

<b>STN</b>	<b>Trvalá udržateľnosť výstavby</b> <b>Posudzovanie udržateľnosti inžinierskych stavieb</b> <b>Metódy výpočtu</b>	<b>STN</b> <b>EN 17472</b>  73 0905
------------	---	--

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

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 06/22

Obsahuje: EN 17472:2022

**134764**

EUROPEAN STANDARD

EN 17472

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2022

ICS 91.040.01

English Version

## 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.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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

**EN 17472:2022 (E)**

<b>Contents</b>		<b>Page</b>
<b>European foreword</b> .....		<b>4</b>
<b>Introduction</b> .....		<b>5</b>
<b>1</b>	<b>Scope</b> .....	<b>8</b>
<b>2</b>	<b>Normative references</b> .....	<b>8</b>
<b>3</b>	<b>Terms and definitions</b> .....	<b>9</b>
<b>4</b>	<b>Abbreviations</b> .....	<b>23</b>
<b>5</b>	<b>The process for the assessment</b> .....	<b>23</b>
<b>6</b>	<b>Purpose of the assessment</b> .....	<b>24</b>
<b>7</b>	<b>Specification of the object of assessment</b> .....	<b>25</b>
<b>7.1</b>	<b>General</b> .....	<b>25</b>
<b>7.2</b>	<b>Functional equivalent</b> .....	<b>25</b>
<b>7.3</b>	<b>Reference study period</b> .....	<b>27</b>
<b>7.4</b>	<b>System boundary</b> .....	<b>28</b>
<b>7.5</b>	<b>Civil engineering works' model</b> .....	<b>36</b>
<b>7.6</b>	<b>Additional functions</b> .....	<b>37</b>
<b>8</b>	<b>Scenarios for defining the civil engineering works life cycle</b> .....	<b>38</b>
<b>8.1</b>	<b>General</b> .....	<b>38</b>
<b>8.2</b>	<b>Requirements for scenarios</b> .....	<b>39</b>
<b>8.3</b>	<b>Scenarios for the pre-construction stage (Module A0)</b> .....	<b>39</b>
<b>8.4</b>	<b>Scenarios for the product stage (Modules A1, A2 and A3)</b> .....	<b>39</b>
<b>8.5</b>	<b>Scenarios for the construction process stage (Modules A4 and A5)</b> .....	<b>39</b>
<b>8.6</b>	<b>Scenarios for use stage (Modules B1-B8)</b> .....	<b>40</b>
<b>8.7</b>	<b>Scenarios for the end of life stage (Modules C1 to C4)</b> .....	<b>42</b>
<b>8.8</b>	<b>Scenarios for benefits and loads beyond the system boundary (Module D)</b> .....	<b>43</b>
<b>9</b>	<b>Quantification of materials and products</b> .....	<b>43</b>
<b>9.1</b>	<b>General</b> .....	<b>43</b>
<b>9.2</b>	<b>Specification net amount</b> .....	<b>43</b>
<b>9.3</b>	<b>Specification gross amount</b> .....	<b>44</b>
<b>10</b>	<b>Data for the assessment</b> .....	<b>45</b>
<b>10.1</b>	<b>General</b> .....	<b>45</b>
<b>10.2</b>	<b>Data quality</b> .....	<b>46</b>
<b>10.3</b>	<b>Selection of environmental data</b> .....	<b>46</b>
<b>10.4</b>	<b>Selection of social data</b> .....	<b>47</b>
<b>10.5</b>	<b>Selection of economic data</b> .....	<b>48</b>
<b>11</b>	<b>Methods for assessment of environmental, economic and social performance</b> .....	<b>49</b>
<b>11.1</b>	<b>General</b> .....	<b>49</b>
<b>11.2</b>	<b>Environmental performance</b> .....	<b>51</b>
<b>11.3</b>	<b>Social performance</b> .....	<b>60</b>
<b>11.4</b>	<b>Economic performance</b> .....	<b>83</b>
<b>11.5</b>	<b>Management mechanisms</b> .....	<b>90</b>
<b>12</b>	<b>Reporting and communication</b> .....	<b>91</b>
<b>12.1</b>	<b>General</b> .....	<b>91</b>
<b>12.2</b>	<b>Information on the assessment</b> .....	<b>91</b>

<b>12.3</b>	<b>Statement of boundaries, scenarios used, and additional functions considered in the assessment</b> .....	<b>92</b>
<b>12.4</b>	<b>Data sources</b> .....	<b>92</b>
<b>12.5</b>	<b>Communication of assessment results</b> .....	<b>92</b>
<b>13</b>	<b>Verification of results</b> .....	<b>94</b>
	<b>Annex A (informative) Energy use – case studies</b> .....	<b>95</b>
<b>A.1</b>	<b>General</b> .....	<b>95</b>
<b>A.2</b>	<b>Study case: hydroelectric power plant</b> .....	<b>95</b>
<b>A.2.1</b>	<b>Description of the civil engineering works</b> .....	<b>95</b>
<b>A.2.2</b>	<b>Description of the energy production and consumption unit(s)</b> .....	<b>95</b>
<b>A.2.3</b>	<b>Scenario and boundary limit for the assessment</b> .....	<b>95</b>
	<b>Annex B (informative) Noise emissions calculation</b> .....	<b>97</b>
	<b>Annex C (informative) Examples of climate change impacts</b> .....	<b>98</b>
	<b>Annex D (informative) Websites with European climate scenarios</b> .....	<b>101</b>
	<b>Annex E (informative) List of indicators in this document</b> .....	<b>102</b>
	<b>Bibliography</b> .....	<b>116</b>

**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.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

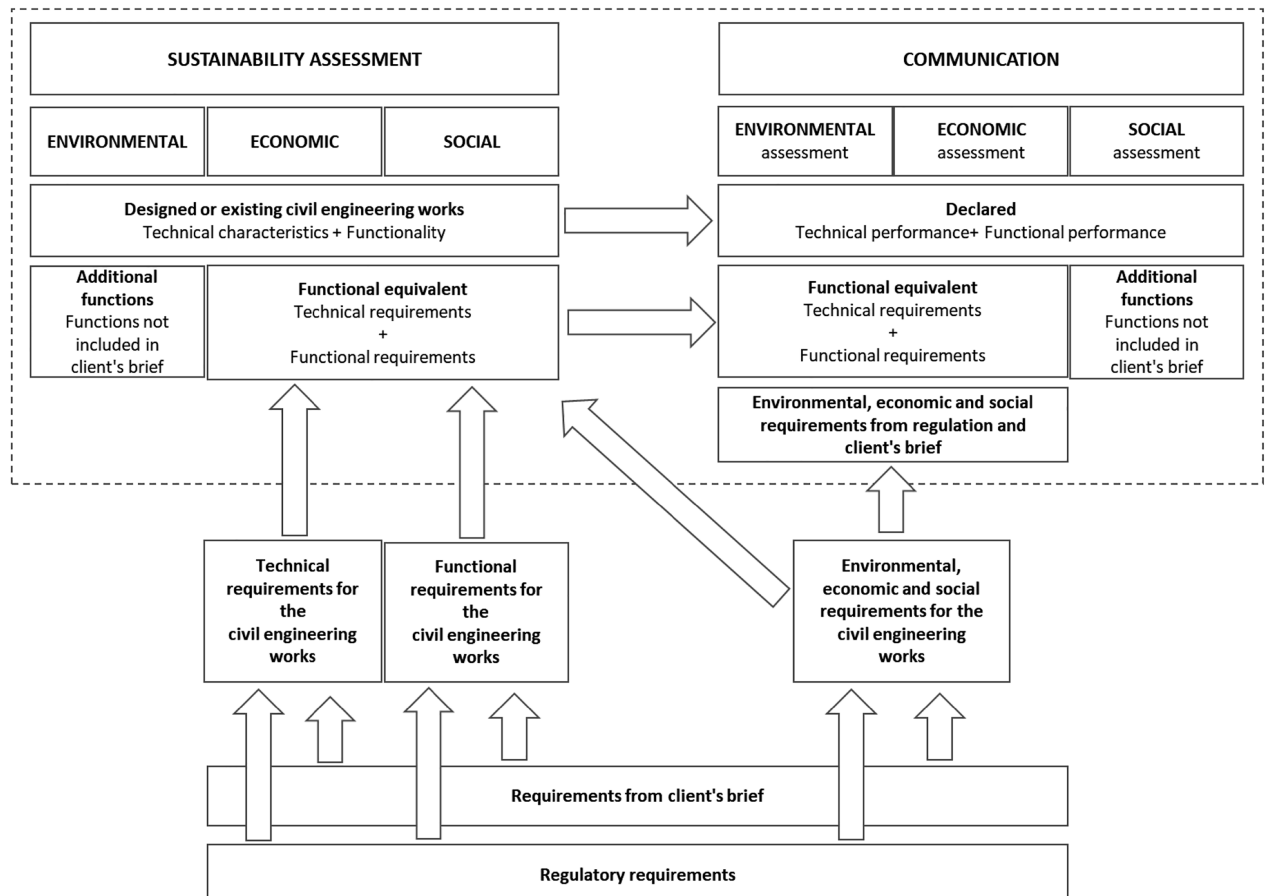
Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 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			ISO 15686-2 <sup>c</sup> Service life prediction procedures  ISO 15686-7 <sup>c</sup> Performance evaluation for feedback of service life data from practice  ISO 15686-8 <sup>c</sup> Reference service life and service-life estimation	
	CEN/TR 16970 Guidance for EN 15804				
	prEN 15941 data quality				
	EN 15942 Communication format B-to-B				
	prEN 17672 Horizontal rules for B-to-C communication				
	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".					



## EN 17472:2022 (E)

### 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*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**