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Data structures for electronic product catalogues for building services —

Part 1: Concepts, architecture and model

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

Partie 1: Concepts, architecture et modèle

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Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Terms and definitions ... **2**
3 Requirements and fundamentals ... **4**
3.1 Content of a catalogue ... 6
3.2 Manufacture vs. user view of a catalogue ... 6
3.3 Parametric representation of catalogue data ... 7
3.4 Dynamic technical properties describing the behaviour of a product ... 8
3.5 Descriptive objects and representation objects ... 10
3.6 Purpose of Content Parts ... 10
3.7 Relationship to dictionary standards (ISO 13584, ISO 12006-3) ... 11
4 Product configuration and selection ... **11**
4.1 Configuration by referencing properties ... 11
4.2 Selection of specific products ... 13
4.3 Standardised and catalogue-specific properties ... 15
5 Technical properties ... **16**
5.1 Static properties ... 17
5.2 Dynamic properties ... 17
6 Accessories and composed products ... **18**
7 Representation objects and descriptive objects ... **21**
7.1 Article numbers ... 21
7.2 Geometry data ... 22
7.3 Product description ... 23
7.4 Descriptive objects ... 23
8 Requirements to implement ISO 16757 in engineering systems ... **23**
9 Data model ... **23**
9.1 Properties ... 24
9.1.1 Technical perspective of properties ... 24
9.1.2 Content perspective of properties ... 26
9.2 Selection properties and the selection property hierarchy ... 27
9.3 Technical properties ... 30
10 Embedding of product data of selected products into the building information model ... **31**
Bibliography ... **33**

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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).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 59, *Buildings and civil engineering works,* Subcommittee SC 13, *Organization of information about construction works*.

ISO 16757 consists of the following parts, under the general title *Data structures for electronic building services product catalogues*:

— *Part 1: Concepts, architecture and model*

— *Part 2: Geometry*

The following parts are planned:

— *Part 3: Script language and functions*

— *Part 4: Cooperation with building information modelling standards*

— *Part 5: Product catalogue exchange format*

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Introduction

These Content Parts of this International Standard will define standardised properties for the product groups and the composition of the technical data model. Furthermore, they determine the specific programming function-interfaces to layout, calculate, and simulate the products.

There is a growing need for information about building services systems during the planning and design of buildings. The designers in building services have to execute detailed calculations and simulations to ensure saving of energy and to satisfy hygienic and comfort criteria in heating, ventilation, air conditioning, and sanitary plants. They have to provide better and better documentation to verify the compliance with these requirements. The resulting designs have to describe the complete plants without internal interference or intersection with the building.

These requirements can only be achieved with modern engineering applications like CAD- and CAE-systems, calculation programs, BIM tools, and management software. The software systems need exact data of the used plant components. Each component contributes to the performance data of the whole building.

There are many manufacturers, who provide products to certain sectors of building services (such as heating, ventilation, air conditioning, sanitary). Others provide only certain product groups (radiators, heaters, air condition equipment, air pipes, valves, devices).

Classical catalogues provide product data in tables and show the design algorithms in diagrams and design rules. In addition to the technical properties required for functional design and calculation (e.g. in the form of curve diagrams), such catalogues also contain the geometry data needed for dimensional design and construction (e.g. in the form of dimensional drawings with port details) and the descriptive objects serving for visualization (such as photos, video sequences, or acoustical sequences).

Additionally, nearly all big manufacturers provide their own software (mostly for free) as electronic catalogues to select, to design, and to calculate their products.

Unfortunately, none of these software solutions meets all the requirements of the planner. Needless to say, that each program contains only the product range of its manufacturer. So it is not possible to perform a continuous planning of the plant with products of different manufacturers.

Thus, it is desirable to provide engineering applications which are independent from the manufacturers. The next problem is that data files from different manufacturers — if available at all — are organized in different data formats, structures, and terminologies.

Independent CAD-systems and calculation software need to get data and algorithms in a uniform way. Only if product data and algorithms are automatically available, the calculation and simulation of a complete HVAC plant is possible.

Software providers cannot afford to provide all data from all product manufacturers in the format required by their system. Also, product manufacturers cannot provide current information about their products in the formats of all potential software systems. Thus, we have a typical situation where standardization is required to improve the exchange of information between business partners.

Within single product groups (e.g. radiators), national initiatives to standardize exchange formats have already been conducted. But there is a lack of unification of existing formats across all product groups.

Required is a uniform, internationally standardised definition for product catalogue data interchange.

Such a definition eliminates the need to manage different data formats and to use different software systems to deal with products of different manufacturers, and this leads to a significant reduction of costs for manufacturers and users. Integrating this data into BIM-systems (Building Information Modelling) allows data interchange between IT systems. In addition, to the benefit for planning, there will be an amount of advantages for other software solutions, e.g. facility management and life cycle management.

This International Standard offers for the first time an interface which allows the uniform handling of data about technical, commercial, maintenance, service, as well as geometry, images, video, and text information.

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ISO 16757 is a multi-part standard. Future parts will include:

— an overview of ISO 16757 and the rationale for its elements and organization;

— geometric elements which are used to represent the products in the catalogues of ISO 16757;

— definition of the script language used in ISO 16757 for various purposes;

— IDM descriptions for ISO 16757, including process descriptions for those processes which are to be supported by the standard and it comprises the rules for mapping of product and the property descriptions to IFC and for defining properties semantically with IFD;

— definition of an exchange format in XML by which electronic catalogues can be exchanged according to the definitions of ISO 16757. The exchange format will be specified as an XML Schema Definition (XSD).

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Data structures for electronic product catalogues for building services —

Part 1:
Concepts, architecture and model

1 Scope

The primary purpose of this International Standard is the provision of data structures for electronic product catalogues to transmit building services product data automatically into models of building services software applications. This includes a meta model for the specification of product classes and their properties and a meta model for the product data which is exchanged in product catalogues. Product data has to follow the specifications for their product groups.

The standard series is split into two areas:

— Basic concepts like conceptual models, languages, geometry representations, and XML schemas for data exchange are provided in the Conceptual Parts of the standard series (Parts with a one digit number).

— Using these resources, the Content Parts of this International Standard define for various product groups of building services concrete models for the description and the exchange of products.

The basic concepts which are provided by the standard series include the following:

— resources for the specification of selection properties and a selection property tree guiding the selection process to identify the appropriate product variant from a parametric electronic catalogue;

— resources for the specification of dependent properties and their computational functions to compute their values in dependency from installation parameters;

— resources for the specification of composition relationships between products which can be used to model structures like bill of materials or accessory relationships;

— resources for a parametric constructed solid geometry (CSG) based geometry representation containing specific CSG elements geometrical elements which are typical for building services products.

This part of ISO 16757 specifies

— the underlying concepts,

— a generic model specifying the available modelling elements and their relationships, and

— a framework for the specification of the Content Parts by describing the elements which are to be provided by these Parts.

Not in scope of this part of ISO 16757 are the following:

— a detailed description of the used geometrical primitives;

NOTE Geometry is described in ISO 16757-2.

— a specification of the script language used to exchange algorithms for computing the values of dependent and computable properties;

NOTE The script language is described in ISO 16757-3.

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