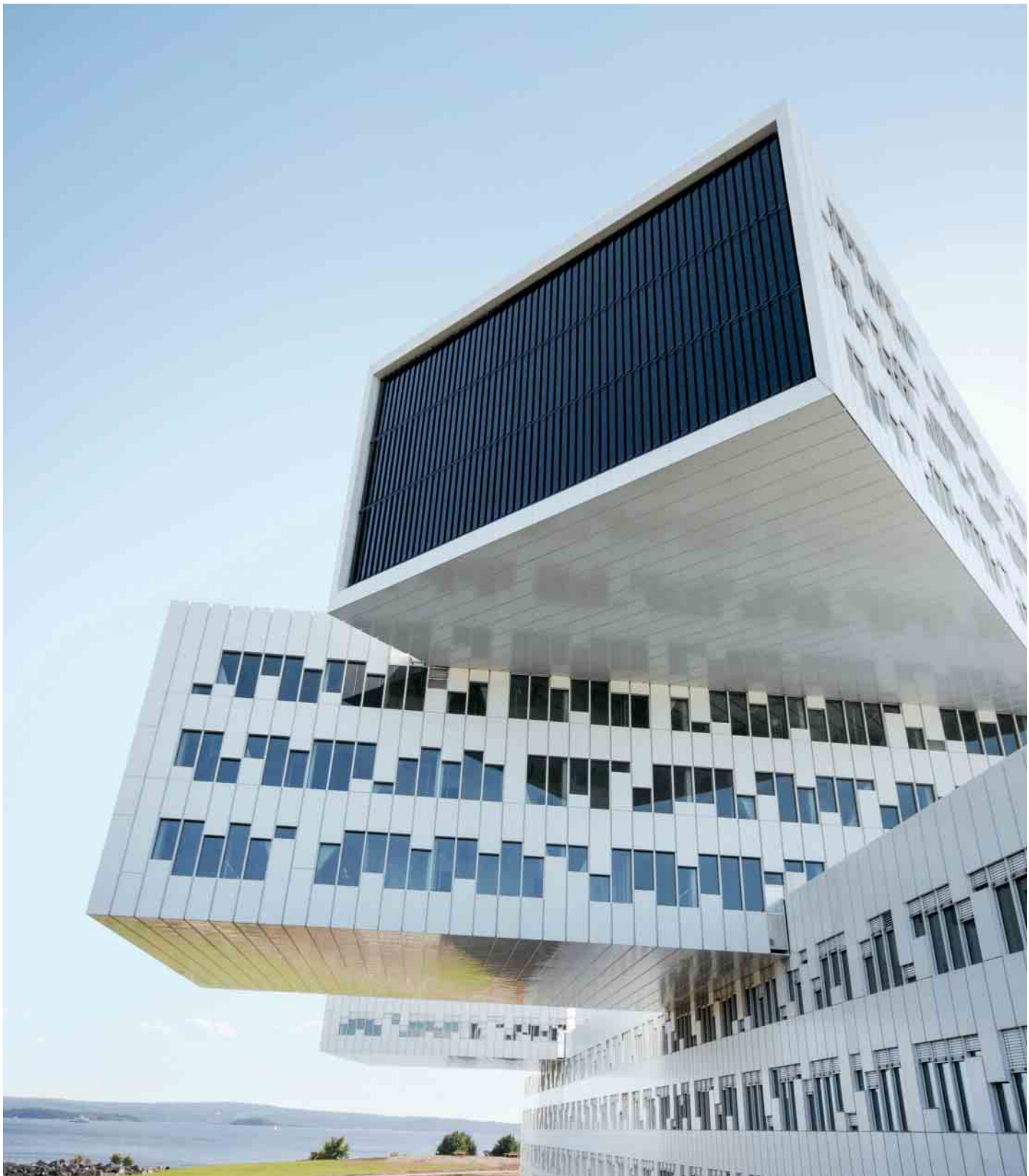
SCHÜCO

Schüco Guide to BREEAM

Supporting information for building certification



Schüco aluminium systems

Schüco systems for BREEAM
By using Schüco systems, up to ten BREEAM criteria can be influenced positively, which corresponds to 40% in the overall assessment. The feasibility of influencing the credits awarded was analysed and confirmed by an independent and qualified expert engineering company, Drees & Sommer, specialised in optimising building energy design and management.

To assist you in achieving the necessary credits, your Schüco contacts can help you to select the most appropriate solutions for your project and provide you with the documents required for the BREEAM assessment. These will include general documents and certificates, but also project-specific information, all of which increase your BREEAM score.

Schüco reference project with BREEAM certification:

Statoil headquarters, Fornebu, Norway

About Schüco International KG

Schüco – system solutions for windows, doors and façades
With its worldwide network of partners, architects, specifiers and investors, Schüco creates sustainable building envelopes which focus on people and their needs in harmony with nature and technology. The highest demands for design, comfort and security can be met, whilst simultaneously reducing CO_2 emissions through energy efficiency, thereby conserving natural resources. The company and its Metal and PVC-U divisions deliver tailored products for new buildings and renovations, designed to meet individual user needs in all climate zones. With 4,800 employees and 12,000 partner companies, Schüco is active in 78 countries and achieved a turnover of 1.5 billion euros in 2013. For more information, visit **www.schueco.com**.

Schüco Aluminium Window Systems

One system for all requirements
In its new AWS (Aluminium Window System) generation of windows, Schüco has developed a system to meet all requirements. Functional benefits are combined with architectural and design features. The few perfectly integrated components combine benefits such as high levels of thermal insulation to passive house standard with low basic depths and narrow face widths. On the basis of standardised interfaces, all fittings can be operated manually, mechatronically or centrally via a building management system.

Schüco Aluminium Door Systems

Safe and versatile
A door does not just provide access to a building. It has to meet higher standards of thermal insulation, security, functionality and design than any other building component. The Schüco ADS (Aluminium Door Systems) series were specifically developed to meet these requirements. They offer excellent thermal values and, thanks to a comprehensive range of systems, can be used for a variety of solutions in building security and automation. Their timeless design combines effectively with the Schüco AWS aluminium window systems. Schüco ADS door systems fit economically into almost any building design and can be used to create efficient and stylish architectural solutions.

Schüco Aluminium Façade Systems

Efficient solutions for all requirements
Energy-efficient designs will determine the future of construction. Solutions for façades and skylights that harmonise architectural and technological demands will therefore play a key role. Here, Schüco already offers a unique aluminium modular system with which architects, planners and fabricators can also meet the highest requirements in terms of energy, security, automation and design.
From mullion/transom façades using steel and timber add-on constructions to structural glazing and unitised façades – including a wide variety of systems for opening units that can be integrated.

Schüco Aluminium Fire and Smoke Protection Systems

Security systems
The need for buildings that protect human life and property is today of central importance worldwide. This applies to private buildings as well as commercial and public projects. An efficient fire and smoke protection concept is therefore a top priority for architects, developers and clients. Schüco offers complete aluminium system solutions for façades, windows and doors, as well as partition walls with fittings and glazing to fulfil the numerous fire and smoke protection requirements. The intercompatibility of the Schüco systems allows elegant, concealed transitions between the fire protection areas and standard series.

Value-driven perspective for green buildings

Schüco supports investors, architects, building consultants and partners through all project phases – from the first idea to the dismantling of a façade. This includes advice on certification, designs using sustainable systems, environmental product declarations and recycling of the building envelope.

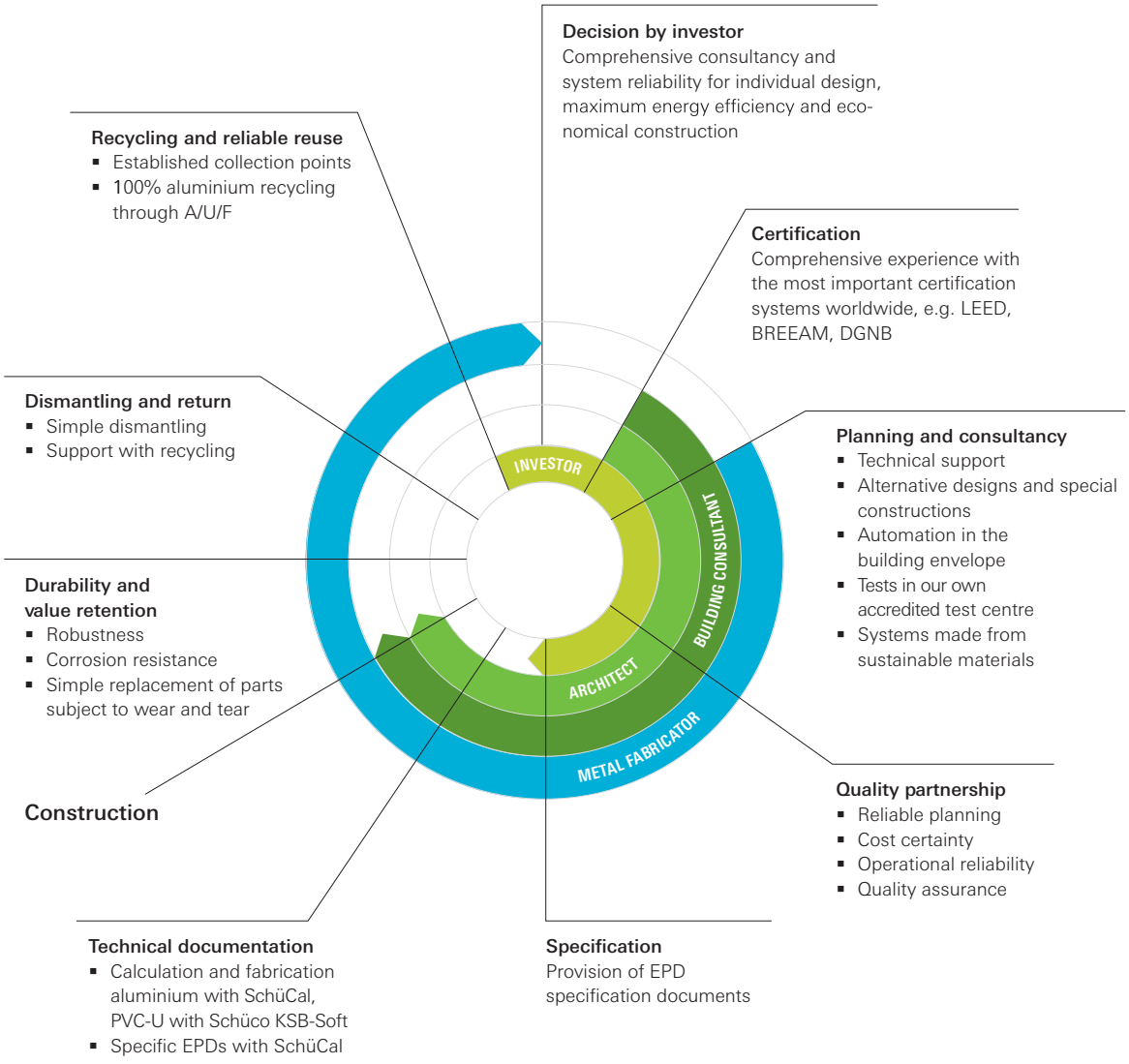
360° sustainability – from the idea to recycling
In the construction sector, sustainability means designing, constructing and operating a property in such a way that it is ecologically, economically and socioculturally future-proof. To this end, it requires high-quality, innovative products and solutions that conserve resources. As a driving force behind innovation, Schüco offers concepts and product solutions with the best possible support for investors, architects, building consultants and metal fabricators in all phases of a project. In practice, this means from the initial idea through to dismantling a façade – support including advice and designs with sustainable systems, environmental product declarations and recycling of the building envelope. Schüco calls this holistic approach, which is guided by the building life cycle, "360° sustainability".

Comparison of materials: potential for recycling aluminium, PVC-U and timber
The use of sustainable products and the use of materials with outstanding recycling properties, which allow for dismantling at a later time, and recyclability are important requirements for "360° sustainability". Buildings are the raw material sources of the future. In an independent study carried out by Drees & Sommer with PE International, windows and façades made from different materials – aluminium, PVC-U, timber and timber/aluminium – were compared on the basis of sustainability criteria. The result verified by international experts is that, in terms of ecology, aluminium and PVC-U are as valuable as timber and, overall, yield equivalent results. The excellent recycling potential of aluminium and PVC-U as well as the characteristics of aluminium, i.e. durability, low running costs for the operation of the building and the range of design options combined with low weight and high stability, are particularly positive.

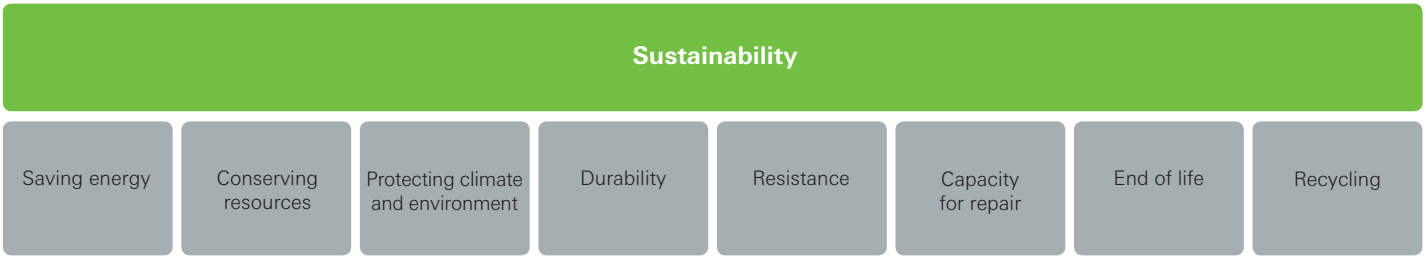
Focus on certified sustainability for buildings
Building certifications from the market leaders BREEAM, DGNB and LEED are being demanded more and more frequently by investors and building consultants – especially for commercial buildings. An important basis for this is suitable product systems with the requisite documentation and proof of the holistic design and evaluation of the buildings. The Schüco systems, which have been verified for this purpose, are ideally suited for the best possible ratings in building certification. Here, Schüco supports architects, investors and fabricators with detailed documentation for design and product selection. As a special service, specially developed software tools are also available to make it easier for the user to produce the documentation, which can be very complex in part. The SchüCal construction software generates environmental product declarations, U-value calculations and declarations of performance, amongst others, at the touch of a button.

Future-oriented through sustainability
Sustainability is an integral part of the Schüco company policy, which is designed to deliver long-term success. To this end, Schüco develops high-quality and energy-efficient products and services that conserve resources, set standards and enable Schüco partners to create reliable and long-lasting values. Innovative environmental philosophies are embraced and integrated in products. Suitable products are currently in development. A good basis for fulfilling current requirements and paving the way for future challenges.

360° cycle of sustainability for Schüco and its partners



Fundamental principles of sustainable product development



BREEAM certification system

What is BREEAM?

BREEAM (Building Research Establishment Environmental Assessment Method) is the world's leading and most widely used environmental assessment method for buildings, with over 200,000 buildings certified and nearly 700,000 registered. It sets the standard for best practice in sustainable design and has become the de facto measure used to describe a building's environmental performance. Credits are awarded in ten categories according to performance. These credits are then added together to produce a single overall score on a scale of Pass, Good, Very Good, Excellent and Outstanding. The operation of BREEAM is overseen by an independent sustainability board, representing a wide cross section of construction industry stakeholders[1].

Aims of BREEAM

- To mitigate the impact of buildings on the environment
- To enable buildings to be recognised according to their environmental benefits
- To provide a credible, environmental label for buildings
- To stimulate demand for sustainable buildings[1]

Objectives of BREEAM

- To provide market recognition for low environmental impact buildings
- To ensure best environmental practice is incorporated in buildings
- To set criteria and standards surpassing those required by regulations and challenge the market to provide innovative solutions that minimise the environmental impact of buildings
- To raise the awareness of owners, occupants, designers and operators to the benefit of buildings with a reduced impact on the environment
- To allow organisations to demonstrate progress towards corporate environmental objectives[1]

[1] Source : BREEAM International New Construction; Technical Manual

Rating system

The number of credits a project achieves determines the level of BREEAM certification

< 30% Unclassified	☆ ☆ ☆ ☆ ☆
≥ 30% Pass	★ ☆ ☆ ☆ ☆
≥ 45% Good	★ ★ ☆ ☆ ☆
≥ 55% Very good	★ ★ ★ ☆ ☆
≥ 70% Excellent	★ ★ ★ ★ ☆
≥ 85% Outstanding	★ ★ ★ ★ ★

Analysis related to the product
Each of these credits was analysed and confirmed by an independent and qualified expert engineering company, Drees & Sommer. The impact of Schüco systems on the credits is explained in this Schüco Guide to BREEAM.

In this Schüco Guide, you will find an explanation of each criterion of the BREEAM Certification System. In the overview of the certification system in detail, the positive product contribution of Schüco systems is illustrated. In addition, an overview of each category with the relevant criteria shows all BREEAM credits where the use of Schüco systems has a positive effect on the overall assessment; the credits where there is no product contribution are also listed. Finally, every BREEAM criterion that can be positively affected in the certification according to the BREEAM system is explained accurately, as well as providing you with information about the intention and requirements of these credits.

Schüco offers the most suitable product solution for any criteria. For that reason, Schüco systems can make a positive contribution to the criteria requirements. Schüco systems are the best possible solution for certifying your project with BREEAM.

System categories
- [MAN] Management
- [HEA] Health and well-being
- [ENE] Energy
- [TRA] Transport
- [WAT] Water
- [MAT] Materials
- [WST] Waste
- [LE] Land use and ecology
- [POL] Pollution
- Innovation

The certification system in detail – non-residential buildings

Content of categories
The BREEAM certification system is divided into ten categories. The system rates every criteria in each category which contributes to an overall performance in the BREEAM rating.
A brief explanation of each category provides an overview of the content and the scope of the system-relevant criteria.

12.0% **[MAN] Management**
Project team members assure the quality of the entire construction in terms of as-built and test documentation. In addition, the environmental and social impact during the building phase are checked and, after one year in use, there is a questionnaire. The management section analyses the global LCA of the building.

15.0% **[HEA] Health and well-being**
As we spend more than 85% of our time in buildings, health and well-being contribute to the quality of our life. For that reason, it is necessary to maximise indoor quality by improving health and well-being in a building.

19.0% **[ENE] Energy**
In order to develop an efficient building, it is essential to consider energy-related topics. That is why BREEAM encourages the owner to minimise the operational energy consumption for the whole life cycle. This is achieved through good design, low and zero carbon technologies, and energy-efficient systems for heating, cooling and ventilation.

8.0% **[TRA] Transport**
As a large part of the greenhouse effect is caused by CO_2, it is important to develop an efficient strategy to improve transportation and thereby reduce CO_2 emissions.

6.0% **[WAT] Water**
As water is the basis of all life on Earth, it is necessary to control and reduce water consumption by employing efficient equipment. Water use can be controlled via monitoring to detect and prevent leaks.

13.0% **[MAT] Materials**
This criterion refers to the minimisation of embodied energy and other factors associated with the extraction, processing, transport, maintenance and disposal of building materials.

8.0% **[WST] Waste**
To achieve a resource-efficient building, it is necessary to manage construction waste in an appropriate and effective way. The demand for raw materials can be reduced by optimising material efficiency in construction. On-site recycling and secondary aggregates help to avoid the unnecessary waste of materials. Waste should be kept in storage facilities for recyclable waste streams.

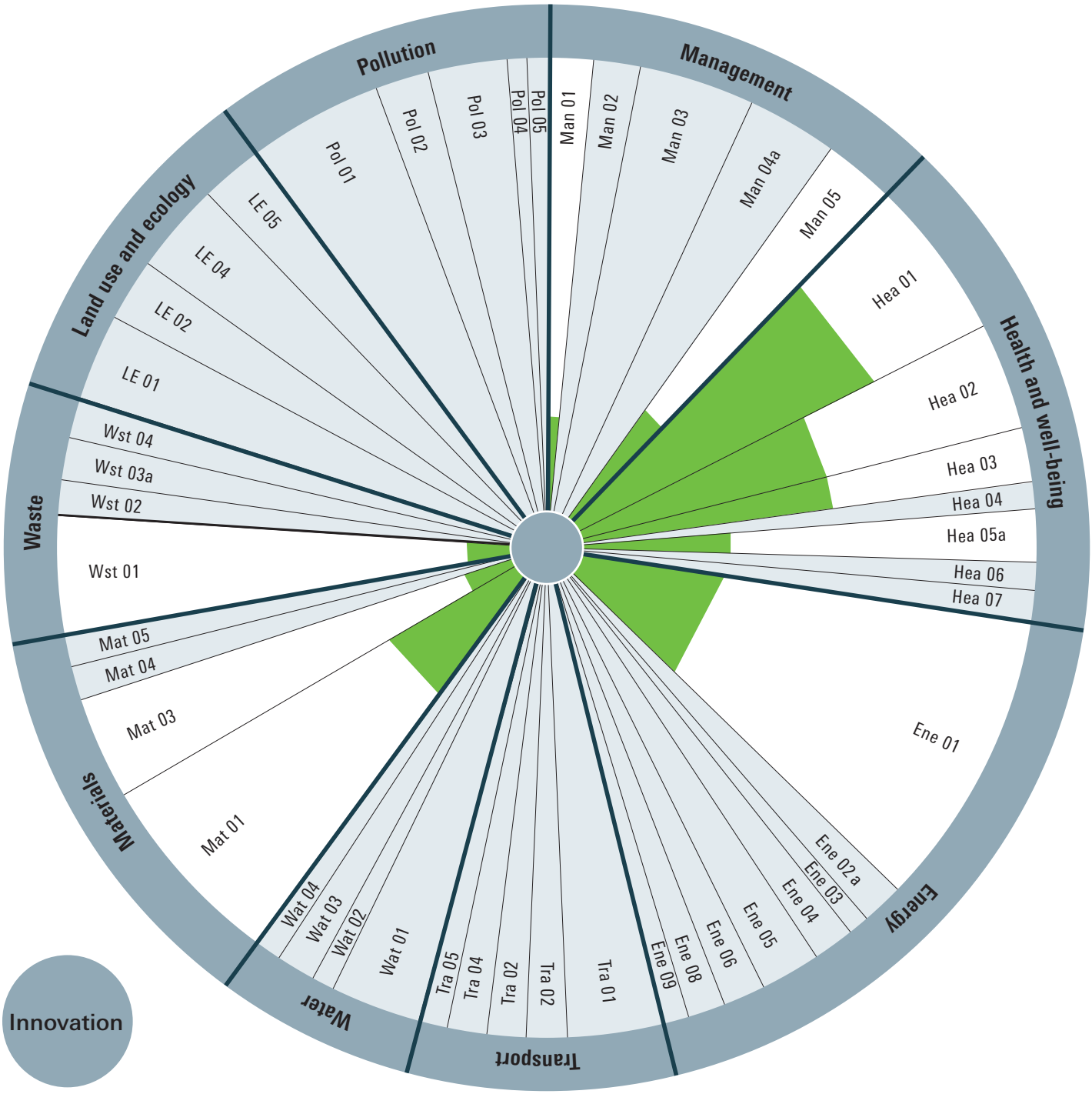
10.0% **[LE] Land use and ecology**
The use of land which has not been previously disturbed should be avoided by using previously developed sites or contaminated land. This measure enables existing ecological features to be protected. Another possibility is to minimise the long-term impact of development on the site and the biodiversity of the surrounding area. By optimising the use of land and materials, the building footprint can be improved across the development.

10.0% **[POL] Pollution**
To reduce the level of greenhouse gases, refrigerants should become more efficient and eco-friendly. Pollution of the local environment can be avoided by using water from systems with low NOx emissions. Another criteria is to avoid the discharge of rainwater to public sewers and thereby minimise the risk of localised flooding and pollution.

-% **Innovation (optional)**
The aim of this optional criterion is to support innovation within the construction industry through the recognition of sustainability-related benefits that are not rewarded by standard BREEAM issues.

See also BREEAM International New Construction Technical Manual SD5075 – 0.0:2013, issue date: 01/06/2013

Overview of certification system



The pie chart contains all the criteria in the BREEAM certification system; a tabular view of these criteria can be found on the following pages.
The width of the pie slice reflects its weighted value in the overall evaluation. Every criterion in which Schüco product systems make a positive contribution to the overall assessment is highlighted in white.

The product influence (shown in green) refers to the percentage area of the system with regard to the entire building envelope, as well as the requirements of the analysed criterion for the relevant Schüco system.
The system itself is not designed to fulfil the complete list of requirements of every criteria. For this, a wide range of technical requirements is necessary.

System evaluation – non-residential buildings

Category	Criteria	Max. credits	System influence on category	Criteria influence on category	Weighted degree of fulfilment
Management					**12.0%**
Man 01	Sustainable procurement	2	Yes	12.5%	1.5%
Man 02	Responsible construction practices	2	No	12.5%	1.5%
Man 03	Construction site impact	5	No	31.3%	3.8%
Man 04a	Stakeholder participation (non-residential)	4	No	25.0%	3.0%
Man 05	Life cycle cost and service life planning	3	Yes	18.8%	2.3%
Health and well-being					**15.0%**
Hea 01	Visual comfort	6	Yes	35.3%	5.3%
Hea 02	Indoor air quality	4	Yes	23.5%	3.5%
Hea 03	Thermal comfort	2	Yes	11.8%	1.8%
Hea 04	Water quality	1	No	5.9%	0.9%
Hea 05 a	Acoustic performance (non-residential)	2	Yes	11.8%	1.8%
Hea 06	Safe access	1	No	5.9%	0.9%
Hea 07	Hazards	1	No	5.9%	0.9%
Energy					**19.0%**
Ene 01	Energy efficiency	15	Yes	53.6%	10.2%
Ene 02 a	Energy monitoring (non-residential only)	2	No	7.1%	1.4%
Ene 03	External lighting	1	No	3.6%	0.7%
Ene 04	Low and zero carbon technologies	2	No	7.1%	1.4%
Ene 05	Energy-efficient cold storage	3	No	10.7%	2.0%
Ene 06	Energy-efficient transportation systems	2	No	7.1%	1.4%
Ene 08	Energy-efficient equipment	2	No	7.1%	1.4%
Ene 09	Drying space	1	No	3.6%	0.7%
Transport					**8.0%**
Tra 01	Public transport accessibility	5	No	41.7%	3.3%
Tra 02	Proximity to amenities	2	No	16.7%	1.3%
Tra 03 a	Alternative modes of transport (non-residential)	2	No	16.7%	1.3%
Tra 04	Maximum car parking capacity	2	No	16.7%	1.3%
Tra 05	Travel plan	1	No	8.3%	0.7%

All BREEAM criteria are listed. Every criterion relevant to Schüco is highlighted in white.

Calculation of criteria influence on category and the weighted degree of fulfilment

$$\text{Criteria influence on category} = \frac{\text{Max. credits}}{\Sigma(\text{Max. credits})} \times 100$$

$$\text{Weighted degree of fulfilment} = \frac{\text{Max. credits}}{\Sigma(\text{Max. credits})} \times 100 \times 12.0\%$$

Example: Man 01 Sustainable procurement

$$\text{Criteria influence on category} = \frac{2}{16} \times 100$$

$$\text{Weighted degree of fulfilment} = \frac{2}{16} \times 100 \times 12.0\%$$

Category	Criteria	Max. credits	System influence on category	Criteria influence on category	Weighted degree of fulfilment
Water					**6.0%**
Wat 01	Water consumption	5	No	55.6%	3.3%
Wat 02	Water monitoring	1	No	11.1%	0.7%
Wat 03	Water leak detection and prevention	2	No	22.2%	1.3%
Wat 04	Water-efficient equipment	1	No	11.1%	0.7%
Materials					**12.5%**
Mat 01	Life cycle impact	6	Yes	54.5%	6.8%
Mat 02	Hard landscaping and boundary protection	0	No	0.0%	0.0%
Mat 03	Responsible sourcing of materials	3	Yes	27.3%	3.4%
Mat 04	Insulation	1	No	9.1%	1.1%
Mat 05	Robustness of design	1	No	9.1%	1.1%
Waste					**7.5%**
Wst 01	Construction waste management	3	Yes	50.0%	3.8%
Wst 02	Recycled aggregates	1	No	16.7%	1.3%
Wst 03 a	Operational waste (non-residential)	1	No	16.7%	1.3%
Wst 04	Speculative floor and ceiling finishes	1	No	16.7%	1.3%
Land use and ecology					**10.0%**
LE 01	Site selection	3	No	30.0%	3.0%
LE 02	Ecological value of site and protection of ecological features	2	No	20.0%	2.0%
LE 04	Enhancing site ecology	3	No	30.0%	3.0%
LE 05	Long-term impact on biodiversity	2	No	20.0%	2.0%
Pollution					**10.0%**
Pol 01	Impact of refrigerants	8	No	44.4%	4.4%
Pol 02	NOx emissions	3	No	16.7%	1.7%
Pol 03	Surface water run-off	5	No	27.8%	2.8%
Pol 04	Reduction of night-time light pollution	1	No	5.6%	0.6%
Pol 05	Noise attenuation	1	No	5.6%	0.6%

Meaning of abbreviations

Max. credits
Maximum points achievable within the evaluation of the criterion.

System influence on category
Indicates whether Schüco systems can make a positive contribution within the criterion.

Criteria influence on category
In this rating, the percentage of the criterion in each category is shown.

Weighted degree of fulfilment
This value specifies the percentage of fulfilment in the overall evaluation.

The certification system in detail – residential buildings

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As we spend more than 85% of our time in buildings, health and well-being contribute to the quality of our life. For that reason, it is necessary to maximise indoor quality by improving health and well-being in a building.

19.0% **[ENE] Energy**
In order to develop an efficient building, it is essential to consider energy-related topics. That is why BREEAM encourages the owner to minimise the operational energy consumption for the whole life cycle. This is achieved through good design, low and zero carbon technologies and energy-efficient systems for heating, cooling and ventilation.

8.0% **[TRA] Transport**
As a large part of the greenhouse effect is caused by CO_2, it is important to develop an efficient strategy to improve transportation and thereby reduce CO_2 emissions.

6.0% **[WAT] Water**
As water is the basis of all life on Earth, it is necessary to control and reduce water consumption by employing efficient equipment. Water use can be controlled via monitoring to detect and prevent leaks.

13.0% **[MAT] Materials**
This criterion refers to the minimisation of embodied energy and other factors associated with the extraction, processing, transport, maintenance and disposal of building materials.

8.0% **[WST] Waste**
To achieve a resource-efficient building, it is necessary to manage construction waste in an appropriate and effective way. The demand for raw materials can be reduced by optimising material efficiency in construction. On-site recycling and secondary aggregates help to avoid the unnecessary waste of materials. Waste should be kept in storage facilities for recyclable waste streams.

10.0% **[LE] Land use and ecology**
The use of land which has not been previously disturbed should be avoided by using previously developed sites or contaminated land. This measure enables existing ecological features to be protected. Another possibility is to minimise the long-term impact of development on the site and the biodiversity of the surrounding area. By optimising the use of land and materials, the building footprint can be improved across the development.

10.0% **[POL] Pollution**
To reduce the level of greenhouse gases, refrigerants should become more efficient and eco-friendly. Pollution of the local environment can be avoided by using water from systems with low NOx emissions. Another aspect is to avoid the discharge of rainwater to public sewers and thereby minimise the risk of localised flooding and pollution.

-% **Innovation (optional)**
The aim of this optional criterion is to support innovation within the construction industry through the recognition of sustainability-related benefits that are not rewarded by standard BREEAM issues.

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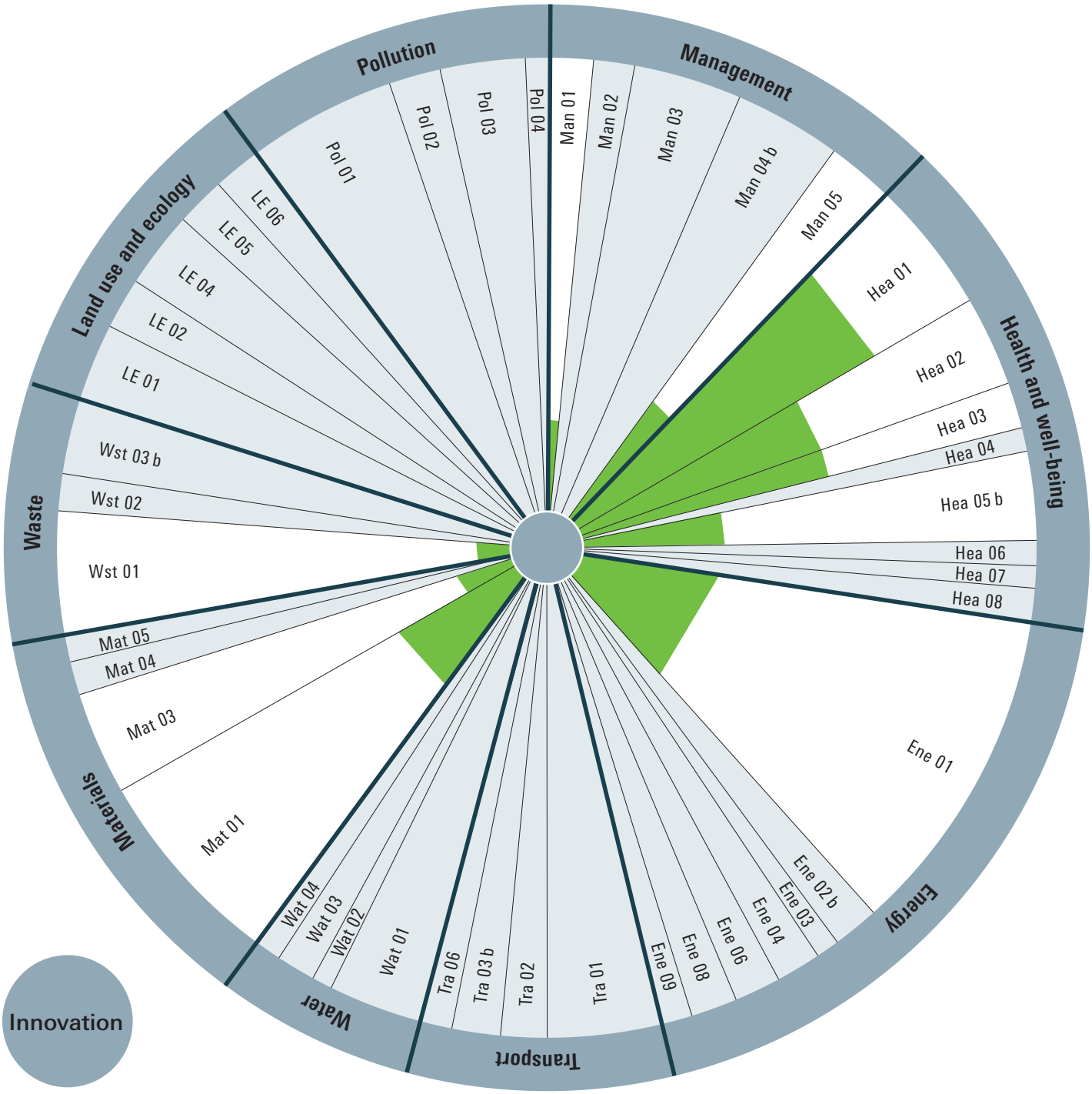

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System evaluation – residential buildings

Category	Criteria	Max. credits	System influence on category	Criteria influence on category	Weighted degree of fulfilment
Management					**12.0%**
Man 01	Sustainable procurement	2	Yes	11.8%	1.4%
Man 02	Responsible construction practices	2	No	11.8%	1.4%
Man 03	Construction site impact	5	No	29.4%	3.5%
Man 04b	Stakeholder participation (residential)	5	No	29.4%	3.5%
Man 05	Life cycle cost and service life planning	3	Yes	17.6%	2.1%
Health and well-being					**15.0%**
Hea 01	Visual comfort	6	Yes	30.0%	4.5%
Hea 02	Indoor air quality	4	Yes	20.0%	3.0%
Hea 03	Thermal comfort	2	Yes	10.0%	1.5%
Hea 04	Water quality	1	No	5.0%	0.8%
Hea 05 b	Acoustic performance (residential)	4	Yes	20.0%	3.0%
Hea 06	Safe access	1	No	5.0%	0.8%
Hea 07	Hazards	1	No	5.0%	0.8%
Hea 08	Private space	1	No	5.0%	0.8%
Energy					**19.0%**
Ene 01	Energy efficiency	15	Yes	60.0%	11.4%
Ene 02 b	Energy monitoring (residential only)	2	No	8.0%	1.5%
Ene 03	External lighting	1	No	4.0%	0.8%
Ene 04	Low and zero carbon technologies	2	No	8.0%	1.5%
Ene 06	Energy-efficient transportation systems	2	No	8.0%	1.5%
Ene 08	Energy-efficient equipment	2	No	8.0%	1.5%
Ene 09	Drying space	1	No	4.0%	0.8%
Transport					**8.0%**
Tra 01	Public transport accessibility	5	No	50.0%	4.0%
Tra 02	Proximity to amenities	2	No	20.0%	1.6%
Tra 03 b	Alternative modes of transport (residential)	2	No	20.0%	1.6%
Tra 06	Home office	1	No	10.0%	0.8%

All BREEAM criteria are listed. Every criterion relevant to Schüco is highlighted in white.

Calculation of criteria influence on category and the weighted degree of fulfilment

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$$\text{Weighted degree of fulfilment} = \frac{\text{Max. credits}}{\Sigma(\text{Max. credits})} \times 100 \times 12.0\%$$

Example: Man 01 Sustainable procurement

$$\text{Criteria influence on category} = \frac{2}{16} \times 100$$

$$\text{Weighted degree of fulfilment} = \frac{2}{16} \times 100 \times 12.0\%$$

Category	Criteria	Max. credits	System influence on category	Criteria influence on category	Weighted degree of fulfilment
Water					**6.0%**
Wat 01	Water consumption	5	No	55.6%	3.3%
Wat 02	Water monitoring	1	No	11.1%	0.7%
Wat 03	Water leak detection and prevention	2	No	22.2%	1.3%
Wat 04	Water-efficient equipment	1	No	11.1%	0.7%
Materials					**12.5%**
Mat 01	Life cycle impact	6	Yes	54.5%	6.8%
Mat 02	Hard landscaping and boundary protection	0	No	0.0%	0.0%
Mat 03	Responsible sourcing of materials	3	Yes	27.3%	3.4%
Mat 04	Insulation	1	No	9.1%	1.1%
Mat 05	Robustness of design	1	No	9.1%	1.1%
Waste					**7.5%**
Wst 01	Construction waste management	3	Yes	50.0%	3.8%
Wst 02	Recycled aggregates	1	No	16.7%	1.3%
Wst 03 b	Operational waste (residential)	2	No	33.3%	2.5%
Land use and ecology					**10.0%**
LE 01	Site selection	3	No	25.0%	2.5%
LE 02	Ecological value of site and protection of ecological features	2	No	16.7%	1.7%
LE 04	Enhancing site ecology	3	No	25.0%	2.5%
LE 05	Long-term impact on biodiversity	2	No	16.7%	1.7%
LE 06	Building footprint		No	16.7%	1.7%
Pollution					**10.0%**
Pol 01	Impact of refrigerants	8	Nein	47.1%	4.7%
Pol 02	NOx emissions	3	Nein	17.6%	1.8%
Pol 03	Surface water run-off	5	Nein	29.4%	2.9%
Pol 04	Reduction of night-time light pollution	1	Nein	5.9%	0.6%

Meaning of abbreviations

Max. credits
Maximum points achievable within the evaluation of the criterion.

System influence on category
Indicates whether Schüco systems can make a positive contribution within the criterion.

Criteria influence on category
In this rating, the percentage of the criterion in each category is shown.

Weighted degree of fulfilment
This value specifies the percentage of fulfilment in the overall evaluation.

Information documents for BREEAM criteria

		Tender documents/ bill of quantities	Design drawings	Service and maintenance instructions	Installation and operating instructions (electric)	Declaration of origin
Source of information						
Distribution		■	■	■	■	■
SchüCal						
Website				■	■	
Catalogue			■			
Management						
Man 01	Sustainable procurement	■		■	■	■
Man 05	Life cycle cost and service life planning	■		■		
Health and well-being						
Hea 01	Visual comfort	■	■			
Hea 02	Indoor air quality	■	■		■	
Hea 03	Thermal comfort	■	■			
Hea 05 a	Acoustic performance (non-residential)	■				
Hea 05 b	Acoustic performance (residential)	■				
Energy						
Ene 01	Energy efficiency	■				
Materials						
Mat 01	Life cycle impact	■	■			■
Waste						
Wst 01	Construction waste management	■				

Certificate of testing	Bill of material	Environmental product declaration (EPD)	Eco-labels/ certifications	High-quality recycling chain of custody (A/U/F)	Safety datasheet/ VOC data	U-value calculation	Isothermal calculations/ visualisation	Sound insulation values	Schüco general technical advice
■			■	■	■	■	■	■	■
	■	■				■			
■			■	■	■			■	
■									■
	■					■			■
									■
■			■		■				■
■						■	■		■
■								■	■
■								■	■
						■	■		■
	■	■	■	■					■
	■			■					■

[MAN 01] Sustainable procurement

Intention of criteria
This criterion aims to ensure delivery of a functional and sustainable asset designed and built in accordance with performance expectations.

Criteria requirements
These are split into three parts:

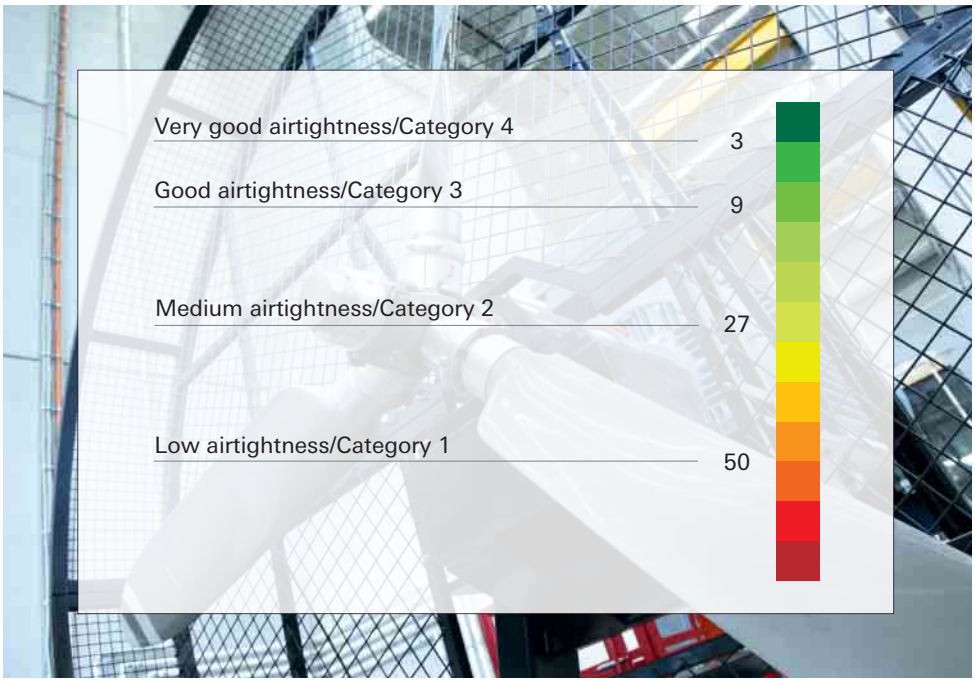
1. Project brief and design
From the design brief stage, every project member has to be involved in contributing to the decision-making process for the project. For relevant building occupiers/premises managers, a schedule of training has to be identified with the contents of the Building User Information Guide(s). BREEAM-related performance targets for the project have to be pursued from the start of the concept design stage up to post-practical completion.

2. Construction and handover
The principal contractor has to include a thermographic survey (as defined by ISO 18436-7:2008) or an air leakage test (the final air leakage rate must be less than 5 $m^2/h/m^2$ at a pressure difference of 50 Pa) within the project budget and programme of works. An appropriate project team member has to be appointed for commissioning of building services.

3. Aftercare
Commissioning responsibilities have to be completed over a minimum 12-month period, once the building is occupied. These responsibilities include testing all the building services, interviews with building occupants and recommissioning of systems. Energy and water consumption data must also be collected for at least 12 months after occupation and compared to what was expected, followed by analysis of the discrepancies to ensure low energy demand.

See also BREEAM International New Construction Technical Manual SD5075 – 0.0:2013, issue date: 01/06/2013, Credit Man 01
Graphic according to Green Building - Guideline for sustainable construction, Bauer/Mösle/Schwarz, Springer Vieweg Berlin Heidelberg, 2007, 2013, 2nd edition

Relevant properties of the systems



Graphic for 2.: Airtightness [m^3/h]
Reference value in accordance with EN 12207 at 100 Pa and maximum pressure differences, referred on the total area.

Product influence on criteria

The present review reveals the positive product influence on the overall assessment of the criterion, according to the "explanation of product influence on criteria" on pages 8 and 12 of this Schüco Guide to BREEAM.
The product influence calculated refers to the percentage area of the system with regard to the entire building envelope, as well as the requirements of the analysed criterion for the relevant Schüco system.

Schüco systems	Influence
Window systems	Up to **10%**
Door systems	Up to **5%**
Façade systems	Up to **10%**
Fire and smoke protection systems	Up to **10%**

[MAN 05] Life cycle cost and service life planning

Intention of criteria
Buildings generate costs over their entire life cycle: from construction and operation to removal/recycling. Design, specifications, continuous maintenance and operation of a building can be improved thanks to the development of a life cycle cost (LCC) analysis model for the project. The analysis must be carried out in accordance with ISO 15686-5:2008 or similar. The results of the feasibility study are implemented in the specification and carried out based on the proposals developed during RIBA work stages C/D (concept design/design development), design and final construction of the assessed building.

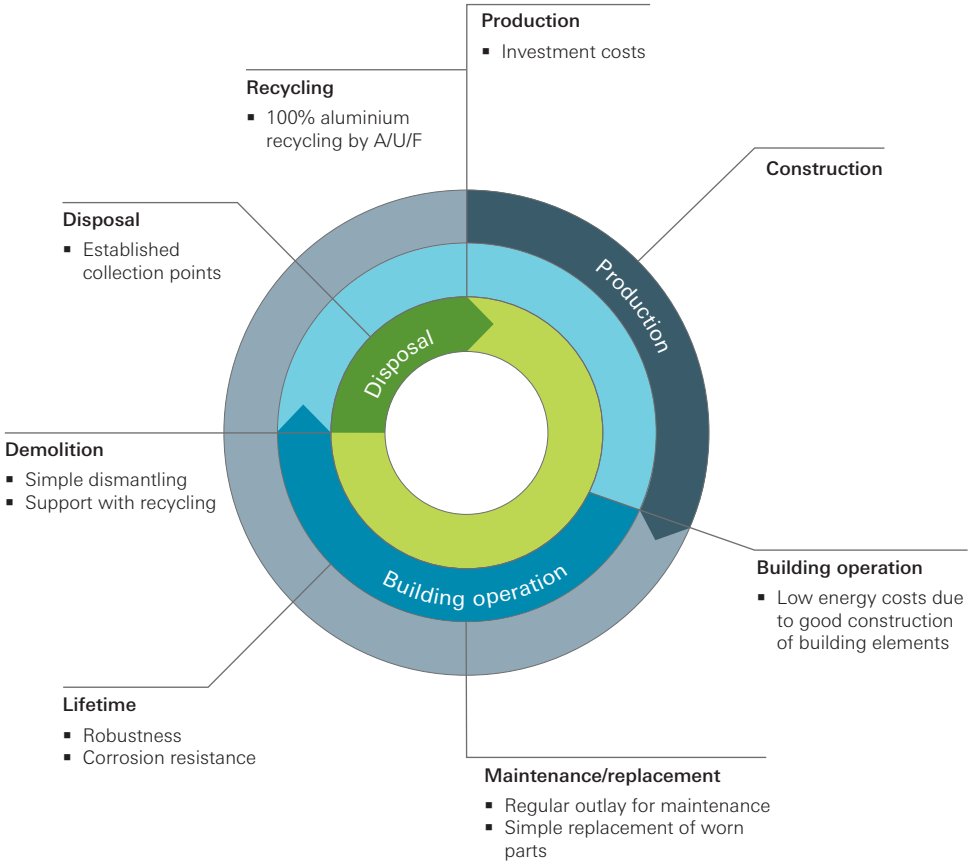
Criteria requirements
BREEAM requires a life cycle cost analysis model with a 40-year study period (although a 60-year study period would be preferred) with the following intent:

- The design life of the building and projected refurbishment period(s)
- Performance requirements/criteria for each building feature/element/system over the design life of the building to ensure that it will be designed and specified to be functional/fit-for-purpose
- Components/systems that will require repair, replacement and/or maintenance within the design life of the building must be identified and a strategy set out on how to achieve this whilst minimising costs, disruption and the resulting environmental impact.

The results of the analysis have to be implemented in the specification, design and final construction of the assessed building to ensure that costs will be minimised over the whole lifetime.

Relevant properties of the systems

Life cycle costs



Product influence on criteria

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Schüco systems	Influence
Window systems	Up to **20%**
Door systems	Up to **5%**
Façade systems	Up to **25%**
Fire and smoke protection systems	Up to **25%**

[HEA 01] Visual comfort

Intention of criteria
Daylight, artificial lighting and occupant controls must be considered at the design stage to ensure best-practice visual performance and comfort for building occupants. A well-designed daylit building uses less electric lighting energy, conserving natural resources and reducing air pollution. Occupants who are able to modify their lighting environment through glare controls will perceive more comfort regardless of conditioning strategy, and they may exhibit additional satisfaction and productivity.

Criteria requirements
These are split into four parts:

1. Prerequisite
All fluorescent and compact fluorescent lamps must be fitted with high-frequency ballasts or the building must be equipped with LED lighting.

2. Daylight
Daylight has to be designed in compliance with national best-practice standards OR the relevant building areas must meet good-practice daylight criteria for the average daylight factor (between 1.2% and 2.2%) OR daylight illuminance recommendations – depending on use and latitude.

3. Glare control and view to the outside
Providing adequate views to the outside: depending on the distance of the workplace from the window, the window opening size must be 20% to 35% of the surrounding wall area. The potential for preventing glare has to be designed for all the relevant building areas.

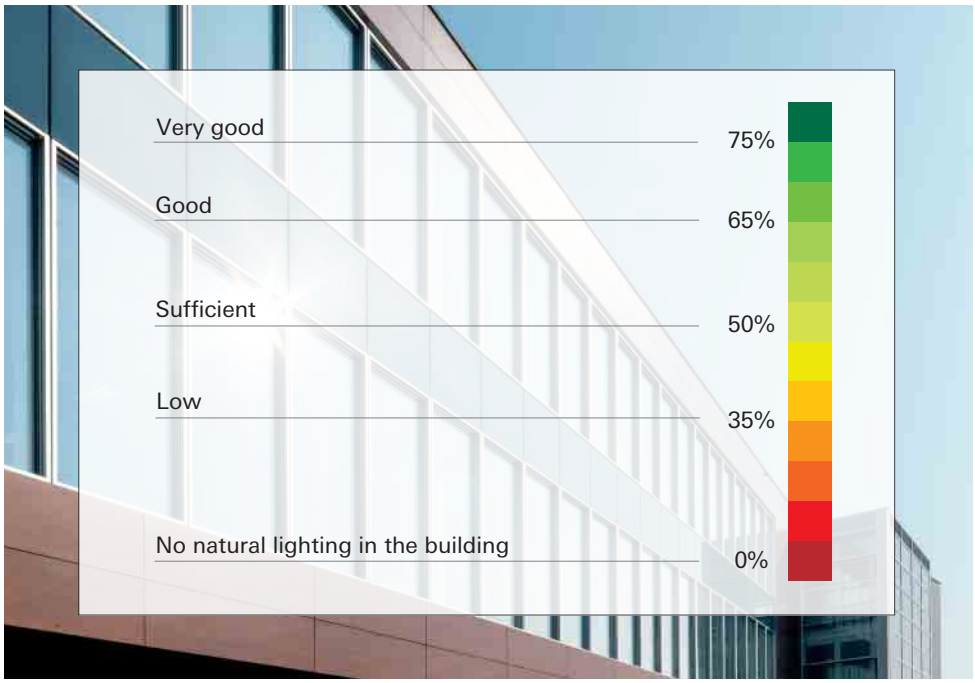
4. Internal and external lighting
Internal and external lighting illuminance (lux) levels have to be specified in accordance with national best-practice lighting guides. Appropriate artificial lighting controls and regulation strategies should be provided.

Product influence on criteria
The present review reveals the positive product influence on the overall assessment of the criterion, according to the "explanation of product influence on criteria" on pages 8 and 12 of this Schüco Guide to BREEAM. The product influence calculated refers to the percentage area of the system with regard to the entire building envelope, as well as the requirements of the analysed criterion for the relevant Schüco system.

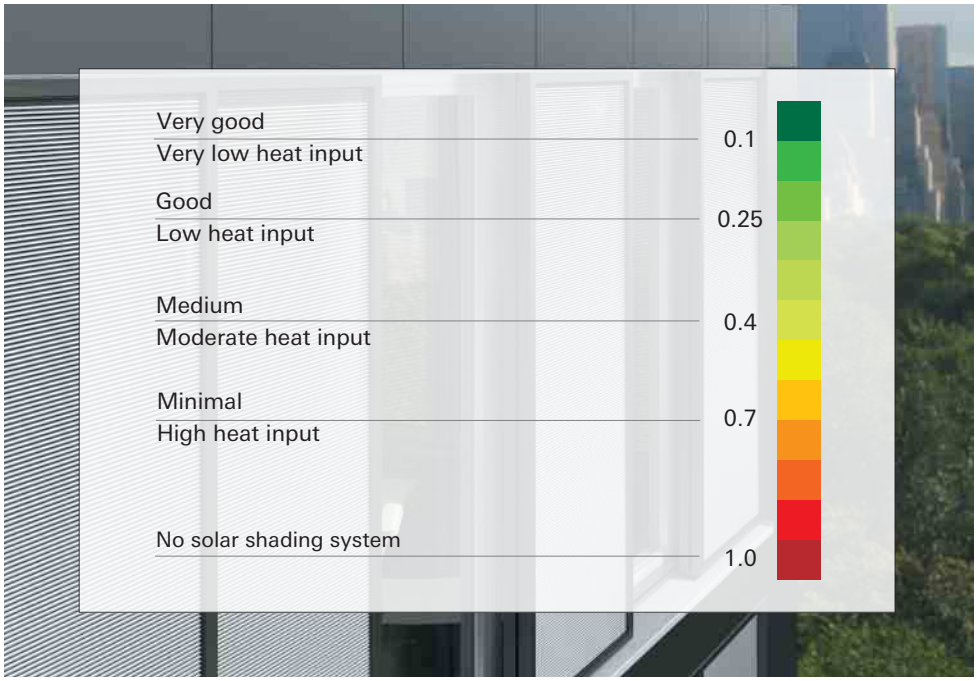
Schüco systems	Influence
Window systems	Up to **75%**
Door systems	–
Façade systems	Up to **75%**
Fire and smoke protection systems	Up to **75%**

See also BREEAM International New Construction Technical Manual SD5075 – 0.0:2013, issue date: 01/06/2013, Credit Hea 01
Graphic according to Green Building - Guideline for sustainable construction, Bauer/Mösle/Schwarz, Springer Vieweg Berlin Heidelberg, 2007, 2013, 2nd edition

Relevant properties of the systems



Graphic for 2.:
Daylight transmittance τ_v [%]
The daylight transmission coefficient of the glazing indicates what percentage of the sunlight shining on the facade penetrates the interior of the building.



Graphic for 3.: Solar shading
Characteristic values for reduction factors F_c of external shading systems.

[HEA 02] Indoor air quality

Intention of criteria
This criterion aims to encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes. An adequate cross-flow of air should be guaranteed for naturally ventilated buildings. Mechanically ventilated buildings should be flexible in terms of future conversion to a natural ventilation strategy.

Product influence on criteria
The present review reveals the positive product influence on the overall assessment of the criterion, according to the "explanation of product influence on criteria" on pages 8 and 12 of this Schüco Guide to BREEAM.
The product influence calculated refers to the percentage area of the system with regard to the entire building envelope, as well as the requirements of the analysed criterion for the relevant Schüco system.

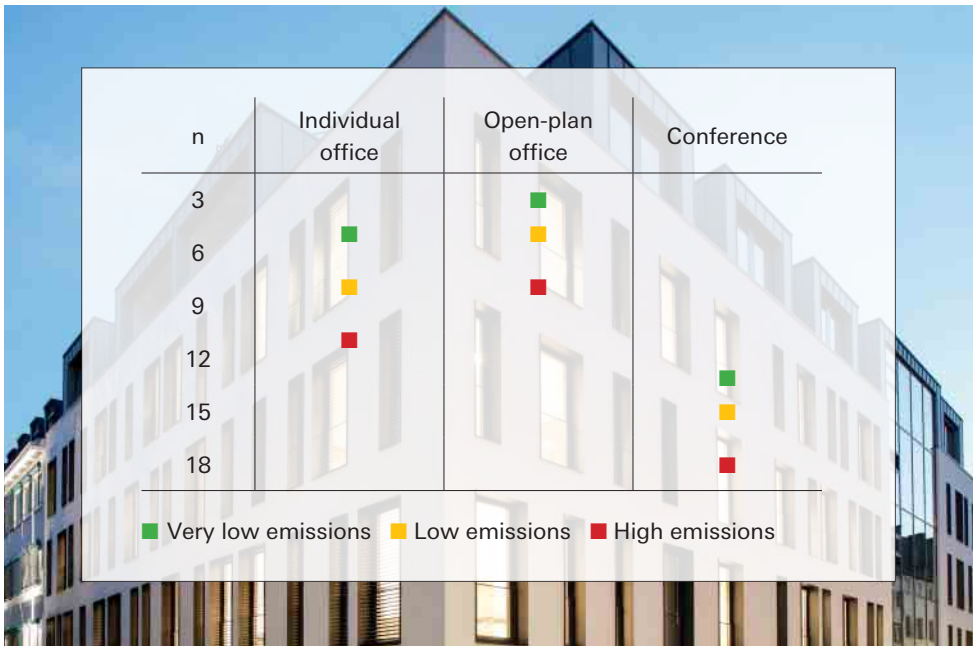
Schüco systems	Influence
Window systems	Up to **40%**
Door systems	–
Façade systems	Up to **50%**
Fire and smoke protection systems	Up to **50%**

Criteria requirements
1. Prerequisite
Materials containing asbestos were not used within the building.

2. Minimising sources of air pollution
- An indoor air quality (IAQ) plan must be implemented
- Sufficient air quality must be guaranteed
- Air quality sensors have to be installed in large buildings

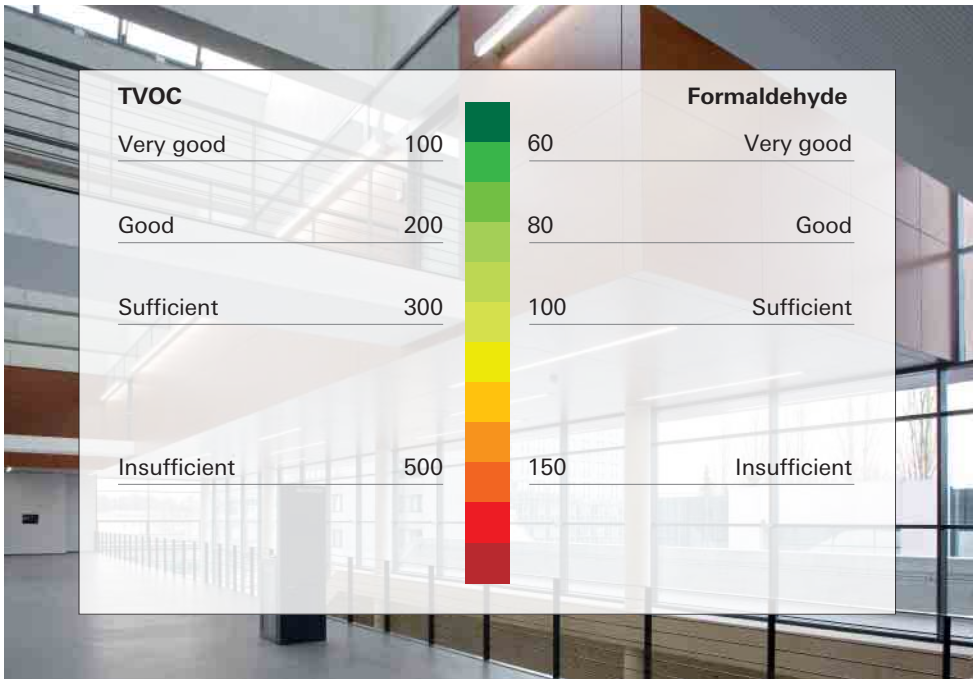
In the early design stage, materials with low volatile organic compound (VOC) emission levels have to be considered to ensure a high indoor air quality. Formaldehyde and total volatile organic compound (TVOC) concentration levels need to be measured post-construction (but pre-occupancy). The formaldehyde concentration must be less than or equal to 100 µg/m^3 averaged over 30 minutes (WHO guidelines, source: BRE Digest 464 part 239) and the TVOC concentration less than 300 µg/m^3 over eight hours.

3. Potential for natural ventilation
Occupied spaces of the building have to be designed to be capable of providing fresh air entirely via user-controlled natural ventilation.

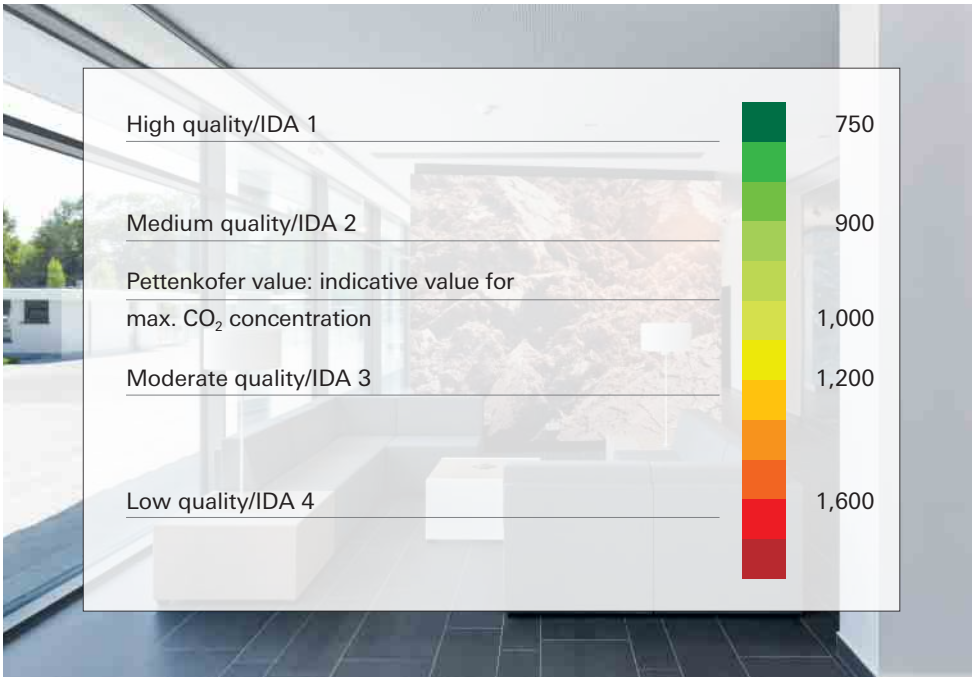


Graphic for 3.: Hygienic air change rate [m^3/(h*m^2)]
Recommended hygienic ventilation rates for non-residential buildings with standard occupation density for three categories of emission levels caused by the building itself, in accordance with EN 15251 Table B.2. "Low emissions" is adopted as the standard.

Relevant properties of the systems



Graphic for 2.: Volatile organic compound [µg/m³]
Total volatile organic compound (TVOC) and formaldehyde levels. The measurement of TVOC concentration is carried out over 8 hours. The measurement for formaldehyde is carried out over 30 minutes.



Graphic for 2.: CO_2 concentration [ppm]
Room air categories (indoor air) and characteristic values for absolute CO_2 emissions in the air in accordance with EN 15251 and EN 13779 (standard values) for an external air CO_2 concentration of 400 ppm.

See also BREEAM International New Construction Technical Manual SD5075 – 0.0:2013, issue date: 01/06/2013, Credit Hea 02
Graphic according to Green Building - Guideline for sustainable construction, Bauer/Mösle/Schwarz, Springer Vieweg Berlin Heidelberg, 2007, 2013, 2nd edition

[HEA 03] Thermal comfort

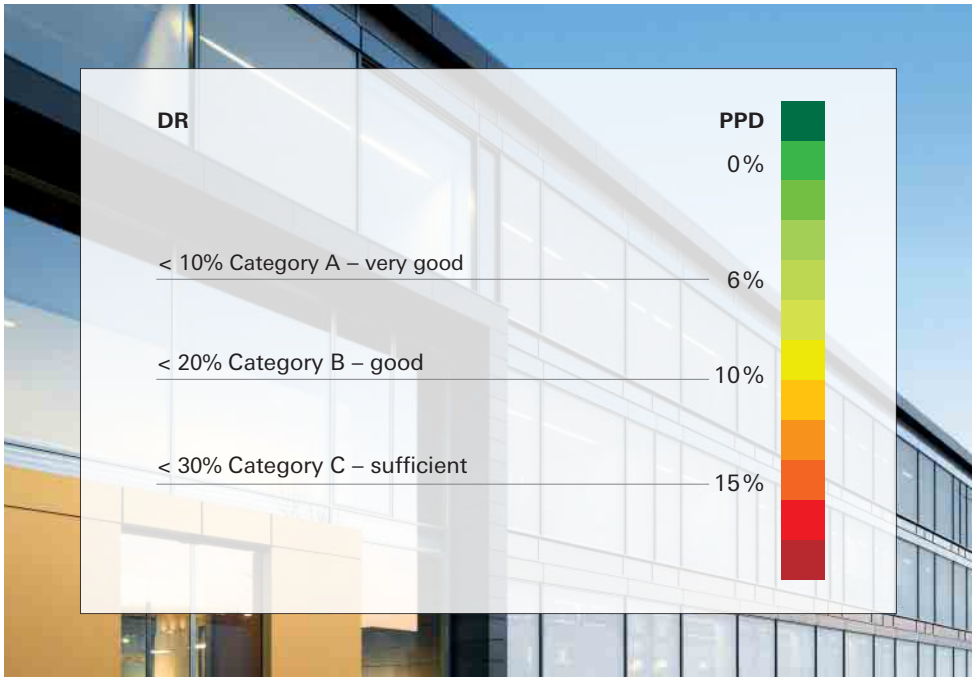
Intention of criteria
This credit promotes the productivity, comfort and well-being of occupants by providing high-quality thermal comfort within the building. Occupants who are able to modify their thermal environment by means of thermal controls will perceive greater comfort regardless of the conditioning strategy, and they may exhibit additional satisfaction and productivity.

Product influence on criteria
The present review reveals the positive product influence on the overall assessment of the criterion, according to the "explanation of product influence on criteria" on pages 8 and 12 of this Schüco Guide to BREEAM. The product influence calculated refers to the percentage area of the system with regard to the entire building envelope, as well as the requirements of the analysed criterion for the relevant Schüco system.

Schüco systems	Influence
Window systems	Up to **40%**
Door systems	–
Façade systems	Up to **50%**
Fire and smoke protection systems	Up to **50%**

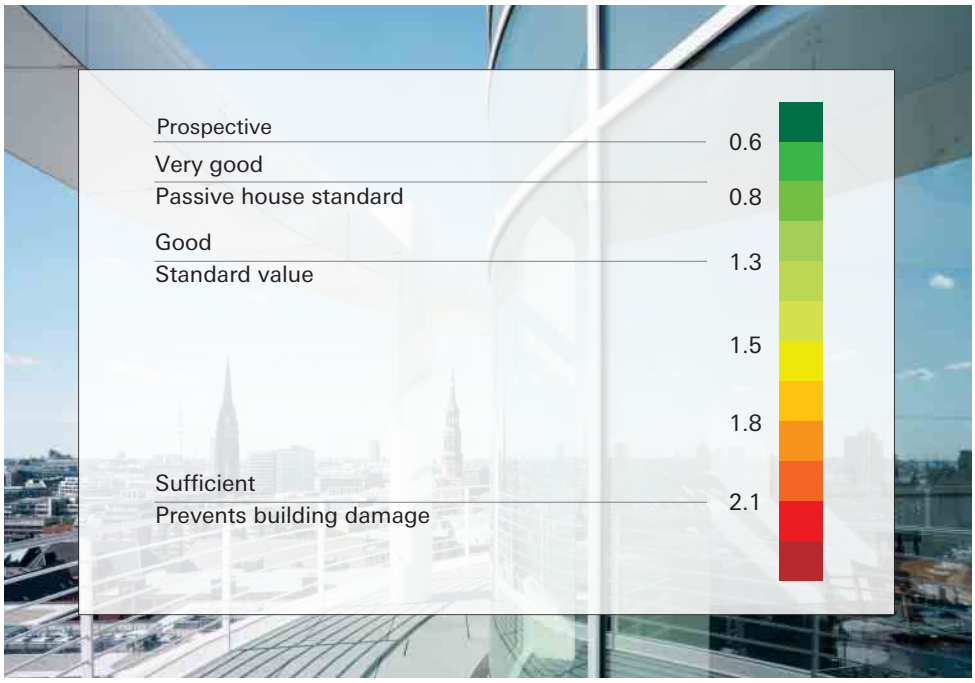
Criteria requirements
1. Thermal modelling
The thermal modelling analysis has to be carried out using the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices in accordance with ISO 7730:2005 taking full account of seasonal variations. Local thermal comfort criteria have to be used to determine the level of thermal comfort in the building. In occupied spaces, the Category B requirements set out in Table A.1 of Annexe A of ISO 7730:2005 have to be met.

2. Thermal simulation
Thermal simulations at the detailed design stage have to provide full dynamic thermal analysis. The strategy for proposed heating/cooling systems, how the systems will interact with each other and the end user behaviour have to be considered in the thermal simulation.

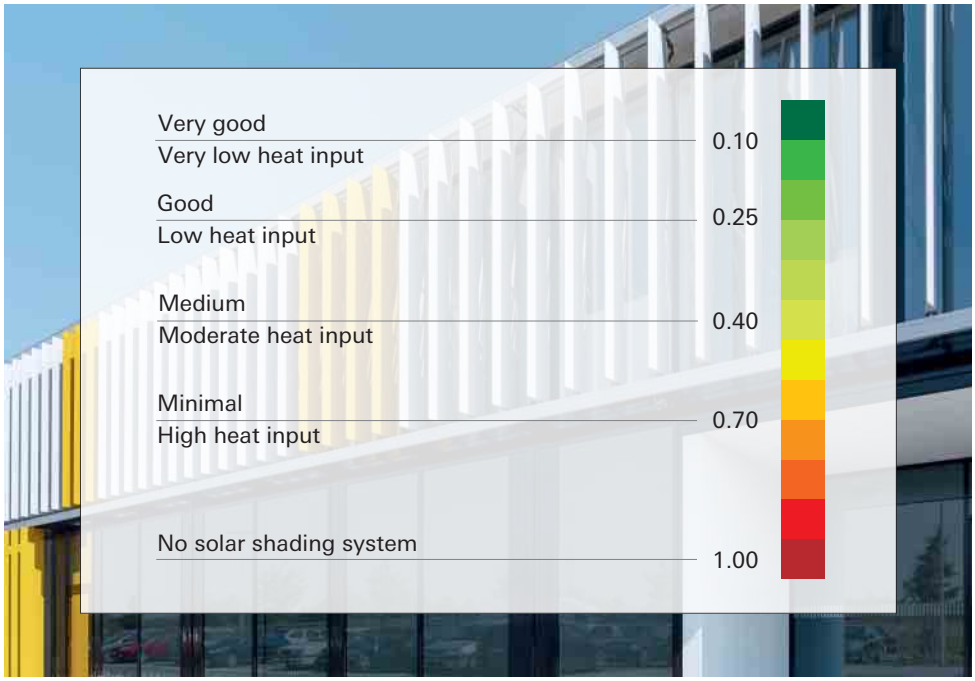


Graphic for 1.: Thermal comfort levels
Examples of the thermal comfort requirements for different environmental categories and room types, in accordance with ISO 7730:2005.

Relevant properties of the systems



Graphic to 1. & 2.: Heat transfer coefficient [(W/(m²*K)]
Characteristic values for the heat transfer coefficient U_W of the entire window or U_{CW} value of the façade, taking into consideration the U_f and U_g values.



Graphic for 1. & 2.: Solar shading
Characteristic values for reduction factors F_C of external shading systems.

See also BREEAM International New Construction Technical Manual SD5075 – 0.0:2013, issue date: 01/06/2013, Credit Hea 03
Graphic according to Green Building - Guideline for sustainable construction, Bauer/Mösle/Schwarz, Springer Vieweg Berlin Heidelberg, 2007, 2013, 2nd edition

[HEA 05A] Acoustic performance (non-residential only)

Intention of criteria
The intention is to ensure the performance of the building, including sound insulation by meeting the appropriate standards for its use.

Criteria requirements
These are split into four parts:

1. Prerequisite
The client must appoint a suitably qualified acoustics expert to provide early design advice on:

- External sources of noise affecting the chosen site
- Site layout and zoning of the building for good acoustics
- Acoustic requirements for users
- Acoustic treatment of different zones and façades

2. Acoustic performance standards
All unoccupied spaces have to comply with the indoor ambient noise level targets stipulated in national building regulations or other good-practice standards with indoor ambient noise levels from ≤ 30 $dBL_{Aeq,T}$ to 55 $dBL_{Aeq,T}$, dependent on usage (for detailed information, see the BREEAM International New Construction Manual Table 15).

A suitably qualified acoustics expert has to carry out ambient noise measurements to ensure that the relevant spaces achieve the required levels and, if not, carry out remedial work. Rooms used for speeches, music performances or rehearsals have to achieve lower reverberation levels.

The measurements must be in accordance with (EN) ISO 140-4:1998 and rated in accordance with (EN) ISO 717-1:1996. Measurements have to be based on finished but unfurnished rooms, taking account of-including the effect of-any carpets and acoustically absorbent ceilings specified.

Noise level range	Relevant external noise level dB (A)	Room types		
		Wards in hospitals and sanatoria	Living rooms in apartments, overnight accommodation, teaching rooms and similar	Offices and similar[1)]
		Required $R'_{w,res}$ value of the external building component in dB		
I	≤ 55	35	30	–
II	56 – 60	35	30	30
III	61 – 65	40	35	30
IV	66 – 70	45	40	35
V	71 – 75	50	45	40
VI	76 – 80	2)	50	45
VII	> 80	2)	2)	50

1) No requirements are laid down for the external building components of rooms where the traffic noise only makes an insignificant impact on the internal noise level in a room, on account of the activities carried out there.

2) The requirements must be laid down in this case based on local conditions.

Sources: DIN 4109, Table 8

Product influence on criteria

The present review reveals the positive product influence on the overall assessment of the criterion, according to the "explanation of product influence on criteria" on pages 8 and 12 of this Schüco Guide to BREEAM. The product influence calculated refers to the percentage area of the system with regard to the entire building envelope, as well as the requirements of the analysed criterion for the relevant Schüco system.

Schüco systems	Influence
Window systems	Up to **25%**
Door systems	Up to **5%**
Façade systems	Up to **25%**
Fire and smoke protection systems	Up to **25%**

[HEA 05B] Acoustic performance (residential only)

Intention of criteria
The intention is to ensure the performance of the building, including sound insulation, by meeting the appropriate standards for its use.

Criteria requirements
These are split into four parts:

1. Prerequisite
The client appoints a suitably qualified acoustics expert to provide early design advice on:

- External sources of noise affecting the chosen site
- Site layout and zoning of the building for good acoustics
- Acoustic requirements for users
- Acoustic treatment of different zones and façades

2. Acoustic performance standards
The building has to meet the following acoustic performance standards:

- **Airborne and impact sound insulation performance improvement standards**
  Airborne sound insulation values are 3 dB (1 credit), 5 dB (3 credits) or 8 dB (4 credits) higher and, at the same time, the impact sound insulation values are at least 3 dB, 5 dB or 8 dB lower.
- **Airborne and impact sound insulation performance standards**
  Airborne sound insulation ($D_{nT,w} + C_{tr}$) minimum values are 48 dB (1 credit), 50 dB (3 credits) or 53 dB (4 credits) and, at the same time, the impact sound insulation ($L_{nT,w}$) maximum values are 59 dB, 57 dB or 54 dB.

A programme of pre-completion testing has to be carried out by a competent test body.

Noise level range	Relevant external noise level dB (A)	Room types		
		Wards in hospitals and sanatoria	Living rooms in apartments, overnight accommodation, teaching rooms and similar	Offices and similar[1)]
		Required $R'_{w,res}$ value of the external building component in dB		
I	≤ 55	35	30	–
II	56 – 60	35	30	30
III	61 – 65	40	35	30
IV	66 – 70	45	40	35
V	71 – 75	50	45	40
VI	76 – 80	2)	50	45
VII	> 80	2)	2)	50

1) No requirements are laid down for the external building components of rooms where the traffic noise only makes an insignificant impact on the internal noise level in a room, on account of the activities carried out there.

2) The requirements must be laid down in this case based on local conditions.

Sources: DIN 4109, Table 8

Product influence on criteria

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Schüco systems	Influence
Window systems	Up to **25%**
Door systems	Up to **5%**
Façade systems	Up to **25%**
Fire and smoke protection systems	Up to **25%**

[ENE 01] Energy efficiency

Intention of criteria
As fossil energy resources run low, it is essential to minimise the energy consumption of fossil fuels and replace them with renewable resources. Energy efficiency also has to be optimised, so that available energy resources can be used most effectively.

Criteria requirements
1. Option 1 – building energy calculation software
The energy performance ratio is calculated using BREEAM's Ene 01 calculator, which takes account of the following parameters:

- The operational energy demand of the building (weighting: 23%)
- The primary energy consumption (of the building weighting: 38%)
- The overall resulting CO_2 emissions (weighting: 39%)

The modelling has to be carried out by a suitably qualified engineer. The relevant EPRINC achieved has to be compared with the Ene 01 benchmark scale. For an EPRINC value of 0.06, 1 credit can be awarded and for an EPRINC value of 0.9 up to 15 credits can be awarded. In addition, the total modelled operational energy consumption and carbon dioxide emissions of the building have to be reported.

2. Option 2 – energy-efficient design features
Where Option 1 is not suitable, confirmation by a building service engineer is required and the energy performance of the building is determined using Option 2 Checklist A5. The items selected in the checklist must be appropriate to the building type and local climatic conditions.

Product influence on criteria
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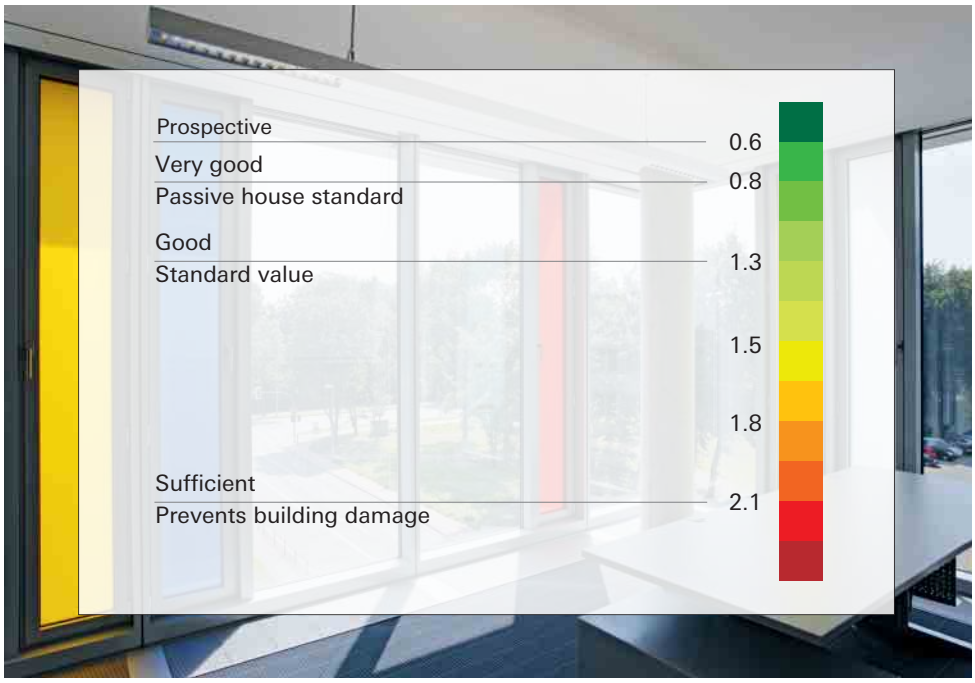
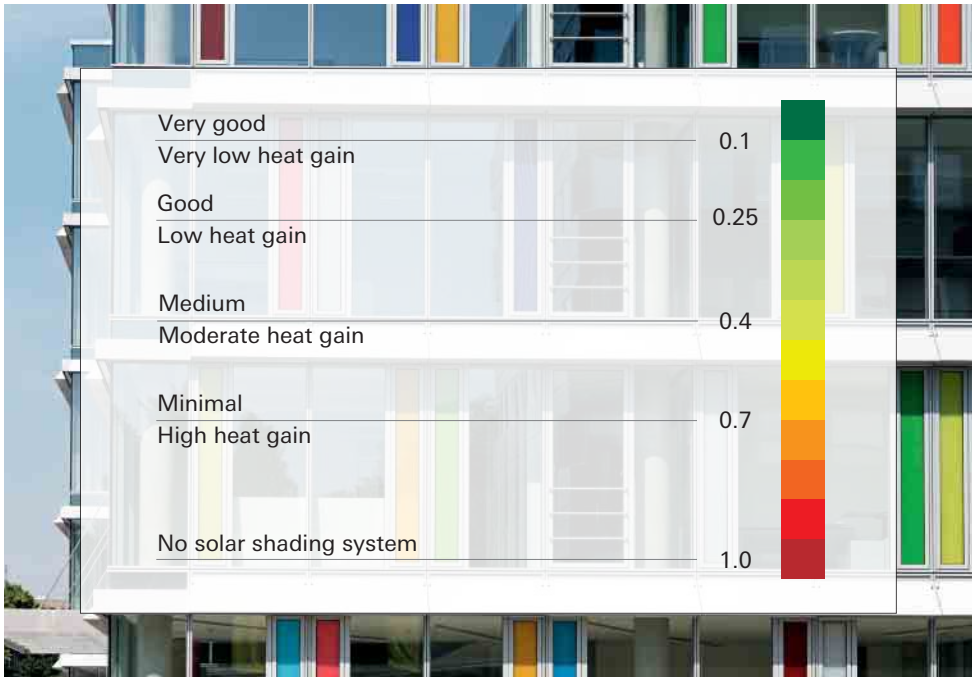
Schüco systems	Influence
Window systems	Up to **20%**
Door systems	Up to **5%**
Façade systems	Up to **25%**
Fire and smoke protection systems	Up to **25%**

See also BREEAM International New Construction Technical Manual SD5075 – 0.0:2013, issue date: 01/06/2013, Credit Ene 01
Graphic according to Green Building - Guideline for sustainable construction, Bauer/Mösle/Schwarz, Springer Vieweg Berlin Heidelberg, 2007, 2013, 2nd edition

Relevant properties of the systems



Graphic for 1. & 2.: Heat transfer coefficient [(W/(m²*K)]
Characteristic values for the heat transfer coefficient U_W of the entire window or U_{CW} value of the façade, taking into consideration the U_f and U_g values.



Graphic for 1. & 2.: Solar shading
Characteristic values for reduction factors F_C of external shading systems.

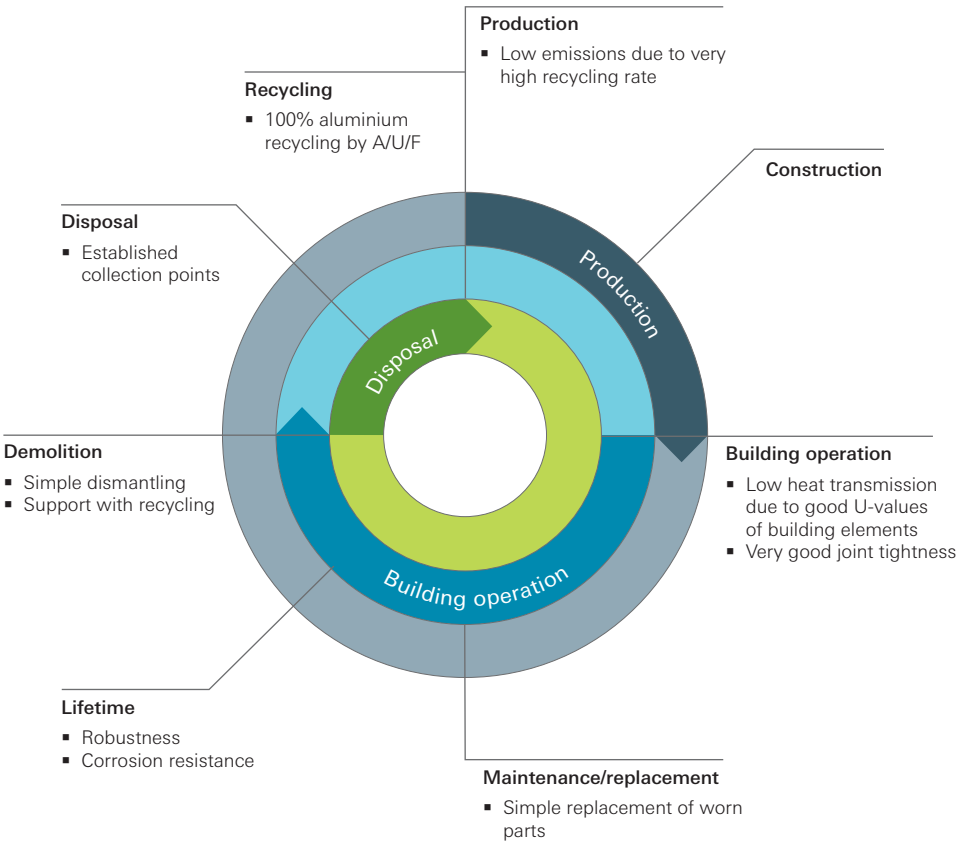
[MAT 01] Life cycle impact

Intention of criteria
Over their lifetime, buildings have a local, regional and global environmental impact. Some occur during the harvest, extraction, manufacture and transportation of materials; some involve construction and operation; whilst others take place at demolition and disposal. A life cycle assessment (LCA) examines as many of these environmental effects as possible. This credit aims to protect the environment within the landscape. Materials with a low environmental impact should therefore be used for construction.

Criteria requirements
At the design stage, the project members should use a life cycle assessment (LCA) tool to measure the life cycle environmental impact of the building elements. This LCA must include at least the mandatory requirements for the building elements (BREEAM Mat 01 Calculator).

The tool has to submit a total building environmental impact result for year 0 (installation only) and year 60 study periods. Issues/indicators, individual results for each life stage, modules and the reporting format in accordance with BS EN 15978:2011 should be used.

Relevant properties of the systems
Building life cycle



Product influence on criteria
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The product influence calculated refers to the percentage area of the system with regard to the entire building envelope, as well as the requirements of the analysed criterion for the relevant Schüco system.

Schüco systems	Influence
Window systems	Up to **20%**
Door systems	Up to **5%**
Façade systems	Up to **25%**
Fire and smoke protection systems	Up to **25%**

[MAT 03] Responsible sourcing of materials

Intention of criteria
This criterion encourages the specification of responsibly sourced materials for key building elements.

Criteria requirements
These are split into two parts:

1. Prerequisite
All timber used on the project has to be "legally harvested and legally traded timber" in accordance with the relevant definitions within the additional information section.

2. Responsible sourcing
Each of the applicable specified materials, comprising the following main building elements, have to be assigned a responsible sourcing:

- Structural frame
- Ground floor
- Upper floors
- Roof
- External walls
- Internal walls
- Foundation/substructure
- Fittings: includes staircase, windows, doors, floor finishes and any other significant fitting or finish present
- Hard landscaping

The proof of responsible sourcing for all materials and the determination of the credits achieved is assigned by the BREEAM Mat 03 calculator. To achieve points for any given building element, at least 80% of the material used to make up that element must be responsibly sourced i.e. classified in tier 1-7.

Product influence on criteria
The present review reveals the positive product influence on the overall assessment of the criterion, according to the “explanation of product influence on criteria” on pages 8 and 12 of this Schüco Guide to BREEAM. The product influence calculated refers to the percentage area of the system with regard to the entire building envelope, as well as the requirements of the analysed criterion for the relevant Schüco system.

Schüco systems	Influence
Window systems	Up to **20%**
Door systems	Up to **5%**
Façade systems	Up to **25%**
Fire and smoke protection systems	Up to **25%**

[WST 01] Construction waste management

Intention of criteria
Waste management services vary widely from one location to another. Therefore, in the early design stages, the technologies, hauliers and facilities in the area of the project should be identified. Planning for construction waste management (CWM) prior to construction allows for time to identify the most effective waste diversion strategies available.

Criteria requirements
These are split into two parts:

1. Construction resource efficiency
Where appropriate, set targets for the amount of non-hazardous and hazardous waste produced on-site and procedures to minimise the waste produced. Where buildings exist on the site, a pre-demolition audit of any existing buildings must be completed to determine if refurbishment/reuse is feasible and, if not, to maximise the recovery of material from demolition for subsequent use, prioritising high-grade/-value applications.

2. Diversion of resources from landfill
A significant quantity of non-hazardous construction and demolition waste generated by the project has to be diverted from landfill. These waste materials have to be sorted into separate key waste groups either on-site or off-site.

Product influence on criteria
The present review reveals the positive product influence on the overall assessment of the criterion, according to the “explanation of product influence on criteria” on pages 8 and 12 of this Schüco Guide to BREEAM. The product influence calculated refers to the percentage area of the system with regard to the entire building envelope, as well as the requirements of the analysed criterion for the relevant Schüco system.

Schüco systems	Influence
Window systems	Up to **5%**
Door systems	Up to **5%**
Façade systems	Up to **5%**
Fire and smoke protection systems	Up to **5%**

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Schüco Guide to BREEAM

By using Schüco systems, up to ten BREEAM criteria can be influenced positively, which corresponds to 40% in the overall assessment. The feasibility of influencing the credits awarded was analysed and confirmed by an independent and qualified expert engineering company, Drees & Sommer, specialised in optimising building energy design and management.

Schüco International KG
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Schüco – system solutions for windows, doors and façades

Together with its worldwide network of partners, architects, specifiers and investors, Schüco creates sustainable building envelopes which focus on people and their needs in harmony with nature and technology. The highest demands for design, comfort and security can be met, whilst simultaneously reducing CO_2 emissions through energy efficiency, thereby conserving natural resources. The company and its Metal and PVC-U divisions deliver tailored products for newbuilds and renovations, designed to meet individual user needs in all climate zones. With 4,800 employees and 12,000 partner companies, Schüco is active in 78 countries and achieved a turnover of 1.5 billion euros in 2013.
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