



**INTERNATIONAL STANDARD ISO 10303-52:2011**  
**TECHNICAL CORRIGENDUM 1**

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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 52:

**Integrated generic resource:  
Mesh based topology**

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TECHNICAL CORRIGENDUM 1

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*Systèmes d'automatisation industrielle et intégration – Représentation et échange de données de produits - Partie 52 Ressources génériques intégrées: Topologie du réseau*  
*RECTIFICATIF TECHNIQUE 1*

Technical Corrigendum 1 to International Standard ISO 10303-52:2011 was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 4, *Industrial data*.

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*Included Bugzilla reports: Bug 3439, Bug 4617, 4813*

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## ***Introduction***

*This Technical Corrigendum applies to ISO 10303-52:2011.*

*The purpose of the modifications to the text of ISO 10303-52:2001 is to correct errors relating to incorrect inclusion of a polygon cell shape. Corrections are made to the text, a table, to correct the EXPRESS in 3 entity definitions and to one EXPRESS function, and to update the document identifiers in annex B.*

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**Modifications to the text of ISO 10303-52:2011****Page vi, tables**

Delete the entry for table 2 and replace with:

Table 2 Edges of triangle and quadrilateral cells . . . . . 27

**Page 14, 4.3.1 array\_based\_unstructured\_mesh**

Some attributes referenced in the EXPRESS are not properly defined, Remove the EXPRESS definition of this entity and replace with:

EXPRESS specification:

```
*)
ENTITY array_based_unstructured_mesh
  SUBTYPE OF (unstructured_mesh);
  cells : ARRAY [1 : SELF\unstructured_mesh.cell_count] OF vertex_defined_cell;
WHERE
  wr1: SELF\mesh.index_count = 1;
END_ENTITY;
(*
```

**Page 26, 4.3.1 explicit\_unstructured\_mesh**

An attribute referenced in the EXPRESS is not properly defined, Remove the EXPRESS definition of this entity and replace with:

EXPRESS specification:

```
*)
ENTITY explicit_unstructured_mesh
  SUBTYPE OF (unstructured_mesh);
  explicit_model : fea_model;
  cells : ARRAY [1 : SELF\unstructured_mesh.cell_count] OF UNIQUE element_represent
END_ENTITY;
(*
```

**Page 27, table 2**

This table contains information on polygon cells which are not included in ISO 10303-52. Remove table 2 completely and replace with:

**Page 34, 4.3.21 vertex\_defined\_cell** The description of the **vertices** attribute contains an inappropriate reference to polygon. Remove the current description and replace with:

**Table 2 – Edges of triangle and quadrilateral cells**

triangle		quadrilateral	
edge	vertices	edge	vertices
1	1, 2	1	1, 2
2	2, 3	2	2, 3
3	3, 1	3	3, 4
		4	4, 1

**vertices:** the vertices at the ends of cell edges, and within cell edges, cell faces and the interior of the cell. The position of a vertex or an edge node in the array depends on the shape of the cell as established graphically in Figures 10 through 39 in ISO 10303-104.

**Page 36, 4.4.2 cell\_counts** This function contains a case of polygon which does not exist. Further qualification has been added to other cases to avoid interaction with definitions in other schemas. Remove the EXPRESS definition of this function and replace with:

EXPRESS specification:

```

*)
FUNCTION cell_counts(arg : vertex_defined_cell) : ARRAY[1:3] OF INTEGER;
LOCAL
  om1      : INTEGER := 0;      -- (order - 1)
  om1sq    : INTEGER := om1**2; -- (order - 1) squared
  vts      : INTEGER;         -- number of bounding vertices
  eds      : INTEGER;         -- number of edges
  qf       : INTEGER := 0;     -- number of quadrilateral faces
  tf       : INTEGER := 0;     -- number of triangular faces
  result   : ARRAY [1:3] OF INTEGER := [0,0,0];
END_LOCAL;

CASE arg.order OF
  linear    : om1 := 0;
  quadratic : om1 := 1;
  cubic     : om1 := 2;
  OTHERWISE : RETURN(result);
END_CASE;

om1sq := om1**2;
CASE arg.shape OF
  cell_shape_0D.single :
    BEGIN
      vts := 1; eds := 0; qf := 0; tf := 0;
      result[1] := vts;
      result[2] := om1*eds;          -- 0, 0, 0
      result[3] := 0;              -- 0, 0, 0
    END;
  cell_shape_1D.line :
    BEGIN

```

```

    vts := 2; eds := 1; qf := 0; tf := 0;
    result[1] := vts;
    result[2] := om1*eds; -- 0, 1, 2
    result[3] := 0; -- 0, 0, 0
  END;
cell_shape_2D.quadrilateral :
  BEGIN
    vts := 4; eds := 4; qf := 1; tf := 0;
    result[1] := vts;
    result[2] := om1*eds; -- 0, 4, 8
    result[3] := om1sq*qf; -- 0, 1, 4
  END;
cell_shape_2D.triangle :
  BEGIN
    vts := 3; eds := 3; qf := 0; tf := 1;
    result[1] := vts;
    result[2] := om1*eds; -- 0, 3, 6
    result[3] := (om1-1)*tf; -- 0, 1
    CASE arg.order OF
      linear : result[3] := 0; -- 0
    END_CASE;
  END;
cell_shape_3D.hexahedron :
  BEGIN
    vts := 8; eds := 12; qf := 6; tf := 0;
    result[1] := vts;
    result[2] := om1*eds; -- 0, 12, 24
    result[3] := om1sq*(qf+om1); -- 0, 7, 32
  END;
cell_shape_3D.wedge :
  BEGIN
    vts := 6; eds := 9; qf := 3; tf := 2;
    result[1] := vts;
    result[2] := om1*eds; -- 0, 9, 18
    result[3] := om1sq*qf + om1*tf; -- 0, 3, 16
  END;
cell_shape_3D.tetrahedron :
  BEGIN
    vts := 4; eds := 6; qf := 0; tf := 4;
    result[1] := vts;
    result[2] := om1*eds; -- 0, 6, 12
    result[3] := (om1-1)*tf; -- 0, 4
    CASE arg.order OF
      linear : result[3] := 0; -- 0
    END_CASE;
  END;
cell_shape_3D.pyramid :
  BEGIN
    vts := 5; eds := 8; qf := 1; tf := 4;
    result[1] := vts;
    result[2] := om1*eds; -- 0, 8, 16
    result[3] := om1sq*qf + (om1-1)*tf; -- 1, 9
  END;

```

## ISO 10303-52:2011/Cor.1:2014(E)

```
        CASE arg.order OF
            linear : result[3] := 0;          -- 0
        END_CASE;
    END;
END_CASE;
RETURN(result);
END_FUNCTION;
(*
```

### **Page 42, 5.4.1 matched\_mesh\_connection**

*Some attributes referenced in the EXPRESS are not properly defined, Remove the EXPRESS definition of this entity and replace with:*

#### EXPRESS specification:

```
*)
ENTITY matched_mesh_connection
    SUBTYPE OF (mesh_connectivity);
    SELF\mesh_connectivity.current : structured_mesh;
    range : indices_range;
    donor : structured_mesh;
    donor_range : indices_range;
    transform : ARRAY [1 : SELF\mesh_connectivity.index_count] OF INTEGER;
WHERE
    wr1 : current :<>: donor;
    wr2: ( donor\mesh.index_count = SELF\mesh_connectivity.index_count);
    wr3: ( range\indices_range.nindices = SELF\mesh_connectivity.index_count);
    wr4: ( donor_range\indices_range.nindices = SELF\mesh_connectivity.index_count);
END_ENTITY;
(*
```

### **Page 58, Annex B**

*With the changes identified in this Technical Corrigendum the document identifiers and the schema information object identifiers have changed. Delete the contents of clause B.1 and replace with the following text:*

To provide for unambiguous identification of an information object in an open system, the object identifier

{ iso standard 10303 part(52) version(2) }

is assigned to this part of ISO 10303. The meaning of this value is defined in ISO/IEC 8824-1, and is described in ISO 10303-1. *Delete the contents of clause B.2 and replace with the following text:*

To provide for unambiguous identification of the mesh\_topology\_schema in an open information system, the object identifier