



## TEC1.6

# Circular construction



## Objective

Our goal is the highly economical handling of natural resources and their efficient utilisation. Accordingly, we promote solutions that allow value that has already been created to be reused without loss, where possible. Guided by an intent to use almost no primary resources for the construction and maintenance of buildings, we are committed to a strategy that aims to increase the current level of material efficiency: for the virtually loss-free recycling of materials - in conjunction with a significant reduction in the quantity of materials used. Thus, the criterion is aimed at one of the DGNB's most important concerns: to create an authentic circular economy that enables stakeholders and users to reduce the consumption of natural resources to a minimum, or ideally, to do without them altogether. The result is that the resources used continue to be available to the next generation to the greatest possible extent after the desired benefit has been achieved.

## Benefit

For building owners who implement a reduced use of materials in their buildings, lower costs can be realised even during construction. For the users, in turn, positive effects are to be expected during the operating phase - in some cases with significantly lower expenditure/costs for modernisation work and measures to improve the quality of life, for maintenance, repair, and in particular for measures involving conversion. The long-term objective of this criterion – which requires in-depth knowledge regarding the materials used in buildings – enables buildings to be seen as "raw material and component stores" and to be planned as a lucrative investment for one's own future.

## Contribution to overarching sustainability goals



## Outlook

The recycling paths of substance and material groups change continuously, e.g. due to process and operating costs, achievable prices, and the margins of the recycling paths. Recycling logistics and recycling plants are only being tested or built for a large number of material flows - with new technologies continuously under development. Achievable quotas are thus subject to constant adjustment.



## Share of the total score

	SHARE	IMPORTANCE FACTOR
Office   Education   Residential   Hotel	3.3%	3
Healthcare buildings		
Shopping centre   Commercial building	3.0%	3
Logistics   Production		
Assembly buildings		
Consumer market	2.7%	3

---




## EVALUATION

The criterion distinguishes whether a previous deconstruction can be assigned to the project. Different points can be achieved in the indicators with and without deconstruction. Circular construction can best be achieved if the potentials at the site are addressed at an early stage and targets are set with the building owners, with circular variant investigations carried out during the design phase. The actual performance achieved then becomes apparent during the execution, e.g. through the use of circular products, components, or elements. If product or material passports are used for documentation, or if components are dispensed with or reused components or products from "circular business models" are used, bonus points can be credited. At the overall building level, good documentation via a (digital) building resource passport is important. At this level it is also particularly relevant to actually achieve good "circularity ratios" of aggregated key metrics. Further bonus points can be credited if the building comes almost entirely from the circular economy or can potentially feed into the circular economy after use. A total of 120 regular points (without deconstruction) or 125 regular points (with deconstruction) are offered, of which a maximum of 100 regular points can go into the assessment, plus 55 bonus points.

### MINIMUM REQUIREMENTS

**FOR ALL BUILDINGS:** It must be demonstrated that circular aspects are taken into account during design and implementation. For this reason, as a minimum requirement regarding certifiability, dismantling instructions (indicator 3.2.3) must be submitted or the minimum score of 20 points for the entire criterion must be demonstrated.

**FOR PLATINUM CERTIFIED BUILDINGS:** For certifiability with the Platinum Award - if deconstruction has taken place in advance - a justification for the deconstruction (indicator 1.3.1) and (also applies to projects without deconstruction in advance) the minimum score of 40 points for the entire criterion must be demonstrated.

NO.	INDICATOR	POINTS PROJECT WITHOUT DECONSTRUCTION	POINTS PROJECT WITH DECONSTRUCTION
1	<b>Site and existing building analysis and preceding (partial) deconstruction</b>	max. 5	max. 20
1.1	<b>Analysis of the existing building and the site</b> The potentials of the site and the region (approx. 50 km radius) for circular construction (e.g. with the help of databases, on-site projects, platforms, etc.) are analysed in order to appropriately exploit the resources at the site and the nearby surroundings for the project.	max. 5	max. 5
1.2	<b>CIRCULAR ECONOMY BONUS - Conservation or use of existing buildings</b> Existing buildings are retained for the project, existing buildings are supplemented or extended, or significant existing components are used in the project.		 +10
1.3	<b>Variable indicator: deconstruction</b>		max. 15
1.3.1	<b>Variable indicator: Deconstruction - Justification and planning of deconstruction</b> In order to avoid deconstruction as far as possible, a fully formulated justification of the deconstruction requirement is available (minimum requirement platinum). As part of the planning of the deconstruction, the inventory of potentially removable	n.a.	5



components and building products, fixtures and furnishings is recorded and evaluated, the resulting masses are estimated in a material flow balance and, as part of an inventory analysis (construction diagnosis of hazardous materials), possible hazardous materials are systematically recorded and a hazardous materials concept is drawn up.

**1.3.2 Variable indicator: Deconstruction - Implementation of deconstruction**

When performing deconstruction, buyers of components and products with value are proactively sought. In addition, an inventory is drawn up showing all the masses and transport distances actually incurred (estimated). It must be shown that measures to optimise recycling and disposal concepts are being implemented. In addition, a significant part of the recommendations for renovation methods formulated in the hazardous material removal concept or equivalent measures defined for this purpose during the course of the deconstruction process will be implemented.

n. a. 10

**1.3.3 Variable indicator: Alternative forms of documentation via DGNB deconstruction certificate**

If a DGNB deconstruction certification is carried out, the fulfilment of defined resource and material-related indicators must be demonstrated.

n. a. 15

**1.3.4 CIRCULAR ECONOMY BONUS - Use of reclaimed elements or materials on site**



+2.5

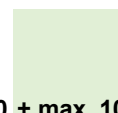
Materials or construction elements from the deconstruction or partial deconstruction carried out are used directly on site in the project to be certified.

<b>2 Circular construction - design phase</b>		<b>max. 15</b>	<b>max. 5</b>
<b>2.1 Definition of objectives and focal points</b>			
	Demand/design planning with circular objectives. Alternative: The design is created with the inclusion of existing components to be reused, which make a significant contribution to the overall mass of the building, or with the application of sufficiency principles.	5	1
<b>2.2 Project-based circular design concepts</b>			
<b>2.2.1 Circular planning in early phases:</b>	Circular variants/design concepts are developed in early project phases (basic assessment, definition of needs, site assessment, preliminary planning or design planning) and are incorporated into the decision-making process for the project.		
	<ul style="list-style-type: none"> <li>Variants are developed in at least four thematic fields (see method) and evaluated and compared qualitatively or quantitatively with regard to their effectiveness with regard to the circular economy. Alternative: The use of circularity balance sheets or circularity indices for optimisation is demonstrated as part of early planning.</li> </ul>	5	2
<b>2.2.2 Circular planning in approval planning and detailed design:</b>	In subsequent project phases (approval, implementation, works planning), circular variants/concepts are developed and flow into the decision-making process for the project.		
	<ul style="list-style-type: none"> <li>In at least four thematic fields (see method), variants are evaluated and compared qualitatively or quantitatively with regard to their effectiveness in terms of circular economy. Alternative: The use of circularity balance sheets or circularity indices for optimisation will be demonstrated in later phases of the project. As a result of the</li> </ul>	5	2




application of tools, a building resource passport is created for the design phase. Variants or the application of tools are evaluated in parallel with regard to climate impact and costs.

<b>3</b>	<b>Circular construction - implementation and documentation</b>	<b>max. 95</b>	<b>max. 95</b>
<b>3.1</b>	<b>Description of circular building properties</b>		
<b>3.1.1</b>	<b>Transparency by means of the building resource passport</b>	<b>max. 50</b>	<b>max. 50</b>
	For the realised buildings, measurable key metrics are determined for the current contribution to the circular economy and valid information with regard to future circularity. Key metrics and information are determined in accordance with the specifications in the "DGNB Building Resource Passport".		
	<ul style="list-style-type: none"> <li>■ The documentation is produced in the form of a "Reduced Building Resource Passport".</li> <li>■ The documentation is produced in the form of a "Complete Building Resource Passport".</li> </ul>	35	35
		50	50
<b>3.2</b>	<b>Assessment of realised circularity properties</b>	<b>max. 15</b>	<b>max. 15</b>
<b>3.2.1</b>	<b>Realised circularity quotas at building level</b>		
	For the realised building, quotas rated as high are achieved for defined key metrics, meaning a high circularity.		
	<ul style="list-style-type: none"> <li>■ For all key metrics (see method), "moderate target quotas" are achieved at building level.</li> <li>■ For at least two defined key metrics (see method), "high target quotas" are achieved at building level.</li> </ul>	10	10
		15	15
<b>3.2.2</b>	<b>Use of circular products at component level</b>	<b>max. 25</b>	<b>max. 25</b>
	When applying the "detailed procedure" with * P <sub>max</sub> (procedure 1), the following maximum total number of points can be achieved for the products comply with the basic requirement for pollutants (ZE01 = QS4) when installed in the building, depending on the demonstrated circular quality level:		
	<ul style="list-style-type: none"> <li>■ Use of products with quality level 4 (QS4)</li> </ul>	<b>max. 25</b>	<b>max. 25</b>
.....	<ul style="list-style-type: none"> <li>■ Use of products with quality level 3 (QS3)</li> </ul>	<b>max. 20</b>	<b>max. 20</b>
.	<ul style="list-style-type: none"> <li>■ Use of products with quality level 2 (QS2)</li> </ul>	<b>max. 15</b>	<b>max. 15</b>
	<ul style="list-style-type: none"> <li>■ Use of products with quality level 1 (QS1)</li> </ul>	<b>max. 10</b>	<b>max. 10</b>
	When applying the "simplified procedure" without * P <sub>max</sub> (procedure 2), the following maximum total number of points can be achieved for the products that comply with the basic requirement for pollutants (ZE01 = QS4) when installed in the building:		
	<ul style="list-style-type: none"> <li>■ Use of all assessed products</li> </ul>	<b>max. 20</b>	<b>max. 20</b>
<b>3.2.3</b>	<b>CIRCULAR ECONOMY BONUSES - Reuse, material-appropriate building construction, avoidance of material mixing, structural fixtures</b>		
	<b>Re-use or recycling:</b> Reused or recycled components are used. The assessment	<b>+ max. 10</b>	<b>+ max. 10</b>





	takes place within the context of the application of indicator 3.1.1.		
	<b>Pollution prevention:</b> The use of material-appropriate building construction avoids the use of harmful substances. One bonus point can be scored per product/component.	+ max. 5	+ max. 5
	<b>Material mixture or material layering:</b> Structures with material mixing or material layering are avoided. One bonus point can be scored per product/component.	+ max. 5	+ max. 5
	<b>Circular structural fixtures:</b> Circular aspects are implemented in the structural fixtures (KG 370).	+2.5	+2.5
<b>3.3</b>	<b>Minimum requirement: Conversion, alteration and deconstruction instructions</b>	<b>max. 5</b>	<b>max. 5</b>
	<ul style="list-style-type: none"> <li>■ There is a detailed description as to how the building can be reused, converted, and deconstructed.</li> <li>■ A detailed description as to how the building can be converted and deconstructed is available for the building; conversion is not considered.</li> </ul>	5	5
		3	3
<b>3.4</b>	<b>CIRCULAR ECONOMY BONUSES - Circular Construction and Aggregated Circularity Assessment</b>		
			
<b>3.4.1</b>	The building (building frame - KG 300) <b>consists almost entirely</b> of components, products, or materials and building materials that originate from the <b>circular economy</b> . <b>Circularity sub-indicator: Circular material origin - implemented closed-loop recycling &gt; 90%</b>		<b>+ 5</b>
<b>3.4.2</b>	The building (building frame - KG 300) is designed in such a way that it can be described as <b>almost completely separable, can be fed almost entirely into the circular economy</b> , and, according to the assessment of DGNB criterion ENV1.2, can be described as <b>low-polluting or low-risk</b> with regard to all substances that restrict subsequent use or recycling. Non-detachable or difficult to detach bondings or sealants and non-detachable composites (without manufacturer's return declaration) will not be installed. <b>Circularity sub-indicator: Circularity - post-use pathways &gt; 90 Mas-%</b>		<b>+5</b>
<b>3.4.3</b>	For the assessment of the circularity of the implemented building, a quantitative assessment tool is applied to determine an <b>aggregated circularity index</b> . The applied tool fulfils the requirements of the DGNB for meaningful circularity assessments (see method). The tool, which enables a quantitative assessment of circularity at the overall building level, is applied to the documentation and evaluation of the completed building and the results are documented in the "Complete Building Resource Passport". The result of the application is a "good" to "very good" rating - defined via the method.		<b>+10</b>



## SUSTAINABILITY REPORTING

The following information can be taken as key metrics/KPIs from the application of the criterion.

NO.	KEY METRICS/KPIS	UNIT
KPI 1	Area share of preservation of existing building	[%]
KPI 2	Mass of materials accrued during deconstruction	[kg]
KPI 3	Percentage by mass of materials produced during deconstruction that were reinstalled directly on site/in the building	[%]
KPI 4*	Building resource passport is available (machine-readable and evaluable)	[yes/no]
KPI 5*	Circularity sub-indicator: Circular material origin achieved - Closed-loop recycling implemented	[%]
KPI 6*	Circularity sub-indicator: Achieved recyclability - post-use pathways	[%]
KPI 7*	Total mass of construction and demolition waste	[kg/m <sup>2</sup> GFA]
KPI 8*	Quota achieved for circular recycling paths for construction and demolition waste	[%]
KPI 9	Aggregated circularity index (with indication of method)	[UNIT AS PER INDEX]



## APPENDIX A - DETAILED DESCRIPTION

### I. Relevance

The core element of the approach is to create the best foundations for the transition from a linear economy to a circular economy from the beginning of the project - including any previous deconstruction, if applicable - starting with a site analysis, through to design, implementation, and documentation. The enormous amount of resource use by the construction and real estate sector must be minimised and transferred into closed-loop cycles that are as loss-free as possible. The criterion probably already draws on upcoming regulatory developments and prepares the stakeholders accordingly.

Due to the high average life expectancy of structures and building components, many of materials installed today will only occur as demolition materials or potential waste in 50 or 100 years' time. The construction sector is therefore a kind of large man-made "interim storage" solution. It is therefore an important resource for future construction materials and should not serve as temporary landfill for future waste. The aim of increasing degradability and recyclability is to conserve natural resources and prevent waste, in particular by reducing its quantity and harmfulness (cf. KrWG § 6 ff.).

### II. Additional explanation

### III. Method

The criterion is divided into three overarching indicators:

**Indicator 1: Site and existing building analysis and preceding (partial) deconstruction**

**Indicator 2: Circular construction - design phase**

**Indicator 3: Circular construction - implementation and documentation**

Scope of the criterion: The structure and the elements of the technical building systems that are also determined and considered in the LCA/life cycle greenhouse gas balance (cost group 300 components and parts of the 400 cost group defined in DIN 276) are to be considered. See Appendix 1 for details.

**Indicator 1: Site and existing building analysis and preceding (partial) deconstruction**

**Indicator 1.1: Analysis of the existing building and the site**

The potential of the site and the region (approx. 50 km radius) for circular construction is recorded as part of a site analysis. This includes, for example, searching adequate databases and platforms to identify components for reuse, contacting authorities to identify planned deconstruction projects, or contacting construction projects directly on site. The aim is to exploit resources from the circular economy or locally available building materials without a high vertical range of manufacture, which originate locally or from the nearby surroundings, for one's own project. Research results can be submitted as evidence.





### **Indicator 1.2: CIRCULAR ECONOMY BONUS: Preservation or use of existing buildings**

If existing buildings are retained for the project, if the new construction project is an addition to or extension of an existing building, or if significant existing building components are reused or continued in the project, points can be credited in this indicator. For this purpose, it must be demonstrated that the preservation of the existing building is of a substantial extent, i.e. that at least 50% of the building is preserved in terms of area. The preserved masses must be estimated and communicated to the DGNB in a suitable form (e.g. in the Building Resource Passport). Alternatively, mass or volume data or suitable physical quantities can be used as evidence of materiality corresponding to the area-based materiality described above.

### **Variable indicator 1.3: Decision-making basis for the inclusion of deconstruction in the system boundary for the certification**

The variable indicators are to be applied and are part of the criterion (the system boundary) if the following statements apply or a (partial) deconstruction is to be carried out on the basis of the DGNB deconstruction certificate:

- (Partial) deconstruction is planned or has already been carried out.
- The building owner of the new building commissions the (partial) deconstruction.

If a DGNB deconstruction certification is carried out, this can be submitted as alternative evidence for indicators 1.3.1 and 1.3.2 in indicator 1.3.3. The provisions of the indicator must be observed.

If at least one of the following statements is true, deconstruction will not be considered in the context of new building certification (and the corresponding variable indicators can be "deactivated" or the "points without deconstruction" can be recognised):

- At the time of acquisition (not takeover), a (partial) deconstruction has already been completed. This was not the responsibility of the current owner.
- The building owner acquires a plot of land with a partially deconstructed building and no further deconstruction activities take place.
- A (partial) deconstruction has taken place at least two years before the building application.

### **Variable indicator 1.3.1: Deconstruction - justification and planning of deconstruction requirements**

Justification for the deconstruction: In order to avoid deconstruction as far as possible, a detailed justification of the need for deconstruction is required. In particular, an explanation must be provided as to why deconstruction is preferred to the continued use of the existing building stock. If there are no technical reasons (fire protection, pollutants, etc.), a differentiated comparison of ecological and economic aspects of the deconstruction (or partial deconstruction) and preservation options must be drawn up. If a deconstruction takes place or has taken place that is outside the influence of the commissioning party of the new construction, corresponding proof of the "elimination" of the variable indicator must be enclosed. Method: analogous to deconstruction certificate PRO1-R (indicator 1).

Inventory of potentially extendible building components and construction products, fixtures and furniture: An inventory of potentially expandable components and construction products, fixtures, and furnishings is available. The inventory is a list of all potentially extendible building components and construction products, fixtures and furnishings. The list can be drawn up on the basis of random samples. Method analogous to DGNB deconstruction certificate ECO2-R (indicator 1) or according to DIN SPEC 91484 (status April 2023: publication planned).

In addition, an assessment of the established inventory of potentially extendible components and construction products, fixtures and furnishings must be prepared. For each item in the inventory, indicate whether the resource is functional and in good condition and therefore has a value. Method analogous to deconstruction certificate ECO2-R (indicator 2).

Inventory checklist:

- An inventory of potentially expandable components and construction products, fixtures, and furnishings is available.



- An assessment is made of the established inventory of potentially extendible components and construction products, fixtures and furnishings.

Material flow balance: Prior to the start of deconstruction, an estimate of the masses to be generated during deconstruction shall be made. The value shall be determined on the basis of the waste fractions according to GewAbfV § 8 Para. 1. The estimate of the masses is made on the basis of measurements on the building (gross volume), supplemented, if necessary, by plan analyses and a visual inspection. In addition, a project-specific estimate of the transport distances to be expected for recycling or disposal is made prior to the start of deconstruction. Methods analogous to deconstruction certificate ENV1-R and TEC1-R (indicator 1/estimates).

Building diagnosis of hazardous substances/systematic recording of hazardous substances in a hazardous substances register

The building is inspected within the scope of an analysis of existing buildings with regard to all listed hazardous substance groups. The result is documented by an expert on pollutants in buildings, in the form of a hazardous substances report and a hazardous substances register. Method analogous to deconstruction certificate ENV2-R indicator 1. If no hazardous substances are found, the requirement is considered fulfilled.

In addition, a comprehensive hazardous materials removal concept must be drawn up on the basis of the hazardous substances construction diagnosis, prior to commencement of the deconstruction work. Method analogous to deconstruction certificate ENV2-R indicator 2.

Building diagnosis checklist:

- The building is inspected within the scope of an analysis of existing buildings with regard to all listed hazardous substance groups.
- On the basis of the hazardous substances construction diagnosis, a comprehensive hazardous substance removal concept is drawn up before deconstruction work commences

### **Indicator 1.3.2: Variable indicator: Deconstruction - Implementation of deconstruction**

Search for purchasers of elements of value from deconstruction: A list is compiled of all possible buyers (e.g. new construction projects in the region, subsequent new construction at the site, component exchanges, etc.) for the items listed in the inventory (according to indicator 1.4.1) that have value. In addition, a proactive search is carried out and contact is made with potential buyers (e.g. offer, planning of removal, and handover of components, etc.). Method analogous to deconstruction certificate ECO2-R Indicator 3.

Inventory of the masses and transport distances actually incurred during deconstruction: After deconstruction, an inventory is drawn up showing all the masses actually incurred. These are recorded on the basis of the waste fractions pursuant to GewAbfV § 8 para. 1. In addition, the actual transport distances for recycling or disposal are documented after deconstruction. Method analogous to deconstruction certificate ENV1-R Indicator 1.2.

Optimisation of recycling and disposal paths: Measures to optimise recycling and disposal paths are implemented. As proof of the optimisation, the recycling and disposal routes actually used are compared with the recycling and disposal paths that are usually chosen according to the current state of the art. An index is used to prove that an actual optimisation of the recycling and disposal paths has taken place (index < 1). Method analogous to deconstruction certificate TEC1-R Indicator 2.

Implementation of the hazardous substance removal concept: A substantial part of the recommendations for removal methods formulated in the hazardous substance removal concept, or equivalent measures defined for this purpose in the course of the deconstruction process, are implemented. If no hazardous substances are found, the full number of evaluation points can be credited for the indicator. Method analogous to deconstruction certificate ENV2-R Indicator 3.



### **Variable indicator 1.3.3: Alternative forms of documentation via a DGNB deconstruction certificate**

If a DGNB deconstruction certification is carried out, the fulfilment of defined, resource and material-related indicators must be demonstrated: PRO1-R (indicator 1), ECO2-R (indicator 2), ENV1-R and TEC1-R (indicator 1/estimates), ENV2-R (indicator 1), ECO2-R: indicator 3 (search for buyers), ENV1-R indicator 1.2 (inventory), TEC1-R indicator 2 (optimisation), ENV2-R indicator 3 (implementation of hazardous substance removal concept).

## **Indicator 2: Circular construction - design phase**

### **Indicator 2.1: Definition of objectives and focal points**

Within the context of requirements planning and/or design planning (by SP 4 at the latest), an examination of circular strategies takes place and objectives or focal points of the project are defined. For this purpose, the checklist in the DGNB publication entitled "In Focus: Circular Construction" is used, for example.

In early planning phases (by SP 4 at the latest), project-specific target quotas to be achieved are stipulated for important circularity aspects (circularity sub-indicators), which clearly exceed the current state of the art (see indicator 3.2.2).

- **Primary raw materials avoided:** Key metric Total mass or mass-% of primary material saved compared to a project-specific defined standard design. Only primary raw materials can be included in the key metric - in the case of a percentage recycling share in the material, only the secondary raw material share can be applied. The key metric is part of the DGNB's Building Resource Passport.
- (Circular) material origin - implemented circularity: Sum of realised reuse rate (mass-% reuse), realised recycling rate (mass-% recovered materials - without thermal material recovery) and realised use of renewable raw materials (mass-%). The key metric can be taken from the DGNB's Building Resource Passport.
- **Reduction and recycling of construction and demolition waste from the construction project:** Total mass related to GFA and quotas of circular recycling paths - realised mass % construction (and demolition) waste for reuse and realised mass % for recycling (without thermal recovery). The key metric can be taken from the DGNB's Building Resource Passport.
- **Circularity - post-use pathways:** Sum of circular post-use pathways (defined from the current state of the art) for the materials in the building as the sum of reusable and recyclable materials (mass %, without thermal recovery). The key metric can be taken from the DGNB's Building Resource Passport.

Alternatively, the points can be achieved if the design is already created with the inclusion of existing building parts, structural elements or components to be reused, which make a significant contribution (greater than 20 mass %) to the total mass of the building (alternative reference values such as areas are possible to show the contribution), e.g. by omitting standard installed building or structural elements or components, or through reduced (area) offerings.

### **Indicator 2.2: Project-based circular design concepts**

**Circular design in early phases:** In early project phases (determination of basic principles, definition of needs, site assessment, preliminary planning or design planning) circular design concept/variants are developed and incorporated into the decision-making process for the project.

**Circular planning in approval planning and detailed design:** In later project phases (approval phase, execution phase, works planning), circular concepts/variants are developed and flow into the decision-making process for the project.

Variants are evaluated and compared qualitatively or quantitatively with regard to their effectiveness on the circular economy. Possible topic areas for variants/design concepts (not an exclusive list, taken from DGNB brochure entitled



"In Focus: Circular Construction" (2022)):

Protecting resources and valuing existing resources:

- Avoid resource consumption
- Preserve existing buildings
- Use existing buildings as a source and store of materials

Make intensive use of recyclable materials, operate without waste:

- Use recycled materials
- Avoid waste generation

Secure value in the long term:

- Consider the environmental and health-related aspects of materials
- Ensure long-term usability and recyclability
- Ensure durability and intensive use over the entire service life
- Prepare relevant information adequately and keep it available in the long term

Alternatively, points can be achieved by demonstrating the use of circularity balancing sheets or circularity indices for optimisation during early design or in later project phases. As a result of the application of such tools, a building resource passport is created for the design.

Variants or the application of tools are evaluated qualitatively or quantitatively in parallel with regard to climate impact and costs. For this purpose, e.g. life cycle assessments and/or life cycle cost calculations during the design phase, and/or adequate (level(s) - "Level 1"-compliant) qualitative assessments regarding pollutants and hazardous substances are carried out.

### **Indicator 3: Circular construction - implementation and documentation**

#### **Indicator 3.1: Description of circular building properties**

##### **Indicator 3.1.1: Building Resource Passport**

A building resource passport in accordance with DGNB specifications will be created for the realised building. This identifies structured and measurable information and key metrics for the current level of circular economy and use, and valid information on future circularity.

If a "Reduced Building Resource Passport" (requirements according to the DGNB Building Resource Passport: provision of less information and key metrics, and use of simplified methods) is provided at building level, fewer points are recognised than if all information and key metrics of the Building Resource Passport are provided and documented based on the "full" version. The "full building resource passport" must have at least the scope/system boundaries of the LCA (KG 300 and partial coverage of KG 400 - see criterion ENV1.1), otherwise it is assigned to the reduced passport and assessed accordingly.

##### **Indicator 3.2: Assessment of realised circularity properties**

###### **Indicator 3.2.1: Realised circularity quotas**

For the realised building, the following key metrics/circularity sub-indicators (ideally substantiated with target quotas in indicator 2.1) are defined as high quotas for circular aspects or high qualitative ratings (above the current state of the art), and as such, a high circularity is achieved. The following key metrics/circularity sub-indicators (which can be taken from the Building Resource Passport) are applicable (for details on the determination, see Indicator 2.1):

- Primary raw materials avoided
- (Circular) material origin - Closed-loop recycling implemented
- Reduction and recycling of construction and demolition waste
- Circularity - post-use pathways



Table 3: Target quotas for key circularity metrics/sub-indicators

KEY METRIC/INDICATOR	CALCULATION RULE	MODERATE TARGET QUOTA	HIGH TARGET QUOTA
(Circular) material origin - Closed-loop recycling implemented	Sum of realised recycling quota (mass-% reuse), realised material recovery rate (mass-% recovered materials without thermal recovery) and realised use of renewable raw materials (mass-%)	20%	50%
Reduction and recycling of construction and demolition waste	Total mass related to GFA and quotas of circular recycling paths - realised mass % construction and demolition waste for reuse, realised mass % construction and demolition waste for material recovery (without thermal recovery) - non-hazardous fraction	At least slightly (at least 5%) reduced total mass compared to project-specific standard design and moderate rate of circular recycling of construction and/or demolition waste of 80%	At least moderately (at least 10%) reduced total mass compared to project-specific standard design and high rate of circular recycling of construction and/or demolition waste of 90%
Circularity - post-use pathways	Proportion of all materials in the building with circular reuse paths (defined from the current state of the art): reusable and recyclable materials as well as compostable materials (mass %, without thermal recycling)	80%	90%

For the evaluation, the quotas according to Table 3 are to be used. For the moderate quotas, statistical data, evaluations of samples or recognised sources can alternatively be used if individual quotas are to be claimed for specific building types in order to meet the specified moderate target quotas. Points can be scored if the key metrics are shown to exceed the moderate or high values for the project.

Note on calculation: Reused or recycled components or products made from renewable raw materials are to be assigned to the "reuse" or "recovery" categories. Only primary (first-use) renewable raw materials are assigned to the "Renewable raw materials" group. For further details see "DGNB Building Resource Passport".

For the "Primary raw materials avoided key metric (total mass or mass-% of primary material saved compared to a project-specific defined standard design key metric), a quota determined on a project-specific basis can be applied. Only primary raw materials can be included in the key metric - in the case of a percentage recycling share in the material, only the secondary raw material share can be applied. The key metric is part of the DGNB's Building Resource Passport.



### Indicator 3.2.2: Use of circular products at component level

The assessment is divided into two main steps: Step 1 requires a classification of product properties (in the criterion, "products" is a synonym for materials, products, components, or building systems) into circular quality levels. This is performed either in advance, e.g. in the DGNB Navigator, or can be carried out by the auditor himself, if adequate product information is provided. Products can be classified into four circular quality levels (QS1 to QS4). The higher the quality level, the higher the rating. For all assessed products, the basic requirement for pollutants (ZE01 = QS4) is fulfilled.

Step 2 then provides the reference for use in the building. The higher the mass-share of the assessed products at component level and in the building, the higher the rating. The assessment of the use of circular products can be carried out via a "Detailed" or "Simplified" procedure, or as a combination of both. The detailed procedure is based on mass balance sheets and quantitatively assesses the use of circular products at component level (KG 3. Level) or sums of components. The simplified procedure is based on a simple assignment of circular products to components (KG 3. Level). Fewer points can be achieved in the simplified procedure.

#### Step 1: Definition and evaluation of circular product properties

The following circular properties (ZE) are assessed:

Table 1 Basic requirement for pollutants:

CIRCULAR PROPERTY (ZE)	WEIGHTING ZA	CIRCULARITY ATTRIBUTE (ZA)	POINTS PER QUALITY LEVEL	
ZE01: Contained hazardous substances	1	(1) The product contains SVHC substances > 0.1 mass percent	QUALITY LEVEL	POINTS
			Yes	0
			No	1
	1	(2) The product contains substances with a harmonised classification as category 1A or 1B carcinogenic (Carc. 1A/Carc. 1B) according to CLP VO > 0.1 mass per cent	QUALITY LEVEL	POINTS
			Yes	0
			No	1
	1	(3) The product contains substances with a harmonised classification as CMR 1A or 1B according to CLP VO > 0.1 mass %	QUALITY LEVEL	POINTS
			Yes	0
			No	1



1

(4) The product contains restricted substances that could exceed the limits set out in Annex XVII or in the REACH Regulation, in relation to the specific use relevant to that product.

QUALITY LEVEL	POINTS
Yes	0
No	1

Note on all ZE attributes (ZE01): The REACH Regulation serves as the basis for determining the requirements. The REACH Regulation does not recognise a product. The scope of consideration includes substances, substances in mixtures or substances in articles. If a product is composed of products and one of them exceeds the limit value, the requirement for the product shall be considered not fulfilled. E.g., the product window consists of the (individual) products: Frame, glass pane, seal, fitting, insulation etc.

Table 2 Circularity properties:

WEIGHTING ZE	CIRCULAR PROPERTY (ZE)	WEIGHTING ZA	CIRCULARITY ATTRIBUTE (ZA)	POINTS PER QUALITY LEVEL																
1	ZE02: Post-consumer recycled content	1	(1) Mass share of recycled material after consumption (post-consumer recycled material)	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>&lt; 1%</td> <td>0</td> </tr> <tr> <td>&gt; 1 - 10%</td> <td>0.1</td> </tr> <tr> <td>&gt; 10 - 25%</td> <td>0.25</td> </tr> <tr> <td>&gt; 25 - 50%</td> <td>0.5</td> </tr> <tr> <td>&gt; 50 - 75%</td> <td>0.75</td> </tr> <tr> <td>&gt; 75 - 95%</td> <td>0.95</td> </tr> <tr> <td>&gt; 95%</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	< 1%	0	> 1 - 10%	0.1	> 10 - 25%	0.25	> 25 - 50%	0.5	> 50 - 75%	0.75	> 75 - 95%	0.95	> 95%	1
QUALITY LEVEL	POINTS																			
< 1%	0																			
> 1 - 10%	0.1																			
> 10 - 25%	0.25																			
> 25 - 50%	0.5																			
> 50 - 75%	0.75																			
> 75 - 95%	0.95																			
> 95%	1																			
1		1	(2) Any chemical substance in the recycled material after consumption (post-consumer recycled material) is reported if accounting for more than 10% by weight.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1										
QUALITY LEVEL	POINTS																			
No	0																			
Yes	1																			
1		1	(3) Any chemical substance in the recycled material after	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS														
QUALITY LEVEL	POINTS																			



			consumption (post-consumer recycled material) is reported if accounting for more than 1% by weight.	<table border="1"> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </table>	No	0	Yes	1		
No	0									
Yes	1									
1			(4) The recycled content after consumption (post-consumer recycled material) does not contain any hazardous substances (= does not contain SVHCs according to the REACH Regulation) at a concentration of more than 0.1% by weight.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1
QUALITY LEVEL	POINTS									
No	0									
Yes	1									
1	ZE03: Ease of maintenance and repair	1	(1) The product does not require maintenance or repair if the intended use of the product is observed.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1
QUALITY LEVEL	POINTS									
No	0									
Yes	1									
1			(2) The product has been designed in such a way that maintenance or repair is possible throughout its service life.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1
QUALITY LEVEL	POINTS									
No	0									
Yes	1									
1			(3) The product can be serviced and repaired by untrained personnel at the product's place of use.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1
QUALITY LEVEL	POINTS									
No	0									
Yes	1									
1			(4) The product can be serviced and repaired by trained personnel at the product's place of use.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1
QUALITY LEVEL	POINTS									
No	0									
Yes	1									
1			(5) Consumables can be easily replaced by untrained personnel.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1
QUALITY LEVEL	POINTS									
No	0									
Yes	1									





		1	(6) Spare parts are provided by the manufacturer or an authorised representative during the product's service life.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1										
QUALITY LEVEL	POINTS																			
No	0																			
Yes	1																			
2	ZE04: Proportion of renewable raw materials	1	(1) Mass proportion of renewable raw materials in the product	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>&lt; 1%</td> <td>0</td> </tr> <tr> <td>&gt; 1 - 10%</td> <td>0.1</td> </tr> <tr> <td>&gt; 10 - 25%</td> <td>0.25</td> </tr> <tr> <td>&gt; 25 - 50%</td> <td>0.5</td> </tr> <tr> <td>&gt; 50 - 75%</td> <td>0.75</td> </tr> <tr> <td>&gt; 75 - 95%</td> <td>0.95</td> </tr> <tr> <td>&gt; 95%</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	< 1%	0	> 1 - 10%	0.1	> 10 - 25%	0.25	> 25 - 50%	0.5	> 50 - 75%	0.75	> 75 - 95%	0.95	> 95%	1
QUALITY LEVEL	POINTS																			
< 1%	0																			
> 1 - 10%	0.1																			
> 10 - 25%	0.25																			
> 25 - 50%	0.5																			
> 50 - 75%	0.75																			
> 75 - 95%	0.95																			
> 95%	1																			
2	ZE05: Biodegradability	2	(1) The product is biodegradable and can be safely returned to the natural cycle.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1										
QUALITY LEVEL	POINTS																			
No	0																			
Yes	1																			
		1	(2) The product is designed for composting in a home composter.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1										
QUALITY LEVEL	POINTS																			
No	0																			
Yes	1																			
		1	(3) The product is designed for composting in an industrial plant.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1										
QUALITY LEVEL	POINTS																			
No	0																			
Yes	1																			
2	ZE06: Dismantling capability	1	(1) The product is designed to be installed and dismantled non-destructively using reversible connections.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1										
QUALITY LEVEL	POINTS																			
No	0																			
Yes	1																			



2	ZE07: Detachability	1	(1) Mass fraction of the product whereby product components can be removed from the product without contamination, using reversible connections	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>&lt; 1%</td> <td>0</td> </tr> <tr> <td>&gt; 1 - 10%</td> <td>0.1</td> </tr> <tr> <td>&gt; 10 - 25%</td> <td>0.25</td> </tr> <tr> <td>&gt; 25 - 50%</td> <td>0.5</td> </tr> <tr> <td>&gt; 50 - 75%</td> <td>0.75</td> </tr> <tr> <td>&gt; 75 - 95%</td> <td>0.95</td> </tr> <tr> <td>&gt; 95%</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	< 1%	0	> 1 - 10%	0.1	> 10 - 25%	0.25	> 25 - 50%	0.5	> 50 - 75%	0.75	> 75 - 95%	0.95	> 95%	1
				QUALITY LEVEL	POINTS															
< 1%	0																			
> 1 - 10%	0.1																			
> 10 - 25%	0.25																			
> 25 - 50%	0.5																			
> 50 - 75%	0.75																			
> 75 - 95%	0.95																			
> 95%	1																			
<hr/>																				
		2	(2) Mass fraction of the product whereby individual materials used in the product can be removed from the product, unmixed and without contamination, for the purpose of reuse or recycling	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>&lt; 1%</td> <td>0</td> </tr> <tr> <td>&gt; 1 - 10%</td> <td>0.1</td> </tr> <tr> <td>&gt; 10 - 25%</td> <td>0.25</td> </tr> <tr> <td>&gt; 25 - 50%</td> <td>0.5</td> </tr> <tr> <td>&gt; 50 - 75%</td> <td>0.75</td> </tr> <tr> <td>&gt; 75 - 95%</td> <td>0.95</td> </tr> <tr> <td>&gt; 95%</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	< 1%	0	> 1 - 10%	0.1	> 10 - 25%	0.25	> 25 - 50%	0.5	> 50 - 75%	0.75	> 75 - 95%	0.95	> 95%	1
				QUALITY LEVEL	POINTS															
< 1%	0																			
> 1 - 10%	0.1																			
> 10 - 25%	0.25																			
> 25 - 50%	0.5																			
> 50 - 75%	0.75																			
> 75 - 95%	0.95																			
> 95%	1																			
<hr/>																				
1	ZE08: Products with a long service life	1	(1) Special measures were taken during product design to increase the service life.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1										
QUALITY LEVEL	POINTS																			
No	0																			
Yes	1																			
<hr/>																				
1	ZE09: Reusability/recyclability	1	(1) The product is designed for reuse in unmodified condition or with minimal modifications.	<table border="1"> <thead> <tr> <th>QUALITY LEVEL</th> <th>POINTS</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>0</td> </tr> <tr> <td>Yes</td> <td>1</td> </tr> </tbody> </table>	QUALITY LEVEL	POINTS	No	0	Yes	1										
QUALITY LEVEL	POINTS																			
No	0																			
Yes	1																			



1	(2) The product has been specially designed to allow maintenance work to be carried out in order to extend its service life.	<b>QUALITY LEVEL</b>	<b>POINTS</b>
		No	0
		Yes	1

---

1	(3) The product has been specially designed to be able to upgrade it to the current state of the art.	<b>QUALITY LEVEL</b>	<b>POINTS</b>
		No	0
		Yes	1

---

1	(4) The manufacturer/industry association has set up a special collection system to collect products already installed in the building after their end of life and to forward them for material recovery or re-use.	<b>QUALITY LEVEL</b>	<b>POINTS</b>
		No	0
		Yes	1

---

1	(5) The manufacturer/industry association has set up a special collection system to collect construction site offcuts or broken containers and to forward them for recycling or re-use.	<b>QUALITY LEVEL</b>	<b>POINTS</b>
		No	0
		Yes	1

---

1	(6) The manufacturer offers product leasing.	<b>QUALITY LEVEL</b>	<b>POINTS</b>
		No	0
		Yes	1



1	ZE10: Re-use/re-purpose	1	(1) Mass fraction of the product made from reused or recycled materials/(sub)components/(sub)products
---	-------------------------	---	---

QUALITY LEVEL	POINTS
0%	0
> 0 - 10%	1/7
> 10 - 25%	2/7
> 25 - 50%	3/7
> 50 - 75%	4/7
> 75 - 95%	5/7
> 95 - 99%	6/7
> 99%	1

**Evaluation method:**

All circularity attributes (ZA) of all circularity properties (ZE) must be evaluated for each product considered. An assessment is carried out separately for each product for the circularity property ZE01 (Hazardous substances contained), i.e. a circularity assessment (ZA02 - ZA10) and a pollutant assessment (ZA01) are determined for each product.

All positively rated circularity attributes are rated proportionately between 0 and 1 depending on the quality level. Negatively evaluated circularity attributes are assigned a value of 0. The allocation of points according to the quality level is defined in the above tables at the level of the circularity attributes.

- (I) The determined quality level of a circularity attribute multiplied by the weighting of the circularity attribute results in the rating of a circularity attribute. **The following applies here:** If a circularity attribute is not assessable for a product, this circularity attribute is not included in the assessment.
- (II) The sum of all assessable circularity attributes of a circularity property divided by the maximum achievable assessment of a circularity property results in the assessment of the circularity property (= degree of fulfilment of the circularity property). The degrees of fulfilment of the circularity properties are output for all assessable circularity properties (ZE01 - ZE10). **The following applies here:** If all circularity attributes of a circularity property are not assessable for a product, then this circularity property is not assessed.
- (III) The total evaluation of the circularity properties ZE02 - ZE10 results from the sum of all assessable circularity properties multiplied by the respective weighting of the circularity property divided by the sum of the weightings of all assessable circularity properties (= total degree of fulfilment). **The following applies here:** A circularity property that cannot be assessed (see II) is not included in the overall assessment.

For the degree of fulfilment of assessable circularity properties and the overall degree of fulfilment, a quality level QS0, QS1, QS2, QS3 or QS4 is determined using the following rules:

- QS4 represents the highest quality level and is achieved with a degree of fulfilment  $\geq 9\%$ .
- QS3 is achieved with a degree of fulfilment between  $\geq 75\%$  and  $< 95\%$ .
- QS2 is achieved with a degree of fulfilment between  $\geq 50\%$  and  $< 75\%$ .
- QS1 is achieved with a degree of fulfilment between  $\geq 25\%$  and  $< 50\%$ .



The QS0 is awarded with a degree of fulfilment < 25 %.

Assessed products are included in the [DGNB Navigator](#). Non-rated products can be rated using a tool provided by the DGNB.

### Step 2: Evaluation of the use of circular products at component level

The overall assessment determined in step 1 (see III above) of a product used in the building is included in the assessment. A product can only be positively assessed if the circularity property ZE01 (basic requirement pollutants) is assessed at QS4.

The scoring at component level can be determined via procedure 1 or procedure 2. If no total mass of a cost group is given, only the simplified procedure (procedure 2) can be applied.

Note on weighting: Cost group 300 has a fourfold greater impact on the overall evaluation than cost group 400. The 2nd and 3rd level ratings are based on typical mass distributions in buildings and replacement cycles and are outlined in Annex 1.

Note on halls and hall-like buildings: If the GFA of the hall area is greater than 80% of the total GFA, then cost group 340 (interior walls) can be excluded from the evaluation.

### Procedure 1: Detailed procedure (evaluation via building components catalogue with mass reference)

In the detailed procedure, the products used are verified via the building components catalogue with mass reference. Annex 1 shows which components are relevant according to the cost groups of DIN 276 and how they are weighted. If there are no components that can be assigned to a cost group in the building, this cost group is removed from the weighting total.

E.g.: If there are no internal columns (KG 343) in KG 340 (interior walls), then KG 343 is removed from the weighting sum of KG 340.

The points are calculated pro rata on the basis of the 3rd level cost group (or possibly also at the 2nd or 1st level if a product or introduced component includes several cost groups) and the quality level of the introduced product or component.

- The use of a **QS4 product** is included in the evaluation with  $P_{max}$  if the condition **ZE01 = QS4** (basic requirement pollutants) is also met.
- The use of a **QS3 product** is included in the evaluation with  $0.75 * P_{max}$  if the condition **ZE01 = QS4** (basic requirement pollutants) is also met.
- The use of a **QS2 product** is included in the evaluation with  $0.5 * P_{max}$  if the condition **ZE01 = QS4** (basic requirement pollutants) is also met.
- The use of a **QS1 product** is included in the assessment with  $0.25 * P_{max}$  if the condition **ZE01 = QS4** (basic requirement pollutants) is also met.
- The use of a **QS0 product** is included in the evaluation with **0 P**.

Calculation formula:

Weighting cost group \* ( $P_{max}$  \* [sum mass-% QS4-products of the cost group] +  
 $0.75 * P_{max}$  \* [Total mass-% QS3 products of the cost group] +  
 $0.5 * P_{max}$  \* [Total mass-% QS2 products of the cost group] +  
 $0.25 * P_{max}$  \* [Total mass-% QS4 products of the cost group])

Products that belong to the 3rd level cost group and to which no evaluated product/component is assigned are



included in the overall evaluation with 0 points.

Only products/components assigned to the 3rd Level cost group are included in the assessment. I.e., is there a positive mass difference (total mass KG 3rd Level - total mass of assessed product/component), the difference cannot be taken into account.

A tool provided by the DGNB must be used to determine the points. Note regarding application: The export of the components/layers considered there into the DGNB tool via LCA tools recognised by the DGNB is envisaged.

Examples for the external doors and windows cost group (KG 334):

The weighting of KG 334 is:  $4/5$  (weighting KG 300) \*  $0.32$  (weighting KG 330) \*  $4/23$  (weighting KG 334) =  $0.044$ .

Assumption: The total mass of 1000 kg of external doors and windows (KG 334) is installed in the building, 40% of which are QS4 products with ZE01 = QS4, and 60% of which are QS0 products:

Therefore,  $0.044$  (weighting KG 334) \*  $0.4$  \*  $P_{max}$  can be assigned for the QS4 products accounting for 40%. The QS0 products accounting for 60% can either be disregarded or included for documentation purposes.

### Procedure 2: Simplified procedure (lump-sum evaluation via building components catalogue without mass reference)

The same methodology as in procedure 1 is used in procedure 2, with the following deviations:

- (1) There is no product mass and no total mass indicated on the 3rd level KG.
- (2) The  $P_{max}$  scoring of a product is reduced by 80%. Please note: If components or construction systems cover the entire 3rd level KG, the detailed procedure should be applied.
- (3) The maximum point allocation for a cost group is capped at 70% of the point allocation according to procedure 1.

Calculation formula:

(2) Formula 1:  $\text{Weighting KG} * ([\text{Total number of QS4 products belonging to the KG}] * 0.2 * P_{max} + [\text{Total number of QS3 products belonging to the KG}] * 0.2 * 0.75 * P_{max} + [\text{Total number of QS2 products belonging to the KG}] * 0.2 * 0.5 * P_{max} + [\text{Total number of QS1 products belonging to the KG}] * 0.2 * 0.25 * P_{max})$

(3) Capping:  $\text{Result Formula 1} \leq 0.7 * \text{Weighting KG} * P_{max}$

If no \*  $P_{max}$  is carried out in the example below on the basis of KG 334, the following points can thus be recognised as a lump sum for a QS4 product:

According to (2):  $0.044$  (weighting KG 334 - see example below) \*  $0.2$  (reduction by 80 %) \*  $P_{max}$ .

According to (3): the total of all evaluated products is capped at 70% for KG334 according to procedure 1:  $4/5$  (weighting KG 300) \*  $0.32$  (weighting KG 330) \*  $4/23$  (weighting KG 334) \*  $0.7$  (70% cap) \*  $P_{max} = 0.044 * P_{max}$

### Site inspections to provide evidence of the circularity property ZE06 (dismantling capability):

In the case of products that have been positively assessed for circularity property ZE06 (disassembly capability), it must be demonstrated that only reversible connections were used in the installation, naming the connection types (loose, click connection, plugged or screwed), and that the product can therefore be removed again without being destroyed. Without documentation, this circularity property receives a negative evaluation.

Verification may be omitted if installation is performed according to a principle of mono-materiality, or if irreversible connections are not technically feasible or are not usually applied.



Examples of monomateriality: Welded joints in steel construction, dowel joints in timber construction, etc.

Examples of products for which the verification can be omitted: Radiators or heat supply systems are always installed using reversible connections.

### **Indicator 3.2.3: Circular Economy Bonuses: Reuse, material-appropriate construction, avoidance of material mixing, structural fixtures**

#### **Bonus: Use of reused or recycled components**

Demonstrably reused or recycled components at the level of the 1st, 2nd or 3rd cost group. Levels can be considered as evidence via the building components catalogue according to procedure 1 or procedure 2 with a total of  $P_{\max} * 1.5$  (corresponds to an increase in QS4 points of 50%).

Example: A room-in-room system is reinstalled after minor retrofitting (= KG 346 Modular internal walls).

Weighting KG 346:  $4/5$  (weighting KG 300) \*  $0.16$  (weighting KG 340) \*  $1/12$  (weighting KG 346) =  $0.011$

Assumption: Total mass KG 346 = 1000 kg, of which the reused room-in-room system accounts for 40%.

According to procedure 1:  $0.011 * 0.4 * P_{\max} * 1.5$

According to procedure 2:  $0.011 * 0.2$  (reduction by 80 %) \*  $P_{\max} * 1.5$

#### **Bonus Pollutant avoidance through the use of material-appropriate building construction**

Please note: The bonus cannot be claimed in addition to the "material mixture or material layering" bonus or already claimed bonuses in criterion ENV1.2. For further explanations of the bonus, see explanations in criterion ENV1.2.

The prevention of pollutants through the use of material-appropriate building construction can be recognised as evidence via the building components catalogue with further documentation, if applicable, in addition to the existing assessment via indicator 3.1.1 per component/product on the 3rd level cost group (+1 bonus point), up to a maximum of + 5 bonus points, via procedure 2.

The following structures, for example, can be credited via the bonus:

- White tub without epoxy resin coating
- Flat roof construction with waterproofing membranes without primers or alternatively use of a gable roof
- Perimeter insulation on the basement wall using foam glass ballast
- Perimeter insulation under the floor slab using foam glass ballast or slabs without additional bitumen waterproofing.

#### **Bonus: Avoidance of constructions with material mixing or material layering**

Please note: The bonus cannot be claimed in addition to bonus 2.

Structures without material mixing or material layering are structures deemed suitable for reuse or the utilisation of the installed materials without an elaborate recycling process and receive a positive evaluation via this bonus. The avoidance of structures with material mixture or material layering can be recognised as evidence via the building components catalogue with, if applicable, further evidence in addition to the existing assessment via the indicator 3.1.1 per component/product on the 3rd level cost group (+1 bonus point), up to a maximum of + 5 bonus points, via procedure 2.

The following structures, for example, can be credited via the bonus:

- Use of single-material/low-material structures (for further examples see [einfach-bauen.net](http://einfach-bauen.net), Office buildings 22/26): e.g.
  - monolithic construction without additional insulation and/or reinforcement
  - Construction of a load-bearing exterior wall as a cross laminated timber construction with hollow



- slots in the inner layers to improve thermal conductivity
- Air chamber brick without vertical mortar joint and horizontal thin-bed mortar to avoid circulation across the brick layers
- Technical systems have a lifespan of approx. 20 years and are prone to failure. They should therefore be separated from the structure to allow for easy maintenance, replacement and repair.
- No basement, no suspended ceiling, exposed concrete. A waiver can only be credited if it can be proven that the use of a product, component, or layer was explicitly dispensed with planning.

#### **Bonus: Circular structural fixtures**

If at least four components/products from the 3rd level cost group of KG 370 (structural fixtures) are assessed as at least QS3, the bonus points can be recognised.

#### **Indicator 3.3: Conversion, alteration, and deconstruction instructions**

There is a detailed description as to how the building can be reused, converted, and deconstructed. The instructions/concept should show which measures can be used to realise conversions, alterations, and deconstruction. For alteration and conversion aspects, reference can be made to criterion ECO2.4 and corresponding documentation can be provided. The deconstruction concept should at least show which measures can be used to recycle or reuse the supporting structure, building envelope (including roof), interior walls, and interior fittings. The following questions should be answered in the concept:

- Deconstructability: Is it possible to ensure that the building materials can be easily separated by type (consideration of connecting materials)? Are individual component layers/elements easily accessible and replaceable with little effort? Is deconstruction quick and uncomplicated?
- Reuse and recycling of building materials: Does the design of the components enable the re-use and recycling of the individual elements? Are, for example, standardised solutions or modular systems used that allow re-use and re-purposing?
- Ease of recycling: Are impurities that impede/prevent the recycling of building materials avoided or are homogeneous/single-material elements used (mono-materiality)? Do established recycling processes for the materials used already exist?

#### **Indicator 3.4: CIRCULAR ECONOMY BONUSES - Circular construction and aggregated circularity assessment**

**Indicator 3.4.1:** Bonus points are achieved if the building (building frame - KG 300) consists almost entirely of components, products, or materials and building materials that originate from the circular economy. This can be verified via the circularity sub-indicator "Circular material origin - Closed-loop recycling implemented" (see indicator 3.2.2). Nearly complete means that at least 90% by mass meets the requirements.

**Indicator 3.4.2:** Bonus points can be achieved if the building is designed in such a way that it can be described as almost completely separable, the material flows can be almost completely fed back into the circular economy, and it does not contain any pollutants or risk materials (according to the assessment DGNB criterion ENV1.2) that restrict subsequent re-use or material recovery. Proof of detachability shall be provided by means of technical descriptions of the components and their joints or by means of corresponding indices (e.g. Detachability Index). Non-detachable or difficult to detach bonding or sealants and non-detachable composites (without manufacturer's return declaration) will not be installed. Evidence of the possibility of returning the material flows to the circular economy is to be presented via the circularity sub-indicator (see indicator 3.2.2) "Circularity - post-use paths" > 90 mass-%.

**Indicator 3.4.3:** Bonus points can be achieved if a quantitative assessment procedure is used for the assessment of the circularity of the building or of built-in components, or if different circularity indices are determined and the results are documented in a structured manner in a "Complete Building Resource Passport" (aggregated or partially





aggregated circularity assessment - circularity index). The assessment procedure(s) used meet the following minimum requirements for meaningful circularity assessments:

Formal requirements:

- Complete coverage of KG 300 is ensured, lacking coverage is declared.
- The evaluation process is objective.
- A transparently accessible method description exists for the assessment procedure.
- Normative references should be made (as far as reasonable).

Content requirements:

- Circularity aspects of material origin, pollutants, and risk substances and circularity are addressed as a minimum requirement.
- The circularity assessment shall result in quantitative indices or sub-indices that can be applied during the optimisation of buildings.
- Time preferences: The material origin is to be weighted higher than the future recyclability, so as to take account of the transformation and current requirements.
- Quantitative factors for the calculation of sub-indices or an overall index must be clearly and comprehensibly differentiated, distinguishing between preferred material origins, pollutant groupings, and post-use paths.
- Dismantling capability and material detachability, costs, or environmental impacts can, but do not have to be considered in the determination of an overall circularity index.

The evaluation of individual circularity aspects should be based on a publicly available method description that clearly describes the algorithms and applied value systems. In the assessment algorithm, the method must focus on the closed-loop recycling (material origin) implemented (today).

Bonus points can be obtained if the result of the application of the assessment results in a good or very good score as defined by the assessment tool method. If the assessment method does not establish such a standard, no points can be awarded.

#### Annex 1: Indicator 3.1.1 - Weighting of cost groups

WEIGHTING KG 1. LEVEL	WEIGHTING KG 2. LEVEL	WEIGHTING KG 3. LEVEL	COST GROUP ID	COST GROUP NAME
0			100	Plot
0			200	Preparatory measures
4	1	103	300	<b>Construction work – Building construction</b>
	0	0	310	<b>Excavation pit/earthworks</b>
		0	311	Manufacturing
		0	312	Enclosure
		0	313	Dewatering
		0	319	Miscellaneous belonging to KG 310
	<b>0.15</b>	15	320	<b>Foundation, substructure</b>
		3	322	Surface foundations and floor slabs
		3	323	Deep foundations
		3	324	Foundation coverings



	2	325	Seals and cladding
	2	326	Drainage
	2	329	Miscellaneous belonging to KG 320
<b>0.33</b>	34	330	<b>Exterior walls, vertical building structures, exterior</b>
	3	331	Load-bearing exterior walls
	4	332	Non-load-bearing exterior walls
	2	333	External columns
	6	334	External wall openings
	6	335	Exterior wall cladding, outside
	2	336	Exterior wall cladding, internal
	6	337	Modular exterior wall structures
	3	338	Light protection belonging to KG 330
	2	339	Miscellaneous belonging to KG 330
<b>0.17</b>	18	340	<b>Internal walls, vertical building structures, interior</b>
	2	341	Load-bearing internal walls
	4	342	Non-load-bearing internal walls
	2	343	Internal columns
	3	344	Internal wall openings
	3	345	Interior wall cladding
	2	346	Modular interior wall structures
	2	349	Miscellaneous belonging to KG 340
<b>0.18</b>	19	350	<b>Ceilings, horizontal building structures</b>
	3	351	Ceiling structures
	8	353	Ceiling coverings
	6	354	Ceiling cladding
	2	359	Miscellaneous belonging to KG 350
<b>0.17</b>	17	360	<b>Roofs</b>
	3	361	Roof structures
	3	362	Roof openings
	6	363	Roof cladding
	3	364	Roof cladding
	2	369	Miscellaneous belonging to KG 360
0	0	380	<b>Structural fixtures</b>
	0	381	General fixtures
	0	382	Special fixtures
	0	389	Miscellaneous belonging to KG 380



0		390	<b>Other measures for building construction</b>
1	33	400	<b>Building construction – technical installations</b>
0	0	410	<b>Sewage, water, gas systems</b>
	0	411	Sewage systems
	0	412	Water systems
	0	413	Gas systems
	0	419	Miscellaneous belonging to KG 410
<b>0.27</b>	9	420	<b>Heat supply systems</b>
	3	421	Heat generation systems
	3	422	Heat distribution networks
	3	423	Space heating surfaces
		429	Miscellaneous belonging to KG 420
<b>0.36</b>	12	430	<b>Air-conditioning systems</b>
	3	431	Ventilation systems
	3	432	Partial air conditioning systems
	3	433	Air conditioning systems
	3	434	Refrigeration systems
		439	Miscellaneous belonging to KG 430
<b>0.09</b>	3	440	<b>Electrical installations</b>
	0	441	High and medium voltage systems
	3	442	In-house power supply systems
	0	443	Low-voltage switchgears
	0	444	Low-voltage installation systems
	0	445	Lighting systems
	0	446	Lightning protection and earthing systems
	0	449	Miscellaneous belonging to KG 440
0		450	<b>Communication, safety, and information technology systems</b>
<b>0.27</b>	9	460	<b>Conveyor systems</b>
	3	461	Lift systems
	3	462	Escalators, moving walks
		463	Access systems
		464	Transport systems
	3	465	Crane systems
		469	Miscellaneous belonging to KG 460
0		470	<b>Use-specific and process engineering systems</b>
0		480	<b>Building and plant automation</b>
0		490	<b>Other measures for technical installations</b>



0	500	<b>Outside facilities and open spaces</b>
0	600	<b>Furnishings and works of art</b>
0	700	<b>Incidental building costs</b>



## APPENDIX B - DOCUMENTATION

### I. Required documentation

The following documentation represents a selection of the possible means by which to provide evidence. Based on the submitted evidence documents, the selected evaluation of the individual indicators must be plausibly documented.

#### **Indicator 1.1: Analysis of the existing building and the site**

- Results of a site analysis according to upcoming, ongoing, or completed (reverse) construction projects, contacting authorities, excerpts from project-specific use of platforms or databases

#### **Indicator 1.2: Preservation or use of existing buildings**

- Presentation of area conservation (plans, area calculation),
- Presentation of component preservation and materiality of preservation in relation to the entire building project

#### **Indicator 1.3: Deconstruction - inclusion in system boundaries**

- Inclusion in the system boundaries: Confirmation from owners/builders

#### **Indicator 1.3.1: Justification of the deconstruction need and planning of deconstruction**

- Justification formulated by the owner
- Excerpt from inventory of potentially extendible components and products, fixtures, furnishings
- Evaluation of the inventory
- Material flow balance deconstruction (estimate) with project-specific estimate of transport distances and material recovery/disposal
- Expert opinion on hazardous substances and register of harmful substances, drawn up by a competent person
- Excerpt from the hazardous substances removal concept

#### **Indicator 1.3.2: Execution of deconstruction**

- List of all possible buyers for the items of value listed in the inventory
- Evidence of proactive search and contact with potential buyers
- Inventory of actually accrued masses and transport distances and material recovery/disposal routes
- Proof of optimisation of the material recovery and/or disposal routes (comparison with the usual state of the art)
- Index to prove optimisation according to deconstruction certificate TEC1-R Indicator 2
- Proof of implementation of the hazardous substance removal concept (confirmation by owner or implementing company)

#### **Variable indicator 1.3.3: Alternative forms of documentation via a DGNB deconstruction certificate**

- Alternative forms of documentation via DGNB deconstruction certificate with fulfilment of the indicators specified in the method (indicator 1.3.3.)

#### **Indicator 2.1: Definition of objectives and focal points**

- Protocols, target-setting by the commissioning party



- Presentation of project-specific target quotas for selected circularity sub-indicators or aggregated indicators

**Indicator 2.2: Project-based circular design concepts**

- Presentation of variants/concepts with reference to the service phases and assessment
- Alternative: Use of tools for the creation of circularity balance sheets, indices, etc. in the context of planning or execution, with reference to/issue of optimised building resource passports
- Presentation of the comparison of climate impacts and costs and pollutant assessments for the variants

**Indicator 3.1.1: Building Resource Passport**

- Completed full or reduced building resource passport (first page)
- Optional: Additional sheets of the Building Resource Passport
- Excerpts from the underlying data structure for a plausibility check (not applicable for recognised tools)

**Indicator 3.2.1: Realised circularity quotas**

- Evidence of compliance with high or moderate target quotas
- If necessary, own or statistical evaluations

**Indicator 3.2.2:**

**Documentation for step 1: Product evaluation on the basis of circularity properties**

It is advisable to specify in the call for tenders that the products have been assessed by the manufacturer/supplier in the DGNB Navigator.

The following documentation shall be submitted for circularity attributes:

Basic requirement regarding hazardous substances:

CIRCULAR PROPERTY (ZE)	CIRCULARITY ATTRIBUTE (ZA)	REQUIRED DOCUMENTATION
ZE01: Contained hazardous substances	(1) The product contains SVHC substances > 0.1 mass percent.	Current - max. 12 months old -- manufacturer's declaration or current safety data sheet
	(2) The product contains substances with a harmonised classification as category 1A or 1B carcinogenic (Carc. 1A/Carc. 1B) according to CLP VO > 0.1 mass percent.	Current - max. 12 months old - manufacturer's declaration or current safety data sheet
	(3) The product contains substances with a harmonised classification as CMR 1A or 1B according to CLP VO > 0.1% by mass.	Current - max. 12 months old - manufacturer's declaration or current safety data sheet



- (4) The product contains restricted substances that could exceed the limits set out in Annex XVII or in the REACH Regulation, in relation to the specific use relevant to that product. Current - max. 12 months old - manufacturer's declaration

Circularity properties:

CIRCULAR PROPERTY (ZE)	CIRCULARITY ATTRIBUTE (ZA)	REQUIRED DOCUMENTATION
ZE02: Post-consumer recycled content	(1) Mass share of recycled material after consumption (post-consumer recycled material)	<p><b>Definition of post-consumer recycled content:</b> Recycled material AFTER use by a consumer. In other words, products already installed in the building whereby material is fed into a recycling process for the manufacture of new products.</p> <p><b>Required documentation if ZA is not relevant for assessment:</b></p> <ol style="list-style-type: none"> <li>1. Manufacturer confirms that the product consists exclusively of renewable raw materials to which no chemical substances have been added or the molecular structure of which has not been artificially altered.</li> </ol> <p><b>Required documentation if ZA is relevant for assessment:</b></p> <p>Manufacturer confirmation shows the proportion of post-consumer recycled material.</p>
	(2) Any chemical substance in the recycled material after consumption (post-consumer recycled material) is reported if accounting for more than 10% by weight.	<p><b>Required documentation if ZA is not relevant for assessment:</b></p> <ol style="list-style-type: none"> <li>1. Manufacturer confirms that the product consists exclusively of renewable raw materials to which no chemical substances have been added or the molecular structure of which has not been artificially altered.</li> </ol> <p style="text-align: center;"><b>or</b></p> <ol style="list-style-type: none"> <li>2. Manufacturer confirms that no post-consumer recycled material has been added to the product.</li> </ol> <p><b>Required documentation if ZA is relevant for assessment:</b></p> <p>Manufacturer's confirmation</p>
	(3) Any chemical substance in the recycled material after	<p><b>Required documentation if ZA is not relevant for assessment:</b></p> <ol style="list-style-type: none"> <li>1. Manufacturer confirms that the product consists</li> </ol>



consumption (post-consumer recycled material) is if above 1%. proportion by weight

exclusively of renewable raw materials to which no chemical substances have been added or the molecular structure of which has not been artificially altered.  
**or**

2. Manufacturer confirms that no post-consumer recycled material has been added to the product.

**Required documentation if ZA is relevant for assessment:**

Manufacturer's confirmation

- (4) The recycled content after consumption (post-consumer recycled material) does not contain any hazardous substances (= does not contain SVHCs according to the REACH Regulation) at a concentration of more than 0.1% by weight.

**Required documentation if ZA is not relevant for assessment:**

1. Manufacturer confirms that the product consists exclusively of renewable raw materials to which no chemical substances have been added or the molecular structure of which has not been artificially altered.  
**or**
2. Manufacturer confirms that no post-consumer recycled material has been added to the product.

**Required documentation if ZA is relevant for assessment:**

Manufacturer's confirmation

ZE03: Ease of maintenance and repair

- (1) The product does not require maintenance or repair if the intended use of the product is observed.

**Definition of "intended use":** Use of a product in accordance with the manufacturer's specifications, instructions, and information

Note on the term: This definition is in line with the European Regulation EU No. 305/2011 (ISO/IEC Guide 51: 2014, definition 3.6 adapted).

**Required documentation:**

Designation of the characteristics of the product due to which no maintenance or repair is to be expected within the service life of the product.

- (2) The product has been designed in such a way that maintenance or repair is possible throughout its service life.

**Definition "Maintenance or repair possibility during the product's useful life":** It need only be possible to maintain or repair damage that affects the intended use of the product. Example: Broken glass in a window impairs the intended use. The question can therefore only be answered positively if the glass can be replaced.

**Required documentation if ZA is not relevant for assessment:**

ZE03/(1) was positively evaluated.

**Required documentation if ZA is relevant for**





**assessment:**

Designation of the characteristics of the product on the basis of which maintenance or repair is verifiably possible within the useful life of the product.

(3) The product can be serviced and repaired by untrained personnel at the product's place of use.	<p><b>Required documentation if ZA is not relevant for assessment:</b> ZE03/(1) was positively evaluated.</p> <p><b>Required documentation if ZA is relevant for assessment:</b></p> <ol style="list-style-type: none"> <li>1. Availability of step-by-step maintenance/repair instructions in German.</li> <li style="text-align: center;"><b>and</b></li> <li>2. Evidence that no use of special tools is necessary</li> <li style="text-align: center;"><b>and</b></li> <li>3. Manufacturer's declaration that untrained personnel can carry out the maintenance and repair, insofar as this is not plausibly evident from the maintenance/repair instructions.</li> </ol>
(4) The product can be serviced and repaired by trained personnel at the product's place of use.	<p><b>Required documentation if ZA is not relevant for assessment:</b> ZE03/(1) was positively evaluated.</p> <p><b>Required documentation if ZA is relevant for assessment:</b> Evidence of a training programme where enrolment is possible at least once per year. The training should be offered either online, in German, or on-site within Germany.</p>
(5) Consumables can be easily replaced by untrained personnel.	<p><b>Definition of "consumables":</b> Consumable material is understood to refer to a material that is essential for the complete functionality of a device, but that wears out within the useful life of the product and therefore must be replaced. E.g.: Paper for photocopiers, beverage pods for coffee and tea machines</p> <p><b>Required documentation if ZA is not relevant for assessment:</b> If the product does not contain any consumables or is itself a consumable:</p> <p><b>Required documentation if ZA is relevant for assessment:</b></p> <ol style="list-style-type: none"> <li>1. Availability of step-by-step instructions in German.</li> <li style="text-align: center;"><b>and</b></li> <li>2. Evidence that no use of special tools is necessary</li> <li style="text-align: center;"><b>and</b></li> <li>3. Manufacturer's declaration that untrained personnel can carry out the replacement if this is not plausibly evident from the instructions.</li> </ol>



- (6) Spare parts are provided by the manufacturer or an authorised representative during the product's service life.
- Required documentation if ZA is not relevant for assessment:**
1. ZE03/(1) was positively evaluated.
- or**
2. Proof that the product cannot be repaired or maintained with spare parts due to its product type (e.g. paint, varnish, etc).

**Required documentation if ZA is relevant for assessment:**

Manufacturer's confirmation that spare parts will be kept available throughout the product's service life.

---

ZE04: Proportion of renewable raw materials

- (1) Mass proportion of renewable raw materials in the product

**Required documentation:**

If renewable raw materials are contained in the product, a manufacturer's confirmation must be submitted, identifying the type of renewable raw materials and their mass proportions.

---

ZE05: Biodegradability

- (1) The product is biodegradable and can be safely returned to the natural cycle.

**Required documentation:**

In the event of a positive evaluation: Manufacturer confirms that the product consists exclusively of renewable raw materials to which no chemical substances have been added or the molecular structure of which has not been artificially altered.

- 
- (2) The product is designed for composting in a home composter.

**Required documentation:**

Manufacturer's confirmation with plausible explanation

- 
- (3) The product is designed for composting in an industrial plant.

**Required documentation:**

Manufacturer's confirmation with plausible explanation



ZE06: Dismantling capability (1) The product is designed to be installed and dismantled non-destructively using reversible connections.

**Definition of “Dismantling capability”:**

The ability to remove a product installed in a building in its entirety.

**Required documentation:**

1. Installation instructions for the product describing at least one method of attachment with a detachable fastener.
2. Due to cross-reference to the Building Resource Passport: The type of connection must be stated for each reversible connection type: i.e. loose, click connection, plugged or screwed.

ZE07: Detachability (1) Mass fraction of the product whereby the product components can be removed from the product without contamination via reversible compounds.

**Definition of “detachability”:**

The ability to separate product components or individual materials used in the product from the product.

**Definition of “product component”:**

A product is made up of several components that complement one another and are all beneficial. A product component can be composed of different materials. E.g. a door can consist of the following product components; frame, door leaf, handle set, lock and hinges.

**Definition of “contamination-free”:**

refers to contaminant-free removal without contact contamination.

**Required documentation if ZA is not relevant for assessment:**

Plausible explanation that the product does not have any multiple product components

**Required documentation if ZA is relevant for assessment:**

1. Manufacturer's declaration with plausible explanation (if necessary also verifiable via maintenance/repair instructions) as to which product components can be removed from the product, specifying the reversible connections.
2. Manufacturer's confirmation of contamination-free removal for each product component
3. Comprehensible calculation of the mass fraction: Mass (in kg) of all product components that are installed in the product so as detachable / Mass (in kg) of the total product



- (2) Mass fraction of the product whereby individual materials used in the product can be removed from the product, unmixed and without contamination, for the purpose of reuse or recycling

**Definition of “unmixed”:**

A (partial) material that can be removed from the material (type) composite without foreign matter (e.g. due to adhesions).

**Required documentation if ZA is not relevant for assessment:**

Manufacturer's confirmation that the product consists of only one material/material type (e.g. for plastics). Or manufacturer's confirmation that the product consists exclusively of renewable raw materials to which no chemical substances have been added, or that the molecular structure of the raw material has not been artificially altered

**Required documentation if ZA is relevant for assessment:**

1. Manufacturer's declaration with comprehensible explanation of which materials/material types can be removed from the product by type (unmixed), specifying the type(s) of connection and the possibility of separation
2. Manufacturer's confirmation of the contamination-free removal of the individual materials/material types
3. Comprehensible calculation of the mass fraction: Mass (in kg) of all materials/material types that can be removed from the product by type (unmixed)/mass (in kg) of the total product

ZE08: Products with a long service life

- (1) Special measures were taken during product design to increase the service life.

**Required documentation in case of positive evaluation:**

1. Plausible manufacturer's declaration that the product has a service life of more than 50 years without life-extending measures.  
**or**
2. Manufacturer's declaration specifying the life-extension measures with which the service life of comparable products is plausibly exceeded according to the BBSR table "Service life of building components for life cycle analysis according to BNB" (2017) (Link: [https://www.nachhaltigesbauen.de/fileadmin/pdf/Nutzungsdauer\\_Bauteile/BNB\\_Nutzungsdauern\\_von\\_Bauteilen\\_2017-02-24.pdf](https://www.nachhaltigesbauen.de/fileadmin/pdf/Nutzungsdauer_Bauteile/BNB_Nutzungsdauern_von_Bauteilen_2017-02-24.pdf)) is exceeded. No measures from ZE03 (ease of maintenance and repair) can be applied here.

ZE09: Reusability/recyclability

1. The product is designed for reuse in unmodified condition or with minimal modifications.

**Definition of “re-use”:**

Products/components (not waste) are reused for their original purpose while retaining their product form.  
Example: A high-fired clinker is reused as a masonry block after deconstruction and cleaning.

**Required documentation if ZA is not relevant for**



**assessment:**

Plausible explanation that the product is generally not suitable for re-use due to the type of product (e.g. varnish, paint, etc.).

**Required documentation if ZA is relevant for assessment:**

Comprehensible manufacturer's declaration, with designation of the implemented measures in the product design, in order to enable re-use of the product

- 
2. The product has been specially designed to allow maintenance work to be carried out in order to extend its service life.

**Definition of "maintenance measure":**

According to DIN EN 13306 and DIN 31051, the combination of all technical and administrative measures as well as management measures during the life cycle of a property that serve to maintain or restore its functional condition so that it can fulfil the required function

**Required documentation if ZA is not relevant for assessment:**

Plausible explanation that the service life of the product cannot be extended by maintenance measures due to the type of product (e.g. paint, varnish etc).

**Required documentation if ZA is relevant for assessment:**

Plausible manufacturer's declaration, specifying the specific maintenance measures that enable the service life of the product to be extended.

- 
3. The product has been specially designed to be able to upgrade it to the current state of the art.

**Required documentation if ZA is not relevant for assessment:**

Plausible explanation that the product cannot be upgraded to the current state of the art due to its product type (e.g. varnish, paint etc).

**Required documentation if ZA is relevant for assessment:**

Plausible manufacturer's declaration, specifying the concrete measures (e.g. also in the product design) so that the product can be upgraded to the current state of the art,

- 
4. The manufacturer/industry association has set up a special collection system to collect products already installed in the building after the end of life in order to forward them for recycling or re-use.

**Required documentation if ZA is not relevant for assessment:**

Plausible explanation that the product cannot be reasonably collected after removal due to its product type (e.g. varnish, paint, etc.).

**Required documentation if ZA is relevant for assessment:**

Manufacturer's declaration, with the following contents:

1. Plausible explanation that the manufacturer has set up an already-established collection system through



	<p>which the return of products is currently practised.</p> <ol style="list-style-type: none"> <li>2. Specify the requirements for the product so that it can be taken back (e.g. unmixed removal without foreign adhesions)</li> <li>3. Explanation as to how the returned products will be processed, specifying the main steps for returning the product or product materials to the material cycle and estimating the proportion of material losses</li> <li>4. Designation/estimation of the product masses over a self-selected period of more than one year that have already been incorporated into new products via the collection system</li> </ol>
<p>5. The manufacturer/industry association has set up a special collection system to collect construction site offcuts or broken containers and to forward them to a recycling or utilisation process.</p>	<p><b>Required documentation if ZA is not relevant for assessment:</b> Plausible explanation that the product, due to its type of product, does not produce any building site waste or that no or only minor amounts of building site waste are produced when processed properly</p> <p><b>Required documentation if ZA is relevant for assessment:</b> Manufacturer's declaration, with the following contents:</p> <ol style="list-style-type: none"> <li>1. Plausible explanation that the manufacturer has set up an already-established collection system through which the take-back of products is currently practised</li> <li>2. Designate the requirements for the product so that it can be taken back</li> <li>3. Explanation as to how the returned products are handled, specifying the essential steps for the return of the product or product materials to the material cycle with an estimate of the proportion of material losses</li> <li>4. Designation/estimation of the product masses over a self-determined period of more than one year that have already been incorporated into new products via the collection system.</li> </ol>
<p>5. The manufacturer offers product leasing.</p>	<p><b>Definition of "product leasing":</b> The manufacturer remains the owner of the product. The owner of the product acquires rights of use via product leasing.</p> <p><b>Required documentation if ZA is not relevant for assessment:</b> Comprehensible explanation that product leasing is not feasible for the product due to its type. E.g. in case of mixtures (e.g. lacquers, paints), chemical substances, small-particle products or auxiliary materials (e.g. spacers, rubbers), consumables, etc.</p> <p><b>Required documentation if ZA is relevant for assessment:</b></p>



1. Product brochure, manufacturer's website, or similar, in which product leasing is offered for the product and the conditions can also be viewed
2. Manufacturer's declaration specifying the essential aspects of the contractual arrangement of leasing contracts
3. Manufacturer provides a sample lease agreement for the product.

ZE10: Re-use/re-purpose (1) Mass fraction of the product made from recycled or re-used materials/(sub)components/(sub)products

**Definition of "re-use":**

See ZE09/(1)

**Definition of "re-use":**

Products/components are used again for another purpose, while retaining their product form.

Example: Old façade bricks are reused as garden path paving.

**ZE not assessable for mixtures:**

In the case of mixtures, it is not possible to retain the product shape. Therefore, this circular property cannot be assessed for mixtures.

**Required documentation if ZA is relevant for assessment:**

Manufacturer's declaration specifying the materials/components re-used and recycled, and traceable derivation of the mass proportion of the materials/components re-used and recycled.

**Documentation for step 2: Evaluation of the use of circular products at component level**

For the quantity survey under the detailed procedure, the following simplifications are permissible provided no manufacturer's declaration on the total mass of the product is available:

1. Small-particle, thin-layer, or low-mass components can be overlooked:  
E.g. fasteners, adhesives, foams, sealants, coatings, films, gaseous substances, etc.
2. It is sufficient to include the components of a product that are significant in terms of mass in the mass calculation: For a wooden window, for example, it is sufficient to limit yourself to the glass and frame.
3. For the components to be included in the mass calculation, it is sufficient to submit a comprehensible volume estimate and to determine this value with an average value of the density of the material using the formula  $m = \rho \cdot V$ .
4. The following material-specific average density values can be used:

Group	Material	Average density in [kg/m <sup>3</sup> ]
Masonry	Solid brick	1700
	Clinker bricks	2000
	Brick	575
	Brick (insulation-filled)	575
	Hollow concrete blocks	1400
	Sand-lime brick	1800



	Autoclaved aerated concrete 380 kg, unreinforced	380
	Autoclaved aerated concrete 500 kg, reinforced	500
	Autoclaved aerated concrete 472 kg, 5 kg unreinforced	472
Concrete	Reinforced concrete	2500
	Lightweight concrete	1400
Mortar/Plaster	Gypsum plaster (gypsum-lime plaster)	900
	Lime-gypsum interior plaster	900
	Synthetic resin plaster	1700
	Interior lime plaster	900
	Lime-cement mortar	1800
	Cement mortar	2000
	Clay plaster	900
Flooring	Laminate flooring	870
	Calcium sulphate (floating) screed	1500
	Synthetic resin screed	1800
	Artificial stone slab (epoxy resin-bonded)	2600
	Cement screed	2400
	Plastic flooring	1500
	Linoleum	1200
	Textile flooring	1000
	Carpet tiles	650
	Solid wood parquet	660
	Multilayer parquet	660
	Tiles	2500
	Natural stone	2600
	Gypsum fibre boards	960
	Mastic asphalt	2400
Wood/wood-based panels	Softwood	600
	Hardwood	800
	Particle board	700
	OSB board	600
	Particle board	600
	Cement-bonded particleboard	1200
	Cross laminated timber	490
Insulation materials	Rigid polystyrene foam (EPS)	20
	Polystyrene extruded (XPS)	32
	Polyurethane foam (PU/PUR)	30
	Wood fibre insulation boards	160
	Calcium silicate board	225
	Mineral insulation board	115
	Mineral wool (floor insulation)	85





	Mineral wool (façade insulation)	46
	Mineral wool (flat roof insulation)	145
	Mineral wool (interior insulation)	26
	Mineral wool (pitched roof insulation)	30
	Rock wool - medium bulk density range	96
	Rock wool - low bulk density range	39
	Rock wool - high bulk density range	155
	Foam glass	160
Fillers	Sand, gravel, chippings	1850
Metals	Steel/iron	7850
	Aluminium	2700
	Copper	8500
	Zinc sheet	7200
Seals, protective coatings	Bitumen sheeting	1045
	PVC roofing membranes	1350
	EPDM/TPO/FPO roofing membranes	960
Ceiling construction	Hollow tile ceiling	900
	Concrete hollow core ceiling	1200
Interior finishing	Plasterboard	1000
	Plasterboard	800
Windows	Single-glazed window glass	2500
	Double-glazed insulating glass	830
	Triple glazing	830
	Aluminium frame profile	280
	Wooden blind frame	430
	PVC-U frame	570

5. The raw densities are integrated into the DGNB tool.
6. Further conversion values can be obtained from the DGNB on request.

Alternatively, more specific values can be taken from other sources (e.g. Ökobau.dat). The source must be cited in the submission.



**Indicator 3.3: Conversion, alteration, and deconstruction instructions**

- Guidance for deconstruction, change of use, conversion of the specific building

**Indicator 3.4: CIRCULAR ECONOMY BONUSES - Circular construction and aggregated circularity assessment**

- 90% compliance for "material origin"
- Proof of almost complete detachability (technical descriptions of the components or use of corresponding indices) and recyclability of more than 90% (mass) of the materials used
- Use quantitative assessment procedures/instruments that allow aggregated or partially aggregated evaluations and demonstrate that a "good" or "very good" result is achieved



## APPENDIX C - LITERATURE

### I. Version

#### Change log based on 2023 version

PAGE	EXPLANATION	DATE
------	-------------	------

---

### II. Literature

Bases of the available substance lists and material information:

- DIN 276-1:2008-12 - Building Costs, Part 1: Building Construction
- Act to Promote Closed Substance Cycle Waste Management and to Ensure Environmentally Compatible Waste Management (German Recycling Act - KrWG) in the version dated 24.04.2012
- Revision of the EC Waste Directive. April 2008
- [www.wecobis.de/service/lexikon/recycling-lex.html](http://www.wecobis.de/service/lexikon/recycling-lex.html)
- Sustainable Development Goals Icons, United Nations/globalgoals.org
- Atlas Recycling, Building as a Material Resource (Hillebrandt, Riegler-Floors, Rosen, Seggewies Edition Detail, Munich 2018
- Urban mining and circular construction, F. Heisel, D. Hebel
- Urban Mining Index, A. Rosen
- Product Circularity Data Sheet (PCSD) (<https://pcds.lu/>)
- [www.BAMB.eu](http://www.BAMB.eu)