INTERNATIONAL STANDARD ISO 10303-216:2003

TECHNICAL CORRIGENDUM 1

Published 2008-02-15

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

Part 216:

Application protocol: Ship moulded forms

TECHNICAL CORRIGENDUM 1

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

Partie 216: Protocole d'application: Formes moulées de navires

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to ISO 10303-216:2003 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 4, *Industrial data.*

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Introduction

This Technical Corrigendum corrects ISO 10303-216:2003, Industrial automation systems and integration — Product data representation and exchange — Part 216: Application protocol: Ship moulded forms.

The purpose of the modifications to the text of ISO 10303-216:2003 is to correct errors in the Global Rule EXPRESS definitions likely to cause compilation problems, to correct errors in the Mapping Specification, to allow unique identification of geometric surfaces to improve interoperability between this standard and other standards within the suite of shipbuilding application protocols, and to replace the object identifier for the document and the applicable schema.

ICS 25.040.40   **Ref. No. ISO 10303-216:2003/Cor.1:2008(E)**

Published in Switzerland

Modifications to the text of ISO 10303-216:2003

Page 22, 4.1.14
The purpose for this change is to allow unique identification of geometric surfaces to improve interoperability between this standard and other standards within the suite of shipbuilding application protocols using the existing Global_id application object, add Surface_with_identifier application object to the ARM in the surface_representations UoF. Replace second paragraph with the following corrected text.

The following application objects are used by the surface_representations UoF:

— Non_manifold_surface_shape;

— Surface_shape_representation;

— Surface_with_identifier.

Page 150
The purpose for this change is to add Surface_with_identifier application object to the ARM. Insert the following new subclause after 4.2.109.1. Renumber succeeding subclauses accordingly. Add surface_with_identifier to Index.

4.2.110 Surface_with_identifier

A Surface_with_identifier is a geometric surface of any of the surface types allowed within a Non_manifold_surface_shape_representation, as specified by ISO 10303-508, additionally constrained to include a persistent, global identifier which uniquely identifies the surface.

NOTE   The capability for persistent, globally unique surface identification is provided to aid in the interoperability and reuse of data between this part of ISO 10303, ISO 10303-215, and ISO 10303-218. A receiving system that has stored a surface with persistent identifier from an exchange file conforming to this part of ISO 10303 may be able to identify that the surface is an identical copy of one that is received in a separate exchange file conforming to ISO 10303-215 or 10303-218.

The data associated with a Surface_with_identifier are the following:

— id.

4.2.110.1 id

The id specifies the globally unambiguous identifier for the surface. See 4.3.109 for the application assertion.

Page 178
The purpose for this change is to add an assertion between the Surface_with_identifier and Global_id application objects in the ARM. Insert the following new subclause after 4.3.108. Renumber succeeding subclauses accordingly.

4.3.109 Surface_with_identifier to Global_id

Each Surface_with_identifier has id defined by exactly one Global_id. Each Global_id defines the id for zero, one, or many Surface_with_identifier objects.

Page 191, 5.1.1.9
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

&T
document_reference_item = &T
document_reference_item <-
applied_document_reference.items[i]
applied_document_reference <=
document_reference
{/ROLE_ASSGN(document_reference)/
[object_role.name = &ID]}
document_reference
document_reference.assigned_document ->
(document)
(document <-
document_usage_constraint.source
document_usage_constraint)

Page 191, 5.1.1.10
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

[&LT.description = 'external instance reference target']
[&LT = external_identification_item
external_identification_item <-
applied_external_identification_assignment.items[i]
applied_external_identification_assignment <=
external_identification_assignment <=
/ID_ROLE('external instance reference')/
external_identification_assignment.source ->
external_source
[external_source.source_id->
source_item = identifier
{identifier = &SN}]
[{/DESCRIPTION_ASSGN_WITH_VAL(external_source,'schema name')/}]
[/EXT_SRC_REL('entity type')/
{identifier = &ET}]]

Page 192, 5.1.1.11
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

external_source <-
external_source_relationship.relating_source
external_source_relationship

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{external_source_relationship.name = 'composition'}
external_source_relationship.related_source
external_source
{/DESCRIPTION_ASSGN_WITH_VAL(external_source, &DESCR)/}
external_source
external_source.source_id ->
source_item
source_item = identifier

Page 193, 5.1.1.12
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

group_assignment.assigned_group
group_assignment =>
{/ROLE_ASSGN(group_assignment)/
[object_role.name = &ARM_ROLE]}
applied_group_assignment
applied_group_assignment.items[i] ->
group_item
group_item = &ENTITY

Page 193, 5.1.1.13
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/IDENTIFICATION(&T)/
[identification_role.name = &ROLE]}
identification_assignment
identification_assignment.assigned_id

Page 194, 5.1.1.14
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/IDENTIFICATION(&T)/
[(identification_role.name = &ROLE1)
(identification_role.name = &ROLE2)]}
identification_assignment
identification_assignment.assigned_id

Page 196, 5.1.1.18
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

```
group_item = &T <-
applied_group_assignment.items[i]
applied_group_assignment <=
group_assignment
{/ROLE_ASSGN(group_assignment)/
object_role.name = 'equivalence'}
group_assignment
group_assignment.assigned_group ->
group
group.name = 'item and item_structure'
```

Page 199, 5.1.1.23

The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

<u>Template body:</u>

```
property_definition_representation.definition
property_definition_representation
{[/NAME_ASSGN_WITH_VAL(property_definition_representation, '&NAME')/]}
property_definition_representation.used_representation
```

Page 202, 5.1.1.28

The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

<u>Template body:</u>

```
/PROD_DEF_PROP_DEF_HELP/
property_definition
```

Page 203, 5.1.1.30

The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

<u>Template body:</u>

```
/PROD_DEF_PROP_DEF_HELP/
/PROP_DEF_TO_DESC_REP_ITEM(&ID1, &ID2)/
```

Page 203, 5.1.1.31

The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

<u>Template body:</u>

```
/PROD_DEF_PROP_DEF_HELP/
/PROP_DEF_REP_HELP(&ID)/
```

Page 204, 5.1.1.32
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/PROD_DEF_PROP_DEF_HELP/
/PROP_DEF_TO_SPECIAL_VAL_REP_ITEM(&ID1, &ID2, &DER_UNIT_NAME)/

Page 204, 5.1.1.33
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/PROD_DEF_PROP_DEF_HELP/
/PROP_DEF_TO_UNITS(&ID)/

Page 205, 5.1.1.34
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/PROD_DEF_PROP_DEF_HELP/
/PROP_DEF_TO_VAL_REP_ITEM(&ID1, &ID2, &MEAS)/

Page 205, 5.1.1.35
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

property_definition
represented_definition = property_definition
represented_definition <
{[/PDR_NAME('&ID')/]}

Page 206, 5.1.1.36
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/PROP_DEF_REP_HELP(&ID1)/
/REP_ITEM(&ID2)/
descriptive_representation_item
descriptive_representation_item.description

Page 207, 5.1.1.38
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/PROP_DEF_REP_HELP(&ID1)/
/REP_TO_SPECIAL_VAL_REP_ITEM(&ID2, &DER_UNIT_NAME)/

Page 207, 5.1.1.39
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/PROP_DEF_REP_HELP(&ID)/
representation
representation.context_of_items ->
representation_context =>
global_unit_assigned_context
global_unit_assigned_context.units

Page 208, 5.1.1.40
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/PROP_DEF_REP_HELP(&ID1)/
/REP_ITEM(&ID2)/
value_representation_item
value_representation_item.value_component -> measure_value
{measure_value = &MEAS}

Page 208, 5.1.1.42
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

applied_action_assignment
applied_action_assignment.items[i] ->
(action_item = &T
{/CLASS_ID(&T, 'versionable object')/})

Page 209, 5.1.1.43
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/GROUPS(&T, &ROLE)/
{/CLASS_ID(&T,'versionable object')/}

Page 209, 5.1.1.44
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

<u>Template body:</u>

```
/GROUPS(&T, &ROLE)/
{/CLASS_ID(&T,'definable object')/}
```

Page 210, 5.1.1.45
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

<u>Template body:</u>

```
identification_assignment
{identification_assignment.role ->
identification_role
[identification_role.name = 'version identifier']} =>
applied_identification_assignment
applied_identification_assignment.items[i] ->
identification_item = &T
{/CLASS_ID(&T, 'versionable object')/}
```

Page 211, 5.1.1.47
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

<u>Template body:</u>

```
representation
{representation.context_of_items ->
representation_context =>
global_unit_assigned_context
global_unit_assigned_context.units[i] ->
unit =
derived_unit
[/NAME_ASSGN_WITH_VAL(derived_unit,'&DER_UNIT_NAME')/]}
representation.items [i] ->
representation_item =>
{representation_item.name = &ID}
value_representation_item
value_representation_item.value_component -> measure_value
{measure_value = context_dependent_measure}
```

Page 212, 5.1.1.48
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

<u>Template body:</u>

```
/REP_ITEM(&ID)/
```

value_representation_item
value_representation_item.value_component -> measure_value
{measure_value = &MEAS}

Page 214, 5.1.1.51
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

property_definition_representation.definition
property_definition_representation
{property_definition_representation=>
shape_definition_representation}
{/NAME_ASSGN_WITH_VAL(property_definition_representation, '&NAME')/}
property_definition_representation.used_representation

Page 215, 5.1.1.54
The purpose for this change is to add surrounding slashes to Mapping Templates referenced from within other Mapping Templates. Replace Template body with the following corrected text.

Template body:

/IDENTIFICATION(&T)/
[identification_role.name = 'version identifier']]
identification_assignment
identification_assignment.assigned_id

Page 365, 5.1.13.2
Density, force, and pressure measures are not used in ISO 10303-216. The purpose for this change is to delete portions of Derived_unit Mapping Path for density unit, force unit, and pressure unit. Replace 5.1.13.2 with the following text.

5.1.13.2 DERIVED_UNIT

NOTE See L.7 for additional discussion on the use of measures and units in this part of ISO 10303

AIM element: derived_unit
Source: ISO 10303-41
Reference path: (derived_unit
                {/NAME_ASSGN_WITH_VAL(derived_unit, 'airflow volume unit')/}
                derived_unit.elements[i] ->
                [derived_unit_element
                {[derived_unit_element.unit ->
                ([length_unit][si_unit])
                ([length_unit][conversion_based_unit])
                ([length_unit][context_dependent_unit])]
                [derived_unit_element.exponent = 3]}]
                [derived_unit_element
                {[derived_unit_element.unit ->
                ([time_unit][si_unit])
                ([time_unit][conversion_based_unit])

([time_unit][context_dependent_unit])]
[derived_unit_element.exponent = -1]}])

(derived_unit
{/NAME_ASSGN_WITH_VAL(derived_unit, 'area unit')/}
derived_unit.elements[i] ->
derived_unit_element
derived_unit_element.unit ->
[([length_unit][si_unit])
([length_unit][conversion_based_unit])
([length_unit][context_dependent_unit])]
[derived_unit_element.exponent = 2]

(derived_unit
{/NAME_ASSGN_WITH_VAL(derived_unit, 'volume unit')/}
derived_unit.elements[i] ->
derived_unit_element
derived_unit_element.unit ->
[([length_unit][si_unit])
([length_unit][conversion_based_unit])
([length_unit][context_dependent_unit])]
[derived_unit_element.exponent = 3]

(derived_unit
{/NAME_ASSGN_WITH_VAL(derived_unit,
'coefficient of thermal expansion unit')/}
derived_unit.elements[i] ->
[derived_unit_element
{[derived_unit_element.unit ->
([length_unit][si_unit])
([length_unit][conversion_based_unit])
([length_unit][context_dependent_unit])]
[derived_unit_element.exponent = 1]}]
[derived_unit_element
{[derived_unit_element.unit ->
([length_unit][si_unit])
([length_unit][conversion_based_unit])
([length_unit][context_dependent_unit])]
[derived_unit_element.exponent = -1]}]
[derived_unit_element
{[derived_unit_element.unit ->
([thermodynamic_temperature_unit][si_unit])
([thermodynamic_temperature_unit][conversion_based_unit])
([thermodynamic_temperature_unit][context_dependent_unit])]
[derived_unit_element.exponent = -1]}])

(derived_unit
{/NAME_ASSGN_WITH_VAL(derived_unit, 'coefficient of vicosity unit')/}
derived_unit.elements[i] ->
[derived_unit_element
{[derived_unit_element.unit ->

([mass_unit][si_unit])
([mass_unit][conversion_based_unit])
([mass_unit][context_dependent_unit])]
[derived_unit_element.exponent = 1]}]
[derived_unit_element
{[derived_unit_element.unit ->
([length_unit][si_unit])
([length_unit][conversion_based_unit])
([length_unit][context_dependent_unit])]
[derived_unit_element.exponent = -1]}]
[derived_unit_element
{[derived_unit_element.unit ->
([time_unit][si_unit])
([time_unit][conversion_based_unit])
([time_unit][context_dependent_unit])]
[derived_unit_element.exponent = -1]}])

(derived_unit
{/NAME_ASSGN_WITH_VAL(derived_unit, 'specific heat capacity unit')/}
derived_unit.elements[i] ->
[derived_unit_element
{[derived_unit_element.unit ->
([length_unit][si_unit])
([length_unit][conversion_based_unit])
([length_unit][context_dependent_unit])]
[derived_unit_element.exponent = 2]}]
[derived_unit_element
{[derived_unit_element.unit ->
([time_unit][si_unit])
([time_unit][conversion_based_unit])
([time_unit][context_dependent_unit])]
[derived_unit_element.exponent = -2]}]
[derived_unit_element
{[derived_unit_element.unit ->
([thermodynamic_temperature_unit][si_unit])
([thermodynamic_temperature_unit][conversion_based_unit])
([thermodynamic_temperature_unit][context_dependent_unit])]
[derived_unit_element.exponent = -1]}])

(derived_unit
{/NAME_ASSGN_WITH_VAL(derived_unit, 'thermal conductivity unit')/}
derived_unit.elements[i] ->
[derived_unit_element
{[derived_unit_element.unit ->
([mass_unit][si_unit])
([mass_unit][conversion_based_unit])
([mass_unit][context_dependent_unit])]
[derived_unit_element.exponent = 1]}]
[derived_unit_element
{[derived_unit_element.unit ->
([length_unit][si_unit])

```
([length_unit][conversion_based_unit])
([length_unit][context_dependent_unit])]
[derived_unit_element.exponent = 1]}]
[derived_unit_element
{[derived_unit_element.unit ->
([time_unit][si_unit])
([time_unit][conversion_based_unit])
([time_unit][context_dependent_unit])]
[derived_unit_element.exponent = -3]}]
[derived_unit_element
{[derived_unit_element.unit ->
([thermodynamic_temperature_unit][si_unit])
([thermodynamic_temperature_unit][conversion_based_unit])
([thermodynamic_temperature_unit][context_dependent_unit])]
[derived_unit_element.exponent = -1]}])

(derived_unit
{/NAME_ASSGN_WITH_VAL(derived_unit, 'inertia moment unit')/}
derived_unit.elements[i] ->
derived_unit_element
{[derived_unit_element.unit ->
([length_unit][si_unit])
([length_unit][conversion_based_unit])
([length_unit][context_dependent_unit])]
[derived_unit_element.exponent = 4]})

(derived_unit
{/NAME_ASSGN_WITH_VAL(derived_unit, 'moment unit')/}
derived_unit.elements[i] ->
[derived_unit_element
{[derived_unit_element.unit ->
([mass_unit][si_unit])
([mass_unit][conversion_based_unit])
([mass_unit][context_dependent_unit])]
[derived_unit_element.exponent = 1]}]
[derived_unit_element
{[derived_unit_element.unit ->
([length_unit][si_unit])
([length_unit][conversion_based_unit])
([length_unit][context_dependent_unit])]
[derived_unit_element.exponent = 2]}]
[derived_unit_element
{[derived_unit_element.unit ->
([time_unit][si_unit])
([time_unit][conversion_based_unit])
([time_unit][context_dependent_unit])]
[derived_unit_element.exponent = -2]}])

(derived_unit
{/NAME_ASSGN_WITH_VAL(derived_unit, 'speed unit')/}
derived_unit.elements[i] ->
```

```
[derived_unit_element
{[derived_unit_element.unit ->
([length_unit][si_unit])
([length_unit][conversion_based_unit])
([length_unit][context_dependent_unit])]
[derived_unit_element.exponent = 1]}]
[derived_unit_element
{[derived_unit_element.unit ->
([time_unit][si_unit])
([time_unit][conversion_based_unit])
([time_unit][context_dependent_unit])]
[derived_unit_element.exponent = -1]}])
```

Page 391

The purpose for this change is to add the mapping specification for the Surface_with_identifier application object. Insert the following new subclause after 5.1.15.2.3.

5.1.15.3 SURFACE_WITH_IDENTIFIER

AIM element: surface
Source: ISO 10303-508
Reference path: /ROOT_CLASS(surface,'surface with identifier')/

5.1.15.3.1 surface_with_identifier to global_id (as id)

AIM element: PATH
Rules: 5.2.4.45, 5.2.4.149
Reference path: surface

                      identification_item = surface <-
                      applied_identification_assignment.items[i]
                      applied_identification_assignment

Page 396, 5.2

Context_dependent_measure is used in the Mapping specification but is not included in the AIM short form. The purpose for this change is to add context_dependent_measure to USE FROM measure_schema. Replace EXPRESS definition with the following text.

USE FROM measure_schema   -- ISO 10303-41
(amount_of_substance_measure,
amount_of_substance_unit,
area_measure,
celsius_temperature_measure,
conversion_based_unit,
context_dependent_measure,
context_dependent_unit,
count_measure,
derived_unit,
electric_current_measure,
electric_current_unit,
global_unit_assigned_context,
length_measure,

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length_measure_with_unit,
length_unit,
luminous_intensity_measure,
luminous_intensity_unit,
mass_measure,
mass_measure_with_unit,
mass_unit,
measure_with_unit,
named_unit,
plane_angle_measure,
plane_angle_measure_with_unit,
plane_angle_unit,
positive_length_measure,
positive_plane_angle_measure,
ratio_measure,
ratio_unit,
si_unit,
solid_angle_measure,
solid_angle_measure_with_unit,
solid_angle_unit,
thermodynamic_temperature_measure,
thermodynamic_temperature_unit,
time_measure,
time_unit,
volume_measure);

Page 400, 5.2.2.4

The purpose for this change is to modify the AIM EXPRESS to add the mapping of Surface_with_identifier application object and to correct global rule compilation errors. Add surface and representation_item to classification_item Select type. Replace subclause with the following text.

5.2.2.4 classification_item

A **classification_item** identifies an **action**, **action_request_solution**, **applied_action_request_-assignment**, **approval**, **axis2_placement_3d**, **compound_representation_item**, **external_source**, **document**, **document_reference**, **edge_curve**, **executed_action**, **group**, **identification_assignment_-relationship**, **measure_with_unit**, **product, product_definition**, **product_definition_relationship**, **product_definition_shape**, **product_related_product_category**, **property_definition**, **property_-definition_representation**, **representation**, **representation _item, representation_relationship**, **shape_representation**, **surface**, **vertex_point**, and **versioned_action_request** to which a classification may be assigned.

EXPRESS specification:

```
*)
TYPE classification_item = SELECT
    (action,
     action_request_solution,
     applied_action_request_assignment,
     approval,
     axis2_placement_3d,
     compound_representation_item,
     document,
```

```
        document_reference,
        edge_curve,
        executed_action,
        external_source,
        group,
        identification_assignment_relationship,
        measure_with_unit,
        product,
        product_definition,
        product_definition_relationship,
        product_definition_shape,
        product_related_product_category,
        property_definition,
        property_definition_representation,
        representation,
        representation_item,
        representation_relationship,
        shape_representation,
        surface,
        vertex_point,
        versioned_action_request);
END_TYPE;
(*
```

Page 403, 5.2.2.10

The purpose for this change is to modify the AIM EXPRESS to add mapping of Surface_with_identifier application object. Add Surface to identification_item Select type. Replace subclause with the following text.

5.2.2.10 identification_item

An **identification_item** identifies an **action, action_request_solution, executed_action, property_definition**, **product_definition_shape**, **group**, **product**, **product_definition**, **product_definition_relationship**, **product_related_product_category**, **compound_representation_item**, **versioned_action_request**, **surface** and **document** to which an identification may be assigned.

EXPRESS specification:

```
*)
TYPE identification_item = SELECT(
        action,
        action_request_solution,
        compound_representation_item,
        document,
        executed_action,
        group,
        product,
        product_definition,
        product_definition_relationship,
        product_definition_shape,
        product_related_product_category,
        property_definition,
        surface,
        versioned_action_request););
END_TYPE;
(*
```

Page 467, 5.2.4.42

The purpose for this change is to correct a compilation error in the global rule.   Replace EXPRESS definition with the following text.

EXPRESS specification:

```
*)
RULE external_instance_reference_has_same_identifier FOR (
            applied_external_identification_assignment);
LOCAL
  violation : LOGICAL := FALSE;
  extref_set : SET OF applied_external_identification_assignment := [];
  aia_set : SET OF applied_identification_assignment := [];
END_LOCAL;

  extref_set := QUERY ( i <* applied_external_identification_assignment |
      (i.role.name = 'external instance reference') );

REPEAT i := 1 TO HIINDEX(extref_set) BY 1 WHILE NOT violation;
  aia_set := bag_to_set(USEDIN(extref_set[i].items[1],
    'SHIP_MOULDED_FORM_SCHEMA.APPLIED_IDENTIFICATION_ASSIGNMENT.ITEMS'));
  violation := NOT (aia_set[1].assigned_id = extref_set[i].assigned_id);
END_REPEAT;

WHERE
wr1: NOT violation;
END_RULE; -- external_instance_reference_has_same_identifier
(*
```

Page 579, 5.2.4.144

The purpose for this change is to correct a compilation error in the global rule and make the rule consistent with others of the same type.   Replace subclause with the following text.

5.2.4.144 spacing_position_with_offset_compound_representation_has_class

The **spacing_position_with_offset_compound_representation_has_class** rule specifies the **item_-element** attribute of a **compound_representation_item** with the class id 'spacing position with offset' to have in the **list_representation_item** exactly one **compound_representation_item** with the class id 'spacing position'.

EXPRESS specification:

```
*)
RULE spacing_position_with_offset_compound_representation_has_class
     FOR (applied_classification_assignment);
   LOCAL
     r3_set      : SET OF representation_item := [];
     violation   : LOGICAL := FALSE;
     t1_set      : SET OF compound_representation_item := [];
     c_a_set     : SET OF applied_classification_assignment := [];
     c_a_set2    : SET OF applied_classification_assignment := [];
     l_rep_item : list_representation_item;
     t2_set      : SET OF compound_representation_item := [];
   END_LOCAL;
   c_a_set := QUERY ( i <* applied_classification_assignment | (i.
      assigned_class.name = 'spacing position with offset') );
   REPEAT i := 1 TO HIINDEX(c_a_set) BY 1;
     REPEAT j := 1 TO HIINDEX(c_a_set[i].items) BY 1;
       t1_set := t1_set + c_a_set[i].items[j];
     END_REPEAT;
   END_REPEAT;
```

```
    c_a_set2 := QUERY ( i <* applied_classification_assignment | (i.
       assigned_class.name = 'spacing position') );
    REPEAT i := 1 TO HIINDEX(c_a_set2) BY 1;
      REPEAT j := 1 TO HIINDEX(c_a_set2[i].items) BY 1;
        t2_set := t2_set + c_a_set2[i].items[j];
      END_REPEAT;
    END_REPEAT;
    REPEAT i := 1 TO HIINDEX(t1_set) BY 1 WHILE NOT violation;
      REPEAT j := 1 TO HIINDEX(t1_set[i].item_element) BY 1;
        l_rep_item := t1_set[i].item_element;
        t3_set := t3_set + l_rep_item[j];
      END_REPEAT;
      violation := SIZEOF(t3_set * t2_set) <> 1;
      t3_set := [];
    END_REPEAT;

  WHERE
    wr1: (NOT violation);
END_RULE;
(*
```

Argument definitions:

applied_classification_assignment: the set of all instances of **applied_classification_assignment** entities.

Formal propositions:

WR1: Every instance of **compound_representation_item** that has an **applied_classification_-assignment** whose attribute **assigned_class** is a **group** with attribute **name** equal 'spacing position with offset' shall have its attribute **item_element** instantiated as a **list_representation_item** which shall collect exactly one instance of **compound_representation_item** that has an **applied_-classification_assignment** whose attribute **assigned_class** equals 'spacing position'.

Page 585

The purpose for this change is to modify the AIM EXPRESS to add the mapping of the Surface_with_identifier to Global_id application assertion. Add Global rule to enforce the application assertion. Insert the following new subclause after 5.2.4.148. Renumber succeeding subclauses accordingly.

5.2.4.149 surface_with_identification_assignment

The **surface_with_identification_assignment** rule specifies a list of entities that require an identification. The identification is defined by the **applied_identification_assignment** attribute.

EXPRESS specification:

```
*)
RULE surface_with_identification_assignment
FOR (APPLIED_CLASSIFICATION_ASSIGNMENT);
  LOCAL
    c_a_set: SET OF APPLIED_CLASSIFICATION_ASSIGNMENT := [];
    t1_set:  SET OF surface := [];
    t2_set:  SET OF applied_identification_assignment := [];
    arg_list: LIST OF STRING := ['surface with identifier'];
    violation: LOGICAL := FALSE;
  END_LOCAL;
```

```
   (* get all classification_assignment instances  *)
     REPEAT j:=1 TO HIINDEX(arg_list) WHILE (NOT violation);
         c_a_set := QUERY(i <* APPLIED_CLASSIFICATION_ASSIGNMENT |
                     i.assigned_class.NAME =  arg_LIST[j]);
     END_REPEAT;

   (* get all instances of surface that have class id *)
    REPEAT i := 1 TO HIINDEX(c_a_set);
     REPEAT j := 1 TO HIINDEX(c_a_set[i].items);
        t1_set := t1_set + c_a_set[i].items[j];
     END_REPEAT;
   END_REPEAT;
     REPEAT i := 1 TO HIINDEX(t1_set) BY 1 WHILE NOT violation;
        t2_set := bag_to_set(USEDIN(t1_set[i],
'SHIP_MOULDED_FORM_SCHEMA.APPLIED_IDENTIFICATION_ASSIGNMENT.ITEMS'));
        t2_set := QUERY ( j <* t2_set |
            j.role.name = 'globally unambiguous identifier');
violation := NOT (SIZEOF(T2_SET) = 1);
     END_REPEAT;

   WHERE
     wr1: NOT violation;
END_RULE;

(*
```

Argument definitions:

applied_classification_assignment: the set of all instances of **applied_classification_assignment**.

Formal propositions:

WR1: Every instance of **surface** that is referenced by an **applied_classification_assignment** whose **assigned_class** has a **name** attribute of value 'surface with identifier' shall require an **applied_identification_assignment** to define the instance identifier.

Page 613, Annex A
The purpose for this change is to modify the AIM EXPRESS to add the mapping of the Surface_with_identifier application object and to correct global rule compilation errors. Add surface and representation_item to classification_item Select type. Replace EXPRESS definition with the following text.

```
TYPE classification_item = SELECT
    (action,
     action_request_solution,
     applied_action_request_assignment,
     approval,
     axis2_placement_3d,
     compound_representation_item,
     document,
     document_reference,
     edge_curve,
     executed_action,
     external_source,
     group,
     identification_assignment_relationship,
     measure_with_unit,
     product,
     product_definition,
     product_definition_relationship,
     product_definition_shape,
```

```
      product_related_product_category,
      property_definition,
      property_definition_representation,
      representation,
      representation_item,
      representation_relationship,
      shape_representation,
      surface,
      vertex_point,
      versioned_action_request);
END_TYPE;  -- classification_item
```

Page 614, Annex A
Context_dependent_measure is used in the Mapping specification but is not included in the AIM long form. The purpose for this change is to add context_dependent_measure to the AIM EXPRESS expanded listing. Insert the following EXPRESS definition before TYPE count_measure.

```
TYPE context_dependent_measure = REAL;
END_TYPE; -- context_dependent_measure
```

Page 616, Annex A
The purpose for this change is to modify the AIM EXPRESS expanded listing to add the mapping of the Surface_with_identifier application object. Add Surface to identification_item Select type. Replace EXPRESS definition with the following text.

```
TYPE identification_item = SELECT(
     action,
     action_request_solution,
     compound_representation_item,
     document,
     executed_action,
     group,
     product,
     product_definition,
     product_definition_relationship,
     product_definition_shape,
     product_related_product_category,
     property_definition,
     surface,
     versioned_action_request););
END_TYPE; -- identification_item
```

Page 617, Annex A
Context_dependent_measure is used in the Mapping specification but is not included in the AIM long form. The purpose for this change is to add context_dependent_measure to measure_value SELECT Type. Replace EXPRESS definition with the following text.

```
TYPE measure_value = SELECT
(length_measure,
 mass_measure,
 time_measure,
 electric_current_measure,
 thermodynamic_temperature_measure,
 celsius_temperature_measure,
 context_dependent_measure,
 amount_of_substance_measure,
 luminous_intensity_measure,
 plane_angle_measure,
 solid_angle_measure,
 area_measure,
```

```
    volume_measure,
    ratio_measure,
    parameter_value,
    positive_length_measure,
    positive_plane_angle_measure,
    count_measure);
END_TYPE; -- measure_value
```

Page 686, Annex A

The purpose for this change is to correct a compilation error in the global rule.   Replace EXPRESS definition with the following text.

```
RULE external_instance_reference_has_same_identifier FOR (
            applied_external_identification_assignment);
LOCAL
  violation : LOGICAL := FALSE;
  extref_set : SET OF applied_external_identification_assignment := [];
  aia_set : SET OF applied_identification_assignment := [];
END_LOCAL;

  extref_set := QUERY ( i <* applied_external_identification_assignment |
      (i.role.name = 'external instance reference') );

REPEAT i := 1 TO HIINDEX(extref_set) BY 1 WHILE NOT violation;
  aia_set := bag_to_set(USEDIN(extref_set[i].items[1],
    'SHIP_MOULDED_FORM_SCHEMA.APPLIED_IDENTIFICATION_ASSIGNMENT.ITEMS'));
  violation := NOT (aia_set[1].assigned_id = extref_set[i].assigned_id);
END_REPEAT;

WHERE
wr1: NOT violation;
END_RULE; -- external_instance_reference_has_same_identifier
```

Page 748, Annex A

The purpose for this change is to modify the AIM EXPRESS to add the mapping of the Surface_with_identifier to Global_id application assertion. Add Global rule to enforce the application assertion. Insert the following text before RULE unique_approvals_in_approval_history.

```
RULE surface_with_identification_assignment
FOR (APPLIED_CLASSIFICATION_ASSIGNMENT);
  LOCAL
    c_a_set: SET OF APPLIED_CLASSIFICATION_ASSIGNMENT := [];
    t1_set:  SET OF surface := [];
    t2_set:  SET OF applied_identification_assignment := [];
    arg_list: LIST OF STRING := ['surface with identifier'];
    violation: LOGICAL := FALSE;
  END_LOCAL;

  (* get all classification_assignment instances  *)
  REPEAT j:=1 TO HIINDEX(arg_list) WHILE (NOT violation);
      c_a_set := QUERY(i <* APPLIED_CLASSIFICATION_ASSIGNMENT |
                i.assigned_class.NAME =  arg_LIST[j]);
  END_REPEAT;

  (* get all instances of surface that have class id *)
  REPEAT i := 1 TO HIINDEX(c_a_set);
    REPEAT j := 1 TO HIINDEX(c_a_set[i].items);
      t1_set := t1_set + c_a_set[i].items[j];
    END_REPEAT;
  END_REPEAT;
```

```
    REPEAT i := 1 TO HIINDEX(t1_set) BY 1 WHILE NOT violation;
        t2_set := bag_to_set(USEDIN(t1_set[i],
'SHIP_MOULDED_FORM_SCHEMA.APPLIED_IDENTIFICATION_ASSIGNMENT.ITEMS'));
        t2_set := QUERY ( j <* t2_set |
            j.role.name = 'globally unambiguous identifier');
violation := NOT (SIZEOF(T2_SET) = 1);
    END_REPEAT;

  WHERE
    wr1: NOT violation;
END_RULE; -- surface_with_identification_assignment
```

Page 797, Annex C

The purpose for this change is to add Part 28 as an allowable Implementation method in addition to Part 21. Insert in the fourth line of the first paragraph, after "ISO 10303-21":

, ISO 10303-28, and

Page 797, Annex C

Edition 2 of ISO 10303-21 added the capability to identify the particular Application protocol Conformance Class to which an exchange file conforms. The purpose for this change is to add the specification of values for this part of ISO 10303 to utilize that capability. Insert the following text after the existing paragraph.

C.1 General requirements

For various reasons, some entities may not be completely exported into an exchange structure. There may be mandatory information in the AIM that has no correspondence in the ARM. Sometimes an application may not maintain all the information that is anticipated for the data exchange. Other times, the information may be maintained by a sending system but not included in the data exchange. Nevertheless, the preprocessor must provide values for all mandatory attributes in an exchange file.

When no data is provided by a sending system for a required string value, the preprocessor shall use '.UNUSED.' or the empty string ''.

To further indicate the reason why no data is provided, the following convention shall be used:

— An empty string '' indicates user data managed by the sending system but not provided for data exchange. As receiving system software may depend upon population of realistic data values for required attributes, use of empty strings is discouraged;

— A string with a value of '.UNUSED.' indicates user data in a mandatory attribute that is not managed by the sending system, is not known at the time of the data exchange, or is mandatory AIM information that has no correspondence in the ARM;

— $ is used in the physical file if an optional attribute is not instantiated.

C.2 Requirements specific to the implementation method defined in ISO 10303-21

If the implementation method is ISO 10303-21, the file format shall be encoded according to the syntax and EXPRESS language mapping defined in ISO 10303-21.

The FILE_SCHEMA element of the header shall specify the name of the EXPRESS schema used and include its object information identifier (see Annex E).

EXAMPLE   The instance below identifies the ship_moulded_form schema:

    FILE_SCHEMA ((('SHIP_MOULDED_FORM_SCHEMA { 1 0 10303 216 2 1 1} '))

C.3 Requirements specific to the implementation method defined in Edition 2 of ISO 10303-21

ISO 10303-21:2002 added the capability to specify the particular Conformance Class to which the Data section of an exchange file conforms. Exchange files conforming to the 2002 Edition of ISO 10303-21 shall contain one or more instances of the entity Section_context in the Header section of the file.

Example   SECTION_CONTEXT ($,('CC1'));

If a single Data section is included in the exchange file, a single instance of the entity Section_context shall be included, and the value of the attribute section_context.section shall be $. The set of values of the attribute section_context.context_identifiers shall contain a single value to identify the particular Application protocol Conformance Class to which the data conforms.

The attribute value shall be one of:

—   CC1;

—   CC2;

—   CC3;

—   CC4;

—   CC5.

Page 800, E.1
Replace the object identifier with the following text.

{iso standard 10303 part(216) version(2)}

Page 800, E.2
Replace the object identifier with the following:

{iso standard 10303 part(216) version(2) object(1) ship-moulded-form-schema(1)}

Page 852, Annex G
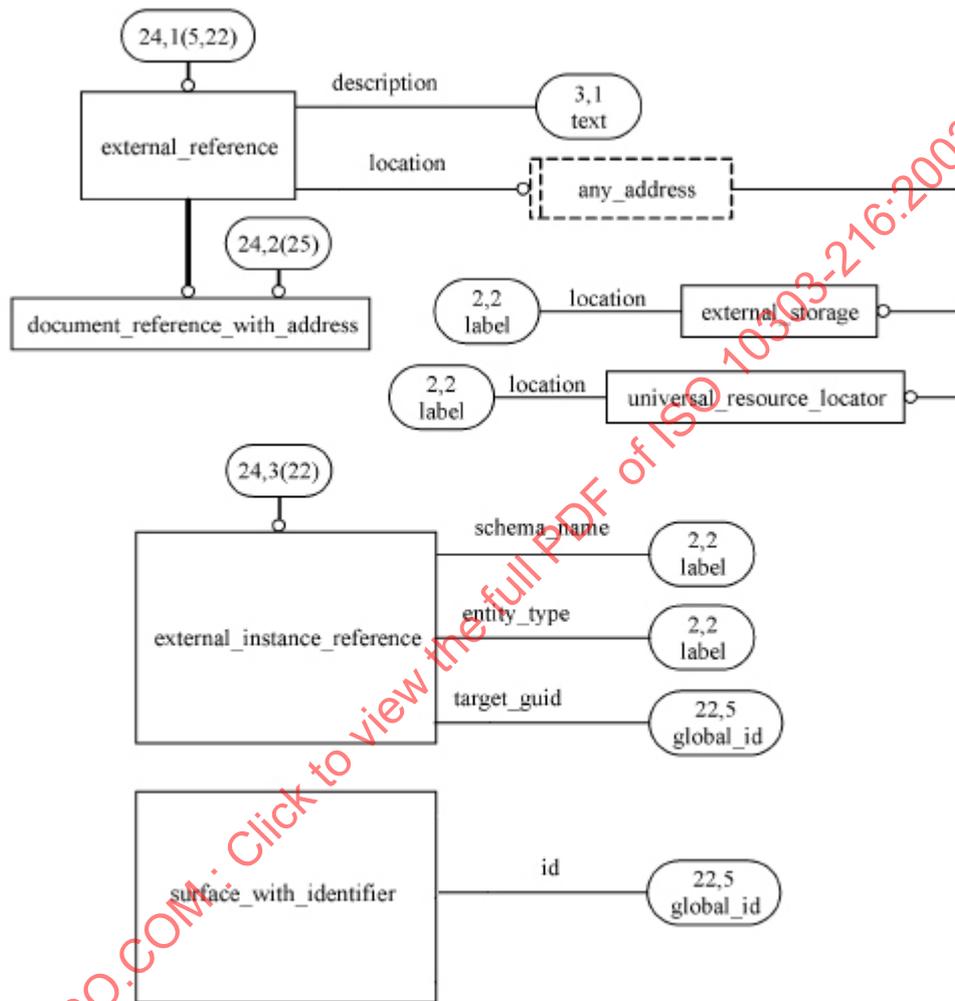*The purpose for this change is to modify the ARM EXPRESS-G to add the Surface_with_identifier application object. Replace Figure G.24 with the following figure.*

Figure G.24 — ARM EXPRESS-G diagram 24 of 25