International Standard

ISO 16757-4

First edition
2025-10

Data structures for electronic product catalogues for building services —

Part 4: Data dictionary structures for product catalogues

Structures de données pour catalogues électroniques de produits pour les services du bâtiment —

Partie 4: Structures des dictionnaires de données pour les catalogues de produits

Reference number
ISO 16757-4:2025(en)

© ISO 2025



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025
All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Published in Switzerland

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **2**
4 Modelling of required kinds of data ... **3**
4.1 General ... 3
4.2 Overall model ... 3
4.3 Subject kinds of the overall model ... 4
4.3.1 Product ... 4
4.3.2 Catalogue ... 5
4.3.3 Block ... 6
4.3.4 Ports and in/outlets ... 7
4.4 Relationship types ... 9
4.4.1 isSubtypeOf ... 9
4.4.2 hasPart ... 10
4.4.3 hasBlock ... 11
4.4.4 isDependentOn ... 11
4.4.5 isSubkindOf ... 11
4.5 Property kinds and their representation in the overall model ... 12
4.5.1 General ... 12
4.5.2 What does a property describe ... 12
4.5.3 Representation of the property kinds using the overall model ... 13
4.6 Relationship to data templates ... 15
5 Representation of the overall model by means of ISO 12006-3 ... **15**
5.1 General ... 15
5.2 Relationships in ISO 12006-3 ... 16
5.2.1 Overview ... 16
5.2.2 Property relationships ... 16
5.2.3 Subject relationships ... 16
5.3 Dictionary meta level to define subject kinds and relationship types ... 17
5.4 Kinds of subjects at the dictionary meta level ... 20
5.5 Subject relationship types at the dictionary meta level ... 20
5.6 Property relationships ... 22
6 Specific rules and recommendations ... **22**
6.1 General ... 22
6.2 Rules for specific situations ... 22
6.2.1 Cardinality properties for hasPart and hasBlock relationships ... 22
6.2.2 References to literature ... 22
6.2.3 Positioning in space ... 23
6.2.4 Predefined calculation functions for dynamic properties ... 23
6.2.5 Relationships to classifications or other dictionaries ... 23
6.3 Recommendations for dealing with controlled value lists ... 24
6.3.1 Problem description ... 24
6.3.2 Property value list with subject contextual filtering ... 24
Bibliography ... **25**

© ISO 2025 – All rights reserved

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 13, *Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM),* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 442, *Building Information Modelling (BIM),* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 16757 series can be found on the ISO website.

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.

© ISO 2025 – All rights reserved

Introduction

Building information modelling (BIM) provides a means for describing and displaying information required throughout the asset life cycle. Increasingly this modelling approach is expanding to encompass all aspects of the built environment, including civil infrastructure, utilities and public space.

The ISO 16757 series provides the structure of a product catalogue model for data sharing and data exchange of product models in product catalogues. It contains specifications for:

— selection of products from different product classes and product variants;

— combining product components and accessories to products;

— geometrical representation in technical systems;

— connectivity to other products in models of technical systems;

— calculation of dynamic property values in accordance with the product behaviour in technical systems.

This document outlines the requirements for data dictionaries to support both semantic definitions and data modelling in product catalogues. ISO 12006-3 defines the underlying data model for related data dictionaries and serves as the foundation of this document.

Tools are used to define, simulate and operate building services systems (including e.g. HVAC systems and building automation systems). To build such a system basically means to interconnect different products in a way that the resulting system fits into the building and works in accordance with the functional requirements. The products are selected from product catalogues of manufacturers or distributors. Important aspects of these products are their connection points and information on their behaviour in different situations.

The goal of this document is to support the engineering tools by enabling them to identify the relevant information easily in different data dictionaries. In the area of building services, a few generic concepts are widely used:

— dynamic properties describing the behaviour of products in different situations and load cases that are dependent on external properties describing external conditions;

— a distinction of data dictionary entries representing products, meta data of catalogues, and specific features of products like subfunctions or ports.

This document defines common kinds of data dictionary elements that provide a way to identify the basic structures across data dictionaries.

Besides this document, the ISO 16757 series contains the following documents:

— ISO 16757-1 describes the fundamental concepts and assumptions about the creation of manufacturer-related product catalogues as BIM data exchange models. It describes the content of product catalogues and the mapping of the content to a data format.

  This data format provides the opportunity to search and select product data together with accessory data which can be read into software applications for planning, designing, calculating and simulating as well as for facility management.

— ISO 16757-2 describes the concept of geometry of the building services product data of a product catalogue in form of 2D symbols and 3D shape models and specifies the required spaces and ports.

  It contains the fundamental concepts and assumptions about the parametric geometry of special products, used in planning software applications e.g. for air condition systems such as ducts and transitions between different forms. It also contains a concept for representing products as 3D solid models, which are made from thin sheet metal.

© ISO 2025 – All rights reserved

— ISO 16757-5 specifies the organization of product catalogues on the basis of ISO 16739-1 (Industry Foundation Classes, IFC) and EN 17549-2. These product catalogues get the semantics of their properties from data dictionaries that are described in this document.

It contains an overview about the representation of important elements of product catalogues and gives detailed specifications of the usage of IFC structures in the product catalogues.

© ISO 2025 – All rights reserved

Data structures for electronic product catalogues for building services —

Part 4:
Data dictionary structures for product catalogues

1 Scope

This document specifies requirements for data dictionaries that are used by product catalogues for building services to provide the semantics of their definitions and data modelling. For this purpose, it defines an overall model that contains:

— subject kinds that allow to distinguish:

  — product subjects representing products in product catalogues;

  — catalogue subjects comprising meta data of product catalogues;

  — various kinds of blocks that collect properties of complex product features, including ports and in/outlets;

— relationship types that allow to distinguish between different kinds of relationships like isSubtypeOf, hasPart, or hasBlock;

— property kinds to distinguish between:

  — static properties describing products by providing property values in product catalogues;

  — dynamic properties that describe the behaviour of products;

  — external properties that represent external conditions that influence the behaviour of the product by influencing the values of dynamic properties.

This document also describes a mapping of the overall model to the data dictionary model of ISO 12006-3 by introducing a dictionary meta level.

Finally, to overcome deficiencies of the standards underlying ISO 16757-5 in capturing all aspects of product catalogues, this document provides some rules and recommendations for required data dictionary elements.

This document does not describe how product catalogues have to be organized, and it does not describe any formats for the exchange of product catalogues. Product catalogues are described in ISO 16757-5.

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

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

© ISO 2025 – All rights reserved

ISO 23387:2025, *Building information modelling (BIM) – Data templates for objects used in the life cycle of assets*

3 Terms and definitions

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

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

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

— IEC Electropedia: available at https://www.electropedia.org/

3.1
property
defined characteristic suitable for the description and differentiation of the objects in a class

[SOURCE: ISO 22274:2013, 3.25, modified — Example has been removed.]

3.2
product property
property (3.1) that describes a product in a product catalogue

EXAMPLE In case of a radiator, examples of product properties are length, width and depth.

3.3
external property
property (3.1) that describes an aspect that is external to a product but influences the behaviour of the product

EXAMPLE In case of a radiator, examples of external properties are the temperature of the incoming medium and the room temperature.

Note 1 to entry: External properties do not describe the product itself.

3.4
static property
product property (3.2) that is not influenced by external conditions

EXAMPLE In case of a radiator, examples of static properties are length, width and depth that do not depend on other properties and volume that depends on length, width and depth.

3.5
dynamic property
product property (3.2) that depends on at least one *external property* (3.3)

EXAMPLE In case of a radiator, an example of a dynamic property is the temperature of the outgoing medium that depends, among others, on the temperature of the incoming medium and the room temperature.

3.6
in/outlet
interface of a technical unit to its environment for the transfer of substances, energy or signals

3.7
port
interface of a technical unit that can be connected to such an interface of another technical unit for the transfer of substances, signals, energy or forces

3.8
block
composed property
group of *properties* (3.1) corresponding to a feature needing multiple properties to be defined

[SOURCE: ISO 23386:2020, 3.8, modified — The preferred term "block" has been added; "category of" has been removed from the beginning of the definition; note 1 to entry and example have been removed.]

© ISO 2025 – All rights reserved