ICDLI

International Committee of the Decorative Laminates Industry

Comparison of the certification systems for buildings DGNB, LEED and BREEAM

Preface

High-pressure laminate (HPL) in accordance with EN 438 has been used in the construction and furniture sector for decades. The European standard EN 438 defines the material, requirements and properties of HPL.

HPL is a resin and paper-based thermosetting composite material and features a unique, extremely robust, resistant, modern and very decorative surface. HPL is omnipresent in our day-to-day lives and is self-supporting or used in conjunction with substrates. The application and usage areas of HPL are extremely diverse and are constantly evolving. This requires knowledge management which provides regularly updated information and assistance with regard to different applications and processing, in the form of technical bulletins.

This information serves to compare the systems for certification of buildings DGNB (D), LEED (US) and BREEAM (UK) which are commonplace today. This is essentially based on the bachelor thesis by Ms Marie Breitenberger on the topic “Critical analysis of the certification systems for sustainable buildings used in Germany” filed at the Mittweida University of Applied Sciences in 2013.

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Important note:

This document makes no claim of completeness regarding listing the full details of any standards referred to in the text.

All information is based on the current state of technical knowledge, but it does not constitute any form of liability. It is the personal responsibility of the user of the products described in this information leaflet to comply with the appropriate laws and regulations.

For more than 50 years the ICDLI has been the international representative of the interests of European laminate manufacturers. Further information about the ICDLI and the data sheets published up to now can be found at www.icdli.com.

This application was compiled by the International Committee of the Decorative Laminates Industry.
It considers the conditions of application technology in the European countries. If you have further questions, please contact us:

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1. Context of HPL material systems, environmental product declaration (EPD) and certification systems for buildings

HPL is an excellent and durable surface material which is used in various applications. It is not only used to enhance the appearance of furniture or kitchen work surfaces; HPL is also used in the building sector for both interior finish and cladding.

In 2012 a decision was taken to draw up an Environmental Product Declaration (EPD) and thus make the sustainability of HPL transparent so that the growing number of requests by architects and builders with regard to its environmental properties could be met. In this process it was important to gain the highest possible degree of objectivity of the data with a type III declaration which are requested and evaluated by a neutral third party.

Environmental product declarations provide quantitative, verified and objective information about the effects of a product or service on the environment by means of clearly defined parameters. The complete life cycle of the product (raw material extraction, production, transport, use, disposal) is taken into consideration in this process.

Environmental product declarations are used more and frequently in the building sector in particular by architects and building contractors in order to verify and guarantee the most sustainable construction possible. Environmental product declarations are also drawn up for products and services beyond the field of construction.

There are three distinct types of environmental product declarations in accordance with the international standard ISO 14020. Type III represents the most comprehensive level which can be achieved. As this type is verified by an independent third party, it has the greatest degree of objectivity and neutrality. An environmental product declaration is drawn up on the basis of applicable international technical rules, which are set down in so-called PCRs (Product Category Rules). These define the content and presentation of the environmental product declaration for the specific product group and they therefore have a normative character.

The environmental product declaration must contain certain parameters so that the life cycle assessment of a product can be presented in a revealing way. The **life cycle inventory analysis** describes which resources a product consumes during its life cycle (e.g. energy, water, renewable and non-renewable resources). The life cycle inventory analysis also states the air, water and ground emissions. The **impact assessment** is based on the results of the life cycle inventory analysis and it provides concrete information on environmental effects such as the greenhouse effect, the destruction of the ozone layer, acidification or the exhaustion of fossil and mineral resources. Additional indicators such as the type and quantity of **waste** produced are also shown.

The material specific EPDs are a requirement for installation in a building which is classified in accordance with a sustainable building classification system. The best-known certification systems are DGNB, LEED and BREEAM.
These are presented in the next section and compared to the extent which is possible.

2. Sustainability of buildings

Environmental compatibility plays an increasingly significant role in construction alongside the quality of the buildings and the associated quality of materials and technology used.
Buildings, particularly commercial buildings, are usually subject to intensive use over many decades. For this reason particular attention is paid to the building and the materials used in it during the course of the sustainability discussion.
Buildings which really stand out in terms of the materials used, the sparing consumption of energy and water can be awarded a corresponding label. This allows the building's sustainability to be identified and made visible to owners and users.

3. Certification systems for buildings

Instruments, so-called certification systems, were developed in the 1990s in order to make the sustainability of modern buildings visible.
The most important certification systems at present are;

- DGNB – Deutsche Gesellschaft für nachhaltiges Bauen (German Sustainable Building Council)
- LEED – Leadership in Energy & Environmental Design (USA)
- BREEAM – Building Research Establishment Environmental Assessment Method (UK)

The ways in which these three systems function are explained below and compared to one another to the extent that this is possible.

4. DGNB

The DGNB is a non-profit organisation which promotes sustainable building and use of the built environment. It is an organisation which is supported by its members who also understand sustainability as an extension of the concept of democracy for future generations. The aim of the DGNB is to plan, operate and use the built environment for everyone's benefit in such a way that the interests of the generations which follow us will not suffer as a result of it while not limiting the interests of the current generation to the extent that this is possible.
The basis for the self-image of the DGNB is the carefully balanced interaction between efficiency, sufficiency and consistency in the development of approaches to solving problems and objectives. Efficiency means better use of the resources available; it is linked to technical considerations and also to systematic approaches to solving problems.
Sufficiency aims for the correct amount; it aims to set limits on the excessive consumption of resources and also to implement frugality and sufficiency in the social consensus.
Consistency describes the transition to nature-compatible technologies; eco-systems are to be used without being destroyed in the process; it thus involves thinking and acting in cycles.
The DGNB is aiming to make sustainability into a philosophy for life and a lifestyle. Instead of the "you should" present in state regulations, the "I wish to" will appear not just a moral imperative but

also as a need. Consideration of sustainability in the built environment is not restricted to technical aspects and it does also incorporate social questions explicitly. The DGNB thus encourages and demands cross-system solutions. The overall perspective takes precedence over the selective consideration of single problems.

The DGNB has been issuing certificates since 2009, primarily in German speaking countries. Since then the DGNB has been consistently pursuing greater internationalisation to make up ground on the LEED and BREEAM systems in particular, which started their work a good decade earlier.

a. Certification process

Certification in line with DGNB usually occurs by order of the developer. An auditor trained by the DGNB undertakes the documentation and assessment of the building to be certified as well as all additional organisational obligations in the pending certification process. A software developed by the DGNB plays an important role here and all building relevant data such as life cycle assessments are recorded and evaluated with it. The data recorded by the auditor with the assistance of the software are checked by the DGNB for accuracy and compliance within the framework of a conformity test. The building will be awarded the DGNB certificate if all criteria are met.

b. Assessment criteria

Six thematic fields which are sub-divided into eleven groups of criteria form the DGNB basis for assessment. The technical quality and the process and location quality play a role for the award of the certificate in addition to the ecological, economic, socio-cultural and functional quality.
The groups of criteria contain the actual assessment criteria of the DGNB certificate. These criteria are stipulated in the DGNB core catalogue. The assessment can be adapted to each type of object individually by means of the various use profiles.

The following criteria were among those included in the assessment for the 2012 version for the use profile of new build office and administration buildings. The life cycle assessment, primary energy requirement, risks for the local environment and the land use are checked within the framework of evaluation of the ecological quality. The economic quality includes the building related costs in the life cycle, the conversion capability and marketability of the building. The socio-cultural and functional quality of buildings includes the thermal, visual and acoustical comfort, the outdoor space qualities and the efficient use of space for example. The accessibility and design qualities such as the artwork on the building are also assessed here. From a technical perspective all measures in relation to fire prevention, sound insulation and those concerning suitability for dismantling and recycling should be met for example. The heat and moisture protection quality of the building shell and the cleaning and maintenance friendliness also count as hugely significant criteria.

The process quality provides requirements such as the securing of the sustainability aspects with regard to the tender and award of building services and the creation of requirements for optimum use and management. The quality assurance of the building construction and the orderly commissioning of the object are also significant points.
The conditions at the micro location, the image and the condition of the location and district and

transport connections are some of the criteria involved in the location quality category. This is considered as an extra thematic field for buildings exclusively but it is not assessed.

c. Assessment

The categories are given different weightings and assessed separately. The ecological, socio-cultural and functional and technical quality take up 22.5 percent of the overall assessment while the process quality takes up 10 percent.

d. Weighting

The DGNB software calculates the degree of fulfilment which results following adherence to the performance parameters and the thematic fields. The ratio between the achievable total points score and the score which is actually reached provides the degree of fulfilment, which is presented as a percentage and as a mark. A building will receive the Bronze award if it achieves an overall degree of fulfilment of at least 50 percent. The building can receive the Silver award if 65 percent is achieved. If the degree of fulfilment is 80 percent or over, the Gold DGNB certificate is awarded. A specific basic level (minimum degree of fulfilment) must however be achieved in each thematic field if the DGNB award is to be made. This is to ensure a uniformly high standard for the buildings.

DGNB certification levels (2012 Version):

- Bronze ≥ 50%
- Silver ≥ 65%
- Gold ≥ 80%

5. LEED

The assessment system Leadership in Energy and Environmental Design (LEED) defines standards for sustainable construction. Originally developed for the American market, it has however become firmly established on the international market and it is the best-known certificate.
The ecological and socio-cultural dimensions of sustainability are essential factors in the LEED assessment. Particular importance is thus attached to water and energy efficiency, the reduction of CO_2 emissions, the environmentally friendly use of resources and the comfort of rooms. The construction activities and the location quality are also assessed.
The LEED system was developed by the non-profit organisation U.S. Green Building Council (USGBC), which was founded in 1993. The work of the USGBC has been shared with the independent subsidiary Green Building Certification Institute (GBCI) since the start of 2008. The GBCI thus supervises the complete certification process up to the award of the certificate.
The aim of the LEED assessment is particularly environmentally friendly handling of natural resources for new builds and for the renovation of buildings. The profitability of the buildings should also be increased, the health and well-being of users encouraged and any negative effects on the environment reduced. The possibility of LEED pre-certification of projects only exists for the system variant LEED Core & Shell.

There are currently nine LEED system variants for assessment of sustainable buildings available on the market:

- LEED for New Construction & Major Renovations (*new builds and general renovations)*
- LEED for Existing Buildings: Operation & Maintenance (*existing buildings: building operation and maintenance)*
- LEED for Core & Shell *(modified shell construction)*
- LEED for Commercial Interiors (*commercial tenant fit-out)*
- LEED for Retail (*retail: new build and tenant fit-out)*
- LEED for Homes *(residential buildings)*
- LEED for Neighbourhood Development (*property development)*
- LEED for Schools (*schools)*

a. Certification process

The first stage is registration of the building or the project. The further process depends on the selection of the system variant. The certification process for "LEED for New Construction & Major Renovations" is comparable with the DGNB and BREEAM processes and it is thus presented below. With many projects an assessment (pre-examination) takes place which serves to provide all project participants with an adequate insight into the LEED certification system and to weigh up the chances of award of a certificate. A so-called Project Team Administrator supervises the complete certification process at LEED. Unlike the role of auditor at the DGNB, no special authorisation is needed for this work. The incorporation of an approved LEED Accredited Professional into the project team is nonetheless recommended.

The further process is divided into two phases, the planning phase (design phase) and the implementation phase (construction phase). The design phase involves setting the objective of the certification and thus also the decision of which certification level is to be achieved. Appropriate requirements and criteria are documented and checked. This documentation is submitted to the GBCI at the end of the design phase and then assessed (Design Review).

The GBCI then makes a decision regarding the rejection or acknowledgement of the criteria, determined by the assumption that these are also implemented during the construction. A second set of documentation is submitted following completion of the construction. During this process additional criteria are checked, which are related to the construction materials used and the construction processes (Construction Review). After this, the Design and Construction Review are compared and checked for adherence. If the planning was not implemented in line with the Design Review, the deviations must be noted and the associated verifications must be brought up to the latest status. The confirmation for the implementation otherwise occurs in accordance with the planning.

There is however also a possibility of submitting the project documentation just once at the end of the construction phase. The Design Review can be avoided in this way. However, this is discouraged as the opportunity for modifications in the design, with reference to the criteria or the level of

certification and consequently assurance of the certification, is no longer provided.

The building receives a certificate following final inspection by the certification body.

b. Assessment criteria

The criteria for an assessment according to the LEED V3 (2009) system are divided into five main categories and two bonus categories:

Category 1: Sustainable Sites
Category 2: Water Efficiency
Category 3: Energy & Atmosphere
Category 4: Material & Resources
Category 5: Indoor Environmental Quality
Bonus category 1: Innovation
Bonus category 2: Regional Priority (USA only)

The criteria of the individual categories are described and explained below. The use profile “LEED for New Construction and Major Renovations” serves as a basis.

The “Sustainable Sites” category deals with the plot and the construction site. The lowest possible level of emissions due to construction activity is a requirement here. The position of the plot is also considered in more detail. Good public transport links or the possibility of using low-emission and fuel-efficient vehicles for example have a positive influence here.

The aim of the “Water Efficiency” category is the reduction of water consumption during the use phase of the building, by means of water-saving fittings or rainwater harvesting systems for example. A saving of 20 percent compared with the regular water consumption of the building is required.

Most points in the LEED certification process can be achieved with the group “Energy & Atmosphere”. This reflects the significance of energy efficiency for a LEED certificate. The fundamental installation of energy building services engineering, minimum energy requirement and innovative refrigeration and cooling are necessary here. The generation and use of renewable energies on the plot or via an energy provider are also rewarded. Unlike the German EnEV (Energy Savings Regulation), the energy efficiency is not assessed on the basis of the primary energy requirement but via the actual saving on energy costs (ASHRAE standard, American Society of Heating and Ventilating Engineers).

The “Material & Resources” area encompasses the lowest possible consumption of resources during the construction phase and highest possible recycling rate of the construction materials used and the components produced. The storage and collection of recyclable materials is the minimum requirement of this category. Points can also be gained through the use of locally sourced and quickly renewable materials and certified wood.

The “Indoor Environmental Quality” category covers the socio-cultural dimension of sustainability.

The objective is the improvement of interior air quality in order to keep negative effects on the health of the users to an absolute minimum and to increase their well-being. The requirements at this point are the fulfilment of the minimum requirements for quality of the room air and encouragement of non-smoker protection. Significant criteria in this category include the visual comfort and the possibilities for the user to influence the lighting and the thermal comfort plus an adequate supply of fresh air.

The category “Innovation” allows further criteria to be assessed which have not yet been considered. Going beyond the previous criteria can also be rewarded with a maximum of three of the five innovation points. An additional point can be awarded if the proportion of recycled materials reaches 30 percent rather than the required 20 percent for example. An additional point can also be awarded for the participation of a LEED Accredited Professional in the certification process.

The final category “Regional Priority” is only applicable for certifications in the USA. For this purpose regional criteria are stipulated on the basis of the zip codes which could have positive effects on local conditions. In this way it is possible to achieve an additional point in an area subject to drought with an increased water saving of 30 percent or more for example (based on Water Efficiency Criterion 3). No points are issued for this outside the USA.

c. Assessment

Certification according to LEED occurs on the basis of a points system. Categories are thus set up which are subdivided into corresponding criteria. Points are issued for the fulfilment of individual criteria. The points achieved in each category are added up and then form the overall points score. The higher the total points score, the higher the certification level will ultimately be. It is possible to achieve an overall total of 100 points in the main categories. It is also possible to achieve 10 points in the form of additional points with the two bonus categories in order to balance out other lost points. In addition to a minimum points score for the certification level aimed for, specific minimum requirements must be met in the individual categories if LEED certification is to be awarded. There are no points for these requirements. The LEED certificate is awarded for the levels Silver, Gold and Platinum depending on the total points score achieved:

- Sustainable Sites 26%
- Water Efficiency 10%
- Energy & Atmosphere 35%
- Materials & Resources 14%
- Indoor Environmental Quality 15%

d. Weighting of the LEED V3 (2009) assessment categories

- Certification level “Certified” 40-49 points
- Certification level “Silver” 50-59 points
- Certification level “Gold” 60-79 points
- Certification level “Platinum” > 80 points

6. BREEAM

The Building Research Establishment's Environmental Assessment Method (BREEAM) is the original version of all certification systems for sustainable building. The system originates from Great Britain and it was developed by the Building Research Establishment (BRE). BREEAM assesses the use of resources, the energy efficiency, the room air quality and the construction site management of buildings. BRE was founded as a state organisation in 1921 under the name Building Research Station.
Most sustainability certificates are aligned to the contents and assessment processes of the original British system in their development. There are therefore definite similarities with the British method in the LEED system such as in the classification of the criteria and the possibility of being awarded additional points. Although it is used internationally, the main focus of use is unquestionably Great Britain. This is linked to the state guidelines for newly constructed dwellings among other things.
Country specific systems have priority outside Great Britain. Cooperation between BRE Global and a national organisation of the respective country results in the formation of a national representative, the so-called National Scheme Operator (NSO). The National Scheme Operator develops the country specific system on the basis of BREEAM while taking local requirements and standards plus climatic conditions into consideration.

The German licensee of BRE Global and thus developer of BREEAM DE is the DIFNI (Deutsches Privates Institut für Nachhaltige Immobilienwirtschaft GmbH & Co. KG). DIFNI brought the German BREEAM version onto the market in March 2012. This builds on the international BREEAM In-Use system via which individual buildings or complete portfolios can be certified with little expenditure. All non-residential buildings can be assessed and certified with BREEAM DE.

BREEAM offers a large number of system variants:

BREEAM New Constructions

• Courts	New builds and renovations of court buildings
• Data Centres	New builds and general renovations of data centres
• Education	New builds, extensions and renovations of educational establishments
• Healthcare	Clinic buildings and health facilities
• Industrial	Logistics buildings, manufacturing premises, workshops
• Multi-Residential	Old people's homes, student residences
• Offices	New builds and renovations of office buildings
• Other Buildings	Buildings which do not fit into any of the categories
• Prisons	New build and renovation of prisons
• Retails	New build and renovation of commercial buildings

BREEAM Communities	Development of city districts while taking sustainability aspects into consideration
BREEAM In-Use	Assessment of existing non-residential builds with a low expenditure

BREEAM Refurbishment

- Domestic — Renovation of housing stock
- Non Domestic — Renovation of non-residential stock

ECO Homes — Residential new builds

BREEAM EcoHomes XB — Service programe for assessment, administration and checking of the sustainability performance of residential buildings

Code for Sustainable Homes — Residential new builds, state specifications for optimisation of the sustainability of buildings

a. Certification process

Following selection of the relevant system variant it is necessary to engage an authorised BREEAM assessor who will supervise the complete certification process, carry out building inspections, draw up documents and submit them to the certification body. There is also the possibility of engaging a BREEAM Accredited Professional who can use particular expertise in the field of sustainable construction and the BREEAM assessment process to help achieve an even higher points score. A pre-assessment finally takes place with the planning team and the BREEAM assessor in which the certification level to be achieved is determined among other things. The project should subsequently be registered with BREEAM. The BREEAM assessor undertakes this task. It is also necessary to decide whether the assessment is to occur in one or two phases, as is the case for LEED. A distinction is made between the Design Stage and the Post-Construction Stage here.

The so-called Design Stage is optional and it represents a provisional assessment during the design phase which is based on the design documents which are present. The assessment in the design phase refers to the building quality which is aimed for. The design process for this assessment must have progressed sufficiently so that the documentation requirements of the BREEAM assessor can be adhered to accordingly. The pre-certificate (interim certificate) is awarded at the end of the Design Stage and normally before the start of the construction work.
The final assessment occurs following completion of the build regardless of whether a Design Stage was chosen or not. If a pre-certificate was awarded, a Post-Construction Review will take place. The results of the interim assessment are revised as necessary and confirmed in this process. Otherwise a complete assessment will take place following completion of the construction work (Post-Construction Assessment). The building is awarded the BREEAM certificate if all the criteria are met.
As the BREEAM In-Use system is a certificate for a building in use, assessment will of course take place during use.

b. Assessment criteria

The assessment criteria are divided into nine categories for BREEAM.

- Category 1: Management
- Category 2: Health & Well-being
- Category 3: Energy

- Category 4: Transport
- Category 5: Water
- Category 6: Materials
- Category 7: Waste
- Category 8: Land Use & Ecology
- Category 9: Pollution
- Additional category: Innovation

The contents of the individual categories are described in brief below. The BREEAM Europe system for office buildings serves as a basis for this.

The effects of the construction site on the environment, the commissioning of the building and the preparation of a manual for the building are assessed in the “Management” category.
The “Health & Well-being” category assesses the thermal comfort of the users, the interior room air quality and the possibility of natural ventilation of the rooms. The provision of effective sound insulation and the use of daylight to improve quality of life and to save energy are further important assessment criteria for this category.

With BREEAM, energy receives the highest weighting. The aims of this are a reduction in CO_2 emissions, the use of renewable energies, energy-efficient building equipment and tenant-focused measurement and billing of consumption. The installation of energy-saving lifts and escalators is also rewarded.

Connection to local public transport, distance to catering and shopping facilities and the use of low-emission and fuel efficient vehicles are all part of the assessment for the transport element. The objective of the “Water” category is the reduction in the consumption of drinking water. The use of rainwater plus the use of water treatment systems and the monitoring of the water system have a positive effect on this.

Importance should be given to the use of environmentally friendly building materials in order to score well in the “Materials” category. Sustainable extraction of building materials, the recyclability and resilience of the building materials used have a great significance here.
The site waste management is the most important criterion in the “Waste” category. A collection point for storage of materials suitable for recycling plus a facility for composting organic waste should be set up.

The selection and efficient land use for the construction plot, dealing with soil contamination and the improvement of the ecological value of the plot are all significant factors in the “Land Use & Ecology” category.

The final assessment category “Pollution” deals with the pollution which results from the building. The objective is to reduce the nitrogen pollution in the atmosphere. Low NO_2 emissions from the heating system are consequently assessed advantageously. Sound and light emissions, the use of refrigerants and pollution of flowing waters and the risk of flooding should also all be minimised.

A maximum of ten points can be gained in the additional category as a result of exceptional technologies and accomplishments, such as going beyond other assessment criteria for example. The involvement of a BREEAM Accredited Professional in the certification process is also rewarded at this point.

c. Assessment

The BREEAM assessment system is divided into nine categories and one additional category. The additional category provides the opportunity to balance out points which were not achieved in other categories. The categories receive different weightings for the assessment. The weightings vary depending on the system variant. The weighting is as follows for the BREEAM Europe Commercial use profile: The assessment by the BREEAM system occurs on the basis of a two-stage process.

The assessment categories are divided into individual criteria. Points are issued for the fulfilment of these criteria. These points are added up and compared to the maximum points achievable in this category. The ratio of the achievable points score and that which is actually achieved provides the degree of fulfilment as a percentage. The degree of fulfilment for the category is then calculated by way of the percentage of the overall assessment which the category makes up. The overall degree of fulfilment for the building is calculated through the addition of the individual degrees of fulfilment achieved for the different categories.

d. Weighting of the BREEAM assessment categories

There are six grades of certification with BREEAM. Certificates can be awarded for the levels Pass, Good, Very Good, Excellent and Outstanding. At the end the overall degree of fulfilment is derived from the minimum requirements for the individual criteria. If a building is to receive the certification level “Excellent” according to the BREEAM Europe Commercial system variant for example, six points must be achieved in the Energy Efficiency category among other things.

BREEAM certification levels (German version March 2012):

- Unclassified < 30%
- Pass ≥ 30%
- Good ≥ 45%
- Very Good ≥ 55%
- Excellent ≥ 70%
- Outstanding ≥ 85%

7. Comparison of the DGNB, LEED and BREEAM systems

a. Comparison of the sustainability aspects

On comparison at the level of sustainability aspects, as examined in a DGNB assessment, it can be established that the DGNB is the only one which covers all three dimensions of sustainability equally. The technical and process quality of the building are also checked. If these five qualities are shifted to the LEED and BREEAM systems, it quickly becomes clear that such a wide-ranging focus in terms of thematic breadth and depth is not present.

Both the LEED and BREEAM systems place their main focus on the ecological dimension of sustainability. Energy efficiency makes up the largest portion of the overall assessment here. The use of renewable energies, the reduction in water consumption and the use of sustainable construction materials also count as important criteria.

With BREEAM the economic quality experiences relatively little consideration with a life cycle cost calculation and the criterion of resistance to wear, meaning value retention in the narrower sense. Economic aspects are ignored for LEED.

All three systems are relatively similar in terms of socio-cultural aspects. The comfort and well-being and the possibility of influence of the users have a role to play in each system. The functional aspects added for the DGNB, such as accessibility and also design qualities, are neglected with LEED and BREEAM.
The technical building quality is not taken into consideration for LEED and BREEAM. With the DGNB this is equated with the dimensions of sustainability.

The consideration of sustainability aspects during the design and construction phases represents the process quality. With the DGNB it is a thematic field with less assessment value but it is still of significance. LEED and BREEAM also incorporate this in their assessment criteria. Orderly site and commissioning management and the avoidance of unnecessary waste during the construction phase are of primary significance here.

The location quality is examined in detail during the DGNB certification process but it does not form part of the final assessment. This has less influence for LEED and BREEAM as well. Links to the local public transport system are an assessment criterion for both systems.

A distinction of the systems according to generations becomes clear by way of this comparison, with the sustainability aspects being taken into consideration. LEED and BREEAM are labelled as systems of the first generation due to their primarily ecologically and energy based approach. The German Sustainable Building Council (DGNB) does in principle build upon the other systems yet it does take all aspects of sustainability into consideration and also assesses other important points. For this reason the DGNB system is characterised as an assessment method of the second generation.

b. Costs

Where costs for certification are concerned, the BREEAM certificate was found to be the least expensive in terms of certification fees. The certification fees for LEED and DGNB are at a very similar level.

c. Spread

The following information is assumed to be based on data available in 2012.

Due to its relatively late start in 2009, the DGNB has the smallest number of registered and certified projects when compared directly. Over 400 pre-certificates and certificates were awarded, the vast majority of these being in Germany, demonstrating its prevalence on the German property market.

LEED is the best-known form of certification globally. The majority of certifications occur within national boundaries for this system although international successes must not be disregarded. The American version has chalked up around 14,000 certified projects and 26,000 registered ones. 50 of these certificates were awarded in Germany and an additional 170 German projects are registered with LEED.

With a total of over 200,000 certified buildings worldwide, BREEAM is the leader among the systems. Almost one million buildings are registered for a British sustainability seal. These figures are supported by the state specifications for Great Britain stated previously in particular. The proportion is relatively low beyond national boundaries, as is the case for the other two systems as well. BRE is however working more and more towards international expansion with its country specific systems. BREEAM is less widespread that LEED and DGNB in Germany.