
**Industrial automation systems and
integration — Product data
representation and exchange —**

**Part 325:
Abstract test suite: Building elements
using explicit shape representation**

*Systèmes d'automatisation industrielle et intégration — Représentation
et échange de données de produits*

*Partie 325: Suite d'essais abstraite: Éléments de construction utilisant
une représentation de forme explicite*



Reference number
ISO/TS 10303-325:2004(E)

AVA Documents
Document Sharing Hub
© ISO 2004

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO 2004

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents	Page
1 Scope	1
2 Normative references	1
3 Terms, definitions and abbreviations	2
3.1 Terms defined in ISO 10303-1	2
3.2 Terms defined in ISO 10303-31	2
3.3 Abbreviations	3
4 Test purposes.....	3
4.1 Application element test purposes.....	3
4.2 AIM test purposes.....	17
5 General test purposes and verdict criteria	39
5.1 General test purposes.....	39
5.2 General verdict criteria for all abstract test cases.....	39
5.3 General verdict criteria for preprocessor abstract test cases	39
5.4 General verdict criteria for postprocessor abstract test cases	40
6 Abstract test cases.....	40
6.1 Building_complex with foundation as faceted_b_rep.....	40
6.2 Building_complex with foundation as block.....	46
6.3 Building_complex with foundation as Truncated_pyramid.....	52
6.4 Building_complex with foundation as Truncated_cone.....	58
6.5 Building_complex with foundation as Right_circular_cylinder	63
6.6 Building_complex with foundation as Trimmed_sphere	69
6.7 Building_complex with foundation as solid_of_linear_extrusion	75
6.8 Building_complex with foundation as solid_of_revolution.....	81
6.9 Wall with window using Faceted_face_with_thickness	87
6.10 Column with recess using Faceted_b_rep	96
6.11 Column with recess using Trimmed_torus.....	103
6.12 Column with recess using Advanced_b_rep	110
6.13 Wall with doorway including change and approval	117
6.14 Wall with doorway using Elementary_face_with_thickness	129
6.15 Wall with doorway using Advanced_face_with_thickness.....	141
6.16 Building with levels (floors) using Faceted_b_rep	152
6.17 Building with levels (floors) using Elementary_b_rep	165
6.18 Item_assembly with approvals as roof (beams) using Faceted_b_rep	182
6.19 Item_assembly as stairway using Faceted_b_rep	193
6.20 Item_group (single level).....	201
6.21 Multi-level Item_group.....	212
6.22 Structural wire using faceted_curve	221
6.23 Structural wire using elementary_curve.....	227
6.24 Structural wire using advanced_curve.....	233
6.25 Building with levels using faceted_shell.....	239
6.26 Building with levels using elementary_shell.....	248
6.27 Building with levels using advanced_shell	257
6.28 Building with levels using ground_face	266

6.29 Building_complex with surrounding_grounds_shape as faceted_surface	276
6.30 Building_complex with surrounding_grounds_shape as point_and_line_representation...	278
Annex A (normative) Conformance classes	281
Annex B (normative) Information object registration	288
Annex C (normative) Postprocessor input specification file names	289
Annex D (informative) Excluded test purposes	291
Index	292

Tables

Table 1 – Application elements for Building_complex with foundation as faceted_b_rep	40
Table 2 – Application elements for Building_complex with foundation as Block.....	46
Table 3 – Application elements for Building_complex with foundation as Truncated_pyramid.....	52
Table 4 – Application elements for Building_complex with foundation as Truncated_cone	58
Table 5 – Application elements for Building_complex with foundation as right_circular_cylinder ...	64
Table 6 – Application elements for Building_complex with foundation as trimmed_sphere	70
Table 7 – Application elements for Building_complex with foundation as solid_of_linear_extrusion	76
Table 8 – Application elements for Building_complex with foundation as solid_of_revolution	82
Table 9 – Application elements for wall with window using Faceted_face_with_thickness	88
Table 10 – Application elements for column with recess using Faceted_b_rep.....	96
Table 11 – Application elements for column with recess using Trimmed_torus	103
Table 12 – Application elements for column with recess using Advanced_b_rep.....	110
Table 13 – Application elements for wall with doorway including change and approval.....	117
Table 14 – Application elements for wall with doorway using Elementary_face_with_thickness	129
Table 15 – Application elements for wall with doorway using Advanced_face_with_thickness	141
Table 16 – Application elements for building with levels (floors) using faceted_b_rep	153
Table 17 – Application elements for building with levels (floors) using elementary_b_rep	166
Table 18 – Application elements for item_assembly with approvals as roof (beams) using faceted_b_rep.....	182
Table 19 – Application elements for item_assembly as stairway using faceted_b_rep.....	194
Table 20 – Application elements for Item_group	201
Table 21 – Application elements for item_group	213
Table 22 – Application elements for structural wire	222
Table 23 – Application elements for structural wire using elementary_curve	228
Table 24 – Application elements for structural wire using advanced_curve.....	234
Table 25 – Application elements for building with levels using faceted_shell	239
Table 26 – Application elements for building with levels using elementary_shell	248
Table 27 – Application elements for building with levels using advanced_shell.....	257
Table 28 – Application elements for building with levels using ground_face	266
Table 29 – Application elements for building_complex with surrounding_grounds_shape as faceted_surface	276
Table 30 – Application elements for building_complex with surrounding_grounds_shape as point_and_line_representation	279
Table C.1 – Postprocessor input specification file names	289

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 10303-325 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 4, *Industrial data*.

ISO 10303 is organized as a series of parts, each published separately. The structure of ISO 10303 is described in ISO 10303-1.

A complete list of parts of ISO 10303 is available from the Internet: <http://www.tc184-sc4.org/titles>

Introduction

ISO 10303 is an International Standard for the computer-interpretable representation and exchange of product data. The objective is to provide a neutral mechanism capable of describing product data throughout the life cycle of a product independent from any particular system. The nature of this description makes it suitable not only for neutral file exchange, but also as a basis for implementing and sharing product databases and archiving.

This International Standard is organized as a series of parts, each published separately. The parts of ISO 10303 fall into one of the following series: description methods, integrated resources, application interpreted constructs, application protocols, abstract test suites, implementation methods, and conformance testing. The series are described in ISO 10303-1. This part of ISO 10303 is a member of the abstract test suite series.

The purpose of an abstract test suite is to provide a basis for evaluating whether a particular implementation of an application protocol actually conforms to the requirements of that application protocol. A standard abstract test suite helps ensure that evaluations of conformance are conducted in a consistent manner by different test laboratories.

This part of ISO 10303 specifies the abstract test suite for ISO 10303-225, Application protocol: Building elements using explicit shape representation. The abstract test cases presented here are the basis for conformance testing of implementations of ISO 10303-225.

This abstract test suite is made up of two major parts:

- the test purposes, the specific items to be covered by conformance testing;
- the set of abstract test cases that meet those test purposes.

The test purposes are statements of the application protocol requirements that are to be addressed by the abstract test cases. Test purposes are derived primarily from the application protocol's application elements and application interpreted model, as well as from other sources such as standards referenced by the application protocol and requirements stated in the application protocol conformance requirements clause.

The abstract test cases address the test purposes by:

- specifying the requirements for input data to be used when testing an implementation of the application protocol;
- specifying the verdict criteria to be used when evaluating whether the implementation successfully converted the input data to a different form.

The abstract test cases set the requirements for the executable test cases that are required to actually conduct a conformance test. Executable test cases contain the scripts, detailed values, and other explicit information required to conduct a conformance test on a specific implementation of the application protocol.

At the time of publication of this document, conformance testing requirements had been established for implementations of application protocols in combination with ISO 10303-21 and ISO 10303-22.

Accordingly, this part of ISO 10303 only specifies test purposes and abstract test cases appropriate to such implementations.

For ISO 10303-21, two kinds of implementations, preprocessors and postprocessors, must be tested. Both these are addressed in this abstract test suite.

For ISO 10303-22, a class of applications will possess the capability to upload and download application protocol-compliant standard data access interface-models and/or schema instances to and from applications that implement the standard data access interface. This abstract test suite addresses such applications.

Industrial automation systems and integration — Product data representation and exchange —

Part 325:

Abstract test suite: Building elements using explicit shape representation

1 Scope

This part of ISO 10303 specifies the abstract test suite to be used in the conformance testing of implementations of ISO 10303-225. The following are within the scope of this part of ISO 10303:

- the specification of the test purposes associated with ISO 10303-225;
- the verdict criteria to be applied during conformance testing of an implementation of ISO 10303-225 using ISO10303-21 or ISO 10303-22;

NOTE The verdict criteria are used to ascertain whether a test purpose has been satisfactorily met by an implementation under test (IUT) within the context of a given test case.

- the abstract test cases to be used as the basis for the executable test cases for conformance testing.

The following are outside the scope of this part of ISO 10303:

- the creation of executable test cases;
- test specifications for tests other than conformance testing such as interoperability or acceptance testing;
- other implementation methods.

2 Normative references

The following referenced documents are indispensable for the application 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/IEC 8824-1:1998, *Information Technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation*

ISO 10303-1:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles*

ISO 10303-11:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual*

ISO/TR 10303-12:1997, *Industrial automation systems and integration — Product data representation and exchange — Part 12: Description methods: The EXPRESS-I language reference manual*

ISO 10303-21:2002, *Industrial automation systems and integration — Product data representation and exchange — Part 21: Implementation methods: Clear text encoding of the exchange structure*

ISO 10303-22:1998, *Industrial automation systems and integration — Product data representation and exchange — Part 22: Implementation methods: Standard data access interface*

ISO 10303-31:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 31: Conformance testing methodology and framework: General concepts*

ISO 10303-32:1998, *Industrial automation systems and integration — Product data representation and exchange — Part 32: Conformance testing methodology and framework: Requirements on testing laboratories and clients*

ISO 10303-225:1999, *Industrial automation systems and integration — Product data representation and exchange — Part 225: Application protocol: Building elements using explicit shape representation*

3 Terms, definitions and abbreviations

3.1 Terms defined in ISO 10303-1

For the purposes of this document, the following terms defined in ISO 10303-1 apply.

- abstract test suite;
- application protocol (AP);
- implementation method;

3.2 Terms defined in ISO 10303-31

For the purposes of this document, the following terms defined in ISO 10303-31 apply.

- abstract test case;
- conformance testing
- executable test case;
- test purpose;
- verdict criterion.

3.3 Abbreviations

For the purposes of this document, the following abbreviations apply.

AE Application element

IUT Implementation Under Test

4 Test purposes

4.1 Application element test purposes

Application element test purposes are derived from the application objects (4.2 of ISO 10303-225) and the application assertions (4.3 of ISO 10303-225). The test purposes are collected as test purpose groups; the test purpose groups are structured by the application objects.

4.1.1 Advanced_b_rep

ae012 Advanced_b_rep with b_spline_surface (see 6.12)

ae013 Advanced_b_rep is element of one Component_shape_representation (see 6.12)

4.1.2 Advanced_curve

ae022 Advanced_curve with b_spline_curve type (see 6.24)

ae023 Advanced_curve is element of one Component_shape_representation (see 6.24)

4.1.3 Advanced_face_with_thickness

ae032 Advanced_face_with_thickness with underlying surface as b_spline_surface and boundaries as b_spline_curve (see 6.15)

ae033 Advanced_face_with_thickness is element of one Component_shape_representation object (see 6.15)

4.1.4 Advanced_shell

ae042 Advanced_shell defines the space shape of one Space (see 6.27)

4.1.5 Approval

ae052 Approval with approver (see 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.25, 6.26, 6.27, 6.28)

ae053 Approval with date (see 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.25, 6.26, 6.27, 6.28)

ae054 Approval with purpose (see 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.25, 6.26, 6.27, 6.28)

ae055 Approval with status (see 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.25, 6.26, 6.27, 6.28)

ae057 Approval providing approval for one Building_element_component (see 6.13, 6.14, 6.15, 6.16, 6.17)

ae058 Approval providing approval for many Building_element_component (see 6.18)

ae0510 Approval providing approval for one Building_item (see 6.18, 6.19, 6.25, 6.26, 6.27)

ae0511 Approval providing approval for many Building_item (see 6.20, 6.28)

- ae0513 Approval providing authorization for one Change_request (see 6.13, 6.14, 6.15, 6.17, 6.25, 6.26, 6.27)
- ae0514 Approval providing authorization for many Change_request (see 6.20, 6.28)
- ae0516 Approval provides approval for one Item_assembly (see 6.18, 6.25, 6.26, 6.27)
- ae0517 Approval provides approval for many Item_assembly (see 6.19)

4.1.6 Block

- ae062 Block is element of one Component_shape_representation (see 6.2)

4.1.7 Building

- ae072 Building with address present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.20)
- ae073 Building with address not present (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae074 Building with description (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae075 Building with name (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae076 Building with owner (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae077 Building with status (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae078 Building is the positioned building in one Building_position_in_complex (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae0710 Building contains one Section_position_in_building (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
- ae0711 Building contains many Section_position_in_building (see 6.20, 6.28)

4.1.8 Building_complex

- ae082 Building_complex with description (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28, 6.29, 6.30)
- ae083 Building_complex with global_position (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.25, 6.26, 6.27)
- ae084 Building_complex with name (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28, 6.29, 6.30)
- ae085 Building_complex with owner (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28, 6.29, 6.30)
- ae088 Building_complex with surrounding grounds shape defined by zero Site_shape_representation (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae089 Building_complex with surrounding grounds_shape defined by one Site_shape_representation (see 6.29, 6.30)
- ae0810 Building_complex with global position specified by zero Gis_position (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.22, 6.23, 6.24, 6.28, 6.29, 6.30)
- ae0811 Building_complex with global position specified by one Gis_position (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.25, 6.26, 6.27)

- ae0812 Building_complex contains zero Building_position_in_complex (see 6.29, 6.30)
- ae0813 Building_complex contains one Building_position_in_complex (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
- ae0814 Building_complex contains many Building_position_in_complex (see 6.28)

4.1.9 Building_document_reference

- ae092 Building_document_reference with document_type (see 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
- ae093 Building_document_reference with identifier (see 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
- ae094 Building_document_reference with item_in_document (see 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
- ae096 Building_document_reference provides information for one Building_item (see 6.13, 6.14, 6.15, 6.16, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
- ae098 Building_document_reference provides information for one Building_element_component (see 6.17)

4.1.10 Building_element

- ae102 Building_element with additions_and_subtractions (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18)
- ae103 Building_element with additions_and_subtractions not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae105 Building_element as Structure_enclosure_element (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae106 Building_element as Service_element (see 6.21)
- ae107 Building_element as Fixture_equipment_element (see 6.9, 6.13, 6.14, 6.15, 6.19)
- ae109 Building_element contains many Building_element_component (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17)
- ae1010 Building_element has a main_component shape defined by one Positive_component (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)

4.1.11 Building_element_component

- ae112 Building_element_component with approval_information present (see 6.16, 6.17, 6.18)
- ae113 Building_element_component with approval_information not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae1118 Building_element_component with many approval_information present
- ae114 Building_element_component with component_characterization present (see 6.9, 6.10, 6.11, 6.12)
- ae115 Building_element_component with component_characterization not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.22, 6.23, 6.24)
- ae1119 Building_element_component with many component_characterization present (see 6.21)
- ae116 Building_element_component with component_class present (see 6.10, 6.11, 6.12, 6.18)
- ae117 Building_element_component with component_class not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae1120 Building_element_component with many component_class present

- ae118 Building_element_component with description (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae119 Building_element_component with document_reference (see 6.10, 6.11, 6.12, 6.16, 6.17, 6.21)
- ae1110 Building_element_component with document_reference not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae1111 Building_element_component with identifier (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae1112 Building_element_component with position (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae1113 Building_element_component with shape (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae1114 Building_element_component as Positive_component (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae1115 Building_element_component as Negative_component (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.18)
- ae1116 Building_element_component defining an addition to the shape of one Building_element object (see 6.16, 6.17)
- ae1117 Building_element_component defining a subtraction from the shape of one Building_element object (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.1.12 Building_item

- ae122 Building_item as Building_element (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae123 Building_item as Space (see 6.25, 6.26, 6.27, 6.28)
- ae124 Building_item with approval_information (see 6.13, 6.14, 6.15, 6.18, 6.19, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae125 Building_item with approval_information not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.13, 6.14, 6.15, 6.17, 6.18, 6.21, 6.22, 6.23, 6.24, 6.28)
- ae1217 Building_item with many approval_information present (see 6.25)
- ae126 Building_item with description (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae127 Building_item with document_reference (see 6.13, 6.14, 6.15, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
- ae128 Building_item with document_reference not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.14, 6.15, 6.17, 6.18, 6.21, 6.26, 6.28)
- ae129 Building_item with identifier (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.27, 6.28)
- ae1210 Building_item with item_characterization (see 6.18, 6.19, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
- ae1211 Building_item with item_characterization not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.13, 6.14, 6.15, 6.17, 6.18, 6.20, 6.28)
- ae1212 Building_item with item_class (see 6.19, 6.20, 6.25, 6.27, 6.28)
- ae1213 Building_item with item_class not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.13, 6.14, 6.15, 6.17, 6.18, 6.21, 6.22, 6.23, 6.24, 6.26)
- ae1214 Building_item with level_assignment (see 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae1215 Building_item with level_assignment not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.13, 6.14, 6.15, 6.18, 6.19, 6.21, 6.22, 6.23, 6.24, 6.28)
- ae1216 Building_item with status (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)

4.1.13 Building_item_identification

- ae132 Building_item_identification with item_identifier (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae133 Building_item_identification with administrator (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae134 Building_item_identification with project (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae136 Building_item_identification identifies one Building_element_component ((see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23)
- ae138 Building_item_identification identifies one Building_item (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae1310 Building_item_identification identifies one Building_level (see 6.16, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae1312 Building_item_identification identifies one Building_section (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae1314 Building_item_identification identifies Building_item as unsatisfactory by one Change_request objects (see 6.13, 6.14, 6.15, 6.25, 6.26, 6.27)
- ae1315 Building_item_identification identifies Building_item as unsatisfactory by many Change_request objects (see 6.20, 6.28)

4.1.14 Building_level

- ae142 Building_level with identifier (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae143 Building_level with level_characterization (see 6.17, 6.20, 6.25, 6.26, 6.27)
- ae144 Building_level with level_characterization not present (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae145 Building_level with level_class (see 6.17, 6.20, 6.25, 6.27)
- ae146 Building_level with level_class not present (see 6.16, 6.17, 6.25, 6.26, 6.27, 6.28)
- ae147 Building_level with name (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae148 Building_level with space_shapes as Ground_face (see 6.28)
- ae149 Building_level with space_shapes as Faceted_shell (see 6.25)
- ae1410 Building_level with space_shapes as Elementary_shell (see 6.26)
- ae1411 Building_level with space_shapes as Advanced_shell (see 6.27)
- ae1412 Building_level with space shapes not present (see 6.16, 6.17, 6.20)
- ae1413 Building_level as Sublevel (see 6.16, 6.17, 6.25, 6.26, 6.27, 6.28)
- ae1414 Building_level with Sublevels (see 6.16, 6.17, 6.25, 6.26, 6.27, 6.28)
- ae1415 Building_level assigned zero Building_item object (see 6.20, 6.28)
- ae1416 Building_level assigned one Building_item object (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae1428 Building_level is the positioned level in one Level_position_in_section object (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)

4.1.15 Building_position_in_complex

- ae152 Building_position_in_complex with location (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae153 Building_position_in_complex with positioned_building (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae154 Building_position_in_complex with positioned_within (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)

4.1.16 Building_section

- ae162 Building_section with description (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae163 Building_section with identifier (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae164 Building_section with name (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae165 Building_section with status (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.18, 6.25, 6.28)
- ae168 Building_section has positioned_in it one Item_position_in_section (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.19, 6.21)
- ae169 Building_section has positioned_in it many Item_position_in_section (see 6.18, 6.20)
- ae1611 Building_section has positioned_in it one Level_position_in_section (see 6.20, 6.28)
- ae1612 Building_section has positioned_in it many Level_position_in_section (see 6.17, 6.25, 6.26, 6.27, 6.28)
- ae1613 Building_section is the positioned_section in one Section_position_in_building (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)

4.1.17 Change_request

- ae172 Change_request with approval_information (see 6.13, 6.14, 6.15, 6.17, 6.20, 6.26, 6.27, 6.28)
- ae1714 Change_request with many approval_information (see 6.14, 6.25, 6.28)
- ae173 Change_request with change_from (see 6.13, 6.14, 6.15, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae174 Change_request with change_to (see 6.13, 6.16, 6.20, 6.28)
- ae175 Change_request with change_to not present (see 6.14, 6.15, 6.17, 6.25, 6.26, 6.27, 6.28)
- ae176 Change_request with description (see 6.13, 6.14, 6.15, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae177 Change_request with reason (see 6.13, 6.14, 6.15, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae178 Change_request with request_date (see 6.13, 6.14, 6.15, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae179 Change_request with requestor (see 6.13, 6.14, 6.15, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae1710 Change_request with responsibility (see 6.13, 6.14, 6.15, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae1711 Change_request with solution (see 6.13, 6.16, 6.20, 6.28)
- ae1712 Change_request with solution not present (see 6.14, 6.15, 6.17, 6.25, 6.26, 6.27, 6.28)
- ae1713 Change_request with status (see 6.13, 6.14, 6.15, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae1715 Change_request specifies one Building_item as proposed replacement (see 6.13, 6.14, 6.15, 6.16, 6.20, 6.28)
- ae1717 Change_request specifies one Building_element_component as proposed replacement

4.1.18 Component_location_in_element

ae183 Component_location_in_element specifying position of one Building_element_component (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)

4.1.19 Component_shape

ae193 Component_shape is shape of Building_element_component (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.20, 6.21, 6.22, 6.23, 6.24)

ae194 Component_shape is shape of Fixture_equipment_element (see 6.19)

ae195 Component_shape is shape of Service_element (see 6.21)

ae196 Component_shape represented by one Component_shape_representation (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)

ae197 Component_shape represented by many Component_shape_representation object (see 6.13, 6.19)

4.1.20 Component_shape_representation

ae202 Component_shape_representation with representation_element (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)

ae204 Component_shape_representation with representation_type as detail (see 6.16)

ae205 Component_shape_representation with representation_type as envelope (see 6.20)

ae206 Component_shape_representation with representation_type as outline (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.22, 6.24)

ae207 Component_shape_representation with representation_type as user_supplied (see 6.21)

ae208 Component_shape_representation representing one Component_shape (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)

ae2010 Component_shape_representation containing one Advanced_b_rep (see 6.12)

ae2012 Component_shape_representation containing one Advanced_curve (see 6.24)

ae2014 Component_shape_representation containing one Advanced_face_with_thickness (see 6.15)

ae2016 Component_shape_representation containing one Block (see 6.2)

ae2018 Component_shape_representation containing one Elementary_b_rep (see 6.17)

ae2020 Component_shape_representation containing one Elementary_curve (see 6.1, 6.23)

ae2022 Component_shape_representation containing one Elementary_face_with_thickness (see 6.14, 6.15)

ae2024 Component_shape_representation containing one Faceted_curve (see 6.10, 6.22)

ae2026 Component_shape_representation containing one Faceted_face_with_thickness (see 6.9)

ae2028 Component_shape_representation containing one Faceted_b_rep (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21)

ae2030 Component_shape_representation containing one Right_circular_cylinder (see 6.5)

ae2032 Component_shape_representation containing one Solid_of_linear_extrusion (see 6.7)

ae2034 Component_shape_representation containing one Solid_of_revolution (see 6.8)

ae2036 Component_shape_representation containing one Trimmed_sphere (see 6.6)

ae2038 Component_shape_representation containing one Trimmed_torus (see 6.11)

ae2040 Component_shape_representation containing one Truncated_cone (see 6.4)

ae2042 Component_shape_representation containing one Truncated_pyramid (see 6.3)

4.1.21 Elementary_b_rep

- ae213 Elementary_b_rep with cylindrical surface
- ae214 Elementary_b_rep with conical surface
- ae215 Elementary_b_rep with spherical surface
- ae216 Elementary_b_rep with toroidal surface
- ae217 Elementary_b_rep is element of one Component_shape_representation (see 6.17)

4.1.22 Elementary_curve

- ae222 Elementary_curve as circle (see 6.1, 6.23)
- ae223 Elementary_curve as ellipse
- ae224 Elementary_curve as hyperbola
- ae226 Elementary_curve as parabola
- ae227 Elementary_curve is element of one Component_shape_representation (see 6.1, 6.23)

4.1.23 Elementary_face_with_thickness

- ae235 Elementary_face_with_thickness is element of one Component_shape_representation (see 6.14)

4.1.24 Elementary_shell

- ae243 Elementary_shell defines space shape of one Space (see 6.26)

4.1.25 Facet_trigon

- ae253 Facet_trigon with border defined by three Point (see 6.29)
- ae255 Facet_trigon defining facets of one Faceted_surface_representation (see 6.29)

4.1.26 Faceted_b_rep

- ae262 Faceted_b_rep is element of one Component_shape_representation (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.16, 6.18, 6.19, 6.20, 6.21)

4.1.27 Faceted_curve

- ae272 Faceted_curve is element of one Component_shape_representation (see 6.10, 6.11, 6.22)

4.1.28 Faceted_face_with_thickness

- ae281 Faceted_face_with_thickness with underlying surface of face as planar (see 6.9)
- ae282 Faceted_face_with_thickness with boundaries of face as linear (see 6.9)
- ae283 Faceted_face_with_thickness is element of one Component_shape_representation (see 6.9)

4.1.29 Faceted_shell

- ae292 Faceted_shell defines space shape of one Space (see 6.25)

4.1.30 Faceted_surface_representation

- ae303 Faceted_surface_representation has facets defined by one Facet_trigon

ae304 Faceted_surface_representation has facets defined by many Facet_trigon (see 6.29)

4.1.31 Fixture_equipment_element

ae312 Fixture_equipment_element with functional_type as ceiling
 ae313 Fixture_equipment_element with functional_type as covering element
 ae314 Fixture_equipment_element with functional_type as door (see 6.13, 6.14, 6.15)
 ae315 Fixture_equipment_element with functional_type as floor covering
 ae316 Fixture_equipment_element with functional_type as furniture
 ae317 Fixture_equipment_element with functional_type as wall covering
 ae318 Fixture_equipment_element with functional_type as window (see 6.9)
 ae319 Fixture_equipment_element with functional_type as user defined (see 6.19)

4.1.32 Gis_position

ae322 Gis_position with height (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.25, 6.26, 6.27, 6.29)
 ae323 Gis_position with scale (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.25, 6.26, 6.27, 6.29)
 ae324 Gis_position with system (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.25, 6.26, 6.27, 6.29)
 ae325 Gis_position with x_coordinate (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.25, 6.26, 6.27, 6.29)
 ae326 Gis_position with x_axis_delta_x (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.25, 6.26, 6.27, 6.29)
 ae327 Gis_position with x_axis_delta_y (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.25, 6.26, 6.27, 6.29)
 ae328 Gis_position with y_coordinate (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.25, 6.26, 6.27, 6.29)
 ae329 Gis_position with zone (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.25, 6.26, 6.27, 6.29)
 ae3211 Gis_position specifying global position of one Building_complex (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.25, 6.26, 6.27)
 ae3213 Gis_position specifying global position of one Site_shape_representation (see 6.29)

4.1.33 Ground_face

ae332 Ground_face defines space shape of one Space_object (see 6.28)

4.1.34 Item_assembly

ae342 Item_assembly with approval_information (see 6.18, 6.19, 6.26, 6.27)
 ae343 Item_assembly with approval_information not present (see 6.18, 6.21, 6.28)
 ae3416 Item_assembly with many approval_information (see 6.25)
 ae344 Item_assembly with assembly_characterization (see 6.18, 6.25, 6.26, 6.27, 6.28)
 ae345 Item_assembly with assembly_characterization not present (see 6.18, 6.19, 6.21, 6.28)
 ae346 Item_assembly with assembly_class (see 6.18, 6.26)
 ae347 Item_assembly with assembly_class not present (see 6.18, 6.19, 6.21, 6.25, 6.27, 6.28)
 ae348 Item_assembly with assembly_type (see 6.18, 6.19, 6.21, 6.25, 6.26, 6.27, 6.28)
 ae349 Item_assembly with assembly_type as user_defined (see 6.21, 6.25, 6.26, 6.27)
 ae3410 Item_assembly with assembly_type as roof (see 6.18)
 ae3411 Item_assembly with assembly_type as stairway (see 6.19)
 ae3412 Item_assembly with assembly_type as vertical passage enclosure (see 6.28)
 ae3413 Item_assembly with components (see 6.18, 6.19, 6.21, 6.25, 6.26, 6.27, 6.28)
 ae3414 Item_assembly with description (see 6.18, 6.19, 6.21, 6.25, 6.26, 6.27, 6.28)
 ae3415 Item_assembly with identifier (see 6.18, 6.19, 6.21, 6.25, 6.26, 6.27, 6.28)
 ae3420 Item_assembly has component of one Building_item object (see 6.18, 6.25, 6.26, 6.27)

- ae3421 Item_assembly has component of many Building_item object (see 6.21, 6.28)
- ae3423 Item_assembly has a component of one Item_assembly object (see 6.28)
- ae3424 Item_assembly has a component of many Item_assembly object (see 6.18)
- ae3426 Item_assembly is a component of one Item_assembly object (see 6.19, 6.28)

4.1.35 Item_classification

- ae352 Item_classification with description (see 6.10, 6.11, 6.12, 6.17, 6.18, 6.19, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae353 Item_classification with name (see 6.10, 6.11, 6.12, 6.17, 6.18, 6.19, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae354 Item_classification with notation (see 6.10, 6.11, 6.12, 6.17, 6.18, 6.19, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae355 Item_classification with table (see 6.10, 6.11, 6.12, 6.17, 6.18, 6.19, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae357 Item_classification specifying classification of one Building_element_component (see 6.10, 6.11, 6.12)
- ae358 Item_classification specifying classification of many Building_element_component (see 6.18)
- ae3510 Item_classification specifying classification of one Building_item (see 6.19, 6.25, 6.27, 6.28)
- ae3511 Item_classification specifying classification of many Building_item (see 6.20, 6.28)
- ae3513 Item_classification specifying classification of one Building_level (see 6.25, 6.27)
- ae3514 Item_classification specifying classification of many Building_level (see 6.17)
- ae3516 Item_classification specifying classification of one Item_assembly (see 6.18, 6.26)
- ae3517 Item_classification specifying classification of many Item_assembly

4.1.36 Item_group

- ae362 Item_group with description (see 6.18, 6.20, 6.21)
- ae363 Item_group with identifier (see 6.18, 6.20, 6.21)
- ae364 Item_group with name (see 6.18, 6.20, 6.21)
- ae366 Item_group has members of one Building_item
- ae367 Item_group has members of many Building_item (see 6.18, 6.20, 6.21)
- ae369 Item_group has members of one Item_group (see 6.21)
- ae3610 Item_group has members of many Item_group
- ae3612 Item_group is a member of one Item_group (see 6.21)
- ae3613 Item_group is a member of many Item_group

4.1.37 Item_position_in_section

- ae372 Item_position_in_section with location (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae373 Item_position_in_section with positioned_item (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae374 Item_position_in_section with positioned_ (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae378 Item_position_in_section with reference_curves (see 6.23)
- ae379 Item_position_in_section with reference_curves not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.22, 6.24)
- ae375 Item_position_in_section is the positioned element of one Building_item (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.17, 6.18, 6.20, 6.21, 6.22, 6.23, 6.24)

- ae376 Item_position_in_section is the positioned element of one Building_section (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae377 Item_position_in_section is located by one Placement (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24)
- ae3710 Item_position_in_section defined by Elementary_curves (see 6.23)

4.1.38 Item_proximity_relationship

- ae611 Item_proximity_relationship with item (see 6.18)
- ae612 Item_proximity_relationship with items_in_proximity (see 6.18)
- ae613 Item_proximity_relationship with relationship_type as penetration
- ae614 Item_proximity_relationship with relationship_type as space to element
- ae615 Item_proximity_relationship with relationship_type as touch (see 6.18)
- ae616 Item_proximity_relationship with item specified by exactly one Building_item (see 6.18)
- ae617 Item_proximity_relationship with items_in_proximity specified by one Building_item (see 6.18)
- ae618 Item_proximity_relationship with items_in_proximity specified by many Building_item

4.1.39 Level_position_in_section

- ae382 Level_position_in_section with location (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae383 Level_position_in_section with positioned_level (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae384 Level_position_in_section with positioned_within (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae385 Level_position_in_section is positioned_within one Building_section (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae386 Level_position_in_section has positioned level in one Building_level (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae387 Level_position_in_section has location specified by one Placement (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)

4.1.40 Negative_component

- ae392 Negative_component as Recess (see 6.10, 6.11, 6.12)
- ae393 Negative_component as Opening (see 6.9, 6.13, 6.14, 6.15, 6.21)

4.1.41 Opening

- ae403 Opening with opening_type as doorway (see 6.13, 6.14, 6.15)
- ae404 Opening with opening_type as service opening (see 6.21)
- ae405 Opening with opening_type as window opening (see 6.9)
- ae406 Opening with opening_type as user_defined (see 6.21)

4.1.42 Placement

- ae413 Placement specifies location of one Building_position_in_complex (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
- ae416 Placement specifies location of one Item_position_in_section (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)

- ae419 Placement specifies location of one Level_position_in_section (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)
- ae4112 Placement specifies location of one Section_position_in_building (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)

4.1.43 Point

- ae423 Point defines survey point for one Point_and_line_representation (see 6.30)
- ae424 Point defines survey point for many Point_and_line_representation
- ae426 Point defines border of one Facet_trigon (see 6.29)
- ae427 Point defines border of many Facet_trigon (see 6.29)
- ae429 Point defines path of one Polyline (see 6.30)
- ae4210 Point defines path of many Polyline (see 6.30)

4.1.44 Point_and_line_representation

- ae434 Point_and_line_representation has survey points defined by many Point (see 6.30)

4.1.45 Polyline

- ae444 Polyline with path defined by many Point (see 6.30)

4.1.46 Positive_component

- ae452 Positive_component is main_component of one Building_element (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.20, 6.21, 6.22, 6.23)

4.1.47 Property

- ae462 Property with code_of_measurement (see 6.13, 6.14, 6.15, 6.18, 6.19, 6.28)
- ae463 Property with code_of_measurement not present (see 6.9, 6.10, 6.11, 6.12, 6.16, 6.17, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae464 Property with formula (see 6.13, 6.14, 6.15, 6.18, 6.19, 6.28)
- ae465 Property with formula not present (see 6.9, 6.10, 6.11, 6.12, 6.16, 6.17, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae466 Property with name (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae467 Property with property_type as material (see 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.19, 6.20)
- ae468 Property with property_type as performance (see 6.9, 6.21, 6.22, 6.23, 6.24)
- ae469 Property with property_type as physical (see 6.25, 6.26, 6.27)
- ae4610 Property with property_type as surface (see 6.16, 6.17)
- ae4611 Property with property_type as user supplied (see 6.18, 6.21, 6.25, 6.26, 6.27, 6.28)
- ae4612 Property with value (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
- ae4614 Property characterizing one Building_item (see 6.13, 6.14, 6.15, 6.18, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
- ae4615 Property characterizing many Building_item
- ae4617 Property characterizing one Building_element_component (see 6.9, 6.10, 6.11, 6.12)
- ae4618 Property characterizing many Building_element_component (see 6.21)
- ae4620 Property characterizing one Building_level (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27)
- ae4621 Property characterizing many Building_level

- ae4623 Property characterises one Item_assembly (see 6.18, 6.25, 6.26, 6.27, 6.28)
 ae4624 Property characterises many Item_assembly

4.1.48 Recess

- ae471 Recess (see 6.10, 6.11, 6.12)

4.1.49 Right_circular_cylinder

- ae482 Right_circular_cylinder is element of one Component_shape_representation (see 6.5)

4.1.50 Section_position_in_building

- ae492 Section_position_in_building with location (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
 ae493 Section_position_in_building with positioned_section (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
 ae494 Section_position_in_building with positioned_within (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
 ae495 Section_position_in_building is positioned in one Building (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
 ae496 Section_position_in_building has a positioned section in one Building_section (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)
 ae497 Section_position_in_building has a location specified by one Placement (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28)

4.1.51 Service_element

- ae502 Service_element with functional_type as electrical system
 ae503 Service_element with functional_type as HVAC system (see 6.21)
 ae504 Service_element with functional_type as plumbing system
 ae505 Service_element with functional_type as transport system

4.1.52 Simple_curve

- ae621 Simple_curve as bounded (see 6.23)
 ae622 Simple_curve as straight line (see 6.23)
 ae623 Simple_curve as circular arc

4.1.53 Site_shape_representation

- ae512 Site_shape_representation as Faceted_surface_representation (see 6.29)
 ae513 Site_shape_representation as Point_and_line_representation (see 6.30)
 ae515 Site_shape_representation with breaklines not specified (see 6.29)
 ae517 Site_shape_representation defines the site shape of one Building_complex (see 6.29, 6.30)
 ae518 Site_shape_representation has global position specified by zero Gis_position (see 6.30)
 ae519 Site_shape_representation has global position specified by one Gis_position (see 6.29)

- ae5110 Site_shape_representation with breaklines defined by one Polyline
ae5111 Site_shape_representation with breaklines defined by many Polyline (see 6.30)

4.1.54 Solid_of_linear_extrusion

- ae522 Solid_of_linear_extrusion is element of one Component_shape_representation (see 6.7)

4.1.55 Solid_of_revolution

- ae532 Solid_of_revolution is element of one Component_shape_representation (see 6.8)

4.1.56 Space

- ae544 Space with space shapes defined by one Advanced_shell (see 6.27)
ae546 Space with space shapes defined by one Elementary_shell (see 6.26)
ae548 Space with space shapes defined by one Faceted_shell (see 6.25)
ae5410 Space with space shapes defined by one Ground_face (see 6.28)

4.1.57 Structure_enclosure_element

- ae552 Structure_enclosure_element with load_bearing (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.20, 6.22, 6.23, 6.24)
ae554 Structure_enclosure_element with functional_type as beam (see 6.18)
ae555 Structure_enclosure_element with functional_type as brace
ae556 Structure_enclosure_element with functional_type as column (see 6.10, 6.11, 6.12)
ae557 Structure_enclosure_element with functional_type as floor (see 6.16, 6.17)
ae558 Structure_enclosure_element with functional_type as foundation (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8)
ae559 Structure_enclosure_element with functional_type as structural_wire (see 6.22, 6.23, 6.24)
ae5510 Structure_enclosure_element with functional_type as wall (see 6.9, 6.13)
ae5511 Structure_enclosure_element with structure_enclosure_type as user_defined (see 6.16, 6.17, 6.20)

4.1.58 Sublevel

- ae562 Sublevel belongs to Building_level (see 6.16, 6.17, 6.25, 6.26, 6.27, 6.28)

4.1.59 Trimmed_sphere

- ae572 Trimmed_sphere is element of one Component_shape_representation (see 6.6)

4.1.60 Trimmed_torus

- ae582 Trimmed_torus is element of one Component_shape_representation (see 6.11)

4.1.61 Truncated_cone

- ae592 Truncated_cone is element of one Component_shape_representation (see 6.4)

4.1.62 Truncated_pyramid

- ae602 Truncated_pyramid is element of one Component_shape_representation (see 6.3)

4.2 AIM test purposes

AIM test purposes are derived from the application interpreted model (Annex A of ISO 10303-225). The test purposes are collected as test purpose groups; the test purpose groups are structured by the AIM elements documented in ISO 10303-225.

NOTE The assignment of aim test purposes to the test cases where they feature is not complete, the listing serves to indicate an example of where the test purpose has been used.

4.2.1 action

aim001 action (see 6.13, 6.14, 6.15, 6.17)

4.2.2 action_assignment

aim002 action_assignment (see 6.13, 6.14, 6.15, 6.17)

4.2.3 action_method

aim005 action_method (see 6.13, 6.14, 6.15, 6.17)

4.2.4 action_request_solution

aim003 action_request_solution (see 6.13, 6.14, 6.15, 6.17)

4.2.5 action_request_status

aim004 action_request_status (see 6.13, 6.14, 6.15, 6.17)

4.2.6 advanced_brep_building_shape_representation

aim006 advanced_brep_building_shape_representation (see 6.12)

4.2.7 advanced_csg_shape_representation

aim007 advanced_csg_shape_representation

4.2.8 advanced_face

aim008 advanced_face (see 6.12, 6.15, 6.27)

4.2.9 advanced_face_with_thickness_shape_representation

aim009 advanced_face_with_thickness_shape_representation (see 6.15)

4.2.10 advanced_space_boundary_shape_representation

aim010 advanced_space_boundary_shape_representation (see 6.27)

4.2.11 advanced_wire_shape_representation

aim011 advanced_wire_shape_representation (see 6.24)

4.2.12 application_context

aim012 application_context (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14)

4.2.13 application_context_element

aim013 application_context_element as product_context (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9)

aim014 application_context_element as product_definition_context (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6)

4.2.14 application_protocol_definition

aim015 application_protocol_definition (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12)

4.2.15 approval

aim016 approval (see 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19)

4.2.16 approval_assignment

aim017 approval_assignment (see 6.13, 6.14, 6.15)

4.2.17 approval_date_time

aim018 approval_date_time (see 6.13, 6.14, 6.15)

4.2.18 approval_person_organization

aim019 approval_person_organization (see 6.13, 6.14, 6.15)

4.2.19 approval_role

aim020 approval_role (see 6.13, 6.14, 6.15)

4.2.20 approval_status

aim021 approval_status (see 6.13, 6.14, 6.15)

4.2.21 assembly_component_usage

aim022 assembly_component_usage with reference_designator (see 6.18, 6.19, 6.20, 6.26)

aim023 assembly_component_usage with reference_designator not present

4.2.22 axis1_placement

aim024 axis1_placement with axis as direction present (see 6.4, 6.5, 6.8, 6.11)

aim025 axis1_placement with axis as direction not present

4.2.23 axis2_placement_2d

- aim026 axis2_placement_2d with ref_direction as direction present
 aim027 axis2_placement_2d with ref_direction as direction not present

4.2.24 axis2_placement_3d

- aim028 axis2_placement_3d with axis as direction present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)
 aim029 axis2_placement_3d with axis as direction not present
 aim030 axis2_placement_3d with ref_direction as direction present
 aim031 axis2_placement_3d with ref_direction as direction not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.25 b_spline_curve

- aim032 b_spline_curve (see 6.12)
 aim033 b_spline_curve as uniform_curve
 aim034 b_spline_curve as uniform_curve ANDOR rational_b_spline_curve
 aim035 b_spline_curve as b_spline_curve_with_knots
 aim036 b_spline_curve as b_spline_curve_with_knots ANDOR rational_b_spline_curve
 aim037 b_spline_curve as quasi_uniform_curve
 aim038 b_spline_curve as quasi_uniform_curve ANDOR rational_b_spline_curve
 aim039 b_spline_curve as bezier_curve (see 6.12)
 aim040 b_spline_curve as bezier_curve ANDOR rational_b_spline_curve (see 6.12)
 aim041 b_spline_curve with two cartesian_point as control_points_list
 aim042 b_spline_curve with many cartesian_point as control_points_list

4.2.26 b_spline_curve_with_knots

- aim043 b_spline_curve_with_knots

4.2.27 b_spline_surface

- aim044 b_spline_surface as b_spline_surface_with_knots
 aim045 b_spline_surface as b_spline_surface_with_knots ANDOR rational_b_spline_surface
 aim046 b_spline_surface as uniform_surface
 aim047 b_spline_surface as uniform_surface ANDOR rational_b_spline_surface
 aim048 b_spline_surface as quasi_uniform_surface
 aim049 b_spline_surface as quasi_uniform_surface ANDOR rational_b_spline_surface
 aim050 b_spline_surface as bezier_surface (see 6.12)
 aim051 b_spline_surface as bezier_surface ANDOR rational_b_spline_surface (see 6.12)

4.2.28 b_spline_surface_with_knots

- aim052 b_spline_surface_with_knots

4.2.29 bezier_curve

- aim052 bezier_curve (see 6.12)

4.2.30 **bezier_surface**

aim053 bezier_surface (see 6.12)

4.2.31 **block**

aim054 block (see 6.2, 6.3, 6.6, 6.11)

4.2.32 **boolean_result**

aim055 boolean_result (see 6.3, 6.6, 6.11, 6.17)

4.2.33 **boundary_curve**

aim056 boundary_curve

4.2.34 **bounded_curve**

aim057 bounded_curve as polyline
aim058 bounded_curve as b_spline_curve
aim059 bounded_curve as trimmed_curve (see 6.7, 6.8)
aim060 bounded_curve as composite_curve

4.2.35 **bounded_surface**

aim061 bounded_surface as b_spline_surface (see 6.12)
aim062 bounded_surface as rectangular_trimmed_surface
aim063 bounded_surface as curve_bounded_surface
aim064 bounded_surface as rectangular_composite_surface

4.2.36 **brep_with_voids**

aim065 brep_with_voids with one void as oriented_closed_shell
aim066 brep_with_voids with many void as oriented_closed_shell

4.2.37 **building**

aim067 building (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.38 **building_complex**

aim068 building_complex (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14)

4.2.39 **building_component_classification_assignment**

aim069 building_component_classification_assignment with one items of building_component_classification_item (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.18)
aim070 building_component_classification_assignment with many items of building_component_classification_item

4.2.40 building_component_classification_group

aim071 building_component_classification_group (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.18)

4.2.41 building_design_approval

aim072 building_design_approval with one items of building_design_approval_item (see 6.13, 6.14)

aim073 building_design_approval with many items of building_design_approval_item

4.2.42 building_design_date_assignment

aim074 building_design_date_assignment with one items of building_design_date_assignment_item (see 6.13, 6.14, 6.15)

aim075 building_design_date_assignment with many items of building_design_date_assignment_item

4.2.43 building_design_organization_assignment

aim076 building_design_organization_assignment with one items of building_design_organization_assignment_item (see 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim077 building_design_organization_assignment with many items of building_design_organization_assignment_item (see 6.1)

4.2.44 building_design_person_and_organization_assignment

aim078 building_design_person_and_organization_assignment with one items of building_design_person_and_organization_assignment_item (see 6.13, 6.14, 6.15)

aim079 building_design_person_and_organization_assignment with many items of building_design_person_and_organization_assignment_item

4.2.45 building_design_person_assignment

aim080 building_design_person_assignment with one items of building_design_person_assignment_item (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim081 building_design_person_assignment with many items of building_design_person_assignment_item

4.2.46 building_document_reference

aim082 building_document_reference with one item of building_document_item (see 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim083 building_document_reference with many items of building_document_item

4.2.47 building_element

aim084 building_element (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13)

4.2.48 building_element_assembly

aim085 building_element_assembly (see 6.18, 6.19, 6.21, 6.26, 6.27)

4.2.49 building_element_group

aim086 building_element_group (see 6.18, 6.21)

4.2.50 building_item_identification_assignment

aim087 building_item_identification_assignment (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.51 building_level

aim088 building_level (see 6.16, 6.17, 6.20, 6.25, 6.26, 6.27, 6.28)

4.2.52 building_section

aim089 building_section (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14)

4.2.53 calendar_date

aim090 calendar_date (see 6.13, 6.14, 6.15)

4.2.54 cartesian_point

aim091 cartesian_point with coordinates of one length_measure

aim092 cartesian_point with coordinates of two length_measure

aim093 cartesian_point with coordinates of three length_measure (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.55 cartesian_transformation_operator

aim094 cartesian_transformation_operator

aim095 cartesian_transformation_operator as cartesian_transformation_operator_3d

aim096 cartesian_transformation_operator with axis 1 as direction

aim097 cartesian_transformation_operator with axis 1 as direction not present

aim098 cartesian_transformation_operator with axis 2 as direction

aim099 cartesian_transformation_operator with axis 2 as direction not present

aim100 cartesian_transformation_operator with scale

aim101 cartesian_transformation_operator with scale not present

4.2.56 cartesian_transformation_operator_3d

aim102 cartesian_transformation_operator_3d with axis3 as direction

aim103 cartesian_transformation_operator_3d with axis3 as direction not present

4.2.57 change

aim104 change with one items of building_design_change_item (see 6.13, 6.14, 6.15)

aim105 change with many items of building_design_change_item

4.2.58 characterized_object

aim106 characterized_object (see 6.22)

4.2.59 circle

aim107circle (see 6.23, 6.24)

4.2.60 classification_table

aim108 classification_table (see 6.10, 6.11, 6.12)

4.2.61 closed_shell

aim109 closed_shell (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.13, 6.15)

4.2.62 composite_curve

aim110 composite_curve with one segment of composite_curve_segment (see 6.7, 6.8)

aim111 composite_curve with many segment of composite_curve_segment (see 6.7, 6.8)

4.2.63 composite_curve_on_surface

aim112 composite_curve_on_surface as boundary_curve

4.2.64 composite_curve_segment

aim113 composite_curve_segment (see 6.7, 6.8)

4.2.65 conic

aim114 conic as circle (see 6.23, 6.24)

aim115 conic as ellipse

aim116 conic as hyperbola

aim117 conic as parabola

4.2.66 conical_surface

aim118 conical_surface

4.2.67 connected_face_set

aim119 connected_face_set as closed_shell with one cfs_faces of face

aim120 connected_face_set as closed_shell with many cfs_faces of face (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim121 connected_face_set as open_shell with one cfs_faces of face

aim122 connected_face_set as open_shell with many cfs_faces of face

4.2.68 conversion_based_unit

aim123 conversion_based_unit

4.2.69 csg_solid

aim124 csg_solid (see 6.17)

4.2.70 curve

aim125 curve as line (see 6.7)
aim126 curve as conic
aim127 curve as pcurve
aim128 curve as surface_curve (see 6.7, 6.8)
aim129 curve as offset_curve_3d
aim130 curve as curve_replica

4.2.71 curve_bounded_surface

aim131 curve_bounded_surface with one boundary of boundary_curve (see 6.7)
aim132 curve_bounded_surface with many boundary of boundary_curve (see 6.8)

4.2.72 curve_replica

aim133 curve_replica

4.2.73 cylindrical_surface

aim134 cylindrical_surface (see 6.12)

4.2.74 date

aim135 date as calendar_date (see 6.13, 6.14, 6.15)
aim136 date as ordinal_date
aim137 date as week_of_year_and_day_date

4.2.75 date_assignment

aim138 date_assignment (see 6.13, 6.14, 6.15)

4.2.76 date_role

aim139 date_role (see 6.13, 6.14, 6.15)

4.2.77 definitional_representation

aim140 definitional_representation

4.2.78 degenerate_toroidal_surface

aim141 degenerate_toroidal_surface

4.2.79 derived_unit

aim142 derived_unit with one element of derived_unit_element
aim143 derived_unit with many element of derived_unit_element

4.2.80 derived_unit_element

aim144 derived_unit_element

4.2.81 descriptive_representation_item

aim145 descriptive_representation_item (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.82 dimensional_exponents

aim146 dimensional_exponents (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.83 direction

aim147 direction with two direction_ratios

aim148 direction with three direction_ratios (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.84 document

aim149 document (see 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.85 document_reference

aim150 document_reference (see 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.86 document_type

aim151 document_type (see 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.87 document_usage_constraint

aim152 document_usage_constraint (see 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.88 edge

aim153 edge as edge_curve (see 6.12, 6.14, 6.15, 6.26, 6.27)

aim154 edge as oriented_edge (see 6.12, 6.14, 6.15, 6.26, 6.27)

4.2.89 edge_curve

aim155 edge_curve (see 6.12, 6.14, 6.15)

4.2.90 edge_loop

aim156 edge_loop (see 6.12, 6.14, 6.15)

4.2.91 elementary_csg_shape_representation

aim157 elementary_csg_shape_representation (see 6.4, 6.5, 6.6, 6.7, 6.8, 6.11)

4.2.92 elementary_face_with_thickness_shape_representation

aim158 elementary_face_with_thickness_shape_representation (see 6.14, 6.15)

4.2.93 elementary_geometric_shape_representation

aim159 elementary_geometric_shape_representation (see 6.17)

4.2.94 elementary_space_boundary_shape_representation

aim160 elementary_space_boundary_shape_representation (see 6.16, 6.26)

4.2.95 elementary_surface

aim162 elementary_surface as plane (see 6.7, 6.8, 6.12, 6.14, 6.15)

aim163 elementary_surface as cylindrical_surface

aim164 elementary_surface as conical_surface

aim165 elementary_surface as spherical_surface

aim166 elementary_surface as toroidal_surface

4.2.96 elementary_wire_shape_representation

aim161 elementary_wire_shape_representation (see 6.23)

4.2.97 ellipse

aim167 ellipse

4.2.98 extruded_area_solid

aim168 extruded_area_solid (see 6.7)

4.2.99 face

aim169 face as face_surface (see 6.1, 6.12, 6.14, 6.15)

aim170 face as oriented_face

aim171 face with bounds of one face_bound (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim172 face with bounds of many face_bound

4.2.100 face_bound

aim173 face_bound (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.14, 6.15)

4.2.101 face_outer_bound

aim174 face_outer_bound (see 6.9, 6.12)

4.2.102 face_surface

aim175 face_surface (see 6.12, 6.14, 6.15)

4.2.103 faceted_brep

aim176 faceted_brep (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.104 faceted_csg_shape_representation

aim177 faceted_csg_shape_representation (see 6.2, 6.3)

4.2.105 faceted_face_with_thickness_shape_representation

aim178 faceted_face_with_thickness_shape_representation (see 6.9)

4.2.106 faceted_geometric_shape_representation

aim179 faceted_geometric_shape_representation (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16)

4.2.107 faceted_space_boundary_shape_representation

aim180 faceted_space_boundary_shape_representation (see 6.25)

4.2.108 faceted_wire_shape_representation

aim181 faceted_wire_shape_representation (see 6.10, 6.22)

4.2.109 fixture_equipment_element

aim182 fixture_equipment_element (see 6.9, 6.13, 6.14, 6.15)

4.2.110 functionally_defined_transformation;

aim183 functionally_defined_transformation

4.2.111 geometric_curve_set

aim184 geometric_curve_set (see 6.30)

4.2.112 geometric_representation_context

aim185 geometric_representation_context (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11)

4.2.113 geometric_representation_item

aim186 geometric_representation_item as point (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10)

aim187 geometric_representation_item as direction (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9)

aim188 geometric_representation_item as vector (see 6.26)

aim189 geometric_representation_item as placement (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9)

aim190 geometric_representation_item as cartesian_transformation_operator

aim191 geometric_representation_item as curve (see 6.7, 6.8)

aim192 geometric_representation_item as surface (see 6.7, 6.8, 6.12)

aim193 geometric_representation_item as edge_curve (see 6.12, 6.14, 6.15)

aim194 geometric_representation_item as face_surface (see 6.1, 6.14, 6.15)

aim195 geometric_representation_item as poly_loop (see 6.1, 6.10, 6.11, 6.13, 6.14, 6.15)
aim196 geometric_representation_item as vertex_point (see 6.9, 6.10, 6.12, 6.14, 6.15)
aim197 geometric_representation_item as solid_model
aim198 geometric_representation_item as boolean_result (see 6.3, 6.6, 6.11)
aim199 geometric_representation_item as sphere (see 6.6)
aim200 geometric_representation_item as right_circular_cone (see 6.4)
aim201 geometric_representation_item as right_circular_cylinder (see 6.5)
aim202 geometric_representation_item as torus (see 6.11)
aim203 geometric_representation_item as block (see 6.2, 6.3, 6.4, 6.6)
aim204 geometric_representation_item as half_space_solid
aim205 geometric_representation_item as geometric_set

4.2.114 geometric_set

aim206 geometric_set as geometric_curve_set (see 6.30)
aim207 geometric_set with one elements of geometric_set_select
aim208 geometric_set with many elements of geometric_set_select

4.2.115 global_unit_assigned_context

aim209 global_unit_assigned_context (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)
aim210 global_unit_assigned_context with one units of unit (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)
aim211 global_unit_assigned_context with many units of unit

4.2.116 ground_face_space_boundary_shape_representation

aim212 ground_face_space_boundary_shape_representation

4.2.117 group

aim213 group (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.118 group_assignment

aim214 group_assignment (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.119 half_space_solid

aim215 half_space_solid

4.2.120 hyperbola

aim216 hyperbola

4.2.121 intersection_curve

aim217 intersection_curve

4.2.122 length_measure_with_unit

aim218 length_measure_with_unit (see 6.1, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.14, 6.15)

4.2.123 length_unit

aim219 length_unit (see 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.124 line

aim220 line (see 6.7, 6.8, 6.12, 6.14, 6.15)

4.2.125 loop

aim221 loop as vertex_loop

aim222 loop as edge_loop (see 6.26, 6.27)

aim223 loop as poly_loop (see 6.1, 6.14, 6.28)

4.2.126 manifold_solid_brep

aim224 manifold_solid_brep (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.14)

4.2.127 mapped_item

aim225 mapped_item (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.128 measure_representation_item

aim226 measure_representation_item (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.14, 6.15)

4.2.129 measure_with_unit

aim227 measure_with_unit (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.14, 6.15)

aim228 measure_with_unit as length_measure_with_unit (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8)

aim229 measure_with_unit as plane_angle_measure_with_unit

4.2.130 name_assignment

aim230 name_assignment (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14)

4.2.131 named_unit

aim231 named_unit as si_unit (see 6.1, 6.2, 6.4, 6.5, 6.6, 6.7, 6.8, 6.10, 6.11, 6.12, 6.13, 6.15)

aim232 named_unit as conversion_based_unit

aim233 named_unit as si_unit ANDOR length_unit (see 6.1, 6.4, 6.5, 6.6, 6.7, 6.8, 6.15)

aim234 named_unit as si_unit ANDOR plane_angle_unit

aim235 named_unit as conversion_based_unit ANDOR length_unit

aim236 named_unit as conversion_based_unit ANDOR plane_angle_unit

4.2.132 negative_component

aim237 negative_component (see 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.133 offset_curve_3d

aim238 offset_curve_3d

4.2.134 open_shell

aim239 open_shell

4.2.135 opening

aim240 opening (see 6.9, 6.13, 6.14, 6.15, 6.21)

4.2.136 ordinal_date

aim241 ordinal_date

4.2.137 organization

aim242 organization (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim243 organization with id (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14)

aim244 organization with id not present

4.2.138 organization_assignment

aim245 organization_assignment (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13)

4.2.139 organization_role

aim246 organization_role (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14)

4.2.140 organizational_project

aim247 organizational_project with one organization as responsible_organization (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim248 organizational_project with many organization as responsible_organization

4.2.141 oriented_closed_shell

aim249 oriented_closed_shell

4.2.142 oriented_edge

aim250 oriented_edge (see 6.12, 6.14, 6.15)

4.2.143 oriented_face

aim251 oriented_face

4.2.144 oriented_open_shell

aim252 oriented_open_shell

4.2.145 oriented_path

aim253 oriented_path

4.2.146 outer_boundary_curve

aim254 outer_boundary_curve (see 6.7, 6.8)

4.2.147 parabola

aim255 parabola

4.2.148 parametric_representation_context

aim256 parametric_representation_context

4.2.149 path

aim257 path (see 6.12, 6.14, 6.15)

aim258 path as edge_loop (see 6.12, 6.14, 6.15)

aim259 path as edge_loop with one oriented_edge as edge_list (see 6.12, 6.14)

aim260 path as edge_loop with many oriented_edge as edge_list (see 6.12, 6.14, 6.15)

aim261 path as oriented_path

aim262 path as oriented_path with one oriented_edge as edge_list

aim263 path as oriented_path with many oriented_edge as edge_list

4.2.150 pcurve

aim264 pcurve

4.2.151 person

aim265 person (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim266 person with last_name (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim267 person with last_name not present (see 6.2)

aim268 person with first_name (see 6.2, 6.13, 6.14, 6.15)

aim269 person with first_name not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.14, 6.15)

aim270 person with one middle_name (see 6.2, 6.13)

aim271 person with many middle_name (see 6.2)

aim272 person with middle_name not present (see 6.1, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14)

aim273 person with one prefix_title (see 6.1, 6.13, 6.14, 6.15)

aim274 person with many prefix_title (see 6.1, 6.2, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim275 person with prefix_title not present (see 6.2)

aim276 person with one suffix_title (see 6.2, 6.13, 6.14, 6.15)

aim277 person with many suffix_title

aim278 person with suffix_title not present (see 6.1, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.14)

4.2.152 person_and_organization;

aim279 person_and_organization (see 6.13, 6.14, 6.15)

4.2.153 person_and_organization_assignment

aim280 person_and_organization_assignment (see 6.13, 6.14, 6.15)

4.2.154 person_and_organization_role

aim281 person_and_organization_role (see 6.13, 6.14, 6.15)

4.2.155 person_assignment

aim282 person_assignment (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.156 person_role

aim283 person_role (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.157 placement

aim284 placement as axis1_placement (see 6.4, 6.5, 6.8, 6.11)

aim285 placement as axis2_placement_2d

aim286 placement as axis2_placement_3d (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.158 plane

aim287 plane (see 6.7, 6.8, 6.12, 6.14, 6.15)

4.2.159 plane_angle_measure_with_unit

aim288 plane_angle_measure_with_unit

4.2.160 plane_angle_unit

aim289 plane_angle_unit

4.2.161 point

aim290 point as cartesian_point (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.10)

4.2.162 poly_loop

aim291 polyloop with three cartesian_point as polygon (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim292 polyloop with many cartesian_point as polygon

4.2.163 polyline

- aim293 polyline with two cartesian_points as points (see 6.30)
 aim294 polyline with many cartesian_points as points (see 6.10, 6.22, 6.23, 6.30)

4.2.164 positive_component

- aim295 positive_component (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.165 product

- aim296 product (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)
 aim297 product with one product_context as frame_of_reference (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)
 aim298 product with many product_context as frame_of_reference

4.2.166 product_category

- aim299 product_category with description (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)
 aim300 product_category with description not present

4.2.167 product_category_relationship

- aim301 product_category_relationship (see 6.18, 6.26)

4.2.168 product_context

- aim302 product_context (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.169 product_definition

- aim303 product_definition (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.170 product_definition_context

- aim304 product_definition_context (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.171 product_definition_formation

- aim305 product_definition_formation (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.172 product_definition_relationship

- aim306 product_definition_relationship (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.173 product_definition_shape

aim307 product_definition_shape (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.174 product_definition_usage

aim308 product_definition_usage

4.2.175 product_related_product_category

aim309 product_related_product_category (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim310 product_related_product_category with one products of product (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim311 product_related_product_category with many products of product

4.2.176 property_definition

aim312 property_definition (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.22)

4.2.177 property_definition_representation

aim313 property_definition_representation (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.22)

4.2.178 quasi_uniform_curve

aim314 quasi_uniform_curve

4.2.179 quasi_uniform_surface

aim315 quasi_uniform_surface

4.2.180 rational_b_spline_curve

aim316 rational_b_spline_curve (see 6.12)

aim317 rational_b_spline_curve with two weights_data (see 6.12)

aim318 rational_b_spline_curve with many weights_data

4.2.181 rational_b_spline_surface

aim319 rational_b_spline_surface

aim320 rational_b_spline_surface with two weights_data

aim321 rational_b_spline_surface with many weights_data

4.2.182 recess

aim323 recess (see 6.10, 6.11, 6.12)

4.2.183 rectangular_composite_surface

- aim324 rectangular_composite_surface
 aim325 rectangular_composite_surface with one segments of surface_patch
 aim326 rectangular_composite_surface with many segments of surface_patch

4.2.184 rectangular_trimmed_surface

- aim327 rectangular_trimmed_surface

4.2.185 representation

- aim328 representation (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)
 aim329 representation with one items of representation_item (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)
 aim330 representation with many items of representation_item (see 6.1, 6.2, 6.3)

4.2.186 representation_context

- aim331 representation_context (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.187 representation_item

- aim332 representation_item (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.188 representation_map

- aim333 representation_map (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.189 representation_relationship

- aim334 representation_relationship

4.2.190 representation_relationship_with_transformation

- aim335 representation_relationship_with_transformation

4.2.191 revolved_area_solid

- aim336 revolved_area_solid (see 6.8)

4.2.192 right_circular_cone

- aim337 right_circular_cone (see 6.4)

4.2.193 right_circular_cylinder

- aim338 right_circular_cylinder (see 6.5)

4.2.194 service_element

aim339 service_element

4.2.195 shape_aspect

aim340 shape_aspect (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.196 shape_aspect_relationship

aim341 shape_aspect_relationship

4.2.197 shape_definition_representation

aim342 shape_definition_representation (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.198 shape_representation

aim343 shape_representation (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.199 si_unit

aim344 si_unit (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

aim345 si_unit with prefix

aim346 si_unit with prefix not present (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.200 site

aim347 site

4.2.201 site_representation

aim348 site_representation (see 6.29, 6.30)

4.2.202 solid_model

aim349 solid_model (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.14)

aim350 solid_model as csg_solid

aim351 solid_model as manifold_solid_brep (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.14)

aim352 solid_model as swept_area_solid (see 6.7, 6.8)

4.2.203 space_element

aim353 space_element (see 6.16, 6.25, 6.26, 6.27)

4.2.204 sphere

aim354 sphere (see 6.6)

4.2.205 spherical_surface

aim355 spherical_surface

4.2.206 structure_enclosure_element

aim356 structure_enclosure_element (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)

4.2.207 surface

aim357 surface as elementary_surface (see 6.7, 6.29)

aim358 surface as swept_surface

aim359 surface as bounded_surface (see 6.12)

4.2.208 surface_curve

aim360 surface_curve as intersection_curve

aim361 surface_curve with one pcurve_or_surface as associated_geometry (see 6.7, 6.8)

aim362 surface_curve with two pcurve_or_surface as associated_geometry

4.2.209 surface_of_linear_extrusion

aim363 surface_of_linear_extrusion

4.2.210 surface_of_revolution

aim364 surface_of_revolution

4.2.211 surface_patch

aim365 surface_patch

4.2.212 swept_area_solid

aim366 swept_area_solid as revolved_area_solid (see 6.8)

aim367 swept_area_solid as extruded_area_solid (see 6.7)

4.2.213 swept_surface

aim368 swept_surface as surface_of_linear_extrusion

aim369 swept_surface as surface_of_revolution

4.2.214 topological_representation_item

aim370 topological_representation_item as vertex (see 6.26)

aim371 topological_representation_item as vertex ANDOR path (see 6.26)

aim372 topological_representation_item as edge (see 6.12, 6.14, 6.15)

aim373 topological_representation_item as edge ANDOR path (see 6.12, 6.14, 6.15)

aim374 topological_representation_item as face_bound (see 6.9, 6.10, 6.11, 6.12, 6.14, 6.15)

aim375 topological_representation_item as face_bound ANDOR path (see 6.12, 6.14, 6.15)

aim376 topological_representation_item as face (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.14, 6.15)

- aim377 topological_representation_item as face ANDOR path (see 6.26)
aim378 topological_representation_item as connected_face_set (see 6.1, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15)
aim379 topological_representation_item as connected_face_set ANDOR path (see 6.12, 6.14, 6.15)
aim380 topological_representation_item as loop (see 6.1, 6.14)
aim381 topological_representation_item as loop ANDOR path (see 6.14)

4.2.215 toroidal_surface

- aim382 toroidal_surface

4.2.216 torus

- aim383 torus (see 6.11)

4.2.217 trimmed_curve

- aim384 trimmed_curve with one trimming_select as trim_1 (see 6.7, 6.8)
aim385 trimmed_curve with two trimming_select as trim_1
aim386 trimmed_curve with one trimming_select as trim_2 (see 6.7, 6.8)
aim387 trimmed_curve with two trimming_select as trim_2

4.2.218 truncated_pyramid

- aim388 truncated_pyramid (see 6.3)

4.2.219 uniform_curve

- aim389 uniform_curve

4.2.220 uniform_surface

- aim390 uniform_surface

4.2.221 vector

- aim391 vector (see 6.26, 6.27)

4.2.222 versioned_action_request

- aim392 versioned_action_request (see 6.13, 6.14, 6.15)

4.2.223 vertex

- aim393 vertex

4.2.224 vertex_loop

- aim394 vertex_loop

4.2.225 vertex_point

aim395 vertex_point (see 6.12, 6.14, 6.15, 6.26, 6.27)

4.2.226 week_of_year_and_day_date

aim396 week_of_year_and_day_date

aim397 week_of_year_and_day_date with day_in_week_number

aim398 week_of_year_and_day_date with day_in_week_number not present

5 General test purposes and verdict criteria

General test purposes are statements of requirements that apply to all abstract test cases, all preprocessor abstract test cases, or all postprocessor abstract test cases. General verdict criteria are the means for evaluating whether the general test purposes are met. General verdict criteria shall be evaluated as a part of every executable test case to which they apply. Each general verdict criterion includes a reference to its associated test purpose.

5.1 General test purposes

The following are general test purposes for this part of ISO 10303:

- g1 The output of an IUT shall preserve all the semantics defined by the input model according to the reference paths specified in the mapping table defined in clause 5 of ISO 10303-225.
- g2 The output of a preprocessor shall conform to the implementation method to which the IUT claims conformance.
- g3 The instances in the output of a preprocessor shall be encoded according to the AIM EXPRESS long form and mapping table defined in Annex A and clause 5 of ISO 10303-225.
- g4 A postprocessor shall accept input data which is encoded according to the implementation method to which the IUT claims conformance.
- g5 A postprocessor shall accept input data structured according to the AIM EXPRESS long form and the mapping table as defined in clause 5 of ISO 10303-225.

5.2 General verdict criteria for all abstract test cases

The following verdict criteria apply to all abstract test cases contained in this part of ISO 10303:

- gvc1 The semantics of the input model are preserved in the output of the IUT according to the reference paths specified in the mapping table defined in clause 5 of ISO 10303-225 (g1).

5.3 General verdict criteria for preprocessor abstract test cases

The following verdict criteria apply to all preprocessor abstract test cases contained in this part of ISO 10303:

- gvc2 The output of a preprocessor conforms to the implementation method to which the IUT claims conformance (g2).

- gvc3 The instances in the output of a preprocessor are encoded according to the AIM EXPRESS long form and mapping table as defined in Annex A and clause 5 of ISO 10303-225 (g3).

5.4 General verdict criteria for postprocessor abstract test cases

The following verdict criteria apply to all postprocessor abstract test cases contained in this part of ISO 10303:

- gvc4 The postprocessor accepts input data which is encoded according to the implementation method to which the IUT claims conformance (g4).
- gvc5 The postprocessor accepts input data which is structured according to the AIM EXPRESS long form and mapping table as defined in Annex A and clause 5 of ISO 10303-225.

6 Abstract test cases

6.1 Building_complex with foundation as faceted_b_rep

Test case summary:

This test case is a building_complex with one building, no surrounding_grounds shape and a structure_enclosure_element as foundation defined using faceted_b_rep.

6.1.1 Preprocessor

Test purposes covered:

The following general test purposes are covered: g1, g2, and g3. In the preprocessor input specification table of a test case, the numbers in column 1 (ignoring the part beyond the decimal point, if any), whose rows are not empty in column 2 (V), identify the AE test purposes covered by this test case.

Input specification:

See Table 1.

Table 1 – Application elements for Building_complex with foundation as faceted_b_rep

ID	V	Application Element	Value	Req
@072	*	Building.address	#712, 'Plot 1'	S
@074	*	Building.description	#700, 'building description'	S
@075	*	Building.name	#702, 'building 1'	S
@076	*	Building.owner	#707	M

Table 1 – Application elements for Building_complex with foundation as faceted_b_rep (continued)

ID	V	Application Element	Value	Req
@077	*	Building.status	#702, 'initial design'	S
@078	*	Building to Building_position_in_complex (is the positioned building)	#1503	M
@0710		Building to Section_position_in_building (contains)	#5003	M
@082	*	Building_complex.description	#803 'new condo complex'	S
@083	*	Building_complex.global_position	#3200	M
@084	*	Building_complex.name	#803, 'Club Villas'	S
@085	*	Building_complex.owner	#806	M
@088	*	Building_complex to Site_shape_representation (as surrounding_grounds_shape)	<not_present>	M
@0811	*	Building_complex.global position (as Gis_position)	#3200	M
@0813	*	Building_complex to Building_position_in_complex (contains)	#1503	M
@103	*	Building_element.additions_and_subtractions	<not_present>	M
@105	*	Building_element (as Structure_enclosure_element)	#5700	M
@1010	*	Building_element.main_component (as Positive_-component)	#4600	M
@113	*	Building_element_component.approval_information	<not_present>	M
@115	*	Building_element_component.component_characterization	<not_present>	M
@117	*	Building_element_component.component_class	<not_present>	M
@118	*	Building_element_component.description	#4600, 'main component'	M
@1110	*	Building_element_component.document_reference	<not_present>	M
@1111	*	Building_element_component.identifier	#1300	M

Table 1 – Application elements for Building_complex with foundation as faceted_b_rep (continued)

ID	V	Application Element	Value	Req
@1112	*	Building_element_component.position	#1800	M
@1113	*	Building_element_component.shape	#1900	M
@1114	*	Building_element_component (as Positive_component)	#4600, #2600	M
@122	*	Building_item (as Building_element)	#5700	M
@125	*	Building_item.approval_information	<not_present>	M
@126	*	Building_item.description	#5700, 'building item as foundation'	S
@128	*	Building_item.document_reference	<not_present>	M
@129	*	Building_item.identifier	#1301	M
@1211	*	Building_item.item_characterization	<not_present>	M
@1213	*	Building_item.item_class	<not_present>	M
@1215	*	Building_item.level_assignment	<not_present>	M
@1216	*	Building_item.status	#5702, 'initial design'	S
@132.1	*	Building_item_identification.item_identifier	#1300, 'component 1'	S
@133.1	*	Building_item_identification.administrator	#1304	M
@134.1	*	Building_item_identification.project	#1309	M
@136	*	Building_item_identification to Building_element_component (identifies)	#4600	M
@132.2	*	Building_item_identification.item_identifier	#1301, 'element 1'	S
@133.2	*	Building_item_identification.administrator	#1304	M
@134.2	*	Building_item_identification.project	#1309	M
@138	*	Building_item_identification to Building_item (identifies)	#5700	M