The Role of the EMICODE® in Green Building Certification Systems

GEV EMICODE®

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History

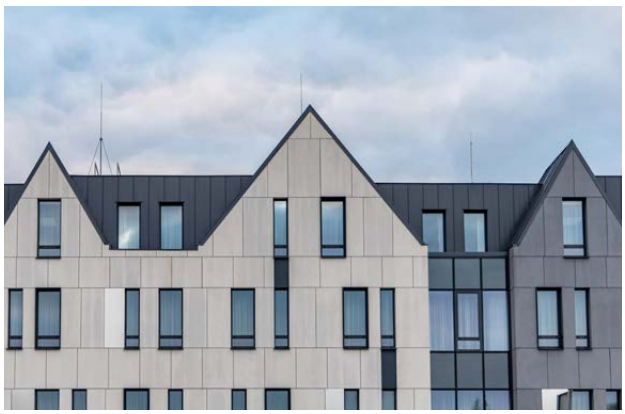
The task of today's building certification systems is to assess the sustainability of buildings. They have their origin in the certification system developed by the British "Building Research Establishment", which was launched in 1990 under the name of "Building Research Establishment Environmental Assessment Method" (BREEAM).

This system represented the first attempt to assess the sustainability of whole buildings in a systematic and comparable manner. Following this model, numerous green building certification systems were developed over the next two decades, taking not only local differences in the climatic, political and economic conditions but also the regulatory requirements into account.

BREEAM® LEED DGNB

Based on the annual reports of 2024, BREEAM[1] is by far the most successful building certification system internationally, with more than 600,000 certified projects worldwide. In second place is the LEED system of the U.S. Green Building Council[2] with more than 100,000 certified projects. Both systems are also very successful in the German market, but are relegated to second and third place by the market leader in Germany, which is the German Sustainable Building Council (DGNB)[3].

The theoretical basis for all three systems is the "three-pillar model of sustainability", which, at political level, was established as a general societal goal in the 1997 Treaty of Amsterdam.



The three-pillar model stipulates that environmental, economic and social sustainability are equally important human needs.

The adaptation of the three-pillar model to the building sector leads to very similar goals across all three certification systems:

- The long-term, energy-efficient and flexible use of buildings is the primary economic goal.
- Conserving natural resources, avoiding pollutants and hazardous substances, reducing the carbon footprint, and protecting biodiversity are the most important environmental goals.
- The social goal is to protect the health and well-being of the buildings' occupants.

If a requirement is met, a certified auditor will award points (so-called "credits"). The assessment of a building's sustainability level is based primarily on the total number of credits earned.

[1] BRE announces winners of BREEAM Awards 2024
https://bregroup.com/news/bre-announces-winners-of-breeam-awards-2024#:~:text=BREEAM%20has%20been%20the%20world,having%20received%20certification%20to%20date

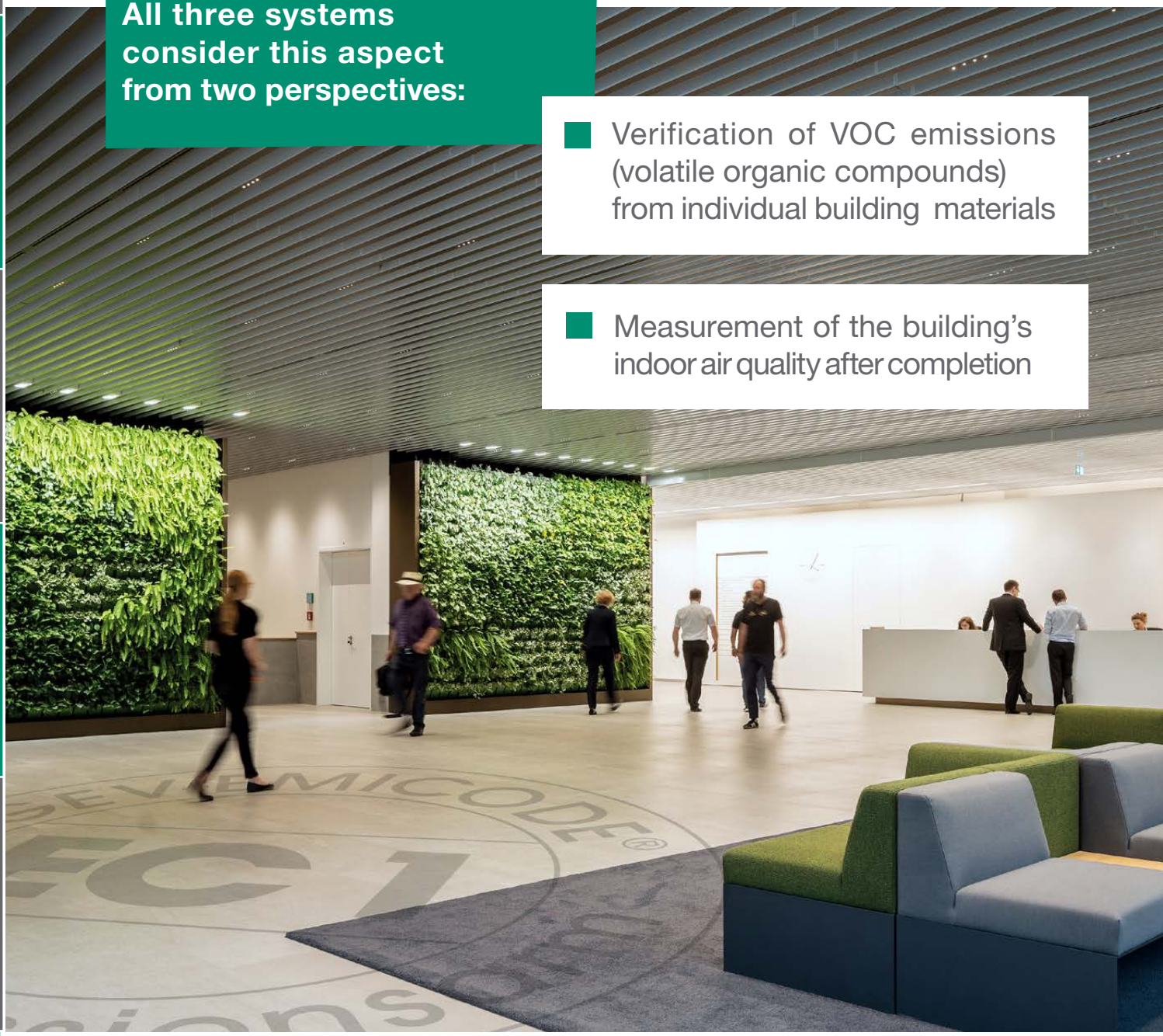
[2] USGBC Impact Report
https://www.usgbc.org/sites/default/files/2025-02/USGBC-Impact-Report-Jan-25.pdf

[3] DGNB: Facts and figures
https://www.dgnb.de/de/dgnb/ueber-die-dgnb/dgnb-in-zahlen

Installation materials and sealants

The three systems specify concrete requirements for the components and materials used in the construction of buildings. For the product group “Installation materials and sealants”, all three systems focus on the contribution these materials make to indoor air quality.

All three systems consider this aspect from two perspectives:



- Verification of VOC emissions (volatile organic compounds) from individual building materials
- Measurement of the building’s indoor air quality after completion

BREEAM

In the BREEAM system (BREEAM International New Construction Version 7), the requirements for building components and materials aimed at improving indoor air quality are specified in the category “Health and Wellbeing” under subcategory “Hea 04 Indoor Air Quality”.

This system divides all building materials into 5 product categories. In 3 out of 5 categories, all building materials used must meet the following VOC emission requirements in order to earn a BREEAM credit:

- Total VOC emissions (TVOCs) ≤ 1000 µg/m³
- Formaldehyde ≤ 60 µg/m³
- Carcinogenic substances of categories 1A/B ≤ 1 µg/m³

If all 5 product categories meet the above requirements, 2 BREEAM credits are awarded.

It is also possible to earn so-called “exemplary credits” to achieve a higher building rating if the products meet the following requirements:

- Total VOC emissions (TVOCs) ≤ 300 µg/m³
- Formaldehyde ≤ 10 µg/m³
- Carcinogenic substances of categories 1A/B ≤ 1 µg/m³

Compliance with these requirements can also be confirmed through “approved alternative schemes”, i.e., through EMICODE® certificates or certificates from other providers.

After completion of construction work but before occupying the building, it is necessary to measure indoor air quality to ensure compliance with the following requirements:

- TVOCs ≤ 300 µg/m³
- Formaldehyde ≤ 100 µg/m³

This earns 1 credit toward certification.

The aspect of “Indoor air quality” accounts for approx. 3 % of the total score in the BREEAM system.

LEED

In the LEED system (LEED V4.1 BD+C New Construction), the requirements for improving indoor air quality are specified in the category “Indoor Environmental Quality”.

The “Low-Emitting Materials” credit lays down the requirements regarding the emission behavior of building materials.

The system divides building materials into 8 product categories. The project earns at least 1 point if the requirements in at least 2 categories are met. Up to 3 points can be earned if the products used meet the requirements in additional categories.

Installation materials fall under the category “Adhesives and Sealants” and must comply with the following requirements:

- At least 75 % (by price, area or volume) of the products used must meet the emission requirements according to Standard Method V1.2-2017 used by the California Department of Public Health (CDPH).
- 100 % of the products used must meet the VOC content specified by SCAQMD Rule 1168.

For projects outside the United States, it is possible (up to LEED V4.1) to prove compliance with these requirements via the “alternative compliance path”, i.e., by using product certificates such as the EMICODE® EC 1PLUS.

For the latest LEED version V5, a list of accepted product certificates is not yet available.

However, even in version V5, it is possible to meet the requirements via the “alternative compliance path”. This can be achieved through testing in accordance with EN 16516 based on the AgBB evaluation scheme (with an additional limit value for formaldehyde of 10 µg/m³ after 28 days). A maximum of 3 points can be earned through the “Low-Emitting Materials” credit.

The credit “Indoor Air Quality Assessment” specifies the requirements for indoor air quality:

- TVOCs < 500 µg/m³
- In addition, limit values for 12 individual substances must be met.

The “Indoor Air Quality Assessment” credit can contribute only 1 point.

The aspect of “Indoor air quality” accounts for approx. 4 % of the total possible score.

DGNB

In the DGNB system (New Buildings, version 2023, 3rd edition), the material and VOC emission requirements for building materials and components are formulated together under criterion ENV1.2 “Local Environmental Impact”.

In its criteria matrix, the DGNB specifies requirements only for those building materials and components that are relevant to the assessment. Any building materials and components not listed in the criteria matrix are not expected to meet any requirements and are not considered for the certification process.

The criteria matrix lays down specific requirements for each product category in the form of four quality levels.

Installation materials fall under line 8 of the criteria matrix and must meet requirements regarding material composition and emission behavior. Compliance with the material requirements can be easily proven via the GISCODE.

With regard to emission requirements, the DGNB takes a different approach than LEED and BREEAM and does not specify its own requirements. Instead, for quality levels 2 to 4 (4 being the highest level), the system requires proof of low VOC emissions through one of the following certificates: EMICODE® EC 1^{PLUS}, Blue Angel (RAL-UZ 113), or an equivalent emissions certificate.

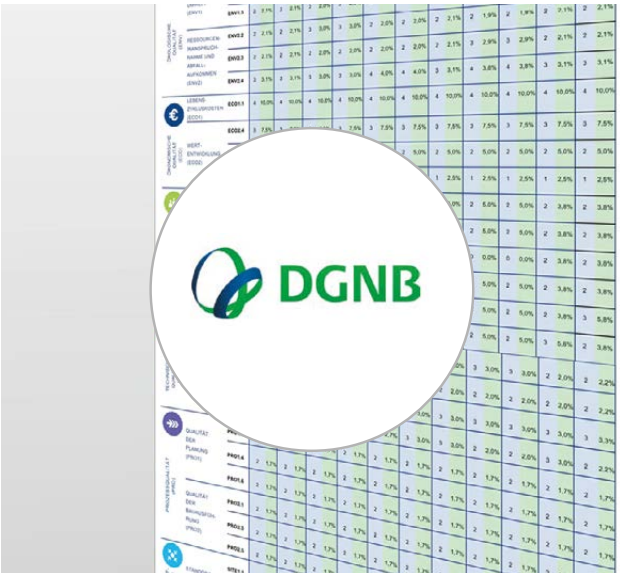
Criterion ENV1.2 can contribute up to 110 points toward certification. This corresponds to approx. 5 % of the total score.

In the DGNB system, VOC emissions from building materials and components are given slightly higher weight than in LEED or BREEAM.

The requirements for indoor air quality are defined in criterion SOC1.2 “Indoor Air Quality”:

- TVOCs ≤ 3000 µg/m^3
- Formaldehyde ≤ 100 µg/m^3
- If an AIR guide value II exists for the measured emission, it must be complied with. These guide values are established by the German Committee for Indoor Air Quality (AIR) at the Federal Environment Agency (UBA).

The above indoor air quality requirements represent the minimum standard. Any building that does not meet these requirements will not receive DGNB certification – regardless of all other results. The classification of SOC1.2 as an exclusion criterion means that the aspect of indoor air quality is given greater weight in the DGNB system than in LEED and BREEAM.



Negligible contribution of installation materials to the GWP

Since installation materials account for only a very small portion of the total building, other sustainability criteria such as the Global Warming Potential (GWP) are not considered or are given only little weight in building certifications.

Both the **BREEAM** and the **DGNB** system stipulate that a life cycle assessment is calculated and submitted for the respective building. Although installation materials also contribute to the results of this assessment, their contribution is negligible due to the relatively small proportion of these products in the total mass of the building.

The **LEED system** (V4.1) awards credits for the use of building materials with a reduced GWP as well as for the use of raw materials from recycling or from bio-based renewable sources. However, to earn these credits, it must be proven that 30 % of the building components and materials used meet these requirements. This 30 % share is calculated based on the total cost of the components.

Since installation materials account for only a very small portion of the building's total cost, their contribution to meeting the credit requirements is negligible.

Summary

Building certification systems evaluate the sustainability of entire buildings based on defined criteria with fixed weightings. This makes it possible to assess the sustainability of buildings in a systematic and comparable way. Over the past 35 years, these systems have gradually evolved and are now widely accepted in the real estate market. BREEAM, LEED and DGNB are the most important green building certification systems – both on a national and international scale.

With all three systems, the requirements for installation materials focus on three key areas:

- Low VOC emissions from the building materials used
- Absence of pollutants and hazardous substances from the building materials used
- Low VOC emissions when measuring indoor air quality

DGNB GEV-EMICODE EC 1 very low emission

The DGNB system directly refers to the EMICODE® label as proof of compliance with the above requirements under criterion ENV1.2.

BREEAM GEV-EMICODE EC 1 very low emission

The EMICODE® is recognized as an “approved alternative scheme” in the BREEAM system and can be used without restriction as proof of compliance with the criteria under category “Hea 04 Indoor Air Quality”.

LEED GEV-EMICODE EC 1 very low emission

In the LEED system, the EMICODE® can also be used as proof of compliance with the VOC requirements in the “Low-Emitting Materials” credit. However, this “alternative compliance path” is only permitted for projects outside the United States.

Being a sophisticated, reliable and recognized certification system for installation materials, the EMICODE® facilitates the work of architects, planners and contractors when selecting building products and when documenting the compliance of buildings seeking LEED, BREEAM or DGNB certification.

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