



DPC: 25/30493448 DC

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Date: 10 April 2025

Origin: European

Latest date for receipt of comments: 03 June 2025

Project No. 2024/01515

Responsible committee: B/558 Sustainability of construction works

Interested committees:

Title: Draft BS EN 18177 BS Circular economy in the construction sector - Framework, principles, and definitions.

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Introduction

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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

English Version

Circular economy in the construction sector - Framework, principles, and definitions

Economie circulaire dans le secteur de la construction -
Cadre, principes et définitions

Kreislaufwirtschaft (Circular Economy) im Bausektor -
Allgemeine Rahmenbedingungen, Grundsätze und
Definitionen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 350.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 18177:2025) has been prepared by Technical Committee CEN/TC 350.

This document is currently submitted to the CEN Enquiry.

Introduction

This document addresses the transformation of the construction sector and related branches towards a circular economy. It embraces the different observations of action (raw materials, construction products, and construction works) in the sector, as well as the huge difference in service lifetime for different construction products and construction works.

This document targets stakeholders involved in decision making processes in the built environment. It is part of the CEN/TC 350 series on the sustainability of construction works, and the document is a horizontal standard that brings a foundation for a set of standards supporting the transformation towards a circular economy in the construction sector.

This document supports implementation of the European Green Deal, which is a roadmap and series of policy measures to ensure that the EU's economy is sustainable and meets climate, ecological and environmental targets whilst enabling economic growth. A key focus of the Green Deal is moving towards a circular economy that decouples economic activity from extraction of primary raw materials and waste production.

A central pillar of the Green Deal is the Circular Economy Action Plan (CEAP, 2020) which provides key measures and development of the Monitoring Framework for the Circular Economy using key indicators. The Construction sector is directly addressed in the CEAP setting minimum targets for recycled content for certain construction products as well as material recovery targets for construction and demolition waste (the results from deconstruction as secondary materials and products or end-of-life materials). As part of the CEAP the strategy for a sustainable built environment promotes circular economy principles for building design and promote the use of Level(s), the European assessment and reporting framework for assessing the sustainability of construction works. The Level(s) approach provides indicators and reporting templates linked to macro-objectives: greenhouse gas emissions through a building's life cycle, resource-efficient and circular material life cycles, efficient use of water resources, healthy and comfortable spaces, adaptation and resilience and optimized life cycle cost and value.

This document brings guidance to actors in the construction and real estate sector. It describes the main terms and definitions ([Clause 3](#)), levels of action ([Clause 4](#)), principles, objectives, and actions of circular construction ([Clause 5](#)), actions for implementation of principles and objectives ([Clause 6](#)), and guidance for the assessment of circularity of construction products and construction works ([Clause 7](#)).

A regulatory challenge in the transformation process from a linear economy towards a circular economy is the fact that technical and legal status must be brought together in order to create a basis for the circularity of materials, resources or products. This can be seen, for example, in the discussion about the beginning of waste status, or the beginning of status as a material, resource or product. This discussion and the associated legal status represent a central challenge and foundation for the circular management of materials and products previously used in construction works.

1 Scope

This document defines key terminology, establishes circular economy principles at the levels of **construction works as well as construction products** of all kinds, and provides a **guidance framework for the implementation and assessment** of circularity in the built environment.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 Terms related to circularity and the circular economy

3.1.1

circular economy

economic system that uses a systemic approach to maintain a circular flow of resources, by regenerating, retaining or adding to their value, while contributing to sustainable development

Note 1 to entry: In an ideal circular economy materials, components and products are kept in closed loops and never reach end of life.

3.1.2

circular

fully aligned with the principles and objectives of a circular economy

[SOURCE: [\[1\]](#), 3.1.14]

3.1.3

circularity

degree of alignment with the principles and objectives of a circular economy

[SOURCE: [\[1\]](#), 3.1.15]

3.1.4

closed loop

system where products and materials are continually used and recovered through unlimited use cycles without loss or degradation of their original properties

3.1.5

open loop

system where products and materials are repeatedly used and recovered through limited use cycles but their original properties are lost or degraded so that further use is not possible

3.1.6

economic system

system by which a society organizes and allocates resources

Note 1 to entry: The economic system can vary depending upon the geographic region or governmental jurisdiction.

Note 2 to entry: This can include the regulation of resources and the production, use and disposal of these resources.

[SOURCE: [\[1\]](#), 3.1.2]

3.1.7**circular construction**

creation, use, reuse and repurposing of construction works, construction products, materials and the built environment whilst minimising the depletion of natural resources and environmental pollution and negative impacts on ecosystems

Note 1 to entry: Specifically, regarding construction works, a circular structure maximises resource utilisation and minimises waste across its lifespan.

[SOURCE: Circular construction and materials for a sustainable building sector, BUILD UP (europa.eu) [2], modified to be compliant with terms and definition used here.]

3.1.8**circularity impact**

measurable change to the economic, social or environmental system as a result of the organization's actions or policies relating to the circular economy

3.1.9**environmental impact**

result of a change to the environment whether adverse, neutral or beneficial, wholly or partially resulting from environmental aspects

[SOURCE: [3], modified – definition of impact has been integrated in the definition]

3.1.10**social impact****societal impact**

result of a change to society or quality of life (including health and well-being) of individuals or at the level of neighbourhoods or other areas of influence, whether adverse, neutral or beneficial, wholly or partially resulting from social aspects

[SOURCE: [3], modified – definition of impact has been integrated in the definition]

3.1.11**economic impact**

result of a change to the economic conditions, whether adverse, neutral or beneficially, wholly or partially resulting from economic aspects

[SOURCE: [3], modified – definition of impact has been integrated in the definition]

3.2 Environmental terms**3.2.1****sustainability**

ability to meet the environmental, social and economic needs of the present without compromising the ability of future generations to meet their own needs

Note 1 to entry: In the construction industry, sustainability relates to how the attributes of the activities, products or services used in the construction work, or the use of the construction works, contribute to creating thriving, healthy, diverse and resilient communities for this generation and generations to come

[SOURCE: [4], 3.2]

3.2.2**natural capital**

stocks of natural assets which include geology, soil, air, water and all living things

Note 1 to entry: Natural capital can be considered on a local, regional or global level.

3.2.3

natural resource

raw material occurring in nature

Note 1 to entry: As a raw material, natural resources usually have not been subjected to any human related processing or modification.

Note 2 to entry: Natural resources can be either a renewable resource or non-renewable resource.

Note 3 to entry: Natural resources are acquired or extracted from the environment or nature (the geosphere or biosphere) into the technosphere and emissions to air, water or land are released from the technosphere into the environment.

[SOURCE: [\[1\]](#), 3.3.1]

3.2.4

non-renewable resource

resource that exists in a finite or limited amount that cannot be naturally regenerated within a foreseeable time frame

Note 1 to entry: Resources that are derived from activities that occur only in the technosphere such as recycling are not considered renewable resources.

[SOURCE: [\[1\]](#), 3.3.7]

3.2.5

environmental footprint

environmental impacts of all chemical emissions, ecosystem changes and resource depletion caused by a product

Note 1 to entry: Product environmental footprints are usually estimated through a life cycle assessment (LCA).

3.2.6

carbon footprint

climate impacts caused by a material, product or construction works measured as greenhouse gas emissions

Note 1 to entry: Product carbon footprints are usually estimated through a life cycle assessment (LCA) and expressed as CO₂ equivalents.

Note 2 to entry: The carbon footprint is the total of the greenhouse gases emitted or removed in the processes associated with the extraction, production, transportation to site, installation, use, refurbishment, replacement, reuse and eventual disposal at the end of life of the materials, products or construction works.

Note 3 to entry: In the construction industry, global warming potential is often used as a term equivalent to carbon footprint. However, in this document we align with the more specific definition used for global warming potential i.e. a measure of how much infrared thermal radiation a greenhouse gas added to the atmosphere would absorb over a given time frame, as a multiple of the radiation that would be absorbed by the same mass of added carbon dioxide.

3.2.7

embodied carbon

climate impacts caused by a material, product or construction works to the point where it is put into use measured as greenhouse gas emissions

Note 1 to entry: The embodied carbon of a material, product or construction work is usually estimated through a life cycle assessment (LCA) and expressed as CO₂ equivalents.

Note 2 to entry: Embodied carbon is the total of the greenhouse gases emitted or removed in the processes associated with the extraction, production, transportation to site and preparation for use.

3.2.8**biomass**

material of biological origin excluding material embedded in geological formations or transformed to fossilised material and excluding peat

Note 1 to entry: This includes organic material (both living and dead) from above and below ground, e.g. trees, crops, grasses, tree litter, algae, animals, and waste of biological origin, e.g. manure

[SOURCE: [\[5\]](#), 3.1.1]

3.2.9**ecosystem**

dynamic complex of communities of plants, animals and microorganisms and their non-living environment, interacting as a functional entity

[SOURCE: [\[6\]](#), 3.2.4]

3.2.10**regenerate**

<ecosystems> improve or restore a degraded ecosystem

3.2.11**renewable resource**

resources that can be naturally grown so they are renewed or replenished on a human time scale whilst maintaining or improving their ecological cycles at a rate equal to or greater than consumption so that the products and services provided by these resources are not endangered and remain available for future use

Note 1 to entry: A renewable resource is capable of being exhausted but may last indefinitely with proper stewardship. Examples include: biomass (used for bio-based materials) and fertile soil that remains within its ecosystem.

Note 2 to entry: Activities that occur in the technosphere such as recycling are not considered natural renewal or replenishment.

Note 3 to entry: In this context, human time scale refers to the typical life of a human rather than the time that humans have been in existence.

Note 4 to entry: Minerals such as river silt, river sand, extracted soils etc. are not considered as renewable resources because of ecosystem damage their extraction is associated with which may take many generations to recover from.

3.2.12**non-renewable resource**

resource that exists in a finite amount that cannot be replenished on a human time scale

[SOURCE: [\[7\]](#)]

3.3 General terms**3.3.1****raw material**

primary or secondary material that is used to produce a product

Note 1 to entry: Primary raw material is a material which has never been processed into any form of end-use product.

Note 2 to entry: The term raw material refers to both extracted and non-extracted raw materials.

[SOURCE: [\[8\]](#), 3.2, modified – addition of Note 2 to entry.]

3.3.2

extracted raw material

is material or minimally processed material obtained by types of mining operations for use in construction works

Note 1 to entry: Soils and minerals are typical excavation products.

Note 2 to entry: Typical extracted material processing are washing, size selection, grinding etc.

3.3.3

non-extracted raw material

material or minimally processed grown material for use in construction works

EXAMPLE timber, straw, plant materials etc.

3.3.4

excavated material

masses that are excavated during construction or deconstruction

Note 1 to entry: Excavated material includes various types of soil and rock or secondary materials that are removed from the ground in order to create space for buildings or infrastructure or to deconstruct existing structures.

Note 2 to entry: Excavated materials arise particularly during civil engineering projects such as the construction or deconstruction of foundations, cellars, trenches or tunnels.

3.3.5

secondary material

material that has previously been processed or used, has been captured and undergone processing to produce new materials or products

EXAMPLE by-products of a process or manufacturing process, recycled materials, recovered materials etc.

Note 1 to entry: Secondary materials are intended to meet market demands and are subject to any validation, certification or standards associated with their intended use.

3.3.6

principle

fundamental basis for decision making or behaviour

[SOURCE: [\[9\]](#), 2.14]

3.3.7

decoupling

separation of economic development from increases in environmental pressure

Note 1 to entry: In a circular economy, raw material extraction is not related to production and use.

Note 2 to entry: In a circular economy, product production and use are not related to the production of waste.

3.3.8

technical service life

period during which a construction works or construction product remains functional and in use for its intended purpose

Note 1 to entry: This includes service, maintenance or repair that allows its continued use before the construction works or construction product reaches end of life.

3.3.9**durability**

ability of a product or material to retain its required properties during its intended service life in function as required, under specified conditions of use, maintenance, repair and update until a limiting state prevents its functioning

Note 1 to entry: Durability can be expressed in units appropriate to the part or product concerned, e.g., operating cycles, distance run, etc. The units should always be clearly stated.

Note 2 to entry: Durability is influenced by reliability, maintenance, repair and updates (e.g. in software).

[SOURCE: [\[10\]](#)]

3.3.10**waste**

material or product which the holder discards or intends to discard, or is required to discard

Note 1 to entry: Materials or products that are properly considered as waste should have reached their end of life and have no functional or economic value.

[SOURCE: [\[11\]](#), 3.102, modified]

3.3.11**end-of-life**

point in time during the life cycle at which a product or material is taken out of use and is disposed of

Note 1 to entry: Disposal could be in the form of incineration, deposit to landfill, or organic recycling.

Note 2 to entry: End of life refers to the point where the product or material has reached the end of its final use life.

[SOURCE: [\[1\]](#), 3.5,30, modified – Replacement of resource with material, addition of disposal of, note 2 to entry added.]

3.3.12**technical value**

ability of a material, component or product to fulfil the purpose expected of it and meet the functional requirements and performance demanded of it by any specifications, standards, regulation or compliance which it may fall under

EXAMPLE thermal insulation performance, mechanical properties, durability, waterproofing

3.3.13**functional value**

ability of a material, component or product to fulfil the purpose expected of it by society

Note 1 to entry: I.e. the material, component or product functions at a minimum level to meet its design criteria.

3.3.14**economic value**

value of an asset calculated according to its ability to produce income in the present or in the future

Note 1 to entry: The economic value is not e.g. the depreciation value. Instead it is related to fulfil its requirements usually beyond the depreciation period.

3.3.15**environmental value**

value of a material, product or construction to the local and global ecosystem

Note 1 to entry: The value can be positive or negative depending on whether it is a benefit or detriment.

Note 2 to entry: Both local and global ecosystems need to be considered. Local ecosystem changes include changes to water, soil quality, toxic waste etc. Global ecosystem changes include emissions to air, ground and water that impact more than the immediate environment.

3.3.16

social value

societal value

value that individuals, groups or societal groups place on the changes they experience in their lives

Note 1 to entry: The value can be positive or negative depending on whether it is a benefit or detriment.

3.3.17

product

physical-based object designed for or utilized with a purpose

Note 1 to entry: A product can be e.g. goods of any type; hardware (e.g. engine mechanical part, spare parts, consumables); processed materials (e.g. lubricant).

[SOURCE: [\[1\]](#), 3.2.2]

3.3.18

resource

asset that can be used in construction works that is not identifiable as a physical material or product

EXAMPLE water, air, energy

Note 1 to entry: Resource use and flows are quantified using resource flow analysis whilst material flow analysis is used to quantify amounts of materials or products.

3.4 Terms related to measurement and assessment

3.4.1

circularity performance

quantification of a material, component or product with reference to measurements that contribute to its circularity

3.4.2

circularity measurement

processes that contribute to the circularity performance of a material, component or product, the progress of actions and contribution to the principles and objectives as well as the circularity impacts through the collection, calculation or compilation of data or information

3.4.3

circularity evaluation

processes by which the data and information gathered in a circularity measurement are interpreted

3.4.4

circularity assessment

evaluation of the circularity performance in terms of the circularity impact(s) or of a material, component and product

3.4.5

circularity indicator

metric used to measure one or more elements characteristics of a material, component or products in a circularity performance rating

3.4.6

system in focus

system that is defined by selected boundaries and is the subject of circularity

3.4.7**system boundary**

boundary representing physical, process, temporal and geographical limits of what is included and what is not included in an assessment

[SOURCE: [\[12\]](#), 3.31]

3.4.8**life cycle assessment**

compilation and evaluation of the inputs, outputs, and the potential environmental impacts of a product system throughout its life cycle

3.4.9**use cycle****use life**

period of time in which a material, component or product is used before being reused, or discarded

3.4.10**life cycle**

consecutive and interlinked use cycles of a product's life, from raw material acquisition or generation from natural resources, or in the case of products which have previously been incorporated in a construction work, from the latest de-installation from the construction work, to final disposal

Note 1 to entry: In an ideal circular economy the life cycle spans an infinite time period as a product and its components and materials have unlimited numbers of use cycles.

[SOURCE: [\[11\]](#)]

3.4.11**resource flow analysis****RFA**

measurement of the inflows and outflows of all resources including emissions and losses from and into the system in focus

Note 1 to entry: In a properly conducted RFA the inflows and outflows of resources should be balanced.

3.4.12**material flow analysis****MFA**

measurement of the inflows and outflows of all materials including related emissions and losses from and into the system in focus

Note 1 to entry: In a properly conducted MFA the inflows and outflows of materials should be balanced.

3.5 Terms related to construction**3.5.1****built environment**

collection of man-made or induced physical objects located in a particular area or region

Note 1 to entry: When treated as a whole, the built environment typically is taken to include buildings, external works (landscaped areas), infrastructure and other construction works within the area under consideration.

[SOURCE: [\[3\]](#), 3.5]