

Schüco Cradle to Cradle[®] guidelines



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Cradle to Cradle stands for continuous material cycles and positively-defined materials which do not harm humans and the environment.

Value-orientated perspectives for green buildings

360° sustainability – from the idea to recycling

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

Recycling potential and value retention

The use of sustainable products and materials with outstanding recycling properties which allow for dismantling at a later stage and recyclability are important requirements for “360° sustainability”. Buildings are the raw material reserves of the future and their materials will become value storage in future. In this respect, however, the products used not only need to be environmentally friendly, their properties need to be recorded so that all the required information is known for future use. By optimising the aluminium windows and façades in accordance with Cradle to Cradle®, Schüco is taking a further step towards recyclable products that meet every requirement for a future-oriented property industry.

Focus on certified sustainability for buildings

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 easy for the user to create the documentation, which is very complex in part. The SchüCal construction software generates environmental product declarations, U value calculations and Declarations of Performance, among others, at the touch of a button, and saves all additional product information such as new Cradle to Cradle certificates.

Future-orientated through sustainability

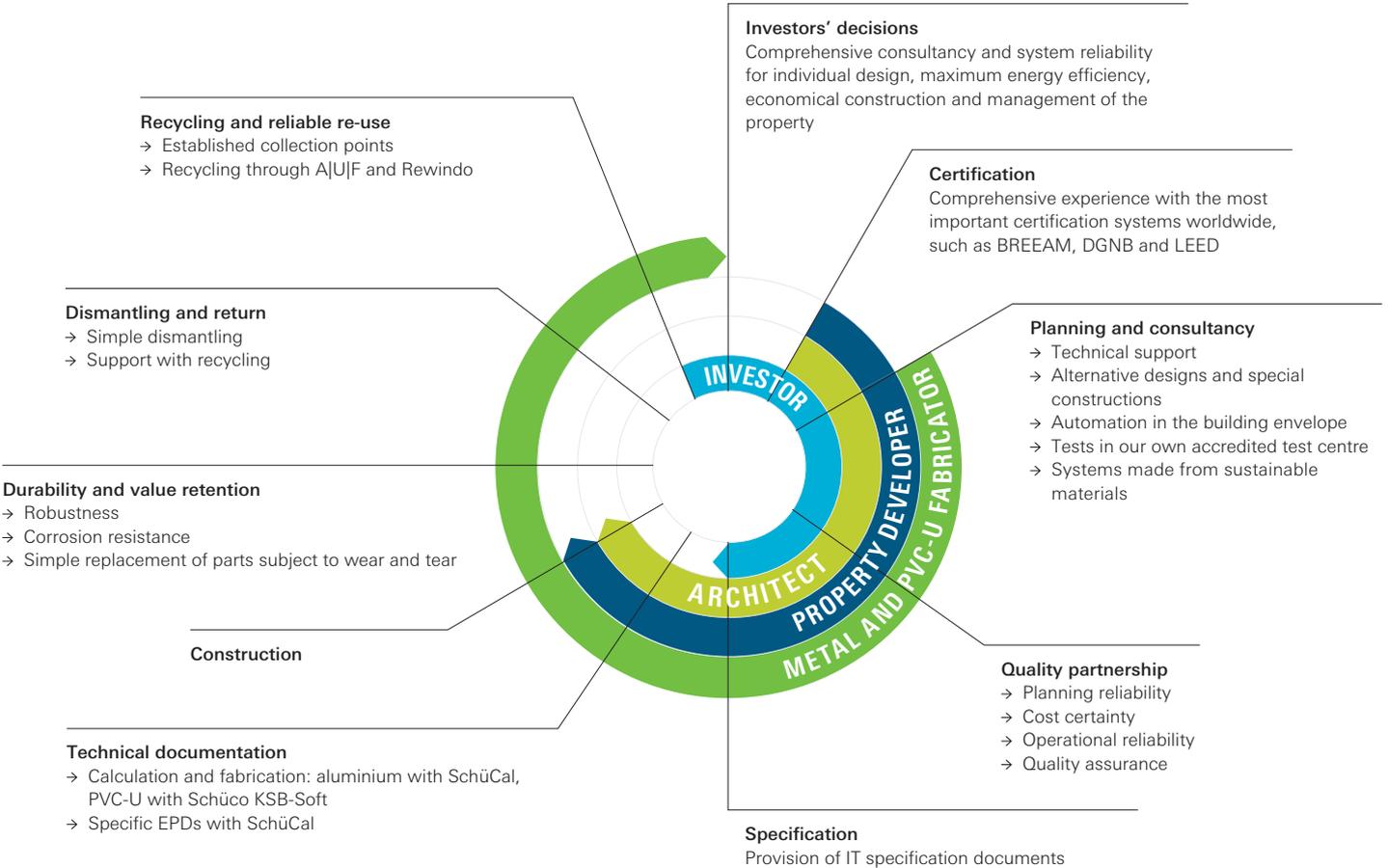
Sustainability is an integral part of the Schüco company policy, which is designed to deliver long-term success. To this end, Schüco develops high-quality and energy-efficient products and services that conserve resources, set standards and enable Schüco partners to create reliable and long-lasting values. Innovative environmental philosophies are embraced and integrated in products. Schüco Cradle to Cradle products follow this approach and meet the highest requirements in terms of ecological and social responsibility. Whether it's innovation leadership now or future-proof quality, with the Cradle to Cradle principle, Schüco is conquering the challenges of modern buildings and setting new standards for the industry.

Find out more

To find out more about 360° sustainability at Schüco, visit our website under *Company > Sustainability*.

Schüco supports investors, architects, building consultants and metal fabricators in all project phases - from the initial idea through to dismantling a façade. This includes advice on certification, designs using sustainable systems, environmental product declarations and recycling the building envelope.

360° sustainability for Schüco and its partners



Basic principle of sustainable product development





The Cradle to Cradle® principle

The “Cradle to Cradle” (C2C) design concept by Professor Michael Braungart and William McDonough is an approach which pays strict attention to the effectiveness of resources and sustainability. The principle also consistently focuses on health and environmental friendliness.

A world without waste

The C2C philosophy sees all materials as valuable resources which return fully to biological or technical cycles without any loss of quality.

In other words, a differentiation is made between consumer goods that are completely biodegradable and consumer goods that can be broken down to their raw materials and recycled at the end of their use. Typical consumer goods that show wear and tear through use are clothes and washing agents. Construction products, technical systems and devices are durable consumer goods.

This means there is no waste. All materials are nutrients that provide for other processes again after they have been used.

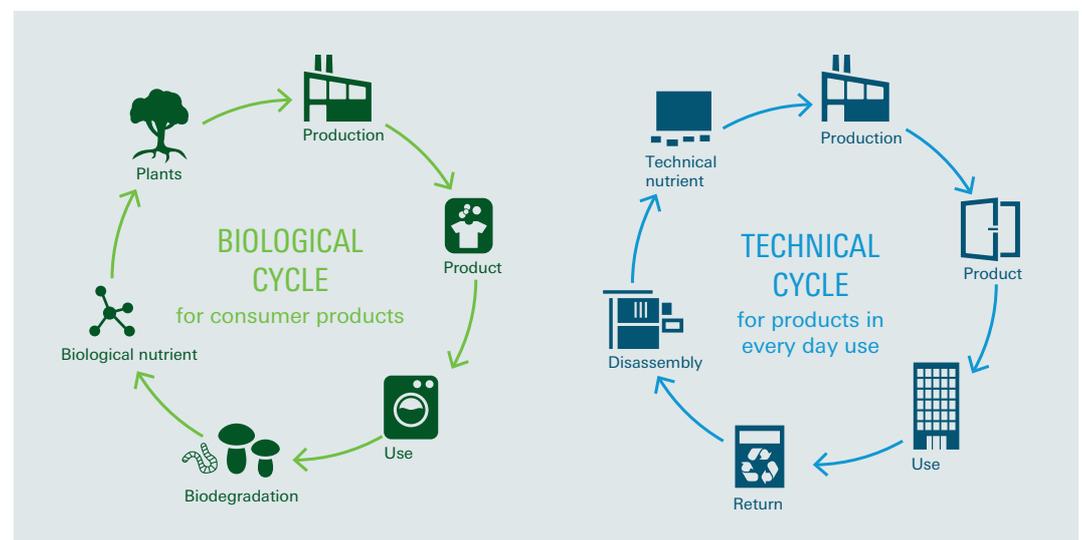
Origin of the principle

Professor Michael Braungart, chemist, and William McDonough, architect, devised the principle in the 1990s as a new approach for the development of a sustainable economy. In 2002, they published their philosophy in the book *Cradle to Cradle: Remaking The Way We Make Things*.

How it works

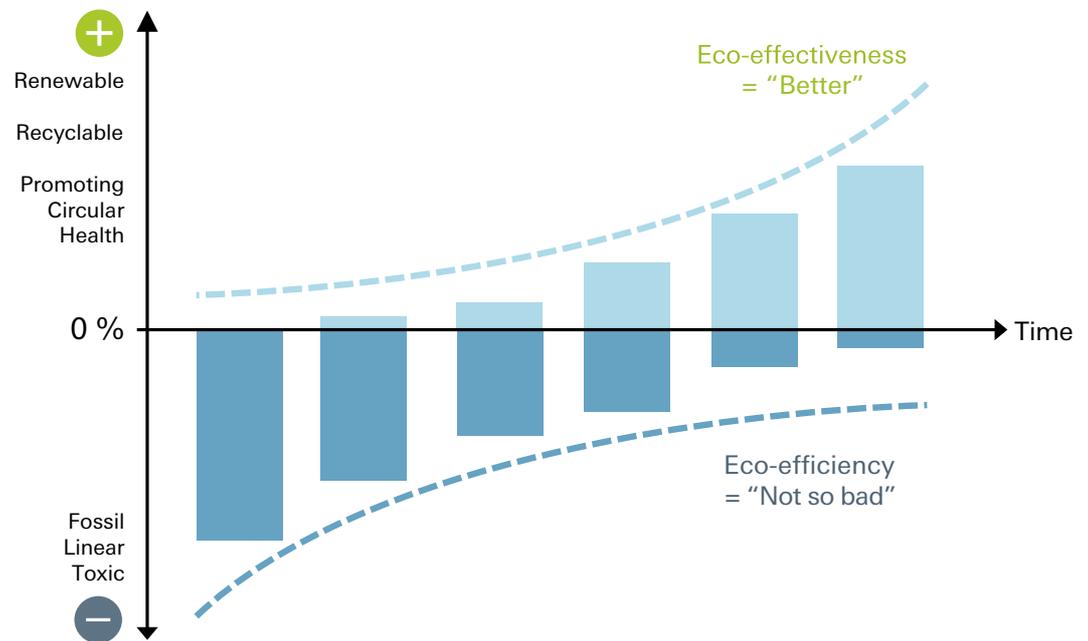
Continuous material cycles are based on choosing only materials that are free of pollutants, chemically safe and can be sorted by type. This is why the focus is on the chemical analysis of the product materials.

At the same time, products and production processes must be planned from the Cradle to the Cradle: from production and usage through to dismantling, recycling and reuse. Recyclability without any loss of quality becomes a key factor here. C2C products are verified as free of pollutants.





The principle of the positive footprint – our products should not only cause less damage to people, nature and the environment, they should ultimately support them too
(Source: Drees & Sommer, in accordance with EPEA)



Differences to recycling in the past

It is important that all materials that are recycled retain their quality. Recycling today is often “downcycling”, i.e. the materials lose their quality (e.g. concrete buildings which subsequently become road gravel). This means that the energy and work that went into the finishing processes is lost. With Cradle to Cradle®, the process is different.

“Better” instead of “not so bad”

Cradle to Cradle is an optimistic philosophy. Not only is it about doing less harm to the environment, such as using fewer harmful substances, the ultimate aim is also to make a positive contribution to nature, humanity and the economy. A model and often-quoted symbol of the C2C movement is the cherry tree with blossoms that are considered to be “economically” inefficient, but useful and aesthetically pleasing in material cycles and life.

Rather than merely minimising the CO₂ footprint, C2C encourages us to leave behind a positive footprint: eco-effective rather than just eco-efficient. The challenge here is not minimising our use of resources, it’s feeding these resources into unending cycles.

Renewable energies

C2C products are created using renewable energies, as the greenhouse gases emitted by fossil fuels cannot be fed into cycles effectively, but rather result in uncontrolled changes to our environment that are bad for humans, flora and fauna.

Diversity

Cradle to Cradle learns from nature, not only in terms of the closed cycles, but also with regard to diversity. Robust and sustainable ecosystems, whether natural, social or technical, are diverse, lively and creative. Innovation can only stem from diversity. This is why the C2C philosophy also considers social fairness within the company and in work with external stakeholders, as well as social commitment.

Sustainability at Schüco

Alongside Cradle to Cradle, the Schüco sustainability report describes the many facets of sustainability at Schüco. Schüco initiatives that are linked to Cradle to Cradle are briefly outlined in the margins of these guidelines. You can read all about them there and on the Schüco website.



The Cradle to Cradle® principle



Sustainable Development Goals (SDG)

The SDG are the 17 development goals of the United Nations and follow on from the Millennium Development Goals (MDG) of 2000-2015. They are more ambitious than the MDG and consider both industrial countries and developing countries. The goals are intended to guide international business towards economically, ecologically and socially sustainable development and improve living conditions all over the world in the process. The SDG entered into force on 1 January 2016 and are valid until 2030.

Circular economy prospects for the future

Ever since the European Commission adopted the Circular Economy Package in 2015, the circular economy has become an international priority. The EU has high expectations for the transformation of the economy, including new industry sectors and innovations, improved environmental conditions and better circulation of resources. Draft legislation and research funding have set incentives. Over the next few years, for example, it is likely that the legal manufacturer responsibility will gradually be extended. This means that, in future, manufacturers in many industries will have to implement or finance reuse and recycling strategies in a similar way to what already happens with the Green Dot or in automobile recycling. With the A|U|F e.V. and Rewindo initiatives, Schüco is already on the path towards accepting this responsibility.

In 2015, the United Nations also set an example for the responsible handling of raw materials with their Sustainable Development Goals (Transforming our World: The 2030 Agenda for Sustainable Development). Goal 12, "Responsible Consumption and Production", promotes the development of sustainable consumption and production patterns. All 193 members of the UN support this goal.

Cradle to Cradle is a scientific basis for the implementation of the circular economy in products. Converting linear economies into circular ones is the logical outcome of the scarcity of raw materials, environmental damage, population growth and climate change. Only when we allow our materials to circulate in cycles instead of disposing of them like rubbish will we have enough for everyone in future – and only when the materials are toxicologically harmless can we ensure the health of people and the environment.

Circular buildings

Construction is the industry with the greatest material consumption in the world at 50%, and also the greatest producer of waste in the world at almost 60%. At the current rate of consumption, supplies of some key building materials such as copper, PVC-U and steel are only sufficient for a few decades, while the demand for raw materials is generally on the increase.

This is why we consider buildings to be raw material stock for the future which will release their materials at the end of the usage phase and lay the foundations for new buildings. Buildings therefore have an additional value: the raw material value. The capital linked to the building materials is not lost, but rather re-released at the end of the usage phase in a similar way to a long-term investment. Due to the fact that raw materials are scarce, the Cradle to Cradle principle will therefore play an increasingly important role in buildings of the future.

New value creation models

Full recyclability of building products makes things very interesting for manufacturers who get the used materials back at the end of the usage phase because they can then ensure that they get calculable prices for such high-quality materials. In this connection, completely new ownership structures are possible in line with the motto "leasing is the new buying". A comparable development is conceivable, in a similar way to what took place some years ago with photocopiers or company cars. Today virtually every company leases photocopiers and company cars, which would have been inconceivable a few years ago. The same models (known as service leasing) can be used for building components such as partition walls, carpets, technical installations or entire façades, and we are working hard to make this a reality for Schüco products.



“The Cradle to Cradle principle is the basis for all product developments at Schüco”

Stefan Rohrmus, Sustainability Manager



Schüco C2C roadmap

The Schüco C2C roadmap

Schüco has been focusing its efforts on C2C since 2012, and is now the industry's trailblazer. It was the first systems provider to offer C2C Silver certified products in 2016. The C2C certification is to be extended to all window, façade and door systems by 2020, following a modular principle.

C2C and our employees

It is our young employees in particular who ask explicitly for the company to take ecological responsibility. After all, sustainable products create empathy. And sustainability starts in the mind. Cradle to Cradle as a school of thought gives employees irresistibly plausible impetus when planning new product projects.

During implementation, an interdisciplinary team works to ensure that the product portfolio conforms to C2C.

The pioneering work of today will become the new normal of tomorrow. Selecting and optimising innocuous materials trigger continuous innovation. Sustainability will become part of the new quality awareness among employees.



The Cradle to Cradle Certified (TM) product standard

From the philosophy to the certification system

Based in San Francisco, the Cradle to Cradle Products Innovation Institute (C2CPPI) is a non-profit organisation founded in 2010 by William McDonough and Dr Michael Braungart to promote the practical application of the Cradle to Cradle philosophy. The basis of this is the Cradle to Cradle Certified™ Product Standard, which can be used to develop, qualify and certify products that comply with this philosophy.

Since 2010, the institute has been developing the standard further, informing the public and acting as an independent examiner and licensor for Cradle to Cradle certificates. The Cradle to Cradle Certified™ Product Standard is currently at version 3.1.

Cradle to Cradle Certified™ Product Standard

The requirements for certified products can be seen in full on the C2CPPI website (currently available in English): www.c2ccertified.org/resources/detail/cradle_to_cradle_certified_product_standard

C2C Certified is a product certification, i.e. independent and voluntary confirmation of the quality of a product. As of August 2017, more than 490 products from different product segments across the globe have been certified, including chemicals, building products, furniture, textiles, cleaning products, print products and toys. In the construction industry in particular, demand is growing for C2C-certified products which can also be positively credited in building certification.

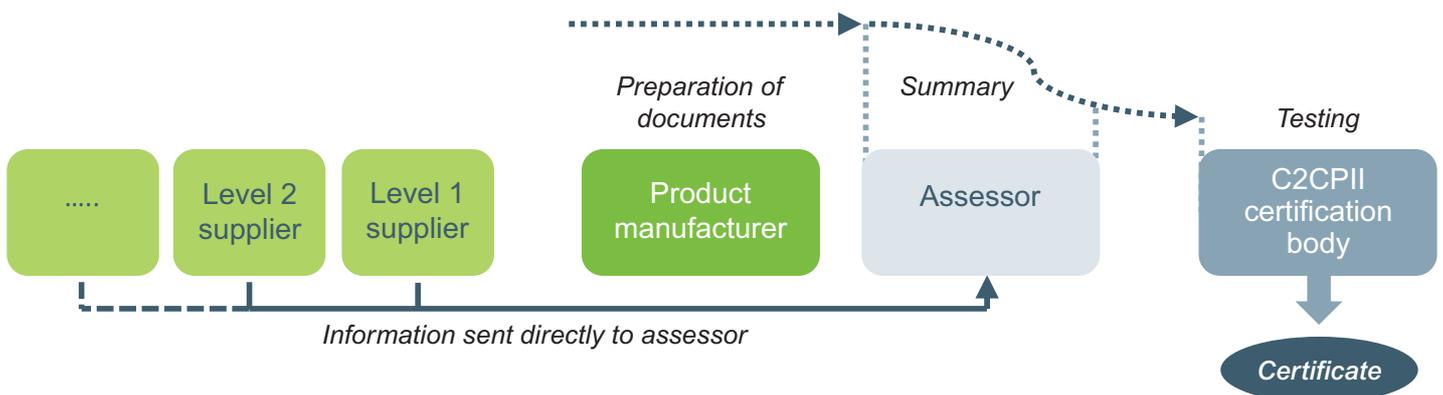
Certification – process and stakeholders

The certification of a product in accordance with the Cradle to Cradle Certified™ Product Standard is based on an exchange of information between the manufacturer, supplier, assessor and certification body.

The information required about the product manufacture is provided by the manufacturer and the supplier. Suppliers can safeguard their business secrets (e.g. production processes) by protecting confidential information with a non-disclosure agreement (NDA).

For the auditing, optimisation and the whole certification process, Schüco works with EPEA Internationale Umweltforschung based in Hamburg, and Drees & Sommer SE. As an accredited assessor, EPEA runs through the process, gathers all the necessary documents and passes them on to the C2CPPI for testing. Following successful testing, it awards the product certificate.

Flow of information for certification





Overview of criteria

The content and requirements of the five criteria of the C2C Certified™ Product Standard are summarised briefly below. More detailed descriptions can be found on pages 12-22.

All criteria are weighted equally. Material health is not a knock-out criterion, however forbidden substances on the banned list defined therein automatically result in disqualification from the certification.

Certificates at Schüco

Schüco and Schüco products are tested in various ways. All Schüco products bear the CE mark, which shows compliance with the European standard, and have environmental product declarations (EPDs) in accordance with ISO 14025 and ISO 14040. Our RAW systems are tested in accordance with DIN EN 12101-2 and our bio-based raw materials are backed by the TÜV quality seal DIN CERTCO. For Schüco itself, there are company certificates for environmental management in accordance with ISO 14001 and for quality management in accordance with ISO 9001 as well as a balancing of our CO₂ footprint by means of the TÜV NORD CERT. More information is available in the sustainability report or at www.schueco.de.

Material Health



Aim: Optimisation of the product composition in order to have healthier, safer materials for people and the environment.

Requirements:

- Evaluation and toxicological assessment of the materials
- Adherence to thresholds, substance bans
- Substitution of problem materials

Material Reutilisation



Aim: Products with components that can be fed in full into closed loops.

Requirements:

- Ensuring the best possible recyclability
- Promoting the greatest possible share of secondary raw materials in the product
- Implementation of collection processes

Renewable Energy



Aim: A future in which all production processes are run with 100% renewable energy.

Requirements:

- Recording of proportion of renewable electricity and greenhouse gas emissions
- Increase in share of renewables or offsetting by means of certificates
- Optimisation of “grey energy” (energy necessary for production, transport, storage, sales and removal)

Water Stewardship



Aim: Manage clean water responsibly as a valuable resource and human right.

Requirements:

- Water stewardship strategy
- Water audit
- Waste water treatment strategy or strategy for solving problems with the supply or quality of water in the supply chain

Social Fairness



Aim: Design processes so that the dignity of all affected people and the integrity of natural systems is considered.

Requirements:

- Self audit or external audit according to recognised guidelines
- Recording of social problems in the supply chain and development of measures
- Implementation of a local “positive impact” strategy

Continuous improvement is the basis of the sustainability process

 CRADLE TO CRADLE CERTIFIED™ PRODUCT SCORECARD					
BRONZE					
CATEGORIES	BASIC	BRONZE	SILVER	GOLD	PLATINUM
MATERIAL HEALTH		✓			
MATERIAL REUTILISATION			✓		
RENEWABLE ENERGY & CARBON MANAGEMENT				✓	
WATER STEWARDSHIP				✓	
SOCIAL FAIRNESS				✓	

Example of a Cradle to Cradle scorecard.
The overall result is Bronze.

Evaluation

In each criterion, an evaluation of Basic, Bronze, Silver, Gold or Platinum can be achieved, depending on the standard of quality. For the certification result, the product receives a certificate and scorecard on which the quality of all criteria is recorded. The overall result for the product depends on the weakest criterion.

effects to nothing, but to achieve a progressive reduction of negative effects while increasing the positive effects. For recertification it is expected that the manufacturer has made sincere efforts to optimise the product.

Updating

A C2C product certificate is valid for two years. For recertification, it is necessary to show progress with the criteria that need to be improved, for example by implementing the outlined action plans. The certification process therefore acknowledges that perhaps not all information is available from the outset and not all processes can be optimised straightaway. The principle of continuous improvement applies. The aim is not to reduce negative

Cradle to Cradle Certified Products Registry

All certified products are registered on the C2CPII website:
www.c2ccertified.org/products/registry

Material Health



The health of materials – starting with the non-toxicity – is a fundamental requirement for safe and sustainable closed-loop circulation. A key element of the criterion is therefore a detailed analysis of the materials contained therein. After all, many manufacturers do not know exactly what their products contain, as these are designed using pre-materials that they do not produce themselves. At the start, therefore, all the materials the product contains are identified in the bill of materials and the product is assigned to the biological or technical cycle. It must not contain any chemicals on the banned list (traces of particularly harmful substances that are not forbidden everywhere). In the next step, the substances are classified by the ABX-X system (see page 13).

As regards substances that are classified as X, a phase-out plan, i.e. a substitution plan, must be created in accordance with the principle of continuous improvement. From the Silver level, there must be no CMR substances either (substances which are proven to be carcinogenic, mutagenic or toxic for reproduction).

Level	Requirement (the requirements for the lower levels must also be fulfilled)
Basic	<ul style="list-style-type: none"> ▪ The generic materials are 100% identified ▪ The product contains no chemicals on the banned list (proof provided by supplier) ▪ For each material, the suitable cycle (technical or biological) is identified
Bronze	<ul style="list-style-type: none"> ▪ The material has been at least 75% assessed (by weight) (ABC-X ratings) ▪ Materials with an X rating have a substitution strategy (phase out)
Silver	<ul style="list-style-type: none"> ▪ The material has been at least 95% assessed (by weight) (ABC-X ratings) ▪ Products for the biological cycle must be 100% assessed ▪ The product contains no CMR substances as per the ABC-X ratings
Gold	<ul style="list-style-type: none"> ▪ The material has been 100% assessed (by weight) (ABC-X ratings) ▪ There are no substances with X rating
Platinum	<ul style="list-style-type: none"> ▪ All substances used in the production process have been assessed (ABC-X) ▪ There are no X substances



MY FUTURE OFFICE

With MY FUTURE OFFICE, Schüco is part of a research project by TÜV Rheinland and the Sentinel Haus Institut for modern, healthy and profitable office design. The aim is to develop standards for newbuilds and renovations. The quality of the indoor air is a key aspect which depends largely on the materials and ventilation technology. For more information, visit www.myfutureoffice.de

Health: air inside the room

Nowadays people spend around 90% of their time indoors. Healthy indoor air is therefore important for our wellbeing and the performance of every individual. When it comes to interior design, those involved in the building project are also affected – and our products are used in our buildings too. Whether for employees, on the building site or with the end user: Schüco wants to contribute to creating healthy air in buildings.

Product development at Schüco

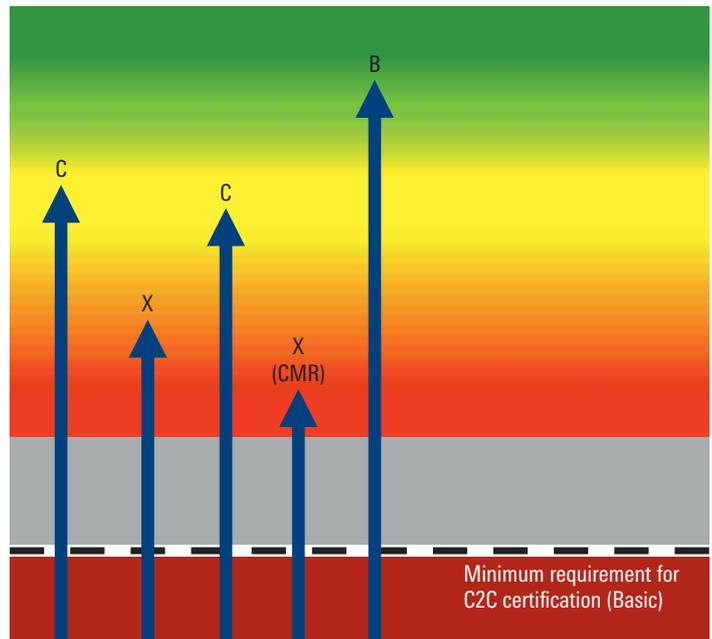
Product development at Schüco today follows a clear process to ensure that future generations of products are sustainable from the outset. Since 2013, in order to safeguard the planning of new product projects, we have been using our checklist for quality product design (QGP), which is continuously updated and is largely in harmony with the C2C requirements when it comes to the selection of materials. Our aim is to gradually transfer the findings and improvements from the C2C product development to every new product development.

Supply chain

What gets developed at Schüco must be implemented by our suppliers. With the Schüco standard SN 175, we set high requirements for our supplier partners and their products, such as the restrictions on use of halogenated organic compounds, phthalates, so-called emollients, or polycyclic aromatic hydrocarbons, which are to be avoided in plastic components with prolonged skin contact. SN 175 already covers all C2C requirements for material health, but the C2C certification goes one step further. The requirements are creating a stir: Since our C2C journey began, three suppliers have had their products independently C2C certified.

The ABC-X system is based on eco-toxicological data, exposure assessment and the resulting overall risk for each individual substance of a product.

A	Material is optimised for C2C
B	Material is very good but can be improved further
C	Material is tolerable
X	Material is unacceptable for the long term (!) Substitution plan (phase out) must be submitted up to Gold
	CMR substance – must be removed from Silver
"GREY"	Unknown substance or insufficient information available for rating
"BANNED"	Banned list substance – cannot be certified



Source: EPEA and Drees & Sommer

Material Reutilisation



Material Reutilisation is the reuse of materials. The classification rates the extent to which a product has been optimised in terms of recyclability and/or compostability. The higher the proportion of materials that can be fed into the technical or biological cycle as “nutrients”, the higher the rating. The role of the manufacturer in the closed-loop circulation of materials is also rated.

Bio-based raw materials

The Schüco Green aluminium product generation uses insulating bars, gaskets and pressure plates made from renewable raw materials for the first time. Materials such as polyamide made from castor beans and synthetic rubber made from sugar cane are rapidly renewable and biodegradable. This will increase the recyclable proportion of the product and avoids waste.

The intention of the criterion is to fundamentally rethink the use of materials. After all, closed-loop circulation of materials means value retention. When products are optimised accordingly, the materials can ideally be used “endlessly”, whereby they are always turned back into a usable form by means of separation or biodegradation. This will turn buildings and cities into raw material stock, and what was previously construction waste is now the base material for new things.

Material reutilisation score

The focus is on the reutilisation potential of the product, shown by the material reutilisation score. The following proportions are calculated for all homogeneous materials in the product:

- Recyclable – can be reused at least once and can be separated under standard recycling conditions
- Biodegradable – biodegradable, including composting

- Rapidly Renewable – raw materials that can be renewed quickly (degradation cycles of < 10 years)
- Recycled – material that has already been reused

In each case, the proportion relates to the dry weight of the product. Special provisions apply to liquid products.

Level	Requirement (the requirements for the lower levels must also be fulfilled)
Basic	<ul style="list-style-type: none"> ▪ For all generic materials in the product, the suitable cycle (technical or biological) is identified
Bronze	<ul style="list-style-type: none"> ▪ The material reutilisation score is ≥ 35
Silver	<ul style="list-style-type: none"> ▪ The material reutilisation score is ≥ 50
Gold	<ul style="list-style-type: none"> ▪ The material reutilisation score is ≥ 65 ▪ The manufacturer has created a “nutrient management strategy” for the product that includes the scope, schedule and budget
Platinum	<ul style="list-style-type: none"> ▪ The material reutilisation score is 100 ▪ The product is actively returned and fed into the technical or biological cycle



Nutrient Management Strategy

From the Gold level, the criterion requires manufacturers to have their own strategy for managing product-specific raw materials. The strategy should illustrate an active process for closed-loop circulation (cyclisation) of the materials processed in the products, which is implemented and actively supported by the manufacturer. Schüco, for example, makes an active contribution to developing return and recycling structures through its work in the aluminium recycling initiative A|U|F.

Building Information Modeling

How is the information on the recyclability of products retained? This will be quite simple for buildings in future through to the integration of C2C product data in the BIM model of the building. Dynamically calculating the raw material value of a construction based on current stock market prices? Soon this will no longer be a problem.

Manufacturer responsibility and new perspectives

With this criterion, the C2C product standard seeks to encourage manufacturers to take more responsibility for production raw materials, even after they have been sold. The intention is for manufacturers to develop more interest in the longevity of their products, as customers pay for the right to use rather than the right to own. With far-reaching implementation, completely new business models can be created for many products, whereby the user is no longer the purchaser, but the leaser or renter. Leasing models for light (lighting as a service), furniture and office carpets, among others, are already being tested.



Material Reutilisation

Focus on recycling initiatives at Schüco

For Schüco, the responsible handling of resources is a key issue. As a systems developer, we have the chance to not only design our products to be sustainable, but also to manage which raw materials remain once the usage phase is over. Here we are consciously going beyond the legally required minimum and getting involved in industry-wide initiatives. Cradle to Cradle shows that we are right and gives us the incentive to optimise our products and supply chains even further. In our most lucrative area of business, metal, the focus on aluminium is not without reason. The material makes up over 60% of the product mass in our products. This is why we are concentrating precisely on this area.



A|U|F e.V.

The A|U|F e.V. promotes the sustainable disposal and recycling of dismantled building components and profiles from windows, doors and façades made of aluminium, so that the material can be reused.



Aluminium Stewardship Initiative

Schüco is a founding member of the Aluminium Stewardship Initiative (ASI) for more sustainability and transparency across the entire value added chain in the aluminium industry. The initiative brings together industrial companies, associations and critical NGOs, and works towards a global political framework for handling the material sustainably. This includes globally valid, independently verifiable standards that can be certified.



European Aluminium Association

The European association for the aluminium industry represents its members in political bodies. It is currently working to implement a "sustainability roadmap" for 2025. Schüco is represented on the "Building Board" of the EAA as well as in various working groups.

Recycling at Schüco

You can find more information on recycling at Schüco in the sustainability report.

ALUMINIUM CAN BE 100% RECYCLED

Renewable Energy & Carbon Management



Sustainability working group

Climate protection at Schüco is not only a matter for the boss, it is a concern for employees too. The employee working group on sustainability actively helps us to make Schüco more environmentally friendly, be it through improvements in product development or events like the Schüco sustainability day.

Renewable energy is a prerequisite for a truly sustainable circular economy and a basic principle of Cradle to Cradle. The use of non-finite or renewable energy sources means that there is no climate-damaging waste in the form of CO₂ or other pollutants. Where there are emissions, they must be in such small quantities that they can be fully utilised as biological raw materials in a short space of time.

For the assessment, energy requirements and greenhouse gas emissions which are attributed to the final production stage of a product need to be recorded in full. Here, the final production stage for various products of C2CPII is defined in its own document, so that, as far as possible, comparable calculations result, even with manufacturers with differing ranges of production.

Level	Requirement (the requirements for the lower levels must also be fulfilled)
Basic	<ul style="list-style-type: none"> The annual energy requirements and greenhouse gas emissions of the final production stage of the product are recorded
Bronze	<ul style="list-style-type: none"> A strategy for using the energy from renewable sources and a CO₂ management strategy are developed
Silver	<ul style="list-style-type: none"> For the product's final production stage, 5% of the annual energy requirements are purchased from renewable sources or compensated through certificates and 5% of greenhouse gas emissions are compensated
Gold	<ul style="list-style-type: none"> For the product's final production stage, 50% of the annual energy requirements are purchased from renewable sources or compensated through certificates and 50% of greenhouse gas emissions are compensated
Platinum	<ul style="list-style-type: none"> For the product's final production stage, 100% of the annual energy requirements are purchased from renewable sources or compensated through certificates and 100% of greenhouse gas emissions are compensated 5% of the "grey" energy that results from the Cradle to Gate product manufacture is compensated through certificates or saved by means of other projects (e.g. projects with suppliers, product redesigns, savings in the usage phase)



Power consumed off-site is measured in kilowatt hours, but is not factored into the calculation of greenhouse gas emissions. All other non-power-related emissions from the final product stage are counted – for example, greenhouse gas emissions from delivery traffic or methane emissions from waste water treatment plants.

2° Foundation

Schüco is a founding member of the 2° Foundation – an alliance of companies founded in 2011 that supports the climate policy of the German government for preventing global warming. More information is available in the Schüco sustainability report or at www.stiftung2grad.de

For more information

Read the latest sustainability report to find out more about the Schüco carbon footprint and related measures.

Renewable power sources and carbon management strategy

At the “Bronze” level and higher, a strategy is needed to increase the proportion of renewable power to 100% in the long term and to close the carbon cycle for the last product stage – i.e. to not emit more CO₂ than can be stored in the renewable product materials. The strategy should demonstrate what means will be used – for instance, energy efficiency, use of renewable energy, improvement in the energy intensity in production, or carbon sequestration. It also includes targets, deadlines and a budget.

Grey energy

The “Platinum” level requires the product’s “grey energy” to be measured. This means that the total power consumption from production (not only the final production stage) is analysed. This requires detailed information to be collected from all suppliers and on their energy suppliers.

Renewable energy at Schüco

Since 2012 and throughout Germany, Schüco has purchased only certified green electricity with the ok-power seal. We began recording CO₂ emissions in 2011, and we have been publishing them in a Corporate Carbon Footprint (CCF) database since 2014 with annual verification from TÜV. In 2013, Schüco set up an ISO 14001-certified environmental management system that sets out a defined, ongoing improvement process for greenhouse gas emissions, for example. In addition, a detailed energy audit according to EN 16247 was also carried out for the first time in 2015.

Overall, Schüco fulfills the criteria for the “Gold” C2C level for all certified products.



Not only does Schüco use green energy, it is also produced by the company itself at the Bielefeld site. Building-integrated photovoltaics (BIPV) from Schüco are used for this.

Water Stewardship



Water stewardship is about responsibly managing the vital resource of water. Water is not only a valuable raw material for production, it is also a human right. In the C2C Certified system, product manufacturers are required to manage water fairly and carefully and to take measures to protect it.

Key components of the criteria are to protect surface water by ensuring waste water that is as clean as possible and to identify and resolve localised water problems in connection with production. Owing to the wide range of local situations, the C2CPII does not specify how the individual water problems should be resolved.

Level	Requirement (the requirements for the lower levels must also be fulfilled)
Basic	<ul style="list-style-type: none"> ▪ No significant infringement of discharge permits in the last two years ▪ Local and company-specific, critical water issues are determined (e.g. water shortage, nearby water preserves) ▪ A written report explains what steps are being taken to tackle the identified critical issues
Bronze	<ul style="list-style-type: none"> ▪ A company-wide water audit has been carried out
Silver	<ul style="list-style-type: none"> ▪ Product-related process chemicals in waste water are determined and assessed <p>OR</p> <p>For companies without product-related waste water:</p> <ul style="list-style-type: none"> ▪ Water issues affecting the supply chain are determined for at least 20% of Tier 1 suppliers; a “positive impact” strategy for improving the situation has been drawn up
Gold	<ul style="list-style-type: none"> ▪ Product-related process chemicals in waste water have been optimised (problematic chemicals flow in closed circuits; waste water does not contain any problematic chemicals) <p>OR</p> <p>For companies without product-related waste water:</p> <ul style="list-style-type: none"> ▪ Verifiable progress in implementing the “positive impact” strategy
Platinum	<ul style="list-style-type: none"> ▪ All waste water that leaves the plant meets drinking water standards



The system is open to a wide range of different scenarios. Whether relating to conflicts of use due to water shortages, access problems, groundwater hazards or “just” polluted waste water, the manufacturer must identify critical water issues and draw up and abide by a “positive impact” strategy to contribute to higher water quality and fair, economical water management.

In the water audit, all water removal and discharge from the plant is described and accounted for to create transparency. At the “Silver” level and higher, manufacturers that do not themselves produce waste water are also required to factor in the supply chain. The manufacturer’s responsibility for water conflicts or pollution associated with its product is therefore not limited to its own plant. Direct suppliers (Tier 1 suppliers) are taken into account. As is also the case for other criteria, C2C Certified does not insist on an ideal scenario from the outset, but active efforts must be made to improve the situation in a verifiable manner.

Environmental management

The Schüco environmental management system was ISO 14001-certified in 2013. Waste water management is also part of the system and is supported by goals and measures. As per ISO 14001, traceability is an important aspect: “plan, do, check, act” is the motto.

Water use at Schüco

Schüco C2C products attain the “Gold” level in water stewardship. Regular water analyses confirm that Schüco waste water does not contain any problematic chemicals.



Water is the most natural “cycle material” – there are no limits to its reuse if it is clean.

Social Fairness



The criteria for social fairness are aimed at ensuring that business activities benefit all stakeholders in the supply chain: not just the manufacturer and the supplier, but also employees, customers, society and the environment. Without them, production would be impossible or meaningless.

The expressly ethics-based criteria for social fairness reward responsible production, fair working conditions and ecological actions.

Audit

The self-audit establishes whether final production stages, contracted work or direct suppliers involve countries or industrial sectors that have a high to very high risk of social violation. The following areas are investigated:

- Child labour
- Forced labour
- Unreasonably long working hours
- Living wages
- Employee health and safety
- Wages below the breadline
- Accidents and fatalities at work
- Toxicity and chemical exposure at work

Level	Requirement (the requirements for the lower levels must also be fulfilled)
Basic	<ul style="list-style-type: none"> ▪ A basic self-audit is carried out to assess the protection of human rights in production ▪ If any critical points are found, systematic steps are devised to tackle them; the progress that has been made must be demonstrated when applying for recertification.
Bronze	<ul style="list-style-type: none"> ▪ An extensive self-audit on social responsibility in accordance with the UN Global Compact Tool or B Corp ▪ Development of a “positive impact” strategy
Silver	<ul style="list-style-type: none"> ▪ Material or area-specific audit or certificate that applies to at least 25% of the material weight (e.g. FSC certified, Fair Trade or other social seals) <p>OR</p> <ul style="list-style-type: none"> ▪ Critical social issues in the supply chain undergo extensive investigation and a “positive impact” strategy is devised <p>OR</p> <ul style="list-style-type: none"> ▪ The company is actively carrying out an innovative social project that has a positive effect on the lives of employees, local or global society, social aspects in the supply chain or recycling/reuse
Gold	<ul style="list-style-type: none"> ▪ Two of the silver requirements are fulfilled
Platinum	<ul style="list-style-type: none"> ▪ A company-wide audit in accordance with an internationally recognised social responsibility scheme (e.g. SA8000 standard, B Corp) has been carried out by independent third parties ▪ All silver requirements are fulfilled



The Social Hotspots Database, which holds information on these indicators and more, forms the basis of the audit. Alternatively, it is possible to consult trusted sources, such as UNICEF, Weltbank, the International Labour Organisation or the World Health Organisation. At the “Bronze” level and higher, the audit has to be conducted in accordance with defined standards.

At the “Silver” level and higher, audits or certifications must be conducted by independent third parties.

Corporate social responsibility

Corporate social responsibility is the international term for the social responsibility of companies to act in a socially, ecologically and economically sustainable manner. To be transparent about how it is complying with these obligations, Schüco began publishing reports in accordance with the internationally recognised standards of the Global Reporting Initiative (GRI) in 2015.

“Positive impact” strategy

If the audit finds social risks in the supply chain, a plan must be devised to resolve them. At the very least, a contractually agreed code of conduct for suppliers must be put in place, child and forced labour must be prohibited, living wages must be stipulated, and unannounced audits must be permitted.

To date, more than 420 employees have benefited from cycle-to-work scheme JobRad with a bike for work and private use. This promotes health, protects the climate and boosts the happiness and motivation of our employees.

Social responsibility at Schüco

Schüco fulfills the criteria for the “Gold” level for all C2C-certified products. The successful self-audit was conducted based on the Social Hotspots Database and the UN Global Compact Tool.

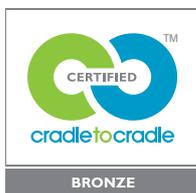
Bielefeld, where Schüco is headquartered, is also home to football club DSC Arminia Bielefeld. It is of particular interest to Schüco to support an identity-shaping club such as Arminia and to contribute to the lively local sporting culture. This is why we have been the club’s main sponsor and the SchücoArena’s namesake since 2004. As the slogan goes: we are East Westphalia!

This involves not only setting an example as an enforcer of the stringent German labour protection law, but also running a variety of social projects for employees and society.



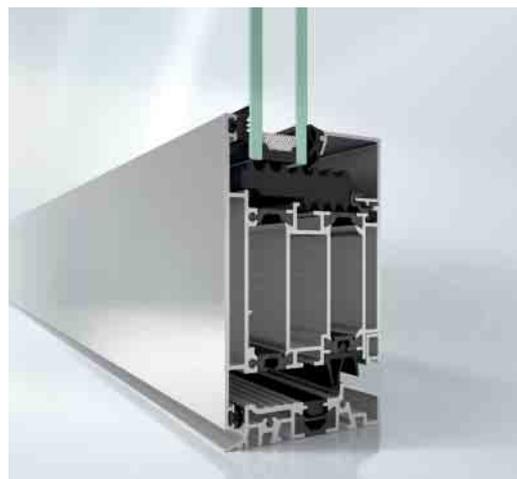
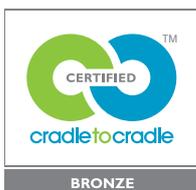
With the SchücoArena, Schüco is involved in inclusive amateur and professional sport in East Westphalia.

The Schüco modular system in C2C Bronze



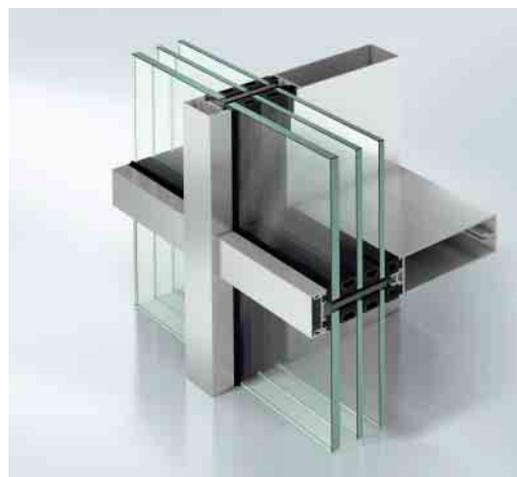
Schüco AWS aluminium window systems

With good reason, the AWS aluminium window systems are popular. The profile range provides the right solution for every project. The Simply-Smart fittings – easy to install and disassemble for conversion or recycling – are particularly suitable for Cradle to Cradle. The new screw-type connection technology is quieter during fabrication. Due to the continuous centre gasket, it is not necessary to bond the gaskets for installation – this saves on adhesive and is kinder on the ambient air.



Schüco ADS SimplySmart aluminium door systems

ADS SimplySmart is “designed for excellence”. Thanks to the hybrid insulating bar (patent pending), new centre gasket design and symmetrical 5-chamber profile system, the door system has won the Red Dot Award: Product Design 2017 and the iF DESIGN AWARD 2017 to date. With the C2C certificate, ADS demonstrates once again that Schüco is an expert in design – and with sustainability in mind.



Schüco FWS façade systems

The Schüco FWS (Façade Wall System) gives architects freedom. With face widths from 35 mm, FWS provides maximum transparency at the same time as high thermal insulation performance and is cost-effective in planning and installation. What is even better is that the all-rounder is now also bringing the prospect of a circular economy to buildings.

The Schüco modular system in C2C Bronze

CRADLE TO CRADLE CERTIFIED™ PRODUCT SCORECARD					
CATEGORIES	BASIC	BRONZE	SILVER	GOLD	PLATINIUM
MATERIAL HEALTH		✓			
MATERIAL REUTILISATION			✓		
RENEWABLE ENERGY & CARBON MANAGEMENT				✓	
WATER STEWARDSHIP				✓	
SOCIAL FAIRNESS				✓	

C2C Scorecard
Schüco FWS façade system



At least 75% of all used materials were assessed. All substances on the C2C banned list were successfully eliminated. Substitution processes that reduce the use of CMR-related reaction accelerators/retardants have begun, in particular with EPDM gasket suppliers.



Data delivery for the analysis was essential here. As a matter for audit, responsible water management was new to us – but as a process it has long been routine. Analysis of the data has confirmed that we are taking all the necessary measures to ensure sensible, recycling-friendly water management.



Across all three products, at least 64% of the materials used are recyclable. In addition to recyclable aluminium, mainly recyclable steels and polyamide insulating bars are used.



Schüco has started a large number of social projects. In the audit, the EPEA was particularly appreciative of the SchücoArena at our home of Bielefeld. As Arminia Bielefeld's main sponsor, we are proud to have been helping to maintain the local football culture for over 13 years. On the roof of the stand, we work with local utilities company Stadtwerke Bielefeld to produce 80,000 kilowatt hours of solar energy per year.



Schüco has been using 100% renewable energy since 2012. The Cradle to Cradle® certification was taken as an opportunity to acquire emissions certificates in order to compensate for some of the emissions that remain despite the use of green energy.

Schüco products with C2C Silver

Bronze is good, silver is better – this is why we are pushing for the whole modular system to obtain Silver C2C certification. However, some Schüco products already meet the Silver C2C quality level. The key to success is to purposefully optimise materials.

What has changed?



For C2C Silver, 95% of the contained substances were analysed. CMR-related substances were eliminated entirely by substitution. To do this, new formulations were developed in some cases – for example, for a flame retardant, for which our supplier previously used antimony trioxide. We were also able to procure antimony-free PET.



In these categories, the products from the Schüco C2C Bronze modular system have already reached the Gold level. These points were not looked at again for the Silver certificates.



Even for the C2C Bronze modular system, we only used supplier products that were tested for material quality beforehand. With clear specifications, we were able to prioritise specific suppliers for the C2C products and increase the proportion of recycled, recyclable, biologically degradable or readily renewable materials to more than 65% by weight.



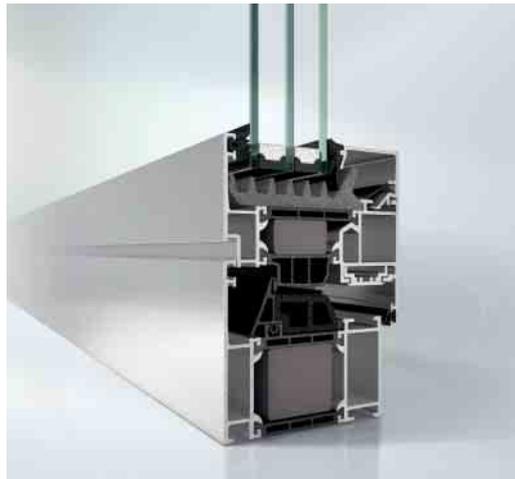
C2C certificate for Schüco FWS 50.SI façade system

Schüco products with C2C Silver



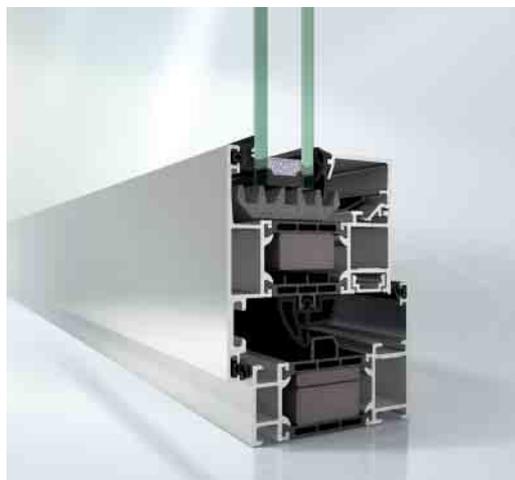
Schüco FWS 50.SI façade

The Schüco FWS 50.SI façade is a system platform for vertical façades and toplights with particularly large modules, and enables a wide range of different roof shapes. The SI system with passive house certification ensures the best thermal insulation values.



Schüco AWS 75.SI+ window

The Schüco AWS window system platform provides classic, outward-opening windows for modern, individual requirements. AWS 75.SI+ is an amalgamation of material innovation and engineering. New materials ensure optimised thermal insulation, while the innovative, screw-type connection technology minimises noise during installation. Internal glare protection, integrated in the glazing bead, is also possible – and in classic, slimline profiles to top it off.



Schüco AWS 65 NL window

AWS 65 NL takes the principle of the continuous centre gasket and applies it to a slimmer window with a basic depth of just 65 mm. In doing so, it meets the requirements of international markets with intermediate thermal insulation requirements.

Plan C2C-inspired projects with Schüco



The Schüco modular system

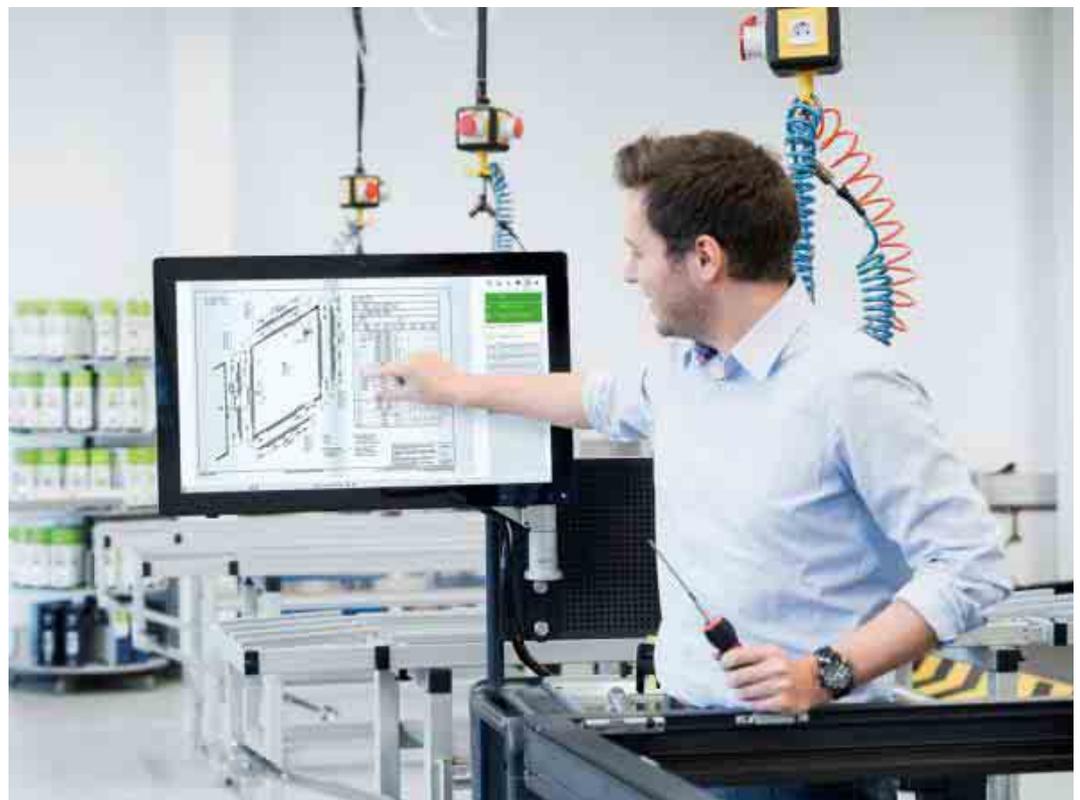
Every building is unique. In practice, the choice of Schüco products therefore varies depending on the building project. Architects and planners need solutions that allow them to plan and configure façades in a flexible, modular fashion and to keep costs and quality in check at the same time. The Schüco modular system has therefore been the ideal basis for individual, efficient façade designs since the 1960s. Much like a component-based system, the structural units in the modular system can be combined to form an unlimited range of façades.

In December 2016, Schüco achieved Bronze C2C certification for the modular system. This makes it possible for the first time to use certified articles to put together entire products, so that they obtain C2C certification.

SchüCal

SchüCal is the Schüco design software that introduces the modular system to modern planning practice. Since 1972, SchüCal has served to bring both planning freedom and planning security into the digital sphere. Using interfaces to all standard planning programs, façade planners and architects can use SchüCal to plan and cost out their building envelope over all the working phases.

SchüCal now integrates C2C certificates for certified Schüco products and checks for each design whether C2C-compliant configuration is possible with the existing products. The software therefore allows individual window, door and façade combinations to be C2C-verified. Sustainability – individually tailored.



Plan sustainability with SchüCal and BIM

It is not just C2C data that is stored in SchüCal and BIM objects. Eco-balance data in EPD format is also integrated and is calculated on a project-by-project basis depending on the assembly of the selected units.

BIM

Building Information Modelling (BIM) is all the rage. The 3D digital planning system with a stored database is a mini revolution in the building industry and can be used to manage costs, quality and deadlines more precisely than ever before.

In the future, an increasing amount of information on sustainability and materials will be stored and queried in the digital building model – with the aim of also planning buildings' sustainability requirements in a fast, timely and precise manner.

All Schüco products already exist as BIM objects and can be integrated into all common BIM planning programs. For all certified Schüco C2C products, the C2C information is now also integrated in the BIM objects. This means that it takes just a few clicks to calculate, for example, the mass of the C2C-certified components in a building as a proportion of the total mass – an important piece of information for some building certificates.



Planned with BIM – and Schüco.

RAG-Stiftung and RAG newbuild at Zollverein, Essen

Project

Name: RAG-Stiftung and RAG
newbuild at Zollverein, Essen
Size: 9600 m² gross floor area
Site: Essen, Germany
Client: RAG-Stiftung
Architect: Kadawittfeldarchitektur
Function: RAG-Stiftung and
RAG headquarters
Period of construction: 2016–2017

Concept

At the Zollverein world heritage site, the RAG-Stiftung has had new headquarters built that are characterised by sustainability and environmental conservation and are largely based on the C2C principle.



“Buildings inspired by Cradle to Cradle are feasible nowadays – and it is high time to also apply circular added-value to the building industry.”

Gerhard Wittfeld, Kadawittfeldarchitektur

Cradle to Cradle aspects

With a material passport, the building will be provided with complete material documentation including C2C aspects, such as the ability of the structure to be dismantled or information relating to green construction. The aim is to receive the Platinum DGNB award.

The building is powered by geothermal energy and cooled with solar power. Rooftop turf and rain water management add the finishing touch to the concept: a building which doubles as a power plant and raw material stockpile, and is sound, flexible and positive for nature and mankind.

Schüco contribution

The Schüco AWS 75.SI+ aluminium window system, which has been awarded the Silver C2C certificate, was used. The system meets all the stringent sustainability requirements and makes the zero-waste façade a reality.

The building is planned entirely in BIM. The window system can be perfectly integrated into digital planning using the optimised Schüco documentation.

AWS 75.SI+

Find out more about the aluminium window system on page 26 or on the Schüco website.

Schüco UZ-D newbuild, Bielefeld

Project

Name: UZ-D House of Technology
 Size: 7200 m² gross floor area
 Site: Bielefeld, Germany
 Client: Schüco International KG
 Architect: 3XN Architects
 Function: Innovation and development centre
 Period of construction: 2018–2020

Concept

For more than 60 years, the company headquarters have defined the Bielefeld cityscape. The recent expansion on Karolinenstraße is the “House of Technology” that will accommodate the Innovation and Development department in the future. The building symbolises sustainable and future-proof working concepts and will also be the first building to achieve the three sustainability certificates DGNB, LEED and BREEAM, becoming one of the most sustainable office buildings in Europe. With organic shapes and a large amount of light, inspiring, flowing rooms will be created around the central atrium.



“We believe that architecture has a big influence on our behaviour. This is why we place great value in general on holistically designed rooms and pleasant environments in which people feel part of a greater whole.”

Jan Ammundsen, 3XN

Schüco products used

Façade upper storeys:

AWS 90.SI

Façade ground floor:

FWS 35 PD.SI, FWS 50.SI

ADS 75.SI, AWS 75 PD.SI

ADS 90 FR

Sun shading:

Schüco CSB

Integralmaster

Skylight:

AOC 75, AWS 57 RO

Technical housing:

FACID textile façade

Cradle to Cradle aspects

The building is a raw material stockpile. A structure that is easy to dismantle and recycle and a high proportion of C2C products allow it to be extended and converted in a recycleable manner. A C2C-certified interior design tested for harmful substances and functional indoor plants ensure optimum ambient air quality, while the turfed roof is also a habitat and an ecosystem. The energy concept, which includes a geothermal heat pump, efficient heat recovery in the ventilation system and passive/active night-time cooling, meets the most stringent requirements. The building is provided with complete documentation in the form of a material passport.

Schüco contribution

The integration of C2C principles and ideas was first postulated and tested in a competition run by Schüco. The winning design by 3XN received the best feedback in this regard.

In the project, Schüco products are used for façades, doors and glass roofs. The systems used include C2C-certified systems.



Cradle to Cradle® in DGNB building certification

Schüco DGNB guidelines

You can find more information about the DGNB system for building certification in the Schüco DGNB guidelines, which describe in detail the impact of all Schüco products on certification.

The DGNB certification system

The DGNB system was developed in 2007 by the German Sustainable Building Council (DGNB) and the German Federal Ministry of Transport, Building and Urban Affairs (BMVBS) and was first used in 2008. In the last few years, the seal has been updated to bring it in line with developments in energy policy and standardisation. The universal assessment system considers all essential aspects of sustainable construction, with a focus on the whole life cycle of the building. In the process, it is the overall performance that is assessed, as opposed to individual measures.

DGNB and Schüco

The DGNB system is important for Schüco because building certifications are required for more and more high-value properties. In particular with commercial buildings, investors and property developers are demanding sustainable building quality. The verified Schüco products help achieve a high quality of distinction in this respect. Schüco supports architects, investors and fabricators with detailed documentation for planning, product selection and DGNB verification.

Design of the system

The sustainability concept in the DGNB system is wide-ranging and extends beyond the known three-pillar model. It considers a comprehensive, universal set of aspects that are essential to sustainable construction. These include the following six areas: ecology, economy, sociocultural and functional aspects, technology, processes and site.





DGNB and Cradle to Cradle®

The aim of the circular economy has come into significantly sharper focus for the DGNB with the new 2018 system version (update). Either directly or indirectly, 17 out of 40 criteria stipulate requirements relating to circular resource management. In April 2017, together with the Cradle to Cradle Products Innovation Institute, the DGNB set up the “Built Positive” initiative in Germany to bring the matter further to the fore in the German building industry.

In light of this, the Schüco products with Cradle to Cradle certification are among the first in the German market to comply with some of the new quality requirements. The following outlines the positive influence of Schüco products with Cradle to Cradle certification on the Cradle to Cradle requirements for DGNB certification.

Circular economy bonus

With the 2018 system, a bonus was introduced for the first time for special contributions to the circular economy. The bonus is based on 13 criteria. Five of the criteria for the bonus are directly linked to the use of building products that are optimised for sustainable resource management – such as the Schüco products with Cradle to Cradle certification.

2030 Agenda bonus

The 2030 Agenda bonus was introduced to reward projects that make a special effort or take special measures towards climate protection and the achievement of the UN Sustainable Development Goals. The bonus is based on two criteria.

Category	Criteria	Weighted degree of overall compliance	Impact of C2C products
Ecological quality			
ENV1.1	Eco balance of the building	9.5%	Dependent on the proportion of C2C products by mass in the building
ENV1.3	Responsible use of resources	2.4%	Dependent on the proportion of C2C products by mass in the building
Technical quality			
ECO1.1	Building-related costs in life cycle	10.0%	Dependent on the proportion of C2C products by mass within the component groups
Ecological quality			
TEC1.6	Easy to dismantle and recycle	3.5%	Dependent on the proportion of C2C products in standard components in as many component groups as possible
Process quality			
PRO1.4	Ensuring sustainability aspects in specification for and awarding of tenders	1.6%	Dependent on the specification texts with sustainability/C2C requirements

[ENV1.1] Life cycle assessment of the building

The life cycle assessment takes into account the environmental impact of a building over its entire life cycle. The ecological impact of manufacturing building products is also calculated. The factors that are investigated include global warming potential, over-fertilisation potential and the proportion of renewable primary energy.

[3] Life cycle assessment comparative calculation

Max. 80 points

The result of the calculation of a building's environmental impact is compared with a DGNB reference value, which is the average of projects of the same usage type. Points are scored if the environmental impact is lower than in the reference calculation.

Influence of Schüco C2C products

All Schüco products have an Environmental Product Declaration (EPD), which quantifies the life cycle impact. This information can be used directly in the building's life cycle assessment. C2C-certified products from Schüco have a smaller environmental impact caused by manufacturing than comparable products, for example through the use of renewable energy.

Frame of reference

Building life cycle (50 or 20 years, depending on building use), including manufacturing, usage, maintenance and end of life cycle.

At the end of their life cycle, C2C-certified products can largely be recycled. They produce a smaller environmental impact than comparable non-recyclable products in this respect. This can be shown in the assessment: for C2C products the Ökobaudat parameter for "recycling" is indicated instead of "landfill" or the product-specific values from the EPD are used.

AGENDA 2030 BONUS

[4.1.3] Climate-neutral construction

Max. 10 points

The "implicated CO₂ emissions" from the manufacture, maintenance and end of life of the building are to be climate-neutral overall.

Influence of Schüco C2C products

C2C-certified Schüco products contribute to this as they are associated with lower manufacturing emissions than reference products and can be recycled at the end of their life.

[ENV1.3] Responsible resource extraction

This criterion aims at greater transparency in the construction value chain and designates two quality levels of responsible resource extraction.

The raw material groups currently being taken into account are concrete, brick, wood and metal.

[1.2] Responsibly extracted raw materials – Quality Level 2

10–50 points per raw material

Quality Level 1 designates minimum requirements (no child or forced labour, no illegal mining or manufacturing) and requires risk management from the manufacturer.

Quality Level 2 additionally rewards the use of building components or products whose resource extraction is certified according to recognised standards. Ecological and social demands that go beyond the legal requirements must be fulfilled.

The number of possible points is dependent on the proportion of responsibly extracted raw materials in the building mass. A building with a steel skeleton construction, for example, can receive more points for responsibly extracted steel than a solid brick construction. However, a maximum of 50 points can be obtained for a raw material group.

Influence of Schüco C2C products

The metal raw material group is of relevance to Schüco. All certified Schüco products are at Quality Level 2, as the C2C certificate requires clearly defined social and ecological standards to be met. The number of points that can be awarded is dependent on the proportion of the metals in the building mass and the proportion of Schüco products in the metal products that are used.

[1.3] Resource savings through the use of secondary raw materials

10–50 points

Demonstrably recycled materials cut down on the environmental impact of raw material extraction. They can be applied proportionately for the mass. A maximum of 50 points can be scored.

Influence of Schüco C2C products

The certified products have a large proportion of recycled aluminium and steel mass. The exact proportions can be taken from the C2C certification documents for the product.

Frame of reference

Masses and surface areas of components made of concrete, brick, wood and metal (cost groups 300, 400 and 600 of DIN 276 only).

[ECO1.1] Building-related costs in the life cycle

The life cycle cost calculation works out the manufacturing, usage and maintenance costs for the life cycle of the building (50 or 20 years). The aim is the early identification of long-term cost-effective solutions instead of only looking at investment cost considerations. Circular economy or sharing economy solutions cannot yet be represented as cost saving in this model. They are awarded a special bonus, however, as they support the transformation to a long-term resource-saving economy.

CIRCULAR ECONOMY BONUS

[2.2] Circular/sharing economy solutions

Max. 10 points

If it can be demonstrated that a significant proportion (at least 80% of cost groups 300 and 400, third level) of the components in a group will be reused or are integrated in circular/sharing economy business models, additional points can be awarded. The components must be integrated in a system that ensures or provides substantial support for circular aspects.

Five points can be awarded for each certified cost group in accordance with DIN 276 (third level).

Frame of reference

Masses and surface areas of cost groups 300 and 400 in accordance with DIN 276, third level.

The cost groups of particular relevance to Schüco are:

- 334 External doors and windows
- 337 Unitised external walls

Influence of Schüco C2C products

The C2C-certified products fulfil the requirement, as the C2C principle provides substantial support for circular aspects.

A façade with at least 80% certified Schüco products secures five points.

[TEC1.6] Ease of dismantling and recycling

Construction products and buildings that are designed to be easy to dismantle and recycle encourage the efficient and effective use of natural resources. This criterion aims at the implementation of the circular economy in the construction sector. It looks at the recycling and disposal routes of building materials on the one hand, and the building construction's non-destructive dismantling and separability by type on the other hand.

[1.1] Selecting recyclable building materials

Max. 45 points

Recyclability is divided into three quality levels (QL): QL 0 for landfill or disposal as hazardous waste, QL 1 for backfilling or energy recovery, and QL 2 for material recycling.

This only takes into account standard building components from the following applications: external walls, internal walls, ceilings, roofs, load-bearing structure and foundations. The quality of the component groups (cost group in accordance with DIN 276, third level) is evaluated in each case. This includes the following component groups of relevance to Schüco:

- 334 External doors and windows
- 337 Unitised external walls

Points can be scored if at least 60% of the relevant reference value (mass or surface area) of a component group is at Quality Level 1 or 2. If at least 10% of the component group is at QL 2, points can be incrementally awarded for this.

Influence of Schüco C2C products

The C2C certificate can be used as proof of recyclability.

Schüco products usually make up a significant proportion of their relevant component groups (e.g. external doors and windows). The certified products are at QL 2 for recyclability.

CIRCULAR ECONOMY BONUS

[1.2] Circular economy bonus 1

Max. 20 points

For every standard component that constitutes >10% of the reference value and whose materials can be made into comparable product, an additional point is awarded. It is important here that a loss-free cycle is secured by an established logistics process, a returns guarantee or a rental leasing/system.

Influence of Schüco C2C products

Thanks to the certified high level of recyclability, seamless documentation and established aluminium recycling process, one point can be scored per standard component from the Schüco C2C portfolio and component group. The number of points that can be obtained is dependent on the proportion of the Schüco products in the relevant component groups.

Frame of reference

Masses and surface areas of cost group 300 in accordance with DIN 276, third level (only "relevant standard components" in accordance with DGNB).

[2] Easy-to-dismantle building construction

Max. 45 points

The ability to be dismantled is divided into two quality levels: QL 1 for a noted but not optimised ability to be dismantled, and QL 2 for easy-to-dismantle building construction. Ease of dismantling exists when the building components can be or do not need to be separated according to types and can be taken out without damage.

External walls, internal walls, ceilings and roofs are evaluated (in accordance with DIN 276, cost group third level). Points are scored if at least 60% of the relevant reference value (mass or surface area) of a component group is at QL 1 or QL 2.

Frame of reference

Masses and surface areas of cost group 300 in accordance with DIN 276, third level (only "relevant standard components" in accordance with DGNB). This indicator only considers external walls, internal walls, ceilings and roofs.

Influence of Schüco C2C products

Schüco products usually make up a significant proportion of their relevant component groups (e.g. external doors and windows). The certified products are at QL 1 to QL 2 for ease of dismantling (depending on the product and installation). The building component layers and a declaration of the non-destructive ability to be moved must be supplied.

[PRO1.4] Ensuring sustainability aspects in specifications and tenders

Specification and tender documents are the contractual basis on which sustainable planning is executed. Integrating sustainability aspects ensures that decisions on building products and processes are made not only on an economic basis, but that qualitative and enhanced functional properties are taken into account as well.

[1.1] Extent of the integration of sustainability aspects in the specification

Max. 100 points

75 points can be awarded if environmental and health compatibility requirements are formulated in a trade-specific way or integrated to some extent at the level of individual service items in the specifications. For a functional specification, specific recommendation/exclusion criteria must be named for the selection of products.

100 points can be awarded if technical aspects (e.g. durability or ability to be dismantled) are also specified.

Frame of reference

All bills of quantity (the overall specification). The requirements must be met in multiple trades.

Influence of Schüco C2C products

Schüco makes specification easier for developers with sample specification texts. Templates for specifying C2C building products that also meet certain technical demands (durability and ability to be dismantled) allow the requirements of the criteria to be successfully fulfilled for the façade construction trade.

CIRCULAR ECONOMY BONUS

[1.2] No recycled materials excluded from the specification

Max. 10 points

If the specification contains building product requirements that explicitly recommend or require the reuse or use of recycled/secondary materials, the bonus can be applied.

Influence of Schüco C2C products

Specifying C2C products with a material reutilisation score above Silver secures the circular economy bonus.

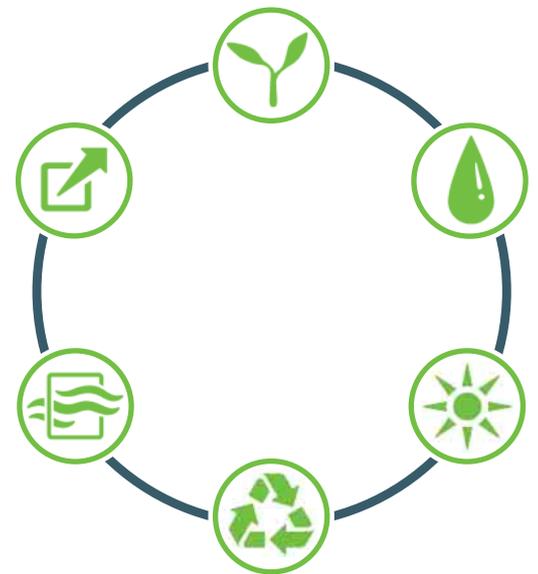
Cradle to Cradle® in LEED building certification

The LEED certification system

The LEED system was developed by the U.S. Green Building Council (USGBC). Since 1998 LEED has been used to evaluate sustainable buildings and has been updated several times. Usage profiles have been developed since then for different building typologies. LEED is an internationally recognised system and the world's leading voluntary seal for green buildings.

Design of the system

LEED for buildings looks at nine categories in version v4. A maximum total of 110 credits (points) is possible. Certain prerequisites also have to be met. There is a free choice between all other criteria.



Schüco LEED guidelines

You can find more information about the LEED system in the Schüco LEED guidelines, which describe in detail the impact of all Schüco products on certification.

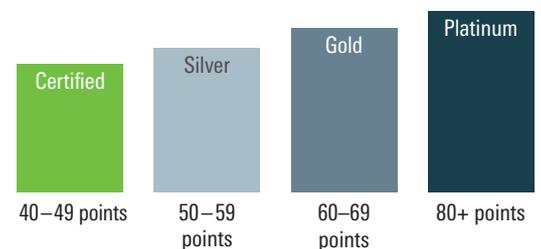
The regional priority category awards additional points to reward the fulfilment of particularly important site-specific criteria, for example the selection of water efficiency credits in arid areas.

The innovation category acknowledges criteria that have been exceeded, the application of credits from other usage profiles, and the development of new sustainability standards.

Categories

- [IP] 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

Evaluation





Criterion	Credits	Impact of C2C products
MR – Materials and Resources		
Building life cycle impact reduction	3	Dependent on the mass proportion of C2C products in the building
Building product disclosure and optimisation – Environmental Product Declarations (EPD)	1–2	Option 1: dependent on the number of products with EPDs Option 2: dependent on the proportion of products with EPDs in the (total) material costs
Building product disclosure and optimisation – sourcing of raw materials	1–2	Option 1: dependent on the highest possible number of C2C products used, from at least five manufacturers Option 2: dependent on the proportion of C2C products in the material costs
Building product disclosure and optimisation – material ingredients	1–2	Option 1: dependent on the number of C2C products used Option 2: dependent on the proportion of C2C products in the material costs
PBT source reduction – lead, cadmium and copper	1–2	Dependent on the specification texts with sustainability/ C2C requirements

LEED and Schüco

The LEED system is important for Schüco because building certifications are increasingly required internationally for high-value properties. As the market leader, LEED sets the standards for green building certification. The verified Schüco products help achieve a high quality of distinction. Schüco supports architects, investors and fabricators with detailed documentation for design, product selection and providing LEED verification.

LEED and Cradle to Cradle

The evaluation is based on the LEED for Building Design and Construction v4 system. LEED v4 was a thorough modernisation of the system in 2013 which put the aim of sustainable resource use back into the foreground. Cradle to Cradle certificates are currently directly used as proof for one criterion. For many other criteria, the positive properties and available data from the certification of certified products help achieve this.

[MR] Building life-cycle impact reduction

This criterion focuses on preventing a negative environmental impact resulting from the use of new construction materials. It primarily looks at the reuse of building components and products. New building products can make a positive contribution beyond the life cycle assessment of the building structure (Option 4).

Option 4:

Whole-building life-cycle assessment

3 credits

The life-cycle assessment takes into account the environmental impact of a building over its entire life cycle (60 years under LEED), including maintenance. The life cycles of the load-bearing structure and building envelope are assessed and compared with a reference building. If the project is at least 10% below the reference value in at least three categories of environmental impact, the credits are applied. Global warming potential must be one of the categories in which the project achieves better values than the reference building.

Influence of Schüco C2C products

C2C-certified products from Schüco have a smaller environmental impact caused by manufacturing than comparable products, for example through the use of renewable energy. All Schüco products have an EPD, which quantifies the life cycle impact. This information can be used directly in the building's life cycle assessment.

In contrast to comparable products, C2C products are lower than at least three of the life cycle assessment characteristics.

Frame of reference

Building life cycle (60 years), including manufacturing, usage, maintenance and end of life cycle. The load-bearing structure and building envelope are taken into account.

There is currently no conclusive clarification from the USGBC of how LEED is to be depicted at the end of the life cycle (life cycle assessment Module D). A decision is expected for 2018. It is clear that C2C-certified products can largely be recycled and therefore have a smaller environmental impact than non-recyclable comparable products in Module D, which are documented in the EPD and can be considered in the assessment in future.

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

This criterion rewards the use of raw materials extracted in an ecologically or socially sustainable way. Points can be added up.

Option 1: Raw material source and extraction reporting

1 credit

The use of at least 20 permanently installed products from at least five different manufacturers who have published a report on their raw material suppliers containing at least the following information is considered.

- Raw material extraction sites
- Agreements about resource-conserving action at the quarrying site and during the production process

Self-declarations are credited at half the value, whereas CSR reports verified by third parties in accordance with established guidelines are credited in full. Reports must be current and cover at least 90% of the raw materials in the product in question.

Influence of Schüco C2C products

Each certified Schüco product has a self-audit in accordance with the UN Global Compact, which makes statements about the required content (differs for each product). Schüco also carries out annual reporting in accordance with the Global Reporting Initiative.

Option 2: Leadership extraction practices

1 credit

The use of products that fulfil certain sustainability properties is evaluated. The costs of the products are calculated and related to the overall material costs of the project. If at least 25% of the overall material costs for products with sustainable properties is used, the point is awarded.

- Recycled materials:
(weighting = 50% pre-consumer; 100% post-consumer)
The weight proportion of the recycled material in the product is crucial and is related to the product costs
- Enhance manufacturer responsibility:
one example of this is take-back programmes (weighting = 50%)
- Other (not currently applicable to Schüco C2C):
bio-based materials, FSC-certified timber products, recycled materials

The load-bearing structure and building envelope must not account for more than 30% of the verified product costs. Products manufactured within a radius of 160 km of the project count for double. No product can be recognised at more than 200% of its actual costs.

Influence of Schüco C2C products

The C2C products have the required information about recycling quotas and place of manufacture (differs for each product). They can be applied accordingly. Schüco has also demonstrated greater responsibility as a manufacturer through its involvement in aluminium recycling initiatives.

Frame of reference [Option 2]

Total material costs of the construction product.

Pre-consumer vs. post-consumer

Pre-consumer means that the material is already recovered during the manufacturing process (example: metal swarf).

Post-consumer refers to traditional recycling: the recovery and reuse of materials after the correct first usage cycle of the product.

[MR] Building product disclosure and optimisation – material ingredients

This criteria rewards the use of products whose chemical composition has been recorded systematically and in detail. In addition, the use of products in which problematic substances have been minimised is also rewarded.

Option 1 and Option 2 are and/or. A maximum of two points can therefore be achieved.

Frame of reference [Option 2]

Overall costs of all permanently installed construction products and components (see LEED Reference Guide).

Option 1: Material ingredient reporting

1 credit

At least 20 products from five different manufacturers, for which a chemical analysis must to 1000 ppm has been carried out, must be used in the building. A C2C certificate at v2 Basic or higher or v3 Bronze or higher serves as proof.

Alternative proof: Health Product Declaration or a publication of the product composition on the basis of CAS numbers/GreenScreen v1.2.

Influence of Schüco C2C products

This credit can be fulfilled with all Schüco products in the C2C Bronze module. The advantage of this is that doors, façades and windows each have individual certificates, meaning that the required 20 products are achieved more quickly. All C2C Silver products from Schüco likewise fulfil the requirement.

Option 2: Material ingredient optimisation

1 credit

At least 25% of the costs of permanently installed products must be applied for such products which fulfil the following requirement: valid C2C certificate above level v2 Gold or v3 Silver (costs may be applied at 100%). The costs may be charged at 150% for v2 Platinum and above v3 Gold.

Alternative proof: GreenScreen v1.2 benchmark (no substances in the "Benchmark 1 hazards" pollutant class, or REACH conformity and no SVHC substances on the REACH candidate list).

Influence of Schüco C2C products

Schüco C2C products at Silver level contribute to the fulfilment at their full cost.

[MR] PBT source reduction – lead, cadmium and copper

The aim is to avoid persistent (durable), bioaccumulative toxic materials in construction products and thereby protect human health.

2 credits (healthcare usage profile)/

1 credit (all others, as innovation credit)

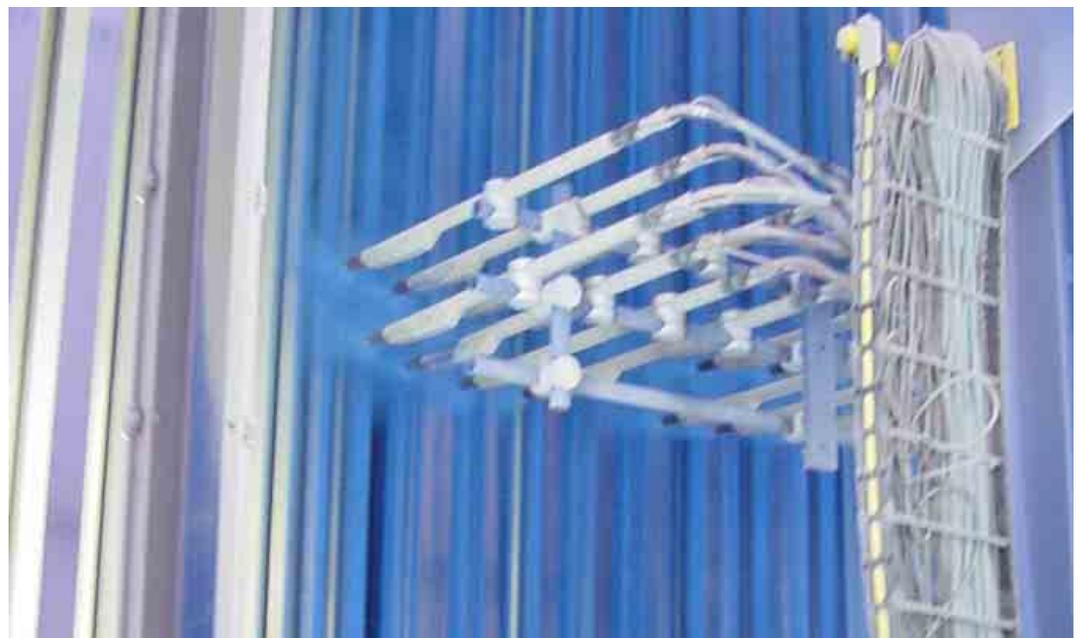
The project's compliance with strict criteria on the use of lead and cadmium is evaluated. These substances must be substituted as far as possible. The requirement must be established in the specification documentation.

Influence of Schüco C2C products

Cadmium and lead are relevant for colour coatings on windows, façades, doors and roof systems from Schüco. Investigations into lead and cadmium and partial substitutions have been carried out for Schüco C2C products.

Schüco makes specification easier for developers with sample specification texts. With templates for specifying C2C construction products that have no or minimal lead and cadmium content, the requirement can be met.

Schüco offers a wide range of cadmium and lead-free surface treatments, such as powder coating.



[MR] Building product disclosure and optimisation – Environmental Product Declarations (EPD)

The criteria focus on the use of construction products for which life cycle data is available. The aim is to promote construction products whose environmental, economic and social impact have been investigated and optimised by the manufacturer. Points can be added up.

Frame of reference

Number of construction products (Option 1) or proportion of installed construction products with an EPD in the overall material costs of all permanently installed construction products and components (see LEED Reference Guide).

Option 1: Environmental Product Declarations (EPD)

1 credit

For the use of 20 different construction products with Environmental Product Declarations (EPDs), one credit is awarded. Products from at least five different manufacturers must be documented.

The following applies:

- Product-specific EPD as a self-declaration without verification from an independent third party can be applied at 25%.
- Cross-industry or cross-association (i.e. generic) EPDs count at 50%. There must be proof that the manufacturer was involved in producing the generic EPD.
- Product-specific EPDs in accordance with ISO 14025 Type III count at 100%.

Influence of Schüco C2C products

All Schüco aluminium products have a Type III EPD verified by a third party. They can be directly used as verification and credited at the full amount.

Option 2: Multi-attribute optimisation

1 credit

It must be demonstrated for the construction products used that they are below the generic, industry-wide average values in at least three of the following categories:

- GWP (CO₂ equivalents)
- ODP (CFC 11)
- AP (SO₂)
- EP (PO₄)
- POCP (C₂H₄)
- PEnr (MJ)

The costs of the products are calculated and related to the overall material costs of the project. If at least 50% of the overall material costs for products with a small environmental impact is used, the point is awarded.

The load-bearing structure and building envelope must not account for more than 30% of the verified product costs. Products manufactured within a radius of 160 km of the project count for double. No product can be recognised at more than 200% of its actual costs.

Influence of Schüco C2C products

For Schüco products with EPDs, the life cycle impact is quantified. Beyond the environmental impact listed in the EPD, it can be demonstrated that they are below industry-wide average values (listed in the Ökobau.dat for Germany).

Cradle to Cradle® in BREEAM building certification

More about BREEAM

For more information about BREEAM and the principles of the system, visit www.breeam.com

The BREEAM certification system

BREEAM, the world's first green building label, was developed in 1990 by BRE (Building Research Establishment) Group. BREEAM stands for Building Research Establishment Environmental Assessment Method. BREEAM focuses in particular on environmental topics and the whole life cycle of the building.

Since 1990 BREEAM usage profiles (schemes) for newbuilds, renovations, operation and other project types have been developed and regularly updated (most recently in 2016). By 2016, over 530,000 buildings in more than 70 countries had been evaluated with BREEAM.

Design of the system

The BREEAM system evaluates sustainability criteria in nine basic categories. The additional category "Innovation" acknowledges criteria that have been exceeded by awarding additional points.

- [Man] Management
- [Hea] Health and well-being
- [Ene] Energy
- [Tra] Transport
- [Wat] Water
- [Mat] Materials
- [Wst] Waste
- [LE] Land use and ecology
- [Pol] Pollution
- [Inn] Innovation

The weighting of the categories varies depending on the project type. A total of 110 credits can be attained. The evaluation uses the percentage fulfilment of the categories.

There are minimum requirements for each evaluation result.

Evaluation

BREEAM rating	% fulfilment
Outstanding	≥ 85 %
Excellent	≥ 70 %
Very Good	≥ 55 %
Good	≥ 45 %
Pass	≥ 30 %

BREEAM and Schüco

The BREEAM system enjoys a high level of international recognition and trust and is of particular significance for the British market. It is now also represented in the Netherlands, Scandinavia, Spain and Germany by National Scheme Operators.

Certified Schüco products provide excellent support for the aims of sustainable construction and with their comprehensive documentation they can also be used in BREEAM certification.



Category	Criteria	Credits*	Impact of C2C products
Materials			
Mat 01	Life cycle impacts	1–6	<p>Life cycle assessment option: dependent on the scope and significance of the overall project life cycle assessment.</p> <p>EPD option: dependent on the overall number of verified EPDs. Schüco can provide two of the required five EPDs.</p>
Inn	Mat 01 Life cycle impacts – exemplary performance	1	Dependent on the overall number of verified EPDs. Schüco can provide two of the required 10 EPDs.
Mat 03	Responsible sourcing of construction products	1–3	Dependent on the relative volume of the components, proportion of recycled material and an verifiable environment management system on the part of the recycling supplier.

BREEAM and Cradle to Cradle®

The evaluation is based on the BREEAM International New Construction 2016 system. The BREEAM 2016 version does not explicitly mention the Cradle to Cradle standard. However, the product information can be used in several criteria because of the good documentation available for the certified products.

[Mat 01] Life cycle impacts

The criteria rewards the use of recognised life cycle assessment methods in the designing of a building. The aim is to encourage the explicit consideration of environmental impact in the design. Environmental Product Declarations (EPDs) are likewise considered as a life cycle assessment at the product level.

Frame of reference

Life cycle assessment over 60 years in accordance with EN 15987:2011 or equivalent, or Environmental Product Declarations (ISO 14025 Type III) in accordance with EN 14025, EN 15804 or ISO 21930.

Life cycle assessment

1–5 credits

An investigation is carried out as to whether and to what extent recognised tools based on international standards are used for a project-specific life cycle assessment of the building. The scope of the life cycle assessment is compared with the BREEAM requirements for a meaningful life cycle assessment that supports the planning. The review includes what indicators are considered, whether geographically adjusted and current data is used, and the extent to which building components are included in the calculation. Depending on how the requirements are covered, up to five points are awarded.

Influence of Schüco C2C products

The C2C certified products have EPDs in accordance with internationally recognised standards and can be included in the calculation for project-specific life cycle assessment. They provide excellent support for the creation of a comprehensive project life cycle assessment.

EPD overfulfilment (Exemplary Level) in the Innovation category:

1 credit

Projects that are specified or installed with at least ten products with current EPDs receive one point, which is applied in the Innovation category. Only two EPDs per material group can be applied (see above).

Influence of Schüco C2C products

Every C2C-certified product from Schüco, like all Schüco aluminium products, has an EPD. Up to two Schüco EPDs in the Metals material group can be applied in order to attain the credits.

Environmental Product Declarations (EPDs)

1 credit

Projects that are specified or installed with at least five products with current EPDs (dependent on the project phase) receive one point, which is applied in the Innovation category.

Only two EPDs per material group can be applied. The material groups include wood and wood products, concrete and cement products, metals, stone or aggregate, concrete-based products, plaster, glass, plastic/polymers/colours/bitumen, etc., animal fibres/hides/cellulose and others. The only group currently of relevance to Schüco is the Metal group.

[Mat 03] Responsible sourcing of construction products

Negative environmental impacts and social consequences can be prevented to a large extent through the procurement of sustainably extracted construction materials and products.

Construction products and materials based on the categories of the RICS NRM are considered. The NRM (New Rules of Measurement) contain a classification system like DIN 276, which delineates component and cost groups. The system was developed by the Royal Institution of Chartered Surveyors (RICS), the British chamber for architects and engineers.

Responsible sourcing of construction products

1–3 credits

Certificates issued by BREEAM-recognised Responsible Sourcing Certification Schemes (RSCS) and the FSC certificate for sustainable wood or certified environment management systems on the part of recycled material suppliers can be used as proof for responsibly sourced materials. The certificates are evaluated at different levels by BREEAM. Each construction product is captured with real volumes or volume parameters and the appropriate certificate is recorded. It is possible to mathematically separate products into their components. The tool provided by BREEAM uses the specified certificates to calculate a volume-related total value for the project, which corresponds to up to three points.

Frame of reference

Volumes of all construction materials and products used. The NRM cost groups and cut-off criteria for small quantities that need to be considered are defined in the BREEAM Technical Manual.

Influence of Schüco C2C products

C2C-certified Schüco products have a large proportion of recycled material in the aluminium that is used (differs for each product). If products are procured from suppliers who have a certified environment management system for the aluminium recycling process, the Schüco products can be used to meet the criterion.