health & Safety and Management of Hazardous Products—Education and Training/Inventory	3 points		
<i>Indoor Environment 5.0</i>			
5.6 Control of Pollutants at Source—Musty Odors	3 points		
5.6 Control of Pollutants at Source—Damp or Musty Carpets	2 points		
5.6 Control of Pollutants at Source—Environmentally Preferable Cleaning Products	5 points		
5.10 Noise (noise reduction)	5 points		
<i>Environmental Management System (EMS) 6.0</i>			
6.1 EMS Documentation—Waste and Recycling	2 point		
6.1 EMS Documentation—Reducing Pollution	1 point		
6.1 EMS Documentation—Proper Purchasing of Hazardous Products	2 points		

6.2 Environmental Purchases—Written Environmental Purchasing Plan	6 points		
6.2 Environmental—Preferred Housekeeping and Building Maintenance Products	7 points		
6.2 Environmental Purchases—Energy-Saving Equipment	6 points		
Total Points			

Appendix J—Green Globes® For CONTINUAL IMPROVEMENT OF EXISTING BUILDINGS FOR Healthcare

	Points Available	Points Earned	Comments
<i>Energy Performance 1.0</i>			
1.6 Other Energy Efficiency Features	16 points		
1.8 Envelope (Condensation, Moisture, and Air Leakage)	4 points		
<i>Resources 3.0</i>			
3.2 Waste Reduction Workplan	5 points		
<i>Emissions, Effluents and Pollution Controls 4.0</i>			
4.5 Waste Water Effluents (Floor Drains)	5 points		
4.6 Asbestos	15 points		
4.7 Lead	5 points		
4.7 Radon	5 points		
4.8 Polychlorinated Biphenyl (PCB)	5 points		

4.13 Health & Safety and Management of Hazardous Products (Proper Storage)	5 points		
4.13 Health & Safety and Management of Hazardous Products—Education and Training	3 points		
4.13 Health & Safety and Management of Hazardous Products—Keeping an Inventory	3 points		
<i>Indoor Environment 5.0</i>			
5.6 Control of Pollutants at Source—Musty Odors	2 points		
5.6 Control of Pollutants at Source—Damp or Musty Carpets	2 points		
5.6 Control of Pollutants at Source—Environmentally Preferable Cleaning Products	5 points		
5.10 Noise Reduction—Waiting Areas	1 point		
5.10 Noise Reduction—Nursing Stations	1 point		
5.10 Noise Reduction—Open Office Space	1 point		

5.10 Noise Reduction— Patient Rooms	1 point		
5.10 Noise Reduction— Dining Area	1 point		
5.10 Noise Reduction— Lobby/Entrance	1 point		
<i>Environmental Management System (EMS) 6.0</i>			
6.1 EMS Documentation—Waste and Recycling	2 points		
6.1 EMS Documentation—Reducing Pollution	1 point		
6.1 EMS Documentation—Proper Purchasing of Hazardous Products	2 points		
6.1 EMS Documentation—Education and Training	2 points		
6.2 Environmental Purchases—Written Environmental Purchasing Plan	6 points		
6.2 Environmental Purchases—Preferred Housekeeping and Building Maintenance Products	7 points		

6.2 Environmental Purchases—Energy-Saving Equipment	6 points		
Total Points			

Appendix K—International Green Construction Code™ (IgCC)

EMISSION LIMITS

Product	Formaldehyde Limit (ppm)	Actual Amount Per Manufacture (ppm)
Hardwood plywood	0.05	
Particle board	0.09	
Medium density fiberboard	0.11	
Thin medium density fiberboard	0.13	

SITE-APPLIED ADHESIVE AND SEALANT VOC LIMITS

Adhesive	VOC Limit	Actual Amount Per Manufacture
Indoor carpet adhesives	50	
Carpet pad adhesives	50	
Outdoor carpet adhesives	150	
Wood flooring adhesive	100	
Rubber floor adhesives	60	
Subfloor adhesives	50	
Ceramic tile adhesives	65	
Vinyl composition tile (VCT) and asphalt tile adhesives	50	
Multipurpose construction adhesives	70	

Structural glazing adhesives	100	
Other sealant primers	750	
CPVC solvent cement	490	
PVC solvent cement	510	
ABS solvent cement	325	
Plastic cement welding	250	
Adhesive primer for plastic	550	
Contact adhesive	80	
Special purpose contact adhesive	250	
Structural wood member adhesive	140	

VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS

Coating Category	Limit	Actual Amount Per Manufacture
Concrete curing compounds	350	
Concrete/masonry sealers	100	
Floor coatings	100	
Recycled coatings	250	
Specialty primers, sealers, and undercoaters	100	
Waterproofing membranes	250	
Wood coatings	275	

Wood preservatives	350	
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Flooring Material

Material	Percentage of Total Flooring
Ceramic and concrete tile	
Organic free, mineral based	
Clay pavers	
Concrete pavers	
Concrete	
Metal	
Total Percentage	

APPENDIX L--LEED® FOR HOMES

	Points Available	Points Earned	Comments
<i>Innovative Design (ID Credit)</i>			
ID 2.1 Durable Planning—Moisture Control	Prerequisite to certification		
<i>Site Selection (SS Credit)</i>			
SS 5 Pest-Control Alternatives	Maximum of 2 points		
<i>Energy & Atmosphere (EA Credit)</i>			
EA 2.1 Basic Insulation	Prerequisite to certification		
EA 2.2 Enhanced Insulation	2 points		
EA 5.3 Heating and Cooling Systems—Flooring Issues	3 points		
<i>Materials & Resources (MR Credit)</i>			
MR 1.1 Framing Waste Limits	Prerequisite to certification		
MR 1.2 Preconstruction Framing Documents	1 Point		

MR 1.2 & 1.3 Salvaged Framing (automatic alternative to MR 1.2 and 1.3)	2 points		
MR 1.4 & 1.5 Framing Efficiencies (preframed or other conditions)	Up to 4 points		
MR 2.1 Preferable Products—FSC Certified Tropical Wood	Prerequisite to certification		
MR 2.2 Preferable Products—Hard Surfaces	½ point for 45% 1 point for 90%		
MR 2.2 Preferable Products—Carpet (CRI Green Label® carpet and pad)	½ point for 45% 1 point for 90%		
MR 2.2 Preferable Products—Regional Materials	½ point for 45% 1 point 90%		
MR 2.2 Recycled Content—Flooring	½ point for 45% and 1 point for 90%		
MR 2.2 Recycled Content—Sheathing	½ point		
MR 2.2 Low-Emitting Materials—Adhesives and Sealants (the manufacturers should provide the VOC levels)	½ point		
MR 2.2 Low-Emitting Materials—Paints and Coatings (pre-finished floors are assumed to satisfy the emissions limits)	½ point		

MR 3.2 Construction Waste Reduction (demolition waste is not included in calculation)	Maximum of 3 points		
MR 3.1 Construction Waste Management	Prerequisite to certification		
<i>Indoor Environmental Quality (EA Credit)</i>			
EQ 8.1 Construction Contamination	1 point		
EQ 8.2 Indoor Contamination	1–2 points		
EQ 9.1 Radon Protection	Prerequisite to certification		
EQ 9.2 Radon Protection	1 point		
EQ 10.2 Garage Pollutants	2 points		
<i>Awareness & Education (AE Credit)</i>			
AE 1.1 Operations Training	Prerequisite to certification		
Total Points			

APPENDIX M— NATIONAL GREEN BUILDING NEW HOME STANDARD®

	Points Available	Points Earned	Comments
<i>Resource Efficiency</i>			
601.2 Material Usage	3–9 points		
601.3 Building Design.	3 points		
601.4 Framing and Structural Plans.	4 points		
601.5 Prefabricated Components	4 points		
601.7 Pre-Finished Materials	4 points		
601.7(a) Concrete and Masonry	1 points for 35% 2 points for 50% 5 points for 90%		
601.7(b) Interior Trim	1 points for 35% 2 points for 50% 5 points for 90%		
601.7(g) Hardwood Floor	1 points for 35% 2 points for 50% 5 points for 90%		
602.1.1.2 Capillary Break	3 points		

602.1.2 Foundation Waterproofing	4 points		
602.1.1.1 Capillary Breaks	Mandatory		
602.1.4.1 Unconditioned Crawlspace	Mandatory		
602.1.4.2 Conditioned Crawlspace	Mandatory		
602.1.4.1 Unconditioned Crawlspace	6 points		
602.1.4.2 Conditioned Crawlspace	8 points		
602.1.5 Termite Barrier	4 points		
602.1.6 Termite-Resistant Materials	2 points in slight to moderate area 4 points in moderate to heavy area 6 points in a very heavy area		
602.1.7.1(1) Moisture Control—Mold	2 points		
602.1.7.1(2) Moisture Control—Cavity	Mandatory & 2 points		
602.1.7.1(3) Moisture Control—Lumber	4 points		
602.1.7.2 Moisture Control—Subfloors	2 points		

602.1.9(1)(c) Flashing	Mandatory		
602.1.11 Tile Backing Materials	Mandatory		
603.1 Reused Materials	1-12 points		
603.2 Salvaged Materials	3 points		
603.3 Scrap Materials	4 points		
604.1 Recycled Content	1-6 points		
605.2 Construction Waste Management Plan	6 points		
605.3 On-site Recycling	7 points		
605.4 Recycled Construction Materials	3-6 points		
606.1 Bio-based Products	3-8 points		
606.2(2) Wood-Based Products	4 points		
606.3 Manufacturing Energy	2 points		
608.1(2) Resource-Efficient Materials—Engineered Wood	3 points		
608.1(3) Resource-Efficient Materials—Floor Trusses	3 points		
609.1 Regional Materials	2-10 points		

610.1 Life-Cycle Analysis	3-15 points		
610.1.1 Whole Building Life-Cycle Analysis	15 point		
610.1.2.1 Life-Cycle Analysis for Products or Assembly	10 point		
610.1.2.1 Life Cycle for Products	2-10 points		
610.1.2.2 Life Cycle for Intermediate Floors	3-10 points		
611.1 Manufacturer's Environmental Management System Concepts	1-10 points		
611.2 Sustainable Products	3-9 points		
<i>Energy Efficiency</i>			
701.4.3.2(2) Air Barrier and Insulation	Mandatory		
703.1.1 Building Envelope—UA Improvement	1-18 points		
703.1.2 Insulation Installation	4 points for grade 2 7 points for grade 1		
<i>Indoor Environmental Quality</i>			
901.4(1) Wood Materials	Mandatory		
901.4(2) Particle Board	2 points		
901.4(2) Medium Density Fiberboard (MDF)	2 points		

901.4(3) Hardwood Plywood	2 points		
901.4(4) Particle Board, MDF, Plywood	3 points		
901.4(5) Composite Wood	4 points		
901.4(6) Non-Emitting Products	4 points		
901.6(1) Carpets (wall-to-wall carpet not installed adjacent to water closets and bathing fixtures).	Mandatory		
901.6(2) Carpets (CRI's Green Label Plus certified)	6 points for carpet 2 points for cushion		
901.7 Hard-Surface Flooring (FloorScore® or GREENGUARD certified)	6 points		
901.9.1 Architectural Coatings (Green Seal GS-11 standard or California Air Resources Board)	5 points		
901.9.2 Architectural Coatings Color Additives GREENGUARD or the Scientific Certification Systems Indoor Advantage Gold Program)	1 point		
901.10.1 Adhesives and Sealants (The California Air Resources Board)	8 points		
901.10.2 & 3 Adhesives and Sealants (Green Seal GS-36 standard or VOC limits)	5 points		
901.11 Insulation	4 points		

901.13 Building Entrance	1 point		
<i>Green Building Practices</i>			
1001.1 Building Owner's Manual	Mandatory		
1001.1 Building Owner's Manual	1 point		
Total Points			

APPENDIX N— NATIONAL GREEN BUILDING REMODEL STANDARD®

	Points Available	Points Earned	Comments
<i>Resource Efficiency</i>			
11.601.2 Material Usage	3–9 points		
11.601.3 Building Design. And Layout	3 points		
11.601.4 Framing and Structural Plans.	4 points		
11.601.5 Prefabricated Components	4 points		
11.601.7 Pre-Finished Materials	4 points		
11.601.7(a) Concrete and Masonry	1 points for 35% 2 points for 50% 5 points for 90%		
11.601.7(b) Interior Trim	1 points for 35% 2 points for 50% 5 points for 90%		
11.601.7(g) Hardwood Floor	1 points for 35% 2 points for 50% 5 points for 90%		
11.602.1.1.2 Capillary Break	3 points		

11.602.1.1.1 Capillary Breaks	Mandatory		
11.602.1.1.2 Foundation Waterproofing	3 points		
11.602.1.2 Foundation Waterproofing—Rubber Coating or Mat	4 points		
11.602.1.4.2 Crawlspace	Mandatory		
11.602.1.4.1 Crawlspaces Unconditioned space	6 points		
11.602.1.4.2 Crawlspaces Conditioned Space	8 points		
11.602.1.5 Termite Barrier	4 points		
11.602.1.6 Termite-Resistant Materials	2 points in slight to moderate area 4 points in moderate to heavy area 6 points in a very heavy area		
11.602.1.7.1(1) Moisture Control—Mold	2 points		
11.602.1.7.1(2) Moisture Control—Cavity	Mandatory & 2 points		
11.602.1.7.1(3) Moisture Control—Lumber	4 points		

11.602.1.7.2 Moisture Control—Subfloors	2 points		
11.602.1.11 Tile Backing Materials	Mandatory		
11.603.1 Reused Materials	1-12 points		
11.603.2 Salvaged Materials	1-9 points		
11.603.3 Scrap Materials	4 points		
11.604.1 Recycled Content	1-6 points		
11.605.1 Hazardous Waste	Mandatory		
11.605.2 Construction Waste Management Plan	6 points		
11.605.3 On-site Recycling	7 points		
11.605.4 Recycled Construction Materials	3-6 points		
11.606.1 Bio-based Products	3-8 points		
11.606.2(2) Wood-Based Products	4 points		
11.606.3 Manufacturing Energy	2 points		

11.608.1(2) Resource-Efficient Materials—Engineered Wood	3 points		
11.608.1(3) Resource-Efficient Materials—Floor Trusses	3 points		
11.609.1 Regional Materials	2-10 points		
11.610.1 Life-Cycle Analysis	3-15 points		
11.610.1.1 Whole Building Life-Cycle Analysis	15 point		
11.610.1.2 Life-Cycle Analysis for Products or Assembly	10 point		
11.610.1.2.1 Life Cycle for Products	2-10 points		
11.610.1.2.2 Life Cycle for Intermediate Floors	3-10 points		
11.611.1 Manufacturer’s Environmental Management System Concepts	1-10 points		
11.611.2 Sustainable Products	3-9 points		
<i>Energy Efficiency</i>			
11.701.4.3.1 Building Thermo Envelop	Mandatory		
11.701.4.3.2 Air Sealing and Insulation	Mandatory		

<i>Indoor Environmental Quality</i>			
11.901.4(1) Wood Materials	Mandatory		
11.901.4(2) Particle Board	2 points		
11.901.4(2) Medium Density Fiberboard (MDF)	2 points		
11.901.4(3) Hardwood Plywood	2 points		
11.901.4(4) Particle Board, MDF, Plywood	3 points		
11.901.4(5) Composite Wood	4 points		
11.901.4(6) Non-Emitting Products	4 points		
11.901.6(1) Carpets (wall-to-wall carpet not installed adjacent to water closets and bathing fixtures).	Mandatory		
11.901.6(2) Carpets (CRI's Green Label Plus certified)	6 points for carpet 2 points for cushion		
11.901.7 Hard-Surface Flooring (FloorScore® or GREENGUARD certified)	6 points		
11.901.9.1 Interior Architectural Coatings (Green Seal GS-11 standard or California Air Resources Board)	5 points		

901.9.2 Architectural Coatings Color Additives (GREENGUARD or the Scientific Certification Systems Indoor Advantage Gold Program)	1 point		
11.901.9.4 Interior Architectural Coatings (Green Seal GS-11 standard or California Air Resources Board)	Mandatory		
11.901.10.(1) Adhesives and Sealants (The California Air Resources Board)	8 points		
11.901.10(2) & (3) Adhesives and Sealants (Green Seal GS-36 standard or VOC limits)	5 points		
11.901.11 Insulation	4 points		
11.901.13 Building Entrance	1 point		
11.901.15 Lead Safety	Mandatory		
<i>Green Building Practices</i>			
11.1001.1 Building Owner's Manual	Mandatory		
11.1003.1 Building Owner's Manual	1 point		
Total Points			

APPENDIX O— NATIONAL GREEN BUILDING REMODELING FUNCTIONAL AREAS STANDARD®

	Satisfied	Comments
<i>General</i>		
12.601.2 Material Usage		
12.602.1.7(1) Moisture Control—Mold		
12.602.1.7(2) Moisture Control—Cavity		
12.602.1.8 Moisture Control—Subfloors		
12.602.1.11 Tile Backing Materials		
12.1(A) Prefabricated Components: At least 2 of following (a) Pigmented, decorative or final finished concrete or masonry floor; (b) Trim that does not require paint or stain; and (c) Pre-finished hard wood floors		
12.1(A).603.1 Reused Materials	1	
12.1(A).603.2 Salvaged Materials		
12.1(A).604.1 Recycled Content		
12.1(A).606.1 Bio-based Products		

12.1(A).606.2(2) Wood-Based Products		
12.1(A).608.1 Resource-Efficient Materials—Engineered Wood and Floor Trusses		
12.1(A).609.1 Regional Materials		
12.1(A).610.1 Life-Cycle Analysis		
12.1(A).610.1.1 Functional Area Life-Cycle Analysis		
12.1(A).610.1.2 Life-Cycle Analysis for Products or Assembly		
12.1(A).610.1.2.1 Life Cycle for Products		
12.1(A).610.1.2.2 Life Cycle for Intermediate Floors		
12.1(A).611.1 Manufacturer’s Environmental Management System Concepts		
12.1(A).611.2 Sustainable Products		
12.701.4.3.1 Building Thermo Envelop		
12.701.4.3.2 Air Sealing and Insulation		
12.901.4 Wood Materials		

12.901.6 Carpets (wall-to-wall carpet not installed adjacent to water closets and bathing fixtures).		
12.901.6(2) Carpets (CRI's Green Label Plus certified)		
12.901.7 Hard-Surface Flooring (FloorScore® or GREENGUARD certified)		
12.901.9.1 Interior Architectural Coatings (Green Seal GS-11 standard or California Air Resources Board)		
12.901.10 Adhesives and Sealants (Green Seal GS-36 or The California Air Resources Board)		
12.901.15 Lead Safety		
<i>Basement Remodel</i>		
12.4.1 Basement Remodel—Moisture		
<i>Additions</i>		
12.5.602.1.1.1 Additions—Capillary Breaks		
12.602.1.4.1 Additions—Crawlspaces		