



SLOVENSKI STANDARD

oSIST prEN ISO 22057:2021

01-marec-2021

Trajnostnost stavb in gradbenih inženirskih objektov - Podatkovne predloge za uporabo okoljskih deklaracij za proizvode (EPD) za gradbene proizvode v informacijskem modeliranju gradenj (BIM) (ISO/DIS 22057:2021)

Sustainability in buildings and civil engineering works - Data templates for the use of EPDs for construction products in BIM (ISO/DIS 22057:2021)

Nachhaltigkeit von Bauwerken - Datenvorlagen für die Verwendung von EPDs für Bauprodukte in BIM (ISO/DIS 22057:2021)

Développement durable dans les bâtiments et ouvrages de génie civil - Modèles de données BIM pour l'utilisation de DEP pour les produits de construction (ISO/DIS 22057:2021)

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35.240.67	Uporabniške rešitve IT v gradbeništvu	IT applications in building and construction industry
91.040.01	Stavbe na splošno	Buildings in general

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Sustainability in buildings and civil engineering works – Data templates for the use of EPDs for construction products in BIM

ICS: 35.240.67; 91.040.01

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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ISO/DIS 22057:2020(E)**Foreword**

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 59, Buildings and civil engineering works, Subcommittee SC 17, Sustainability in buildings and civil engineering works.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Environmental product declarations (EPDs) are Type III environmental declarations (see ISO 14025) that provide quantified environmental data using predetermined parameters based on ISO 14040 and ISO 14044 and, where relevant, additional environmental information. ISO 21930 and EN 15804 are two standardized sources of the core product category rules (PCR) to develop EPDs for construction products to provide modular data to enable consistent assessment of environmental impacts at the construction works level.

All types of assessment at construction works level are complex and building information modelling (BIM) provides a process for describing and displaying information required in the planning, design, construction and operation of constructed facilities. The BIM approach is expanding to encompass all aspects of the built environment, including civil infrastructure, utilities and public spaces. Designers, owners and other stakeholders in the construction sector are increasingly looking to BIM to enable them to address the environmental impacts of construction works.

ISO 19650 sets out the recommended concepts and principles for business processes to support the management and production of information during the life cycle of constructed assets when using BIM. To do this, standardization is of the highest importance. Machine-interpretable data is essential to provide a reliable and sustainable exchange of information, and a data template supports the standardized provision of data in machine-interpretable data sheet formats for use in BIM. The data provided in EPDs, like other construction product data, is therefore needed in a machine-interpretable format to enable its use in BIM.

Data templates enable construction project stakeholders to exchange information about construction objects throughout the life cycle of a constructed asset, using the same data structure, terminology, and globally unique identifiers to enable the data to be machine-interpretable and interoperable. Data templates should be standardized and made available across the built environment sector through data dictionaries based on ISO 12006-3. Data templates should be used in conjunction with the data schema and industry foundation classes based on ISO 16739-1.

This document provides and explains the data template structure to support the provision of both EPD and generic LCA data in standardized machine-interpretable data sheet formats to assist in the assessment of the environmental performance of the construction works over its life cycle. The data template structure in this standard is based on the general data template structure in ISO 23387.

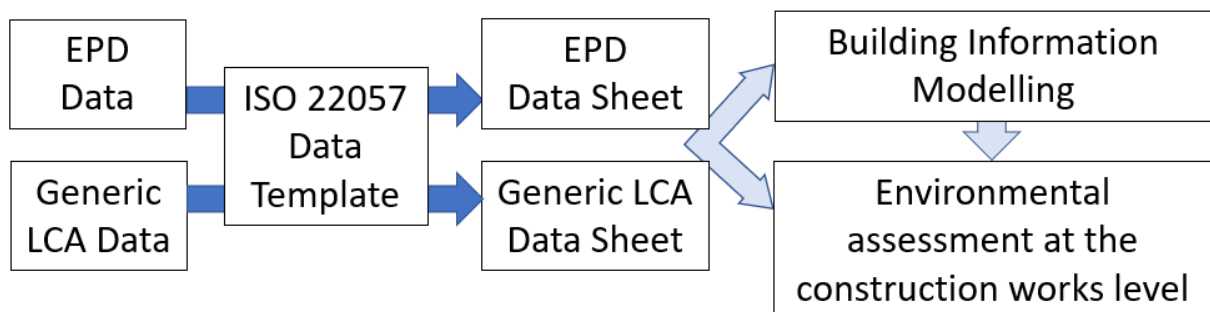


Figure 1 — Relationship between Data, Data templates, Data sheets, BIM and Environmental assessment at the construction works level

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Providing the data from an EPD according to either ISO 21930 or EN 15804 in machine-interpretable format means some information will need to be standardized in ways not considered in those standards. Historically, the indicator data for gate-to-grave information modules from machine-interpretable EPD were often not used because the description of the scenario information was not concurrently provided in machine-interpretable format, and/or the data were not provided in a sufficiently flexible fashion to allow adaption for different scenarios at the construction works level. Responding to these needs, this document provides specifications for the provision of gate-to-grave scenario data for EPD in machine-interpretable formats, so the data are more appropriate for environmental assessment at the construction works level when using BIM.

Figure 2 shows the relationship between this document and other standards for buildings and civil engineering works related to building information modelling (BIM) and sustainability

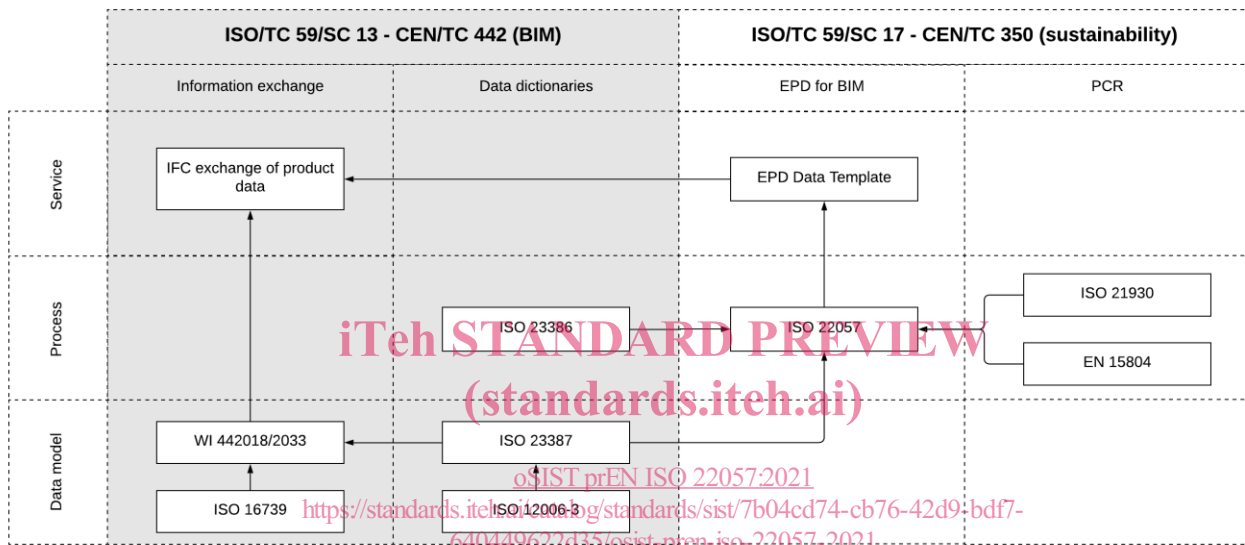


Figure 2 — Relationship between BIM standards and sustainable standards

Users of this document should be able to find the data template described in this document in existing data dictionaries, but in case there is a data dictionary that does not support the structure, they should be able to recreate the data template structure in their own implementations using the information provided in this document (see Annex A).

Sustainability in buildings and civil engineering works – Data templates for the use of EPDs for construction products in BIM

1 Scope

This document provides the principles and requirements to enable environmental and technical data provided in environmental product declarations (EPDs) for construction products and services, construction elements and integrated technical systems to be used in building information modelling (BIM) to assist in the assessment of the environmental performance of the construction works over its life cycle.

The mechanism used in this document to enable this is a data template created following ISO 23386 and ISO 23387 and the resulting data sheet.

This includes both mandatory and optional data from different types of EPD, such as generic, specific, average and representative, and other relevant information necessary for use of EPDs at the construction works level within a BIM environment.

This document gives requirements on structuring EPD information using a data template, to make EPD data machine-interpretable, and enable their integration into information-driven design, construction and operational processes.

This document is also appropriate to structure generic life cycle assessment (LCA) data for use within a BIM environment, as these data are required in the absence of suitable EPD data to enable assessment of the environmental performance at the construction works level.

The requirements in this document are further supplemented by technical information about construction products and services, construction elements and integrated technical systems. This document recommends the use of the same principles for structuring information (data template concepts) and the use of existing technical information created by other domain experts.

EXAMPLE In Europe, Construction Products Regulation (CPR) experts are responsible for structuring technical information based on European Harmonised Standards. This information might already exist in a data dictionary, and EPD/LCA experts are advised to use it for the technical description of products in EPD

This document is intended to help in the understanding the different template concepts and their relation to EPD information and to enable users to create new concepts according to their specific needs.

NOTE For example, experts developing sub-category PCR according to ISO 21930 or complementary PCR (c-PCR) according to EN 15804 could create a data template for additional specific requirements in the sub-category PCR or c-PCR for the relevant product group.

The assessment of environmental performance at the construction works level is not covered by this document.

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.

ISO/DIS 22057:2020(E)

ISO 639-1, *Codes for the representation of names of languages — Part 1: Alpha-2 code*

ISO 3166-2, *Codes for the representation of names of countries and their subdivisions — Part 2: Country subdivision code*

ISO 5807, *Information processing — Documentation symbols and conventions for data, program and system flowcharts, program network charts and system resources charts*

ISO 6707-1, *Buildings and civil engineering works — Vocabulary — Part 1: General terms*

ISO 8601-1, *Date and time — Representations for information interchange — Part 1: Basic rules*

ISO 12006-3, *Building construction — Organization of information about construction works — Part 3: Framework for object-oriented information*

ISO 14040, *Environmental management — Life cycle assessment — Principles and framework*

ISO 14046, *Environmental management — Water footprint — Principles, requirements and guidelines*

ISO 14050, *Environmental management — Vocabulary*

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

ISO 19136-1, *Geographic information — Geography Markup Language (GML) — Part 1: Fundamentals*

ISO 21930, *Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services*

ISO 23386, *Building information modelling and other digital processes used in construction — Methodology to describe, author and maintain properties in interconnected data dictionaries*

ISO 23387, *Building Information Modelling (BIM) — Data templates for construction objects used in the life cycle of any built asset — Concepts and principles*

ISO 80000 (all parts), *Quantities and units*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6701-1, ISO 14040, ISO 14050, ISO 21930, EN 15804 and the following apply.

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

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1 Terms relating to environmental labelling and construction products

3.1.1

environmental product declaration

EPD

Type III environmental declaration

environmental declaration providing quantified environmental data using predetermined parameters and, where relevant, additional environmental information

Note 1 to entry: The predetermined parameters are based on ISO 14040 and ISO 14044.

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.

[SOURCE: ISO 21930:2017, 3.1.1]

3.1.2

construction product

product

item manufactured or processed for incorporation in construction works

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

Note 2 to entry: In this document, unless otherwise designated, the term construction product is used for any good(s) or service(s) related to construction works.

Note 3 to entry: Construction assemblies, construction elements and integrated technical systems, incorporated within construction works, can be considered construction products.

[SOURCE: ISO 21930:2017, 3.2.2, modified – An additional preferred term has been listed]

3.1.3

Construction object

object (3.2.3) of interest in the context of a process resulting in a construction

EXAMPLE 1 The construction object “wall” is a type of system.

EXAMPLE 2 The construction object “calcium silicate masonry unit” is a type of construction product (3.1.2).

Note 1 to entry: See ISO 21931-1:2010, 3.11 for the definition of *process*, ISO 6707-1:2020, 3.3.5.6 for the definition of *construction*; and ISO 23387:2020, 3.13 for the definition of *system*.

3.1.4

Information module

compilation of data to be used as a basis for an EPD (3.1.1), covering a unit process or a combination of unit processes that are part of the life cycle of a product

[SOURCE: ISO 14025:2006, 3.13]

ISO/DIS 22057:2020(E)**3.2 Terms relating to concepts, objects and properties****3.2.1****concept**

unit of knowledge created by a unique combination of *characteristics* (3.2.2)

[SOURCE: ISO 1087:2019, 3.2.7, modified – Notes 1 and 2 to entry have been removed]

3.2.2**characteristic**

abstraction of a *property* (3.2.5)

Note 1 to entry: Characteristics are used for describing *concepts* (3.2.1) and *construction objects* (3.1.3).

[SOURCE: ISO 1087:2019, 3.2.1, modified – EXAMPLE has been removed and reference to *construction objects* has been added to the Note to entry]

3.2.3**object**

any part of the perceivable or conceivable world

Note 1 to entry: An object is something abstract or physical toward which thought, feeling, or action is directed.

[SOURCE: ISO 12006-2:2015, 3.1.1]

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3.2.4**domain**

area of activity covering a science, a technique, a material, et cetera

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Note 1 to entry: A domain can be associated with a group to which the *property* (3.2.5) applies.

[SOURCE: ISO 23386:2020, 3.11]

3.2.5**property**

inherent or acquired feature of an item or *object* (3.2.3)

EXAMPLE 1 Thermal efficiency, heat flow, sound reduction index, sound power level, colour.

EXAMPLE 2 'Being made of wood' as a property of a given construction product.

Note 1 to entry: One or more objects can have the same property.

[SOURCE: ISO 23386:2020, 3.17, modified - A reference to 'object' in the definition, a second EXAMPLE and Note 1 to entry have been added]

3.2.6**group of properties**

collection enabling the *properties* (3.2.5) to be prearranged or organized

[SOURCE:ISO 23386:2020, 3.14, modified - Four notes to entry have been removed]

3.2.7**identifier**

string of characters created by an organization to reference a *dataset* (3.3.5)

3.2.8**quantity**

property (3.2.5) of a phenomenon, body, or substance, where the property has a magnitude that can be expressed by means of a number and a reference

EXAMPLE 1 Length, mass, electric current (ISQ base quantities).

EXAMPLE 2 Plane angle, force, power (derived quantities).

Note 1 to entry: Quantities can appear as base quantities or derived quantities.

[SOURCE:ISO 23386:2020, 3.6]

3.3 Terms relating to data**3.3.1****data**

reinterpretable representation of information in a formalized manner suitable for communication, interpretation, or processing

[SOURCE: ISO 8000:2020, 3.2.2]

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3.3.2**data template**

data (3.3.1) structure used to describe the characteristics (3.2.2) of construction objects (3.1.3)

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[SOURCE: ISO 23387:2020, 3.3, modified - Two EXAMPLES and two Notes to entry have been removed]

3.3.3**data sheet**

completed *data template* (3.3.2) containing the relevant values and other information representing the content of the *EPD* (3.1.1)

3.3.4**data dictionary**

centralized repository of information about *data* (3.3.1) such as meaning, relationships to other data, origin, usage and format

[SOURCE: ISO 23387:2020, 3.2, modified - The Note to entry has been removed]

3.3.5**dataset**

identifiable collection of *data* (3.3.1)

EXAMPLE Integer, Real, Boolean, String, Date, and GM_Point.

Note 1 to entry: A *data type* (3.3.7) is identified by a term, e.g. Integer.

[SOURCE: ISO/IEC 30182:2017, 2.6]

ISO/DIS 22057:2020(E)**3.3.6****data quality**

characteristics of *data* (3.3.1) that relate to their ability to satisfy stated requirements

[SOURCE: ISO 14044:2006, 3.19]

3.3.7**data type**

named set of *values* (3.4.3)

[SOURCE: ISO 10161-1:2014, 3.2.1]

3.3.8**enumerated value**

data type (3.3.7) consisting of a set of named *values* (3.4.3) called elements, members, enumerals, or enumerators of the type

[SOURCE: ISO 23387:2020, 3.5, modified — The preferred term has been changed]

3.3.9**globally unique identifier****GUID**

unique *identifier* (3.2.7) generated using an algorithm

[SOURCE: ISO 23386:2020, 3.13, modified — Note 1 to entry has been removed]

3.3.10**building information modelling****BIM**

use of a shared digital representation of an asset to facilitate design, construction and operation processes to form a reliable basis for decisions

[SOURCE: ISO 23386:2020, 3.6]

3.3.11**machine-interpretable**

data (3.3.1) that is in a specific context and format and can be read and stored in a computer system such that action may be taken based on the content of the data

[SOURCE: ISO 10303-232:2002, 3.5.3]

3.3.12**string**

sequence of elements of the same nature, such as characters or bits, considered as a whole

Note 1 to entry: A string may be empty (null) or contain only one element.

[SOURCE: ISO/IEC 2382:2015, 2121583, modified - Reference to 'null' has been added and two Notes to entry have been removed]

3.3.13**null**

contains no elements

3.3.14**float number**

data type ([3.3.7](#)) of real numbers that is used to define floating decimal points

3.3.15**boolean**

data type ([3.3.7](#)) having two values: one and zero [which are equivalent to true and false]

[SOURCE: ISO 2146:2010, 4.6.1]

3.4 Other terms**3.4.1****reference document**

publication that is consulted to find specific information, particularly in a technical or scientific domain ([3.2.4](#))

EXAMPLE See EN 771-1:2011+A1: 2015.

Note 1 to entry: A reference document can be associated with any *data* ([3.3.1](#)) present in a *data dictionary* ([3.3.4](#)). It can include the document date and version.

[SOURCE: ISO 23387:2020, 3.12]

3.4.2**unit**

real scalar *quantity* ([3.2.8](#)), defined and adopted by convention, with which any other quantity of the same kind can be compared to express the ratio of the second quantity to the first one as a number

[SOURCE: ISO 23386:2020, 3.19, modified - Two admitted terms have been removed]

3.4.3**value**

number and reference together expressing magnitude of a *quantity* ([3.2.8](#))

EXAMPLE 1 Length of a given rod: 5,34 m or 534 cm.

EXAMPLE 2 Mass of a given body: 0,152 kg or 152 g.

[SOURCE: ISO 23386:2020, 3.20, modified - Two admitted terms and EXAMPLES 3-10 have been removed]

3.4.4**M****mandatory**

information indicating that a *data* ([3.3.1](#)) element shall be present within a specific record

[SOURCE: ISO 2146:2010, 4.4.1]