



INTERNATIONAL STANDARD ISO 10303-46:1994
TECHNICAL CORRIGENDUM 3

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

Part 46:

Integrated generic resources: Visual presentation

TECHNICAL CORRIGENDUM 3

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

Partie 46: Ressources génériques intégrées: Présentation visuelle

RECTIFICATIF TECHNIQUE 3

Technical Corrigendum 3 to ISO 10303-46:1994 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 4, *Industrial data*.

Introduction

This corrigendum applies to ISO 10303-46:1994 as corrected by ISO 10303-46:1994/Cor.1:1999 and ISO 10303-46:1994/Cor 2:2002. For the convenience of the user, this corrigendum also includes the content of corrigenda 1 and 2.

The purpose of the modifications to the text of ISO 10303-46:1994 is to correct errors in the EXPRESS, to clarify a definition, to correct errors in Informal propositions and Formal propositions, to correct errors identified in the ballot for ISO 10303-518, and to replace the object identifier for the document and the schemas.

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Modifications to the text of ISO 10303-46:1994

Clause 2, p. 2

The Normative references require an additional normative reference for the correction identified in clause 7.3.21. Add the following to the list of Normative references:

ISO 3098-0:1977, *Technical product documentation — Lettering — Part 0: General requirements*

Clause 4, p. 5

The EXPRESS specification of *camera_image_3d_with_scale* and *aspect_ratio*, defined below, requires additional EXPRESS external references. Remove the following:

REFERENCE FROM presentation_resource_schema

```
(colour,
 planar_box,
 presentation_scaled_placement);
```

REFERENCE FROM measure_schema

```
(length_measure,
 positive_plane_angle_measure);
```

Replace with the following:

REFERENCE FROM presentation_resource_schema

```
(colour,
 planar_box,
 planar_extent,
 presentation_scaled_placement);
```

REFERENCE FROM measure_schema

```
(length_measure,
 positive_ratio_measure,
 positive_plane_angle_measure);
```

The EXPRESS specification for the **presentation_organization_schema** did not include a reference to required data type. The first required data type is an entity data type, the **annotation_occurrence** for the Formal propositions in **area_dependent_annotation_representation** and **view_dependent_annotation_representation**. The second required data type is an entity data type, the symbol_representation for the Formal propositions in **symbol_representation_rule**. The third required data type is an entity data type, the **symbol_representation_relationship** for the Formal propositions in **symbol_representation_rule**. The fourth required data type is an entity data type, the **styled_item** for the Formal propositions in **camera_model** and **light_source**. The fifth required data type is an entity data type, the **founded_item**. It is required to be referenced since it is now a supertype of **view_volume**. Add the following to the EXPRESS specification between the 'SCHEMA presentation_organization_schema;' and the 'REFERENCE FROM presentation_resource_schema':

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REFERENCE FROM presentation_definition_schema
(annotation_occurrence,
symbol_representation,
symbol_representation_relationship);

REFERENCE FROM presentation_appearance_schema
(styled_item);

Delete the following EXPRESS specification:

REFERENCE FROM representation_schema
(item_defined_transformation,
item_in_context,
mapped_item,
representation,
representation_item,
representation_map,
representation_relationship,
representation_relationship_with_transformation);

Replace with the following EXPRESS specification:

REFERENCE FROM representation_schema
(founded_item,
item_defined_transformation,
item_in_context,
mapped_item,
representation,
representation_item,
representation_map,
representation_relationship,
representation_relationship_with_transformation);

With the addition of the annotation_occurrence, symbol_representation, symbol_representation_relationship and styled_item to the presentation_organization_schema, NOTE 1 changed. Delete NOTE 1 and replace with the following:

NOTE 1 The schemas referenced above can be found in the following parts of ISO 10303:

Presentation_definition_schema	Clause 5 of this part of ISO 10303
Presentation_appearance_schema	Clause 6 of this part of ISO 10303
Presentation_resource_schema	Clause 7 of this part of ISO 10303
Geometry_schema	ISO 10303-42
Representation_schema	ISO 10303-43
Measure_schema	ISO 10303-41

Clause 4.3.45, p. 13

The Informal proposition of **layered_item** contradicts to the intended use of **presentation_layer_assignment**. The type of **representation_items** assigned to a layer shall not be restricted. Remove Informal proposition IP1.

Clause 4.5.5, p. 26

The EXPRESS specification of **view_volume** is revised to make it a subtype of **founded_item** in order to provide a representation context for the **projection_point** and **planar_box** attributes. Remove the EXPRESS specification and replace with the following:

EXPRESS specification:

*)

ENTITY view_volume

SUBTYPE OF (founded_item);

projection_type : central_or_parallel;

projection_point : cartesian_point;

view_plane_distance : length_measure;

front_plane_distance : length_measure;

front_plane_clipping : BOOLEAN;

back_plane_distance : length_measure;

back_plane_clipping : BOOLEAN;

view_volume_sides_clipping : BOOLEAN;

view_window : planar_box;

END_ENTITY;

(*

Add the following note at the end of the entity description:

NOTE Since **view_volume** is not a subtype of **geometric_representation_item** the instances of **cartesian_point** which is the **projection_point** attribute and **planar_box** which is the **view_window** attribute are not associated in the usual way with the **geometric_representation_context** of each **representation** using a **camera_model_d3** containing this **view_volume**. The **geometric_representation_context** is associated via the **founded_item** supertype.

Clause 4.5.9, p. 31

The EXPRESS specification of **light_source** contained logical errors in the WHERE rule. WR1 requires a role name qualified by attribute name 'ITEM' for argument 2 of built-in function USEDIN. Delete the current WR1 and replace WR1 with the following:

WR1: SIZEOF(USEDIN(SELF, 'PRESENTATION_APPEARANCE_SCHEMA.' +
'STYLED_ITEM.ITEM')) = 0;

Clause 4.5.14, p. 35

The description of the Formal propositions does not give a correct explanation of WR2. Remove the description of WR2 and replace with the following:

WR2: The target of the mapping shall be a planar_box.

Clause 4.5.16, p. 35

*The EXPRESS specification for **camera_image_3d_with_scale** defined below are required for reference from other parts of ISO 10303. Add the following as clause 4.5.16 after clause 4.5.15*

4.5.16 camera_image_3d_with_scale

A **camera_image_3d_with_scale** is a **camera_image** that projects three-dimensional geometry and has a derived scale. The scale is the ratio between the size of the viewport and the size of the **view_window** of the **view_volume**.

EXPRESS specification:

*)

ENTITY camera_image_3d_with_scale

SUBTYPE OF (camera_image);

DERIVE

scale: positive_ratio_measure := ((SELF\mapped_item.mapping_target\planar_extent.size_in_x / (SELF\mapped_item.mapping_source.mapping_origin\camera_model_d3.perspective_of_volume.view_window.size_in_x));

WHERE

WR1: ('PRESENTATION_ORGANIZATION_SCHEMA.CAMERA_MODEL_D3'

IN TYPEOF (SELF\mapped_item.mapping_source.mapping_origin));

WR2: aspect_ratio(SELF\mapped_item.mapping_target) =

aspect_ratio(SELF\mapped_item.mapping_source.mapping_origin\camera_model_d3.perspective_of_volume.view_window);

WR3: SELF\mapped_item.mapping_source.mapping_origin\camera_model_d3.perspective_of_volume.front_plane_clipping

AND

SELF\mapped_item.mapping_source.mapping_origin\camera_model_d3.perspective_of_volume.view_volume_sides_clipping;

WR4: (SELF\mapped_item.mapping_target\planar_extent.size_in_x > 0)

AND

(SELF\mapped_item.mapping_target\planar_extent.size_in_y > 0);

WR5: (SELF\mapped_item.mapping_source.mapping_origin\camera_model_d3.perspective_of_volume.view_window.size_in_x > 0)

AND

```

        (SELF\mapped_item.mapping_source.mapping_origin\camera_model_d3.
        perspective_of_volume.view_window.size_in_y > 0);
    WR6: ( 'GEOMETRY_SCHEMA.' +
        'AXIS2_PLACEMENT_2D' IN TYPEOF (SELF\mapped_item.
        mapping_target\planar_box.placement))
        AND NOT ( 'GEOMETRY_SCHEMA.' +
        'AXIS2_PLACEMENT_3D' IN TYPEOF (SELF\mapped_item.
        mapping_target\planar_box.placement));
END_ENTITY;
( *

```

Attribute definitions:

scale: the **positive_ratio_measure** derived from the rectangular size of the viewport and the rectangular size of the **view_volume** of the **camera_model**.

Formal propositions:

WR1: The source of the projection shall be a **camera_model_d3**.

WR2: The aspect ratio of the viewport shall equal the aspect ratio of the **view_window** of the **view_volume**.

WR3: The geometry of the projected representation shall be clipped against the plane represented by the **front_plane_distance** and the planes which are the sides of the volume defined by the **view_volume**.

WR4: The rectangular size of the viewport shall be specified by positive values.

WR5: The rectangular size of the **view_window** shall be specified by positive values.

WR6: The drawing space of a **camera_image_3d_with_scale** shall be specified in a 2D coordinate system.

Informal propositions:

IP1: The horizontal and vertical components of the viewport shall be parallel to the corresponding components of the **view_window** of the **view_volume**.

Clause 4.9.1, p. 39

*The EXPRESS specification for the FUNCTION **acyclic_presentation_representation_relationship** contained logical errors in the function body. The assignment to variable 'x' requires a 'SET' and not a 'BAG'. Remove the EXPRESS specification and replace with the following:*

EXPRESS specification:

```

*)
FUNCTION acyclic_presentation_representation_relationship
  ( relation : presentation_representation_relationship;

```

ISO 10303-46:1994/Cor.3:2006(E)

```
children : SET OF presentation_representation ) : BOOLEAN;

LOCAL
  x : SET OF presentation_representation_relationship;
  local_children : SET OF presentation_representation;
END_LOCAL;

REPEAT i:=1 TO HIINDEX(children);
  IF relation\presentation_relationship.rep_1 :=: children[i] THEN
    RETURN(FALSE);
  END_IF;
END_REPEAT;

x := bag_to_set (USEDIN ( relation\presentation_relationship.rep_1,
  'REPRESENTATION_SCHEMA.'+
  'REPRESENTATION_RELATIONSHIP.REP_2')));
local_children := children + relation\presentation_relationship.rep_1;

IF SIZEOF (x) > 0 THEN
  REPEAT i:=1 TO HIINDEX (x);
    IF NOT acyclic_presentation_representation_relationship
      (x[i] , local_children) THEN
      RETURN (FALSE);
    END_IF;
  END_REPEAT;
END_IF;

RETURN (TRUE);

END_FUNCTION;
(*
```

Clause 4.9.2, p.39

The EXPRESS specification for **aspect_ratio** defined below are required for reference from other parts of ISO 10303. This entity was incorrectly defined in ISO 10303-517. Add the following as clause 4.9.2 after clause 4.9.1 and before the END_SCHEMA EXPRESS specification:

4.9.2 aspect_ratio

The **aspect_ratio** function checks that both the attributes, size_in_x and size_in_y, have positive values and returns a **positive_ratio_measure** that is the ratio of length to height for a given **planar_box**. In other cases, an indeterminate value is returned.

EXPRESS specification:

*)

```

FUNCTION aspect_ratio (p : planar_box) : positive_ratio_measure;
(* if the dimensions of the planar_box are greater than zero,
   compute the aspect ratio and return the resulting value. *)
  IF (p.size_in_x > 0.) AND (p.size_in_y > 0.) THEN
    RETURN (p.size_in_x / p.size_in_y);
  ELSE
    RETURN (?);
  END_IF;
END_FUNCTION;
(*

```

Argument definitions:

p: The input **planar_box** to be checked.

Clause 5, p. 40

The EXPRESS specification for the **presentation_definition_schema** did not include a reference to a required data type. The required reference is a function, the **bag_to_set** for the EXPRESS specifications changed in **acyclic_presentation_representation_relationship**, **acyclic_symbol_representation_relationship** and **field_in_table**. Delete the following EXPRESS specification:

```

REFERENCE FROM support_resource_schema
  (label,
   text);

```

Replace with the following EXPRESS specification:

```

REFERENCE FROM support_resource_schema
  (label,
   text,
   bag_to_set);

```

Clause 5.4.13, p.53

The EXPRESS specification for **table_record_representation** was incorrect. The local rules of **table_record_representation** are incorrect since the variable **map_item** is of type **REPRESENTATION**, but it is used as argument to the function **using_representations**, which accepts only variables of type **FOUNDED_ITEM_SELECT**. Remove the EXPRESS specification and replace with the following:

EXPRESS specification:

```

*)
ENTITY table_record_representation
  SUBTYPE OF (symbol_representation);
WHERE
  WR1: (SIZEOF(USEDIN(SELF, 'REPRESENTATION_SCHEMA.'+
    'REPRESENTATION_RELATIONSHIP.REP_2')) > 0)
    OR
  (SIZEOF(QUERY( map_item <* USEDIN(SELF, 'REPRESENTATION_SCHEMA.'+

```

```

        'REPRESENTATION_MAP.' +
        'MAPPED_REPRESENTATION') |
        SIZEOF(QUERY( mi <* USEDIN(map_item, 'REPRESENTATION_SCHEMA.' +
        'MAPPED_ITEM.' +
        'MAPPING_SOURCE') |
        'PRESENTATION_DEFINITION_SCHEMA.' +
        'TABLE_REPRESENTATION' IN
        TYPEOF (using_representations (mi)) )) > 0))
        > 0);
END_ENTITY;
( *

```

Clause 5.4.14, p.54

The EXPRESS specification for **table_record_field_representation** was incorrect. The local rules of **table_record_field_representation** are incorrect since the variable **map_item** is of type **REPRESENTATION**, but it is used as argument to the function **using_representations**, which accepts only variables of type **FOUNDED_ITEM_SELECT**. Remove the EXPRESS specification and replace with the following:

EXPRESS specification:

```

*)
ENTITY table_record_field_representation
  SUBTYPE OF (symbol_representation);
WHERE
  WR1: (SIZEOF(USEDIN(SELF, 'REPRESENTATION_SCHEMA.' +
    'REPRESENTATION_RELATIONSHIP.REP_2')) > 0)
    OR
  (SIZEOF(QUERY( map_item <* USEDIN(SELF, 'REPRESENTATION_SCHEMA.' +
    'REPRESENTATION_MAP.' +
    'MAPPED_REPRESENTATION') |
    SIZEOF(QUERY( mi <* USEDIN(map_item, 'REPRESENTATION_SCHEMA.' +
    'MAPPED_ITEM.' +
    'MAPPING_SOURCE') |
    'PRESENTATION_DEFINITION_SCHEMA.' +
    'TABLE_RECORD_REPRESENTATION' IN
    TYPEOF (using_representations (mi)) )) > 0))
    > 0);
END_ENTITY;
( *

```

Clause 5.6.2, p. 72

The EXPRESS specification for the FUNCTION **acyclic_symbol_representation_relationship** contained logical errors in the function body. The assignment to variable 'x' requires a 'SET' and not a 'BAG'. Remove the EXPRESS specification and replace with the following:

EXPRESS specification:

```

*)
FUNCTION acyclic_symbol_representation_relationship
  (relation : symbol_representation_relationship;
   children : SET OF symbol_representation ) : BOOLEAN;
LOCAL
  x : SET OF symbol_representation_relationship;
  local_children : SET OF symbol_representation;
END_LOCAL;

REPEAT i:=1 TO HIINDEX(children);
  IF relation\representation_relationship.rep_1 :=: children[i] THEN
    RETURN(FALSE);
  END_IF;
END_REPEAT;

x := bag_to_set (USEDIN ( relation\representation_relationship.rep_1,
                        'REPRESENTATION_SCHEMA.'+
                        'REPRESENTATION_RELATIONSHIP.'+ 'REP_2' ));
local_children := children + relation\representation_relationship.rep_1;

IF SIZEOF (x) > 0 THEN
  REPEAT i:=1 TO HIINDEX (x);
    IF NOT acyclic_symbol_representation_relationship(x[i] ,
                                                    local_children) THEN

      RETURN (FALSE);
    END_IF;
  END_REPEAT;
END_IF;

RETURN (TRUE);

END_FUNCTION;
( *

```

Clause 5.6.3, p. 73

The EXPRESS specification for the FUNCTION **field_in_table** contained spelling and logical errors. The expression in the first QUERY requires a string 'PRESENTATION_DEFINITION_SCHEMA.TABLE_RECORD_REPRESENTATION' and not a string 'PRESENTATION_DEFINITIONS_SCHEMA.TABLE_RECORD_REPRESENTATION'. The declaration of variable 'symbol_rep_rel_set' requires a 'SET' and not a 'SET[1:?]'. The declaration of variable mapped_item_set' requires a 'SET' and not a 'SET[1:?]'. The declaration of variable 'table_record_rep_set' requires a 'SET' and not a 'SET[1:?]'. The assignment to variable 'symbol_rep_rel_set' requires a 'SET' and not a 'BAG'. The built-in function USEDIN in the second QUERY requires a role name qualified by an attribute name as argument 2. Remove the EXPRESS specification and replace with the following:

EXPRESS specification:

```

*)
FUNCTION field_in_table (field : table_record_field_representation;
                        table : annotation_table_occurrence): BOOLEAN;

LOCAL
    table_rep : table_representation;
    symbol_rep_rel_set : SET OF symbol_representation_relationship;
    mapped_item_set : SET OF mapped_item;
    table_record_rep_set : SET OF table_record_representation := [];
END_LOCAL;

table_rep := table\styled_item.item\mapped_item.mapping_source.
mapped_representation;
mapped_item_set := QUERY(item <* table_rep.items |
    ('REPRESENTATION_SCHEMA.MAPPED_ITEM' IN
     TYPEOF(item))
    AND
    ('PRESENTATION_DEFINITION_SCHEMA.' +
     'TABLE_RECORD_REPRESENTATION' IN
     TYPEOF(item\mapped_item.mapping_source.
     mapped_representation ))
    );
REPEAT i := 1 TO HIINDEX(mapped_item_set);
    table_record_rep_set := table_record_rep_set +
        mapped_item_set[i].mapping_source.mapped_representation;
END_REPEAT;

symbol_rep_rel_set := bag_to_set (USEDIN(table_rep,
    'REPRESENTATION_SCHEMA.' +
    'REPRESENTATION_RELATIONSHIP.REP_1'));

REPEAT i := 1 TO HIINDEX(symbol_rep_rel_set);
    table_record_rep_set := table_record_rep_set +
        symbol_rep_rel_set[i]\representation_relationship.rep_2;
END_REPEAT;

IF SIZEOF(QUERY( table_record_rep <* table_record_rep_set |
    (SIZEOF(QUERY( rep_rel <* USEDIN(table_record_rep,
        'REPRESENTATION_SCHEMA.' +
        'REPRESENTATION_RELATIONSHIP.REP_1') |
    ('PRESENTATION_DEFINITION_SCHEMA.' +
    'SYMBOL_REPRESENTATION_RELATIONSHIP' IN
    TYPEOF(rep_rel))

```

```

AND
(rep_rel.rep_2 :=: field)
)) > 0)
OR
(SIZEOF(QUERY(item <* table_record_rep.items |
('REPRESENTATION_SCHEMA.MAPPED_ITEM' IN
  TYPEOF(item))
AND
(field :=: item\mapped_item.mapping_source.
  mapped_representation )
)) > 0)
)) = 0 THEN
  RETURN(FALSE);
END_IF;

RETURN(TRUE);

END_FUNCTION;
( *
```

Clause 6, p. 74

The EXPRESS specification for the **presentation_appearance_schema** did not include a reference to required data type. The first required data type is an entity data type, the group for the amended SELECT type **style_context_select**. The second required reference is a function, the **bag_to_set** for the EXPRESS specifications changed in **acyclic_occlusion_precedence**. Add the following EXPRESS specification before the 'REFERENCE FROM MEASURE_SCHEMA':

```
REFERENCE FROM group_schema
  (group);
```

Delete the following EXPRESS specification:

```
REFERENCE FROM support_resource_schema
  (label);
```

Replace with the following EXPRESS specification:

```
REFERENCE FROM support_resource_schema
  (label,
  bag_to_set);
```

Clause 6.3.1, p. 80

The possibility to control the presentation style by a layer is a fundamental concept of ISO 10303-46. However the EXPRESS specification for the type **style_context_select** did not include the necessary entities. Remove the EXPRESS specification and replace with the following:

EXPRESS specification:

```
*)
TYPE style_context_select = SELECT
  (group,
   presentation_layer_assignment,
   representation,
   representation_item,
   presentation_set);
END_TYPE;
( *
```

Clause 6.3.43, p. 96

*The restriction of invisibility to **presentation_representation** does not satisfy the requirement to define a complete model as invisible. Include the entity representation instead of **presentation_representation** in the SELECT type **invisible_item**. Remove the EXPRESS specification and replace with the following:*

EXPRESS specification:

```
*)
TYPE invisible_item = SELECT
  (styled_item,
   presentation_layer_assignment,
   representation);
END_TYPE;
( *
```

Clause 6.6.12, p.106

*The EXPRESS specification for **draughting_pre_defined_curve_font** defined below are required for reference from other parts of ISO 10303. Add the following as clause 6.6.12 after clause 6.6.11.*

6.6.12 draughting_pre_defined_curve_font

A **draughting_pre_defined_curve_font** is a **pre_defined_curve_font** that is identified by name.

EXPRESS specification:

```
*)
ENTITY draughting_pre_defined_curve_font
  SUBTYPE OF (pre_defined_curve_font);
WHERE
```

```

WR1: SELF.name IN
    ['continuous',
     'chain',
     'chain double dash',
     'dashed',
     'dotted'];
END_ENTITY;
( *

```

Formal propositions:

WR1: The name of the **draughting_pre_defined_curve_font** shall be 'continuous', 'chain', 'chain double dash', 'dashed', or 'dotted'.

Attribute value definitions:

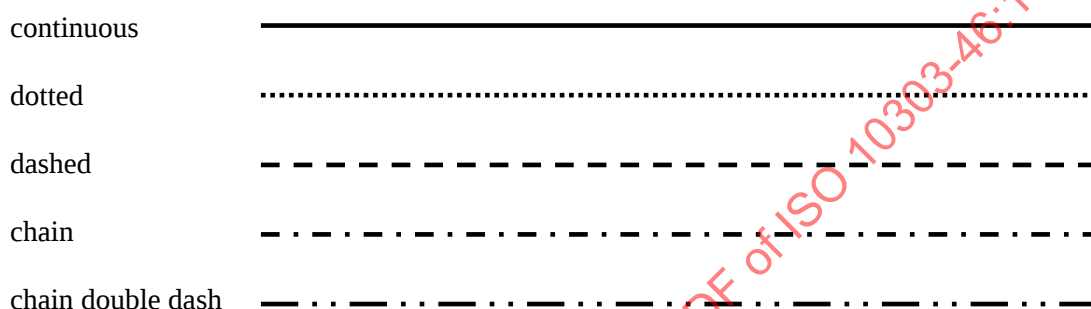
Table 2 states the lengths of each line segment and space, in millimetres, corresponding to each of the predefined curve fonts that are specified in this part of ISO 10303. If the **pre_defined_curve_font** is used as part of the definition of a **curve_style_font_and_scaling**, then the given lengths are those when the **curve_font_scaling** attribute has the value 1.0.

NOTE 1 - The **curve_style_font_and_scaling** entity is defined in the **presentation_appearance_schema** in ISO 10303-46.

NOTE 2 - Illustrations of curve fonts are given in Figure 1.

Table 2 – Line segment and space lengths for predefined curve fonts

Curve pattern name	Segment (mm)	Space (mm)	Segment (mm)	Space (mm)	Segment (mm)	Space (mm)	Number of segments
continuous							0
dashed	4.0	1.5					2
Chain	7.0	1.0	1.0	1.0			4
Chain double dash	7.0	1.0	1.0	1.0	1.0	1.0	6
dotted	1.0	1.0					2

**Figure 1 – Illustration of predefined curve fonts****Clause 6.9.10, p.124**

The EXPRESS specification for **text_style_with_mirror** does not specify in the definition or in the EXPRESS specification that the **axis_2_placement** has to be founded in the appropriate context. Add the following paragraph after Attribute definitions: and before clause 6.9.11.

Informal propositions:

IP1: **Text_style_with_mirror.mirror_placement** shall have the **axis2_placement** founded in the same context as the text that is being mirrored.

Clause 6.13.1, p. 130

The EXPRESS specification for the FUNCTION **acyclic_occlusion_precedence** contained logical errors in the function body. The assignment to variable 'x' requires a 'SET' and not a 'BAG'. Remove the EXPRESS specification and replace with the following:

EXPRESS specification:

*)

```
FUNCTION acyclic_occlusion_precedence
( relation : occlusion_precedence;
  set_of_lower : SET OF hiding_or_blanking_select ) : BOOLEAN;
LOCAL
```

```

    x : SET OF occlusion_precedence;
    local_set_of_lower : SET OF hiding_or_blanking_select;
END_LOCAL;
REPEAT i:=1 TO HIINDEX(set_of_lower);
    IF relation.higher_precedence == set_of_lower[i] THEN
        RETURN(FALSE);
    END_IF;
END_REPEAT;
x := bag_to_set (USEDIN ( relation.higher_precedence,
    'PRESENTATION_APPEARANCE_SCHEMA.'+
    'OCCLUSION_PRECEDENCE.LOWER_PRECEDENCE'));
local_set_of_lower := set_of_lower + relation.higher_precedence;
IF SIZEOF (x) > 0 THEN
    REPEAT i:=1 TO HIINDEX (x);
        If NOT acyclic_occlusion_precedence(x[i] ,
                                            local_set_of_lower) THEN

            RETURN (FALSE);
        END_IF;
    END_REPEAT;
END_IF;
RETURN (TRUE);
END_FUNCTION;
( *
```

Clause 7.2.3, p.133

The EXPRESS specification of `font_select` is missing the select item `text_font`. Remove the EXPRESS specification and replace with the following:

EXPRESS specification:

```

*)
TYPE font_select = SELECT (
    pre_defined_text_font,
    externally_defined_text_font,
    text_font);
END_TYPE;
( *
```

Clause 7.3.1, p.133

The EXPRESS specification of `character_glyph_symbol` is revised to make it a subtype of the new generic `character_glyph_symbol`, which is used by the revised `character_glyph_font_usage`. Remove the EXPRESS specification and replace with the following:

EXPRESS specification:

```

*)
ENTITY character_glyph_symbol
    SUBTYPE OF (generic_character_glyph_symbol);
    character_box : planar_extent;
    baseline_ratio : ratio_measure;
    character_font : font_select;
DERIVE
    box_height : positive_length_measure := character_box.size_in_y;
WHERE
    WR1: {0.0 <= baseline_ratio <= 1.0};
    WR2: item_in_context(SELF.character_box,
        SELF\representation.context_of_items);
END_ENTITY;
( *

```

Clause 7.3.4, p.136

The EXPRESS specification of **character_glyph_font_usage** is changed for the new **generic_character_glyph_symbol** to support other kinds of representations for glyph symbols. Remove the description and EXPRESS specification and replace with the following:

A **character_glyph_font_usage** is the participation of a **generic_character_glyph_symbol** in a **text_font**.

EXPRESS specification:

```

*)
ENTITY character_glyph_font_usage;
    character : generic_character_glyph_symbol;
    font      : text_font;
END_ENTITY;
( *

```

Attribute definitions:

character: the **generic_character_glyph_symbol** that is part of the font.

font: the **text_font** to which the **generic_character_glyph_symbol** is assigned.

Clause 7.3.13, p.139

The EXPRESS specification of **colour_associated** contained logical errors in the attribute declaration. Attribute 'name' requires a type 'label' and not 'colour'. Remove the EXPRESS specification and replace with the following:

EXPRESS specification: