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Cutting tool data representation and exchange —

Part 1: Overview, fundamental principles and general information model

AMENDMENT 1

Représentation et échange des données relatives aux outils coupants —

Partie 1: Vue d'ensemble, principes fondamentaux et modèle général d'informations

AMENDEMENT 1

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
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Foreword

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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.

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Amendment 1 to ISO 13399-1:2006 was prepared by Technical Committee ISO/TC 29, *Small tools*.

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Part 1: Overview, fundamental principles and general information model

AMENDMENT 1

Page 6, 5.1.2

Add the following application object as the first indent:

— fitting_bounds

Page 14, 5.2.11

Replace the EXPRESS specification with the following:

EXPRESS specification:

```
TYPE limitation_definition_select = SELECT
    (limits_and_fits,
    plus_minus_bounds,
    fitting_bounds);
END_TYPE;
```

Page 21, 5.2.26

Add the following definition below the title.

A coating is an applied material layer or layers deposited on a substrate.

Add the following subclauses.

5.2.26.1 coating_name

A coating_name is a name by which the coating is referred to.

5.2.26.2 coating_process

A coating_process is a process by which the coating has been applied.

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Page 42, 5.2.58

Replace this subclause with the following:

5.2.58 grade

A grade is a label for the final composition of the cutting item material substrate or substrate and coating.

5.2.58.1 coating

The coating specifies the coating of the grade.

5.2.58.2 cutting_condition

The cutting_condition specifies the relevant cutting conditions for the grade.

5.2.58.3 identifier

This is an identifier for the grade.

5.2.58.4 standard_designation

A standard_designation is a designation for the grade based on a standard.

5.2.58.5 substrate

The substrate specifies the substrate of the grade.

5.2.58.6 workpiece_material

The workpiece_material specifies workpiece materials that are suitable for machines using the grade.

Page 43, 5.2.60

Replace the first paragraph with the following:

5.2.60 item

An item is either a single object or a unit in a group of objects. It collects the information that is common to all versions of the object. An item shall always be classified as 'cutting item', 'tool item', 'adaptive item', or 'assembly item' using a specific_item_classification. Additionally, if an assembly_definition exists for at least one version of the item, the item shall be classified as being an 'assembly' using specific_item_classification.

Page 44, 5.2.61

Replace this subclause with the following:

5.2.61 item_characteristic_association

An item_characteristic_association associates a characteristic to an item_definition.

```
ENTITY item_characteristic_association;
    associated_characteristic  :  item_characteristic_select;
    associated_item            :  item_definition;
    relation_type              :  OPTIONAL STRING;
END_ENTITY;
```

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Add the following subclause.

5.2.61.3 relation_type

The relation_type specifies the meaning of the relationship. Where applicable, the following values shall be used:

— 'has characteristic': The relationship indicates that the item possesses the related characteristic.

— 'is related to': The relationship indicates that the item is related to the characteristic.

— 'used for': The relationship indicates that the item may be used in the context of the related characteristic.

Page 44, 5.2.62

Replace this subclause with the following:

5.2.62 item_definition

An item_definition is a view of an item_version. This view is relevant for the requirements of one or more application domains and collects product data of the item_version.

NOTE The selection of data describing an item_version can be different for assembly purposes, shipping purposes or analysis purposes.

Each item_definition may be a mating_definition, an assembly_definition, or a physical_item_definition.

EXPRESS specification:

```
ENTITY item_definition
    SUPERTYPE OF (ONEOF(assembly_definition, mating_definition, physical_item_definition));
        associated_item_version  :  item_version;
        contexts                 :  OPTIONAL SET OF application_context;
        id                       :  STRING;
        name                     :  OPTIONAL string_select;
END_ENTITY;
```

Page 44, 5.2.62.1

Replace this subclause with the following:

5.2.62.1 contexts

The contexts specifies the set of application_context objects in which this view of the item_version is relevant.

Page 44, delete 5.2.62.4

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Page 50, 5.2.70

Add the following definition below the title.

A location is a place or position where a product or resource can exist.

Add the following subclauses.

5.2.70.1 location_id

A location_id is an identifier of the location.

5.2.70.2 location_name

A location_name is the word or group of words by which the location is known.

5.2.70.3 location_type

The location_type specifies the type of location. Where applicable, the following values shall be used:

— 'warehouse': The location is a warehouse.

— 'turret': The location is a tool turret.

— 'room': The location is a room.

— 'machine': The location is a machine tool.

Page 57, 5.2.84

Add the following definition below the title.

A physical_item is a type of item that identifies an individual artefact that has been made. It is a collector of data common to all revisions of the physical_item.

Page 57, 5.2.85

Add the following definition below the title.

A physical_item_location_association is a relationship that allows a physical_item_definition to have a location.

Add the following subclauses.

5.2.85.1 located_item

The located_item attribute specifies the physical_item that is being located.

5.2.85.2 location

The location attribute specifies the location object.

Page 57, 5.2.86

Add the following definition below the title.

A physical_item_definition is a type of item_definition that defines a characterization view of a version of a physical_item.

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NOTE The physical_item_definition entity type supports the representation of different views of a physical_item for different purposes. Multiple views of the same physical_item are represented by different instances of physical_item_definition for the same physical_item_version.

Page 57, 5.2.87

Add the following definition below the title.

A physical_item_state_association is a relationship that allows a physical_item_definition to have state or to be in a state.

Add the following subclauses.

5.2.87.1 associated_physical_item

The associated_physical_item specifies the physical_item_definition which has a state.

5.2.87.2 associated_state

The associated_state specifies the state which is being assigned.

5.2.87.3 role

The role specifies the role of the physical_item_state_association. Where applicable, the following values shall be used:

— 'observed': The associated state is an actual observed state.

— 'predicted': The associated state is a predicted state, it may or may not be true.

Page 57, 5.2.88

Add the following definition below the title.

A physical_item_structure_association creates a parent child relationship between physical_item_definitions.

NOTE The relationship relates physical_items at the physical_item_definition level since a single physical_item (a single solid body which you can touch) can have multiple functions with their own assembly of components.

EXAMPLE A multi-function tool which has three different functions on the same tool body, each function having its own insert and clamping system.

Add the following subclauses.

5.2.88.1 related

The related attribute specifies the child of the relationship.

5.2.88.2 relating

The relating attribute specifies the parent of the relationship.

Page 58, 5.2.89

Add the following definition below the title.

A physical_item_version is a type of item_version that identifies a revision of an individual artefact that has been made. An item whose properties can only be known by observation, or by derivation from observations.

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NOTE The physical_item_version represents the physical product, something one can touch.

Page 65, 5.2.100

Add the following definition below the title.

A realized_item_association is a relationship between a product, represented by an item, and the product that has been made, represented by a physical_item_version.

Add the following subclauses.

5.2.100.1 physical_item

The physical_item attribute specifies the physical_item that is a realization of the item_version.

5.2.100.2 realized_item_version

The realized_item_version attribute specifies the item_version object of which the physical_item is a realization.

Page 67, 5.2.104

Add the following definition below the title.

A state is the mode of being in which something does or could exist for a period of time.

Add the following subclause.

5.2.104.1 name

The name specifies the name by which the state is known.

Page 68, 5.2.107

Add the following definition below the title.

A substrate is the main material composition of a cutting item.

Add the following subclause.

5.2.107.1 name

This is the name by which the substrate is referred to.

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Page 68, 5.2.108

Replace this subclause with the following:

5.2.108 Transformation

A transformation is a geometric transformation composed of translation and rotation. Scaling is not included. Each transformation is a transformation_3d or a transformation_2d.

EXPRESS specification:

```
ENTITY transformation

    ABSTRACT SUPERTYPE OF (ONEOF(transformation_2d, transformation_3d));

    axis_1 : OPTIONAL direction;

    axis_2 : OPTIONAL direction;

    local_origin : cartesian_point;

END_ENTITY;
```

Add the following subclauses.

5.2.108.1 axis_1

Axis_1 is the direction used to determine the derived X-axis direction.

5.2.108.2 axis_2

Axis_2 is the direction used to determine the derived Y-axis direction.

5.2.108.3 local_origin

The local_origin is the required translation, specified as a cartesian point. The actual translation included in the transformation is from the geometric origin to the local origin.

Page 68, 5.2.110

Replace this subclause with the following:

5.2.110 transformation_3d

A transformation_3d is the definition of a geometric transformation in 3D space.

A transformation_3d is a type of transformation.

EXPRESS specification:

```
ENTITY transformation_3d

    SUBTYPE OF (transformation);

    axis_3 : OPTIONAL direction;

END_ENTITY;
```

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Add the following subclause.

5.2.110.1 axis_3

Axis_3 is the direction used to determine the derived Z-axis direction.

Page 72, after 5.2.117

Add the following new subclauses.

5.2.118 fitting_bounds

A fitting_bounds is the specification of the allowable deviation from a numerical value for a fitting.

EXPRESS specification:

```
ENTITY fitting_bounds;
    lower_bound          :    STRING;
    significant_digits   :    OPTIONAL STRING;
    upper_bound          :    STRING;
    value_determination  :    OPTIONAL STRING;
END_ENTITY;
```

5.2.118.1 lower_bound

The lower_bound specifies the value of the tolerance that shall be subtracted or added from the exact value to establish the minimum allowed value.

5.2.118.2 significant_digits

The significant_digits specifies the number of decimal digits indicating the accuracy of the lower_bound and upper_bound values. The significant_digits need not be specified for a particular fitting_bounds.

5.2.118.3 upper_bound

The upper_bound specifies the value of the tolerance that shall be added or subtracted to the exact value to establish the maximum allowed value.

5.2.118.4 value_determination

The value_determination specifies information on how the fitting_bounds shall be interpreted. The value_determination need not be specified for a particular fitting_bounds. Where applicable, the following values shall be used:

— 'calculated': The value has been calculated;

— 'designed': The value represents a value intended by the design;

— 'estimated': The value has been estimated;

— 'measured': The value has been measured;

— 'required': The value represents a requirement.

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NOTE A fitting_bounds can be specified in the design stage of a product but it can also be documented as measured on a prototype.

5.2.119 cartesian_point

A cartesian_point is a point defined by its coordinates in a rectangular Cartesian coordinate system.

EXPRESS specification:

```
ENTITY cartesian_point;

    coordinates : LIST [1:3] OF REAL;

END_ENTITY;
```

5.2.119.1 coordinates

The coordinates attribute is a list; the individual elements of this list are defined below:

— coordinates[1]: The first coordinate of the point location.

— coordinates[2]: The second coordinate of the point location; this will not exist in the case of a one-dimensional point.

— coordinates[3]: The third coordinate of the point location; this will not exist in the case of a one-or two-dimensional point.

5.2.120 direction

This entity defines a general direction vector in two- or three-dimensional space. The actual magnitudes of the components have no effect upon the direction being defined, only the ratios *x*:*y*:*z* or *x*:*y* are significant.

EXPRESS specification:

```
ENTITY direction;

    direction_ratios : LIST [2:3] OF REAL;

END_ENTITY;
```

The components of this entity are not normalized. If a unit vector is required, it should be normalized before use.

5.2.120.1 direction_ratios

The direction_ratios attribute is a list; the individual elements of this list are defined below.

— direction_ratios[1]: The component in the direction of the X axis.

— direction_ratios[2]: The component in the direction of the Y axis.

— direction_ratios[3]: The component in the direction of the Z axis; this will not be present in the case of a direction in two-dimensional coordinate space.

Page 92, 6.1.1.11.1:

Delete the following lines in Reference path.

(product_category.name = 'accessory item')

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(product_category.name = 'cutting tool')

Page 96, after 6.1.2.3.4

Add the following new subclauses.

6.1.2.4 fitting_bounds

AIM element : tolerance_value

Source : ISO 10303-47

Rules : dependent_instantiable_tolerance_value

6.1.2.4.1 lower_bound

AIM element : tolerance_value.lower_bound

Source : ISO 10303-47

6.1.2.4.2 significant_digits

AIM element : precision_qualifier.precision_value

Source : ISO 10303-45

Rules : dependent_instantiable_precision_qualifier

Reference path : [tolerance_value

Tolerance_value.lower_bound ->

measure_with_unit <-]

[tolerance_value

tolerance_value.upper_bound ->

measure_with_unit <-]

measure_qualification.qualified_measure

measure_qualification

measure_qualification.qualifiers[i] ->

value_qualifier

value_qualifier = precision_qualifier

precision_qualifier

precision_qualifier.precision_value

6.1.2.4.3 upper_bound

AIM element : tolerance_value.upper_bound

Source : ISO 10303-47

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