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SUSTAINABLE DESIGN

Sustainable building design (also known as “green” building) is an increasingly important part of interior design. Sustainable design includes a wide range of concerns, such as the environmental impact of an interior design project, the wise use of materials, energy conservation, use of alternative energy sources, adaptive reuse, indoor air quality, recycling, reuse, and other strategies to achieve a balance between the consumption of environmental resources and the renewal of those resources. Sustainable design considers the full life cycle of a building and the materials that comprise the building. This includes the impact of raw material extraction through its fabrication, installation, operation, maintenance, and disposal.

Although an architect addresses many sustainable design issues during the design of a building, there are several steps the interior designer can take to minimize the environmental impact of interior build-out.

BUILDING RATING SYSTEMS

Several organizations have emerged that provide industry-recognized ratings of the relative sustainability of a building or interior build-out. These organizations

develop objective criteria that designers must follow in order to receive a particular type of rating. Although conforming to the criteria that these organizations establish is not mandatory by any building code, some governmental entities and large corporations may require their designers to follow the organizations’ guidelines. The following are the major rating systems in the United States, Canada, and Great Britain.

Leadership in Energy and Environmental Design (LEED) Certification

www.usgbc.org

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a national, consensus-based building rating system designed to accelerate the development and implementation of green building practices. It was developed by the U.S. Green Building Council (USGBC), which is a national coalition of leaders from all aspects of the building industry. The USGBC works to promote buildings that are environmentally responsible and profitable and that provide healthy places to live and work. In addition to developing the rating

system, USGBC offers training workshops and resource support.

In 2008, the Green Building Certification Institute (GBCI) was established as a third-party organization to administer the professional accreditation processes and perform the technical review and verification of projects applying for LEED certification. The GBCI also oversees the continuing education requirements as part of the credential maintenance program for LEED professionals. These activities were previously overseen by the USGBC.

In order for a building to be certified, certain prerequisites must be achieved and enough points must be earned to meet or exceed the program’s technical requirements. Points add up to a final score that relates to one of four possible certification levels: certified, silver, gold, and platinum. LEED is one of the primary building rating systems in the United States.

The LEED program awards various categories of credentials to people who meet the requirements of the program. These include the LEED Green Associate and the LEED Accredited Professional (AP) with specialty. Specialties include Building Design and Construction, Operations and Maintenance, Interior Design and Construction, Homes, and Neighborhood

Development. The USGBC also offers the LEED for Homes Green Rater and the Green Classroom Professional certificates.

LEED Rating Systems

Depending on the type of project, buildings can become LEED certified under one of several different rating systems. The available LEED ratings systems include

- LEED for New Construction
- LEED for Existing Buildings: Operations and Maintenance
- LEED for Commercial Interiors
- LEED for Core and Shell
- LEED for Schools
- LEED for Retail
- LEED for Homes
- LEED for Neighborhood Development
- LEED for Healthcare

Each rating system is divided into five main credit categories and two bonus credit categories, as listed in Table 21.1. Projects must fulfill each credit category’s prerequisites, and are then awarded points within each credit category. Each credit category is weighted to reflect its potential impact on the environment. Additional LEED for Neighborhood Development credit categories include smart location and linkage, neighborhood pattern and design, and green infrastructure and buildings. Additional LEED for Homes credit categories include location and linkage, and awareness and education.

For commercial buildings and neighborhoods, points are awarded on a 110 point scale (including up to 10 bonus points), but the number of points available in each category varies with the rating system. For a commercial building or neighborhood to earn LEED certification, it must satisfy all the prerequisites and receive a minimum of 40 points. Homes must earn a minimum of 45 points on a 136 point scale. The total number of points a project achieves will determine the level of certification it is awarded.

Table 21.1

LEED Credit Categories and Point Percentages

category	possible points	percentage of total
sustainable sites	21	19%
water efficiency	11	10%
energy and atmosphere	37	34%
materials and resources	14	13%
indoor environmental quality	17	15%
innovation in design or operation	6*	5%
regional priority	4*	4%
total	110	

*bonus points

LEED 2009 is available for new registrations until June 2015. LEED v4, which replaces LEED 2009, has more credit categories and prerequisites than previous versions. The exact credit categories and individual credits required depend on the project type. This version includes specialty market sections, such as warehouses, data centers, and hospitality facilities; updated credit weights and requirements; and an increased emphasis on measurement and performance.

A project can be awarded one of four different certification levels, depending on the number of total points it achieves. The four levels are

- certified: 40–49 points
- silver: 50–59 points
- gold: 60–79 points
- platinum: ≥ 80 points

The LEED program has also been adopted by the Canada Green Building Council (CaGBC; www.cagbc.org) for use across Canada. The requirements are essentially the same except that SI units are used, Canadian standards and regulations are referenced, protection of fish habitats is recognized, some definitions are changed, and a few other minor modifications are made to tailor the requirements to Canada.

Green Building Initiative (GBI)

www.thegbi.org

Green Globes, a green building guidance and assessment program, is a product of the Green Building Initiative (GBI), a not-for-profit organization that promotes environmentally sustainable building practices. Building owners can use Green Globes to evaluate their building during design and construction on a 1000 point scale in the categories of energy, indoor environment, site, water, resources, emissions, and project management. After the initial evaluation, third-party assessors review the building and documentation for certification. If the building is certified, it may be awarded a rating of one to four globes.

National Association of Home Builders (NAHB) Green Building Standard

www.nahbgreen.org

In partnership with the International Code Council (ICC), the National Association of Home Builders (NAHB) developed ICC 700, *National Green Building Standard*, which was approved by the American National Standards Institute (ANSI). The NAHB has also developed companion publications and resources on green building products and practices. ICC 700 applies to single-family homes; low-, mid-, and high-rise multifamily buildings; residential remodeling projects; and site development projects. The standard includes six areas: lot design, preparation, and development; resource efficiency; energy efficiency; water efficiency; indoor environmental quality; and operation, maintenance, and building owner education. There is a separate rating system for green land developments. After a project is completed, the builder can request a third-party inspection and review. Successful projects are awarded a bronze, silver, gold, or emerald rating based on the number of performance points obtained in the six areas of design and construction.

Energy Star

www.energystar.gov

Energy Star is a program of the Environmental Protection Agency and the U.S. Department of Energy, started in 1992. As part of the Energy Star for Buildings and Manufacturing Plants program, Energy Star provides tools and resources to assist architects, business owners, and others involved in the building process to design, build, commission, and manage projects in ways that save energy. Once a building is completed and one year's worth of energy performance is obtained, the project's energy use is compared with other, similar facilities on a scale of 1–100. Buildings scoring 75 or higher are eligible for the Energy Star label.

Collaborative for High Performance Schools (CHPS)

www.chps.net

The Collaborative for High Performance Schools is a membership association composed of public, private, and nonprofit organizations. Founded with the goal of increasing the energy efficiency of schools in California and improving California's quality of education, CHPS is now a national organization. CHPS publishes several best practices manuals, holds training seminars, and maintains a database of high-performance products, including a list of low-emitting materials meeting the criteria of the California Department of Public Health's (CDPH's) *Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers*, Version 1.1 (CDPH Standard Method V1.1).

CDPH Standard Method V1.1, also known as Section 01350 (an older name of the standard used by California), is the most stringent testing method widely in use in the industry. The test evaluates the *emissions* of VOCs, rather than just VOC content. It establishes methods of testing products, materials, and freestanding furniture to ensure that pollutant concentrations do not exceed the limits of chronic reference exposure levels (CRELs) set by California within schools, offices, and residences. In addition to defining a standard test method, CDPH Standard Method V1.1 sets guidelines for standard classroom and office spaces.

CHPS provides assessment tools and criteria for recognition for twelve states, as well as California, and may be adding others. For new construction and major modernizations, CHPS provides two recognition programs, CHPS Designed and CHPS Verified, depending on the state in which the project is located.

Building Research Establishment Environmental Assessment Method

www.breeam.org

The Building Research Establishment (BRE) is a British organization that provides research-based consultancy, testing, and certification services covering all aspects of the built environment and associated industries. The BRE Environmental Assessment Method (BREEAM) is a method of reviewing and improving the environmental performance of buildings. There are methods to review offices, industrial buildings, retail buildings, and homes.

BREEAM evaluates the performance of buildings in the areas of management, energy use, health and well-being, pollution, transportation, land use, ecology, materials, and water use. Credits are awarded in each area and are added to produce a total score. The building is then given a rating of pass, good, very good, or excellent, and awarded a certificate.

The BRE also runs a certified environmental profiling system that provides a measurement of the environmental performance of building materials and products.

PRODUCT CERTIFICATION

As with entire buildings, there are organizations that certify products as being environmentally sound. The following are the most notable.

BIFMA International

www.bifma.org

The Business and Institutional Furniture Manufacturers Association maintains two ANSI-approved standards for volatile organic compound emissions from office furniture. These are ANSI/BIFMA M7.1, *Standard Test Method for Determining VOC Emissions from Office Furniture Systems, Components and Seating*, and ANSI/BIFMA X7.1, *Standard for Formaldehyde and TVOC*