



**INTERNATIONAL STANDARD ISO 10303-109:2004**  
**TECHNICAL CORRIGENDUM 2**

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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

Part 109:

**Integrated generic resource:  
Kinematic and geometric constraints for assembly  
models**

TECHNICAL CORRIGENDUM 2

*Systèmes d'automatisation industrielle et intégration – Représentation et échange de données de produits -  
Partie 109: Ressources génériques intégrées: Contraintes cinématiques et géométriques pour les modèles d'assemblage* **RECTIFICATIF TECHNIQUE 2**

Technical Corrigendum 2 to International Standard ISO 10303-109:2004 was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 4, *Industrial data*.

*The purpose of the modification is to the text of ISO 10303-109:2004 is to correct editorial issues.*

**ICS 25.040.40**

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## ISO 10303-109:2004/Cor.1:2010(E) (Only Reference)

### *Modifications to the text of ISO 10303-109:2004*

#### **Page 2, Clause 2, Normative references**

*Add the following to the list of normative references:*

ISO 10303-59, *Industrial automation systems and integration — Product data representation and exchange — Part 59: Integrated generic resource — Quality of product shape data*

#### **Page 5, 4.1**

*Remove the existing EXPRESS specification and NOTE 1 and replace them with the following new EXPRESS specification and NOTE 1:*

EXPRESS specification:

\*)

```
SCHEMA assembly_feature_relationship_schema;
```

```
REFERENCE FROM assembly_constraint_schema; -- 10303-109
REFERENCE FROM geometry_schema; -- 10303-42
REFERENCE FROM kinematic_motion_representation_schema; -- 10303-105
REFERENCE FROM kinematic_structure_schema; -- 10303-105
REFERENCE FROM product_definition_schema; -- 10303-41
REFERENCE FROM product_property_definition_schema; -- 10303-41
REFERENCE FROM product_property_representation_schema; -- 10303-41
REFERENCE FROM product_structure_schema; -- 10303-44
REFERENCE FROM representation_schema; -- 10303-43
REFERENCE FROM support_resource_schema; -- 10303-41
REFERENCE FROM shape_data_quality_inspection_result_schema
    (using_product_definition_of_shape_representation); -- 10303-59
```

(\*

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

```
assembly_constraint_schema ISO 10303-109 geometry_schema
ISO 10303-42 kinematic_motion_representation_schema ISO
10303-105 kinematic_structure_schema ISO 10303-105
product_definition_schema ISO 10303-41
product_property_definition_schema ISO 10303-41
product_property_representation_schema ISO 10303-41
product_structure_schema ISO 10303-44 representation_schema
ISO 10303-43 support_resource_schema ISO 10303-41
shape_data_quality_inspection_result_schema ISO 10303-59
```

#### **Pages 22 to 24, 4.5.10, 4.5.11 and 4.5.12**

*Delete the whole of subclause 4.5.10 and renumber subclauses 4.5.11 and 4.5.12 as 4.5.10 and 4.5.11.*

#### **Page 46, Index**

*Remove the line “Using product definition of shape representation”.*

# Modifications to the text of ISO 10303-109:2004

## Page iii, Contents

Removal of the line regarding Using product definition of shape representation

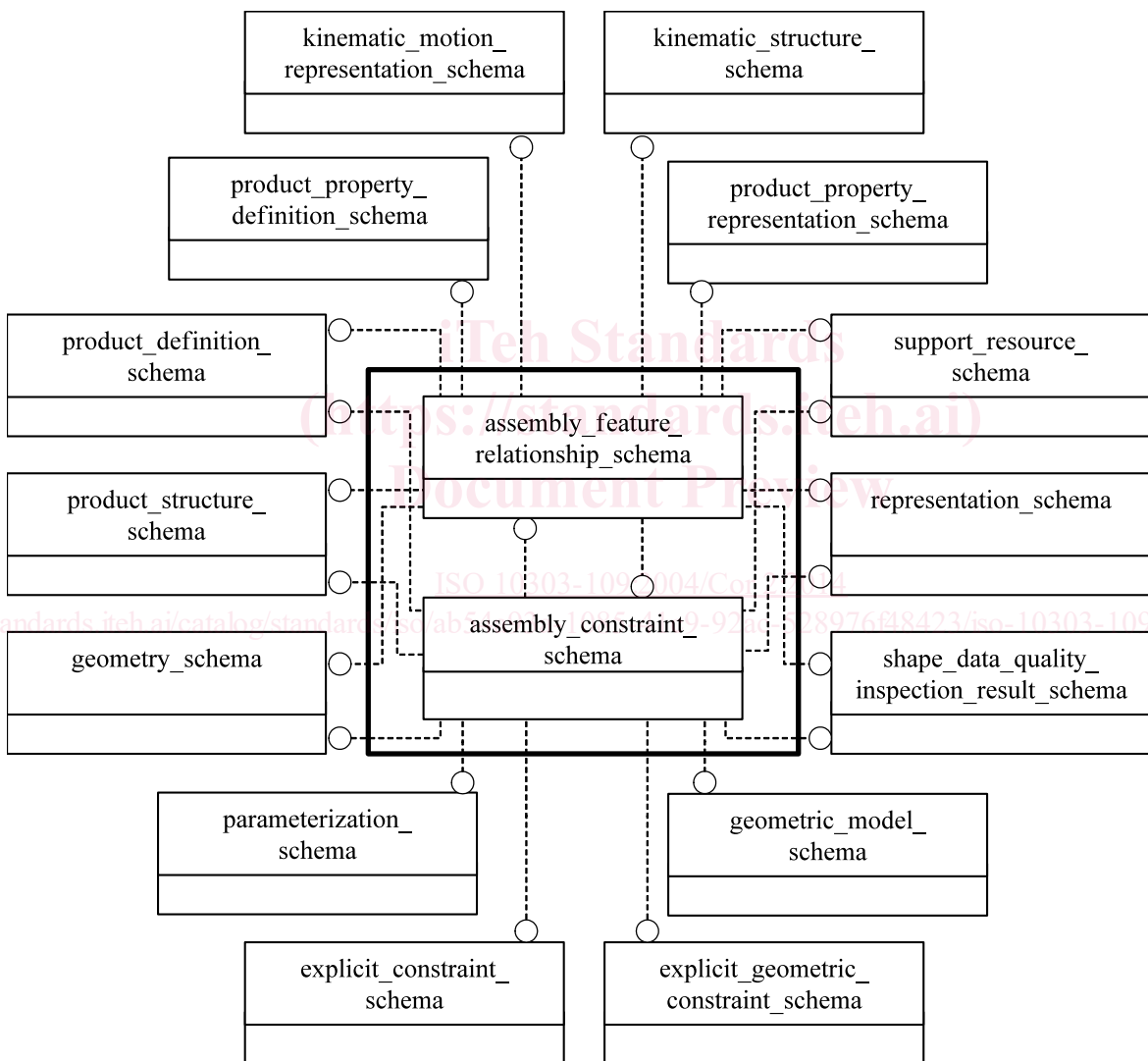
## Page vii, Introduction

Addition of the following two lines at the end of the page

shape_data_quality_inspection_result_schema	ISO 10303-59
support_resource_schema	ISO 10303-41

## Page viii, Figure 1

Remove Figure 1 and replace it with the following new Figure



## Page 5, 4.1

Remove the existing EXPRESS specification and Note 1, and replace them with the following new EXPRESS

EXPRESS specification:

\*)  
 SCHEMA assembly\_feature\_relationship\_schema;  
 REFERENCE FROM assembly\_constraint\_schema; --10303-109  
 REFERENCE FROM geometry\_schema; -- 10303-41  
 REFERENCE FROM kinematic\_motion\_representation\_schema; -- 10303-105  
 REFERENCE FROM kinematic\_structure\_schema; -- 10303-105  
 REFERENCE FROM product\_definition\_schema; -- 10303-41  
 REFERENCE FROM product\_property\_definition\_schema; -- 10303-41  
 REFERENCE FROM product\_property\_representation\_schema; -- 10303-41  
 REFERENCE FROM product\_structure\_schema; -- 10303-44  
 REFERENCE FROM representation\_schema; -- 10303-43  
 REFERENCE FROM shape\_data\_quality\_inspection\_result\_schema; -- ISO 10303-59  
 REFERENCE FROM support\_resource\_schema; -- 10303-41  
 (\*

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

assembly_constraint_schema	ISO 10303-109
geometry_schema	ISO 10303-42
kinematic_motion_representation_schema	ISO 10303-105
kinematic_structure_schema	ISO 10303-105
product_definition_schema	ISO 10303-41
product_property_definition_schema	ISO 10303-41
product_property_representation_schema	ISO 10303-41
product_structure_schema	ISO 10303-44
representation_schema	ISO 10303-43
shape_data_quality_inspection_result_schema	ISO 10303-59
support_resource_schema	ISO 10303-41

**Page 7, 4.4.1**

Remove the existing EXPRESS specification, and replace it with the following new EXPRESS

**EXPRESS specification:**

\*)  
 ENTITY shape\_aspect\_relationship\_representation\_association;  
 represented\_shape\_aspect\_relationship: shape\_aspect\_relationship;  
 representing\_representation\_relationship: representation\_relationship;  
 WHERE  
 WR1: ('ASSEMBLY\_FEATURE\_RELATIONSHIP\_SCHEMA.REPRESENTATIVE\_SHAPE\_REPRESENTATION'  
 IN TYPEOF(representing\_representation\_relationship%representation\_relationship.  
 rep\_1)) AND  
 ('ASSEMBLY\_FEATURE\_RELATIONSHIP\_SCHEMA.REPRESENTATIVE\_SHAPE\_REPRESENTATION'  
 IN  
 TYPEOF(representing\_representation\_relationship%representation\_relationship.  
 rep\_2));  
 WR2: (represented\_shape\_aspect\_relationship.relate\_shape\_aspect IN  
 using\_shape\_aspect\_of\_shape\_representation  
 (representing\_representation\_relationship.rep\_1)) AND  
 (represented\_shape\_aspect\_relationship.related\_shape\_aspect IN  
 using\_shape\_aspect\_of\_shape\_representation  
 (representing\_representation\_relationship.rep\_2));  
 WR3: ((find\_representative\_shape\_representation\_of\_product\_definition  
 (using\_product\_definition\_of\_shape\_aspect  
 (represented\_shape\_aspect\_relationship.relate\_shape\_aspect)).  
 context\_of\_items) :=:  
 (find\_representative\_shape\_representation\_of\_shape\_aspect  
 (represented\_shape\_aspect\_relationship.relate\_shape\_aspect).  
 context\_of\_items)) AND  
 ((find\_representative\_shape\_representation\_of\_product\_definition  
 (using\_product\_definition\_of\_shape\_aspect  
 (represented\_shape\_aspect\_relationship.related\_shape\_aspect)).

```

        context_of_items) :=:
        (find_representative_shape_representation_of_shape_aspect
        (represented_shape_aspect_relationship.related_shape_aspect).
        context_of_items));
WR4: using_product_definition_of_shape_aspect
    (represented_shape_aspect_relationship.relateing_shape_aspect) :<>:
    using_product_definition_of_shape_aspect
    (represented_shape_aspect_relationship.related_shape_aspect);
WR5: find_assembly_root ([using_product_definition_of_shape_aspect
    (represented_shape_aspect_relationship.relateing_shape_aspect)]) :=:
    find_assembly_root ([using_product_definition_of_shape_aspect
    (represented_shape_aspect_relationship.related_shape_aspect)]);
END_ENTITY; -- shape_aspect_relationship_representation_association
(*)

```

**Page 10, 4.4.3**

*Remove the existing EXPRESS specification, and replace it with the following new EXPRESS*

**EXPRESS specification:**

```

*)
ENTITY free_kinematic_motion_representation
    SUBTYPE OF (representation_relationship_with_transformation);
SELF%representation_relationship.rep_1:
    representative_shape_representation;
SELF%representation_relationship.rep_2:
    representative_shape_representation;
motion : kinematic_path;
WHERE
WR1: 'REPRESENTATION_SCHEMA.ITEM_DEFINED_TRANSFORMATION' IN TYPEOF
    (SELF%representation_relationship_with_transformation.
    transformation_operator);
WR2: ('GEOMETRY_SCHEMA.GEOMETRIC_REPRESENTATION_ITEM' IN TYPEOF
    (SELF%representation_relationship_with_transformation.
    transformation_operator%item_defined_transformation.transform_item_1)) AND
    ('GEOMETRY_SCHEMA.GEOMETRIC_REPRESENTATION_ITEM' IN TYPEOF
    (SELF%representation_relationship_with_transformation.
    transformation_operator%item_defined_transformation.
    transform_item_2));
WR3: ((dimension_of
    (SELF%representation_relationship_with_transformation.
    transformation_operator%item_defined_transformation.
    transform_item_1) = 3 ) AND
    (dimension_of
    (SELF%representation_relationship_with_transformation.
    transformation_operator%item_defined_transformation.
    transform_item_2) = 3 ));
WR4: (SELF%representation_relationship.rep_1 IN
    (using_representations
    (SELF%representation_relationship_with_transformation.
    transformation_operator%item_defined_transformation.transform_item_1) +
    using_representation_with_mapping
    (SELF%representation_relationship_with_transformation.
    transformation_operator%item_defined_transformation.transform_item_1)))
    AND
    (SELF%representation_relationship.rep_2 IN
    (using_representations
    (SELF%representation_relationship_with_transformation.
    transformation_operator%item_defined_transformation.transform_item_2) +
    using_representation_with_mapping
    (SELF%representation_relationship_with_transformation.
    transformation_operator%item_defined_transformation.transform_item_2)));
END_ENTITY; -- free_kinematic_motion_representation
(*)

```

Remove the existing EXPRESS specification, and replace it with the following new EXPRESS

EXPRESS specification:

```

*)
ENTITY constrained_kinematic_motion_representation
  SUBTYPE OF (representation_relationship_with_transformation);
SELF%representation_relationship.rep_1:
  representative_shape_representation;
SELF%representation_relationship.rep_2:
  representative_shape_representation;
WHERE
WR1: ('GEOMETRY_SCHEMA.AXIS2_PLACEMENT_3D' IN TYPEOF
      (SELF%representation_relationship_with_transformation.
       transformation_operator%item_defined_transformation.transform_item_1)) AND
      ('GEOMETRY_SCHEMA.AXIS2_PLACEMENT_3D' IN TYPEOF
      (SELF%representation_relationship_with_transformation.
       transformation_operator%item_defined_transformation.transform_item_2));
WR2: ((dimension_of
      (SELF%representation_relationship_with_transformation.
       transformation_operator%item_defined_transformation.
       transform_item_1) = 3 ) AND
      (dimension_of
      (SELF%representation_relationship_with_transformation.
       transformation_operator%item_defined_transformation.
       transform_item_2) = 3 ));
WR3: (SELF%representation_relationship.rep_1 IN
      (using_representations
      (SELF%representation_relationship_with_transformation.
       transformation_operator%item_defined_transformation.transform_item_1) +
      using_representation_with_mapping
      (SELF%representation_relationship_with_transformation.
       transformation_operator%item_defined_transformation.transform_item_1))) AND
      (SELF%representation_relationship.rep_2 IN
      (using_representations
      (SELF%representation_relationship_with_transformation.
       transformation_operator%item_defined_transformation.transform_item_2) +
      using_representation_with_mapping
      (SELF%representation_relationship_with_transformation.
       transformation_operator%item_defined_transformation.transform_item_2)));
WR4: ('KINEMATIC_STRUCTURE_SCHEMA.KINEMATIC_PAIR' IN TYPEOF
      (SELF%representation_relationship_with_transformation.
       transformation_operator);
END_ENTITY; -- constrained_kinematic_motion_representation
(*

```

Remove the existing EXPRESS specification, and replace it with the following new EXPRESS

EXPRESS specification:

```

*)
FUNCTION assembly_root
  (item: product_definition) : BOOLEAN;
-- extraction of related assembly_component_relationships --
IF (SIZEOF(QUERY(pdr <* USEDIN (item,
  'PRODUCT_DEFINITION_SCHEMA.PRODUCT_DEFINITION_RELATIONSHIP.' +
  'RELATED_PRODUCT_DEFINITION') |
  'PRODUCT_STRUCTURE_SCHEMA.ASSEMBLY_COMPONENT_USAGE' IN
  TYPEOF(pdr)))
  = 0) THEN RETURN(TRUE);
ELSE RETURN (FALSE);
END_IF;

```