SLOVENSKI STANDARD
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Trajnostnost gradbenih objektov - Ocenjevanje trajnostnosti stavb in gradbenih inženirskih objektov - 5. del: Okvir za določitev posebnih načel in zahtev za gradbene inženirske objekte

Sustainability of construction works - Sustainability assessment of buildings and civil engineering works - Part 5: Framework on specific principles and requirement for civil engineering works

Nachhaltigkeit von Bauwerken - Bewertung der Nachhaltigkeit von Gebäuden und Ingenieurbauwerken - Teil 5: Leitfaden zu den Grundsätzen für und den Anforderungen an Ingenieurbauwerke

Contribution des ouvrages de construction au développement durable - Évaluation de la contribution des bâtiments et des ouvrages de génie civil au développement durable - Partie 5 : Cadre méthodologique définissant les principes et les exigences spécifiques aux ouvrages de génie civil

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Sustainability of construction works - Sustainability assessment of buildings and civil engineering works - Part 5: Framework on specific principles and requirement for civil engineering works

Contribution des ouvrages de construction au développement durable - Évaluation de la contribution des bâtiments et des ouvrages de génie civil au développement durable - Partie 5 : Cadre méthodologique définissant les principes et les exigences spécifiques aux ouvrages de génie civil

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This European Standard was approved by CEN on 16 July 2017.

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European foreword

This document (EN 15643-5:2017) 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of an identical text or by endorsement, at the latest by May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

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 is part of a series of standards that consists of the following parts:

— EN 15643-1, *Sustainability of construction works - Sustainability assessment of buildings - Part 1: General framework*

— EN 15643-2, *Sustainability of construction works - Assessment of buildings - Part 2: Framework for the assessment of environmental performance*

— EN 15643-3, *Sustainability of construction works - Assessment of buildings - Part 3: Framework for the assessment of social performance*

— EN 15643-4, *Sustainability of construction works - Assessment of buildings - Part 4: Framework for the assessment of economic performance*

— EN 15643-5, *Sustainability of construction works - Sustainability assessment of buildings and civil engineering works - Part 5: Framework on specific principles and requirement for civil engineering works*

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard forms part of a series of European Standards, written by CEN/TC 350, that provide a system for the sustainability assessment of civil engineering works using a life cycle approach. The sustainability assessment quantifies aspects and impacts to assess the environmental, social and economic performance of civil engineering works using quantifiable indicators measured without value judgements. The purpose of this series of standards is to enable comparability of the results of assessments. This series of European Standards does not set benchmarks or levels of performance.

This series of standards will allow the sustainability assessment, i.e. the assessment of environmental, social and economic performance of a civil engineering works, to be made concurrently and on an equal footing, on the basis of the technical characteristics and functionality of the object of assessment.

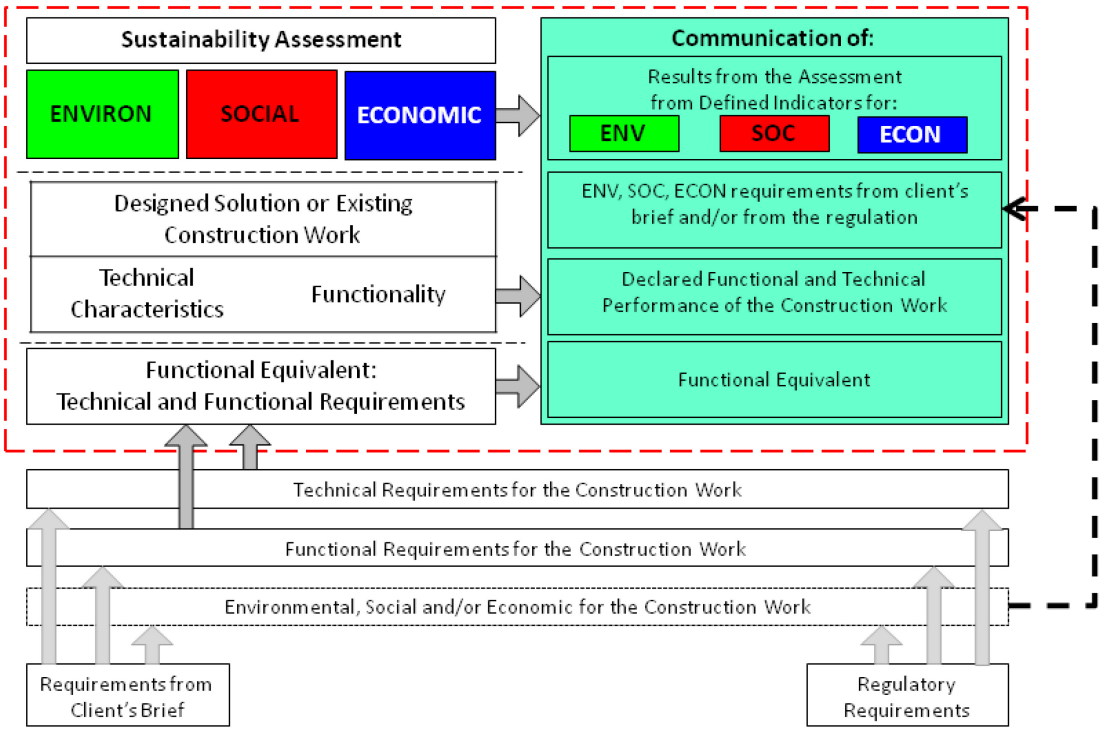
The sustainability assessment of civil engineering works uses different types of information. The results of a sustainability assessment of a civil engineering works provide information on the different types of indicators, the related civil engineering works scenarios, and the life cycle stages included in the assessment.

In carrying out assessments, scenarios and a functional equivalence are determined at the civil engineering works level. Assessment at the civil engineering works level means that the descriptive model of the works with the major technical and functional requirements has been defined in the client's brief or in the regulations, as illustrated in Figure 1.

Assessments can be undertaken either for the whole civil engineering works, for a part of the civil engineering works or for a combination of several civil engineering works.

Although the evaluation of technical and functional performance is beyond the scope of this series of standards, the technical and functional characteristics are considered within this framework by reference to the functional equivalence. The functional equivalence takes into account the technical and functional requirements and forms the basis for comparisons of the results of the assessment.

Any particular demands for, or related to, the environmental, social and economic performance defined in the client's brief, or in regulations, may be declared and communicated. Figure 1 shows how the functional equivalence, and the technical and functional characteristics that differ from those required, either by the client's brief or through regulations, are to be declared and communicated with the results of the assessment.



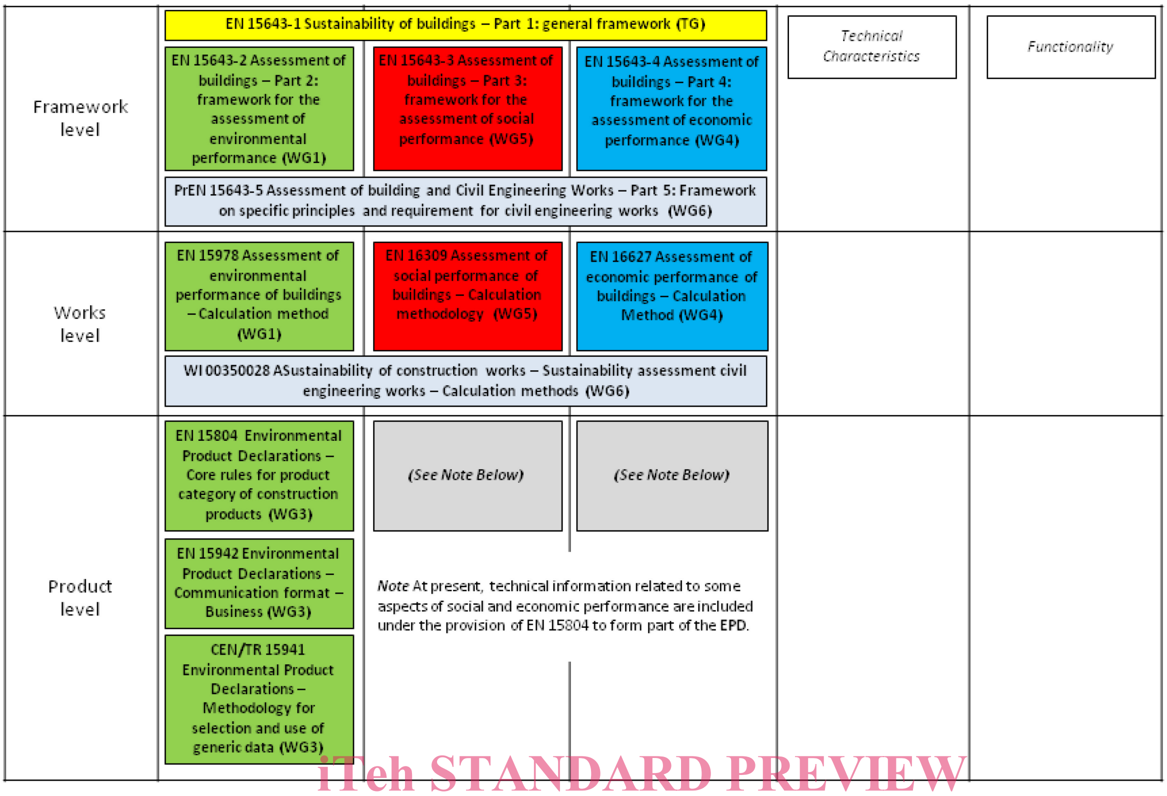
NOTE The outer box with the dotted line represents the area standardized by CEN/TC 350.

Figure 1 — Concept of sustainability assessment of Civil engineering works

In concept, the integrated civil engineering works performance incorporates environmental, social and economic performance as well as the technical and functional performance, and these are intrinsically related to each other, as illustrated in Figure 2. 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 performance of civil engineering works and, therefore, is taken into account.

The users utilization impacts and aspect are part of the assessment, including those related to the possible ways of use of the infrastructure, the users utilization, and the way of capitalizing from the investment (e.g. the fuel consumed by the cars users of a road).

It is advisable to carry out an assessment at the earliest opportunity during the conceptual stages of a construction or refurbishment project such as in the initial planning stage in order to provide a broad estimate of the environmental performance, social performance and economic performance. As the project evolves, the assessment may be periodically reviewed and updated to support decision-making. A final assessment (as-built) should be carried out. The results of this final assessment can be used to inform all parties concerned, and also serve as the database for future new similar projects.



NOTE The coloured boxes represent the current work programme of CEN/TC 350.

Figure 2 — Work program of CEN/TC 350

This framework is a part of the framework standards for sustainability assessment of civil engineering works. The purpose of this EN 15643-5 is to provide a framework with principles, requirements and guidelines for the assessment of the environmental, social and economic performance of a civil engineering works at the “framework level”. In the drafting of this European Standard, ISO 21930 and ISO/TS 21929-2 have been taken into consideration.

1 Scope

This European Standard provides specific principles and requirements for the assessment of environmental, social and economic performance of civil engineering works taking into account its technical characteristics and functionality. Assessments of environmental, social and economic performance are the three aspects of sustainability assessment of civil engineering works.

The framework applies to all types of civil engineering works, both new and existing, and it is relevant for the assessment of the environmental, social and economic performance of new civil engineering works over their entire life cycle, and of existing civil engineering works over their remaining service life and end of life stage.

The sustainability performance assessment of civil engineering works concentrates on the assessment of aspects and impacts of civil engineering works expressed with quantifiable indicators. It includes the assessment of a civil engineering works' influence on the environmental, social and economic impacts and aspects of the local infrastructure beyond the area of the civil engineering works, and environmental impacts and aspects resulting from transportation of the users of the civil engineering works and the use and exploitation of the infrastructure itself. It excludes environmental, social and economic risk assessment, but the results of the risk assessment should be taken into consideration.

The European Standards developed under this framework do not set the rules for how the different assessment methodologies may provide valuation methods; nor do they prescribe levels, classes or benchmarks for measuring performance.

NOTE Valuation methods, levels, classes or benchmarks can be prescribed in the requirements for environmental, social and economic performance in the client's brief, construction regulations, national standards, national codes of practice, civil engineering works assessment and certification schemes, etc.

The rules for assessment of environmental, social and economic aspects of organizations, such as management systems, are not included within this framework. However, the consequences of decisions or actions that influence the environmental, social and economic performance of the object of assessment are taken into account.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 15978, *Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method*

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

EN 16627, *Sustainability of construction works - Assessment of economic performance of buildings - Calculation methods*

EN ISO 14044, *Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044)*

ISO 15392:2008, *Sustainability in building construction — General principles*

ISO 15686-1:2011, *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 15686-7, *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/TS 15686-9, *Buildings and constructed assets — Service-life planning — Part 9: Guidance on assessment of service-life data*

ISO/TS 21929-2, *Sustainability in building construction — Sustainability indicators — Part 2: Framework for the development of indicators for civil engineering works*

3 Terms and definitions

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

3.1
area of influence
area or combination of areas surrounding a civil engineering works that can be affected with changes to their economical, environmental or social conditions by the civil engineering works' operations throughout its life cycle

Note 1 to entry: The area of influence is defined per aspect.

Note 2 to entry: The area of influence is variable and dependent on the civil engineering works project, its location and its life cycle stage.

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

[SOURCE: ISO/TS 21929-2:2015]

3.2
assembled system
part of works
component or a set of components incorporated in the civil engineering works

Note 1 to entry: Adapted from the definitions in the Construction Products Directive (CPD) Guidance Paper C and from the definition of construction in ISO 6707-1:2014.

3.3
brief
written document that states the client's requirements for a construction project

Note 1 to entry: Adapted from ISO 6707-2:2014.

3.4
building
construction works that has the provision of shelter for its occupants or contents as one of its main purposes and is usually enclosed and designed to stand permanently in one place

[SOURCE: ISO 6707-1:2014, modified]

3.5
building-integrated technical system
installed technical equipment to support operation and maintenance of a building or civil engineering works

Note 1 to entry: This includes technical building systems and other systems for sanitation, security, fire safety, internal transport, building automation and control, and IT communications.

Note 2 to entry: These systems are used in many civil engineering works, to provide necessary services.

3.6
construction site
specified area of land where a building or a civil engineering works is located or is defined to be located and construction work of the building or civil engineering works and associated external works are undertaken

Note 1 to entry: Adapted from the definition of site in ISO 6707-1:2014

3.7
built environment
collection of buildings, civil engineering works, external works (landscape area), associated infrastructures and other civil engineering works within an area

Note 1 to entry: Adapted from the definition of environment in ISO 6707-1:2014.

3.8
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/TS 21929-2:2015]

3.9
client
person or organisation that requires a building or civil engineering works to be provided, altered or extended and is responsible for initiating and approving the brief

Note 1 to entry: Adapted from ISO 6707-1:2014.

3.10
component
construction product manufactured as a distinct unit to serve a specific function or functions

[SOURCE: ISO 6707-1:2014]

3.11
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.

Note 2 to entry: Adapted from the definition in ISO 6707-1:2014 according to the recommendation of ISO/TC59/AHG Terminology.

3.12
construction work
activities of forming a civil engineering works

[SOURCE: ISO 6707-1:2014]

3.13
construction works
everything that is constructed or results from construction operations

Note 1 to entry: This covers both building and civil engineering works, and both structural and non-structural elements.

Note 2 to entry: Adapted from the definition in ISO 6707-1:2014.

3.14
cut-off criteria
specification of the amount of resource flows or the level of significance associated with unit processes or product system to be excluded from a study

[SOURCE: EN ISO 14044:2006]

3.15
characterization factor
factor derived from a characterization model which is applied to convert an assigned life cycle inventory analysis result to the common unit of the category indicator

Note 1 to entry: The common unit allows calculation of the category indicator result.

[SOURCE: EN ISO 14044:2006]

3.16
decommissioning
activities that change a building or a civil engineering works or an assembled system (part of works) from an operational status to a non-operational status

3.17
delivered energy
total energy, expressed per energy carrier, supplied to the technical system of works through the system boundary to satisfy the uses taken into account or to produce energy

[SOURCE: EN 15603:2008]

3.18
design life
service life intended by the designer

[SOURCE: ISO 15686-1:2011]

3.19
disposal
waste treatment operation other than recovery

Note 1 to entry: Adapted from the definition in Directive 2008/98/EC.