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**Trajnostnost gradbenih objektov - Ocenjevanje trajnostnosti gradbenih inženirskih objektov - Računske metode**

Sustainability of construction works - Sustainability assessment of civil engineering works  
- Calculation methods

Nachhaltigkeit von Bauwerken - Bewertung der Nachhaltigkeit von Ingenieurbauwerken -  
Rechenverfahren

Contribution des ouvrages de construction au développement durable - Évaluation de la  
contribution au développement durable des ouvrages de génie civil - Méthodes de calcul

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**Sustainability of construction works - Sustainability  
assessment of civil engineering works - Calculation  
methods**

Contribution des ouvrages de construction au  
développement durable - Évaluation de la contribution  
au développement durable des ouvrages de génie civil -  
Méthodes de calcul

Nachhaltigkeit von Bauwerken - Bewertung der  
Nachhaltigkeit von Ingenieurbauwerken -  
Rechenverfahren

This European Standard was approved by CEN on 1 November 2021.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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**EN 17472:2022 (E)****European foreword**

This document (EN 17472:2022) has been prepared by Technical Committee CEN/TC 350 “Sustainability of construction works”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2022, and conflicting national standards shall be withdrawn at the latest by August 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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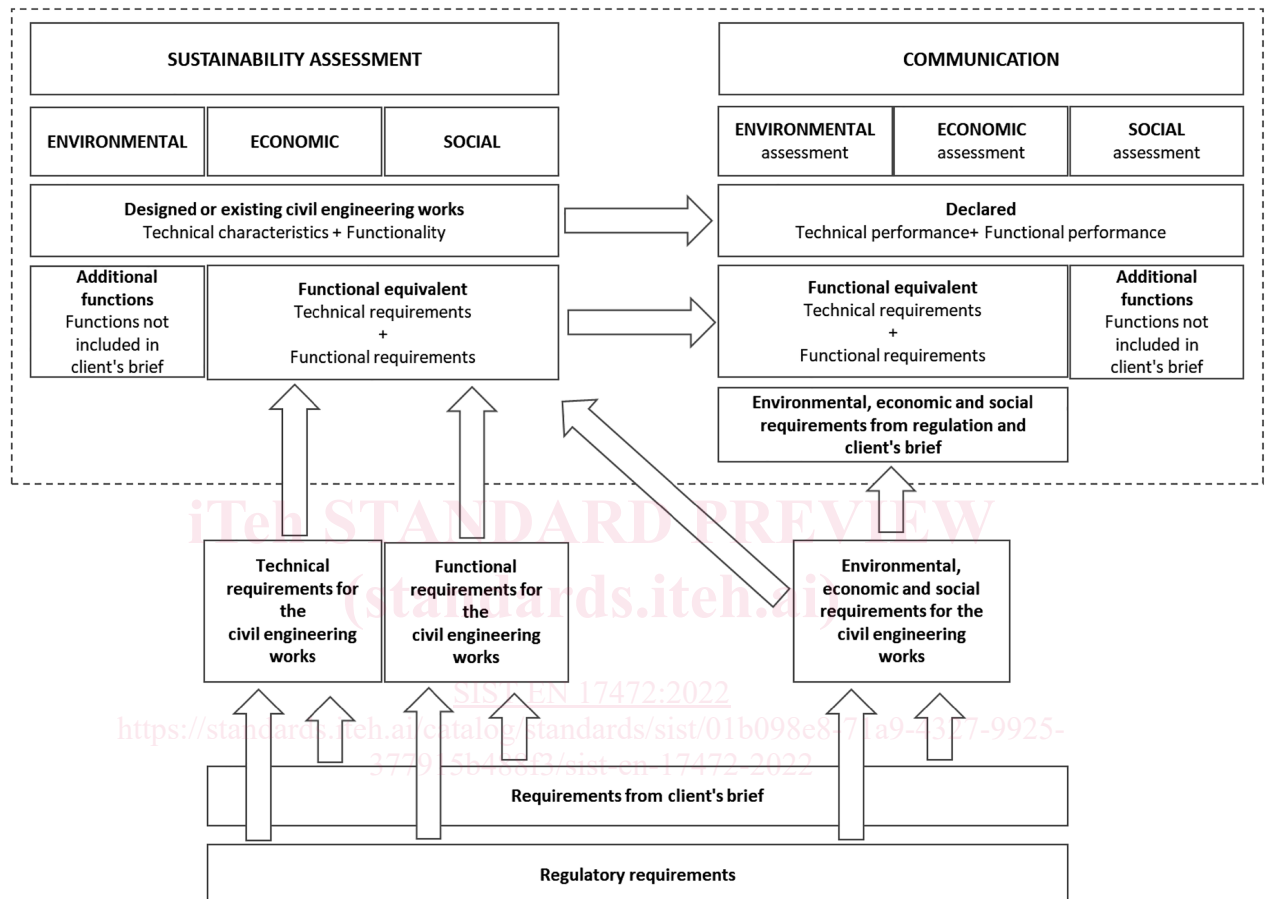
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## Introduction

This document provides rules for the assessment of the sustainability of civil engineering works including environmental, economic and social aspects.

Figure 1 illustrates how the assessment of the environmental, economic and social performances fits within the concept of the sustainability assessment of a civil engineering works.



NOTE The outer box with the dashed line represents the area standardized by CEN/TC 350 – Sustainability of construction works.

**Figure 1 — Concept of sustainability assessment of civil engineering works**

Those economic, social or environmental requirements not expressed in the sustainability assessment are communicated, too.

This document supports quantification of the contribution of the assessed civil engineering works to sustainable construction and sustainable development.

The evaluation of technical and functional performance is beyond the scope of this document. Technical and functional characteristics are taken into account here by reference to the functional equivalent, which also forms a basis for comparison of the results of assessments.

Although the assessment of technical and functional performance does not form part of this series of standards, their interrelationship with environmental, social and economic performance is a prerequisite for an assessment of sustainability of construction works and, therefore, is taken into account, as illustrated in Figure 1.

**EN 17472:2022 (E)**

The method of assessment of sustainability described in this document is based on a life cycle approach and provides a consistent model for describing and recording the civil engineering works and its life cycle for assessing the environmental, economic and social performance. For the assessment of the three aspects, the same reference study period is used.

The assessment of social performance differs from the assessment of economic and environmental aspects because it requires both quantitative and descriptive approaches.

The document sets requirements for:

- the description of the object of assessment;
- the system boundary that applies at the civil engineering works level;
- the procedure to be used for the analysis;
- definition of the indicators to be declared, information to be provided and the way in which they are collated and reported;
- presentation of the results in reporting and communication; and
- the data necessary for the application of the standard and calculation.

The economic assessment is undertaken at the civil engineering works level. However, it requires technical and cost information about individual products and components within the civil engineering works and its services and systems, including service life data, type and frequency of maintenance, replacement and repair, and deconstruction and disposal. This information is used as input quantities for the calculation of cost in the life cycle of the civil engineering works.

The framework and the general requirements for sustainability assessments of civil engineering works are specified in EN 15643. Further documents on sustainability assessment have already been developed by CEN/TC 350 or are currently under development. Table 1 gives an overview on relevant standards related to sustainability of construction works. Each standard has been assigned to either the framework level, the works level, or the product level according to the specifications it contains.



**Table 1 — Overview on relevant sustainability of construction works standards**

	Sustainability assessment			Technical characteristics	Functionality
	environmental	social	economic		
<b>Framework level</b>	EN 15643 Framework for assessment of buildings and civil engineering works			ISO 15686-1 <sup>c</sup> Service life planning	a
<b>Works level</b>	prEN 15978-1 Environmental performance of buildings	EN 16309 <sup>b</sup> Social performance of buildings	EN 16627 <sup>b</sup> Economic performance of buildings	EN ISO 52000-1 Energy performance of buildings	
	prEN 17680 Evaluation of potential for sustainable building refurbishment				
	EN 17472 Sustainability assessment of civil engineering works				
<b>Product level</b>	EN 15804 EPD core rules				
	CEN/TR 16970 Guidance for EN 15804				
	prEN 15941 data quality			ISO 15686-2 <sup>c</sup> Service life prediction procedures	
	EN 15942 Communication format B-to-B			ISO 15686-7 <sup>c</sup> Performance evaluation for feedback of service life data from practice	
	prEN 17672 Horizontal rules for B-to-C communication			ISO 15686-8 <sup>c</sup> Reference service life and service-life estimation	
	prEN ISO 22057 Data templates for the use of EPDs in BIM				
	CEN/TR 17005 Additional impact categories and indicators				
NOTE 1 The complete titles of the documents shown above can be found in Clause 3 or in the Bibliography.					
NOTE 2 The documents in the grey fields are part of the current CEN/TC 350 work programme.					
a Functional requirements are part of the client's brief and building regulations.					
b The revision of EN 16309 and EN 16627 as parts 2 and 3 of EN 15978 is under preparation in CEN/TC 350.					
c The document has been developed by ISO/TC 59/SC 14 "Design life".					

## 1 Scope

This document establishes the requirements and specific methods for the assessment of environmental, economic and social performances of a civil engineering works while taking into account the civil engineering works' functionality and technical characteristics. By the means of this document the decision making for a project is supported by providing a standardized method for enabling comparability of scheme options.

The assessment of environmental and economic performances of a civil engineering works is based on Life Cycle Assessment (LCA), Life Cycle Cost (LCC), Whole-Life Cost (WLC) and other quantified environmental and economic information. The approach to the assessment covers all stages of the civil engineering works life cycle and includes all civil engineering works related construction products, processes and services, used over its life cycle.

This document is applicable to new and existing civil engineering works and refurbishment projects. The environmental performance is based on data obtained from Environmental Product Declarations (EPD) and additional indicators.

This document is not applicable for the assessment of the environmental, social and economic performance of building(s) as part of the civil engineering works; instead, EN 15978, EN 16309 and EN 16627 apply.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15804, *Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products*

EN 16309, *Sustainability of construction works — Assessment of social performance of buildings — Calculation methodology*

EN ISO 52000-1, *Energy performance of buildings — Overarching EPB assessment — Part 1: General framework and procedures (ISO 52000-1)*

ISO 15686-1, *Buildings and constructed assets — Service life planning — Part 1: General principles and framework*

ISO 15686-2, *Buildings and constructed assets — Service life planning — Part 2: Service life prediction procedures*

ISO 15686-5, *Buildings and constructed assets — Service life planning — Part 5: Life-cycle costing*

ISO 15686-7, *Buildings and constructed assets — Service life planning — Part 7: Performance evaluation for feedback of service life data from practice*

ISO 15686-8, *Buildings and constructed assets — Service-life planning — Part 8: Reference service life and service-life estimation*

ISO 1996-2, *Acoustics — Description, measurement and assessment of environmental noise — Part 2: Determination of sound pressure levels*

### 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

#### 3.1

##### **accessibility**

ability for users to access the service(s) that the civil engineering works is providing and/or to access nature

Note 1 to entry: Examples of services that can be provided include water or energy supply and mobility service.

#### 3.2

##### **adaptability**

ability of the object of assessments or parts thereof to be changed or modified to make suitable for a particular use

[SOURCE: ISO 21929-1:2011, 3.4, modified – “of the object of assessments or parts thereof” has been added.]

#### 3.3

##### **adaptation to climate change**

climate change adaptation

process of adjustment to actual or expected climate and its effects

Note 1 to entry: In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities.

Note 2 to entry: In some natural systems, human intervention can facilitate adjustment to expected climate and its effects.

[SOURCE: ISO 14090:2019, 3.1]

#### 3.4

##### **appliance**

device or piece of equipment designed to perform a specific task

#### 3.5

##### **area of influence**

area or combination of areas surrounding a civil engineering works that can be affected with changes to their economic, environmental or social conditions by the civil engineering works' operations throughout its life cycle

Note 1 to entry: The area of influence is variable and dependent on the civil engineering works project, its location and its life cycle stage.

Note 2 to entry: The area of influence is defined per aspect.

Note 3 to entry: The area of influence concerns only the civil engineering works and not construction products. Example: Stones coming from China, China is not in the influence area.

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[SOURCE: ISO/TS 21929-2:2015, 3.2, modified – The second sentence from Note 1 has been removed, the Notes 2 and 3 have been added.]

**3.6**  
**assembled system**  
**part of works**

component or a set of components incorporated in the civil engineering works

**3.7**  
**brief**

document that states the client's requirements for a construction project

[SOURCE: ISO 6707-2:2017, 3.2.18, modified – “client's” and “construction” has been added.]

**3.8**  
**building**

construction works that has the provision of shelter for its occupants or contents as one of its main purposes, usually enclosed and designed to stand permanently in one place

[SOURCE: ISO 6707-1:2020, 3.1.1.3, modified – “partially and totally” and Note 1 have been removed.]

**3.9**  
**civil engineering works**

construction works comprising a structure, such as a dam, bridge, road, railway, runway, utilities, pipeline, or sewerage system, or the result of operations such as dredging, earthwork, geotechnical processes, but excluding a building and its associated site works

[SOURCE: ISO 6707-1:2020, 3.1.1.2, modified – Note 1 has been removed.]

**3.10**  
**climate**

statistical description of weather in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years

Note 1 to entry: The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization.

Note 2 to entry: The relevant quantities are most often near-surface variables such as temperature, precipitation and wind.

[SOURCE: ISO 14090:2019, 3.4]

**3.11**  
**climate change**

change in climate that persists for an extended period, typically decades or longer

Note 1 to entry: Climate change can be identified by such means as statistical tests (e.g. on changes in the mean, variability).

Note 2 to entry: Climate change might be due to natural processes, internal to the climate system, or external forcings such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use.

[SOURCE: ISO 14090:2019, 3.5]

**3.12****client**

person or organization initiating and financing a project and approving the brief

[SOURCE: ISO 6707-1:2020]

**3.13****construction product**

item manufactured or processed for incorporation in civil engineering works

Note 1 to entry: Construction products are items supplied by a single responsible body.

[SOURCE: ISO 6707-1:2020, 3.4.1.2, modified – “construction works” has been replaced by “civil engineering works”; Note 1 has been replaced.]

**3.14****component**

construction product manufactured as a distinct unit to serve a specific function or functions

**3.15****construction site**

area of land or water where construction work or civil engineering works is undertaken

[SOURCE: ISO 6707-1:2020, 3.1.1.5, modified – “other development” has been replaced by “civil engineering works”.]

**3.16****construction work**

activities of forming a civil engineering works

[SOURCE: ISO 6707-1:2020, 3.5.1.1, modified – “construction works” has been replaced by “a civil engineering works”.]

**3.17****construction works**

everything that is constructed or results from construction operations

Note 1 to entry: Refers to both building and civil engineering works.

[SOURCE: ISO 6707-1:2020, 3.1.1.1, modified – Note 1 has been removed.]

**3.18****decommissioning**

activities that change a building or a civil engineering works or an assembled system from an operational status to a non-operational status

**3.19****design life**

service life intended by the designer

[SOURCE: ISO 15686-1:2011, 3.3]

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## 3.20

**discount rate**

factor or rate used to convert future expenses or incomes to their present value reflecting the time value of money

## 3.21

**disposal**

waste treatment operation other than recovery even where the operation has a secondary consequence the reclamation of substances or energy

[SOURCE: Directive 2008/98/EC, modified – “disposal means any operation which is not” has been replaced by “waste treatment operation other than” in the definition; “Annex I sets out a non-exhaustive list of disposal operations” has been removed.]

## 3.22

**downstream process**

process that is carried out after the designated process in the stream of relevant processes

[SOURCE: ISO 21931-1:2010, 3.2]

## 3.23

**economic aspect**

characteristic of civil engineering works, part of works, processes or services related to their life cycle that can cause change to economic conditions

[SOURCE: ISO 15392:2019, 3.12, modified – “construction works” has been replaced by “civil engineering works”.]

## 3.24

**economic impact**

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

[SOURCE: ISO 15392:2019, 3.13.1, modified – definition of “impact” has been integrated in the definition.]

## 3.25

**economic performance**

performance related to economic impacts and economic aspects

## 3.26

**environmental aspect**

characteristic of civil engineering works, part of works, processes or services related to their life cycle that can cause change to the environment

[SOURCE: ISO 15392:2019, 3.13, modified – “construction works” has been replaced by “civil engineering works”.]

## 3.27

**environmental impact**

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

[SOURCE: ISO 15392:2019, 3.17.2, modified – definition of “impact” has been integrated in the definition.]

**3.28****environmental performance**

performance related to environmental impacts and environmental aspects

[SOURCE: ISO 15392:2019, 3.16, modified – Note 1 has been removed.]

**3.29****escalation rate**

positive or negative factor or rate reflecting an estimate of differential increase/decrease in the general price level for a particular commodity, or group of commodities, or resource

[SOURCE: ISO 15686-1:2011, 3.3.2, modified – Note 1 has been removed.]

**3.30****estimated service life**

service life that a building or civil engineering works or an assembled system would be expected to have in a set of specific in-use conditions, determined from reference service life data after taking into account any differences from the reference in-use conditions

[SOURCE: ISO 15686-1:2011, 3.7, modified – “civil engineering works or an assembled system” has been added in the definition.]

**3.31****exported energy**

energy, expressed per energy carrier, supplied by the technical building systems or integrated technical systems of works through and beyond the system boundary

Note 1 to entry: The term “exported utilities” is used in this document to describe utilities, such as electricity, water, heat, which may be exported.

[SOURCE: EN ISO 52000-1:2017, 3.4.20, modified – “or integrated technical systems of works”, and “and beyond” have been added; “assessment boundary” has been replaced with “system boundary”; Note 1 has been replaced and Note 2 has been removed.]

**3.32****functional equivalent**

quantified functional requirements and/or technical requirements for a building or civil engineering works or an assembled system for use as a basis for comparison

[ISO 21931-1:2010, 3.7, modified – “or civil engineering works or an assembled system” has been added.]

**3.33****functional performance**

performance related to the functionality of a civil engineering works or an assembled system which is required by the client, users and/or by regulations

**3.34****functional requirement**

type and level of functionality of a building, civil engineering works or assembled system which is required by the client, users and/or by regulations

**3.35****functionality**

suitability or usefulness for a specific purpose or activity

[SOURCE: ISO 15686-10:2010, 3.13]