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Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Framework for specification of BIM implementation

Organisation et numérisation des informations relatives aux bâtiments et ouvrages de génie civil, y compris modélisation des informations de la construction (BIM) — Cadre pour la spécification de la mise en œuvre du BIM

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Contents

Page

Foreword ... **iv**

Introduction ... **v**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**
3.1 Terms related to knowledge resources ... 2
3.2 Terms related to requirements management ... 2

4 Purpose and background ... **3**
4.1 Role of the framework ... 3
4.2 Intention of BIM implementation specifications ... 4
4.3 Overview of framework sections ... 4
4.4 Implementation ... 4
4.5 Conformity ... 5
4.6 Implications of nonconformity ... 5

5 Relationship to other standards ... **5**
5.1 Review ... 5
5.2 Use ... 6
5.3 Development of new outcomes ... 6
5.4 Specialized application areas ... 6
5.5 Classification structures and language usage ... 7
5.6 Automation ... 7

6 Framework ... **7**
6.1 Overview ... 7
6.2 Framework sections ... 7
6.2.1 Framework Section 1: Outcomes ... 7
6.2.2 Framework Section 2: Controls ... 8
6.2.3 Framework Section 3: Input ... 8
6.3 Extensions ... 8
6.4 Clause structure ... 9
6.4.1 Overall ... 9
6.4.2 Title ... 9
6.4.3 Applicability ... 10
6.4.4 Selection ... 10
6.4.5 Exception ... 10
6.4.6 Requirement ... 10
6.4.7 Complex metrics ... 10
6.4.8 Notes ... 10

Annex A (informative) **Clause ordering** ... **11**

Annex B (informative) **BIM implementation specification examples** ... **14**

Bibliography ... **22**

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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 13, *Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM)*.

This first edition cancels and replaces the Technical Specification ISO/TS 12911:2012, which has been technically revised.

The main changes are as follows:

— formalization of requirements;

— references updated.

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.

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Introduction

Information management processes for the built environment sector have been defined through several international standards (e.g. the ISO 19650 series and the ISO 29481 series). These standards can be supported by creating structured and checkable technical specifications for the inputs to, controls on and outputs from those processes.

Structured and checkable technical specifications cover a wide range of situations. They can be used to define:

— the structure of an information planning document (e.g. a BIM execution plan);

— an information management control (e.g. the convention for a file name);

— the contents of an information container (e.g. the specified level of information need in a particular type of design model, drawing or schedule).

Some of these applications are already subject to standardized definitions but these definitions are usually in the form of textual descriptions which means they cannot be used by rule-based software to check for the expected outcomes.

This document defines a systematic approach through which a structured specification for any type of BIM implementation document can be created. Once created, these BIM implementation specifications can be shared amongst those providing and receiving information to enable deliverables to be checked, ideally through automated processes. The BIM implementation specifications are designed so that they can be both human-readable and machine-readable. This is done through the clear definition of the requirements that the deliverable has to meet, the applicable situation(s) that each specification is for, any selection of subsets, and any exceptions that need to be stated. This structured process is referred to as "RASE" (requirement, application, selection, exception).

Use of this document is expected to help organizations and individuals at all points during information management processes to explain their own expectations and to understand the expectations of others.

Authors of BIM implementation specifications, including international and national institutions as well as individual organizations, can use this framework to document their expectations in a way that is clear, concise and checkable. Those supporting specific software application usage can also conform to the framework.

Implementers of information management processes will benefit from the clear structure and the ability to compare and merge BIM implementation specifications, potentially from multiple sources, to mobilize, execute and check their internal BIM implementations.

BIM implementation specifications can be used:

— internally within an organization, to standardize the production of planning documents or to encode the rules to be used during the production of information containers;

— in appointment documentation to convey requirements from one organization to another;

— by discipline or sector-wide organizations to capture consensus on specific aspects of information management and production (e.g. the expected contents of detailed design drawings for structural steelwork or architectural floor plans).

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Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Framework for specification of BIM implementation

1 Scope

This document establishes a framework for providing specifications for the internal commissioning and implementation of building information modelling (BIM) during both delivery and operational phases. It identifies a structured approach so as to encourage clarity during development, management and checking processes for use by organizations that develop and apply these specifications.

This document does not provide specific content but it does provide examples.

It is applicable to buildings, infrastructure, facilities and managed landscapes, of any size or complexity.

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

ISO 12006-2, *Building construction — Organization of information about construction works — Part 2: Framework for classification*

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

ISO 19650 (all parts), *Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Information management using building information modelling*

ISO 29481-1, *Building information models — Information delivery manual — Part 1: Methodology and format*

ISO 29481-3, *Building information models — Information delivery manual — Part 3: Data schema and code*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6707-1 and the following 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/

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3.1 Terms related to knowledge resources

3.1.1
framework
structure of processes and specifications designed to support the accomplishment of a specific task

Note 1 to entry: A framework for a specification is analogous to a schema for an information container.

[SOURCE: ISO/IEEE 11073-10201:2020, modified — Note 1 to entry added.]

3.1.2
building information modelling implementation specification
BIM implementation specification
technical specification that aids authors and implementers in achieving their intended results through the use of *BIM* (3.1.5)

EXAMPLE Guide, guideline, manual, handbook.

Note 1 to entry: BIM implementation specifications are instantiations of a *framework* (3.1.1) schema.

Note 2 to entry: BIM implementation specifications can include BIM execution plans, definitions of style and content of deliverables such as types of drawing or schedule, and rules for preparing deliverables such as information container naming conventions.

3.1.3
information delivery manual
IDM
documentation which captures the business process and gives detailed specifications of the information that a user fulfilling a particular role would need to provide at a particular point within a project

Note 1 to entry: This can be referred to as an "information delivery specification (IDS)".

[SOURCE: ISO 29481-1:2016, 3.10]

3.1.4
information model
set of structured and unstructured information containers

[SOURCE: ISO 19650-1:2018, 3.3.8]

3.1.5
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

Note 1 to entry: The acronym BIM also stands for “building information model” as a shared digital representation of the physical and functional characteristics of any construction works.

[SOURCE: ISO 29481-1:2016, 3.2, modified — “asset” has replaced “built object”, and “(including buildings, bridges, roads, process plants, etc.)” has been deleted from the definition. ‘“building information model” as a’ has replaced “the” in Note 1 to entry.]

3.2 Terms related to requirements management

3.2.1
constraint
objective (3.2.4) or *metric* (3.2.2) that can be evaluated to true, false or unknown

Note 1 to entry: Based on specification of IfcConstraint in ISO 16739-1.

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3.2.2
metric
limiting value or boundary condition that can be applied to or tested against a descriptive resource

Note 1 to entry: Based on specification of IfcMetric in ISO 16739-1.

Note 2 to entry: A building information model is an example of a descriptive resource.

3.2.3
clause
part of a specification document which contains one or more *objectives* (3.2.4)

Note 1 to entry: See 6.1.

3.2.4
objective
constraint (3.2.1) that is decidable by examination of its constituent *objectives* (3.2.4) and *metrics* (3.2.2)

Note 1 to entry: Based on specification of IfcObjective in ISO 16739-1.

3.2.5
requirement, application, selection, exception
RASE
method for structuring knowledge by distinguishing requirements, applicability, selections and exceptions

Note 1 to entry: See 6.4 and Reference [16].

4 Purpose and background

4.1 Role of the framework

The objectives of the framework are as follows:

a) Create a common approach for BIM implementation specifications by:

   1) aiding the development of clear and repeatable processes;

   2) allowing international, national, institutional and project/enterprise BIM implementation specifications to be prepared according to a common framework.

b) Make BIM implementation specifications manageable by:

   1) encouraging completeness of BIM implementation specifications by providing a common structure for outcomes, controls and inputs;

   2) encouraging the provision of reasoned explanations for demanded performance;

   3) enabling extensibility of BIM implementation specifications;

   4) supporting the comparing and merging of BIM implementation specifications.

c) Make BIM implementation specifications able to be tested by:

   1) encouraging the testing of BIM implementation specifications against this document;

   2) supporting the testing of outcomes against BIM implementation specifications;

   3) encouraging the use of formal arrangements which refer to BIM implementation specifications.

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