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

Part 505:
**Application interpreted construct: Drawing
structure and administration**

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

*Partie 505: Construction interprétée d'application: Structure et
administration des dessins*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this part of ISO 10303 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 10303-505 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 4, *Industrial data*.

This International Standard is organized as a series of parts, each published separately. The parts of ISO 10303 fall into one of the following series: description methods, integrated resources, application protocols, abstract test suites, implementation methods, and conformance testing. The series are described in ISO 10303-1.

A complete list of parts of ISO 10303 is available from the internet:

<http://www.nist.gov/sc4/editing/step/titles/>

Annexes A and B form a normative part of this part of ISO 10303. Annexes C and D are for information only.

Introduction

ISO 10303 is an International Standard for the computer-interpretable representation and exchange of product data. The objective is to provide a neutral mechanism capable of describing product data throughout the life cycle of a product, independent from any particular system. The nature of this description makes it suitable not only for neutral file exchange, but also as a basis for implementing and sharing product databases and archiving.

This International Standard is organized as a series of parts, each published separately. The parts of ISO 10303 fall into one of the following series: description methods, integrated resources, application interpreted constructs, application protocols, abstract test suites, implementation methods, and conformance testing. The series are described in ISO 10303-1. This part of ISO 10303 is a member of the application interpreted constructs series.

An application interpreted construct (AIC) provides a logical grouping of interpreted constructs that supports a specific functionality for the usage of product data across multiple application contexts. An interpreted construct is a common interpretation of the integrated resources that supports shared information requirements among application protocols.

This document specifies the application interpreted construct for the description of the hierarchical organization of drawings, drawing sheets, and drawing views, together with the administrative information necessary to manage drawings and drawing sheets, and the information necessary to relate a product to a drawing.

.....

Industrial automation systems and integration — Product data representation and exchange — Part 505: Application interpreted construct: Drawing structure and administration

1 Scope

This part of ISO 10303 specifies the interpretation of the integrated resources to satisfy requirements for the definition of the hierarchical structure of drawings and the administration information to manage drawings and relate a product to the drawing.

The following are within the scope of this part of ISO 10303:

- the structures for representing a drawing that depicts any phase of design;
- the structures for representing individual drawing revisions;
- the hierarchical structure of drawings, drawing sheets, and views of the draughting shape model;
- the administrative data used for the purpose of drawing management;
- the administrative data identifying the product versions being documented by the drawing.

The following are outside the scope of this part of ISO 10303:

- the structures for representing drawings that are not related to a product;
- the exchange of drawing history;

NOTE - Drawing history refers to prior drawing revisions.

- the exchange of data used exclusively for the creation of paper or hard copy versions of the drawing;

EXAMPLE - Printer or plotter data can be pen designations, plot scale, or plot color specifications.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revision of, any of these publications do not apply. However, parties to agreements based on this part of ISO 10303 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of the ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 8824-1:1998, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation.*

ISO 10209-1:1992, *Technical product documentation — Vocabulary — Part 1: Terms relating to technical drawings: general and types of drawings.*

ISO 10303-1:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles.*

ISO 10303-11:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual.*

ISO 10303-41:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 41: Integrated generic resources: Fundamentals of product description and support.*

ISO 10303-42:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 42: Integrated generic resources: Geometric and topological representation.*

ISO 10303-43:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 43: Integrated generic resources: Representation structures.*

ISO 10303-46:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 46: Integrated generic resources: Visual presentation.*

ISO 10303-101:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 101: Integrated application resources: Draughting.*

ISO 10303-202:1996, *Industrial automation systems and integration — Product data representation and exchange — Part 202: Application protocol: Associative draughting.*

3 Terms, definitions and abbreviations

3.1 Terms defined in ISO 10209-1

For the purposes of this part of ISO 10303, the following terms defined in ISO 10209-1 apply:

- drawing.

3.2 Terms defined in ISO 10303-1

For the purposes of this part of ISO 10303, the following terms defined in ISO 10303-1 apply:

- application;
- application context;
- application protocol (AP);
- implementation method;
- integrated resource;
- interpretation;
- product;
- product data.

3.3 Terms defined in ISO 10303-46

For the purposes of this part of ISO 10303, the following terms defined in ISO 10303-46 apply:

- annotation;
- presentation.

3.4 Terms defined in ISO 10303-101

For the purposes of this part of ISO 10303, the following terms defined in ISO 10303-101 apply:

- draughting.

3.5 Terms defined in ISO 10303-202

For the purposes of this part of ISO 10303, the following terms defined in ISO 10303-202 apply:

— draughting shape model.

3.5.1

application interpreted construct

AIC

a logical grouping of interpreted constructs that supports a specific function for the usage of product data across multiple application contexts

[ISO 10303-202:1996]

3.6 Abbreviations

For the purposes of this part of ISO 10303, the following abbreviations apply.

AIC application interpreted construct

AP application protocol

4 EXPRESS short listing

This clause specifies the EXPRESS schema that uses elements from the integrated resources and contains the types, entity specializations, and functions that are specific to this part of ISO 10303.

NOTE 1 - There may be subtypes and items of select lists that appear in the integrated resources that are not imported into the AIC. Constructs are eliminated from the subtype tree or select list through the use of the implicit interface rules of ISO 10303-11. References to eliminated constructs are outside the scope of the AIC. In some cases, all items of the select list are eliminated. Because AICs are intended to be implemented in the context of an application protocol, the items of the select list will be defined by the scope of the application protocol.

EXPRESS Specification:

```

*)
SCHEMA aic_drawing_structure_and_administration;

USE FROM approval_schema -- ISO 10303-41
  (approval,
   approval_date_time,
   approval_person_organization);

USE FROM date_time_schema -- ISO 10303-41
  (calendar_date);

USE FROM drawing_definition_schema -- ISO 10303-101
  (draughting_title,
   drawing_revision,
   drawing_sheet_revision,
   drawing_sheet_revision_usage);

USE FROM geometry_schema -- ISO 10303-42
  (axis2_placement_2d);

USE FROM management_resources_schema -- ISO 10303-41
  (approval_assignment,
   contract_assignment,
   document_reference,
   organization_assignment,
   person_and_organization_assignment,
   person_assignment,
   security_classification_assignment);

USE FROM person_organization_schema -- ISO 10303-41
  (organizational_address,
   personal_address);

USE FROM presentation_definition_schema -- ISO 10303-46
  (annotation_occurrence);

USE FROM presentation_organization_schema -- ISO 10303-46
  (camera_image,
   presentation_size,
   presentation_view,
   presented_item,
   presented_item_representation);

```

```
USE FROM product_definition_schema -- ISO 10303-41
  (product,
   product_definition,
   product_definition_formation);
(*
```

NOTE 2 - The schemas referenced above can be found in the following parts of ISO 10303:

approval_schema	ISO 10303-41
date_time_schema	ISO 10303-41
drawing_definition_schema	ISO 10303-101
geometry_schema	ISO 10303-42
management_resources_schema	ISO 10303-41
person_organization_schema	ISO 10303-41
presentation_definition_schema	ISO 10303-46
presentation_organization_schema	ISO 10303-46
product_definition_schema	ISO 10303-41

4.1 Fundamental concepts and assumptions

The following entities are intended to be independently instantiated in the application protocol schema that use this AIC:

- calendar_date;
- product_definition.

4.2 aic_drawing_structure_and_administration type definitions

4.2.1 approved_item

An **approved_item** type specifies those objects to which an approval may be assigned.

EXPRESS specification:

```
*)
TYPE approved_item = SELECT
  (drawing_revision,
   drawing_sheet_revision);
END_TYPE;
(*
```

4.2.2 classified_item

A **classified_item** type specifies those objects to which a security classification may be assigned.

EXPRESS specification:

```
*)
TYPE classified_item = SELECT
  (drawing_revision,
   drawing_sheet_revision);
END_TYPE;
(*
```

4.2.3 contracted_item

A **contracted_item** type specifies those objects to which a contract may be assigned.

EXPRESS specification:

```
*)
TYPE contracted_item = SELECT
  (drawing_revision);
END_TYPE;
(*
```

4.2.4 draughting_organization_item

A **draughting_organization_item** type specifies the objects to which a person, an organization, or a person and an organization may be assigned.

EXPRESS specification:

```
*)
TYPE draughting_organization_item = SELECT
  (product_definition_formation,
   drawing_revision,
   drawing_sheet_revision);
END_TYPE;
(*
```

4.2.5 draughting_presented_item_select

A **draughting_presented_item_select** type specifies those objects that may be presented by a drawing.

EXPRESS specification:

```
*)
TYPE draughting_presented_item_select = SELECT
  (product_definition_formation);
END_TYPE;
(*
```

4.2.6 specified_item

A **specified_item** type specifies the objects to which a **draughting_specification_reference** (see 4.3.9) may be assigned.

EXPRESS specification:

```
*)
TYPE specified_item = SELECT
  (drawing_revision);
END_TYPE;
(*
```

4.3 aic_drawing_structure_and_administration entity definitions

4.3.1 draughting_approval_assignment

A **draughting_approval_assignment** is the assignment of an approval to a **drawing_revision** or **drawing_sheet_revision**.

EXPRESS specification:

```
*)
ENTITY draughting_approval_assignment
  SUBTYPE OF (approval_assignment);
  approved_items : SET [1:?] OF approved_item;
WHERE
  WR1: SIZEOF (QUERY (item <* approved_items |
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.DRAWING_REVISION'
    IN TYPEOF (item))) <= 1;
END_ENTITY;
(*
```

Attribute definitions:

approved_items: a set of **approved_items** which identify the **drawing_revision** or **drawing_sheet_revision** to which an **approval** is assigned.

Formal propositions:

WR1: The set of **approved_items** shall contain at most one **drawing_revision**.

4.3.2 draughting_contract_assignment

A **draughting_contract_assignment** is the assignment of a contract to a **drawing_revision**, for the purpose of identifying the **drawing_revision** as relevant to the given contract.

EXPRESS specification:

```
*)
ENTITY draughting_contract_assignment
  SUBTYPE OF (contract_assignment);
  items : SET [1:?] OF contracted_item;
END_ENTITY;
(*
```

Attribute definitions:

items: the **drawing_revisions** that are related to the given contract.

4.3.3 draughting_drawing_revision

A **draughting_drawing_revision** is a **drawing_revision** that specifies constraints within the context of draughting. An application protocol that uses this AIC shall ensure that the **drawing_revision** entity is instantiated as an **draughting_drawing_revision**.

EXPRESS specification:

```
*)
ENTITY draughting_drawing_revision
  SUBTYPE OF (drawing_revision);
WHERE
WR1:                                     -- drawing_requires_sheets:
  (SIZEOF (USEDIN (SELF,
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET')) >= 1)
AND   (SIZEOF (QUERY (ais <* USEDIN (SELF,
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT   ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.DRAWING_SHEET_REVISION'
    IN TYPEOF (ais.area))
  )) = 0);
WR2:                                     -- drawing_approval_has_date:
  SIZEOF (QUERY (app_ass <* USEDIN (SELF,
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
    'DRAUGHTING_APPROVAL_ASSIGNMENT.APPROVED_ITEMS') |
NOT   (SIZEOF (USEDIN (app_ass.assigned_approval,
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
    'APPROVAL_DATE_TIME.DATED_APPROVAL')) = 1)
  )) = 0;
```

```

WR3:                                     -- sheet_approval_has_date:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (QUERY (app_ass <* USEDIN (ais.area,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
  'DRAUGHTING_APPROVAL_ASSIGNMENT.APPROVED_ITEMS') |
  NOT (SIZEOF (USEDIN (app_ass.assigned_approval,
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
    'APPROVAL_DATE_TIME.DATED_APPROVAL')) = 1)
  )) = 0)
)) = 0;

WR4:   -- drawing_approval_has_authorization:
SIZEOF (QUERY (app_ass <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
  'DRAUGHTING_APPROVAL_ASSIGNMENT.APPROVED_ITEMS') |
  NOT (SIZEOF (USEDIN (app_ass.assigned_approval,
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
    'APPROVAL_PERSON_ORGANIZATION.AUTHORIZED_APPROVAL')) >= 1)
  )) = 0;

WR5:   -- sheet_approval_has_authorization:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
  NOT (SIZEOF (QUERY (app_ass <* USEDIN (ais.area,
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
    'DRAUGHTING_APPROVAL_ASSIGNMENT.APPROVED_ITEMS') |
    NOT (SIZEOF (USEDIN (app_ass.assigned_approval,
      'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
      'APPROVAL_PERSON_ORGANIZATION.AUTHORIZED_APPROVAL')) >= 1)
    )) = 0)
  )) = 0;

WR6:   -- drawing_title:
SIZEOF (USEDIN (SELF, 'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
  'DRAUGHTING_TITLE.ITEMS')) <= 1;

WR7:   -- sheet_title:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
  NOT (SIZEOF (USEDIN (ais.area,
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
    'DRAUGHTING_TITLE.ITEMS')) <= 1)
  )) = 0;

WR8:   -- allowable_items_of_sheet:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
  NOT (SIZEOF (QUERY (item <* ais.area.items |
    NOT (SIZEOF (TYPEOF(item) *
      ['AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.STYLED_ITEM',
      'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.MAPPED_ITEM',
      'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AXIS2_PLACEMENT',
      'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.PLANAR_BOX'])) = 1)
    )) = 0)
  )) = 0;

```



```

WR9:                                     -- sheet_contains_view_or_annotation:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (QUERY (item <* ais.area.items |
  (SIZEOF (TYPEOF(item) *
    ['AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.STYLED_ITEM',
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.MAPPED_ITEM']) = 1)
  )) > 0)
)) = 0;

WR10:                                     -- planar_box_in_sheet:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (QUERY (p_b <*
  QUERY (item <* ais.area.items |
    ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.PLANAR_BOX'
    IN TYPEOF(item))) |
  NOT (SIZEOF (USEDIN (p_b, 'AIC_DRAWING_STRUCTURE_AND_' +
    'ADMINISTRATION.PRESENTATION_SIZE.SIZE') ) = 1)
  )) = 0)
)) = 0;

WR11:                                     -- sheets_contain_views:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (QUERY (mi <* QUERY (item <* ais.area.items |
  ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.MAPPED_ITEM'
  IN TYPEOF(item))) |
  NOT ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.PRESENTATION_VIEW' IN
  TYPEOF(mi.mapping_source.mapped_representation))
  )) = 0)
)) = 0;

WR12:                                     sheets_contain_placements:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (QUERY (a2p <* QUERY (item <* ais.area.items |
  ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AXIS2_PLACEMENT'
  IN TYPEOF(item))) |
  NOT (SIZEOF (USEDIN (a2p,
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
    'MAPPED_ITEM.MAPPING_TARGET')) > 0)
  )) = 0)
)) = 0;

WR13:                                     -- sheets_have_unique_context:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (ais.area.context_of_items.
  representations_in_context) = 1) )) = 0;

WR14:                                     -- views_presented_once:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (QUERY (mi <* QUERY (item <* ais.area.items |
  ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.MAPPED_ITEM'
  IN TYPEOF(item))) |
  NOT (SIZEOF (USEDIN (mi.mapping_source.mapped_representation,
    'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
    'REPRESENTATION_MAP.MAPPED_REPRESENTATION')) = 1)
  )) = 0) )) = 0;

```

```

WR15:                                     -- allowable_items_of_view:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (QUERY (mi <* QUERY (item <* ais.area.items |
  ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.MAPPED_ITEM'
  IN TYPEOF(item))) |
NOT (SIZEOF (QUERY (pv_item <* mi.mapping_source.
  mapped_representation.items |
NOT (SIZEOF (TYPEOF(pv_item) *
  ['AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
  'STYLED_ITEM',
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.CAMERA_IMAGE',
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
  'AXIS2_PLACEMENT'])) = 1)
  )) = 0)
  )) = 0)
)) = 0;

WR16:                                     -- views_contain_one_projection:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (QUERY (mi <* QUERY (item <* ais.area.items |
  ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.MAPPED_ITEM'
  IN TYPEOF(item))) |
NOT (SIZEOF (QUERY (pv_item <* mi.mapping_source.
  mapped_representation.items |
  ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.CAMERA_IMAGE'
  IN TYPEOF(pv_item)) )) = 1)
  )) = 0)
)) = 0;

WR17:                                     -- views_contain_one_placement:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (QUERY (mi <* QUERY (item <* ais.area.items |
  ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.MAPPED_ITEM'
  IN TYPEOF(item))) |
NOT (SIZEOF (QUERY (a2p <* QUERY (pv_item <* mi.mapping_source.
  mapped_representation.items |
  ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AXIS2_PLACEMENT'
  IN TYPEOF(pv_item))) |
  ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
  'REPRESENTATION_MAP.MAPPING_SOURCE' IN ROLESOF (a2p))
  )) = 1)
  )) = 0)
)) = 0;

WR18:                                     -- views_have_unique_context:
SIZEOF (QUERY (ais <* USEDIN (SELF,
  'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.AREA_IN_SET.IN_SET') |
NOT (SIZEOF (QUERY (mi <* QUERY (item <* ais.area.items |
  ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.MAPPED_ITEM'
  IN TYPEOF(item))) |
NOT (SIZEOF (mi.mapping_source.
  mapped_representation.context_of_items.
  representations_in_context) = 1)
  )) = 0) )) = 0;

END_ENTITY;
(*)

```

Formal propositions:

WR1: The **draughting_drawing_revision** shall be related to at least one **presentation_area**, each of which is a **drawing_sheet_revision**.

WR2: Each **approval** related to the **draughting_drawing_revision** shall have exactly one date.

WR3: Each **approval** related to each sheet of the **draughting_drawing_revision** shall have exactly one date.

WR4: Each **approval** related to the **draughting_drawing_revision** shall be authorized by one or more organizations.

WR5: Each **approval** related to each sheet of the **draughting_drawing_revision** shall be authorized by one or more organizations.

WR6: The **draughting_drawing_revision** shall be one of the items of no more than one **draughting_title**.

WR7: Each sheet of the **draughting_drawing_revision** shall be one of the items of no more than one **draughting_title**.

WR8: The items of each sheet of the **draughting_drawing_revision** shall be a **styled_item**, a **mapped_item**, an **axis2_placement**, or a **planar_box**.

WR9: The items of each sheet of the **draughting_drawing_revision** shall include at least one **styled_item** or **mapped_item**.

WR10: Each sheet of the **draughting_drawing_revision** shall contain exactly one **planar_box** that is the **size** of a **presentation_size**.

WR11: If there is a **mapped_item** in a sheet of the **draughting_drawing_revision**, the source of the **mapped_item** shall be a **presentation_view**.

WR12: Every **axis2_placement** in a sheet of the **draughting_drawing_revision** shall be the **mapping_target** for some **mapped_item**.

WR13: The **representation_context** of a sheet of the **draughting_drawing_revision** shall not be the context of any other **representation**.

WR14: Each view in a sheet of the **draughting_drawing_revision** shall be the **mapped_representation** for exactly one **mapped_item**.

WR15: The items of each view of each sheet of the **draughting_drawing_revision** shall be a **styled_item**, a **camera_image**, or an **axis2_placement**.

WR16: Each view of each sheet of the **draughting_drawing_revision** shall contain exactly one **camera_image**.

WR17: Each view of each sheet of the **draughting_drawing_revision** shall contain exactly one **axis2_placement** which is the **mapping_origin** for a **mapped_item**.

WR18: The **representation_context** of each view of each sheet of the **draughting_drawing_revision** shall not be the context of any other **representation**.

4.3.4 draughting_organization_assignment

A **draughting_organization_assignment** relates an **organization** to a **product_definition_formation**, a **drawing_revision**, or a **drawing_sheet_revision**.

EXPRESS specification:

```
*)
ENTITY draughting_organization_assignment
  SUBTYPE OF (organization_assignment);
  assigned_items : SET [1:?] OF draughting_organization_item;
END_ENTITY;
(*
```

Attribute definitions:

assigned_items: a set of **draughting_organization_items** that identify the **product_definition_formation**, **drawing_revision**, or **drawing_sheet_revision** to which the **organization** is related.

4.3.5 draughting_person_and_organization_assignment

A **draughting_person_and_organization_assignment** relates a **person_and_organization** to a **product_definition_formation**, a **drawing_revision**, or a **drawing_sheet_revision**.

EXPRESS specification:

```
*)
ENTITY draughting_person_and_organization_assignment
  SUBTYPE OF (person_and_organization_assignment);
  assigned_items : SET [1:?] OF draughting_organization_item;
END_ENTITY;
(*
```

Attribute definitions:

assigned_items: a set of **draughting_organization_items** that identify the **product_definition_formation**, **drawing_revision**, or **drawing_sheet_revision** to which the **person_and_organization** is related.

4.3.6 draughting_person_assignment

A **draughting_person_assignment** relates a **person** to a **product_definition_formation**, a **drawing_revision**, or a **drawing_sheet_revision**.

EXPRESS specification:

```
*)
ENTITY draughting_person_assignment
  SUBTYPE OF (person_assignment);
  assigned_items : SET [1:?] OF draughting_organization_item;
END_ENTITY;
(*
```

Attribute definitions:

assigned_items: a set of **draughting_organization_items** that identify the **product_definition_formation**, **drawing_revision**, or **drawing_sheet_revision** to which the **person** is related.

4.3.7 draughting_presented_item

A **draughting_presented_item** defines the presentation by a drawing of a **product_definition_formation**.

EXPRESS specification:

```
*)
ENTITY draughting_presented_item
  SUBTYPE OF (presented_item);
  items      : SET [1:?] OF draughting_presented_item_select;
WHERE
  WR1:
    -- presented_item_presentation:
    SIZEOF (QUERY (pir <* USEDIN (SELF,
      'AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.' +
      'PRESENTED_ITEM_REPRESENTATION.ITEM') |
      NOT ('AIC_DRAWING_STRUCTURE_AND_ADMINISTRATION.DRAWING_REVISION'
        IN TYPEOF (pir.presentation)) )) = 0;
END_ENTITY;
(*
```

Attribute definitions:

items: a set of **draughting_presented_item_select** that identifies the particular **product_definition_formation**s that are presented.

Formal propositions:

WR1: Each **presented_item_representation** shall have as its presentation a **drawing_revision**.

4.3.8 draughting_security_classification_assignment

A **draughting_security_classification_assignment** is the assignment of a security classification to a drawing or a drawing sheet.

EXPRESS specification:

```
*)
ENTITY draughting_security_classification_assignment
  SUBTYPE OF (security_classification_assignment);
  assigned_items : SET [1:?] OF classified_item;
END_ENTITY;
(*
```

Attribute definitions:

assigned_items: the **drawing_revisions** and **drawing_sheet_revisions** to which a security classification is assigned.

4.3.9 draughting_specification_reference

A **draughting_specification_reference** is the designation of an external draughting specification for a drawing revision.

EXPRESS specification:

```
*)
ENTITY draughting_specification_reference
  SUBTYPE OF (document_reference);
  specified_items : SET [1:?] OF specified_item;
WHERE
  WR1: (SELF.assigned_document.kind.product_data_type =
        'draughting_specification');
END_ENTITY;
(*
```

Attribute definitions:

specification_items: the **drawing_revisions** to which a draughting specification is applied.

Formal propositions:

WR1: Each document assigned shall be a draughting specification.

```
*)
END_SCHEMA; -- aic_drawing_structure_and_administration
(*
```

Annex A
(normative)

Short names of entities

Table A.1 provides the short names of entities specified in this part of ISO 10303. Requirements on the use of the short names are found in the implementation methods included in ISO 10303.

Table A.1 - Short names of entities

Entity names	Short names
DRAUGHTING_APPROVAL_ASSIGNMENT	DRAPAS
DRAUGHTING_CONTRACT_ASSIGNMENT	DRCNAS
DRAUGHTING_DRAWING_REVISION	DRDRRV
DRAUGHTING_ORGANIZATION_ASSIGNMENT	DRORAS
DRAUGHTING_PERSON_AND_ORGANIZATION_ASSIGNMENT	DPAOA
DRAUGHTING_PERSON_ASSIGNMENT	DRPRAS
DRAUGHTING_PRESENTED_ITEM	DRPRIT
DRAUGHTING_SECURITY_CLASSIFICATION_ASSIGNMENT	DSCA
DRAUGHTING_SPECIFICATION_REFERENCE	DRSPRF

Annex B

(normative)

Information object registration

B.1 Document identification

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

{ iso standard 10303 part(505) version(1) }

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.

B.2 Schema identification

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

{ iso standard 10303 part(505) version(1) object(1) aic-drawing-structure-and-administration(1) }

is assigned to the `aic_drawing_structure_and_administration` schema (see clause 4). The meaning of this value is defined in ISO/IEC 8824-1, and is described in ISO 10303-1.

Annex C

(informative)

EXPRESS-G diagrams

Figure C.1 through C.14 correspond to the EXPRESS generated from the short listing given in clause 4 using the interface specifications of ISO 10303-11. The diagrams use the EXPRESS-G graphical notation for the EXPRESS language. EXPRESS-G is defined in annex D of ISO 10303-11.

NOTE - The following select types: `invisible_item`, `style_context_select`, `founded_item_select`, `layered_item`, `vector_or_direction`, `trimming_select`, `character_spacing_select`, `measure_value`, `draughting_organization_item`, `area_or_view`, `hiding_blank_or_select`, and `invisibility_context`, are interfaced into the AIC expanded listing according to the implicit interface rules of ISO 10303-11. These select types are not referenced by other entities of this part of ISO 10303.

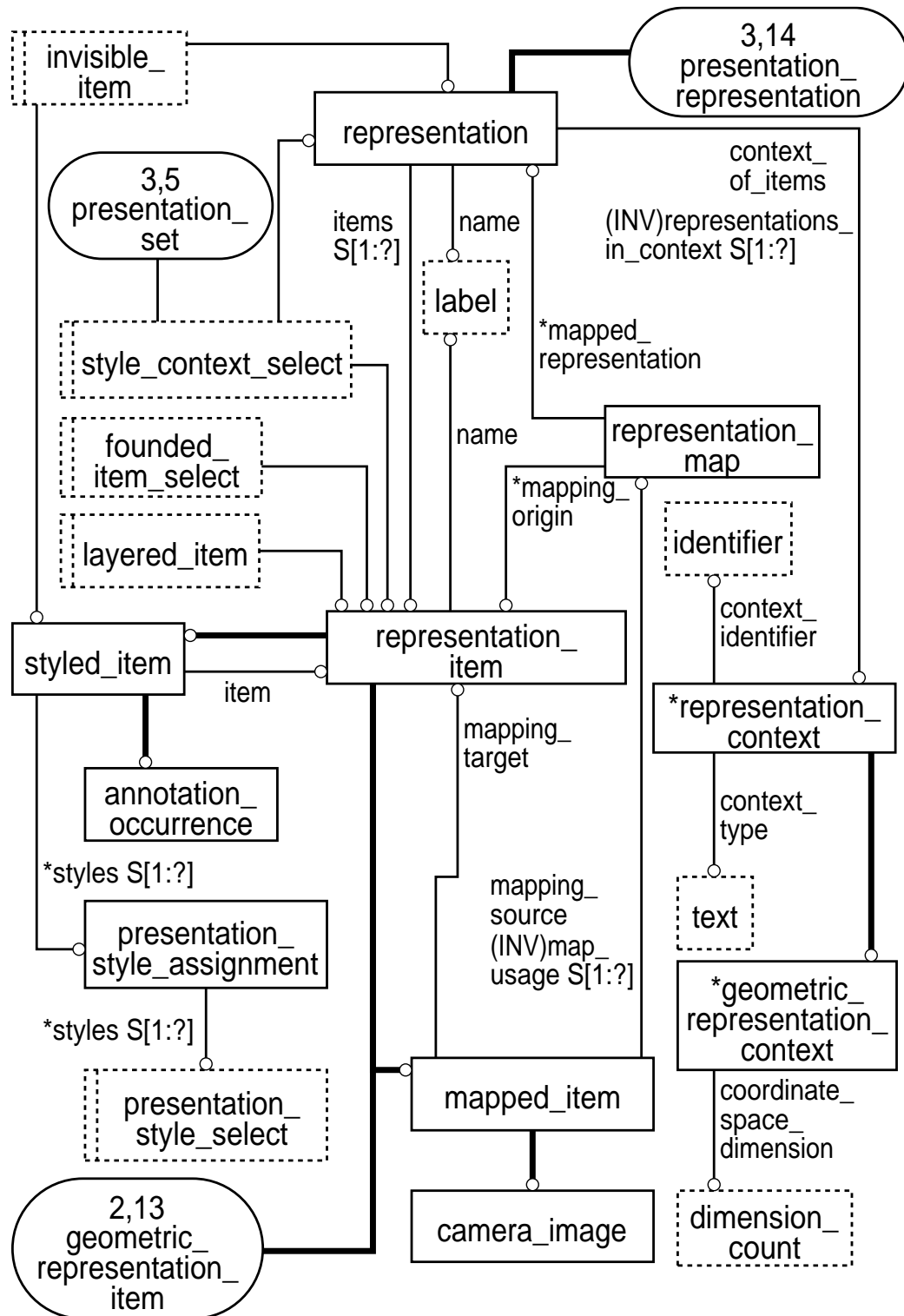


Figure C.1 – AIC expanded listing diagram in EXPRESS-G: 1 of 14

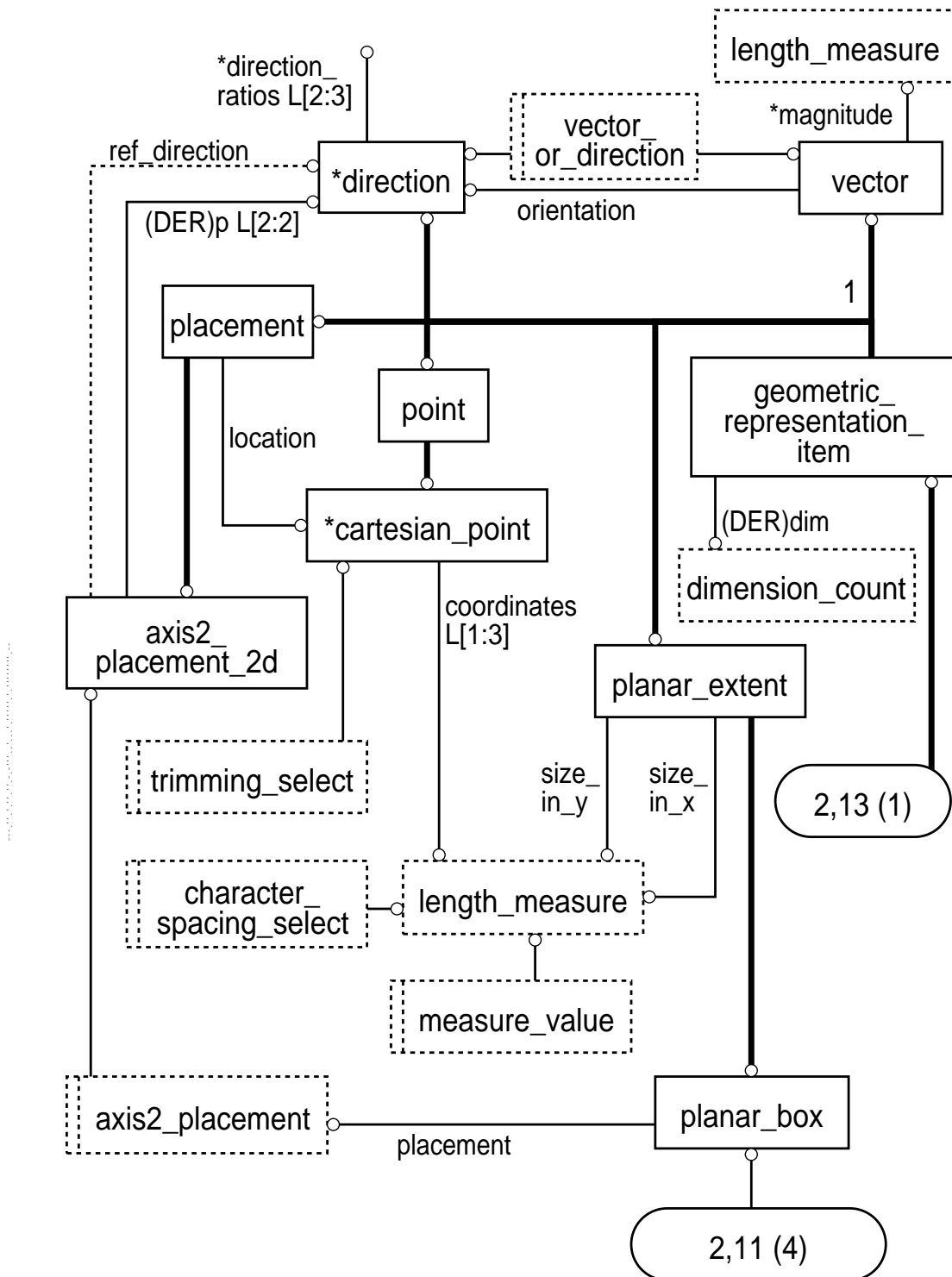


Figure C.2 – AIC expanded listing diagram in EXPRESS-G: 2 of 14

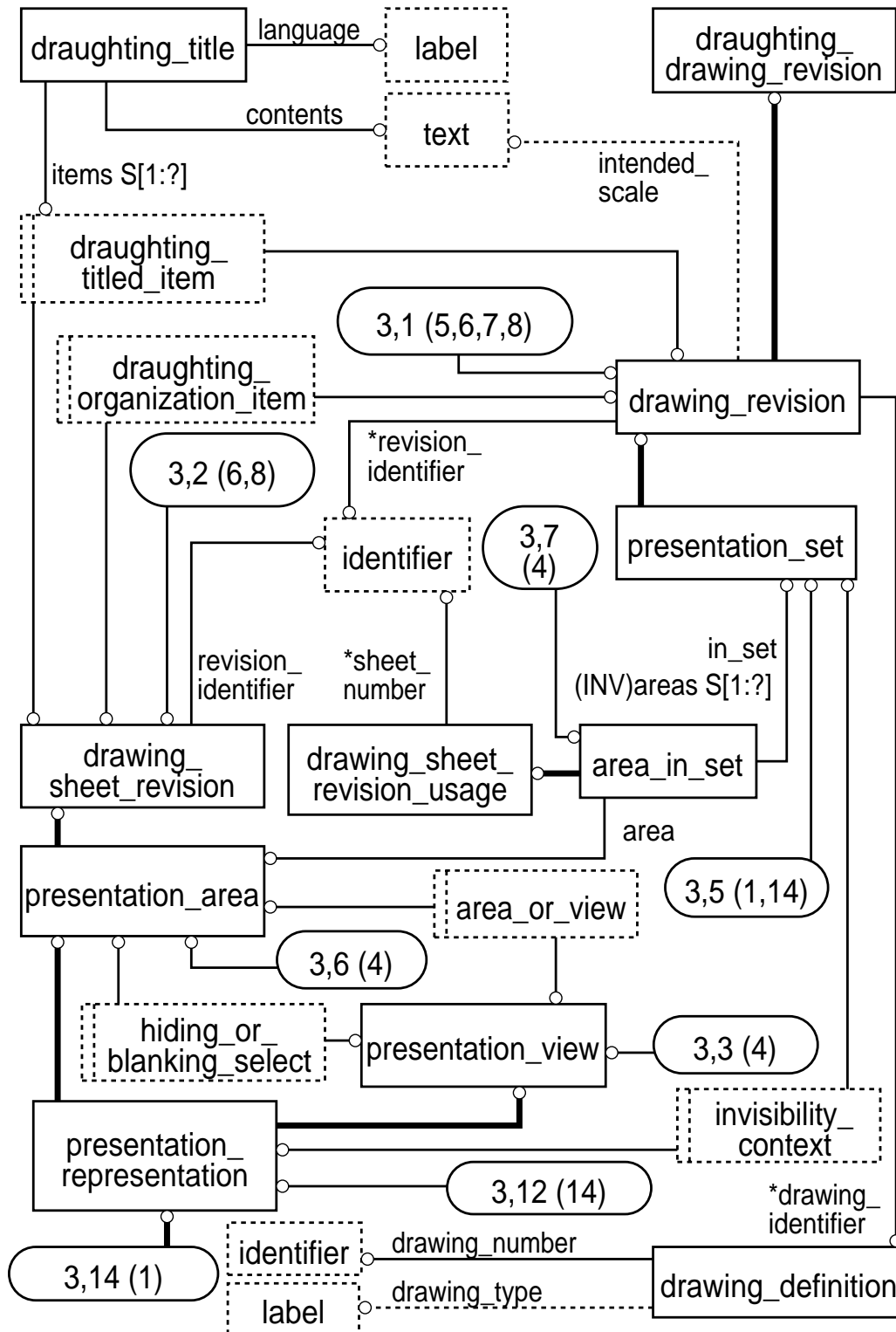


Figure C.3 – AIC expanded listing diagram in EXPRESS-G: 3 of 14

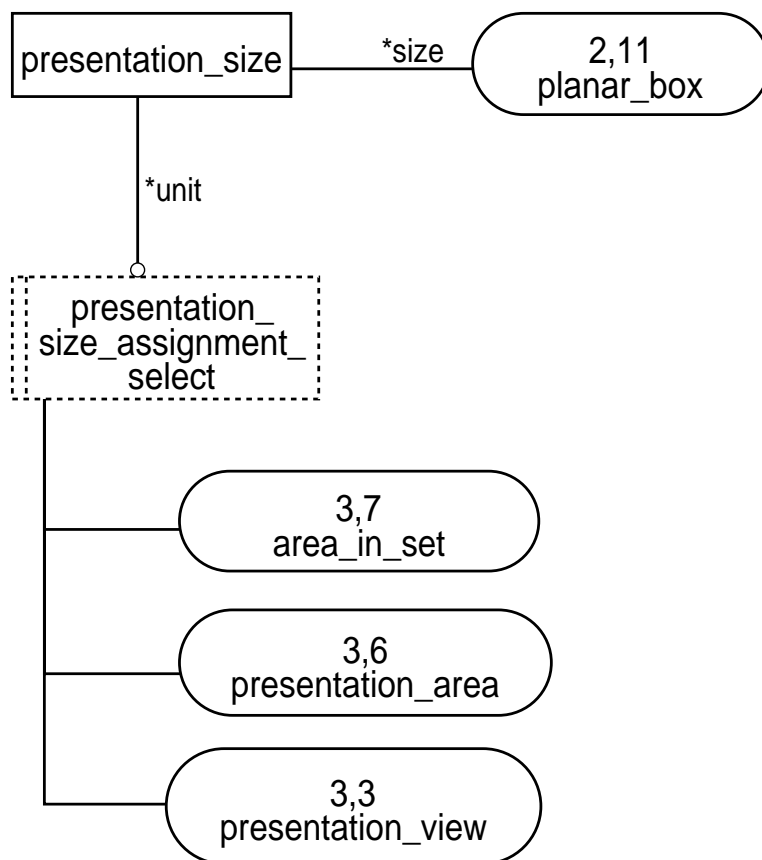


Figure C.4 – AIC expanded listing diagram in EXPRESS-G: 4 of 14

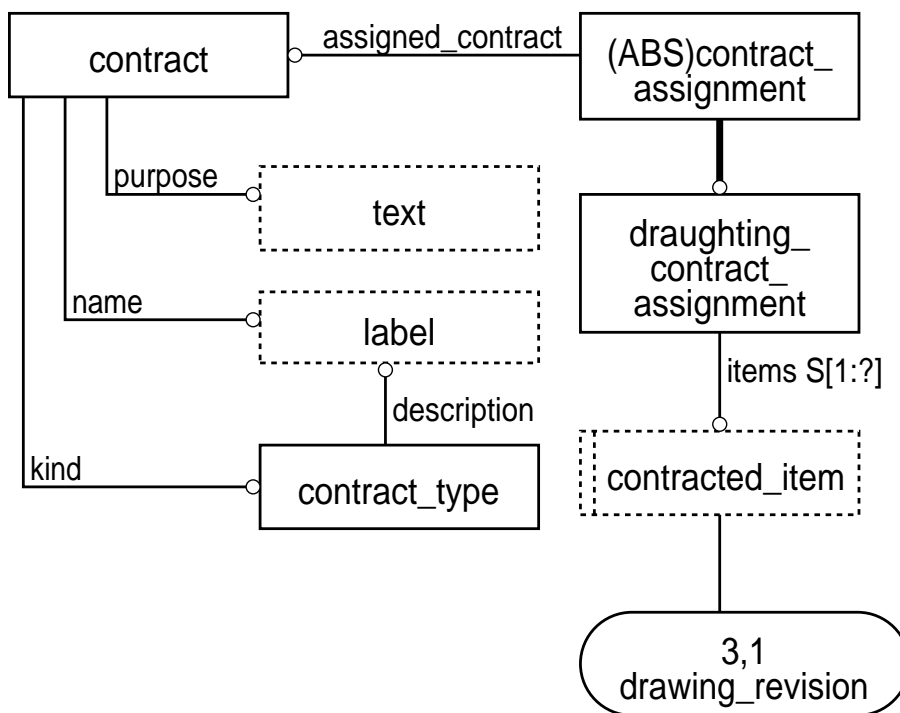


Figure C.5 – AIC expanded listing diagram in EXPRESS-G: 5 of 14

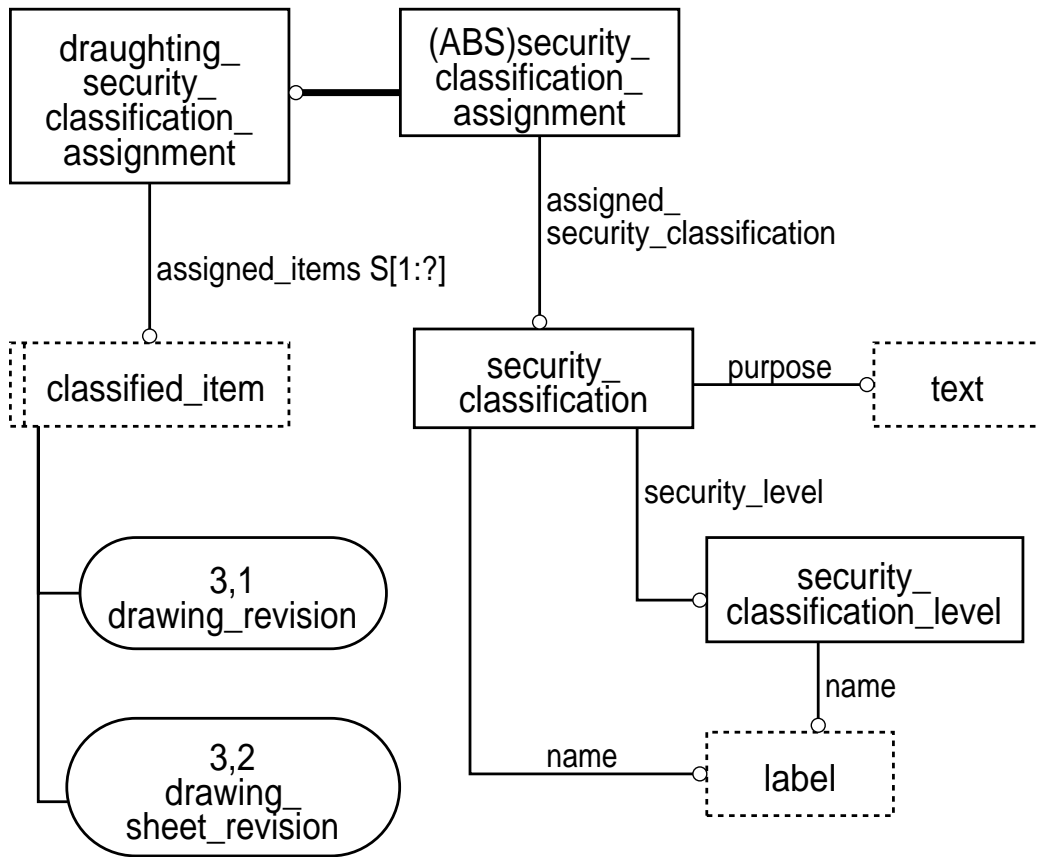


Figure C.6 – AIC expanded listing diagram in EXPRESS-G: 6 of 14

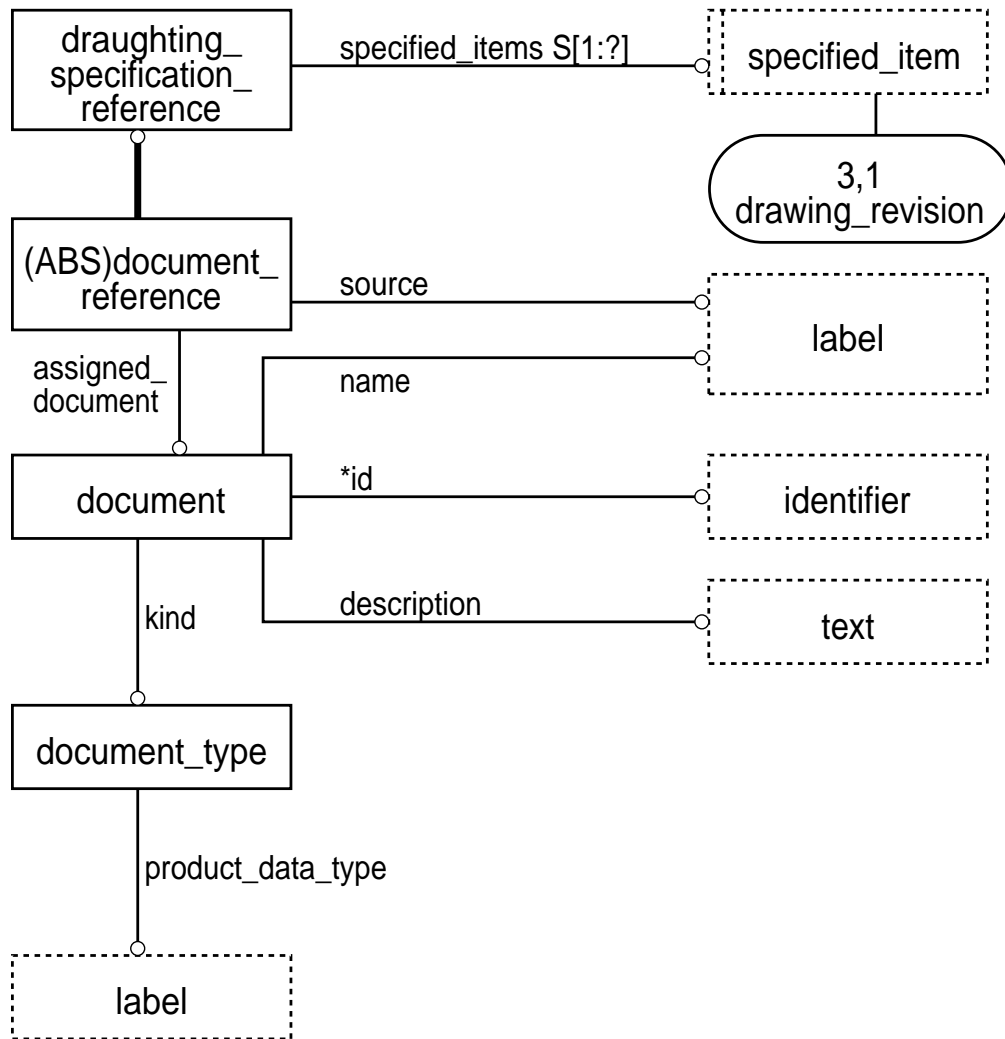


Figure C.7 – AIC expanded listing diagram in EXPRESS-G: 7 of 14

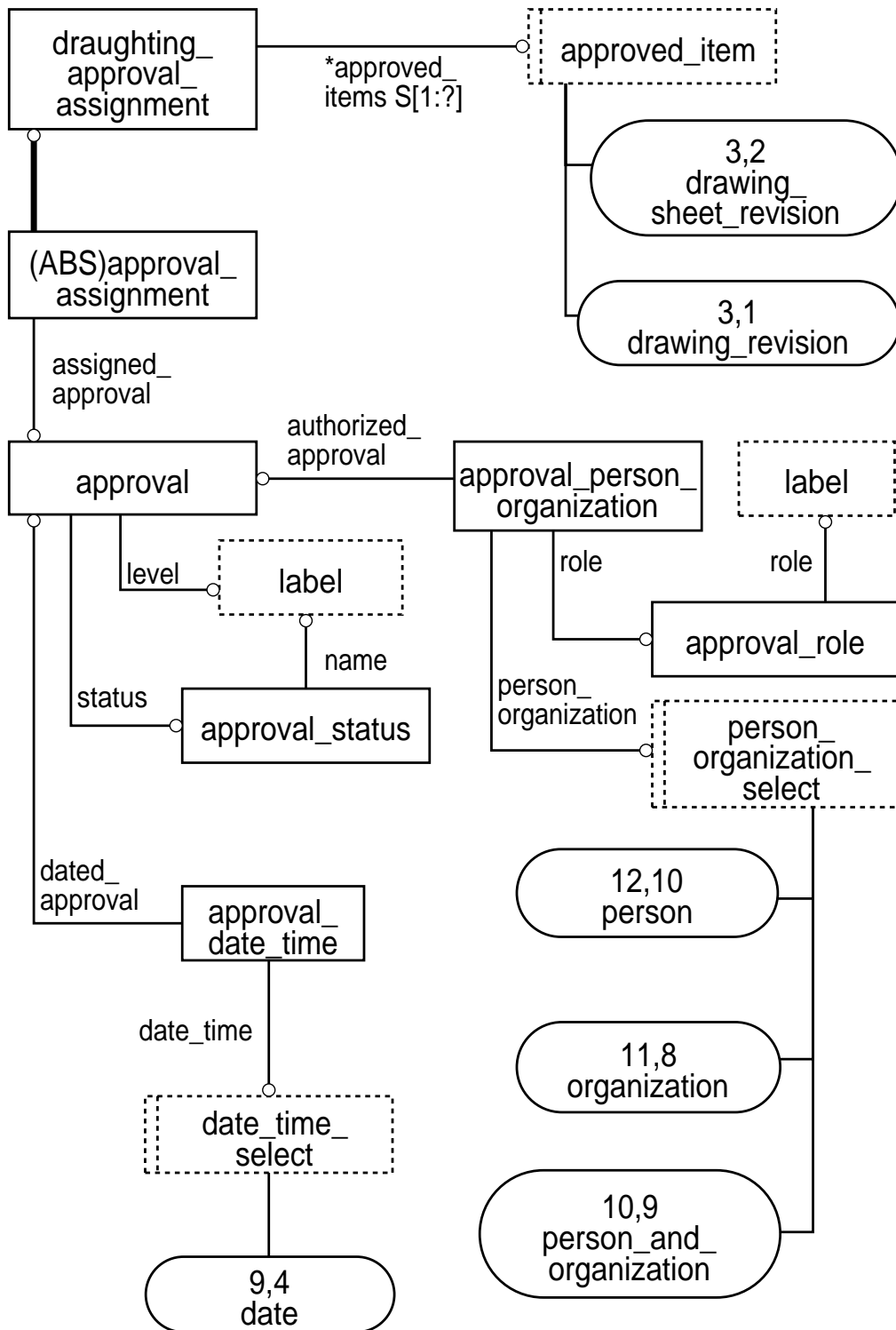


Figure C.8 – AIC expanded listing diagram in EXPRESS-G: 8 of 14

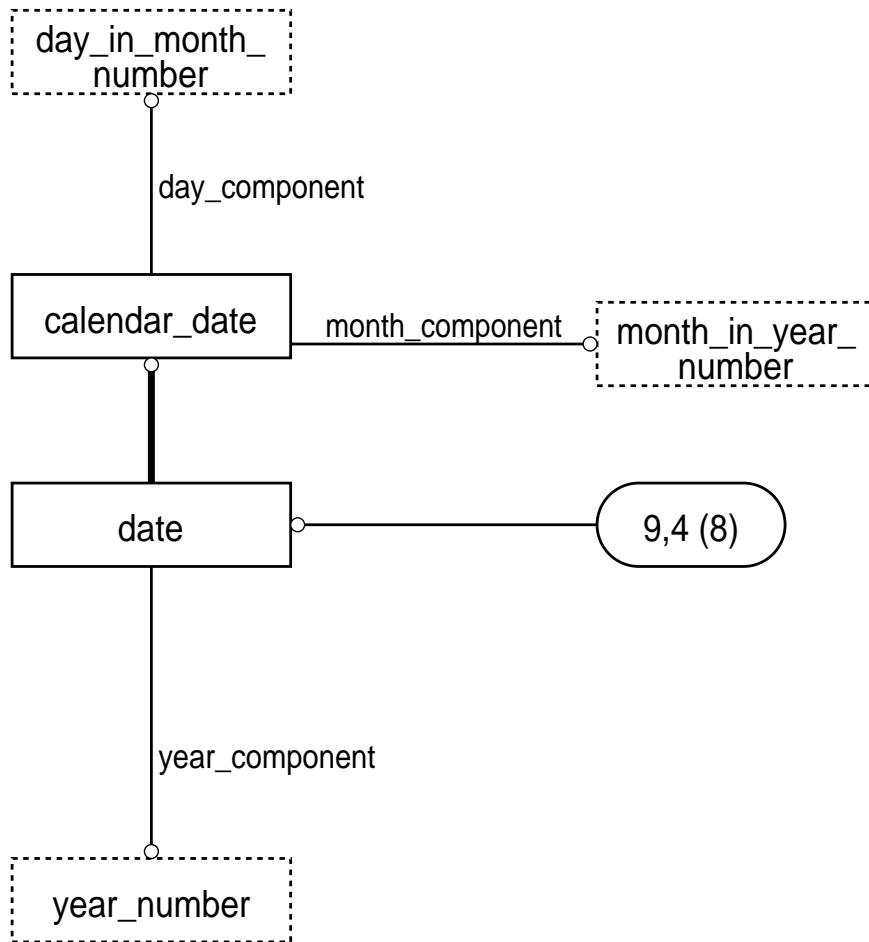


Figure C.9 – AIC expanded listing diagram in EXPRESS-G: 9 of 14

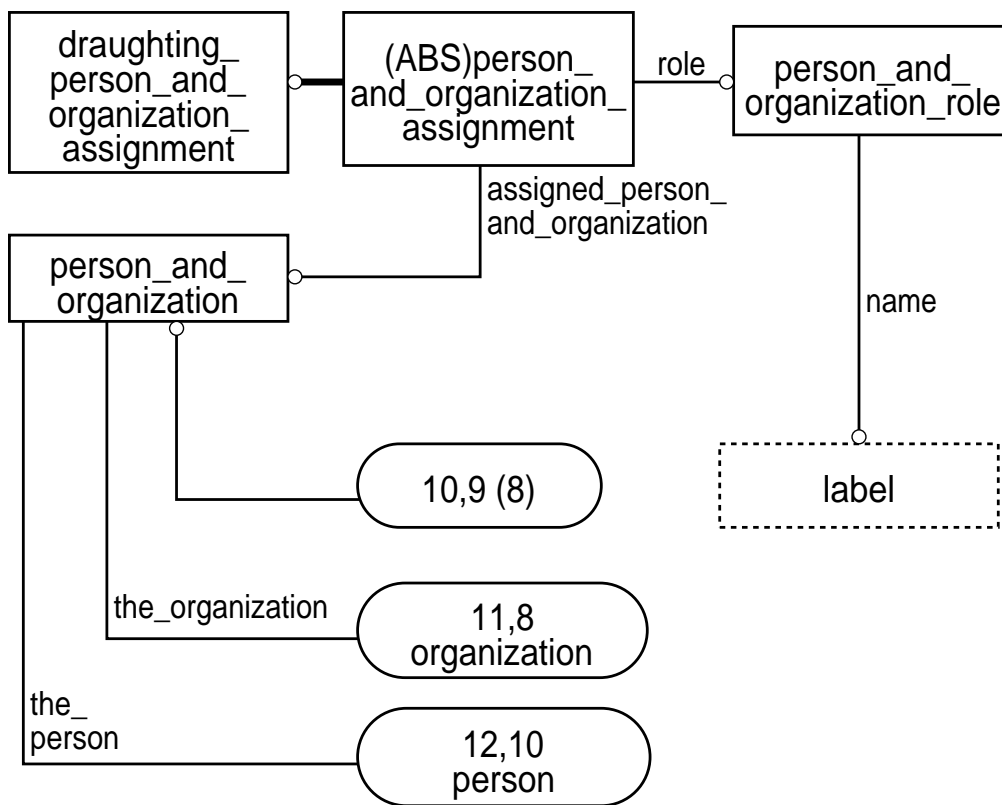


Figure C.10 – AIC expanded listing diagram in EXPRESS-G: 10 of 14

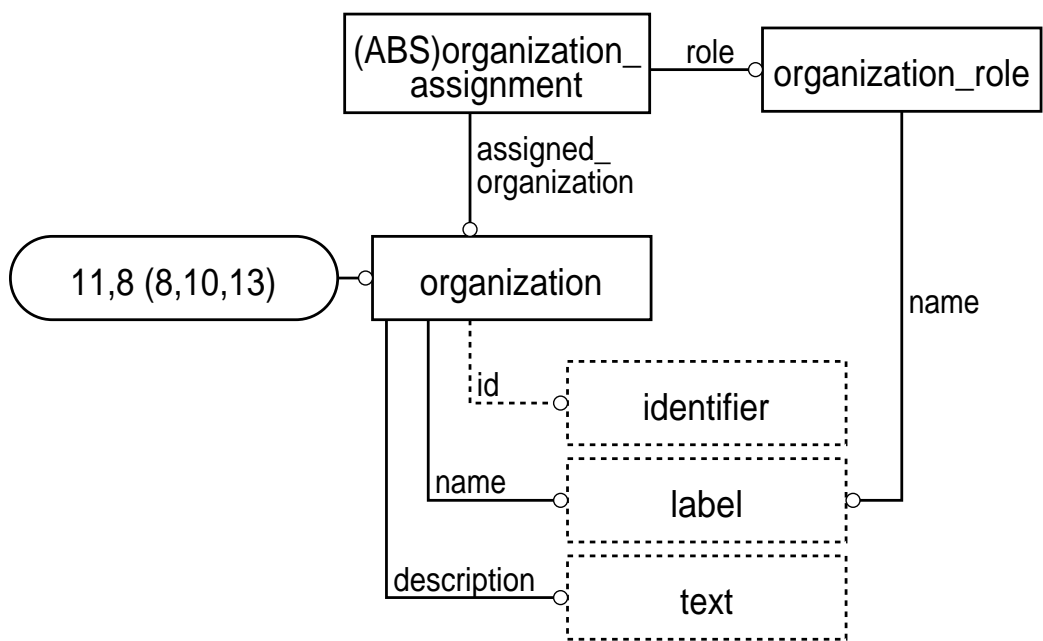


Figure C.11 – AIC expanded listing diagram in EXPRESS-G: 11 of 14

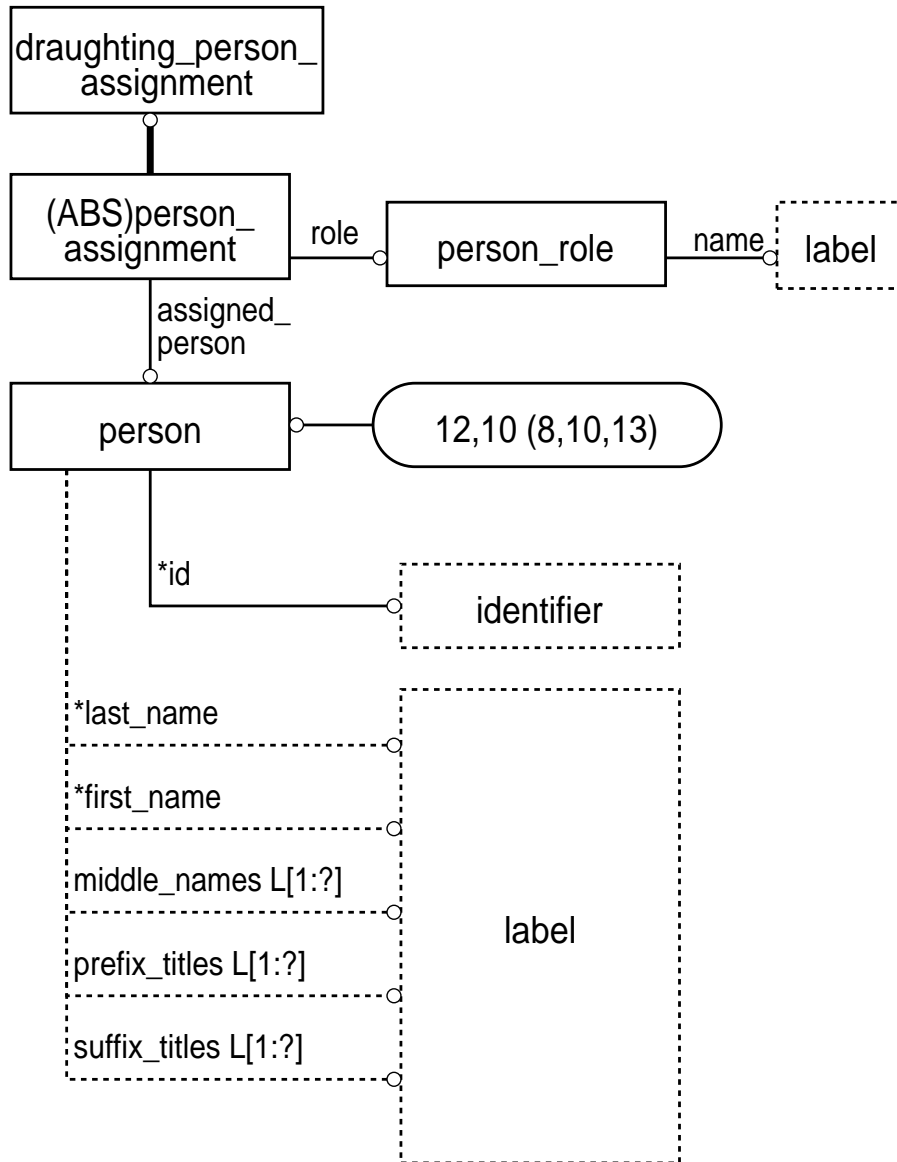


Figure C.12 – AIC expanded listing diagram in EXPRESS-G: 12 of 14

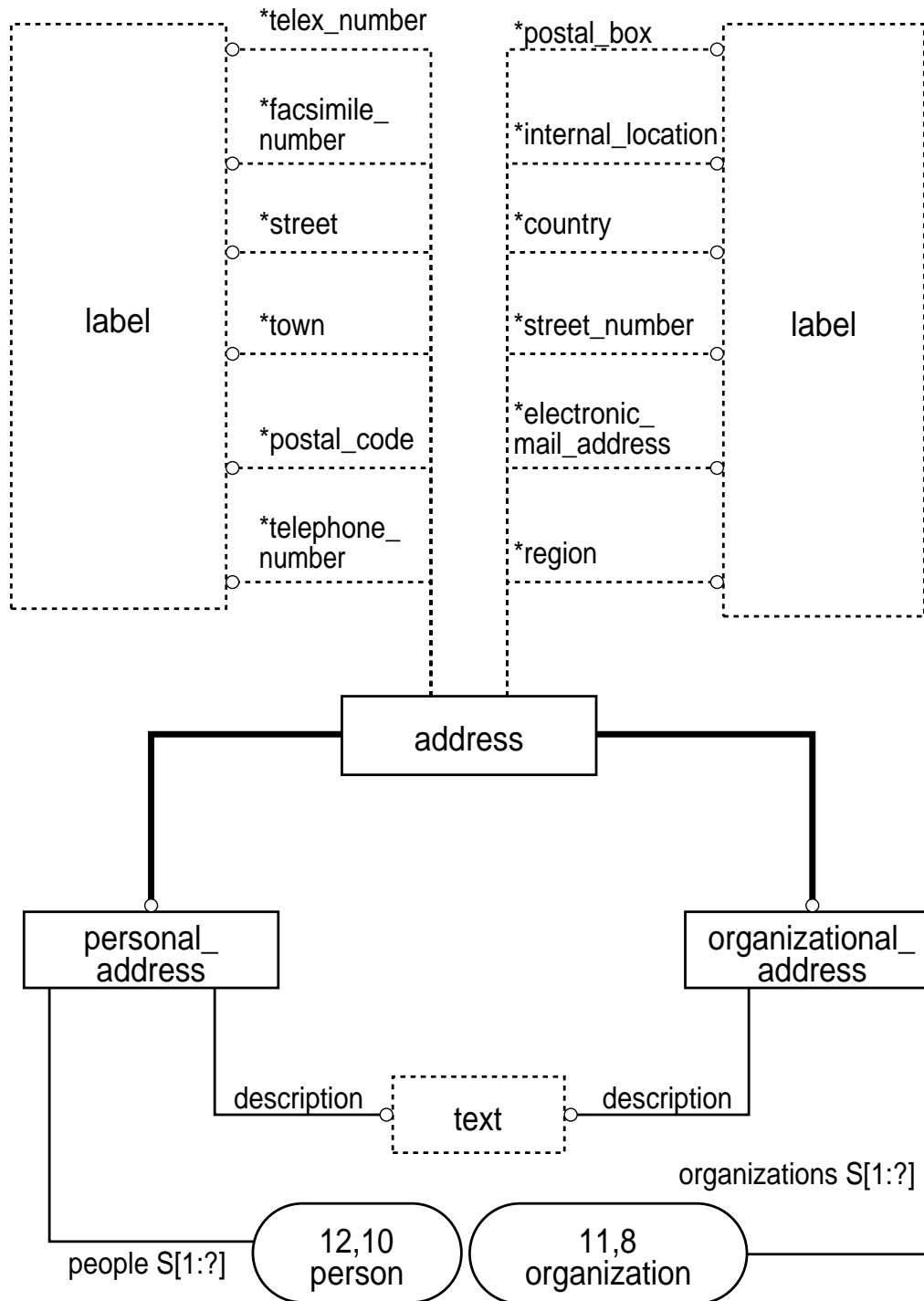


Figure C.13 – AIC expanded listing diagram in EXPRESS-G: 13 of 14

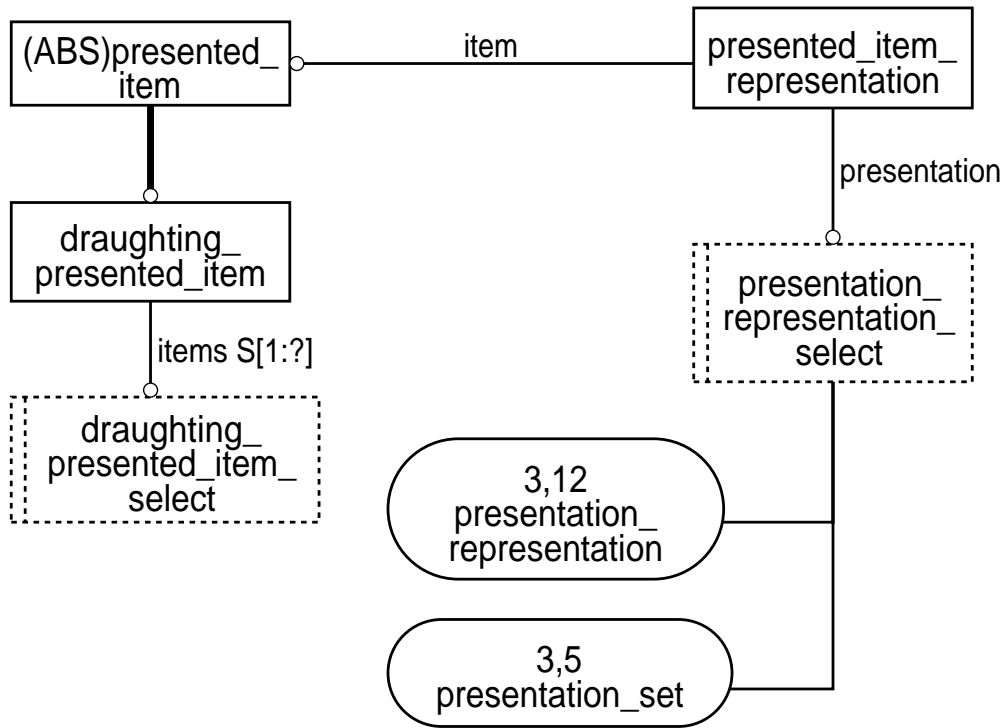


Figure C.14 – AIC expanded listing diagram in EXPRESS-G: 14 of 14

Annex D

(informative)

Computer interpretable listings

This annex references a listing of the EXPRESS entity names and corresponding short names as specified in this part of ISO 10303. It also provides a listing of each EXPRESS schema specified in this part of ISO 10303 without comments or other explanatory text. These listings are available in computer-interpretable form and can be found at the following URLs:

Short names: <http://www.mel.nist.gov/div826/subject/apde/snr/>
EXPRESS: <http://www.mel.nist.gov/step/parts/part505/IS/>

If there is difficulty accessing these sites contact ISO Central Secretariat or contact the ISO TC 184/SC4 Secretariat directly at: sc4sec@cme.nist.gov.

NOTE - The information provided in computer-interpretable form at the above URLs is informative. The information that is contained in the body of this part of ISO 10303 is normative.

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