

Schüco Guide to LEED

Building Design and Construction v4



Schüco Product System

Schüco can help you to achieve LEED credits

By using Schüco Product Systems within a building assessment according to LEED certification system up to 14 Criteria can be influenced in a positive way. The feasibility to affect these credits were analyzed and confirmed by the independent and qualified expert engineering company Drees & Sommer, specialized in optimizing building energy design and management.

Some Schüco references with LEED certificates:



Siemens City, Vienna, Austria:
LEED-certified



Vodafone Campus Center, Düsseldorf, Germany:
LEED gold certificate aimed

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 focussing 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 CO₂ 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 1.4 billion euros in 2015. For more information, visit www.schueco.com.



Schüco 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 up 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. Burglar resistance up to security class RC3 (WK3) (EN 1627).



Schüco Door Systems – safe and varied

A door does not just provide access to a building. It has to meet high standards of thermal insulation, security, functionality and design than any other building component. The Schüco ADS Door Systems (Aluminium Door Systems) were specifically developed to meet these requirements. They offer excellent thermal values and due to a versatile range of systems, can be used for a variety of solutions in building security and automation. Their timeless design: fits in perfectly with the Schüco Aluminium Window System AWS. Schüco ADS Door Systems have a cost effective fit into almost any building design and can be used to create efficient and stylish architectural solutions.



Schüco Façade Systems – efficient solutions for all requirements

The efficient use of energy is today and for the future a central focus of modern building design concepts. Thereby the National and European specifications as well as varied requirements like security, automation and design have to be considered. All components are perfectly matched to each other to achieve the architectural and technical requirements for façades and lightroofs. Therefore Schüco offers a complete assortment for new construction and modernization of buildings including mullion/transom façades, add-on constructions (timber and steel), structural glazing and panellised façade systems with a large assortment of integrated opening elements.



Schüco Security Systems – Schüco fire and smoke protection systems

The need for buildings, which 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 compatibility of the Schüco systems allows elegant, concealed transitions between the fire protection and standard series.

360° Sustainability

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 a low weight and high stability, are particularly positive.

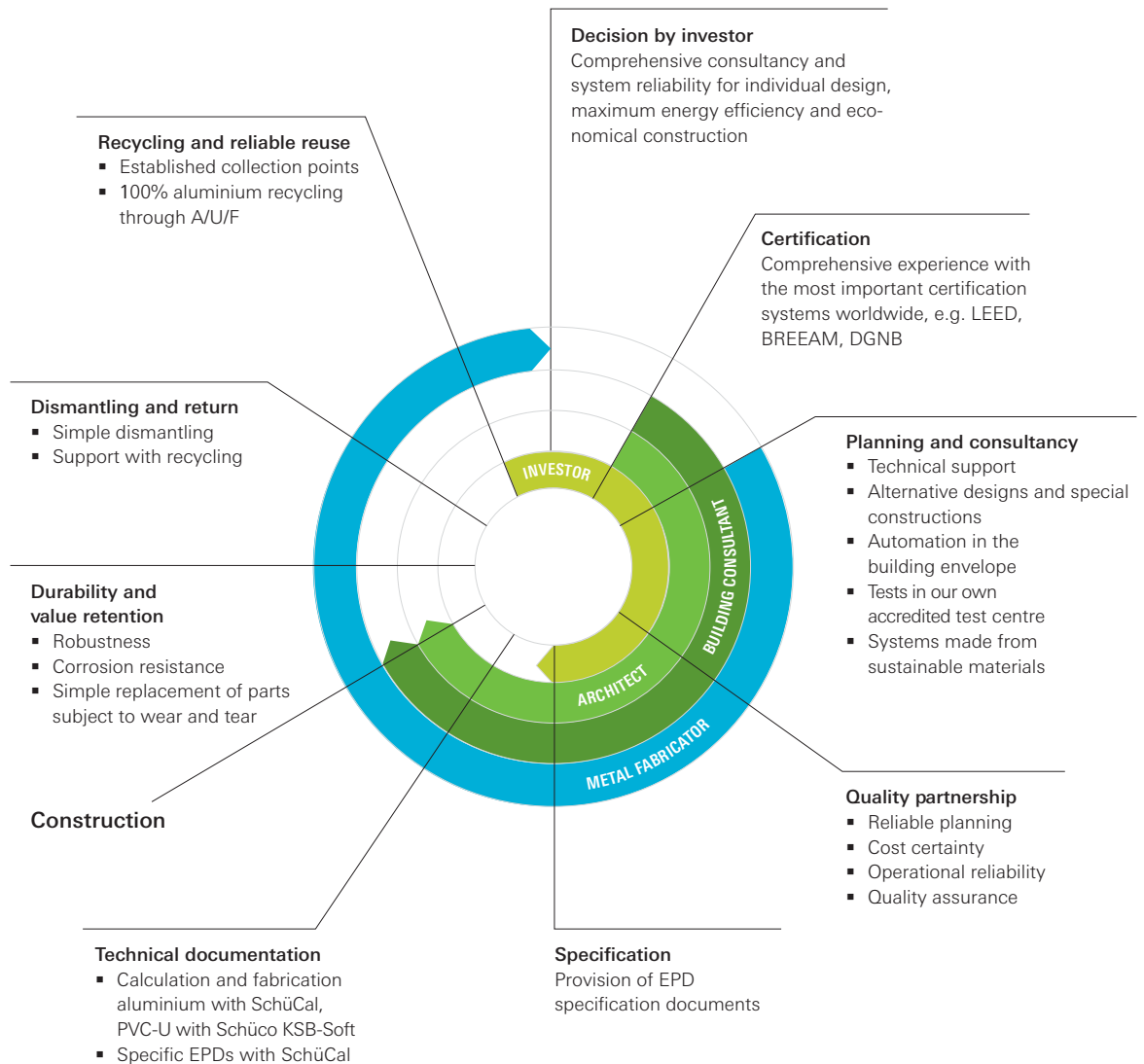
Focus on certified sustainability for buildings

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

Sustainability

Saving energy

Conserving resources

Protecting climate and environment

Durability

Resistance

Capacity for repair

End of life

Recycling

LEED certification system

What is LEED?

Developed by the U.S. Green Building Council, LEED is a framework for identifying, implementing and measuring green building and neighbourhood design, construction operations, and maintenance. LEED is a voluntary, market-driven, consensus-based tool that serves as a guideline and assessment mechanism. LEED rating systems address commercial, institutional, and residential buildings and neighbourhood developments. LEED for New Construction and Major Renovations was developed in 1998 for the commercial building industry and has since been updated several times. Over the years, other rating systems have been developed to meet the needs of different market sectors. LEED sets a challenging yet achievable set of benchmarks that define green building for interior spaces, entire structures and whole neighbourhoods¹.

Aims of LEED

LEED promotes the use of natural resources and regenerative and restorative strategies. It also maximises the positive impact and minimises the environmental impact and effect on public health of the construction industry, and provides high-quality indoor environments for building occupants. LEED emphasises integrative design, integration of existing technology, and state-of-the-art strategies to advance expertise in green building and transform professional practice.

Objectives of LEED

- To reverse the contribution to global climate change
- To enhance individual human health and well-being
- To protect and restore water resources
- To protect, enhance and restore biodiversity and ecosystems
- To promote sustainable and regenerative material resource cycles
- To build a greener economy
- To enhance social equity, environmental justice, community health and quality of life

cf. LEED Reference Guide for Building Design and Construction v4, 2013 Edition

System Categories



Integrative Process



[LT] Location and Transportation



[SS] Sustainable Sites



[WE] Water Efficiency



[EA] Energy and Atmosphere



[MR] Materials and Resources



[EQ] Indoor Environmental Quality



[IN] Innovation



[RP] Regional Priority

Certification process

The process begins when the owner selects the rating system and registers the project. The project is then designed to meet the requirements for all prerequisites and for the credits the team has chosen to pursue. After documentation has been submitted for certification, a project goes through preliminary and final reviews. The preliminary review provides technical advice on credits that require additional work for achievement, and the final review contains the project's final score and certification level. The decision can be appealed if a team believes additional consideration is warranted.

Analysis related to the product

Each of these credits were analyzed and confirmed by an independent and qualified expert engineering company, Drees & Sommer. The impacts of Schüco product systems on the credits are shown in this Schüco guide to LEED.


In this Schüco guide you will find at the beginning an explanation of each criterion of the LEED Certification System. In the overview of the Certification System in detail, the positive product contribution of Schüco product systems is illustrated. In addition an overview of each category with the included criteria shows all LEED credits where the use of Schüco product systems have an positive effect in the overall assessment and the credits without product contribution are listed, too. Finally, every LEED criterion where you can achieve positive effects in the Certification according LEED System is explained accurately, you get information of intent and requirements of these credits.

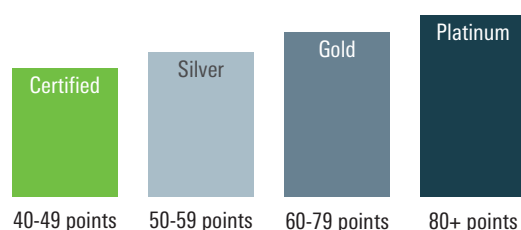
Schüco offers the most suitable product solution for any criteria. For that reason Schüco can contribute with its products to comply with the criteria requirements. Consequently with **Schüco product systems** you chose the best possible solution to certify your project with LEED.

System categories

- Integrative process
- [LT] Location and transportation
- [SS] Sustainable sites
- [WE] Water efficiency
- [EA] Energy and atmosphere
- [MR] Materials and resources
- [EQ] Indoor environmental quality
- [IN] Innovation
- [RP] Regional priority

Rating system

 LEED has four levels of certification, depending on the point thresholds achieved:



The certification system in detail

Content of categories

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

0.9% [IP] Integrative process

An integrative process is a comprehensive approach to building systems and equipment. Project team members look for synergies among systems and components – the mutual advantages that can help achieve high levels of building performance, human comfort and environmental benefits. The process should involve rigorous questioning and coordination and challenge typical project assumptions. Team members collaborate to enhance the efficiency and effectiveness of every system.

14.5% [LT] Location and transportation

This category rewards thoughtful decisions about building location, with credits that encourage compact development, alternative transportation and connection with amenities, such as restaurants and parks. The LT category is an outgrowth of the Sustainable Sites category, which formerly covered location-related topics. The LT category considers the existing features of the surrounding community and how this infrastructure affects occupants' behaviour and environmental performance.

9.1% [SS] Sustainable sites

The Sustainable sites [SS] category rewards decisions about the environment surrounding the building, with credits that emphasise the vital relationships among buildings, ecosystems and ecosystem services. It focuses on restoring project site elements, integrating the site with local and regional ecosystems, and preserving the biodiversity upon which natural systems rely.

10.0% [WE] Water efficiency

The Water Efficiency [WE] section addresses water holistically, looking at indoor use, outdoor use, specialised uses and metering. The section is based on an "efficiency first" approach to water conservation. As a result, each prerequisite looks at water efficiency and reductions in potable water use alone. The WE credits then additionally recognise the use of non-potable and alternative sources of water.

30.0% [EA] Energy and atmosphere

The Energy and Atmosphere [EA] category approaches energy from a holistic perspective, addressing energy use reduction, energy-efficient design strategies, and renewable energy sources. The EA category recognises that the reduction of fossil fuel use extends far beyond the walls of the building. Projects can contribute to increasing the electricity grid's efficiency by enrolling in a demand response programme.

11.8% [MR] Materials and resources

The Materials and Resources [MR] credit category focuses on minimising the embodied energy and other impacts associated with the extraction, processing, transport, maintenance and disposal of building materials. The requirements are designed to support a life cycle approach that improves performance and promotes resource efficiency. Each requirement identifies a specific action that fits into the larger context of a life cycle approach to embodied impact reduction.

14.5% [EQ] Indoor environmental quality

This category rewards decisions made by project teams about indoor air quality and thermal, visual and acoustic comfort. Green buildings with good indoor environmental quality protect the health and comfort of building occupants. High-quality indoor environments also enhance productivity, decrease absenteeism, improve the building's value and reduce liability for building designers and owners.

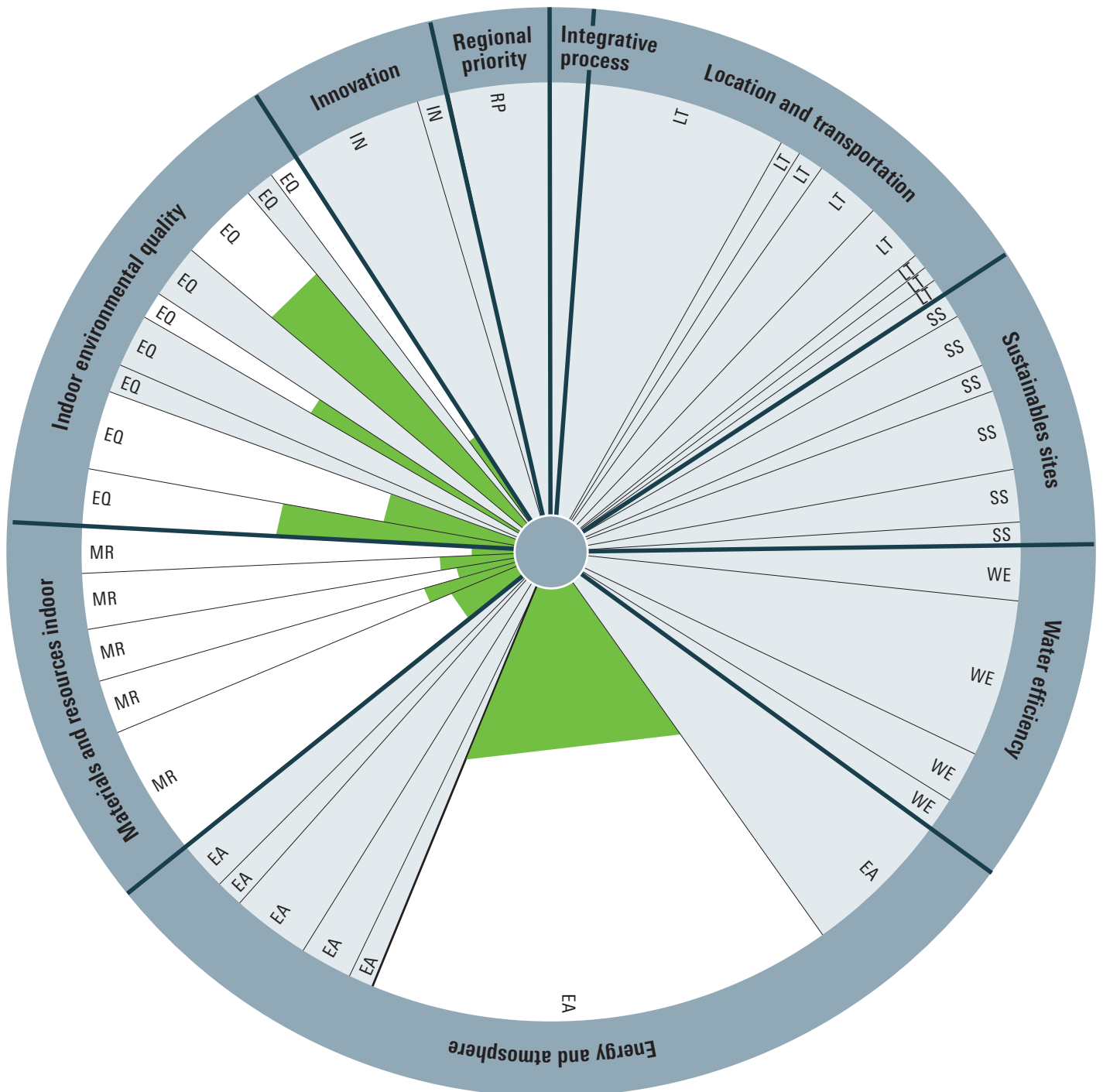
5.5% [IN] Innovation

Sustainable design strategies and measures are constantly evolving and improving. New technologies are continually introduced to the marketplace, and up-to-date scientific research influences building design strategies. The purpose of this LEED category is to recognise projects for innovative building features and sustainable building practices and strategies.

3.6% [RP] Regional priority

As some environmental issues are particular to a locale, volunteers from USGBC chapters and the LEED International Roundtable have identified distinct environmental priorities within their areas and the credits that address those issues. These Regional Priority credits encourage project teams to focus on their local environmental priorities.

Overview of certification system



Explanation of Product influence on criteria

The figure contains every criteria of the LEED certification system. A tabular view of all these criteria can be found on the following pages. The width of a criteria in the figure reflects the influence in the overall evaluation. Every criterion in which Schüco product systems have a positive contribution in the overall assessment are highlighted in white. The green area inside the white highlighted credits represents the estimated, maximum

product influence of Schüco Systems within the evaluation of a LEED Credit. The positive influence refers to the area fraction of the Product System to the entire building envelope as well as the requirements of the analyzed criterion to the relevant Schüco System. A product by itself is not designed to fulfill the complete requirements of a criteria, therefore a wide range of technical requirements are necessary.

Product evaluation

Category	Criteria	Max. credits	Product influence to category	Estimated product contribution to criteria	Criteria influence to category	Criteria influence to system
Integrative process						0.9%
	Integrative process	1	No		100.0%	0.9%
Location and transportation						14.5%
LT	LEED for neighbourhood development location	16	No		50.0%	7.3%
LT	Sensitive land protection	1	No		3.1%	0.5%
LT	High-priority site	2	No		6.3%	0.9%
LT	Surrounding density and diverse uses	5	No		15.6%	2.3%
LT	Access to quality transit	5	No		15.6%	2.3%
LT	Bicycle facilities	1	No		3.1%	0.5%
LT	Reduced parking footprint	1	No		3.1%	0.5%
LT	Green vehicles	1	No		3.1%	0.5%
Sustainable sites						9.1%
SS	Construction activity pollution prevention	Req'd	No		-	-
SS	Site assessment	1	No		10.0%	0.9%
SS	Site development – protect or restore habitat	2	No		20.0%	1.8%
SS	Open space	1	No		10.0%	0.9%
SS	Rainwater management	3	No		30.0%	2.7%
SS	Heat island reduction	2	No		20.0%	1.8%
SS	Light pollution reduction	1	No		10.0%	0.9%
Water efficiency						10.0%
WE	Outdoor water use reduction	Req'd	No		-	-
WE	Indoor water use reduction	Req'd	No		-	-
WE	Building-level water metering	Req'd	No		-	-
WE	Outdoor water use reduction	2	No		18.2%	1.8%
WE	Indoor water use reduction	6	No		54.5%	5.5%
WE	Cooling tower water use	2	No		18.2%	1.8%
WE	Water metering	1	No		9.1%	0.9%

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

Meaning of abbreviations

Max. credits

Maximum points achievable within the evaluation of the criterion.

Product influence on category

Here the question is answered whether Schüco product systems have a positive contribution within the criterion.

Criteria influence on category

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

Criteria Influence to System

This value specifies the percentage of fulfillment (whole system) .

Category	Criteria	Max. credits	Product influence to category	Estimated product contribution to criteria	Criteria influence to category	Criteria influence to system
Energy and Atmosphere						30.0%
EA	Fundamental commissioning and verification	Req'd	No		-	-
EA	Minimum energy performance	Req'd	Yes	25.0%	-	-
EA	Building-level energy metering	Req'd	No		-	-
EA	Fundamental refrigerant management	Req'd	No		-	-
EA	Enhanced commissioning	6	No		18.2%	5.5%
EA	Optimise energy performance	18	Yes	25.0%	54.5%	16.4%
EA	Advanced energy metering	1	No		3.0%	0.9%
EA	Demand response	2	No		6.1%	1.8%
EA	Renewable energy production	3	No		9.1%	2.7%
EA	Enhanced refrigerant management	1	No		3.0%	0.9%
EA	Green power and carbon offsets	2	No		6.1%	1.8%
Materials and resources						11.8%
MR	Storage and collection of recyclables	Req'd	No		-	
MR	Construction and demolition waste management planning	Req'd	Yes	5.0%	-	
MR	Building life cycle impact reduction	5	Yes	15.0%	38.5%	4.5%
MR	Building product disclosure and optimisation — environmental product declarations	2	Yes	20.0%	15.4%	1.8%
MR	Building product disclosure and optimisation — sourcing of raw materials	2	Yes	10.0%	15.4%	1.8%
MR	Building product disclosure and optimisation — material ingredients	2	Yes	15.0%	15.4%	1.8%
MR	Construction and demolition waste management	2	Yes	5.0%	15.4%	1.8%
Indoor environmental quality						14.5%
EQ	Minimum indoor air quality performance	Req'd	Yes	50.0%	-	
EQ	Environmental tobacco smoke control	Req'd	No		-	
EQ	Enhanced indoor air quality strategies	2	Yes	50.0%	12.5%	1.8%
EQ	Low-emitting materials	3	Yes	20.0%	18.8%	2.7%
EQ	Construction indoor air quality management plan	1	No		6.3%	0.9%
EQ	Indoor air quality assessment	2	No		12.5%	1.8%
EQ	Thermal comfort	1	Yes	50.0%	6.3%	0.9%
EQ	Interior lighting	2	No		12.5%	1.8%
EQ	Daylight	3	Yes	75.0%	18.8%	2.7%
EQ	Quality views	1	No		6.3%	0.9%
EQ	Acoustic performance	1	Yes	15.0%	6.3%	0.9%
Innovation						5.5%
IN	Innovation	5	No		83.3%	4.6%
IN	LEED accredited professional	1	No		16.7%	0.9%
Regional priority						3.6%
RP	Regional priority	4	No		100.0%	3.6%

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

$$\text{Criteria influence to category} = \frac{16}{\Sigma(\text{Max. credits})} \times 100$$

$$\text{Criteria influence to system} = \frac{16}{\Sigma(\text{Max. credits})} \times 100 \times 14.5\%$$

Example: LT LEED for neighbourhood development location

$$\text{Criteria influence to category} = \frac{16}{32} \times 100 = 50.0\%$$

$$\text{Criteria influence to system} = 50.0\% \times 100 \times 14.5\% = 7.3\%$$

Information documents for LEED criterias with product influence

The following schedule provides an overview of information the Schüco International KG can provide you in case of a building certification according to LEED System to meet the requirements of criteria and fulfill the product related issues.

		Tender documents/ bill of quantities	Design drawings	Service and maintenance instructions	Installation and operating instruction (electric)	Declaration of origin
Source of information						
Distribution		■	■	■	■	■
SchüCal						
Website				■	■	
Catalogue			■			
Energy and atmosphere						
EA	Minimum energy performance	■				
EA	Optimise energy performance	■				
Materials and resources						
MR	Construction and demolition waste management planning	■				
MR	Building life cycle impact reduction	■	■			■
MR	Building product disclosure and optimisation — environmental product declarations	■				
MR	Building product disclosure and optimisation — sourcing of raw materials	■				■
MR	Building product disclosure and optimisation — material ingredients	■				■
MR	Construction and demolition waste management	■				
Indoor environmental quality						
EQ	Minimum indoor air quality performance	■			■	
EQ	Enhanced indoor air quality strategies	■			■	
EQ	Low-emitting materials	■				■
EQ	Thermal comfort	■	■		■	
EQ	Daylight	■	■			
EQ	Acoustic performance	■				

[EA] Minimum energy performance

Criteria Intent

An optimized building design can substantially reduce energy use – often for a modest initial cost with a short payback period – when it includes load reduction, improved mechanical system efficiency, and smart operational strategies. An integrated building design can lower operating and maintenance costs and improve indoor air quality, thermal comfort, and access to daylight. Either a prescriptive or a performance approach may be used to attain such results.

Criteria requirements

1. Option 1: Whole-Building Energy Simulation

Demonstrate an improvement of 5% for new construction, 3% for major renovations, or 2% for core and shell projects in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G, with errata, using a simulation model.

The proposed design must meet the following criteria:

- compliance with the mandatory provisions
- inclusion of all energy consumption and costs
- comparison against a baseline building

2. Option 2: Prescriptive Compliance: ASHRAE 50% Advanced Energy Design Guide

Provide compliance with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata (or a USGBC-approved equivalent standard for the project outside the U.S.). And comply with the HVAC and service water heating requirements, including equipment efficiency, economizers, ventilation, ducts and dampers.

2. Option 3: Prescriptive Compliance: Advanced Buildings™ Core Performance™ Guide

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or USGBC approved equivalent standard for projects outside the U.S.). Comply with Section 1: Design Process Strategies, Section 2: Core Performance Requirements, and the following three strategies from Section 3: Enhanced Performance Strategies, as applicable.

To be eligible for Option 3, the project must be less than 100,000 square feet (9,290 square meters).

Product influence on criteria

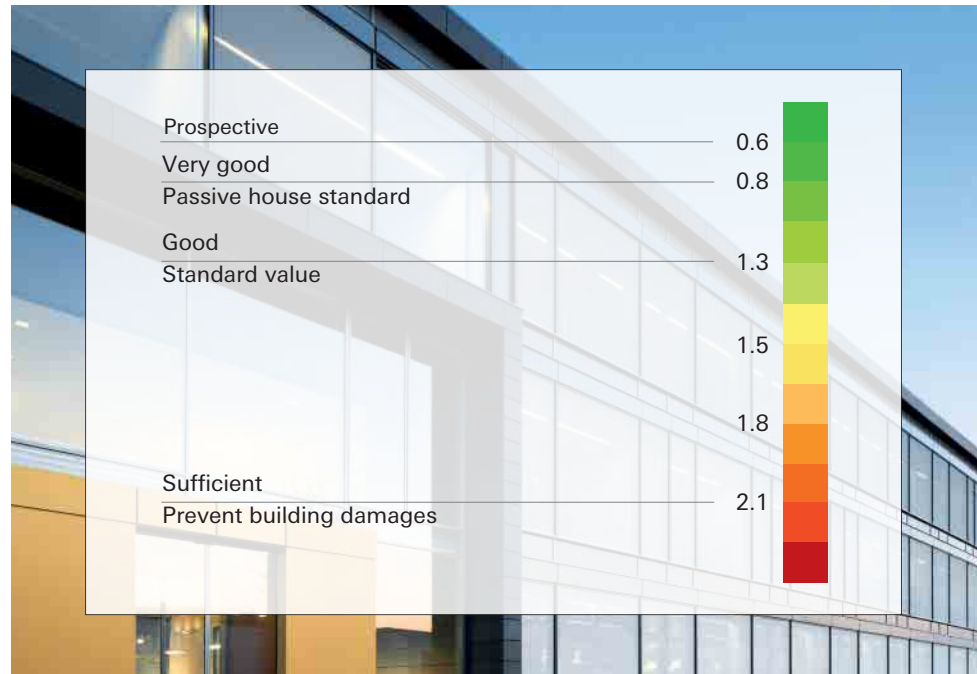
The present review discloses the positive product influence in the overall assessment of the criterion, according to the “Explanation of Product influence on criteria” on page 4 of this Schüco Guide for LEED Program.

The presented system influence refers to the area fraction of the system to the entire building envelope as well as the requirements of the analyzed criterion to the relevant Schüco system.

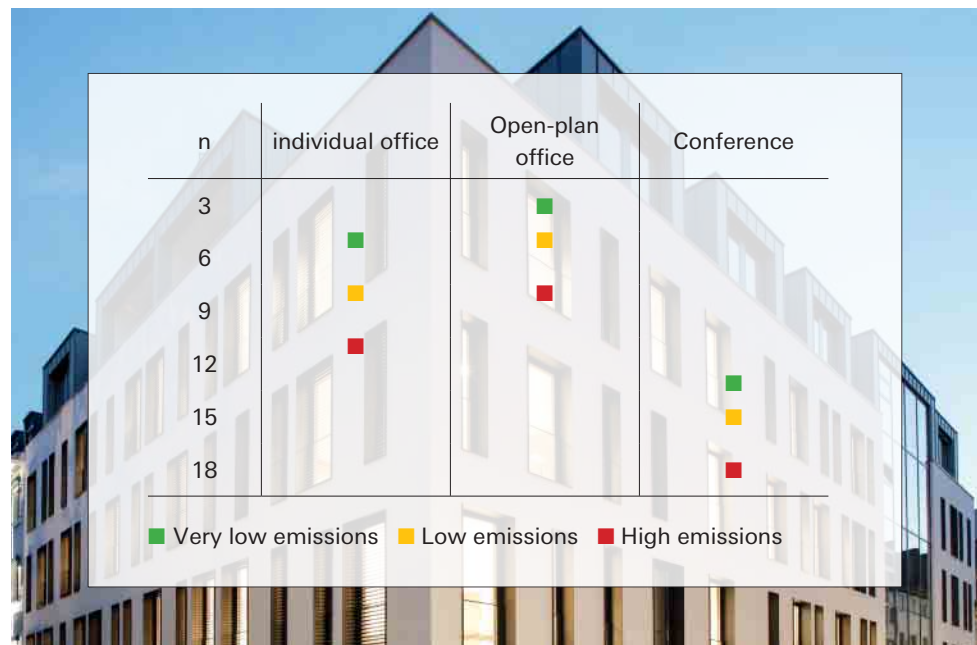
Schüco systems	Influence
Window systems	Up to 20%
Door systems	Up to 5%
Façade systems	Up to 25%
Fire and smoke protection systems	Up to 25%



Relevant properties of the systems



Graphic for 1.–3.: 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 consideration of the U_i and U_g values.



Graphic for 1.–3.: Hygienic air change rate [m³/(h*m²)]
 Recommended hygienic ventilation rates for non-residential buildings for standard occupation density for three categories of emission levels caused by the building itself, according to EN 15251 Table B.2. "Low-emission" is adopted as the standard.

Criteria requirements

1. Option 1: Whole-building energy simulation

Demonstrate an improvement of 5% for new construction, 3% for major renovations or 2% for core and shell projects in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G, with errata, using a simulation model.

The proposed design must meet the following criteria:

- Compliance with the mandatory provisions
- Inclusion of all energy consumption and costs
- Comparison against a baseline building

2. Option 2: Prescriptive compliance: ASHRAE 50% advanced energy design guide

Provide compliance with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata (or a USGBC-approved equivalent standard for the project outside the US). And comply with the HVAC and service water heating requirements, including equipment efficiency, economisers, ventilation, and ducts and dampers.

3. Option 3: Prescriptive compliance: advanced buildings™ core performance™ guide

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or a USGBC-approved equivalent standard for projects outside the US). Comply with Section 1: Design Process Strategies, Section 2: Core Performance Requirements, and the following three strategies from Section 3: Enhanced Performance Strategies, as applicable.

To be eligible for Option 3, the project must be less than 100,000 square feet (9,290 square metres).



Graphic for 1.–3.: Solar shading
Characteristic values for reduction factors F_c of external shading systems.

[EA] Optimise energy performance

Criteria Intent

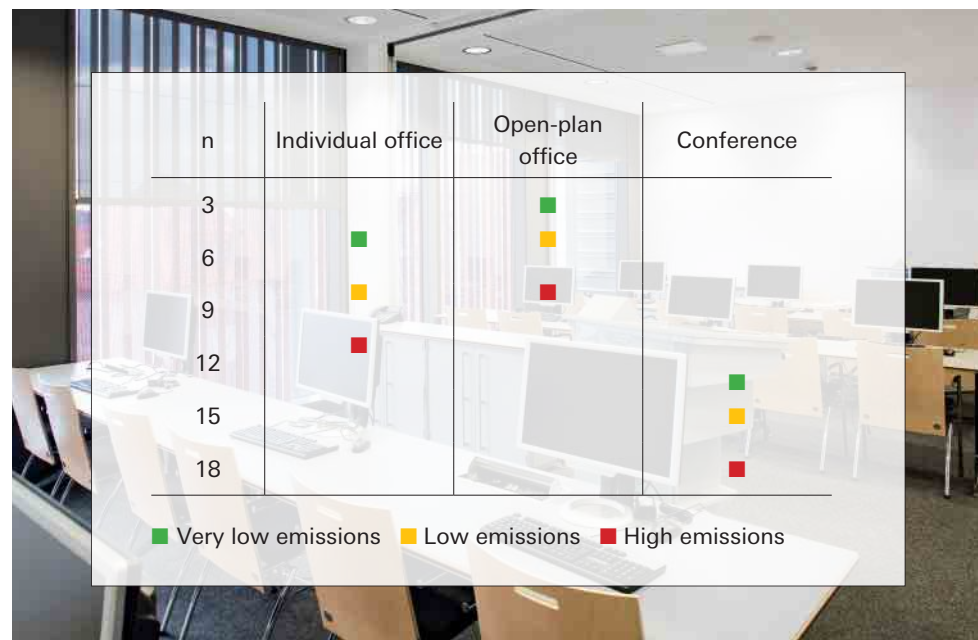
This credit rewards an increasing level of energy performance beyond the prerequisite standard. An integrated building design can reduce environmental and economic harms associated with excessive energy use.

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 influences on criteria on pages 8–9 of this Schüco Guide to LEED.

The system influence shown 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%



Graphic for 1.-2: Hygienic air change rate [$\text{m}^3/(\text{h}\cdot\text{m}^2)$]

Recommended hygienic ventilation rates for non-residential buildings for 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.

Criteria requirements

An energy performance target should be established no later than the schematic design phase.

1. Option 1: Whole-Building Energy Simulation (1–18 Points)

During the design process, efficiency measures have to be analysed and the results accounted for in design decision-making. Energy simulation of efficiency opportunities, past energy simulation analyses for similar buildings, or published data from analyses for similar buildings have to be used. Efficiency measures, focusing on load reduction and HVAC-related strategies appropriate for the facility, project potential energy savings and holistic project cost implications have to be analysed.

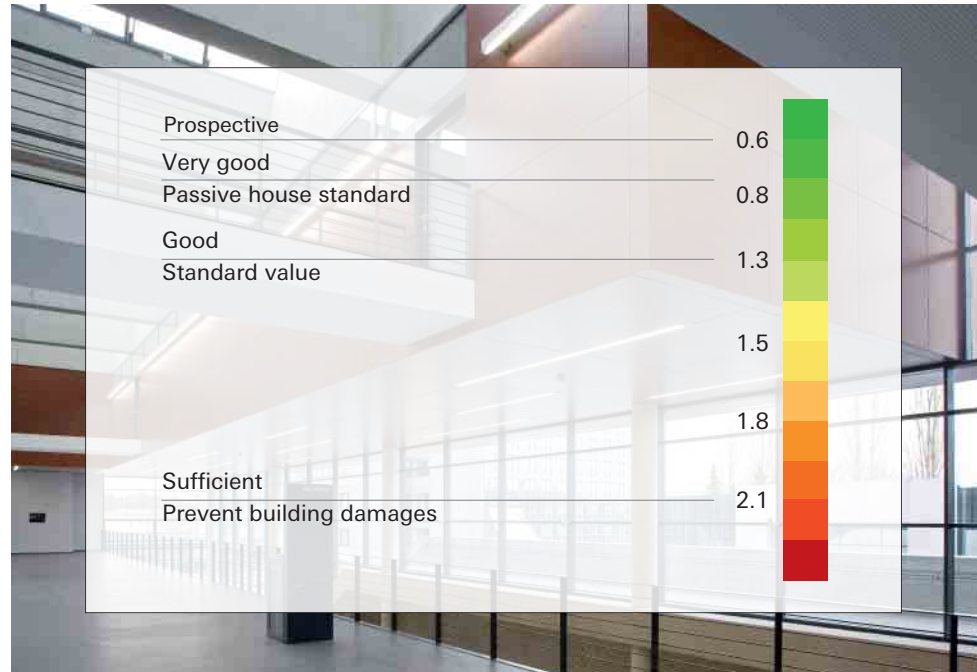
To demonstrate a percentage improvement of the building against the baseline building, the criteria EA prerequisite minimum energy performance have to be followed.

2. Option 2: Prescriptive Compliance ASHRAE Advanced Energy Design Guide (1–6 Points)

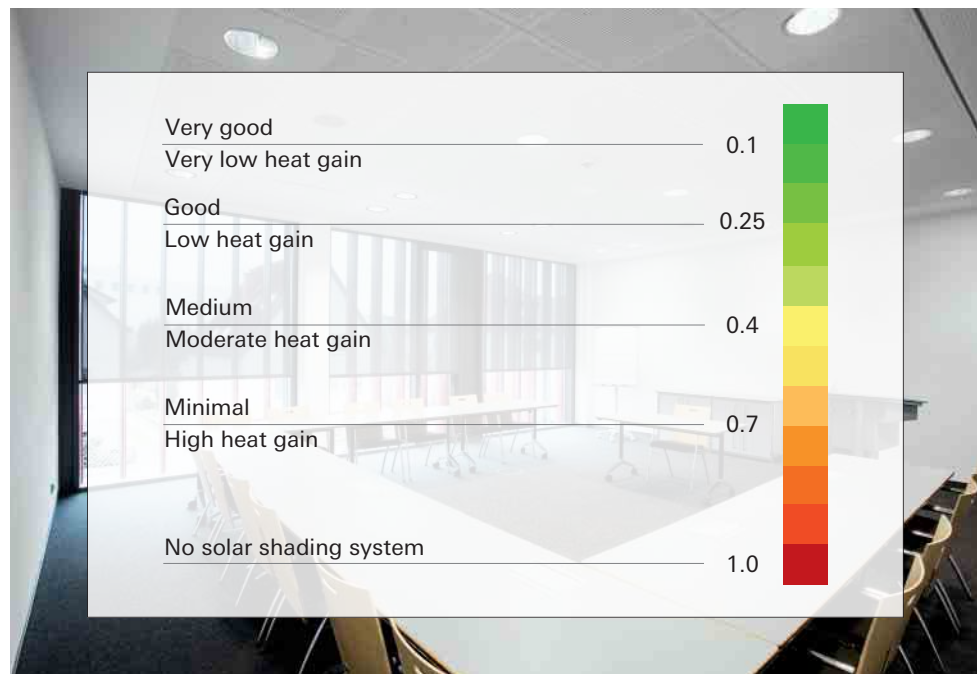
To be eligible for Option 2, projects must use Option 2 in EA prerequisite minimum energy performance. Compliance with the applicable recommendations and standards in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone have to be implemented and documented. For projects outside the US, consult ASHRAE/IESNA Standard 90.1–2010, Appendixes B and D, to determine the appropriate climate zone.



Relevant properties of the systems



Graphic for 1. and 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 consideration of the U_f and U_g values.



Graphic for 1. and 2.: Solar shading
 Characteristic values for reduction factors F_c of external shading systems.

[MR] Construction and demolition waste management planning criteria

Criteria Intent

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) before construction allows time to identify the most effective waste diversion strategies available. A well-devised CWM plan can also minimise costs and maximise return by decreasing tipping fees, selling high-valued scrap materials or identifying materials for reuse.

Criteria requirements

A construction and demolition waste management plan has to be developed and implemented:

- Waste diversion goals for the project have to be established by identifying at least five materials targeted for diversion. Approximate a percentage of the overall project waste that these materials represent.
- Specifications whether materials will be separated or commingled and description of the diversion strategies planned for the project. Where the material will be taken and how the recycling facility will process the material must be described.

A final report detailing all major waste streams generated, including disposal and diversion rates must be provided.



Product influence on criteria

The present review discloses the positive product influence in the overall assessment of the criterion, according to the “explanation of product influence on criteria” on page 8–9 of this Schüco Guide for LEED Program.

The presented system influence refers to the area fraction of the system to the entire building envelope as well as the requirements of the analyzed criterion to 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%

[MR] Building life cycle impact reduction

Criteria Intent

Over their lifetimes, buildings have local, regional and global environmental effects. Some occur during the harvest, extraction, manufacture and transportation of materials; others involve construction and operations; still others take place at demolition and disposal. A life cycle assessment (LCA) examines as many of these environmental effects as possible. This credit identifies several strategies for reducing damage done to the environment over a building’s entire life cycle: restoring existing buildings, reusing building components, and reducing a building’s environmental footprint through LCA.

Criteria requirements

Reduced environmental effects during initial project decision-making by reusing existing building resources or demonstrating a reduction in materials use through life-cycle assessment have to be demonstrated.

1. Option 1: Historic building reuse (5 Points)

The existing building structure, envelope and interior nonstructural elements of a historic building or contributing building in a historic district have to be maintained. Any alteration of a historic building must be done in accordance with local or national standards for rehabilitation, whichever are applicable.

2. Option 2: Renovation of abandoned or blighted building (5 Points)

Maintain at least 50%, by surface area, of the existing building structure, enclosure and interior structural elements for buildings that meet local criteria of abandoned or are considered blight. The building must be renovated to a state of productive occupancy.

3. Option 3: Building and material reuse (2-4 Points)

Reuse or salvage building materials from off-site or on-site as a percentage of the surface area, either 25%, 50% or 75% of completed project surface area. Include structural elements, enclosure materials and permanently installed interior elements.

4. Option 4: Whole building life cycle assessment (3 Points)

For new construction, conduct a life-cycle assessment for at least 60 years of the project’s structure and enclosure that demonstrates a minimum of 10% reduction in environmental impact compared with a baseline building. The baseline and proposed buildings must be of comparable size, function, orientation, and operating energy performance as defined in EA pre-requisite minimum energy performance.



Schüco systems	Influence
Window systems	Up to 15%
Door systems	Up to 5%
Façade systems	Up to 15%
Fire and smoke protection systems	Up to 15%

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 influences on criteria on pages 8–9 of this Schüco Guide to LEED.

The system influence shown 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.



Relevant properties of the systems

Graphic for 4.: Life cycle assessment

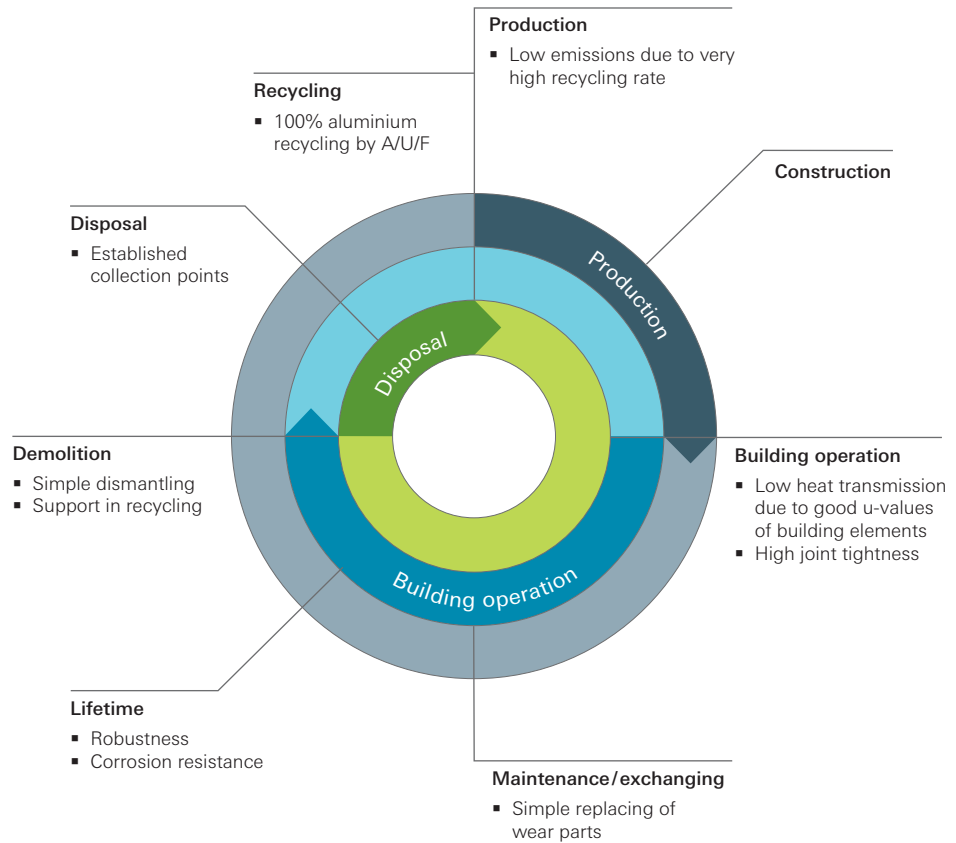


Table to 4: Impact measurement systems and impact indicator units

LCA Impact Indicators	TRACI 2.1	CML 2002	ReCiPe
Global warming potential	CO ₂ -eq	CO ₂ -eq	CO ₂ -eq
Ozone depletion potential	CFC-11-eq	CFC-11-eq	CFC-11-eq
Acidification potential (land)	SO ₂ -eq	SO ₂ -eq	SO ₂ -eq
Eutrophication potential (fresh water)	N-eq	PO ₄ ³⁻ -eq	P-eq
Formation of tropospheric ozone (photochemical oxidant formation)	NO _x -eq	C ₂ H ₄ -eq	kg NMVOC
Depletion of nonrenewable energy resources	MJ	Weight or volume of raw material	Kg oil-eq

Cradle to Cradle influence to Criteria (indirect)

The Schüco product has an indirect influence to Item

4. Option 4: Whole-Building Life-Cycle Assessment.

A Cradle to Cradle certificate provides most of the relevant information.

By the provision of information about the ecological impact of the Cradle to Cradle certified product, the environmental impact can be analyzed and possibly reduced over the whole lifetime of a building.

Definition of ecological impacts:

CO₂: Carbon Dioxide (combustion process)

CFC-11: Trichlorofluoromethane (Refrigerant)

SO₂: Sulphur dioxide (acid rain)

N: Nitrogen

PO₄³⁻: Phosphate (fertilizer)

NO_x: Nitrogen oxides (combustion process)

C²H⁴: Ethene

NMVOC: volatile organic compounds without methane (Evaporation of solvents)

[MR] Building product disclosure and optimisation – environmental product declarations

Criteria Intent

This credit recognises the selection of products for which the environmental impacts are well known because of industry standard life cycle information and reporting protocols. Environmental product declarations (EPDs) are a standardised way of communicating the environmental effects associated with a product or system's raw material extraction, energy use, chemical make-up, waste generation, and emissions to air, soil and water.

Criteria requirements

1. Option 1: Environmental Product Declaration (1 Point)

Use at least 20 different permanently installed products sourced from at least five different manufacturers have to meet one of the disclosure criteria below.

- Product-specific declaration
- Environmental Product Declarations which conform to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930 and have at least a cradle-to-gate scope
- USGBC-approved programme

2. Option 2: Multi-Attribute Optimisation (1 Point)

Use products that comply with one of the criteria below for 50%, by cost, of the total value of permanently installed products in the project.

- Third-party-certified products that demonstrate impact reduction below industry average
- USGBC-approved programme

For calculating credits, products sourced within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost.

Cradle to Cradle influence to Criteria (indirect)

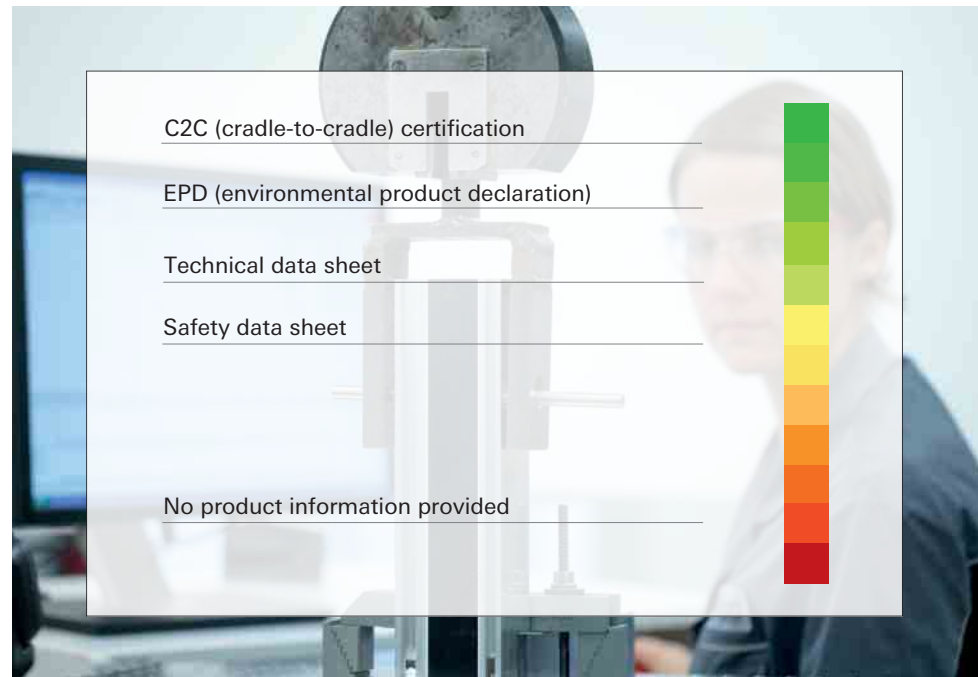
The Schüco product has an indirect influence to Item

1. Option 1: Environmental Product Declaration. A Cradle to Cradle certificate provides most of the relevant information.

By the provision of information about the ecological impact of the Cradle to Cradle certified product, the environmental impact can be analyzed and possibly reduced over the whole lifetime of a building.



Relevant properties of the systems



**Graphic for 1. and 2.:
Declaration of products**

Opportunities for how to provide information about products. Therefore, safe handling and disposal is ensured.

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 influences on criteria on pages 8–9 of this Schüco Guide to LEED.

The system influence shown 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 15%
Door systems	Up to 5%
Façade systems	Up to 20%
Fire and smoke protection systems	Up to 20%

[MR] Building product disclosure and optimisation – sourcing of raw materials

Criteria Intent

This credit encourages the use of responsibly sourced and extracted materials through reporting and demonstration of responsible extraction practices. Corporate sustainability reports (CSRs), based on widely recognised frameworks and standards, can shed light on product supply chains and identify sources of raw material extraction.

Criteria requirements

1. Option 1: Raw Material Source and Extraction Reporting (1 Point)

Products from manufacturers should be used that have publicly released a report from their raw material suppliers which include raw material supplier extraction locations, a commitment to long-term ecologically responsible land use, a commitment to reducing environmental harms from extraction and/or manufacturing processes, and a commitment to meeting applicable standards or programmes voluntarily that address responsible sourcing criteria.

2. Option 2: Leadership Extraction Practices (1 Point)

Products should be used that meet at least one of the responsible extraction criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project

- Extended producer responsibility
- Bio-based materials
- Wood products
- Materials reuse
- Recycled content
- USGBC-approved programme

Cradle to Cradle influence to Criteria (indirect)

The Schüco product has an indirect influence to Item

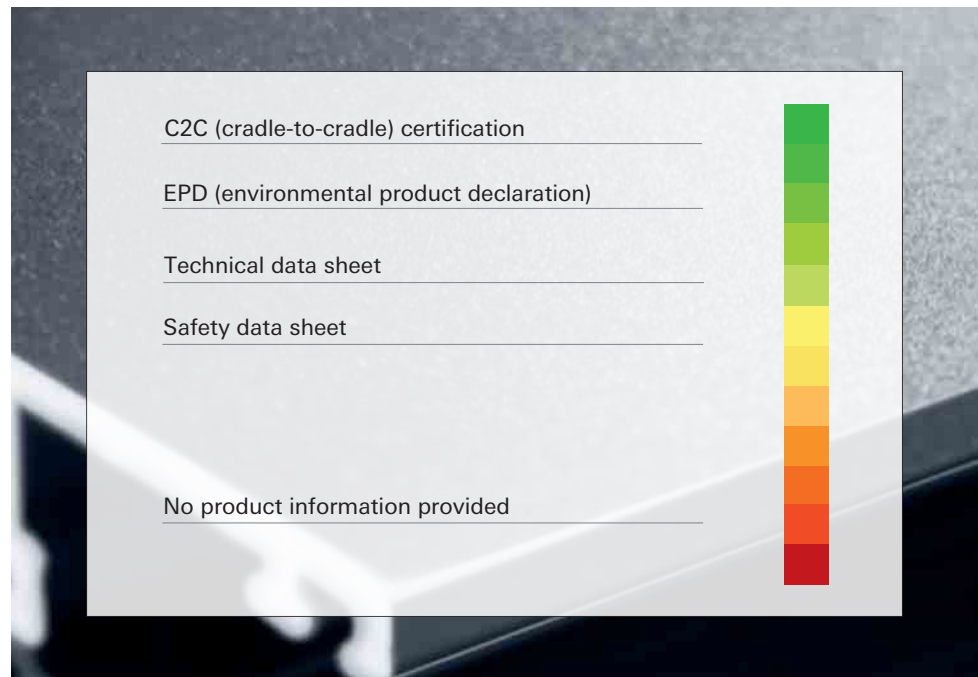
1 Option 1: Raw Material Source and Extraction Reporting and Item (2) Option 2. Leadership Extraction Practices.

A Cradle to Cradle certificate provides most of the relevant information.

Cradle to Cradle certified products provide information about locations of resource extraction, consider agreements about resource-friendly management during production process and the recycled content of a product.



Relevant properties of the systems



**Graphic for 1. and 2.:
Declaration of products**

Opportunities for how to provide information about products. Therefore, safe handling and disposal is ensured.

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 influences on criteria on pages 8–9 of this Schüco Guide to LEED.

The system influence shown 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%

[MR] Building product disclosure and optimisation – material ingredients

Criteria Intent

By adhering to the precautionary principle and supporting green chemistry, this credit encourages project teams to avoid products containing potentially harmful chemicals, which will ultimately spur on innovation in materials from manufacturers. This credit aims to support manufacturers that disclose information about the ingredients in their products, allowing project teams to make better-informed decisions.

Criteria requirements

1. Option 1: Material Ingredient Reporting (1 Point)

At least 20 different permanently installed products from at least five different manufacturers should be used that use any of the following programmes to demonstrate the chemical inventory of the product to at least 0.1% (1,000 ppm).

- Manufacturer inventory
- Health product declaration
- Cradle-to-cradle
- USGBC-approved programme

2. Option 2: Material Ingredient Optimisation (1 Point)

Products that document their material ingredient optimisation using the paths below for at least 25%, by cost, of the total value of permanently installed products in the project have to be used.

- GreenScreen v1.2 Benchmark
- Cradle-to-Cradle Certified
- International Alternative Compliance Path – REACH Optimisation
- USGBC-approved programme

3. Option 3: Product Manufacturer Supply Chain Optimisation (1 Point)

Building products for at least 25%, by cost, of the total value of permanently installed products in the project should be used that:

- Are sourced from product manufacturers who engage in validated and robust safety, health, hazard and risk programmes
- Are sourced from product manufacturers with independent third-party verification of their supply chain

Cradle to Cradle influence to Criteria (direct)

The Schüco product has a direct influence to Item

1. Option 1: Material Ingredient Reporting and Item

2. Option 2: Material Ingredient Optimization. A Cradle to Cradle certificate provides most of the relevant information.

Within a Cradle to Cradle certification all materials used in the product and their ecological values were classified.



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 influences on criteria on pages 8–9 of this Schüco Guide to LEED.

The system influence shown 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 15%
Fire and smoke protection systems	Up to 15%

[MR] Construction and demolition waste management

Criteria Intent

This credit rewards projects that implement the plan created in MR Prerequisite Construction and Demolition Waste Management Planning. It encourages the diversion of a greater quantity and diversity of materials across multiple material streams by setting thresholds for both an overall diversion percentage and a minimum number of material streams.

Criteria requirements

1. Requirements

Non-hazardous construction and demolition materials should be recycled and/or salvaged. Calculations can be by weight or volume but must be consistent throughout. However, for projects that cannot meet credit requirements using reuse and recycling methods, waste-to-energy systems may be considered.

2. Option 1: Diversion (1-2 Points)

Divert at least 50% (1 point) or 75% (2 points) of the total construction and demolition material; diverted materials must include at least three (1 point) or four (2 points) material streams.

3. Option 2: Reduction of Total Waste Material (2 Points)

Preventing the generation of more than 2.5 pounds of construction waste per square foot (12.2 kilograms of waste per square metre) of the building's floor area.



Product influence on criteria

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The system influence shown 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%

[EQ] Minimum indoor air quality performance

Criteria Intent

By diluting pollutants created by a building's occupants and other contaminant sources, ventilation contributes to the occupants' comfort and well-being. Maintaining good indoor air quality (IAQ) depends on controlling pollutant sources, removing contaminants from outdoor air, and supplying at least some outdoor air, among other factors. The standards referenced in this prerequisite outline well-tested methods for determining the amount of outdoor air each type of space requires.

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 influences on criteria on pages 8–9 of this Schüco Guide to LEED.

The system influence shown 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 50%
Door systems	Up to 5%
Façade systems	Up to 50%
Fire and smoke protection systems	Up to 50%

Criteria requirements

1. Ventilation

a. Mechanically ventilated spaces

Option 1: For mechanically ventilated spaces, determine the minimum outdoor air intake flow for mechanical ventilation systems using the ventilation rate procedure from ASHRAE 62.1–2010 or a local equivalent, whichever is more stringent and meet the minimum requirements.

OR Option 2: Projects outside the US may instead meet the minimum outdoor air requirements of Annex B of EN 15251 and the relevant requirements of EN 13779.

b. Naturally ventilated spaces

For naturally ventilated spaces, determine the minimum outdoor air opening and space configuration requirements and confirm that natural ventilation is an effective strategy. Natural ventilation procedure from ASHRAE Standard 62.1–2010 or a local equivalent, whichever is more stringent, should be used.

2. Monitoring

a. Mechanically ventilated spaces

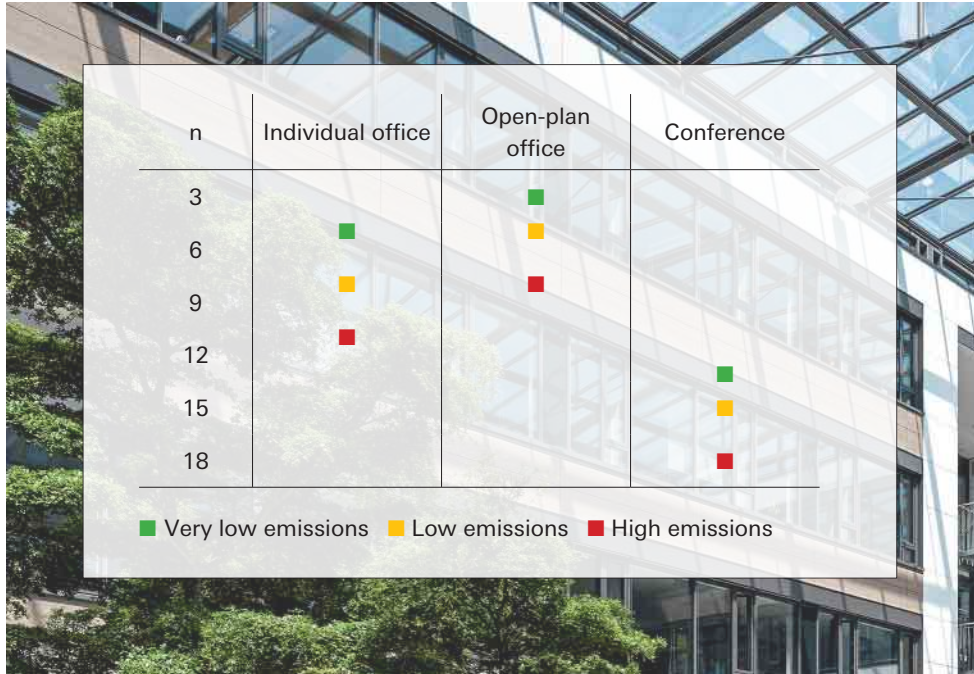
For mechanically ventilated spaces, outdoor air intake flows have to be monitored.

b. Naturally ventilated spaces

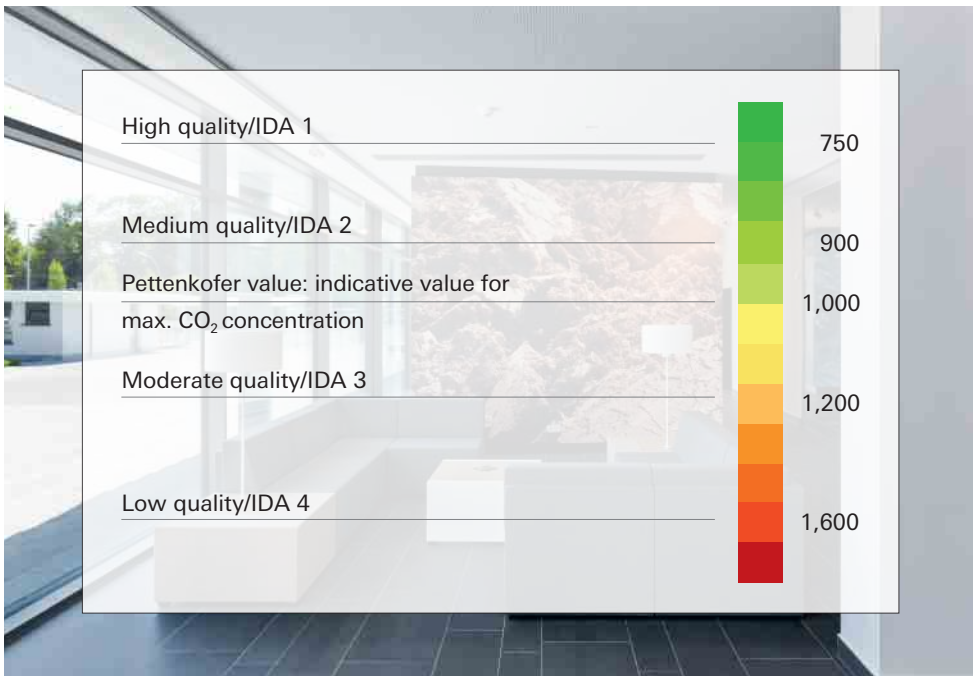
For naturally ventilated spaces a direct exhaust airflow measurement device or automatic indication devices on all natural ventilation openings should be provided or each thermal zone will be equipped with carbon dioxide (CO₂) monitors.



Relevant properties of the systems



Graphic for 1b.: Hygienic air change rate [m³/(h*m²)]
 Recommended hygienic ventilation rates for non-residential buildings for 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.



Graphic for 2b.: CO₂ concentration [ppm]
 Room air categories (Indoor air) and characteristic values for the absolute CO₂ emissions in the air in accordance with EN 15251 and EN 13779 (standard values) for an external air CO₂ concentration of 400 ppm.

[EQ] Enhanced indoor air quality strategies

Criteria Intent

Indoor pollutants and particulates are brought indoors by occupants, through ventilation system intakes or building openings, and from activities conducted within the building. Designing for effective indoor air quality (IAQ) can help produce a comfortable indoor environment for building occupants and prevent the human health problems associated with poor indoor air quality. This credit identifies IAQ strategies that extend beyond the outdoor air requirements of EQ prerequisite minimum indoor air quality performance.

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 influences on criteria on pages 8–9 of this Schüco Guide to LEED.

The system influence shown 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 50%
Door systems	Up to 5%
Façade systems	Up to 50%
Fire and smoke protection systems	Up to 50%

Criteria requirements

Determination whether the project will use mechanical ventilation, natural ventilation or a mixed-mode approach (see EQ prerequisite minimum indoor air quality performance).

1. For Option 1: Enhanced IAQ strategies

provide compliance with all of the following relevant requirements, as applicable.

a. Mechanically ventilated spaces

Entryway systems, interior cross-contamination prevention and filtration.

b. Naturally ventilated spaces

Entryway systems and natural ventilation design calculations.

c. Mixed-mode system

Entryway systems, interior cross-contamination prevention and filtration, natural ventilation design calculations and mixed-mode design calculations.

2. For Option 2: Additional enhanced IAQ strategies

provide compliance with all of the following relevant requirements, as applicable.

a. Mechanically ventilated spaces

Exterior contamination prevention, increased ventilation, carbon dioxide monitoring or additional source control and monitoring.

b. Naturally ventilated spaces

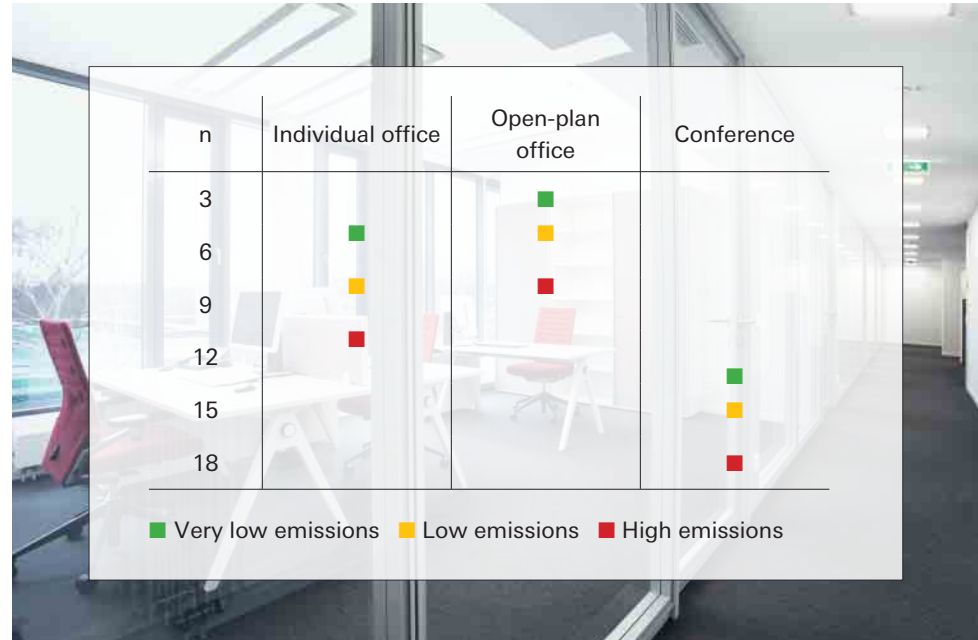
Exterior contamination prevention, additional source control and monitoring or natural ventilation room-by-room calculations.

c. Mixed-mode system

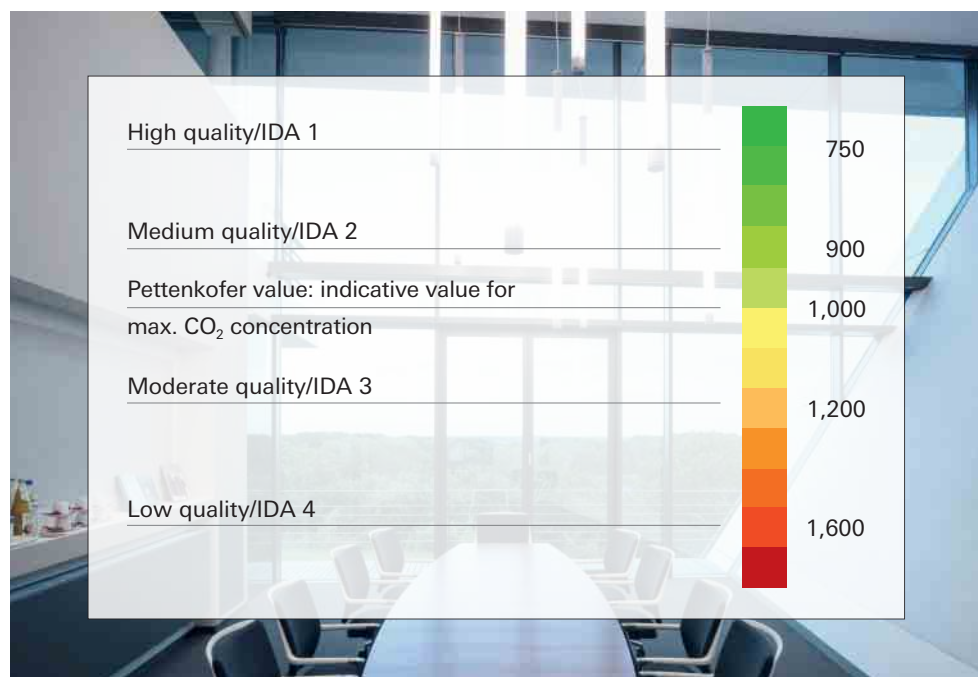
Exterior contamination prevention, increased ventilation, additional source control and monitoring or natural ventilation room-by-room calculations.



Relevant properties of the systems



Graphic for 1b. and 2b.: Hygienic air change rate [m³/(h*m²)]
 Recommended hygienic ventilation rates for non-residential buildings for 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.



Graphic for 1b. and 2b.: CO₂ concentration [ppm]
 Room air categories (Indoor Air) and characteristic values for the absolute CO₂ emissions in the air in accordance with EN 15251 and EN 13779 (standard values) for an external air CO₂ concentration of 400 ppm.

[EQ] Low-emitting materials

Criteria Intent

Many types of chemicals, both engineered and naturally occurring, are present everywhere. Volatile organic compounds (VOCs) are chemicals that are released into the air from numerous materials – some of them natural, man-made, plant-based and from animals, including people. Project teams should specify products that meet the compliance thresholds established by recognised standards or choose products classified as inherently non-emitting. This credit addresses each layer of wall, flooring and ceiling interior finish – a methodology that is conservatively protective of occupants, given that the emissions from layers that are not directly exposed to air are tested separately.

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 influences on criteria on pages 8–9 of this Schüco Guide to LEED.

The system influence shown 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 15%
Door systems	Up to 5%
Façade systems	Up to 20%
Fire and smoke protection systems	Up to 20%

Criteria requirements

1. Option 1: Product category calculations (1-3 Points)

Threshold levels of compliance with emissions and content standards, defined in the LEED Reference Guide criteria EQ Low-Emission Materials should be achieved. Building elements (determined in seven categories) will be evaluated regarding the general emission levels and the VOC content of the product.

2. Option 2: Budget calculation method (1-3 Points)

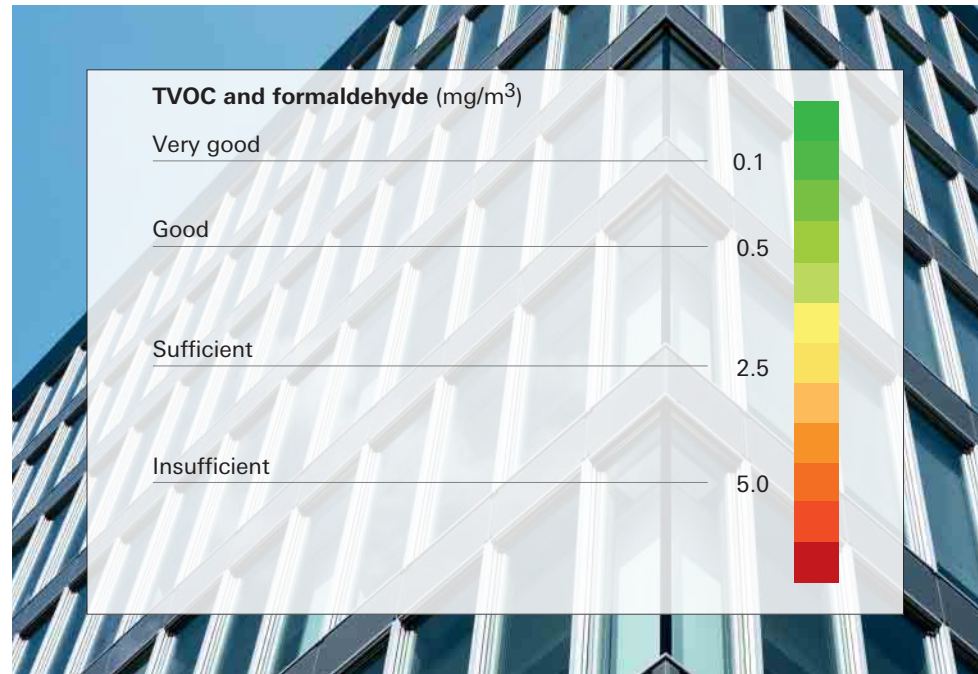
The budget method organises the building interior into six assemblies: flooring, ceilings, walls, thermal and acoustic insulation, furniture (and exterior applied products). The percentage of compliant materials has to be determined and the surface area of assembly layers calculated.

3. Emissions and content requirements

- Inherently non-emitting sources. Products that are inherently non-emitting sources of VOCs are considered fully compliant without any testing.
- General emissions evaluation. Building products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010, using the applicable exposure scenario.
- Additional VOC content requirements for wet-applied products. On-site wet-applied products must not contain excessive levels of VOCs, disclosure of VOC content must be made by the manufacturer.
- Composite wood evaluation. Wood products must be documented to have low formaldehyde emissions.
- Furniture evaluation. New furniture and furnishing items must be tested using either the concentration modelling approach or the emissions factor approach.



Relevant properties of the systems



Graphic for 3.:

Total volatile organic compound (TVOC) levels of building products in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010. The measurement of TVOC concentration is carried out after 14 days (336 hours).

Table to 1: Emissions and content standards

Category	Threshold	Emissions and content requirements
Interior paints and coatings applied on site	At least 90%, by volume, for emissions; 100% for VOC content	<ul style="list-style-type: none"> General Emissions Evaluation for paints and coatings applied to walls, floors, and ceilings VOC content requirements for wet applied products
Interior adhesives and sealants applied on site (including flooring adhesive)	At least 90%, by volume, for emissions; 100% for VOC content	<ul style="list-style-type: none"> General Emissions Evaluation VOC content requirements for wet applied products
Flooring	100%	General Emissions Evaluation
Composite wood	100% not covered by other categories	Composite Wood Evaluation
Ceilings, walls, thermal, and acoustic insulation	100%	<ul style="list-style-type: none"> General Emissions Evaluation Healthcare, Schools only Additional insulation requirements
Furniture (include in calculations if part of scope of work)	At least 90% by cost	Furniture Evaluation
Healthcare and Schools Projects only: Exterior applied products	At least 90% by cost	Exterior Applied Products

Cradle to Cradle influence to Criteria (indirect)

The Schüco product has an indirect influence to Item

1. Option 1: Product Category Calculations and Item

2. Option 2: Budget Calculation Method.

A Cradle to Cradle certificate provides most of the relevant information.

Cradle to Cradle certified products are

tested against their VOC emissions and VOC content, therefore the use of these products can improve the indoor air quality compared to conventional products.

[EQ] Thermal comfort

Criteria Intent

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

Criteria requirements

1. Thermal Comfort Design

a. Option 1: Heating, ventilation and air-conditioning (HVAC) systems and the building envelope have to be designed to meet the requirements of ASHRAE Standard 55–2010, with errata or a local equivalent.

b. Option 2: HVAC systems and the building envelope have to be designed to meet the requirements of the applicable standard of ISO 7730:2005 and CEN Standard EN 15251:2007.

2. Thermal Comfort Control

Individual thermal comfort controls for at least 50% of individual occupant spaces should be provided. For all shared multi-occupant spaces group, thermal comfort controls should be provided. Thermal comfort controls allow occupants, whether in individual spaces or shared multi-occupant spaces, to adjust at least one of the following in their local environment: air temperature, radiant temperature, air speed and humidity.

Product influence on criteria

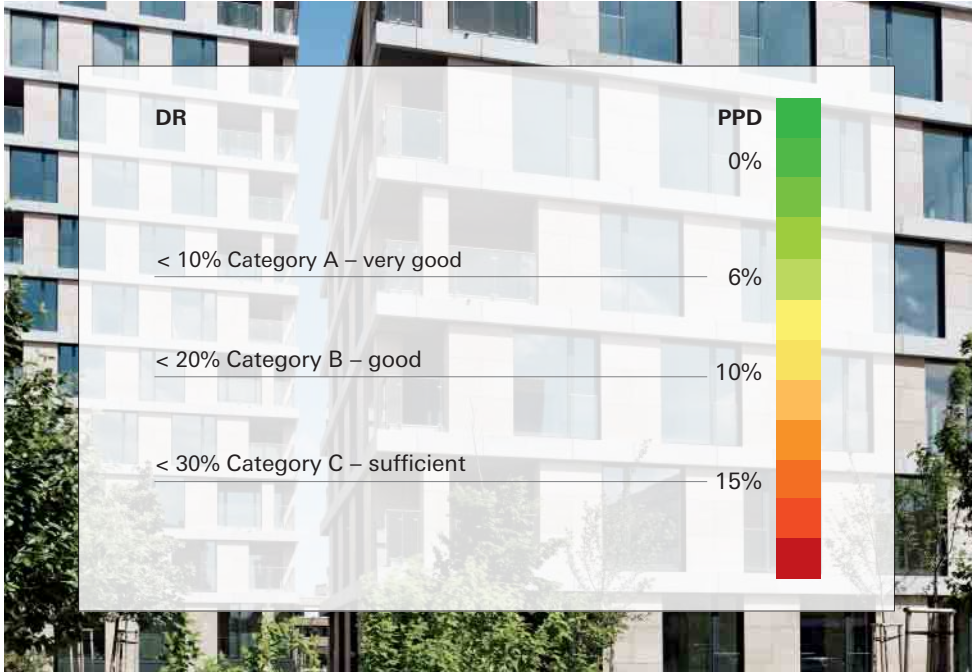
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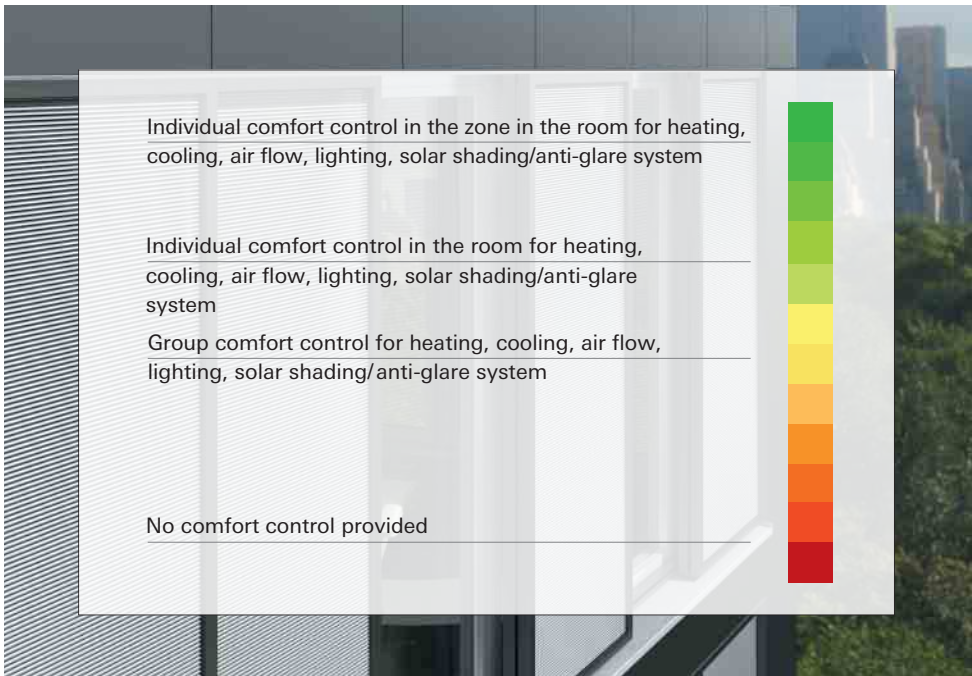
Schüco systems	Influence
Window systems	Up to 40%
Door systems	Up to 5%
Façade systems	Up to 50%
Fire and smoke protection systems	Up to 50%



Relevant properties of the systems



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



Graphic for 2.: Comfort control
Examples for the requirements on thermal comfort for different environmental categories and room types.

[EQ] Daylight

Criteria Intent

Increased access to daylight has positive human behavioural and health effects because it reinforces our circadian rhythms. A well-designed daylight building also uses less electric lighting energy, conserving natural resources and reducing air pollution. This credit has evolved significantly and now focuses on using simulated daylight analysis and actual measurement to estimate daylight quality and daylight levels. These methods more accurately predict daylight access and support the design process for optimising daylight.

Criteria requirements

Manual or automatic glare-control devices for all regularly occupied spaces have to be provided.

1. Option 1: Simulation:

Spatial Daylight Autonomy and Annual Sunlight Exposure (2–3 points)

Demonstrate through annual computer simulations that spatial daylight autonomy $_{300/50\%}$ (sDA $_{300/50\%}$) of at least 55%, 75%, or 90% is achieved. Annual sunlight exposure of no more than 10% has to be achieved.

2. Option 2: Simulation:

Illuminance Calculations (1–2 points)

Demonstration through computer modelling that illuminance levels will be between 300 lux and 3,000 lux between 9 a.m. and 3 p.m. for 75% or 90% of the regularly occupied floor area. Blinds and shades are executed from the model.

3. Option 3: Measurement (2–3 points)

Achieve illuminance levels between 300 lux and 3,000 lux for 75% or 90% of the regularly occupied floor area.

Product influence on criteria

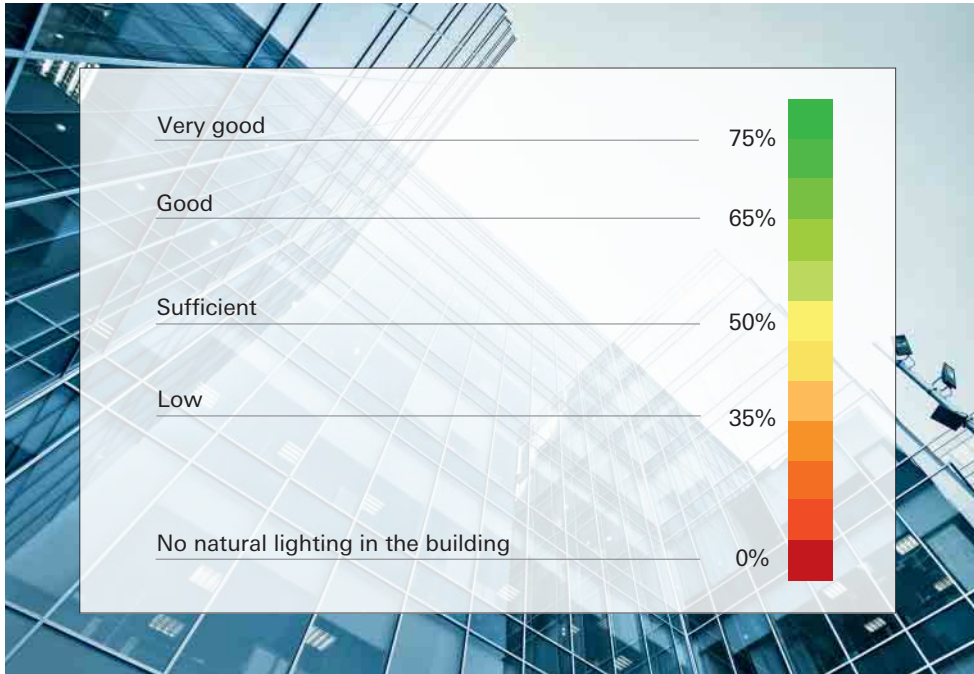
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The system influence shown refers to the percentage area of the system with regard to the entire building envelope, as well as the requirements of the analysed criterion for the relevant Schüco system.

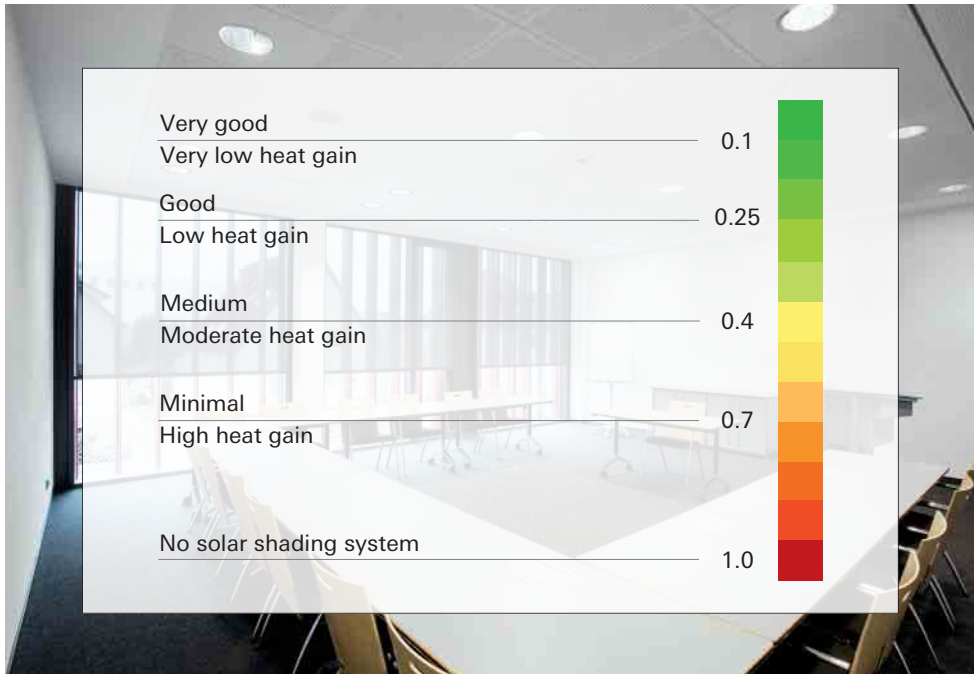
Schüco systems	Influence
Window systems	Up to 75%
Door systems	-
Façade systems	Up to 75%
Fire and smoke protection systems	Up to 75%



Relevant properties of the systems



Graphic for 1. and 2.: Daylight transmittance τ_v [%]
The daylight transmission coefficient of the glazing indicates what percentage of the sunlight shining on the façade penetrates the interior of the building.



Graphic for 1.–3.: Solar shading
Characteristic values for reduction factors F_c of external shading systems.

[EQ] Acoustic performance

Criteria Intent

This credit challenges project teams to address best practices in acoustic design as an indoor environmental quality imperative that complements other green building practice.

Criteria requirements

1. HVAC Background Noise

Engineers or acoustic experts have to analyse background noise levels from heating, ventilation, and air-conditioning (HVAC) systems.

2. Sound Transmission

The composite sound transmission class (STC_c) ratings, which are between 45 and 60 depending on the usage of the building, or local building code, whichever is more stringent, have to be met.

3. Reverberation Time

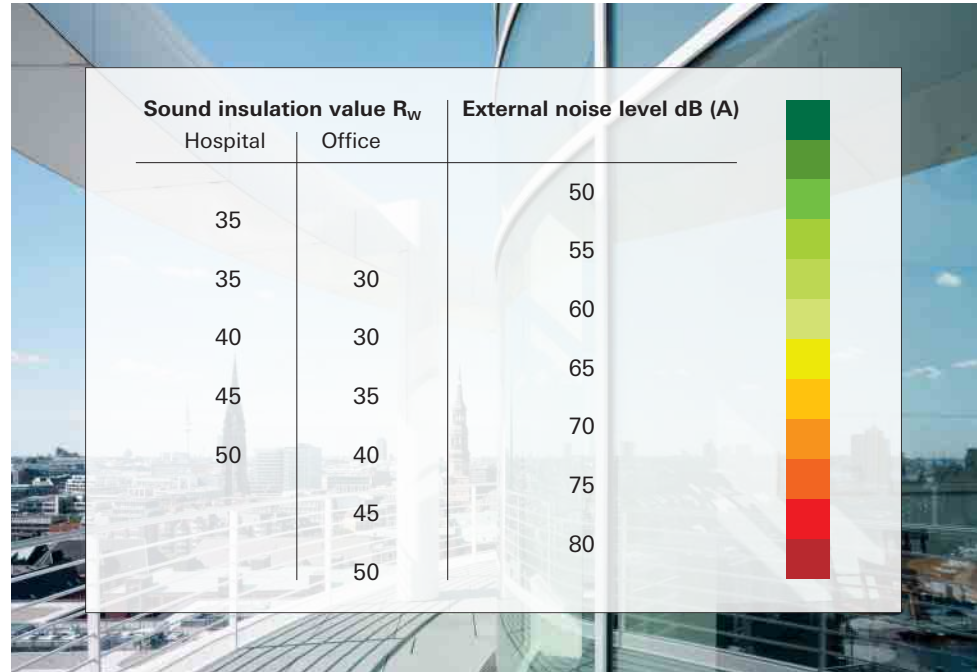
The reverberation time requirements with maximum values between 0.6 and 2.0, depending on the usage of the building, for the testing requirements T_{60} (sec), at 500 Hz, 1,000 Hz and 2,000 Hz have to be met. (All requirements listed in Table 9.1 in the Performance Measurement Protocols for Commercial Buildings.)

4. Sound Reinforcement and Masking Systems

For all large conference rooms and auditoria seating more than 50 persons, an evaluation is needed as to whether sound reinforcement and AV playback capabilities are necessary. For projects that use masking systems, the design levels must not exceed 48 dB(A). It must be ensured that loudspeaker coverage provides uniformity of ± 2 dB(A) and that speech spectra are effectively masked.



Relevant properties of the systems



Graphic for 2.: Sound insulation R_w [dB]
 Required sound insulation value R_w of the window depending on relevant external noise levels and the function of the building.

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 influences on criteria on pages 8–9 of this Schüco Guide to LEED.

The system influence shown 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 15%
Fire and smoke protection systems	Up to 15%

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By using Schüco systems, up to 14 LEED criteria can be influenced positively, which corresponds to 37% 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

these credits, your Schüco contact can help you to select the most appropriate solutions for your project and provide you with the documents required for the LEED assessment. This will include general documents and certificates, but also project-specific information, all to increase your LEED score.

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