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Trajnostnost gradbenih objektov - Metodologija za ocenjevanje učinkovitosti stavb - 1. del: Okoljska učinkovitost

Sustainability of construction works - Methodology for the assessment of performance of buildings - Part 1: Environmental Performance

Nachhaltigkeit von Bauwerken - Methodik zur Bewertung der Qualität von Gebäuden - Teil 1: Umweltqualität

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English Version

Sustainability of construction works - Methodology for the assessment of performance of buildings - Part 1: Environmental Performance

Nachhaltigkeit von Bauwerken - Methodik zur Bewertung der Qualität von Gebäuden - Teil 1: Umweltqualität

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

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European foreword

This document (prEN 15978-1:2021) has been prepared by Technical Committee CEN/TC 350 “Sustainability of construction works”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15978:2011.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of EU Directive(s).

Introduction

The purpose of this document is to provide calculation rules for the assessment of the environmental performance of new and existing buildings.

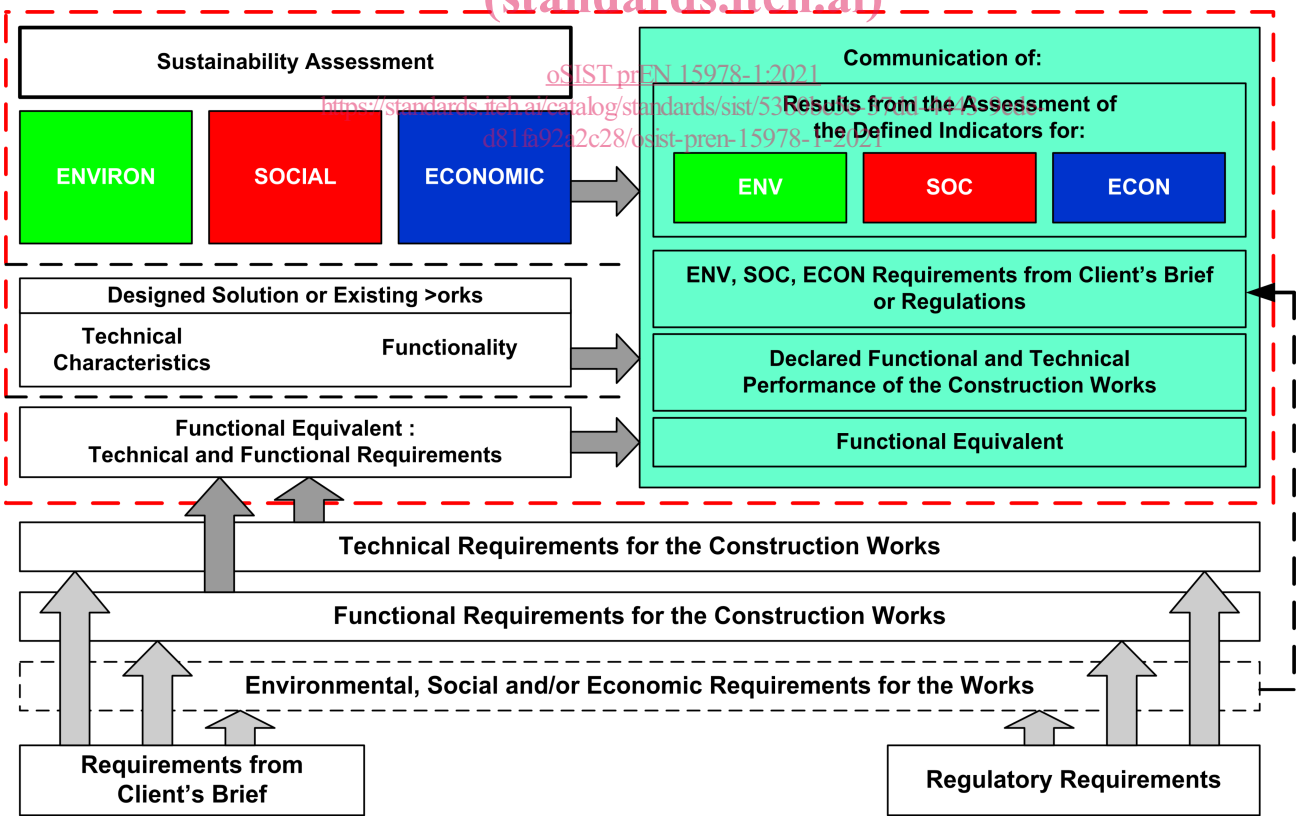
This document is part of a suite of European Standards, Technical Specifications and Technical Reports for the assessment of the environmental performance of buildings that together support quantification of the contribution of the assessed building to sustainable construction and sustainable development.

The environmental performance of a building is only one aspect of its sustainability. The social and economic performance of the building are also aspects of sustainability that should be assessed as part of a sustainability assessment. These are described in the framework standard (EN 15643).

NOTE 1 The environmental assessment at building level requires information from products and services (EN 15804).

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.

This document is intended to support the decision-making process and documentation of the assessment of the environmental performance of a building. Although the assessment results are based on realistic scenarios, they may not fully reflect the actual and future performance of the building. Figure 1 — Concept of sustainability assessment of buildings illustrates how the assessment of the environmental performance takes place within the concept of the sustainability assessment of buildings.



NOTE 2 The outer box with the red dotted line represents the area standardized by CEN/TC 350.

Figure 1 — Concept of sustainability assessment of buildings

In this document, the assessment method for the quantitative evaluation of the environmental performance of the building is based on a life cycle approach. The general requirements for sustainability assessment of buildings are described in EN 15643 (the general framework standard). Other standards developed by CEN/TC 350 in this area, and how they are related to this European Standard, are shown in Figure 2

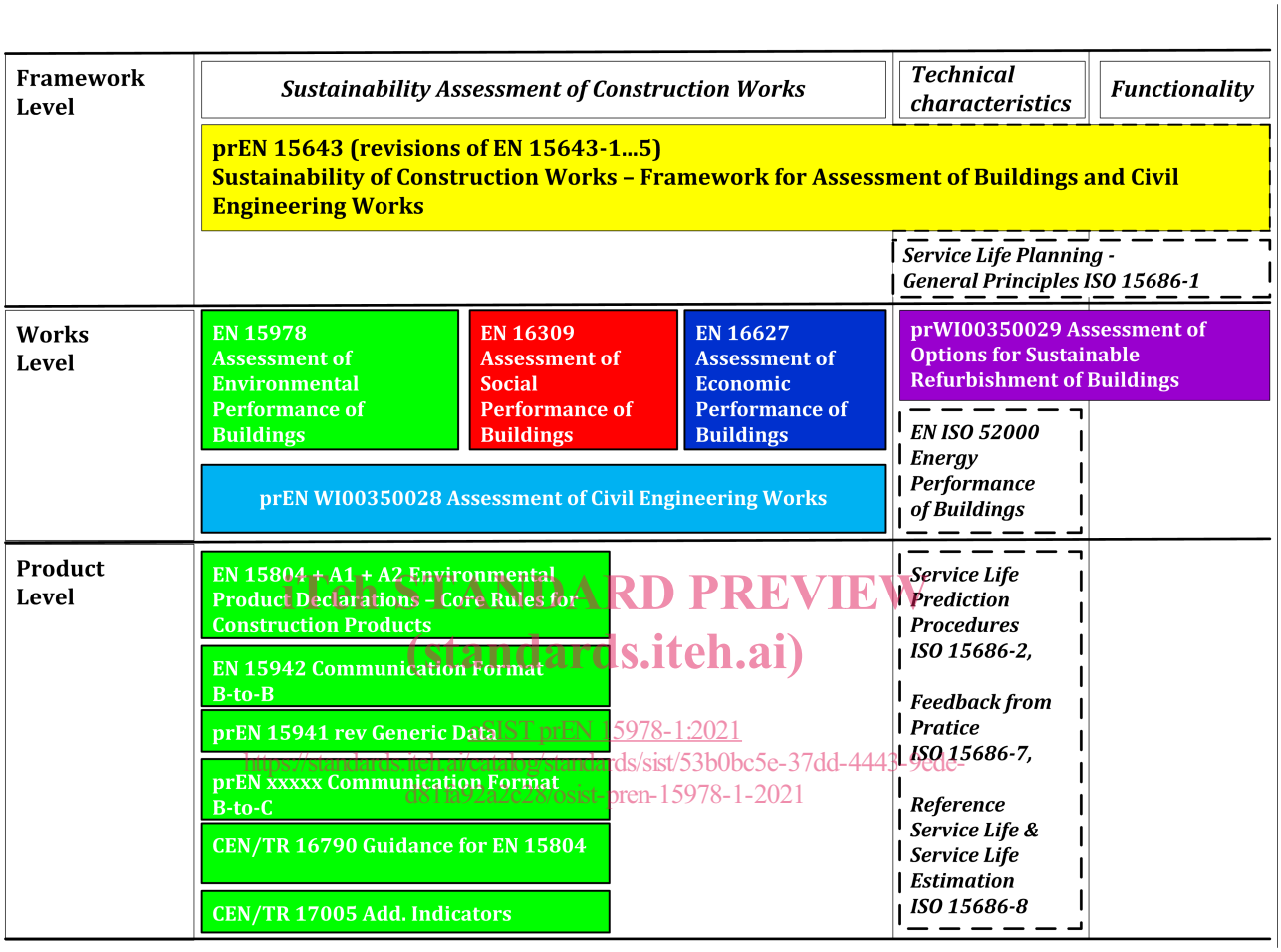


Figure 2 — Standards of CEN/TC 350

NOTE 3 EN15978-1 supports the assessment of buildings within the Level(s) Framework (see Bibliography) for macro objectives 1, 2, 3 and 7. Other standards from TC350 can also support Levels macro Objectives 4 and 5 (EN16309) and macro objective 6 (EN 16627)

Buildings and constructed assets have an impact on sustainable development. Therefore, the internationally recognized Sustainable Development Goals (SDGs) formulated by the United Nations also apply to the construction and real estate industry. As part of targets towards sustainable cities and communities formulated in SDG 11, the construction of sustainable and resilient buildings is also required, among other things. This goal is closely interrelated with the other SDGs. Both providers and buyers of real estate need clear characteristics and assessment criteria in order to evaluate, assess and communicate the contribution of buildings to sustainable development.

The use of this document can be used to show where a building (its development and use) could make a contribution United Nations SDG Goal 11 and other SDGs such as 6, 7, 12, 13, and 15

Figure 3

NOTE 4 EN ISO 52001-1, in common with all EPB standards, provides a certain flexibility with regard to the methods, the required input data and references to other EPB standards, For the correct use of EN5200-1, informative default choices are provided in EN ISO 52000-1, Annex B.

NOTE 5 In the case EN ISO 52000-1 is used in the context of national or regional legal requirements, mandatory choices can be given at national or regional level for such specific applications.

1 Scope

This document specifies the calculation method, based on Life Cycle Assessment (LCA) and other quantified environmental information, to assess the environmental performance of a building and its site, and gives the means for the reporting and communication of the outcome of the assessment. The standard is applicable to new and existing buildings and refurbishment projects.

The document gives:

— the description of the object of assessment,

— the system boundary that applies at the building level,

— the procedure to be used for the inventory analysis,

— the list of indicators and procedures for the calculations of these indicators,

— optional indicators that may be used to provide additional information concerning environmental impacts and aspects at the local level, technical characteristics and management processes that support environmental performance,

— the requirements for the data necessary for the calculation, and

— the requirements for presentation of the results in reporting and communication.

The approach to the assessment covers all stages of the building life cycle and is based on data obtained from Environmental Product Declarations (EPD), their "information modules" (EN 15804+A2,2019) and other data and information necessary and relevant for carrying out the assessment. The assessment includes all building related construction products, processes and services, used over the life cycle of the building.

The interpretation and value judgments of the results of the assessment are not within the scope of this European Standard.

NOTE 1 EPD according to product category rules of construction products (i.e. PCR or c-PCR) that follow EN15804+A2:2019) are generally deemed to satisfy the requirements of this standard, subject to their also meeting the requirements of PrEN 15941.

NOTE 2 EN 15978 -1 provides indicators, calculation rules and system boundaries for the assessment of greenhouse gas emissions, resource consumption and operational water use among other issues of the life cycle related environmental performance of buildings. It also provides the methodological basis and assessment rules

to support the achievement of environment related macro objectives in Europe and instruments such as the European reporting framework LEVEL(s).

NOTE 3 LEVEL(s), is a common European approach to assess and report on the sustainability of buildings. Using existing standards, the voluntary Level(s) framework provides a common language for building sustainability, which other initiatives can also use. More information can be found at [Level(s) (europa.eu).](Level(s) (europa.eu))

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.

FprEN 15643, Sustainability of construction works — Framework for assessment of buildings and civil engineering works

EN 15804+A2:2019, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

prEN 15941, Sustainability of construction works - data quality for environmental assessment of products and construction works - Selection and use of data

ISO 15392, Sustainability in Building Construction - General Principles

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

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

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

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

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

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 http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
assembled system
part of works
component or a set of components incorporated in the construction works

3.2
average data
data representative of a product, product group or construction service, provided by one or more suppliers

Note 1 to entry: The product group or construction service can contain similar products or construction services.

[SOURCE: EN 15804:2012+A2:2019]

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

[SOURCE: ISO 6707-2:2017, modified – "construction" has been added in the definition]

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

[SOURCE: ISO 6707 1:2017, modified – "partially and totally" has been removed from the definition]

3.5
building fabric
all *construction products* that are fixed to the *building* in a permanent manner, so that the dismantling of the product changes the performance of the building and the dismantling or replacement of the product constitute construction operations

3.6
building-integrated technical system
installed technical equipment to support the operation of a *building*, or installed technical equipment that enables the core functions of the *building*

Note 1 to entry This includes the *technical building system* and other systems e.g. for sanitation, security, fire safety, internal transport and building automation and control and IT communications, climate control systems and installations. Building integrated technical equipment (including onsite energy generating equipment) are construction products.

3.7
building site
specified area of land where a *building* is located or is defined to be located and *construction work* of the *building* and associated *external works* are, or will be, undertaken

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

3.8
cleaning
all operations that ensure a level of cleanliness and appearance, consisting of separating and eliminating generally visible dirt from a surface by means of the following combined factors, in variable proportions, such as chemical action, mechanical action, temperature, duration of application

[SOURCE: ISO 22716:2007, 2.8]

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

[SOURCE: ISO 6707-2:2017, modified – "construction" has been replaced with "a building or a civil engineering works" in the definition]

3.10
complementary product category rules
c-PCR
product group specific or horizontal PCR, which provide additional compliant and non-contradictory requirements to EN 15804

Note 1 to entry: c-PCR are meant to be used together with EN 15804.

[SOURCE: CEN/TR 16970:2016]

3.11
component
construction product manufactured as a distinct unit to serve a specific function or functions

[SOURCE: ISO 6707-1:2017]

3.12
construction element
building component
building element
component or a set of assembled components incorporated in a building or construction works

[SOURCE FprEN 15643:2021]

3.13
construction product
item manufactured or processed for incorporation in construction works

3.14
construction work
activities of forming a *construction works*

[SOURCE: ISO 6707-1:2017]

3.15
construction works
everything that is constructed or results from construction operations

Note 1 to entry: This includes buildings, civil engineering works, structures, landscaping, external works and other types of construction works within a built environment.

Note 2 to entry: From an economic perspective, completed construction works are typically referred to as a constructed asset.

[SOURCE: ISO 15392: 2019]

3.16
cut-off criteria
specification of the amount of material or energy flows or the level of significance associated with unit processes or product system to be excluded from a study

[SOURCE: EN ISO 14044:2006]

3.17
declared unit
quantity of a construction product for use as a reference unit in an EPD for an environmental declaration based on one or more information modules

EXAMPLE Mass (kg), volume (m^3).

Note 1 to entry Adapted from the definition in ISO 21930:2017.

3.18
environmental aspect
characteristic of construction works, part of works, processes or services related to their life cycle that can cause change to the environment

[SOURCE: ISO 15392:2019]

3.19
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, modified - – definition of "impact" has been integrated in the definition]

3.20
environmental performance
performance related to environmental impacts and environmental aspects

[SOURCE: ISO 15392:2019 modified - Note 1 has been removed]

3.21
Environmental Product Declaration
EPD
Type III Environmental declaration
claim which indicates the environmental impacts and aspects of a product, providing quantified environmental data using predetermined parameters and, where relevant, additional environmental information

Note 1 to entry: Adapted as a combination of definitions in ISO 14025:2006, (3.1) and ISO 21930:2017, (3.1.1)

Note 2 to entry: The additional environmental information can be quantitative or qualitative.

Note 3 to entry: The shorter initialism, EPD, is used as the primary preferred term in this document.

3.22
estimated service life
ESL
service life that a *building* or an *assembled system (part of works)* 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]

3.23
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 standard to describe utilities, such as electricity, water, heat, which may be exported.

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

3.24
functional equivalent
quantified functional requirements and/or technical requirements for a building or an assembled system (part of works) for use as a basis for comparison

Note 1 to entry: Adapted from the definition in ISO 21931-1:2010.

3.25
functional performance
performance related to the *functionality* of the *construction works* or an *assembled system (part of works)*, which is required by the client and/or by *users* and/or by regulations

Note 1 to entry: Adapted from the definition in FprEN 15643:2021.

3.26
functional requirement
type and level of *functionality* of a building or assembled system which is required by the client and/or by *users* and/or by regulations

Note 1 to entry: Adapted from the definition in FprEN 15643:2021.

3.27
functional unit
quantified performance of a product system for use as a reference unit

[SOURCE: EN ISO 14040:2006]

3.28
functionality
suitability or usefulness for a specific purpose or activity

[SOURCE: ISO 15686 10:2010]

3.29
generic data
data that is not site or enterprise specific.

Note 1 to entry: This refers to data that is not directly collected, measured, or estimated by a company, but sourced from a third party LCI database or other sources.

Note 2 to entry: Generic data includes industry average data (e.g., from published production data, government statistics, and industry associations), literature studies, engineering studies and patents, and may also be based on financial data, and contain proxy data, and other generic data.

Note 3 to entry: In this context site can mean production site and or construction site

3.30
handover
step at which possession of the construction works is surrendered to the client upon completion with or without reservation

[SOURCE: ISO 6707-2:2017]

3.31
indicator
quantitative, qualitative or descriptive measure

SOURCE [ISO 15392:2019(en), 3.18]

3.32
life cycle
consecutive and interlinked stages in the life of the object under consideration

[SOURCE: FprEN 15643:2021]

3.33
maintenance
combination of all technical and associated administrative actions during the *service life* to retain a *building* or an assembled system (part of works) in a state in which it can perform its required functions

Note 1 to entry: Adapted from the definition in ISO 15686-1:2011, ISO 6707-1 and in CPD Guidance Paper F.

3.34
maintenance (planned)
combination of planned technical and associated administrative actions during the service life to retain a building, or its parts (functional units), in a state in which it can perform its required functions

Note 1 to entry: preventive (planned) maintenance covers cleaning, servicing, lubrication, changing wearing parts, testing, inspection, condition monitoring, done on a periodic basis and done before a failure would occur.

[SOURCE: ISO 15686-1:2011, 3.13]: modified - adapted for the purposes of this standard to apply concept of planned maintenance by replacing the term 'all' with 'planned' and adding '(functional units) and the Note to entry

3.35
offsetting
mechanism for compensating for the carbon footprint of a product through the prevention of the release of, reduction in, or removal of, an equivalent amount of GHG emissions in a process outside the boundary of the product system

EXAMPLE: External investment in renewable energy technologies; energy efficiency measures; afforestation/reforestation.

[SOURCE ISO 14021:2016, 3.1.12]

3.36
operational energy use
energy use during use and operation of the *building*

Note 1 to entry: Adapted from the definition in FprEN 15643:2021.

3.37
operational water use
water use during use and operation of the building

Note 1 to entry: Adapted from the definition in FprEN 15643:2021.

3.38
recovery
operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function in the plant or in the wider economy

[SOURCE: FprEN 15643:2021]

3.39
recycling
recovery operation by which waste materials are reprocessed into products, materials or substances either for the original purpose or other purposes

Note 1 to entry: Recycling operations include:

— recycling of organic substances;

— recycling of metals;

— recycling of other inorganic materials;

as defined in Directive 2008/98 Annex II.

Note 2 to entry Recycling does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations or other recovery operations as defined in Directive 2008/98 Annex II.

[SOURCE: FprEN 15643:2021]-Modified Note 1 to entry added and Note 2 amended to reference Directive]

3.40
reference service life
RSL
service life of a construction product, component, assembly or system which is known to be expected under a set of reference in-use conditions and which may form the basis of estimating the service life under other in-use conditions

Note 1 to entry: The RSL is described as part of the functional unit and considered in the calculation of replacements at both the construction product level and construction works level (B4) and refurbishment (B5).

[SOURCE: ISO 15686-1:2011, modified – “construction” has been added in the definition; “particular set, i.e. a reference set of” has been replaced with “a set of reference” in the definition; Note 1 to entry has been added]

3.41
reference study period
period over which the time-dependent characteristics of the object of assessment are analysed

Note 1 to entry: In some cases, the reference study period may differ significantly from the required service life of the construction works