
Informacijsko modeliranje gradenj - Podatkovna struktura za izmenjavo podatkovnih predlog in tehničnih listov gradnikov, ki temelji na EN ISO 16739-1 - 1. del: Podatkovne predloge in konfigurirani gradniki

Building information modelling - Information structure based on EN ISO 16739 1 to exchange data templates and data sheets for construction objects - Part 1: Data templates and configured construction objects

Building Information Modelling (BIM) - Datenstruktur nach EN ISO 16739-1:2018 für den Austausch von Datenvorlagen und Datenblättern für Bauobjekte - Teil 1: Datenvorlagen und konfigurierte Bauobjekte

<https://standards.iteh.ai/catalog/standards/sist/82ae632e-da92-4ddd-9d06-b5e55101b758/osist-pr-en-17549-1-2022>

Modélisation des informations de la construction (BIM) - Structure des informations basée sur l'EN ISO 16739-1:2018 pour l'échange de modèles de données et de feuilles de données pour les objets de construction - Partie 1: Modèles de données et objets de construction configurés

Ta slovenski standard je istoveten z: prEN 17549-1

ICS:

35.240.67	Uporabniške rešitve IT v gradbeništvu	IT applications in building and construction industry
91.010.01	Gradbeništvo na splošno	Construction industry in general

oSIST prEN 17549-1:2022

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 17549-1

May 2022

ICS 35.240.67

English Version

**Building information modelling - Information structure
based on EN ISO 16739 1 to exchange data templates and
data sheets for construction objects - Part 1: Data
templates and configured construction objects**

Modélisation des informations de la construction (BIM)
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1:2018 pour l'échange de modèles de données et de
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Partie 1: Modèles de données et objets de construction
configurés

Building Information Modelling (BIM) - Datenstruktur
nach EN ISO 16739-1:2018 für den Austausch von
Datenvorlagen und Datenblättern für Bauobjekte - Teil
1: Datenvorlagen und konfigurierte Bauobjekte

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 442.

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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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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European foreword

This document (prEN 17549-1:2022) has been prepared by Technical Committee CEN/TC 442 “Building Information Modelling (BIM)”, the secretariat of which is held by SN.

This document is currently submitted to the CEN Enquiry.

Building Information Modelling (BIM) can be used as a method to plan build and operate buildings in a digital and collaborative way. One core aspect of BIM is the possibility to store information about buildings in a consistent and comprehensive digital model. The standard EN ISO 16739-1:2018 defines an open and vendor neutral structure for these building models. The application of this standard enables all stakeholder in the construction industry to exchange the models, or to exchange parts of the models, based on their use cases. The present standard defines a subset of EN ISO 16739-1:2018, that can be used to describe, store and exchange single construction objects or a set of construction objects, e.g. construction products or other model elements. The entirety of the objects together, then again results in the model of the building.

The standard is applicable in the phases of planning, building and operating of buildings. The standard defines related aspects, especially how to

- store and exchange data templates for construction objects based on prEN ISO 23386 and prEN ISO 23387
- store and exchange data sheets that include the specify information for construction objects

The seamless compatibility to EN ISO 16739-1:2018 enables the users of this standard to assembly the information about construction objects in the model of the building.

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.

Introduction

The digital transformation of the construction industry fully interests the production chain of construction involving related activities as manufacturing, certification, promotion, marketing, procurement, selection, supply, transportation, transformation, assembly, installation, maintenance and replacement over the time. Effective digital dialogues between these activities overcomes the current exchange traditionally based on documentation, no matter if printed or digital, which for the most cases is not digitally interpretable.

The supply chain of construction needs a complete digitalization of information transactions sharing data and construction objects characteristics. The digital supply chain shall comply to the standards used in the design, construction and maintenance stages.

The smart transport of construction objects data needs a clear and common understanding of the format to express the structure and the data. The data can be transported in several ways, e.g. via direct database connect, or via webservices or file transfer. In all cases, the sender and the receiver of the digital data need a standard to implement import and export of data.

This standard defines the format for the exchange of construction objects data, based on the EN ISO 16739-1:2018 and contains of two parts. The Part 1 defines formats for the exchange of data templates, catalogues of configured construction objects and construction data. The Part 1 includes basic structures, that are reusable also by Part 2 (shared elements). The Part 2 includes the structures that are used to express requirement requests and responses as declarative expressions.

The following not exhaustive list of purposes is identified in the context of digital construction object data exchange:

Detailed digital description of a construction object

In order to identify and understand the function of a construction object, a technical description is needed. This standard allows the exchange of descriptions, technical and business properties, geometry, information like pictures and mounting instructions in a digital data structure. This digital object description is used for design, specification, quotation processes that converge toward Asset Information Models.

Procurement and purchase

The digital description of construction objects, based on properties with standardized structures, makes searches in catalogues easier and automatable. It grants the possibility to query construction object properties across digital marketplace. The purchase of products is more reliable if features and performances are digitally available.

Construction site management (Logistic)

During construction phases, site managers assure daily operations to keep the construction project on time and on budget. They also manage quality controls and the correspondence between built progresses and design's prescriptions. All players operating on site, both supervisors and contractors, exchange data related to construction objects (e.g. products) that are installed into the buildings. All digital data related to construction objects are variously demanded (e.g. technical specification, purchase orders, installation procedures, compliance with standards, checklists, etc.) and can be exchanged according to this standard between the stakeholders.

Handover to facilities management

Exchanging data through a digital schema allows the importation of construction objects into Asset Information Models. The models are hereby digitally enriched with data related to spare parts, maintenance, onsite installing procedures, Declarations of Performance, etc.

Safety and risk management

Safety management has impacts on most construction operations: quality control, scheduling, cost control/budgeting and installations procedures. During all these phases, operators interact exchanging required documents in conformity to standards and regulations. On the construction site, however, the Health, Safety and Environment Coordinator deals with construction object like products, tools and machines, work equipment, safety lifelines and harnesses, lifting ropes, scaffoldings, cranes etc.

Exchange of digital product declaration

Exchange formats improve transport and interpretation of some documentation required according to regulations for construction products. Examples of digitally structured documents are:

- DoP: Declaration of Performance, reporting the essential characteristics of construction product under the Construction Product Regulation (CPR) 305/2011
- DoC: Declaration of Conformity for the legal conformity of construction product in terms of health and safety requirements
- EPD: Environmental Product Declaration defining all products' environmental information according to ISO 14025:2006.

Online platforms for construction objects

Manufacturers online products' catalogues provide all kinds of data through their websites, expressing and exchanging machine interpretable information. Digital formats ensure interoperability and a single data structure, avoiding data redundancy.

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1 Scope

The scope of this standard is to define the syntactic characteristics of a generic structure to transport data about construction objects based on EN ISO 16739-1:2018, prEN ISO 23386 and prEN ISO 23387.

The application of this standard allows stakeholders in the construction industry to structure, govern, update, maintain and transport their information about construction objects (e.g. product data) through a machine-interpretable format.

In addition, several stakeholders of the process can take the most out from their software technologies, avoiding data replication as well as saving time and improving both quality and transparency. The scenario within which this standard applies affects producers, designers, constructors, facility and property managers.

The syntactic approach considers as primary objective the ability to reuse specifications given in the international standard EN ISO 16739-1:2018. This specific goal is reached by the delivery of the Model View Definition “Construction Objects Data View” (COD) which is made available alongside the others MVD already issued.

Software houses and software application developers can use this standard to implement interfaces for importing and exporting constructions object according to the official standard EN ISO 16739-1:2018.

Format	Description
Tab-delimited	infobase.csv

1.1 Construction Objects Data View

1.1.1 General

Code	Version	Status	Author	Copyright
COD.1	0.9	Candidate	CEN-TC442-WG2-TG3	CEN – European Committee for Standardization

The view is based on EN ISO 16739-1:2018 where the Industry Foundation Classes (IFC) are defined. IFC is a structure to transport data models of a construction like a building or a bridge. The models contain the geometrical and alphanumeric information of the complete building.

The “Construction Objects Data View” (COD) defines subsets of IFC that can be used to store construction objects data in an IFC file. Construction objects data contains three types of data:

- 1) Alphanumeric Information (Lists)
- 2) Information in Documents (Files)
- 3) Geometric Information (Visual Representation)

Based on the identified purposes, the standard supports different exchanges within the life cycle of a construction object. The following figure describes the main stages of the construction objects, from the requirements expressed as objects in a design model to the registration as products in an AsBuilt model.

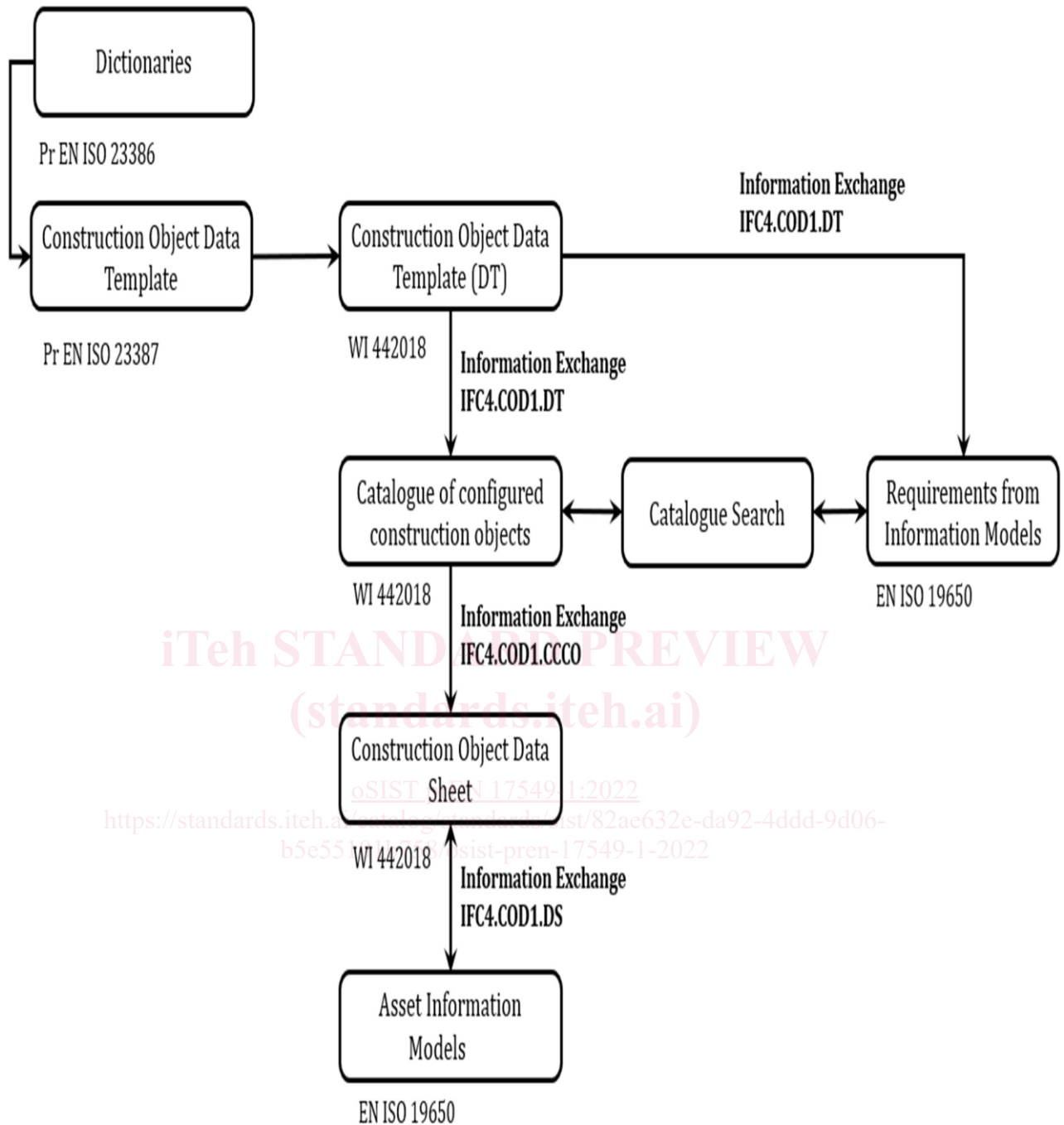


Figure 1: Generic principles for a selection process of construction objects (e.g. products)

The standard contains the following three definitions of information exchange requirements.

Exchange	Exchange name	Exchange description
COD1.DT	Data template exchange	Definition of the structures of data templates for construction objects, retrieved from dictionaries.
COD1.CCCO	Catalogue of configured construction objects exchange	
COD1.DS	Data sheet exchange	Information about instances of configured construction objects that are selected for ordering, delivery and installation without any further configuration options.

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Each element in the exchange requirements corresponds to an element in EN ISO 16739-1:2018. The elements from EN ISO 16739-1:2018 that are applicable for the exchange requirements are defined in detail in the chapters “Fundamental concepts and assumptions”. All inherited elements are part of the standard. The documentation of EN ISO 16739-1:2018 (IFC 4, ADD 2, TC 1, Version 4.0.2.1) will not be repeated in this document.

Declarations

Field	Mapping	Definition	Catalogue of configured construction objects exchange	Data sheet exchange	Data template exchange
(Query)	\IfcContext				
Declaration for data sheet exchange	\IfcContext.GlobalId \IfcGloballyUniqueId	Assignment of a globally unique identifier within the entire software world.	XX	■ ■	XX
Declaration for data template exchange	\IfcContext.GlobalId \IfcGloballyUniqueId	Assignment of a globally unique identifier within the entire software world.	■ ■	■ ■	■ ■
Measures and units	\IfcContext.UnitsInContext \IfcUnitAssignment.Units[*] \IfcDerivedUnit.UnitType \IfcDerivedUnitEnum	Name of the derived unit chosen from an enumeration of derived unit types for use in IFC models.	■ ■ ■	■ ■ ■	■ ■
Project Document Information	\IfcContext.HasAssociations[*] \IfcRelAssociatesDocument.RelatingDocument \IfcDocumentInformation.Location \IfcURIReference	Resource identifier or locator, provided as URI, URN or URL, of the document information for online references. { .change-ifc2x4 } > IFC4-CHANGE New attribute added at the place of the removed attribute _DocumentReferences_.	▲ ▲	▲ ▲	▲ ▲
Declaration of property templates	\IfcContext.Declares[*] \IfcRelDeclares.RelatedDefinitions[*] \IfcPropertySetTemplate	Set of object or property definitions that are assigned to a context and to which the unit and representation context definitions of that context apply.	■ ■	■ ■	■ ■
Declaration of classification	\IfcContext.HasAssociations[*] \IfcRelAssociatesClassification.RelatingClassification \IfcClassification.HasReferences[*] \IfcClassificationReference	The classification references to which the classification applies. It can either be the final classification notation, or an intermediate classification item.	■ ■	■ ■	■ ■

Documents

Field	Mapping	Definition	Catalogue of configured construction objects exchange	Data sheet exchange	Data template exchange
(Query)	\IfcDocumentInformation .Name \IfcLabel				
Document information	\IfcDocumentInformation .DocumentInfoForObjects[*]	The document information with which objects are associated. { .change-ifc2x4 } > IFC4 CHANGE New inverse attribute.	▲▲	▲▲	▲▲
Document classification	\IfcDocumentInformation .HasDocumentReferences[*] \IfcDocumentReference .ExternalReferenceForResources[*] \IfcExternalReferenceRelationship .RelatedResourceObjects[*] \IfcClassificationReference	Objects within the list of <i>_IfcResourceObject Select_</i> that can be tagged by an external reference to a dictionary, library, catalogue, classification or documentation.	▲▲	▲▲	▲▲

Construction element data (standards.iteh.ai)

Field	Mapping	Definition	Catalogue of configured construction objects exchange	Data sheet exchange	Data template exchange
(Query)	\IfcElement				
Construction object filling	\IfcElement .IsTypedBy[*]	Set of relationships to the object type that provides the type definitions for this object occurrence. The then associated <i>_IfcTypeObject_</i> , or its subtypes, contains the specific information (or type, or style), that is common to all instances of <i>_IfcObject_</i> , or its subtypes, referring to the same type. { .change-ifc2x4 } > IFC4 CHANGE New inverse relationship, the link to <i>_IfcRelDefinesByType_</i> had previously be included in the inverse relationship <i>_IfcRelDefines_</i> . Change made with upward compatibility for file based exchange.	■	■	XX