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Environments



THE BENEFITS OF DAYLIGHTING IN ARCHITECTURAL DESIGN

Daylighting in LEED and BREEAM Standards

In modern architecture, daylighting transcends basic illumination – it enhances energy efficiency, occupant well-being, and the creation of high-performance buildings. Certification systems such as **LEED** and **BREEAM** recognize the key role daylighting plays in allowing projects to reach their sustainability goals, although they approach it differently. In this article we'll explore how LEED addresses daylighting, compare it to BREEAM, and look at real-world case studies where daylighting systems have helped projects meet ambitious sustainability goals.

Daylighting in LEED:

Unlocking Indoor Environmental Quality

Introduced by the US Green Building Council (USGBC) in 1998, **LEED (Leadership in Energy and Environmental Design)** is the most widely used sustainability building rating system in the world, providing a framework for creating healthy, highly efficient, cost-saving buildings.



LEED v4.1: Precision in Daylight Performance

LEED v4.1 rating system for Building Design and Construction (BD+C) places a strong emphasis on daylighting in its Indoor Environmental Quality (IEQ) category under the 'EQ Credit: Daylight.'

Purpose of the Daylight Credit

LEED's daylight credit is designed to reduce dependence on artificial lighting, enhance occupant comfort and well-being, and support productivity and mood through natural lighting conditions. These three objectives align with LEED's mission to promote healthy, high-performance buildings.

Credit Requirements

Projects must demonstrate adequate daylight illuminance levels in regularly occupied spaces to earn the LEED daylight credit. There are three possible routes to compliance:

1. Dynamic Simulation – Spatial Daylight Autonomy (sDA 300/50): Recently updated in V4.1 Beta, projects must now achieve:

- At least 40% sDA (300 lux for 50% of the building's occupied hours) across 55% or more of the regularly occupied floor area to earn **1 point**.
- Higher thresholds than the previous 55% target, which now earns **2 points**, with **3 points** being awarded for 75% sDA.
- This provides a dynamic, year-round simulation of daylight availability and is considered the most rigorous and comprehensive method of measurement.

2. Simulation – Illuminance Modeling:

This is a more straightforward modeling approach using specific time and sky conditions (typically 9am and 3pm on the equinox). According to v4.1, illuminance levels must be:

- Between 300 and 3,000 lux for a minimum of 55% of regularly occupied space, lowered from the previous minimum of 75%, which now earns **2 points**.
- The latest update also means that areas with view-preserving automatic glare control devices need only comply with the minimum 300 lux level.

3. On-site Measurement:

For actual on-site measurements of daylight levels under clear sky conditions, readings for each regularly occupied space must fall within:

- The 300–3,000 lux range on a clear-sky day between 9am and 3pm.
- Glare-controlled spaces require only with view-preserving automatic glare.



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LEED v5: Toward Near-Zero Carbon & Enhanced Well-Being

LEED v5 has been created to provide a comprehensive framework for the creation of near-zero carbon buildings. LEED v5's revamped scoring system reflects its primary goals. Half of the available points in v5 will relate to climate action, while the other half are equally split between quality of life and ecological initiatives.

Key Updates:

Lighting Environment (Occupant Experience Credit). Improving occupant health, wellness, and overall quality of life is addressed through the Occupant Experience credit. As part of this, designers can achieve points by ensuring a healthy and productive Lighting Environment. This includes ensuring effective daylighting access by using daylight simulation analysis to **optimize visual comfort and reduce glare.**

Embodied Carbon Reduction. The focus on embodied carbon has increased significantly in LEED v5. It introduces a new credit concept focused explicitly on procuring low-carbon construction materials as part of the broader effort to reduce the embodied carbon footprint associated with building materials.

The new credit offers three options to earn points:

- **Option 1:**
Whole-building lifecycle assessment (LCA):
This option requires a comprehensive assessment of the building's lifecycle to identify and reduce embodied carbon.
- **Option 2:**
Low-carbon procurement: This simplified option focuses on procuring specific low-carbon materials. By reducing complexity and focusing on high-impact materials, it aims to be more accessible and straightforward than previous versions.
- **Option 3:**
Environmental Product Declarations (EPDs):
This option involves using materials with verified EPDs, emphasizing transparency and environmental performance

This shift highlights the importance of considering the entire lifecycle of building materials — including those used for daylighting — through Whole-Building Life Cycle Assessment (LCA).

LEED v5's incorporation of Whole-Building Life Cycle Assessment (LCA) and Life Cycle Thinking, as part of its comprehensive approach to sustainable building practices, involves evaluating a building's environmental impact from construction and operation to final demolition or reuse, so that projects not only meet immediate environmental goals but also consider long-term ecological effects.



A Brief Look at BREEAM International
BREEAM (Building Research Establishment Environmental Assessment Method) International New construction is the standard used for new developments in the USA.

Whilst the issues addressed are the same as the usual BREEAM standard, this international version provides ways to adapt section weightings to reflect the environmental conditions specific to the country of assessment. This regional approach is to make sure that any BREEAM certified project exceeds local regulations. The USA has been divided into 10 regions, based on climate, energy use, transport availability, population density, ecology and other factors. [You can learn more about the weightings here.](#)

BREEAM International New construction approaches daylighting through its **Hea 01 Visual Comfort** credit. This system generally uses daylight factor calculations, focusing on:

- Static illuminance levels under overcast sky conditions.
- Minimum daylight factor thresholds (eg. 2% for offices).
- Glare control and uniformity.
- Window and view considerations.

While BREEAM's method can be considered more prescriptive than LEED's dynamic and performance-based approach, both standards aim to ensure high-quality lighting environments. To illustrate this, we have created a table that sets the BREEAM requirements against that of LEED v4.1.

Category	LEED v4/v4.1 (EQ Credit: Daylight)	BREEAM (Hea 01 Visual Comfort)
Primary Objective	Ensure adequate natural lighting while supporting occupant comfort and reducing energy use.	Ensure sufficient daylight provision to improve occupant wellbeing and reduce artificial lighting demand.
Assessment Method	Dynamic simulation (sDA and ASE), illuminance simulations, or physical measurement.	Static daylight factor calculations under overcast sky conditions.
Key Metrics	• sDA 300/50 $\geq$ 40% of regularly occupied area (v4.1). • Illuminance: 300–3,000 lux at 9am & 3pm (equinox). • Measurement-based lux readings.	• Minimum Daylight Factor: typically 2% for offices, 1.5% for classrooms/habitable rooms. • Uniformity ratio requirements.
Glare Control Requirement	Required for all compliance paths (eg. blinds, dynamic glazing).	Must demonstrate glare is controlled (eg. shading, design strategies).
Occupant-Centric Approach	Yes – considers time of use, area, and daylight availability throughout the year.	No – evaluates a single point in time under overcast sky conditions.
Climate Consideration	Radiance, Climate Studio, Solatube Design Calculator, etc.	BRE Daylight and Sunlight guidance, simple simulation tools, BRE-recommended spreadsheets.
Compliance Tools	1–3 points depending on the level of daylight achieved.	1–2 credits depending on building type and performance.
Certification Influence	Yes, for exemplary performance or integration with other wellness strategies.	Possible if integrated into broader visual comfort or occupant health strategies.
Innovation Credit Eligibility	Yes, for exemplary performance or integration with other wellness strategies.	Possible if integrated into broader visual comfort or occupant health strategies.

Fig 1. Comparison of certifications/standards

Case Studies

The following are seven standout examples where daylighting played a central role in achieving LEED certification and elevating building performance



Ecofibre North American Headquarters – Georgetown, KY, USA

LEED Certification: Platinum.

Daylighting Solution: 66 Solatube Daylighting Systems, including SolaMaster 750 DS-O, 330 DS-C, and SkyVault M74 DS units.

Summary: Ecofibre integrated high-performance tubular daylighting across its office, warehouse, and cleanroom spaces to support its sustainability mission and wellness goals, providing a 58% reduction in total energy consumption and a bright, welcoming environment.

[Explore the full case study here.](#)



Madison Fire Station #14
– Madison, WI, USA

LEED Certification: Platinum.

Daylighting Solution: 2,630 sq ft of UniQuad® translucent wall panels.

Summary: To daylight the fire station's interiors, UniQuad® panels were used to manage west-facing glare while maintaining energy efficiency. The system helped reduce energy use by 70% and supported a healthy, glare-free environment.

Explore the full case study [here](#).





Arizona State University Student Pavilion – Tempe, AZ, USA

LEED Certification:

Platinum (Net Zero Energy design).

Daylighting Solution:

Solatube SolaMaster Series 330 and 750 DS-C with long tubing and 90° bends.

Summary: Solatube daylighting systems channeled natural light deep into the second and third-floor corridors of ASU's Student Pavilion, improving comfort and reducing energy demand to support the building's Net Zero goals.

[Explore the full case study here.](#)



**Eagle Center Public
Charter School
– Washington, D.C., USA**

LEED Certification: Silver.

Daylighting Solution: 13,020 sq ft of UniQuad® translucent panels with Removable Skin Technology.

Summary: In a community-sensitive location, the school replaced traditional windows with UniQuad® panels to enhance security while delivering daylight without glare. The gymnasium requires little to no artificial lighting during the day.



Austin ISD Performing Arts Center
– Austin, TX, USA

LEED Certification: Certified
(plus Austin Green Building Program).

Daylighting Solution: 6,840 sq ft of UniQuad®
translucent panels.

Summary: This performing arts venue used a UniQuad® translucent wall system to create a 'lantern' effect at night while minimizing solar heat gain during the day. The building achieved 23% lower energy use than baseline facilities.





103 CityPoint – Waltham, MA, USA

LEED Certification: Certified.

Daylighting Solution: UniQuad® translucent wall system, PentaClad® cladding system.

Summary: This project integrated Kingspan's UniQuad® translucent wall panels and PentaClad® cladding to create a versatile manufacturing, office, and lab space, enhancing aesthetic appeal and optimizing natural daylighting while contributing to an energy-efficient environment.

[Explore the full case study here.](#)

Images: Raj Das Photography

Boeing Assembly Facility – Charleston, SC, USA

LEED Certification:

Platinum (Net Zero Energy design).

Daylighting Solution:

UniQuad® translucent wall system.

Summary: To light an enormous industrial space while minimizing heat and glare, Boeing used UniQuad® panels featuring Nano-Cell® technology. The system enabled early HVAC startup and helped meet challenging LEED goals on a fast-track timeline.



Whatever the structure's purpose, daylighting is a design strategy that delivers benefits from reducing energy use to enhancing occupant comfort, and supports certification under LEED and BREEAM. With simulation tools, high-performance materials, and intelligent design choices, project teams can deliver functional and beautiful spaces where occupants and owners profit from natural light.

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