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Low-voltage switchgear and controlgear - Product data and properties for information exchange - Engineering data - Part 2-2: Switchgear and controlgear assembly objects for building information modelling

Appareillage à basse tension - Données et propriétés de produits pour l'échange d'informations - Données d'ingénierie - Partie 2-2: Objets d'ensembles d'appareillage pour la modélisation des informations de la construction

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CONTENTS

FOREWORD 2
INTRODUCTION 4
1 Scope 7
2 Normative references 7
3 Terms and definitions 7
4 Object models 8
4.1 Electrical assemblies and their building related aspects 8
4.2 Object attributes 8
4.3 Decomposition of the building information models 8
4.4 Assembly building information model 11
4.5 Busbar trunking unit building information model 14
5 Library of properties 14
6 How to create a BIM object 26
6.1 General 26
6.2 Create a new electrical family 26
6.3 Create a geometry 27
6.4 Create properties 27
6.5 Create connectors 27
Annex A (informative) Typical use case 28
Bibliography 29

Figure 1 – BIM and the building lifecycle 4
Figure 2 – BIM data standard overview 5
Figure 3 – Drawing of property ACE911 23
Figure 4 – Drawing of property ACE912 23
Figure 5 – Drawing of property ACE913 24
Figure 6 – Drawing of property ACE914 and ACE921 24
Figure 7 – Drawing of properties ACE915, ACE916, ACE919 and ACE922 24
Figure 8 – Drawing of properties ACE917, ACE918, ACE920 and ACE923 25
Figure 9 – Drawing of properties ACE890, ACE891, ACE892, ACE895, ACE896 and ACE898 25
Figure 10 – Example of creation of properties 27
Figure A.1 – Typical use case 28

Table 1 – Building information models 9
Table 2 – Assembly building information model 11
Table 3 – Library of properties created or modified for the BIM classes 15
Table 4 – Value lists of properties 25

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Low-voltage switchgear and controlgear – Product data and properties for information exchange - Engineering data - Part 2-2: Switchgear and controlgear assembly objects for building information modelling

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IEC 62683-2-2 has been prepared by IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
121/224/FDIS	121/229/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 62683 series, published under the general title *Low-voltage switchgear and controlgear – Product data and properties for information exchange – Engineering data*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

Building information modelling (BIM) is an optimizing design process for the construction and operation of buildings. The information in the model remains coordinated and consistent throughout the lifecycle of the project to better optimise its construction schedule and operation (see Figure 1). BIM is a digital process enabled by a set of software, dictionaries, BIM objects and data which aims to increase efficiency around the building lifecycle, through the design, operation, maintenance and destruction phases. BIM was initially mainly used at the design stage to avoid collisions between the different elements of the construction. However, BIM offers many other possible use cases to be investigated, such as extracting electrical load demands, simulating photovoltaic production capacity, and simulating thermal and energy behaviour of the building, etc.

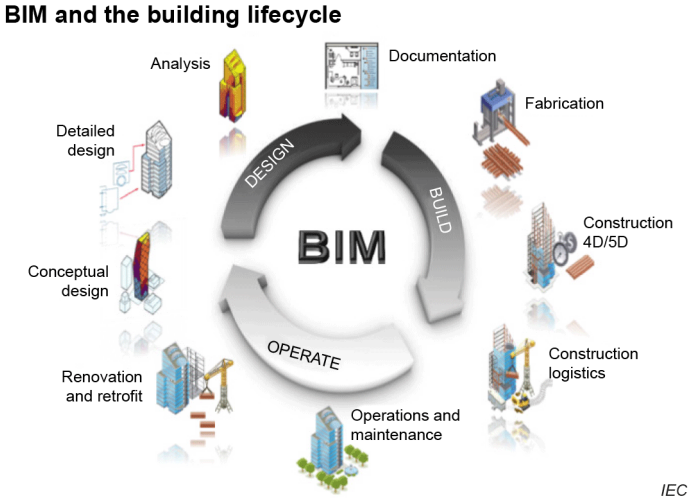


Figure 1 – BIM and the building lifecycle

The main intended benefits of BIM are:

– increasing design dependability and process transparency;
– improving project communication and project marketing;
– shortening construction periods;
– minimizing risks in execution and reducing construction costs;
– increasing the degree of prefabrication;
– use information for building operation purposes.

Governments worldwide recommend or require the use of digitalised information for public construction projects, recognizing its value for helping to deliver projects successfully.

BIM is a standardised process by ISO TC 59/SC 13 and includes a 3D representation and an optimised set of data, which can be enhanced by adding further information, such as technical features.

BuildingSMART is a global community committed to creating and developing open digital ways of working for built asset environment. BuildingSMART promotes international consensus among stakeholders on specific standards to accelerate implementation and uptake and propose standards to ISO TC 59.

ISO 19650 defines the information management process.

Other standards such as ISO 16739 and dictionaries such as ISO 12006 specifically address the exchange format. An overview is shown in Figure 2.

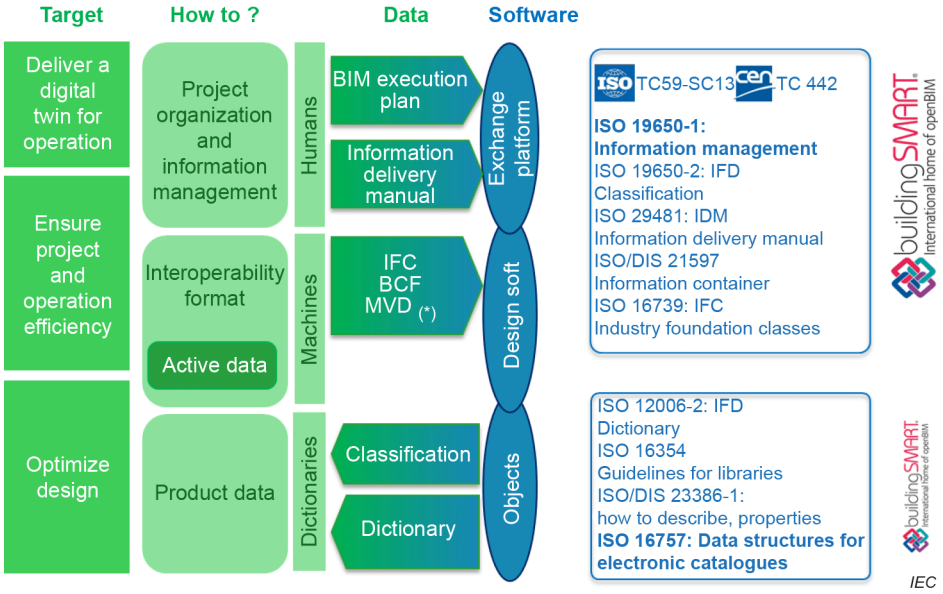


Figure 2 – BIM data standard overview

The main elements of the BIM process are:

– Industry foundation class (IFC – ISO 16739-1)
IFC is a standardized, digital description of the built asset industry. It is an open, international standard (ISO 16739-1) and promotes vendor-neutral or agnostic, and usable capabilities across a wide range of hardware devices, software platforms, and interfaces for many different use cases.

– Information delivery specifications (IDS)
An IDS is a computer interpretable document that defines the exchange requirements of model-based exchange. It defines how objects, classifications, materials, properties, and even values should be delivered and exchanged. This is often done based on industry foundation classes (IFC) and additional classifications, materials and properties (national agreements or company specific ones; either stored in bSDD or somewhere else). This is the standard to use to define the level of information needs (CEN term), the exchange information requirements (ISO 19650 term) or even to exchange product data templates with some more details.

– Building smart data dictionary (bSDD ISO 12006-3, ISO 23386)
The buildingSMART Data Dictionary (bSDD) is a library of classes, properties, relations and units. It is an online service that hosts classifications and their properties, allowed values, units and translations. The bSDD allows linking between all the content inside the database. It provides a standardized workflow to guarantee data quality and information consistency.

– BIM Collaboration Format (BCF)
The BIM Collaboration Format (BCF) allows different BIM applications to communicate model-based issues with each other by leveraging IFC data that have been previously shared among project collaborators. BCF was created for facilitating open communications and improving IFC-based processes to more readily identify and exchange model-based issues between BIM software tools, bypassing proprietary formats and workflows.

– Information delivery manual (IDM, ISO 29481-1)
  The built asset industry (including buildings and civil infrastructure) is characterized by bringing many different companies and authorities together in a project specific organisation. In order to work efficiently, it is necessary for all participants in the organisation to know which and when different kinds of information have to be communicated. The issue is even more important when digital tools are applied, since most industry tools have a very low threshold of tolerance when it comes to the ability to interpret digital data. The “building information modelling – Information delivery manual” standard has been developed by buildingSMART in order to have a methodology to capture and specify processes and information flow during the lifecycle of a facility.

Up to now, electrical engineering has not been adequately represented in BIM (IFC, IDS, BSDD) although electrical engineering is an essential trade within every property.

Particularly in electrical systems engineering, the expectation is to cover from planning, execution, operation, to demolition and improve ease of exchange and interoperability between, different phases, electrical personas and CAD and CAE software.

BIM is the right approach as a working method in the electrotechnical trade of a building (low voltage and medium voltage). But objects of electrical assemblies should be further detailed and standardised.

BIM design software should be supplied with objects. The properties of these objects, for example, the functional description of an electrical distribution panel, will be easier to be handled by a building designer if this description is based on a common ontology defined by recognised electrical standards.

This part of IEC 62683-2 series is intended to be used in combination with the following part:

– IEC 62683-1, *Catalogue data*

The described data models including in this part is intended to be hosted within IEC CDD in the class tree dedicated to engineering data of low-voltage switchgear, controlgear and their assemblies. This branch of the IEC 62683 DB dictionary is intended to be used by catalogue consortia, other database standards and engineering software editors as reference to low-voltage switchgear and controlgear standards.

IEC CDD ontology data model followings IEC 61360-2 and ISO 13584-42. It includes the unique identification of each dictionary and dictionary element according to ISO 29002-5 called "international registration data identifier" (IRDI). This identifier includes the IEC International Code Designator (ICD) “0112” registered according to the registration authority identification concept as defined in ISO/IEC 6523-1.

1 Scope

This part of IEC 62683-2 specifies the building information modelling (BIM) with the physical characteristics and technical services of low-voltage switchgear and controlgear assemblies to be used mainly for the construction phase of the building and for delivering data for operation.

This document covers all types of assemblies covered by the IEC 61439 series which can be installed in a building.

Busbar trunking systems defined by IEC 61439-6 are under consideration for a next edition.

These BIM object models, registered in IEC CDD, are intended to supply the process defined by ISO 16739 series.

This document does not cover:

– the built-in components included within the assembly such as switchgear and controlgear,
– safety related control system of machinery,
– the detailed electrical and mechanical configuration of the assembly
– logistic information.

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.

IEC 61360-1, *Standard data element types with associated classification scheme - Part 1: Definitions - Principles and methods*

IEC 62683-1, *Low-voltage switchgear and controlgear - Product data and properties for information exchange - Part 1: Catalogue data*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62683-1 and the following apply.

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

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
BIM
building information modelling
construction of a model that contains the information about a building for all phases of the building life cycle

Note 1 to entry: It includes both the 3D model and the building processes.

[SOURCE: ISO 16757-1:2015, 2.4, modified – the note has been replaced]