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

Part 324:

**Abstract test suite: Mechanical product
definition for process plans using
machining features**

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

*Partie 324: Suite d'essais abstraits: Définition de produits mécaniques pour
les plans de procédés utilisant des caractéristiques d'usinage*



Reference number
ISO/TS 10303-324:1999(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 every three years with a view to deciding whether it can be transformed into an International Standard.

ISO/TS 10303-324 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC4, *Industrial data*.

ISO 10303 consists of the following parts under the general title *Industrial automation systems and integration - Product data representation and exchange*:

- Part 1, Overview and fundamental principles;
- Part 11, Description methods: The EXPRESS language reference manual;
- Part 12, Description method: The EXPRESS-I language reference manual;
- Part 21, Implementation methods: Clear text encoding of the exchange structure;
- Part 22, Implementation method: Standard data access interface specification;

- Part 23, Implementation method: C++ language binding to the standard data access interface;
- Part 24, Implementation method: C language binding to the standard data access interface;
- Part 26, Implementation method: Interface definition language binding to the standard data access;
- Part 31, Conformance testing methodology and framework: General concepts;
- Part 32, Conformance testing methodology and framework: Requirements on testing laboratories and clients;
- Part 34, Conformance testing methodology and framework: Abstract test methods;
- Part 35, Conformance testing methodology and framework: Abstract test methods for SDAI implementations;
- Part 41, Integrated generic resources: Fundamentals of product description and support;
- Part 42, Integrated generic resources: Geometric and topological representation;
- Part 43, Integrated generic resources: Representation structures;
- Part 44, Integrated generic resources: Product structure configuration;
- Part 45, Integrated generic resource: Materials;
- Part 46, Integrated generic resources: Visual presentation;
- Part 47, Integrated generic resource: Shape variation tolerances;
- Part 49, Integrated generic resource: Process structure and properties;
- Part 101, Integrated application resource: Draughting;
- Part 104, Integrated application resource: Finite element analysis;
- Part 105, Integrated application resource: Kinematics;
- Part 106, Integrated application resource: Building construction core model;
- Part 201, Application protocol: Explicit draughting;
- Part 202, Application protocol: Associative draughting;
- Part 203, Application protocol: Configuration controlled design;

- Part 204, Application protocol: Mechanical design using boundary representation;
- Part 205, Application protocol: Mechanical design using surface representation;
- Part 207, Application protocol: Sheet metal die planning and design;
- Part 208, Application protocol: Life cycle management - Change process;
- Part 209, Application protocol: Composite and metallic structural analysis and related design;
- Part 210, Application protocol: Electronic assembly, interconnect, and packaging design;
- Part 212, Application protocol: Electrotechnical design and installation
- Part 213, Application protocol: Numerical control process plans for machined parts;
- Part 214, Application protocol: Core data for automotive mechanical design processes;
- Part 215, Application protocol: Ship arrangement;
- Part 216, Application protocol: Ship moulded forms;
- Part 217, Application protocol: Ship piping;
- Part 218, Application protocol: Ship structures;
- Part 221, Application protocol: Functional data and their schematic representation for process plant;
- Part 222, Application protocol: Exchange of product data for composite structures;
- Part 223, Application protocol: Exchange of design and manufacturing product information for casting parts;
- Part 224, Application protocol: Mechanical product definition for process plans using machining features;
- Part 225, Application protocol: Building elements using explicit shape representation;
- Part 226, Application protocol: Ship mechanical systems;
- Part 227, Application protocol: Plant spatial configuration;
- Part 229, Application protocol: Exchange of design and manufacturing product information for forged parts;

- Part 230, Application protocol: Building structural frame: Steelwork;
- Part 231, Application protocol: Process engineering data: Process design and process specification of major equipment;
- Part 232, Application protocol: Technical data packaging core information and exchange;
- Part 301, Abstract test suite: Explicit draughting;
- Part 302, Abstract test suite: Associative draughting;
- Part 303, Abstract test suite: Configuration controlled design;
- Part 304, Abstract test suite: Mechanical design using boundary representation;
- Part 305, Abstract test suite: Mechanical design using surface representation;
- Part 307, Abstract test suite: Sheet metal die planning and design;
- Part 308, Abstract test suite: Life cycle management - Change process;
- Part 309, Abstract test suite: Composite and metallic structural analysis and related design;
- Part 310, Abstract test suite: Electronic assembly, interconnect, and packaging design;
- Part 312, Abstract test suite: Electrotechnical design and installation;
- Part 313, Abstract test suite: Numerical control process plans for machined parts;
- Part 314, Abstract test suite: Core data for automotive mechanical design processes;
- Part 315, Abstract test suite: Ship arrangement;
- Part 316, Abstract test suite: Ship moulded forms;
- Part 317, Abstract test suite: Ship piping;
- Part 318, Abstract test suite: Ship structures;
- Part 321, Abstract test suite: Functional data and their schematic representation for process plant;
- Part 322, Abstract test suite: Exchange of product data for composite structures;
- Part 323, Abstract test suite: Exchange of design and manufacturing product information for casting parts;

- Part 324, Abstract test suite: Mechanical product definition for process plans using machining features;
- Part 325, Abstract test suite: Building elements using explicit shape representation;
- Part 326, Abstract test suite: Ship mechanical systems;
- Part 327, Abstract test suite: Plant spatial configuration;
- Part 329, Abstract test suite: Exchange of design and manufacturing product information for forged parts;
- Part 330, Abstract test suite: Building structural frame: Steelwork;
- Part 331, Abstract test suite: Process engineering data: Process design and process specification of major equipment;
- Part 332, Abstract test suite: Technical data packaging core information and exchange;
- Part 501, Application interpreted construct: Edge-based wireframe;
- Part 502, Application interpreted construct: Shell-based wireframe;
- Part 503, Application interpreted construct: Geometrically bounded 2D wireframe;
- Part 504, Application interpreted construct: Draughting annotation;
- Part 505, Application interpreted construct: Drawing structure and administration;
- Part 506, Application interpreted construct: Draughting elements;
- Part 507, Application interpreted construct: Geometrically bounded surface;
- Part 508, Application interpreted construct: Non-manifold surface;
- Part 509, Application interpreted construct: Manifold surface;
- Part 510, Application interpreted construct: Geometrically bounded wireframe;
- Part 511, Application interpreted construct: Topologically bounded surface;
- Part 512, Application interpreted construct: Faceted boundary representation;
- Part 513, Application interpreted construct: Elementary boundary representation;
- Part 514, Application interpreted construct: Advanced boundary representation;

- Part 515, Application interpreted construct: Constructive solid geometry;
- Part 517, Application interpreted construct: Mechanical design geometric presentation;
- Part 518, Application interpreted construct: Mechanical design shaded presentation.

The structure of this International Standard is described in ISO 10303-1. The numbering of the parts of the International Standard reflects its structure:

- Parts 11 to 12 specify the description methods,
- Parts 21 to 26 specify the implementation methods,
- Parts 31 to 35 specify the conformance testing methodology and framework,
- Parts 41 to 49 specify the integrated generic resources,
- Parts 101 to 106 specify the integrated application resources,
- Parts 201 to 232 specify the application protocols,
- Parts 301 to 332 specify the abstract test suites, and
- Parts 501 to 518 specify the application interpreted constructs.

Should further parts be published, they will follow the same numbering pattern.

Annexes A, B and C form an integral part of this part of ISO 10303. Annex D is for information only.

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 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 10303-224, application protocol Mechanical product definition for process planning using machining features. The abstract test cases presented here are the basis for conformance testing of implementations of ISO 10303-224.

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 information requirements and AIM, as well as from other sources such as standards referenced by the application protocol and other 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. This part of ISO 10303 only specifies test purposes and abstract test cases for a subset of such implementations.

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

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Industrial automation systems and integration — Product data representation and exchange — Part 324: Abstract test suite: Mechanical product definition for process planning using machining features

1 Scope

This part of ISO 10303 specifies the abstract test suite to be used in the conformance testing of implementations of ISO 10303-224. The following are within the scope of this part of ISO 10303:

- the specification of the test purposes associated with ISO 10303-224;
- the verdict criteria to be applied during conformance testing of an implementation of ISO 10303-224 using ISO 10303-21 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 normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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 10303-21:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 21: Implementation method: Clear text encoding of the exchange structure.*

ISO 10303-22:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 22: Implementation method: 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 10303-224:1999, *Industrial automation systems and integration — Product data representation and exchange — Part 224: Application protocol: Mechanical product definition for process planning using machining features.*

3 Terms, definitions, and abbreviations

3.1 Terms defined in ISO 10303-1

For the purpose of this part of ISO 10303, the following terms defined in ISO 10303-1 apply.

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

3.2 Terms defined in ISO 10303-31

For the purpose of this part of ISO 10303, the following terms defined in ISO 10303-31 apply.

- abstract test case (ATC);
- conformance testing;
- executable test case;
- implementation under test (IUT);
- postprocessor;
- preprocessor;
- test purpose;
- verdict criterion.

3.3 Terms defined in ISO 10303-224

For the purpose of this part of ISO 10303, the following terms defined in ISO 10303-224 apply.

- design_exception;
- feature_definition_item;
- feature_profile;
- manufacturing_feature;
- manufacturing_part_properties;
- manufacturing_process_control_documentation;
- manufacturing_process_requirement_documents;
- measurement_limitations;
- part_administration_data;
- part_model;

- requisitions;
- shape_representation_for_machining.

3.4 Other terms and definitions

For the purposes of this part of ISO 10303, the following definitions apply.

3.4.1

application element

an application object, attribute, or assertion defining the information requirements in clause 4 of an application protocol.

3.4.2

application element test purpose

a test purpose derived from the application elements in the ARM of an application protocol.

3.4.3

application interpreted model test purpose

a test purpose derived from the AIM EXPRESS schema of an application protocol.

3.4.4

domain test purpose

a test purpose that arises from the requirements that are implicit in an application protocol and derived from usage scenarios and the process and information flows in the application domain of an application protocol.

3.4.5

external reference test purpose

test purpose derived from requirements that arise from standards referenced by an application protocol.

3.4.6

input specification

the instance model of an abstract test case presented in an unambiguous form, the table format for preprocessors and physical files (ISO 10303-21).

3.4.7

Coordinate System zero

the position used for placement and location for test case parts.

3.5 Abbreviations

For the purpose of this part of ISO 10303, the following abbreviations apply:

AE	application element
AIM	application interpreted model
AP	application protocol
ARM	application reference model
CC	conformance class
CS0	coordinate system zero
IUT	implementation under test
UoF	unit of functionality

4 Test purposes

This clause specifies the test purposes for this part of ISO 10303. Test purposes in 4.1 and 4.2 are derived from the information requirements contained in clause 4 of ISO 10303-224 and the AIM EXPRESS schema in annex A of ISO 10303-224, and common usage scenarios. Each test purpose statement identifies some specific element from the AEs or the AIM. These test purpose statements implicitly require that the identified element, as specified in the test purpose statement, will be correctly instantiated by the implementation under test.

Implementation method test purposes in 4.3 are derived from ISO 10303-21. Implementation method and domain test purposes are individually identified by the prefix “other” in the test purpose number. These test purposes are statements of requirements that shall be met by a conforming implementation.

4.1 Application element test purposes

AE test purposes are individually identified by the prefix “ae” in the test purpose number. Each test purpose derived from the information requirements shall be interpreted as given in the following statement: the IUT shall preserve the semantics associated with the unique application element from which the test purpose was derived. This implies that the semantics of the application element are preserved by the IUT between the input and output of a test, according to the reference path specified in the mapping table of the AP. AE test purposes apply to the input specifications of both preprocessor and postprocessor test cases. AE test purposes are derived from the AP information requirements as follows:

- application objects (see 4.2 of ISO 10303-224). A test purpose derived from an application object is a simple statement of the object's name. Each application object test purpose is documented in a separate subclause.
- application objects with categorisations (subtypes) (see 4.2 of ISO 10303-224). Test purposes derived from application objects with categorisations are statements of the application object name as a specific subtype.
- application object attributes (see 4.2 of ISO 10303-224). Test purposes derived from application object attributes are statements of the application object name with a specific attribute name.
- application assertions (see 4.3 of ISO 10303-224). Test purposes derived from application assertions are statements describing the relationship between two application objects. Application assertion test purposes address the directions of relationships as well as the number (cardinality) of relationships.

Each application object test purpose is listed as a separate subclause, with its related application object attribute test purposes and assertion test purposes.

4.1.1 Alternate_material

- ae1 Alternate_material (see 6.2, 6.3)
- ae2 Alternate_material with alternate_ranking (see 6.2, 6.3)
- ae4 Alternate_material has the material_substitute defined by exactly one Material (see 6.2, 6.3)
- ae5 Alternate_material defines the alternate_material_definition for exactly one Part (see 6.2)

4.1.2 Angle_taper

- ae6 Angle_taper (see 6.4, 6.5, 6.6, 6.13, 6.22)
- ae8 Angle_taper has the angle defined by exactly one Numeric_parameter (see 6.4, 6.5, 6.6, 6.13, 6.22)
- ae9 Angle_taper defines the reduced_size for zero Outer_diameter
- ae10 Angle_taper defines the reduced_size for one Outer_diameter
- ae11 Angle_taper defines the reduced_size for many Outer_diameter
- ae12 Angle_taper defines the change_in_boundary for zero General_boss
- ae13 Angle_taper defines the change_in_boundary for one General_boss (see 6.5)
- ae14 Angle_taper defines the change_in_boundary for many General_boss
- ae15 Angle_taper defines the change_in_diameter for zero Circular_boss
- ae16 Angle_taper defines the change_in_diameter for one Circular_boss (see 6.5)
- ae17 Angle_taper defines the change_in_diameter for many Circular_boss
- ae18 Angle_taper defines the change_in_boundary for zero Pocket
- ae19 Angle_taper defines the change_in_boundary for one Pocket
- ae20 Angle_taper defines the change_in_boundary for many Pocket
- ae21 Angle_taper defines the change_in_diameter for zero Round_hole
- ae22 Angle_taper defines the change_in_diameter for one Round_hole (see 6.4)
- ae23 Angle_taper defines the change_in_diameter for many Round_hole (see 6.4)

4.1.3 Angular_dimension_tolerance

- ae24 Angular_dimension_tolerance (see 6.25)
- ae25 Angular_dimension_tolerance with major_angle (see 6.25)
- ae26 Angular_dimension_tolerance with mirror_origin (see 6.25)
- ae27 Angular_dimension_tolerance with mirror_termination (see 6.25)

4.1.4 Angular_size_dimension_tolerance

- ae28 Angular_size_dimension_tolerance (see 6.22)
- ae29 Angular_size_dimension_tolerance with full_or_half (see 6.22)
- ae30 Angular_size_dimension_tolerance with major_angle (see 6.22)

4.1.5 Angularity_tolerance

- ae31 Angularity_tolerance (see 6.24)
- ae33 Angularity_tolerance with segment_size (see 6.24)
- ae34 Angularity_tolerance has the geometric_reference defined by exactly one Datum (see 6.24)

4.1.6 Approval

- ae35 Approval (see 6.1, 6.2, 6.3)
- ae37 Approval with approval_date (see 6.1, 6.2, 6.3)
- ae39 Approval with status = approved (see 6.3)
- ae40 Approval with status = disapproved (see 6.3)
- ae41 Approval with status = not_yet_approved (see 6.2)
- ae42 Approval with status = withdrawn (see 6.1)
- ae43 Approval has the approval_authority defined by one Person_in_organization (see 6.1, 6.2)
- ae44 Approval has the approval_authority defined by many Person_in_organization (see 6.3)
- ae45 Approval defines the manufacturer_authorization for zero Part (see 6.1)
- ae46 Approval defines the manufacturer_authorization for one Part (see 6.2)
- ae47 Approval defines the manufacturer_authorization for many Part
- ae48 Approval defines the release_authorization for zero Project_Order
- ae49 Approval defines the release_authorization for one Project_Order (see 6.2)

4.1.7 Base_shape

- ae50 Base_shape (excluded, is an abstract supertype)
- ae51 Base_shape as Explicit_base_shape_representation (excluded, is an abstract supertype)
- ae52 Base_shape as Implicit_base_shape_representation (excluded, is an abstract supertype)
- ae53 Base_shape defines the base_shape_definition for exactly one Shape (see 6.4)

4.1.8 Blind_bottom_condition

ae54 Blind_bottom_condition (excluded, is an abstract supertype)
ae55 Blind_bottom_condition as Conical_hole_bottom (excluded, is an abstract supertype)
ae56 Blind_bottom_condition as Flat_hole_bottom (excluded, is an abstract supertype)
ae57 Blind_bottom_condition as Flat_with_radius_hole_bottom (excluded, is an abstract supertype)
ae58 Blind_bottom_condition as Spherical_hole_bottom (excluded, is an abstract supertype)
ae60 Blind_bottom_condition with start_or_end = TRUE (see 6.4)
ae61 Blind_bottom_condition with start_or_end = FALSE (see 6.4)
ae62 Blind_bottom_condition defines the bottom_condition for zero Round_hole
ae63 Blind_bottom_condition defines the bottom_condition for one Round_hole (see 6.4)
ae64 Blind_bottom_condition defines the bottom_condition for many Round_hole (see 6.4)

4.1.9 Block_base_shape

ae65 Block_base_shape (see 6.4, 6.5, 6.7, 6.8, 6.9, 6.10, 6.13, 6.15, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.25, 6.26)
ae68 Block_base_shape has the width defined by exactly one Numeric_parameter (see 6.4, 6.5, 6.7, 6.8, 6.9, 6.10, 6.13, 6.15, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.25, 6.26)
ae69 Block_base_shape has the height defined by exactly one Numeric_parameter (see 6.4, 6.5, 6.7, 6.8, 6.9, 6.10, 6.13, 6.15, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.25, 6.26)

4.1.10 Boss

ae70 Boss (excluded, is an abstract supertype)
ae71 Boss as Circular_boss (excluded, is an abstract supertype)
ae72 Boss as General_boss (excluded, is an abstract supertype)
ae73 Boss with boss_height (excluded, is an abstract supertype)
ae74 Boss with fillet_radius (excluded, is an abstract supertype)
ae75 Boss with top_condition (excluded, is an abstract supertype)
ae76 Boss has the top_condition defined by exactly one Boss_top_condition (see 6.5, 6.12, 6.15)
ae77 Boss has the boss_height defined by exactly one Linear_path (see 6.5, 6.12, 6.15)
ae78 Boss has the fillet_radius defined by exactly one Numeric_parameter (see 6.5, 6.12, 6.15)

4.1.11 Boss_top_condition

ae79 Boss_top_condition (see excluded, is an abstract supertype)
ae80 Boss_top_condition as General_top_condition (see excluded, is an abstract supertype)
ae81 Boss_top_condition as Planar_top_condition (see 6.5)
ae82 Boss_top_condition with start_or_end (see excluded, is an abstract supertype)
ae83 Boss_top_condition with start_or_end = TRUE (see 6.5, 6.1)
ae84 Boss_top_condition with start_or_end = FALSE (see 6.5, 6.12, 6.15)

ae85 Boss_top_condition defines the top_condition for zero Boss
ae86 Boss_top_condition defines the top_condition for one Boss (see 6.5)
ae87 Boss_top_condition defines the top_condition for many Boss

4.1.12 Brep_model

ae88 Brep_model (see 6.4, 6.5, 6.6, 6.7, 6.8, 6.10, 6.11, 6.12, 6.13, 6.14, 6.18, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27)
ae89 Brep_model defines the removal_volume for zero, one, or many General_removal_volume
ae90 Brep_model defines the element for zero, one, or many Brep_model_element (see 6.5)
ae91 Brep_model defines the shape_definition for zero Brep_shape_aspect_representation
ae92 Brep_model defines the shape_definition for one Brep_shape_aspect_representation (see 6.5)
ae93 Brep_model defines the shape_definition for many Brep_shape_aspect_representation

4.1.13 Brep_model_element

ae94 Brep_model_element (see 6.5, 6.7, 6.10, 6.11, 6.12, 6.13, 6.18, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.27)
ae96 Brep_model_element has the element defined by exactly one Brep_model (see 6.5, 6.7, 6.10, 6.11, 6.12, 6.13, 6.18, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.27)
ae97 Brep_model_element defines the Brep_shape for exactly one Shape_aspect (see 6.5)

4.1.14 Brep_shape_aspect_representation

ae98 Brep_shape_aspect_representation (see 6.4, 6.5, 6.6, 6.7, 6.8, 6.10, 6.11, 6.12, 6.13, 6.18, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.27)
ae100 Brep_shape_aspect_representation has the shape_definition defined by exactly one Brep_model (see 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.18, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.27)
ae101 Brep_shape_aspect_representation defines the Brep_form for exactly one Shape_aspect (see 6.4)

4.1.15 Brep_shape_representation

ae102 Brep_shape_representation (see 6.12)
ae104 Brep_shape_representation has the shape_definition defined by exactly one Brep_model (see 6.12)
ae105 Brep_shape_representation defines the Brep_form for exactly one Shape
ae106 Brep_shape_representation defines the Brep_form for zero Explicit_base_shape_representation
ae107 Brep_shape_representation defines the Brep_form for one Explicit_base_shape_representation
ae108 Brep_shape_representation defines the Brep_form for many Explicit_base_shape_representation

4.1.16 Catalogue_knurl

ae109 Catalogue_knurl (see 6.16)
ae111 Catalogue_knurl has documentation defined by exactly one Specification (see 6.16)

4.1.17 Catalogue_marking

ae112 Catalogue_marking (see 6.15)

ae114 Catalogue_marking has documentation defined by exactly one Specification (see 6.15)

4.1.18 Catalogue_thread

ae115 Catalogue_thread (see 6.14)

ae117 Catalogue_thread has documentation defined by exactly one Specification (see 6.14)

4.1.19 Chamfer

ae118 Chamfer (see 6.27)

ae122 Chamfer has the chamfer_face shape identified by exactly one Face_shape_element (see 6.27)

ae123 Chamfer has the first_face_offset defined by exactly one First_offset (see 6.27)

ae124 Chamfer has the second_face_offset defined by exactly one Second_chamfer_offset (see 6.27)

4.1.20 Chamfer_angle

ae125 Chamfer_angle (see 6.27)

ae127 Chamfer_angle has the angle_amount defined by exactly one Numeric_parameter (see 6.27)

4.1.21 Circular_boss

ae128 Circular_boss (see 6.5, 6.12)

ae131 Circular_boss has the circular_profile defined by exactly one Circular_closed_profile (see 6.5, 6.12)

ae132 Circular_boss has the change_in_diameter defined by zero Angle_taper (see 6.5, 6.12)

ae133 Circular_boss has the change_in_diameter defined by one Angle_taper (see 6.5)

ae134 Circular_boss has the change_in_diameter defined by zero Diameter_taper

ae135 Circular_boss has the change_in_diameter defined by one Diameter_taper (see 6.5)

4.1.22 Circular_closed_profile

ae136 Circular_closed_profile (see 6.2, 6.3, 6.4, 6.5, 6.12, 6.14, 6.17, 6.18, 6.19, 6.20, 6.22, 6.23, 6.24, 6.25)

ae138 Circular_closed_profile has the diameter defined by exactly one Numeric_parameter (see 6.2, 6.3, 6.4, 6.5, 6.12, 6.14, 6.17, 6.18, 6.19, 6.20, 6.22, 6.23, 6.24, 6.25)

ae139 Circular_closed_profile defines the circular_profile for zero Circular_boss

ae140 Circular_closed_profile defines the circular_profile for one Circular_boss (see 6.5)

ae141 Circular_closed_profile defines the circular_profile for many Circular_boss

ae142 Circular_closed_profile defines the diameter for zero Round_hole

ae143 Circular_closed_profile defines the diameter for one Round_hole (see 6.2)

ae144 Circular_closed_profile defines the diameter for many Round_hole

4.1.23 Circular_offset_pattern

ae145 Circular_offset_pattern (see 6.17)

ae148 Circular_offset_pattern has the angular_offset defined by exactly one Numeric_parameter (see 6.17)

ae149 Circular_offset_pattern has the index_number defined by exactly one Numeric_parameter (see 6.17)

ae150 Circular_offset_pattern defines the relocated_base_feature for one Circular_pattern

ae151 Circular_offset_pattern defines the relocated_base_feature for many Circular_pattern

4.1.24 Circular_omit_pattern

ae152 Circular_omit_pattern (see 6.17)

ae154 Circular_omit_pattern has the omit_index defined by exactly one Numeric_parameter (see 6.17)

ae155 Circular_omit_pattern defines the missing_base_feature for one Circular_pattern

ae156 Circular_omit_pattern defines the missing_base_feature for many Circular_pattern

4.1.25 Circular_path

ae157 Circular_path (excluded, is an abstract supertype)

ae158 Circular_path as Complete_circular_path (excluded, is an abstract supertype)

ae159 Circular_path as Partial_circular_path (excluded, is an abstract supertype)

ae161 Circular_path has the radius defined by exactly one Numeric_parameter (see 6.21, 6.22)

4.1.26 Circular_pattern

ae162 Circular_pattern (see 6.17)

ae169 Circular_pattern has the relocated_base_feature defined by zero Circular_offset_pattern (see 6.17)

ae170 Circular_pattern has the relocated_base_feature defined by one Circular_offset_pattern (see 6.17)

ae171 Circular_pattern has the relocated_base_feature defined by many Circular_offset_pattern (see 6.17)

ae172 Circular_pattern has the missing_base_feature defined by zero Circular_omit_pattern (see 6.17)

ae173 Circular_pattern has the missing_base_feature defined by one Circular_omit_pattern (see 6.17)

ae174 Circular_pattern has the missing_base_feature defined by many Circular_omit_pattern (see 6.17)

ae175 Circular_pattern has the angular_spacing defined by exactly one Numeric_parameter (see 6.17)

ae176 Circular_pattern has the base_feature_diameter defined by exactly one Numeric_parameter (see 6.17)

ae177 Circular_pattern has the base_feature_rotation defined by exactly one Numeric_parameter (see 6.17)

ae178 Circular_pattern has the number_of_features defined by exactly one Numeric_parameter (see 6.17)

4.1.27 Circular_runout_tolerance

ae179 Circular_runout_tolerance (see 6.24)

ae181 Circular_runout_tolerance with runout_angle (see 6.24)

ae182 Circular_runout_tolerance has the geometric_reference defined by one Datum (see 6.24)

ae183 Circular_runout_tolerance has the geometric_reference defined by two Datum

4.1.28 Circularity_tolerance

ae184 Circularity_tolerance (see 6.23, 6.24)

4.1.29 Closed_profile

ae185 Closed_profile (excluded, is an abstract supertype)

ae186 Closed_profile as Circular_closed_profile (excluded, is an abstract supertype)

ae187 Closed_profile as General_closed_profile (excluded, is an abstract supertype)

ae188 Closed_profile as Ngon_profile (excluded, is an abstract supertype)

ae189 Closed_profile as Rectangular_closed_profile (excluded, is an abstract supertype)

ae190 Closed_profile defines the enclosed_boundary for zero General_boss

ae191 Closed_profile defines the enclosed_boundary for one General_boss (see 6.5)

ae192 Closed_profile defines the enclosed_boundary for many General_boss

4.1.30 Complete_circular_path

ae193 Complete_circular_path (see 6.21)

4.1.31 Compound_datum

ae194 Compound_datum (see 6.26)

ae196 Compound_datum has the element defined by two Datum_feature (see 6.26)

ae197 Compound_datum has the element defined by more Datum_feature

4.1.32 Compound_feature

ae198 Compound_feature (see 6.4)

ae200 Compound_feature with feature_description (see 6.4)

ae201 Compound_feature with feature_name (see 6.4)

ae202 Compound_feature has the element defined by two Compound_feature_element (see 6.4)

ae203 Compound_feature has the element defined by more Compound_feature_element (see 6.4)

4.1.33 Compound_feature_element

ae204 Compound_feature_element (see 6.4)

ae206 Compound_feature_element may have the element defined by exactly one Machining_feature (see 6.4)

ae207 Compound_feature_element may have the element defined by exactly one Transition_feature

ae208 Compound_feature_element defines the successor for zero Compound_feature_relationship

ae209 Compound_feature_element defines the successor for one Compound_feature_relationship (see 6.4)

ae210 Compound_feature_element defines the successor for many Compound_feature_relationship (see 6.4)

ae211 Compound_feature_element defines the element for zero Compound_feature

ae212 Compound_feature_element defines the element for one Compound_feature (see 6.4)

ae213 Compound_feature_element defines the element for many Compound_feature

ae214 Compound_feature_element defines the predecessor for zero Compound_feature_relationship

ae215 Compound_feature_element defines the predecessor for one Compound_feature_relationship (see 6.4)

ae216 Compound_feature_element defines the predecessor for many Compound_feature_relationship

4.1.34 Compound_feature_relationship

ae217 Compound_feature_relationship (see 6.4)

ae220 Compound_feature_relationship has the successor defined by exactly one Compound_feature_element (see 6.4)

ae221 Compound_feature_relationship has the predecessor defined by exactly one Compound_feature_element (see 6.4)

4.1.35 Concentricity_tolerance

ae222 Concentricity_tolerance (see 6.24)

ae224 Concentricity_tolerance with value_qualifier (see 6.24)

ae225 Concentricity_tolerance has the geometric_reference defined by exactly one Datum (see 6.24)

4.1.36 Conical_hole_bottom

ae226 Conical_hole_bottom (see 6.4)

ae229 Conical_hole_bottom has the tip_angle defined by exactly one Numeric_parameter (see 6.4)

ae230 Conical_hole_bottom has the tip_radius defined by zero or one Numeric_parameter (see 6.4)

4.1.37 Constant_radius_edge_round

ae231 Constant_radius_edge_round (see 6.22, 6.25, 6.27)

ae235 Constant_radius_edge_round has the first_face_offset defined by exactly one Numeric_parameter (see 6.22, 6.25, 6.27)

ae236 Constant_radius_edge_round has the second_face_offset defined by exactly one Numeric_parameter (see 6.22, 6.25, 6.27)

ae237 Constant_radius_edge_round has the radius defined by exactly one Numeric_parameter (see 6.22, 6.25, 6.27)

4.1.38 Constant_radius_fillet

ae238 Constant_radius_fillet (see 6.27)

ae242 Constant_radius_fillet has the first_face_offset defined by exactly one Numeric_parameter (see 6.27)

ae243 Constant_radius_fillet has the second_face_offset defined by exactly one Numeric_parameter (see 6.27)

ae244 Constant_radius_fillet has the radius defined by exactly one Numeric_parameter (see 6.27)

4.1.39 Counterbore_hole

ae245 Counterbore_hole (see 6.4)

ae248 Counterbore_hole has the smaller_hole defined by exactly one Round_hole (see 6.4)

ae249 Counterbore_hole has the larger_hole defined by exactly one Round_hole (see 6.4)

4.1.40 Countersunk_hole

ae250 Countersunk_hole (see 6.4)

ae253 Countersunk_hole has the constant_diameter_hole defined by exactly one Round_hole (see 6.4)

ae254 Countersunk_hole has the tapered_hole defined by exactly one Round_hole (see 6.4)

4.1.41 Curved_dimension_tolerance

ae255 Curved_dimension_tolerance (see 6.22)

4.1.42 Customer_order

ae256 Customer_order (see 6.2, 6.3)

ae258 Customer_order with delivery_date (see 6.2, 6.3)

ae260 Customer_order with material_disposition (see 6.2, 6.3)

ae261 Customer_order with order_number (see 6.2, 6.3)

ae262 Customer_order with order_status (see 6.2, 6.3)

ae264 Customer_order with special_instructions (see 6.2, 6.3)

ae265 Customer_order has the quantity_ordered defined by one Ordered_part (see 6.2)

ae266 Customer_order has the quantity_ordered defined by many Ordered_part (see 6.3)

ae267 Customer_order has the customer defined by exactly one Person_in_organization (see 6.2, 6.3)

ae268 Customer_order has the initiated_order defined by one Project_order (see 6.2)

ae269 Customer_order has the initiated_order defined by many Project_order (see 6.3)

4.1.43 Cutting_tool_requisition

ae270 Cutting_tool_requisition (see 6.1, 6.2, 6.3)

4.1.44 Cylindrical_base_shape

ae271 Cylindrical_base_shape (see 6.1, 6.2, 6.3, 6.6, 6.11, 6.16, 6.17, 6.24, 6.28)

ae273 Cylindrical_base_shape has the diameter defined by exactly one Numeric_parameter (see 6.1, 6.2, 6.3, 6.6, 6.11, 6.14, 6.16, 6.17, 6.24, 6.28)

4.1.45 Cylindricity_tolerance

ae274 Cylindricity_tolerance (see 6.23, 6.24, 6.28)

4.1.46 Datum

ae275 Datum (excluded, is an abstract supertype)
 ae276 Datum as Datum_feature (excluded, is an abstract supertype)
 ae277 Datum as Compound_datum (excluded, is an abstract supertype)
 ae278 Datum with name (see 6.23, 6.24, 6.26)
 ae279 Datum with precedence (see 6.23, 6.24, 6.26)
 ae283 Datum defines the geometric_reference for zero Circular_runout_tolerance
 ae284 Datum defines the geometric_reference for one Circular_runout_tolerance
 ae285 Datum defines the geometric_reference for many Circular_runout_tolerance
 ae286 Datum defines the geometric_reference for zero Perpendicularity_tolerance
 ae287 Datum defines the geometric_reference for one Perpendicularity_tolerance
 ae288 Datum defines the geometric_reference for many Perpendicularity_tolerance
 ae289 Datum is the geometric_reference for zero Concentricity_tolerance
 ae290 Datum is the geometric_reference for one Concentricity_tolerance
 ae291 Datum is the geometric_reference for many Concentricity_tolerance
 ae292 Datum defines the geometric_reference for zero Surface_profile_tolerance
 ae293 Datum defines the geometric_reference for one Surface_profile_tolerance
 ae294 Datum defines the geometric_reference for many Surface_profile_tolerance
 ae295 Datum defines the geometric_reference for zero Symmetry_tolerance
 ae296 Datum defines the geometric_reference for one Symmetry_tolerance
 ae297 Datum defines the geometric_reference for many Symmetry_tolerance
 ae298 Datum defines the geometric_reference for zero Position_tolerance
 ae299 Datum defines the geometric_reference for one Position_tolerance
 ae300 Datum defines the geometric_reference for many Position_tolerance
 ae301 Datum defines the geometric_reference for zero Parallelism_tolerance
 ae302 Datum defines the geometric_reference for one Parallelism_tolerance
 ae303 Datum defines the geometric_reference for many Parallelism_tolerance
 ae304 Datum defines the geometric_reference for zero Linear_profile_tolerance
 ae305 Datum defines the geometric_reference for one Linear_profile_tolerance
 ae306 Datum defines the geometric_reference for many Linear_profile_tolerance
 ae307 Datum defines the geometric_reference for zero Total_runout_tolerance
 ae308 Datum defines the geometric_reference for one Total_runout_tolerance
 ae309 Datum defines the geometric_reference for many Total_runout_tolerance
 ae310 Datum is the geometric_reference for zero Angularity_tolerance
 ae311 Datum is the geometric_reference for one Angularity_tolerance
 ae312 Datum is the geometric_reference for many Angularity_tolerance

4.1.47 Datum_feature

ae313 Datum_feature (see 6.23, 6.24, 6.26)
 ae282 Datum_feature has the datum_representation defined by exactly one Datum_target_set (see 6.23, 6.24, 6.26)
 ae316 Datum_feature has the datum_representation defined by exactly one Shape_element (see 6.26)

ae1980 Datum_feature has the modifier defined by zero Material_condition_modifier (see 6.23, 6.24, 6.26)
ae317 Datum_feature has the modifier defined by exactly Material_condition_modifier (see 6.26)
ae318 Datum_feature defines the element for zero Compound_datum
ae319 Datum_feature defines the element for one Compound_datum
ae320 Datum_feature defines the element for many Compound_datum

4.1.48 Datum_target

ae321 Datum_target (excluded, is an abstract supertype)
ae322 Datum_target as Placed_target (excluded, is an abstract supertype)
ae323 Datum_target as Target_area (excluded, is an abstract supertype)
ae324 Datum_target with identifier (see 6.23, 6.24, 6.26)
ae325 Datum_target defines the target_shape for zero Datum_target_set
ae326 Datum_target defines the target_shape for one Datum_target_set
ae327 Datum_target defines the target_shape for many Datum_target_set

4.1.49 Datum_target_set

ae328 Datum_target_set (see 6.23, 6.24, 6.26)
ae329 Datum_target_set with rule_description (see 6.23, 6.24, 6.26)
ae331 Datum_target_set has the target_shape defined by one Datum_target (see 6.23, 6.24, 6.26)
ae332 Datum_target_set has the target_shape defined by many Datum_target (see 6.26)
ae333 Datum_target_set defines the datum_representation for zero Datum_feature
ae334 Datum_target_set defines the datum_representation for one Datum_feature
ae335 Datum_target_set defines the datum_representation for many Datum_feature

4.1.50 Dedicated_fixture_requisition

ae336 Dedicated_fixture_requisition (see 6.1, 6.2, 6.3)

4.1.51 Defined_marking

ae337 Defined_marking (see 6.15)
ae342 Defined_marking has the special_instructions defined by exactly one Descriptive_parameter (see 6.15)
ae343 Defined_marking has the font_name defined by exactly one Descriptive_parameter (see 6.15)
ae344 Defined_marking has the character_height defined by exactly one Numeric_parameter (see 6.15)
ae345 Defined_marking has the character_spacing defined by exactly one Numeric_parameter (see 6.15)

4.1.52 Defined_thread

ae346 Defined_thread (see 6.14)
ae354 Defined_thread has the fit_class defined by zero Descriptive_parameter
ae355 Defined_thread has the fit_class defined by one Descriptive_parameter (see 6.14)
ae356 Defined_thread has the form defined by exactly one Descriptive_parameter (see 6.14)

ae357 Defined_thread has the thread_hand defined by exactly one Descriptive_parameter (see 6.14)
 ae358 Defined_thread has the major_diameter defined by exactly one Numeric_parameter (see 6.14)
 ae359 Defined_thread has the minor_diameter defined by zero Numeric_parameter
 ae360 Defined_thread has the minor_diameter defined by one Numeric_parameter (see 6.14)
 ae361 Defined_thread has the number_of_threads defined by exactly one Numeric_parameter (see 6.14)
 ae362 Defined_thread has the pitch_diameter defined by zero Numeric_parameter
 ae363 Defined_thread has the pitch_diameter defined by one Numeric_parameter (see 6.14)

4.1.53 Descriptive_parameter

ae364 Descriptive_parameter (see 6.14, 6.15, 6.16)
 ae365 Descriptive_parameter with descriptive_string (see 6.14, 6.15, 6.16)
 ae366 Descriptive_parameter defines text for zero Marking
 ae367 Descriptive_parameter defines text for one Marking
 ae368 Descriptive_parameter defines text for many Marking
 ae369 Descriptive_parameter defines the helix_hand for zero Diagonal_knurl
 ae370 Descriptive_parameter defines the helix_hand for one Diagonal_knurl
 ae371 Descriptive_parameter defines the helix_hand for many Diagonal_knurl
 ae372 Descriptive_parameter defines the form for zero Defined_thread
 ae373 Descriptive_parameter defines the form for one Defined_thread
 ae374 Descriptive_parameter defines the form for many Defined_thread
 ae375 Descriptive_parameter defines the fit_class for zero Defined_thread
 ae376 Descriptive_parameter defines the fit_class for one Defined_thread
 ae377 Descriptive_parameter defines the fit_class for many Defined_thread
 ae378 Descriptive_parameter defines special_instructions for zero Defined_marking
 ae379 Descriptive_parameter defines special_instructions for one Defined_marking
 ae380 Descriptive_parameter defines special_instructions for many Defined_marking
 ae381 Descriptive_parameter defines font_name for zero Defined_marking
 ae382 Descriptive_parameter defines font_name for one Defined_marking
 ae383 Descriptive_parameter defines font_name for many Defined_marking
 ae384 Descriptive_parameter defines the thread_hand for zero Defined_thread
 ae385 Descriptive_parameter defines the thread_hand for one Defined_thread
 ae386 Descriptive_parameter defines the thread_hand for many Defined_thread
 ae387 Descriptive_parameter defines the qualifier for zero Thread
 ae388 Descriptive_parameter defines the qualifier for one Thread
 ae389 Descriptive_parameter defines the qualifier for many Thread

4.1.54 Design_exception_notice

ae390 Design_exception_notice (see 6.1, 6.2, 6.3)
 ae392 Design_exception_notice with issuing_date (see 6.1, 6.2, 6.3)
 ae393 Design_exception_notice with notice_description (see 6.1, 6.2, 6.3)
 ae394 Design_exception_notice with notice_number (see 6.1, 6.2, 6.3)
 ae396 Design_exception_notice with technical_recommendation (see 6.1, 6.2, 6.3)
 ae397 Design_exception_notice has the result defined by zero Engineering_change_proposal (see 6.1)

ae398 Design_exception_notice has the result defined by one Engineering_change_proposal (see 6.2)
ae399 Design_exception_notice has the result defined by many Engineering_change_proposal (see 6.3)
ae400 Design_exception_notice has the discrepant_part defined by one Part objects (see 6.1, 6.2)
ae401 Design_exception_notice has the discrepant_part defined by many Part objects (see 6.3)

4.1.55 Diagonal_knurl

ae402 Diagonal_knurl (see 6.16)
ae405 Diagonal_knurl has the helix_hand defined by exactly one Descriptive_parameter (see 6.16)
ae406 Diagonal_knurl has the helix_angle defined by exactly one Numeric_parameter (see 6.16)

4.1.56 Diameter_dimension_tolerance

ae407 Diameter_dimension_tolerance (see 6.22)

4.1.57 Diameter_taper

ae408 Diameter_taper (see 6.4, 6.5, 6.6)
ae410 Diameter_taper has the final_diameter defined by exactly one Numeric_parameter (see 6.4, 6.5, 6.6)
ae411 Diameter_taper defines the change_in_diameter for zero Round_hole
ae412 Diameter_taper defines the change_in_diameter for one Round_hole (see 6.4)
ae413 Diameter_taper defines the change_in_diameter for many Round_hole (see 6.4)
ae414 Diameter_taper defines the change_in_diameter for zero Circular_boss
ae415 Diameter_taper defines the change_in_diameter for one Circular_boss (see 6.5)
ae416 Diameter_taper defines the change_in_diameter for many Circular_boss
ae417 Diameter_taper defines the reduced_size for zero Outer_diameter
ae418 Diameter_taper defines the reduced_size for one Outer_diameter
ae419 Diameter_taper defines the reduced_size for many Outer_diameter

4.1.58 Diamond_knurl

ae420 Diamond_knurl (see 6.16)
ae422 Diamond_knurl has the helix_angle defined by exactly one Numeric_parameter (see 6.16)

4.1.59 Digital_technical_data_package_work_order

ae423 Digital_technical_data_package_work_order (see 6.2, 6.3)
ae424 Digital_technical_data_package_work_order with order_id (see 6.2, 6.3)
ae425 Digital_technical_data_package_work_order defines the technical_data_package_status for exactly one Project_order (see 6.2, 6.3)

4.1.60 Dimensional_tolerance

ae426 Dimensional_tolerance (excluded, is an abstract supertype)
 ae427 Dimensional_tolerance as Location_tolerance (excluded, is an abstract supertype)
 ae428 Dimensional_tolerance as Size_tolerance (excluded, is an abstract supertype)
 ae429 Dimensional_tolerance with dimension_description (see 6.22, 6.25)
 ae430 Dimensional_tolerance with dimension_value (see 6.22, 6.25)
 ae432 Dimensional_tolerance with significant_digits (see 6.22, 6.25)
 ae433 Dimensional_tolerance with unit_of_measure (see 6.22, 6.25)
 ae434 Dimensional_tolerance has the limit defined by zero Tolerance_value (see 6.22, 6.25)
 ae435 Dimensional_tolerance has the limit defined by one Tolerance_value (see 6.22, 6.25)

4.1.61 Direction_element

ae436 Direction_element (see 6.5, 6.10, 6.11, 6.12, 6.13, 6.15, 6.18, 6.22, 6.23, 6.24, 6.25, 6.26, 6.28)
 ae437 Direction_element defines floor_normal for zero Planar_pocket_bottom_condition
 ae438 Direction_element defines floor_normal for one Planar_pocket_bottom_condition
 ae439 Direction_element defines floor_normal for many Planar_pocket_bottom_condition
 ae440 Direction_element defines the row_layout direction for zero Rectangular_pattern
 ae441 Direction_element defines the row_layout direction for one Rectangular_pattern
 ae442 Direction_element defines the row_layout direction for many Rectangular_pattern
 ae443 Direction_element defines the material_side for zero Revolved_feature
 ae444 Direction_element defines the material_side for one Revolved_feature
 ae445 Direction_element defines the material_side for many Revolved_feature
 ae446 Direction_element defines the removal_direction for zero Planar_face
 ae447 Direction_element defines the removal_direction for one Planar_face
 ae448 Direction_element defines the removal_direction for many Planar_face
 ae449 Direction_element defines the column_layout direction for zero Rectangular_pattern
 ae450 Direction_element defines the column_layout direction for one Rectangular_pattern
 ae451 Direction_element defines the column_layout direction for many Rectangular_pattern
 ae452 Direction_element defines the offset_direction for zero Rectangular_offset_pattern
 ae453 Direction_element defines the offset_direction for one Rectangular_offset_pattern
 ae454 Direction_element defines the offset_direction for many Rectangular_offset_pattern
 ae455 Direction_element defines the top_normal direction for zero Planar_top_condition
 ae456 Direction_element defines the top_normal direction for one Planar_top_condition (see 6.5)
 ae457 Direction_element defines the top_normal direction for many Planar_top_condition

4.1.62 Distance_along_curve_tolerance

ae458 Distance_along_curve_tolerance (see 6.25)
 ae460 Distance_along_curve_tolerance with with_curve_direction (see 6.25)
 ae461 Distance_along_curve_tolerance has a path defined by exactly one Shape_aspect (see 6.25)

4.1.63 Edge_round

ae462 Edge_round (see 6.27)

ae463 Edge_round as Constant_radius_edge_round (excluded, is an abstract supertype)

ae467 Edge_round has the edge_round_face shape defined by exactly one Face_shape_element (see 6.22, 6.25, 6.27)

ae468 Edge_round has the first_face_shape defined by exactly one Face_shape_element (see 6.22, 6.25, 6.27)

ae469 Edge_round has the second_face_shape defined by exactly one Face_shape_element (see 6.22, 6.25, 6.27)

4.1.64 Engineering_change_order

ae470 Engineering_change_order (see 6.2, 6.3)

ae471 Engineering_change_order with change_order_number (see 6.2, 6.3)

ae474 Engineering_change_order has the new_version defined by one Part (see 6.2)

ae475 Engineering_change_order has the new_version defined by many Part (see 6.3)

ae476 Engineering_change_order has the incorporated_proposal defined by one Engineering_change_proposal (see 6.2)

ae477 Engineering_change_order has the incorporated_proposal defined by many Engineering_change_proposal (see 6.2, 6.3)

4.1.65 Engineering_change_proposal

ae478 Engineering_change_proposal (see 6.2, 6.3)

ae479 Engineering_change_proposal with change_proposal_number (see 6.2, 6.3)

ae480 Engineering_change_proposal defines the incorporated_proposal for zero Engineering_change_order

ae481 Engineering_change_proposal defines the incorporated_proposal for one Engineering_change_order (see 6.2, 6.3)

ae482 Engineering_change_proposal defines the incorporated_proposal for many Engineering_change_order

ae483 Engineering_change_proposal defines the result for exactly one Design_exception_notice (see 6.2, 6.3)

4.1.66 Explicit_base_shape_representation

ae484 Explicit_base_shape_representation (see 6.12)

ae486 Explicit_base_shape_representation has the Brep_form defined by exactly one Brep_shape_representation (see 6.12)

4.1.67 Externally_defined_tolerance_value

ae487 Externally_defined_tolerance_value (see 6.22)

ae489 Externally_defined_tolerance_value with tolerance_value (see 6.22)

ae490 Externally_defined_tolerance_value has the documentation defined by exactly one Specification (see 6.22)

ae491 Externally_defined_tolerance_value defines the define_value for zero Tolerance_value

ae492 Externally_defined_tolerance_value defines the define_value for one Tolerance_value

ae493 Externally_defined_tolerance_value defines the define_value for many Tolerance_value

4.1.68 Face_shape_element

ae494 Face_shape_element (see 6.5, 6.12, 6.13, 6.22, 6.25, 6.27)

ae495 Face_shape_element defines the edge_round_face shape for zero Edge_round

ae496 Face_shape_element defines the edge_round_face shape for one Edge_round

ae497 Face_shape_element defines the edge_round_face shape for many Edge_round

ae498 Face_shape_element defines the first_face_shape for zero Edge_round

ae499 Face_shape_element defines the first_face_shape for one Edge_round

ae500 Face_shape_element defines the first_face_shape for many Edge_round

ae501 Face_shape_element is the chamfer_face shape for zero Chamfer

ae502 Face_shape_element is the chamfer_face shape for one Chamfer

ae503 Face_shape_element is the chamfer_face shape for many Chamfer

ae504 Face_shape_element defines the second_face_shape for zero Edge_round

ae505 Face_shape_element defines the second_face_shape for one Edge_round

ae506 Face_shape_element defines the second_face_shape for many Edge_round

ae507 Face_shape_element defines the first_face_shape for zero Fillet

ae508 Face_shape_element defines the first_face_shape for one Fillet

ae509 Face_shape_element defines the first_face_shape for many Fillet

ae510 Face_shape_element defines the second_face_shape for zero Fillet

ae511 Face_shape_element defines the second_face_shape for one Fillet

ae512 Face_shape_element defines the second_face_shape for many Fillet

ae513 Face_shape_element defines the face_shape for zero First_offset

ae514 Face_shape_element defines the face_shape for one First_offset

ae515 Face_shape_element defines the face_shape for many First_offset

ae516 Face_shape_element defines the floor for zero General_pocket_bottom_condition

ae517 Face_shape_element defines the floor for one General_pocket_bottom_condition

ae518 Face_shape_element defines the floor for many General_pocket_bottom_condition

ae519 Face_shape_element defines the fillet_face for zero Fillet

ae520 Face_shape_element defines the fillet_face for one Fillet

ae521 Face_shape_element defines the fillet_face for many Fillet

ae522 Face_shape_element defines the top_face for zero General_top_condition

ae523 Face_shape_element defines the top_face for one General_top_condition (see 6.5)

ae524 Face_shape_element defines the top_face for many General_top_condition

ae525 Face_shape_element defines the second face for zero Second_chamfer_offset

ae526 Face_shape_element defines the second face for one Second_chamfer_offset

ae527 Face_shape_element defines the second face for many Second_chamfer_offset

4.1.69 Fillet

ae528 Fillet (see 6.27)

ae529 Fillet as Constant_radius_fillet (excluded, is a supertype)

ae533 Fillet has the fillet_face defined by exactly one Face_shape_element (see 6.27)

ae534 Fillet has the first_face_shape defined by exactly one Face_shape_element (see 6.27)

ae535 Fillet has the second_face_shape defined by exactly one Face_shape_element (see 6.27)

4.1.70 First_offset

ae536 First_offset (see 6.27)

ae539 First_offset has the face_shape defined by exactly one Face_shape_element (see 6.27)

ae540 First_offset has the offset_amount defined by exactly one Numeric_parameter (see 6.27)

ae541 First_offset defines the first_face_offset for zero Chamfer

ae542 First_offset defines the first_face_offset for one Chamfer

ae543 First_offset defines the first_face_offset for many Chamfer

4.1.71 Flat_hole_bottom

ae544 Flat_hole_bottom (see 6.4, 6.12, 6.14, 6.24)

4.1.72 Flat_slot_end_type

ae545 Flat_slot_end_type (see 6.9, 6.21, 6.22)

ae548 Flat_slot_end_type has the first_radius defined by exactly one Numeric_parameter (see 6.9, 6.21, 6.22)

ae549 Flat_slot_end_type has the second_radius defined by exactly one Numeric_parameter (see 6.9, 6.21, 6.22)

4.1.73 Flat_with_radius_hole_bottom

ae550 Flat_with_radius_hole_bottom (see 6.4)

ae552 Flat_with_radius_hole_bottom has the corner_radius defined by exactly one Numeric_parameter (see 6.4)

4.1.74 Flatness_tolerance

ae553 Flatness_tolerance (see 6.24)

ae554 Flatness_tolerance with segment_size (see 6.24)

4.1.75 General_boss

ae555 General_boss (see 6.5, 6.12, 6.15)

ae558 General_boss has enclosed_boundary defined by exactly one Closed_profile (see 6.5, 6.12, 6.15)

ae559 General_boss has the change_in_boundary defined by zero Angle_taper (see 6.5, 6.12, 6.15)

ae560 General_boss has the change_in_boundary defined by one Angle_taper (see 6.5)

4.1.76 General_closed_profile

ae561 General_closed_profile (see 6.5, 6.12, 6.13, 6.20)

ae563 General_closed_profile has the closed_profile_shape defined by exactly one Path_element (see 6.5, 6.12, 6.13, 6.20)

4.1.77 General_open_profile

ae564 General_open_profile (see 6.7, 6.11)

ae566 General_open_profile has enclosed_boundary defined by exactly one Path_element

ae567 General_open_profile defines the outer_edge_shape for zero General_revolution

ae568 General_open_profile defines the outer_edge_shape for one General_revolution

ae569 General_open_profile defines the outer_edge_shape for many General_revolution

4.1.78 General_outside_profile

ae570 General_outside_profile (see 6.12, 6.18, 6.19)

ae572 General_outside_profile has boundary defined by exactly one Profile (see 6.12, 6.18, 6.19)

4.1.79 General_path

ae573 General_path (see 6.21)

ae575 General_path has the sweep_path defined by exactly one Path_element (see 6.21)

4.1.80 General_pattern

ae576 General_pattern (see 6.19)

ae578 General_pattern has the feature_placement defined by one Orientation (see 6.19)

ae579 General_pattern has the feature_placement defined by many Orientation (see 6.19)

4.1.81 General_pocket

ae580 General_pocket (see 6.13, 6.20)

ae582 General_pocket has the boundary defined by exactly one Profile (see 6.13, 6.20)

4.1.82 General_pocket_bottom_condition

ae583 General_pocket_bottom_condition (see 6.13)

ae586 General_pocket_bottom_condition has the floor defined by exactly one Face_shape_element (see 6.13)

ae587 General_pocket_bottom_condition has the floor_radius defined by exactly one Numeric_parameter (see 6.13)

4.1.83 General_removal_volme

ae588 General_removal_volume (see 6.10, 6.23)

ae590 General_removal_volume has the removal_volume defined by exactly one Brep_model (see 6.10, 6.23)

4.1.84 General_revolution

ae591 General_revolution (see 6.11)

ae593 General_revolution has the outer_edge_shape defined by exactly one General_open_profile (see 6.11)

4.1.85 General_top_condition

ae594 General_top_condition (see 6.5, 6.12)

ae596 General_top_condition has the top_face defined by exactly one Face_shape_element (see 6.5, 6.12)

4.1.86 Geometric_tolerance

ae597 Geometric_tolerance (excluded, is an abstract supertype)

ae598 Geometric_tolerance as Angularity_tolerance (excluded, is an abstract supertype)

ae599 Geometric_tolerance as Circular_runout_tolerance (excluded, is an abstract supertype)

ae600 Geometric_tolerance as Circularity_tolerance (excluded, is an abstract supertype)

ae601 Geometric_tolerance as Concentricity_tolerance (excluded, is an abstract supertype)

ae602 Geometric_tolerance as Cylindricity_tolerance (excluded, is an abstract supertype)

ae603 Geometric_tolerance as Flatness_tolerance (excluded, is an abstract supertype)

ae604 Geometric_tolerance as Linear_profile_tolerance (excluded, is an abstract supertype)

ae605 Geometric_tolerance as Parallelism_tolerance (excluded, is an abstract supertype)

ae606 Geometric_tolerance as Perpendicularity_tolerance (excluded, is an abstract supertype)

ae607 Geometric_tolerance as Position_tolerance (excluded, is an abstract supertype)

ae608 Geometric_tolerance as Straightness_tolerance (excluded, is an abstract supertype)

ae609 Geometric_tolerance as Surface_profile_tolerance (excluded, is an abstract supertype)

ae610 Geometric_tolerance as Symmetry_tolerance (excluded, is an abstract supertype)

ae611 Geometric_tolerance as Total_runout_tolerance (excluded, is an abstract supertype)

ae613 Geometric_tolerance with geometric_tolerance_value

ae618 Geometric_tolerance has the modifier_control defined by zero Material_condition_modifier (see 6.23, 6.24, 6.28)

ae619 Geometric_tolerance has the modifier_control defined by one Material_condition_modifier (see 6.24)

ae620 Geometric_tolerance has the applied_shape defined by one Shape_aspect (see 6.23, 6.24, 6.28)

ae621 Geometric_tolerance has the applied_shape defined by many Shape_aspect (see 6.28)

ae622 Geometric_tolerance has the zone_definition defined by zero Tolerance_zone

ae623 Geometric_tolerance has the zone_definition defined by one Tolerance_zone

ae624 Geometric_tolerance defines the pattern_shape_tolerance for zero Geometric_tolerance_precedence_relationship

ae625 Geometric_tolerance defines the pattern_shape_tolerance for one Geometric_tolerance_precedence_

relationship

ae626 Geometric_tolerance defines the pattern_shape_tolerance for many Geometric_tolerance_precedence_relationship

ae627 Geometric_tolerance defines the base_shape_tolerance for zero Geometric_tolerance_precedence_relationship

ae628 Geometric_tolerance defines the base_shape_tolerance for one Geometric_tolerance_precedence_relationship

ae629 Geometric_tolerance defines the base_shape_tolerance for many Geometric_tolerance_precedence_relationship

4.1.87 Geometric_tolerance_precedence_relationship

ae630 Geometric_tolerance_precedence_relationship (see 6.23)

ae633 Geometric_tolerance_precedence_relationship has the base_shape_tolerance defined by exactly one Geometric_tolerance (see 6.23)

ae634 Geometric_tolerance_precedence_relationship has the pattern_shape_tolerance defined by exactly one Geometric_tolerance (see 6.23)

4.1.88 Groove

ae635 Groove (see 6.11, 6.28)

ae636 Groove with sweep (see 6.11, 6.28)

ae637 Groove has a sweep defined by exactly one Open_profile (see 6.11, 6.28)

4.1.89 Hardness

ae638 Hardness (see 6.2, 6.3)

ae639 Hardness with high_value (see 6.2, 6.3)

ae640 Hardness with low_value (see 6.2, 6.3)

ae641 Hardness with nominal (see 6.2, 6.3)

ae642 Hardness with scale (see 6.2, 6.3)

ae643 Hardness defines material_hardness for exactly one Material_property (see 6.2, 6.3)

4.1.90 Hole

ae644 Hole (excluded, is an abstract supertype)

ae645 Hole as Counterbore_hole (excluded, is an abstract supertype)

ae646 Hole as Countersunk_hole (excluded, is an abstract supertype)

ae647 Hole as Round_hole (excluded, is an abstract supertype)

4.1.91 Implicit_base_shape_representation

ae648 Implicit_base_shape_representation (excluded, is an abstract supertype)

ae649 Implicit_base_shape_representation as Block_base_shape (excluded, is an abstract supertype)

ae650 Implicit_base_shape_representation as Cylindrical_base_shape (excluded, is an abstract supertype)
 ae651 Implicit_base_shape_representation as Ngon_base_shape (excluded, is an abstract supertype)
 ae654 Implicit_base_shape_representation has the base_shape_length defined by exactly one Numeric_parameter (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 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)
 ae655 Implicit_base_shape_representation has placement defined by exactly one Orientation (see 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 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)

4.1.92 Indirect_stock_requisition

ae656 Indirect_stock_requisition (see 6.1, 6.2, 6.3)

4.1.93 Knurl

ae657 Knurl (excluded, is an abstract supertype)
 ae658 Knurl as Catalogue_knurl (excluded, is an abstract supertype)
 ae659 Knurl as Turned_knurl (excluded, is an abstract supertype)
 ae662 Knurl has the partial_profile defined by zero Partial_area_definition (see 6.16)
 ae663 Knurl has the partial_profile defined by one Partial_area_definition (see 6.16)
 ae664 Knurl has the applied_shape defined by exactly one Shape_element (see 6.16)

4.1.94 Linear_path

ae665 Linear_path (see 6.2, 6.3, 6.4, 6.5, 6.7, 6.8, 6.9, 6.10, 6.12, 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)
 ae667 Linear_path has the distance defined by exactly one Numeric_parameter (see 6.2, 6.3, 6.4, 6.5, 6.7, 6.8, 6.9, 6.10, 6.12, 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)
 ae668 Linear_path defines the course_of_travel for zero Step
 ae669 Linear_path defines the course_of_travel for one Step
 ae670 Linear_path defines the course_of_travel for many Step
 ae671 Linear_path defines the course_of_travel for zero Rounded_end
 ae672 Linear_path defines the course_of_travel for one Rounded_end
 ae673 Linear_path defines the course_of_travel for many Rounded_end
 ae674 Linear_path defines the course_of_travel for zero Planar_face
 ae675 Linear_path defines the course_of_travel for one Planar_face
 ae676 Linear_path defines the course_of_travel for many Planar_face
 ae677 Linear_path defines the boss_height for zero Boss
 ae678 Linear_path defines the boss_height for one Boss (see 6.5)
 ae679 Linear_path defines the boss_height for many Boss (see 6.5)
 ae680 Linear_path defines the hole_depth for zero Round_hole
 ae681 Linear_path defines the hole_depth for one Round_hole (see 6.4)
 ae682 Linear_path defines the hole_depth for many Round_hole

ae683 Linear_path defines the pocket_depth for zero Pocket
ae684 Linear_path defines the pocket_depth for one Pocket
ae685 Linear_path defines the pocket_depth for many Pocket

4.1.95 Linear_profile

ae686 Linear_profile (see 6.10, 6.11, 6.22, 6.24, 6.25, 6.26, 6.28)
ae688 Linear_profile has the profile_length defined by exactly one Numeric_parameter (see 6.10, 6.11, 6.22, 6.24, 6.25, 6.26, 6.28)
ae689 Linear_profile defines the removal_boundary for zero Planar_face
ae690 Linear_profile defines the removal_boundary for one Planar_face
ae691 Linear_profile defines the removal_boundary for many Planar_face
ae692 Linear_profile defines the flat_edge_shape for zero Revolved_flat
ae693 Linear_profile defines the flat_edge_shape for one Revolved_flat
ae694 Linear_profile defines the flat_edge_shape for many Revolved_flat

4.1.96 Linear_profile_tolerance

ae695 Linear_profile_tolerance (see 6.23)
ae698 Linear_profile_tolerance has the geometric_reference defined by zero Datum
ae699 Linear_profile_tolerance has the geometric_reference defined by one Datum (see 6.23)
ae700 Linear_profile_tolerance has the geometric_reference defined by two Datum
ae701 Linear_profile_tolerance has the geometric_reference defined by three Datum
ae702 Linear_profile_tolerance has an affected_plane defined by exactly one Orientation (see 6.23)

4.1.97 Location_dimension_tolerance

ae703 Location_dimension_tolerance (see 6.25)
ae704 Location_dimension_tolerance with directed (see 6.25)
ae706 Location_dimension_tolerance has a plane_and_direction defined by zero Orientation (see 6.25)
ae707 Location_dimension_tolerance has a plane_and_direction defined by one Orientation (see 6.25)

4.1.98 Location_element

ae708 Location_element (see 6.5, 6.12, 6.13, 6.15, 6.23, 6.24)
ae709 Location_element defines the top_location for zero Planar_top_condition
ae710 Location_element defines the top_location for one Planar_top_condition (see 6.5)
ae711 Location_element defines the top_location for many Planar_top_condition (see 6.5)
ae712 Location_element defines the floor_location for zero Planar_pocket_bottom_condition
ae713 Location_element defines the floor_location for one Planar_pocket_bottom_condition
ae714 Location_element defines the floor_location for many Planar_pocket_bottom_condition

4.1.99 Location_tolerance

ae715 Location_tolerance (excluded, is an abstract supertype)

ae716 Location_tolerance as Angular_dimension_tolerance (excluded, is an abstract supertype)

ae717 Location_tolerance as Location_dimension_tolerance (excluded, is an abstract supertype)

ae718 Location_tolerance as Distance_along_curve_tolerance (excluded, is an abstract supertype)

ae721 Location_tolerance has the termination_shape defined by exactly one Shape_element (see 6.25)

ae722 Location_tolerance has the origin_shape defined by exactly one Shape_element (see 6.25)

4.1.100 Machine_requisition

ae723 Machine_requisition (see 6.1, 6.2, 6.3)

4.1.101 Machining_feature

ae724 Machining_feature (excluded, is an abstract supertype)

ae725 Machining_feature as Boss (excluded, is an abstract supertype)

ae726 Machining_feature as General_outside_profile (excluded, is an abstract supertype)

ae727 Machining_feature as General_removal_volume (excluded, is an abstract supertype)

ae728 Machining_feature as Hole (excluded, is an abstract supertype)

ae729 Machining_feature as Knurl (excluded, is an abstract supertype)

ae730 Machining_feature as Outer_round (excluded, is an abstract supertype)

ae731 Machining_feature as Revolved_feature (excluded, is an abstract supertype)

ae732 Machining_feature as Rounded_end (excluded, is an abstract supertype)

ae733 Machining_feature as Planar_face (excluded, is an abstract supertype)

ae734 Machining_feature as Pocket (excluded, is an abstract supertype)

ae735 Machining_feature as Protrusion (excluded, is an abstract supertype)

ae736 Machining_feature as Slot (excluded, is an abstract supertype)

ae737 Machining_feature as Step (excluded, is an abstract supertype)

ae738 Machining_feature as Thread (excluded, is an abstract supertype)

ae739 Machining_feature as Marking (excluded, is an abstract supertype)

ae740 Machining_feature as Spherical_cap (excluded, is an abstract supertype)

ae741 Machining_feature as Compound_feature (excluded, is an abstract supertype)

ae743 Machining_feature with usage_name (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, 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)

ae744 Machining_feature has placement defined by exactly one Orientation (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, 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)

ae745 Machining_feature defines the element for zero Compound_feature_element

ae746 Machining_feature defines the element for one Compound_feature_element (see 6.4)

ae747 Machining_feature defines the element for many Compound_feature_element (see 6.4)

ae748 Machining_feature defines the base_feature for zero Replicate_base

ae749 Machining_feature defines the base_feature for one Replicate_base

ae750 Machining_feature defines the base_feature for many Replicate_base

4.1.102 Manufacturing_feature

ae751 Manufacturing_feature (excluded, is an abstract supertype)

ae752 Manufacturing_feature as Machining_feature (excluded, is an abstract supertype)

ae753 Manufacturing_feature as Replicate_feature (excluded, is an abstract supertype)

ae754 Manufacturing_feature as Transition_feature (excluded, is an abstract supertype)

4.1.103 Marking

ae755 Marking (excluded, is an abstract supertype)

ae756 Marking as Defined_marking (excluded, is an abstract supertype)

ae757 Marking as Catalogue_marking (excluded, is an abstract supertype)

ae758 Marking with applied_to_shape (excluded, is an abstract supertype)

ae760 Marking has text defined by exactly one Descriptive_parameter (see 6.15)

ae761 Marking has an applied_to_shape defined by exactly one Shape_element (see 6.15)

4.1.104 Material

ae762 Material (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)

ae764 Material with material_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)

ae765 Material with material_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, 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)

ae767 Material with stock_size (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)

ae768 Material has the material_characteristics defined by zero Material_property (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, 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)

ae769 Material has the material_characteristics defined by one Material_property (see 6.2)

ae770 Material has the material_characteristics defined by many Material_property (see 6.3)

ae771 Material has the material_specification defined by zero Specification (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, 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)

ae772 Material has the material_specification defined by one Specification (see 6.2)

ae773 Material has the material_specification defined by many Specification (see 6.3)

ae774 Material defines the material_definition for one Part (see 6.1, 6.2, 6.3)

ae775 Material defines the material_definition for many Part (see 6.3)

ae776 Material is the material_substitute for zero Alternate_material (see 6.1)

ae777 Material is the material_substitute for one Alternate_material (see 6.2)

ae778 Material is the material_substitute for many Alternate_material

4.1.105 Material_condition_modifier

ae779 Material_condition_modifier (see 6.24, 6.26)

ae780 Material_condition_modifier with material_type (see 6.24, 6.26)

ae781 Material_condition_modifier defines the modifier_control for zero Geometric_tolerance

ae782 Material_condition_modifier defines the modifier_control for one Geometric_tolerance

ae783 Material_condition_modifier defines the modifier_control for many Geometric_tolerance

ae784 Material_condition_modifier defines the modifier for zero Datum

ae785 Material_condition_modifier defines the modifier for one Datum

ae786 Material_condition_modifier defines the modifier for many Datum

4.1.106 Material_property

ae787 Material_property (see 6.1, 6.2, 6.3)

ae790 Material_property has the property_characteristics defined by zero Property_parameter (see 6.1, 6.3)

ae791 Material_property has the property_characteristics defined by one Property_parameter (see 6.2)

ae792 Material_property has the property_characteristics defined by many Property_parameter (see 6.3)

ae793 Material_property has the material_hardness defined by zero Hardness (see 6.1, 6.3)

ae794 Material_property has the material_hardness defined by one Hardness (see 6.2)

ae795 Material_property has the material_hardness defined by many Hardness (see 6.3)

ae796 Material_property defines the material_characteristics for exactly one Material (see 6.2, 6.3)

ae797 Material_property defines the material_characteristic for one Property (see 6.2, 6.3)

ae798 Material_property defines the material_characteristic for many Property

4.1.107 Material_requisition

ae799 Material_requisition (see 6.1, 6.2, 6.3)

4.1.108 Modular_fixture_requisition

ae800 Modular_fixture_requisition (see 6.1, 6.2, 6.3)

4.1.109 Ngon_base_shape

ae801 Ngon_base_shape (see 6.27)

ae805 Ngon_base_shape has the number_of_sides defined by exactly one Numeric_parameter (see 6.27)

ae806 Ngon_base_shape has the circumscribed_diameter defined by exactly one Numeric_parameter (see 6.27)

ae807 Ngon_base_shape has the corner_radius defined by exactly one Numeric_parameter (see 6.27)

4.1.110 Ngon_profile

ae808 Ngon_profile (see 6.20)

ae812 Ngon_profile has the number_of_sides defined by exactly one Numeric_parameter (see 6.20)

ae813 Ngon_profile has the circumscribed_diameter defined by exactly one Numeric_parameter (see 6.20)

ae814 Ngon_profile has the corner_radius defined by exactly one Numeric_parameter (see 6.20)

4.1.111 Numeric_parameter

ae815 Numeric_parameter (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)

ae816 Numeric_parameter as Numeric_parameter_with_tolerance (excluded, is an abstract supertype)

ae817 Numeric_parameter with parameter_units (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)

ae818 Numeric_parameter with parameter_value (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)

ae820 Numeric_parameter defines slot_depth for many Slot

ae821 Numeric_parameter defines slot_depth for one Slot

ae822 Numeric_parameter defines slot_depth for zero Slot

ae823 Numeric_parameter defines the offset_amount for one First_offset

ae824 Numeric_parameter defines the offset_amount for many First_offset

ae825 Numeric_parameter defines the offset_amount for zero First_offset

ae826 Numeric_parameter defines the angle for many Angle_taper

ae827 Numeric_parameter defines the angle for one Angle_taper (see 6.4)

ae828 Numeric_parameter defines the angle for zero Angle_taper

ae829 Numeric_parameter defines the angle_amount for many Chamfer_angle

ae830 Numeric_parameter defines the angle_amount for one Chamfer_angle

ae831 Numeric_parameter defines the angle_amount for zero Chamfer_angle

ae832 Numeric_parameter defines the angular_offset for many Circular_offset_pattern

ae833 Numeric_parameter defines the angular_offset for one Circular_offset_pattern

ae834 Numeric_parameter defines the angular_offset for zero Circular_offset_pattern

ae835 Numeric_parameter defines the angular_spacing for many Circular_pattern

ae836 Numeric_parameter defines the angular_spacing for one Circular_pattern

ae837 Numeric_parameter defines the angular_spacing for zero Circular_pattern

ae838 Numeric_parameter defines the applied_length for many Partial_area_definition

ae839 Numeric_parameter defines the applied_length for one Partial_area_definition

ae840 Numeric_parameter defines the applied_length for zero Partial_area_definition

ae841 Numeric_parameter defines the base_feature_diameter for many Circular_pattern

ae842 Numeric_parameter defines the base_feature_diameter for one Circular_pattern

ae843 Numeric_parameter defines the base_feature_diameter for zero Circular_pattern

ae844 Numeric_parameter defines the base_feature_rotation for many Circular_pattern

ae845 Numeric_parameter defines the base_feature_rotation for one Circular_pattern

ae846 Numeric_parameter defines the base_feature_rotation for zero Circular_pattern

ae848 Numeric_parameter defines the base_shape_length for one Implicit_base_shape_representation (see 6.1)

ae849 Numeric_parameter defines the base_shape_length for zero Implicit_base_shape_representation(see 6.1)

ae850 Numeric_parameter defines the character_height for many Defined_marking

ae851 Numeric_parameter defines the character_height for one Defined_marking

ae852 Numeric_parameter defines the character_height for zero Defined_marking

ae853 Numeric_parameter defines the character_spacing for many Defined_marking

ae854 Numeric_parameter defines the character_spacing for one Defined_marking

ae855 Numeric_parameter defines the character_spacing for zero Defined_marking

ae856 Numeric_parameter defines the circumscribed_diameter for many Ngon_base_shape

ae857 Numeric_parameter defines the circumscribed_diameter for many Ngon_profile

ae858 Numeric_parameter defines the circumscribed_diameter for one Ngon_base_shape

ae859 Numeric_parameter defines the circumscribed_diameter for one Ngon_profile

ae860 Numeric_parameter defines the circumscribed_diameter for zero Ngon_base_shape

ae861 Numeric_parameter defines the circumscribed_diameter for zero Ngon_profile

ae862 Numeric_parameter defines the column_index for many Rectangular_offset_pattern

ae863 Numeric_parameter defines the column_index for many Rectangular_omit_pattern

ae864 Numeric_parameter defines the column_index for one Rectangular_offset_pattern

ae865 Numeric_parameter defines the column_index for one Rectangular_omit_pattern

ae866 Numeric_parameter defines the column_index for zero Rectangular_offset_pattern

ae867 Numeric_parameter defines the column_index for zero Rectangular_omit_pattern

ae868 Numeric_parameter defines the column_spacing for many Rectangular_pattern

ae869 Numeric_parameter defines the column_spacing for one Rectangular_pattern

ae870 Numeric_parameter defines the column_spacing for zero Rectangular_pattern

ae871 Numeric_parameter defines the columns for many Rectangular_pattern

ae872 Numeric_parameter defines the columns for one Rectangular_pattern

ae873 Numeric_parameter defines the columns for zero Rectangular_pattern

ae874 Numeric_parameter defines the corner_radius for many Flat_with_radius_hole_bottom (see 6.4)

ae875 Numeric_parameter defines the corner_radius for one Flat_with_radius_hole_bottom

ae876 Numeric_parameter defines the corner_radius for zero Flat_with_radius_hole_bottom

ae877 Numeric_parameter defines the corner_radius for many Ngon_base_shape

ae878 Numeric_parameter defines the corner_radius for many Ngon_profile

ae879 Numeric_parameter defines the corner_radius for many Rectangular_closed_profile

ae880 Numeric_parameter defines the corner_radius for one Ngon_base_shape

ae881 Numeric_parameter defines the corner_radius for one Ngon_profile

ae882 Numeric_parameter defines the corner_radius for one Rectangular_closed_profile

ae883 Numeric_parameter defines the corner_radius for zero Ngon_base_shape

ae884 Numeric_parameter defines the corner_radius for zero Ngon_profile

ae885 Numeric_parameter defines the corner_radius for zero Rectangular_closed_profile

ae886 Numeric_parameter defines the cross_bar_depth for one Tee_profile

ae887 Numeric_parameter defines the cross_bar_depth for zero Tee_profile

ae888 Numeric_parameter defines the cross_bar_depth for many Tee_profile

ae889 Numeric_parameter defines the cross_bar_width for zero Tee_profile

ae890 Numeric_parameter defines the cross_bar_width for one Tee_profile

ae891 Numeric_parameter defines the cross_bar_width for many Tee_profile

ae892 Numeric_parameter defines the depth for many Tee_profile
 ae893 Numeric_parameter defines the depth for one Tee_profile
 ae894 Numeric_parameter defines the depth for zero Tee_profile
 ae901 Numeric_parameter defines the diameter for zero Circular_closed_profile (see 6.4)
 ae898 Numeric_parameter defines the diameter for one Circular_closed_profile (see 6.4)
 ae895 Numeric_parameter defines the diameter for many Circular_closed_profile (see 6.4)
 ae902 Numeric_parameter defines the diameter for zero Cylindrical_base_shape (see 6.1)
 ae899 Numeric_parameter defines the diameter for one Cylindrical_base_shape (see 6.1)
 ae896 Numeric_parameter defines the diameter for many Cylindrical_base_shape
 ae903 Numeric_parameter defines the diameter for zero Outer_diameter
 ae900 Numeric_parameter defines the diameter for one Outer_diameter
 ae897 Numeric_parameter defines the diameter for many Outer_diameter
 ae906 Numeric_parameter defines the diametral_pitch for zero Turned_knurl
 ae905 Numeric_parameter defines the diametral_pitch for one Turned_knurl
 ae904 Numeric_parameter defines the diametral_pitch for many Turned_knurl
 ae909 Numeric_parameter defines the distance for zero Linear_path (see 6.4)
 ae908 Numeric_parameter defines the distance for one Linear_path (see 6.4)
 ae907 Numeric_parameter defines the distance for many Linear_path (see 6.4)
 ae910 Numeric_parameter defines the feature_length for many Outer_diameter
 ae911 Numeric_parameter defines the feature_length for one Outer_diameter
 ae912 Numeric_parameter defines the feature_length for zero Outer_diameter
 ae913 Numeric_parameter defines the fillet_radius for many Boss
 ae914 Numeric_parameter defines the fillet_radius for one Boss
 ae915 Numeric_parameter defines the fillet_radius for zero Boss
 ae916 Numeric_parameter defines the final_diameter for many Diameter_taper
 ae917 Numeric_parameter defines the final_diameter for one Diameter_taper
 ae918 Numeric_parameter defines the final_diameter for zero Diameter_taper
 ae919 Numeric_parameter defines the first_angle for many Tee_profile
 ae920 Numeric_parameter defines the first_angle for one Tee_profile
 ae921 Numeric_parameter defines the first_angle for zero Tee_profile
 ae922 Numeric_parameter defines the first_offset for many Tee_profile
 ae923 Numeric_parameter defines the first_offset for one Tee_profile
 ae924 Numeric_parameter defines the first_offset for zero Tee_profile
 ae925 Numeric_parameter defines the first_angle for many Square_U_profile
 ae926 Numeric_parameter defines the first_angle for one Square_U_profile
 ae927 Numeric_parameter defines the first_angle for zero Square_U_profile
 ae928 Numeric_parameter defines the first_face_offset for many Constant_radius_edge_round
 ae929 Numeric_parameter defines the first_face_offset for many Constant_radius_fillet
 ae930 Numeric_parameter defines the first_face_offset for one Constant_radius_edge_round
 ae931 Numeric_parameter defines the first_face_offset for one Constant_radius_fillet
 ae932 Numeric_parameter defines the first_face_offset for zero Constant_radius_edge_round
 ae933 Numeric_parameter defines the first_face_offset for zero Constant_radius_fillet
 ae934 Numeric_parameter defines the first_radius for many Flat_slot_end_type
 ae935 Numeric_parameter defines the first_radius for many Square_U_profile
 ae936 Numeric_parameter defines the first_radius for one Flat_slot_end_type
 ae937 Numeric_parameter defines the first_radius for one Square_U_profile

ae938 Numeric_parameter defines the first_radius for zero Flat_slot_end_type
ae939 Numeric_parameter defines the first_radius for zero Square_U_profile
ae940 Numeric_parameter defines the floor_radius for many General_pocket_bottom_condition
ae941 Numeric_parameter defines the floor_radius for many Planar_pocket_bottom_condition
ae942 Numeric_parameter defines the floor_radius for one General_pocket_bottom_condition
ae943 Numeric_parameter defines the floor_radius for one Planar_pocket_bottom_condition
ae944 Numeric_parameter defines the floor_radius for zero General_pocket_bottom_condition
ae945 Numeric_parameter defines the floor_radius for zero Planar_pocket_bottom_condition
ae946 Numeric_parameter defines the height for many Block_base_shape
ae947 Numeric_parameter defines the height for one Block_base_shape
ae948 Numeric_parameter defines the height for zero Block_base_shape
ae949 Numeric_parameter defines the helix_angle for many Diagonal_knurl
ae950 Numeric_parameter defines the helix_angle for many Diamond_knurl
ae951 Numeric_parameter defines the helix_angle for one Diagonal_knurl
ae952 Numeric_parameter defines the helix_angle for one Diamond_knurl
ae953 Numeric_parameter defines the helix_angle for zero Diagonal_knurl
ae954 Numeric_parameter defines the helix_angle for zero Diamond_knurl
ae955 Numeric_parameter defines the index_number for many Circular_offset_pattern
ae956 Numeric_parameter defines the index_number for one Circular_offset_pattern
ae957 Numeric_parameter defines the index_number for zero Circular_offset_pattern
ae958 Numeric_parameter defines the internal_angle for many Spherical_cap
ae959 Numeric_parameter defines the internal_angle for one Spherical_cap
ae960 Numeric_parameter defines the internal_angle for zero Spherical_cap
ae961 Numeric_parameter defines the major_diameter for many Defined_thread
ae962 Numeric_parameter defines the major_diameter for many Turned_knurl
ae963 Numeric_parameter defines the major_diameter for one Defined_thread
ae964 Numeric_parameter defines the major_diameter for one Turned_knurl
ae965 Numeric_parameter defines the major_diameter for zero Defined_thread
ae966 Numeric_parameter defines the major_diameter for zero Turned_knurl
ae967 Numeric_parameter defines the minor_diameter for many Defined_thread
ae968 Numeric_parameter defines the minor_diameter for one Defined_thread
ae969 Numeric_parameter defines the minor_diameter for zero Defined_thread
ae970 Numeric_parameter defines the nominal_diameter for many Turned_knurl
ae971 Numeric_parameter defines the nominal_diameter for one Turned_knurl
ae972 Numeric_parameter defines the nominal_diameter for zero Turned_knurl
ae973 Numeric_parameter defines the number_of_features for many Circular_pattern
ae974 Numeric_parameter defines the number_of_features for one Circular_pattern
ae975 Numeric_parameter defines the number_of_features for zero Circular_pattern
ae976 Numeric_parameter defines the number_of_sides for many Ngon_base_shape
ae977 Numeric_parameter defines the number_of_sides for many Ngon_profile
ae978 Numeric_parameter defines the number_of_sides for one Ngon_base_shape
ae979 Numeric_parameter defines the number_of_sides for one Ngon_profile
ae980 Numeric_parameter defines the number_of_sides for zero Ngon_base_shape
ae981 Numeric_parameter defines the number_of_sides for zero Ngon_profile
ae982 Numeric_parameter defines the number_of_teeth for many Turned_nurl
ae983 Numeric_parameter defines the number_of_teeth for one Turned_knurl

ae984 Numeric_parameter defines the number_of_teeth for zero Turned_knurl
ae985 Numeric_parameter defines the number_of_threads for many Defined_thread
ae986 Numeric_parameter defines the number_of_threads for one Defined_thread
ae987 Numeric_parameter defines the number_of_threads for zero Defined_thread
ae988 Numeric_parameter defines the offset_amount for many Second_offset
ae989 Numeric_parameter defines the offset_amount for one Second_offset
ae990 Numeric_parameter defines the offset_amount for zero Second_offset
ae991 Numeric_parameter defines the offset_distance for many Rectangular_offset_pattern
ae992 Numeric_parameter defines the offset_distance for one Rectangular_offset_pattern
ae993 Numeric_parameter defines the offset_distance for zero Rectangular_offset_pattern
ae994 Numeric_parameter defines the omit_index for many Circular_omit_pattern
ae995 Numeric_parameter defines the omit_index for one Circular_omit_pattern
ae996 Numeric_parameter defines the omit_index for zero Circular_omit_pattern
ae997 Numeric_parameter defines the pitch_diameter for many Defined_thread
ae998 Numeric_parameter defines the pitch_diameter for one Defined_thread
ae999 Numeric_parameter defines the pitch_diameter for zero Defined_thread
ae1000 Numeric_parameter defines the profile_angle for many Vee_profile
ae1001 Numeric_parameter defines the profile_angle for one Vee_profile
ae1002 Numeric_parameter defines the profile_angle for zero Vee_profile
ae1003 Numeric_parameter defines the profile_length for many Linear_profile
ae1004 Numeric_parameter defines the profile_length for many Rectangular_closed_profile
ae1005 Numeric_parameter defines the profile_length for one Linear_profile
ae1006 Numeric_parameter defines the profile_length for one Rectangular_closed_profile
ae1007 Numeric_parameter defines the profile_length for zero Linear_profile
ae1008 Numeric_parameter defines the profile_length for zero Rectangular_closed_profile
ae1009 Numeric_parameter defines the profile_radius for many Vee_profile
ae1010 Numeric_parameter defines the profile_radius for one Vee_profile
ae1011 Numeric_parameter defines the profile_radius for zero Vee_profile
ae1012 Numeric_parameter defines the profile_width for many Rectangular_closed_profile
ae1013 Numeric_parameter defines the profile_width for one Rectangular_closed_profile
ae1014 Numeric_parameter defines the profile_width for zero Rectangular_closed_profile
ae1015 Numeric_parameter defines the radius for many Circular_path
ae1016 Numeric_parameter defines the radius for many Constant_radius_edge_round
ae1017 Numeric_parameter defines the radius for many Constant_radius_fillet
ae1018 Numeric_parameter defines the radius for many Partial_circular_profile
ae1019 Numeric_parameter defines the radius for many Revolved_feature
ae1020 Numeric_parameter defines the radius for many Spherical_cap
ae1021 Numeric_parameter defines the radius for many Spherical_hole_bottom
ae1022 Numeric_parameter defines the radius for many Tee_profile
ae1023 Numeric_parameter defines the radius for many Woodruff_slot_end_type
ae1024 Numeric_parameter defines the radius for one Circular_path
ae1025 Numeric_parameter defines the radius for one Constant_radius_edge_round
ae1026 Numeric_parameter defines the radius for one Constant_radius_fillet
ae1027 Numeric_parameter defines the radius for one Partial_circular_profile
ae1028 Numeric_parameter defines the radius for one Revolved_feature
ae1029 Numeric_parameter defines the radius for one Spherical_cap

ae1030 Numeric_parameter defines the radius for one Spherical_hole_bottom
 ae1031 Numeric_parameter defines the radius for one Tee_profile
 ae1032 Numeric_parameter defines the radius for one Woodruff_slot_end_type
 ae1033 Numeric_parameter defines the radius for zero Circular_path
 ae1034 Numeric_parameter defines the radius for zero Constant_radius_edge_round
 ae1035 Numeric_parameter defines the radius for zero Constant_radius_fillet
 ae1036 Numeric_parameter defines the radius for zero Partial_circular_profile
 ae1037 Numeric_parameter defines the radius for zero Revolved_feature
 ae1038 Numeric_parameter defines the radius for zero Spherical_cap
 ae1039 Numeric_parameter defines the radius for zero Spherical_hole_bottom
 ae1040 Numeric_parameter defines the radius for zero Tee_profile
 ae1041 Numeric_parameter defines the radius for zero Woodruff_slot_end_type
 ae1042 Numeric_parameter defines the root_fillet for many Turned_knurl
 ae1043 Numeric_parameter defines the root_fillet for one Turned_knurl
 ae1044 Numeric_parameter defines the root_fillet for zero Turned_knurl
 ae1045 Numeric_parameter defines the row_index for many Rectangular_offset_pattern
 ae1046 Numeric_parameter defines the row_index for many Rectangular_omit_pattern
 ae1047 Numeric_parameter defines the row_index for one Rectangular_offset_pattern
 ae1048 Numeric_parameter defines the row_index for one Rectangular_omit_pattern
 ae1049 Numeric_parameter defines the row_index for zero Rectangular_offset_pattern
 ae1050 Numeric_parameter defines the row_index for zero Rectangular_omit_pattern
 ae1051 Numeric_parameter defines the row_spacing for many Rectangular_pattern
 ae1052 Numeric_parameter defines the row_spacing for one Rectangular_pattern
 ae1053 Numeric_parameter defines the row_spacing for zero Rectangular_pattern
 ae1054 Numeric_parameter defines the rows for many Rectangular_pattern
 ae1055 Numeric_parameter defines the rows for one Rectangular_pattern
 ae1056 Numeric_parameter defines the rows for zero Rectangular_pattern
 ae1057 Numeric_parameter defines the second angle for many Tee_profile
 ae1058 Numeric_parameter defines the second angle for one Tee_profile
 ae1059 Numeric_parameter defines the second angle for zero Tee_profile
 ae1060 Numeric_parameter defines the second offset for many Tee_profile
 ae1061 Numeric_parameter defines the second offset for one Tee_profile
 ae1062 Numeric_parameter defines the second offset for zero Tee_profile
 ae1063 Numeric_parameter defines the second_angle for many Square_U_profile
 ae1064 Numeric_parameter defines the second_angle for one Square_U_profile
 ae1065 Numeric_parameter defines the second_angle for zero Square_U_profile
 ae1066 Numeric_parameter defines the second_face_offset for many Constant_radius_edge_round
 ae1067 Numeric_parameter defines the second_face_offset for many Constant_radius_fillet
 ae1068 Numeric_parameter defines the second_face_offset for one Constant_radius_edge_round
 ae1069 Numeric_parameter defines the second_face_offset for one Constant_radius_fillet
 ae1070 Numeric_parameter defines the second_face_offset for zero Constant_radius_edge_round
 ae1071 Numeric_parameter defines the second_face_offset for zero Constant_radius_fillet
 ae1072 Numeric_parameter defines the second_radius for many Flat_slot_end_type
 ae1073 Numeric_parameter defines the second_radius for many Square_U_profile
 ae1074 Numeric_parameter defines the second_radius for one Flat_slot_end_type
 ae1075 Numeric_parameter defines the second_radius for one Square_U_profile