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Building information modelling — Information structure based on EN ISO 16739 1 to exchange data templates and data sheets for construction objects

Part 2: Configurable construction objects and requirements

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This British Standard is the UK implementation of EN 17549-2:2023.

The UK participation in its preparation was entrusted to Technical Committee B/555, Construction design, modelling and data exchange.

A list of organizations represented on this committee can be obtained on request to its committee manager.

The UK committee notes that this standard uses the term 'architect' to mean 'person who designs buildings and superintends the carrying out of building works', as defined in Subclause 3.8.24 of BS ISO 6707-2:2017 Buildings and civil engineering works — Vocabulary — Part 2: Contract and communication terms, and advises users that this includes professionals beyond those protected by the Architects Act. As such, professionals such as chartered architectural technologists are covered by the term 'architect' in this standard.

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English Version

Building information modelling - Information structure based on EN ISO 16739 1 to exchange data templates and data sheets for construction objects - Part 2: Configurable construction objects and requirements

Modélisation des informations de la construction (BIM) - Structure des informations basée sur l'EN ISO 16739-1:2020 pour l'échange de modèles de données et de feuilles de données pour les objets de construction - Partie 2 : Objets de construction configurables et exigences

Building Information Modeling - Datenstruktur für den Austausch von Produktdatenvorlagen und Produktdatenblättern nach EN-ISO 16739-1 - Teil 2: Anforderungen und konfigurierbare Produkte

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European foreword

This document (EN 17549-2:2023) has been prepared by Technical Committee CEN/TC 442 “Building Information Modelling (BIM)”, the secretariat of which is held by SN.

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of an identical text or by endorsement, at the latest by November 2023, and conflicting national standards shall be withdrawn at the latest by November 2023.

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.

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in CEN Internal Regulation 2019, Part 3, clause 7.

SHALL is the strongest expression (Requirement)

MAY is to permit something

MUST means something to apply for legal reasons

CAN expresses a possibility

SHOULD is a recommendation

Requirements – shall, shall not

Recommendations – should, should not

Permission – may, need not

Possibility and capability – can, cannot

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, Türkiye and the United Kingdom.

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Introduction

This document describes and explains a subset of the schema provided by EN ISO 16739-1:2020; in technical terms, this subset is a technical Model View Definition (MVD). It is given in Annex A of this document. It aims to set a comprehensive structure to store and exchange construction object data. This MVD is therefore called Construction Object Data View 2 or CODview2 for short.

It is intended for software vendors for the construction sector (planning, finance, legal, procurement, construction management, design, construction process, commissioning and handover, after sales service, maintenance, operation, repair and improvement, demolition) as well as professionals in this sector using their software.

While “Building information modelling — Information structure based on EN ISO 16739-1:2020 to exchange data templates and data sheets for construction objects — Part 1” focuses on data templates and configured construction objects, this document includes the structures that will be used to:

- link the objects and properties to their semantic definitions through data dictionaries
- express requirements and describe configurable construction objects using declarative expressions
- organize the data exchanged during construction workflows

This document does not only support data sheets based on data template as defined by EN ISO 23387 but goes beyond that and supports any construction object based on any construction object schema that can be described using EN ISO 12006-3:2022.

It selects a few technical IFC classes to leverage the maximum potential from Building Information Modelling (BIM):

- It aims to provide access to dynamic construction specific semantics. For this it uses the complementarity between the underlying EN ISO 16739-1:2020 and the EN ISO 12006-3:2022 for data dictionaries, thereby outsourcing construction specific semantics of the schema. The use of EN ISO 12006-3:2022 is extended to the negotiation of construction object schemas to agree on a common language prior to data exchanges. These data exchanges can concern construction projects as well as catalogues of construction products, see B.2.4 “Product Catalogue” and B.2.7 “Procurement and product purchase”.
- It aims to ease concurrent engineering by allowing the expression of requirements. For this it highlights the use of constraints especially in the perspective of data exchanges related to construction processes (EN ISO 29481-2) and the traceability of decisions in models. These constraints make it possible to express requests relating to construction projects or product catalogues. At last, they may also be used to describe configurable products.
- It aims to integrate into workflows as described in EN ISO 19650-1.

These three aspects make it possible to achieve interoperability of data used in software for the construction sector.

Thanks to CODview2 several objectives of Building Information Modelling (BIM) can be achieved:

- Less complex implementations without reduction of functionality,
- Agile integration of construction specific semantics leading to more comprehensive interoperability for the end user,
- Support concurrent engineering by using already existing EN ISO 16739-1:2020 mechanisms.

This document enables the users of the tools based on it to:

- Use their specific semantics thanks to the use of data dictionaries,

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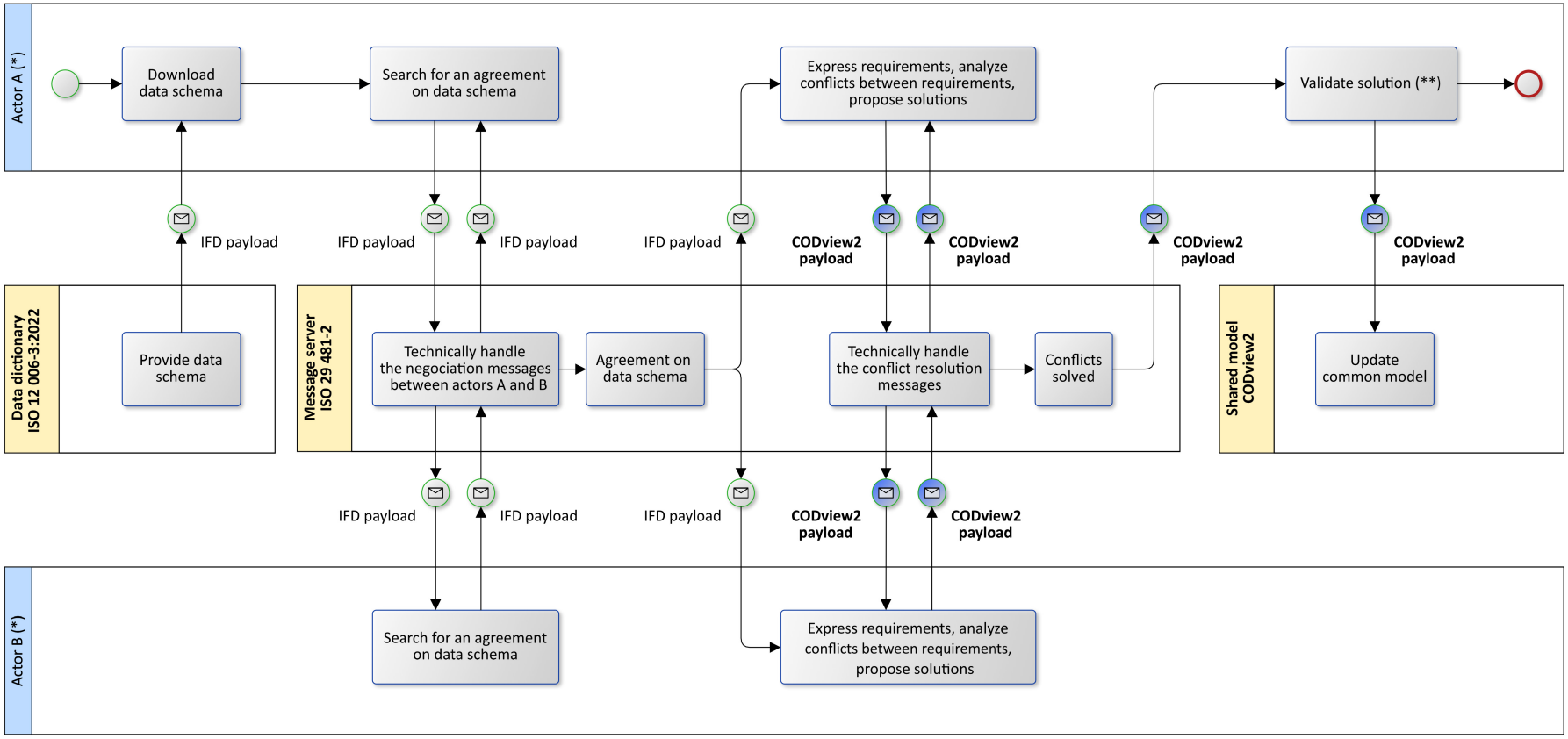
- Express their requirements and proposals related to construction objects,
- Describe parametric construction objects as well as configurable construction objects or products,
- Import and export construction object data in BIM at any stage of the project (inception, brief, design, production, demolition) as well as during operation,
- Describe bills of quantities (pre-design programs, technical specifications, offers),
- Call for tender and purchase construction objects,
- Check that the construction objects included in a project meet previously described requirements,
- Describe product catalogues.

These scenarios fit in the construction object models of owners, designers, builders, manufacturers, and facility managers.

Figure 1 shows the general workflow of exchanges between actors willing to agree on a construction object. It involves several standards (EN ISO 12006-3:2022, EN ISO 29481-2, EN ISO 19650-1). The exchanges using CODview2 appear as CODview2 payloads in this figure.



(*) Only two actors (actor A and Actor B) are represented in this schema. However, many more actors may be involved in such an exchange. Actor C, D, E ... may also have their own requirements and participate to the exchange. Actors can be any actor of the project: clients, architects, engineers, contractors, manufacturers ... or even machines like product catalogues.

(**) In this schema actor A validates the solution. Many alternatives may exist in a real process. For example, the validation could belong to an actor C that has not been involved in the exchange.

See “B.2.3. Semantic, concurrent, and iterative definition of an object during design phases”.

Figure 1 — General workflow of exchanges between actors willing to agree on a construction object

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1 Scope

This document defines a Model View Definition (MVD) of the IFC schema defined in EN ISO 16739-1:2020.

The MVD described by this document is designated as CODview2.

This document focuses on core and resource classes and relies on external data dictionaries to describe construction specific semantics.

NOTE 1 Core classes are those defined in EN ISO 16739-1:2020, 5.

NOTE 2 Resource classes are those defined in EN ISO 16739-1:2020, 8.

This document does not provide any construction object schema as it considers that these are already defined in data dictionaries compliant with EN ISO 12006-3:2022.

This document focuses only on the format of the exchanged data and not on the way to process them.

CODview2 does not support the geometrical representations of construction objects but allows the exchange of geometrical properties. These properties may be used to define geometrical representations of construction objects.

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 ISO 12006-3:2022, *Building construction — Organization of information about construction works — Part 3: Framework for object-oriented information*

EN ISO 16739-1:2020, *Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries — Part 1: Data schema*

ISO 6707-1:2017, *Building and civil engineering words — Part 1: General terms*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 6707-1 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 and definitions

3.1.1
attribute
data element for the computer-sensible description of a property, a relation, or a class

EXAMPLE: Creation date of a class object in a computer system.

[SOURCE: ISO 22274:2013, 3.2]