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Part 5: Extensions to the EXPRESS dictionary schema

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

STANDARD DATA ELEMENT TYPES WITH ASSOCIATED CLASSIFICATION SCHEME FOR ELECTRIC COMPONENTS –

Part 5: Extensions to the EXPRESS dictionary schema

FOREWORD

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International Standard IEC 61360-5 has been prepared by subcommittee 3D: Data sets for libraries, of IEC technical committee 3: Information structures, documentation and graphical symbols

The text of this standard is based on the following documents:

FDIS	Report on voting
3D/128/FDIS	3D/129/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IEC 61360 consists of the following parts, under the general title *Standard data element types with associated classification scheme for electric components:*

– Part 1: Definitions – Principles and methods
– Part 2: EXPRESS dictionary schema
– Part 3: Maintenance and validation procedures
– Part 4: IEC reference collection of standard data element types, component classes and terms.
– Part 5: Extensions to the EXPRESS dictionary schema.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

A bilingual edition of this standard may be issued at a later date.

INTRODUCTION

To understand the generic resources used in this part of the IEC 61360 series knowledge of EXPRESS as defined in ISO 10303-11:1994 is required. Basic knowledge of ISO 13584-24:2003, and ISO 13584-42:1998 is also required.

The generic resources specified in this document were developed as a joint effort of ISO Technical Committee 184/Subcommittee 4/Working Group 2 and IEC Subcommittee 3D. They are intended to be documented both in this part of IEC 61360 and ISO 13584. Both committees agreed not to change and/or modify the EXPRESS schemas independently of each other in order to guarantee the harmonization and the reusability of the work from both committees. Requests for amendments should therefore be sent to both committees. These requests should be adopted by both committees before modifying the EXPRESS schemas.

This document is fully compatible with ISO 13584 parts 42 and 25.

This document contains those extensions to the common ISO13584_IEC61360_dictionary_ schema (IEC 61360-2) that are generated in order to fulfil user needs.

The following parts are copied from ISO 13584-25 and appear in IEC 61360-5 as follows:

ISO 13584-25	IEC 61360-5
Clause 6	Annex A (informative)
Clause 8	Annex B (informative)
Annex C	Annex C (informative)
Annex D	Annex D (informative)
Annex E	Annex E (informative)
Figure F.1	Annex F (informative)

STANDARD DATA ELEMENT TYPES WITH ASSOCIATED CLASSIFICATION SCHEME FOR ELECTRIC COMPONENTS –

Part 5: Extensions to the EXPRESS dictionary schema

1 Scope and object

The scope of this part of IEC 61360 is the extension of the common ISO/IEC dictionary schema for the definition of concepts which are used in IEC 61360-1 but which are not addressed by the information models specified in IEC 61360-2.

The object of this standard is to provide a formal model for data according to the scope as given above, and thus to provide, with IEC 61360-2, a means for the computer-sensible representation and exchange of all data which comply with IEC 61360-1.

The common ISO/IEC dictionary schema as defined in IEC 61360-2 is the common ISO/IEC dictionary schema based on the intersection of the scopes of the two base standards:

- IEC 61360-1;
- ISO 13584-42.

and facilitates a harmonization of both.

Quotation of a relevant part from the scope and object of IEC 61360-1:

This part of IEC 61360 provides a firm basis for the clear and unambiguous definition of characteristic properties (data element types) of all elements of electrotechnical systems from basic components to subassemblies and full systems. Although originally conceived in the context of providing a basis for the exchange of information on electric/electronic components, the principles and methods of this standard may be used in areas outside the original conception such as assemblies of components and electrotechnical systems and subsystems

Quotation of a relevant part from the introduction of ISO 13584-42:

This part of ISO 13584 provides rules and guidelines for library data suppliers to create hierarchies of families of parts according to a common methodology intended to enable multi-supplier consistency. These rules pertain to the following: the method for grouping parts into families of parts to form a hierarchy; the dictionary elements that describe the families and properties of parts.

IEC 61360-2 provides a common information model for the work of both committees, thus allowing for the implementation of dictionary systems dealing with data delivered according to either of the standards elaborated by both committees.

This part of IEC 61360 provides a Library Integrated Information Model (liim) that, with resources from IEC 61360-2, ISO 13584 and ISO 10303, allows modelling and exchanging dictionary information compliant with IEC 61360-1.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61360-1:2002, *Standard data element types with associated classification scheme for electric components – Part 1: Definitions – Principles and methods*

IEC 61360-2:2002, *Standard data element types with associated classification scheme for electric components – Part 2: EXPRESS dictionary schema*

IEC 61360-4:1997, *Standard data element types with associated classification scheme for electric components – Part 4: IEC reference collection of standard data element types, component classes and terms*

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

ISO 13584-1:2001, *Industrial automation systems and integration – Parts library – Part 1: Overview and fundamental principles*

ISO 13584-24:2003, *Industrial automation systems and integration – Parts library – Part 24: Logical resource: Logical model of supplier library*

ISO 13584-25, *Industrial automation systems and integration – Parts library – Part 25: Logical resource: Logical model of supplier library with aggregate values and explicit content* [1]

ISO 13584-42:1998, Industrial automation systems and integration – Parts library – Part 42: Description methodology: Methodology for structuring part families

3 Terms and definitions and abbreviations

For the purposes of this document, the terms and definitions as given in IEC 61360-1, IEC 61360-2, ISO 13584-24 as well as the following apply. Some of these definitions are repeated for convenience.

NOTE Definitions copied verbatim from other standards are followed by a reference to the source standard in brackets. Definitions that have been adapted from other standards are followed by an explanatory note.

3.1
applicable property
a property that is defined for some family of parts and that shall apply to any part that belongs to this family of parts

[ISO 13584-24:2003, definition 3.3]

EXAMPLE For a generic family of screws, the threaded diameter is an applicable property. This characteristic applies to any screw.

---

[1] To be published.

3.2
basic semantic unit
BSU
entity that provides an absolute and universal identification of certain objects of the application domain (for example classes, data element types)

[IEC 61360-2:2002, definition 2.1]

3.3
class extension
the set of all instances satisfying the class definition

[ISO 13584-24:2003, definition 3.13]

3.4
common dictionary schema
information model for a dictionary, using the modelling language EXPRESS

[IEC 61360-2:2002, definition 2.3]

NOTE The common dictionary schema is formally named ISO13584_IEC61360_dictionary_schema and is specified in IEC 61360-2:2002. This schema is duplicated in Annex D of ISO 13584-42:1998.

3.5
conformance class
a subset of a standard for which conformance may be claimed

[ISO 13584-24:2003, definition 3.17]

3.6
conformance requirement
a precise, text definition of a characteristic required to be present in a conforming implementation

[ISO 10303-1:1994, definition 3.2.13]

3.7
dictionary element
set of attributes that constitutes the dictionary description of certain objects of the application domain (for example classes, data element types)

[IEC 61360-2:2002, definition 2.2]

3.8
data element type
DET
unit of data for which the identification, description and value representation have been specified

[IEC 61360-1:2002, definition 2.3]

3.9
data type
set of allowed values of a data element type.

[IEC 61360-2:2002, definition 2.4]

NOTE Within IEC the **data_type** that is either a unit of measure or a value domain is defined separately for each data element type.

3.10
family of parts
a simple or generic family of parts

[ISO 13584-24:2003, definition 3.40]

3.11
functional model
the library data that represent one representation category of a part in an integrated library

[ISO 13584-1:2001,definition 3.1.3]

3.12
functional view
the data that represent one representation category of a part in product data

[ISO 13584-1:2001, definition 3.1.4]

NOTE The structure of a functional view does not depend on the part it represents.

3.13
general model
the library data that carries the definition and identity of a part in an integrated library

[ISO 13584-1:2001, definition 3.1.5]

3.14
generic family of parts
a grouping of simple or generic families of parts done for purposes of classification or for factoring common information

[ISO 13584-24:2003, definition 3.44]

3.15
library delivery file
a population of EXPRESS entity instances conforming to a library integrated information model and represented according to one of the implementation methods specified in ISO 10303

[ISO 13584-24:2003, definition 3.68]

NOTE A library delivery file specifies the structure and the content of a supplier library. It may reference library external files.

3.16
library part
a part associated with a set of data that represents it in a library

[ISO 13584-1:2001, definition 3.1.13]

3.17
library part data
data that represent a part in a library

[ISO 13584-1:2001, defintion 3.1.14]

3.18
library exchange context
the set of one library delivery file and zero, one or more library external files that represent together a supplier library

[ISO 13584-24:2003, definition 3.70]

3.19
library external file
a file, referenced from a library delivery file, that contributes to the definition of a supplier library

[ISO 13584-24:2003, definition 3.71]

NOTE The structure and the format of a library external file is specified in the library delivery file that references it.

3.20
library integrated information model
LIIM
an EXPRESS schema that integrates resource constructs from different EXPRESS schemas for representing supplier libraries for the purpose of exchange and that is associated with conformance requirements

[ISO 13584-24:2003, definition 3.72]

3.21
library specification of a class
the explicit representation of a class extension in a supplier library

[ISO 13584-24:2003, definition 3.76]

NOTE 1 In the ISO 13584 series, every class is intentionally defined through a dictionary element. Only those classes of which the supplier desires to represent explicitly the possible instances are associated with a library specification.

NOTE 2 In ISO 13584-24, the library specification of a class consists of a set that contains all the different possible instances.

3.22
part
material or functional element that is intended to constitute a component of different products

[ISO 13584-1:2001, definition 3.1.16]

3.23
property
an information that may be represented by a data element type

[ISO 13584-42:1998, definition 3.4.10]

3.24
representation category
an abstraction used to distinguish between various possible user requirements regarding a part representation

[ISO 13584-1:2001, definition 3.1.20]

NOTE In the model defined in the ISO 13584 standard series, this distinction is formally expressed in terms of a view logical name and in terms of the view control variables.

3.25
resource construct
the collection of EXPRESS language entities, types, functions, rules and references that together define a valid description of data

[ISO 13584-24:2003, definition 3.97]

3.26
simple family of parts
a set of parts of which each part may be described by the same group of properties

[ISO 13584-24:2003, definition 3.98]

3.27
supplier library
a set of data, and possibly of programs, for which the supplier is defined and that describes in the standard format defined in ISO 13584 a set of parts and/or a set of representation of parts

[ISO 13584-1:2001, definition 3.1.22]

3.28
user library
information that results from the integration of one or more supplier libraries by the library management system and possibly from a later adaptation performed by the user

[ISO 13584-1:2001, definition 3.1.23]

3.29
view exchange protocol
VEP
a part of ISO 13584 that describes the use of resource constructs and of representation transmission interfaces that satisfy the information requirement for the exchange of one representation category of parts

[ISO 13584-24:2003, definition 3.107]

3.30
visible property
a property that is defined for some family of parts and that may or not apply to the different parts of this family of parts

[ISO 13584-24:2003, definition 3.109]

EXAMPLE For a generic family of screws, the non-threaded length is a visible property: it is clearly defined for any screw, but only those screws with a non-threaded part have a value for this property.

NOTE The code of the class where a property is defined as visible is part of the identification of the data element type that represents this property.

3.31
IEC root class
class that is the superclass of all the classes defined in IEC 61360-4; its class code is ‘AAA000' and its version is ‘001'

[IEC 61360-2:2002, definition 2.5]

3.32
applicable data element type
data element type that is defined for some component class and that applies to any component that belongs to this component class

[IEC 61360-2:2002, definition 2.6]

3.33
visible data element type
data element type that is defined for some component class and that may or may not apply to the different components of this component class.

NOTE 1 The code of the class where a data element type is defined as visible is part of the identification of this data element type.

NOTE 2 Within IEC all data element types are defined as visible at the level of the root class, that is the superclass of both the component class and the material class.

4 Structure of IEC 61360-5

IEC 61360-5 has two main parts:

- the generic resource part provides resource constructs for representing aggregate data types. Aggregate data types and values are modelled in total conformance with the EXPRESS language.
- the library integrated information model gathers the above resource construct with other generic resource constructs from IEC 61360-2 and from different parts of ISO 13584 and ISO 10303 into one single schema for representing dictionaries that may include aggregate data types.

4.1 Generic resource

The generic resource contains the

ISO13584_IEC61360_dictionary_aggregate_extension_schema EXPRESS schema.

This schema provides resource constructs that are generic in nature. It may be used outside the IEC 61360 series and particularly in all the applications that use a data dictionary compliant with the IEC 61360 series

It provides the resource constructs needed to describe data types corresponding to aggregate data types as defined in the EXPRESS language. It defines resources to describe array, bag, list and set data types. These data types extend the data types already defined in the **ISO13584_ISO61360_dictionary_schema** published in IEC 61360-2:2002.

4.2 Library integrated information model

4.2.1 General

The library integrated information model specified in this part of IEC 61360, gathers the generic resource constructs defined in this part of IEC 61360 with other generic resource constructs from IEC 61360-2 and various other parts of ISO 13584 and ISO 10303 into a single schema for representing dictionaries for the purpose of exchange. The library integrated information model was jointly developed between ISO and IEC. For the purpose of exchanging dictionary information compliant with IEC 61360-1, only four kinds of exchange are applicable for IEC 61360-5 and are defined below. Other kinds of exchange are defined in ISO 13584-25.

- Dictionaries that define hierarchies of classes of items, that may be parts, materials or other items, with aggregate-structured properties using only the EXPRESS resource constructs defined in the ISO/IEC common dictionary schema or in the **ISO13584_IEC61360_dictionary_aggregate _extension_schema** defined in this part of IEC 61360 correspond to conformance class 1;
- Dictionaries that define hierarchies of classes of items, that may be parts, materials, features or other items, using the extension of the ISO/IEC common dictionary schema defined in ISO 13584-24, but without description of item representations and of representation categories of items, and without aggregate-structured properties, correspond to conformance class 2;
- Dictionaries that define hierarchies of classes of items, of item representations, and of representation categories of items, with aggregate-structured properties, correspond to conformance class 3;
- Dictionaries with the same scope as conformance class 3 but with no more than two levels nesting for aggregate-structured properties, correspond to conformance class 4;

Each of the above kinds of exchange context corresponds to one conformance class of the library-integrated model 'ISO13584_25_IEC61360_5_liim_schema'. Each conformance class specifies the conformance requirements for implementations that claim conformance to this conformance class. In this part of IEC 61360, each subset that defines a conformance class is defined by means of a list of entities. An implementation that claims conformance to any conformance class shall support all the entities listed for this conformance class and related constructs.

The library integrated model 'ISO13584_25_IEC61360_5_liim_schema 'is defined by means of a set of entities, types and associated constructs that addresses the requirements of both ISO Technical Committee 184/Subcommittee 4/Working Group 2 and IEC Subcommittee 3D and is therefore broader than just the IEC conformance class.

4.2.2 Conformance class 1: minimal dictionaries

Conformance class 1 supports the information requirements for exchanging definitions of hierarchies of item classes, where items may be parts or materials. It allows the exchange of all dictionary elements from the ISO/IEC dictionary schema (IEC 61360-2) and those dictionary elements that may have aggregate-structured values according to Annex A of this part of IEC 61360. Conformance class 1 is associated with implementation methods for the library delivery file. Conformance requirements to conformance class 1 are defined in B.3.1 of this part of IEC 61360.

4.2.3 Conformance class 2: dictionaries of items classes

Conformance class 2 supports the information requirements for exchanging definitions of hierarchies of item classes, where items may be parts, materials or features, whose properties may not have aggregate-structured values. Conformance class 2 is associated with a set of standard data that defines the formats of library external files that may be referenced by a library delivery file conforming to conformance class 2, and with implementation methods for the library delivery file. Conformance requirements for conformance class 2 are defined in B.3.2 of this part of IEC 61360.

4.2.4 Conformance class 3: complete dictionaries

Conformance class 3 supports the information requirements for exchanging definitions of hierarchies of item classes, where items may be parts, materials or features, together with definitions of representations of such item classes, and with definitions of representation categories of such item classes. Properties of all these classes may have aggregate-structured values. Conformance class 3 is associated with a set of standard data that defines the formats of library external files that may be referenced by a library delivery file conforming to conformance class 3, and with implementation methods for the library delivery file. Conformance requirements for conformance class 3 are defined in B.3.3 of this part of IEC 61360.

4.2.5 Conformance class 4: complete dictionaries with limited nested aggregate values

Conformance class 4 supports the information requirements corresponding to conformance class 3 with a restriction. The aggregate values involved in conformance class 4 shall not be nested more than twice. Conformance requirements for conformance class 4 are defined in B.3.4 of this part of IEC 61360.

Based on the same library integrated model 'ISO13584_25_IEC61360_5_liim_schema' five additional conformance classes are defined for the exchange of libraries and/or instances of parts. Those definitions can be found in ISO 13584-25.

5 Requirements

The requirements of this standard shall be fulfilled by compliance with the appropriate Clauses and Annexes from ISO 13584-25.

For convenience these Clauses and Annexes are reproduced below as informative Annexes to this standard as follows:

Annex A:
EXPRESS information model for the aggregate data type; [Clause 6 of ISO 13584-25]

Annex B:
Definition of the library integrated model 'ISO13584_25_IEC61360_5_liim_schema', and the definition of the conformance classes; [Clause 8 of ISO 13584-25]

Annex C:
Library integrated information model 'ISO13584_25_IEC61360_5_liim_schema', expanded listing; [Annex C of ISO 13584-25]

Annex D:
Standard data requirements for library integrated information model 'ISO13584_25_IEC61360_5_liim_schema' [Annex D of ISO 13584-25]

Annex E:
Implementation requirements for the library integrated information model 'ISO13584_25_IEC61360_5_liim_schema', defining this part of IEC 61360-5; [Annex E of ISO 13584-25]

Annex F:
EXPRESS diagram for aggregate data types. [Annex F1 of ISO 13584-25].

Annex A
(informative)

ISO13584_IEC61360_dictionary_aggregate_extension_schema

A.1 General

This Annex defines the requirements for the **ISO13584_IEC61360_dictionary_aggregate_extension_schema**. The following EXPRESS declaration introduces the **ISO13584_IEC61360_dictionary_aggregate_extension_schema** and identifies the necessary external references.

EXPRESS specification:

```
*)
SCHEMA ISO13584_IEC61360_dictionary_aggregate_extension_schema;

REFERENCE FROM ISO13584_IEC61360_dictionary_schema(
     data_type,
     entity_instance_type);

(*
```

NOTE The schema referenced above can be found in the following documents:
ISO13584_IEC61360_dictionary_schema IEC 61360-2:2002
(which is duplicated for convenience in informative Annex D of ISO 13584-42:1998.)

A.2 Introduction to the ISO13584_IEC61360_dictionary_aggregate_extension_schema

The **ISO13584_IEC61360_dictionary_aggregate_extension_schema** provides the information model for the extension to the ISO/IEC common dictionary schema which allows the use of lists, sets, bags, arrays and sets of subsets of simple or complex data types.

This extension is achieved in two steps.

- the **entity_instance_type_for_aggregate** entity provides the means to reference EXPRESS-defined entities that specify aggregate data types. The **entity_instance_type_for_aggregate** is a subtype of the **entity_instance_type** entity;

NOTE The **entity_instance_type** entity is defined in the IEC 61630-2 and duplicated in ISO 13584-42.

- then, entities that specify aggregate data types are modelled by the **aggregate_type** entity and its specializations.

A.3 ISO13584_IEC61360_dictionary_aggregate_extension_schema entity definitions

The following entity type definitions describe the necessary resources needed to encode aggregate types.

A.3.1 Aggregate_entity_instance_type entity

The **entity_instance_type_for_aggregate** entity provides for referencing definitions of data types that may be expressed as lists, sets, bags or arrays of simple or complex values. It is defined by referencing an **aggregate_type** defined in this schema.

EXPRESS specification:

```
*)
ENTITY entity_instance_type_for_aggregate
SUBTYPE OF(entity_instance_type);
     type_structure: aggregate_type;
WHERE
     WR1: SELF\entity_instance_type.type_name =

     ['ISO13584_IEC61360_DICTIONARY_AGGREGATE_EXTENSION_SCHEMA'
         + '.AGGREGATE_TYPE'];
END_ENTITY;
(*
```

Attribute definition:

type_structure: the aggregate_type referenced and carried by the entity_instance_type.

Formal propositions:

WR1: the **type_name** attribute of the **entity_instance_type** shall contain the string 'ISO13584_IEC61360_DICTIONARY_AGGREGATE_EXTENSION_SCHEMA.AGGREGATE_TYPE'.

A.3.2 Aggregate_type entity

The **aggregate_type** entity provides for the definition of data types that may be expressed as lists, sets, bags or arrays of simple or complex values.

EXPRESS specification:

```
*)
ENTITY aggregate_type
ABSTRACT SUPERTYPE OF(ONEOF(
          list_type,
          set_type,
          bag_type,
          array_type,  set_with_subset_constraint_type ));
     bound_1: OPTIONAL INTEGER;
     bound_2: OPTIONAL INTEGER;
     value_type: data_type;
WHERE
     WR1: bound_1 <= bound_2;
END_ENTITY;
(*
```

Attribute definition:

value_type: is the type of value (simple or complex) which is used for each element of the aggregate.

bound_1: the optional integer that defines the low bound of the defined aggregate type.

bound_2: the optional integer that defines the upper bound of the defined aggregate type.

Formal propositions:

WR1: **bound_1** cannot be greater than **bound_2**.

A.3.3 List_type entity

The **list_type** entity provides for the definition of data types that may be expressed as ordered lists of values in which duplication may or may not be allowed.

EXPRESS specification:

```
*)
ENTITY list_type
SUBTYPE OF(aggregate_type);
     uniqueness: BOOLEAN;
WHERE
     WR1: EXISTS(bound_1) OR NOT(EXISTS(bound_2));
     WR2: NOT(EXISTS(bound_1)) OR (bound_1 >= 0);
END_ENTITY;
(*
```

Attribute definition:

uniqueness: a flag to indicate whether all elements of the list must be unique (true) or whether duplicates are allowed (false).

Formal propositions:

WR1: if the upper bound **bound_2** of the defined list optional attribute exists, it implies that the lower bound **bound_1** optional attribute of the defined list exists as well.

WR2: if the lower bound **bound_1** of the defined list optional attribute exists then it is greater or equal to 0.

A.3.4 Set_type entity

The **set_type** entity provides for the definition of data types that may be expressed as unordered collections of values in which no duplication can occur.

EXPRESS specification:

```
*)
ENTITY set_type
SUBTYPE OF(aggregate_type);
WHERE
     WR1: EXISTS(bound_1) OR NOT(EXISTS(bound_2));
     WR2: NOT(EXISTS(bound_1)) OR (bound_1 >= 0);
END_ENTITY;
(*
```

Formal propositions:

WR1: if the upper bound **bound_2** of the defined list optional attribute exists, it implies that the lower bound **bound_1** optional attribute of the defined list exists as well.

WR2: if the lower bound **bound_1** of the defined list optional attribute exists then it is greater or equal to 0.

A.3.5 Bag_type entity

The **bag_type** entity provides for the definition of data types that may be expressed as unordered collections of values in which duplication may occur.

EXPRESS specification:

```
*)
ENTITY bag_type
SUBTYPE OF(aggregate_type);
WHERE
     WR1: EXISTS(bound_1) OR NOT(EXISTS(bound_2));
     WR2: NOT(EXISTS(bound_1)) OR (bound_1 >= 0);
```

```
END_ENTITY;
(*
```

Formal propositions:

WR1: if the upper bound **bound_2** of the defined list optional attribute exists, it implies that the lower bound **bound_1** optional attribute of the defined list exists as well.

WR2: if the lower bound **bound_1** of the defined list optional attribute exists then it is greater or equal to 0.

A.3.6 Array_type entity

The **array_type** entity provides for the definition of data types that may be expressed as an array of values. An array data type has as its domain indexed, fixed-size collection of like elements. The lower and upper bounds, which are integer values, define the range of index values and thus the size of each array collection. An array data type definition may optionally specify that an array value cannot contain duplicate elements.

EXPRESS specification:

```
*)
ENTITY array_type
SUBTYPE OF (aggregate_type);
     SELF\aggregate_type.bound_1: INTEGER;
     SELF\aggregate_type.bound_2: INTEGER;
     uniqueness: BOOLEAN;
     are_optional: BOOLEAN;
END_ENTITY;
(*
```

Attribute definition:

bound_1: the integer that defines the low index of the defined aggregate type.

bound_2: the integer that defines the upper index of the defined aggregate type.

uniqueness: indicates whether all elements of the array must be present (false) or whether some elements of the array may be missing (true).

are_optional: indicates whether all elements of the array must be present (false) or whether some elements of the array may be missing (true).

A.3.7 Set_with_subset_constraint_type entity

The **set_with_subset_constraint_type** entity provides for the definition of data types that may be expressed as a set of values of which subsets may be extracted. The sizes of allowed subsets are defined by their minimal and maximal values. If these sizes do not exist, any subset is allowed.

NOTE The context in which subsets may be extracted is outside the scope of the part of ISO 13584.

EXPRESS specification:

```
*)
ENTITY set_with_subset_constraint_type
SUBTYPE OF (aggregate_type);
     cardinal_min: OPTIONAL INTEGER;
     cardinal_max: OPTIONAL INTEGER;
WHERE
     WR1: cardinal_min <= cardinal_max ;
     WR2: NOT EXISTS (bound_2) OR NOT EXISTS (cardinal_max)
          OR (cardinal_max <= bound_2);
```

```
        WR3: NOT EXISTS (bound_1) OR NOT EXISTS (cardinal_min)
            OR (cardinal_min <= bound_1);
END_ENTITY;
(*
```

Attribute definition:

cardinal_min: the minimal size of the subsets that may be extracted.

cardinal_max: the maximal size of the subsets that may be extracted.

Formal propositions:

WR1: the minimal size of the subsets that may be extracted **cardinal_min** shall be less or equal the maximal size of the subsets that may be extracted **cardinal_max**.

WR2: the maximal size of the subsets that may be extracted from the set shall not be greater than the maximal size of the set itself.

WR3: the minimal size of the subsets that may be extracted from the set shall not be greater than the minimal size of the set itself.

```
*)
END_SCHEMA;
-- ISO13584_IEC61360_dictionary_aggregate_extension_schema

(*
```

Annex B
(informative)

Library integrated information model 25

B.1 General

Conformance to the library integrated information model LIIM 25 includes satisfying the information requirements stated in the **ISO13584_25_IEC61360_5_liim_schema** schema presented in Clause B.2, the requirements to support standard data stated in the **ISO13584_25_IEC61360_5_conformance_schema** schema presented in Annex D, the requirements of the implementation method(s) supported and the relevant requirements of the normative references.

An implementation shall support at least the following implementation method: ISO 10303-21. Requirements with respect to implementation methods are specified in Annex E.

The **ISO13584_25_IEC61360_5_liim_schema** schema provides for a number of options that may be supported by an implementation. These options have been grouped into conformance classes. Nine conformance classes are defined. Options are defined by each class and may be selected by an implementation. Conformance to a particular conformance class requires that all the **ISO13584_25_IEC61360_5_liim_schema** entities, types and associated constraints defined as part of the class, be supported, together with the standard data associated with the class.

NOTE 1 Support of standard data associated with a class is insured by the global rule specified in the **ISO13584_25_IEC61360_5_conformance_schema.**

The numbering schema of the conformance classes is as follows:

- class 1: minimal **dictionary_element**s from the ISO/IEC common dictionary schema more aggregate types;

NOTE 2 The ISO/IEC common dictionary schema is defined by the **ISO13584_IEC61360_dictionary_schema** documented in ISO 13584-42:1998.

- class 2: **dictionary_element**s from the extended dictionary schema without functional models and functional views and without aggregate types;

NOTE 3 The extended dictionary schema is defined by the **ISO13584_extended_dictionary_schema** documented in ISO 13584-24.

- class 3: **dictionary_element**s from the extended dictionary schema with functional models and functional views and aggregate types;
- class 4: identical to class 3 but with limited nested aggregate types;
- class 5: **dictionary_element**s from the extended dictionary schema without functional models and functional views classes and without aggregate types and values, but with explicit description of **class_extension**s for the classes in the library;
- class 6: **dictionary_element**s from the extended dictionary schema with functional models and functional views, aggregate types and values and with explicit description of **class_extension**s for the classes in the library;
- class 7: identical to class 6 but with limited nested aggregate types and values;
- class 10: item instances and item representation instances without dictionary definitions and without library structure;
- class 11: item instances and item representation instances with dictionary definitions but without library structure.

NOTE 4 The attribute values for the **external_file_protocol** entities that do not belong to the standard data defined in Annex D of this part of IEC 61360 or to the standard data defined in one part of the view exchange protocol series of part of ISO 13584 are subject to prior agreement between the sender and the receiver. They are outside the scope of this standard.

NOTE 5 The only files that may be referenced as **http_file**s in conformance classes 2 to 8 and 10 to 11 of library integrated information model 25 are files whose MIME type and subtype:

- either corresponding to specifications that are publicly available, or
- that are associated with public domain Internet-available readers.

Table B.1 shows the supported capabilities of the different conformance classes of library integrated information model 25.

Table B.1 – Conformance options of library integrated information model 25

Capabilities	Dictionary elements			Library specification (class extension)	Instance representation
Conformance class	Dictionary definitions of item classes	Dictionary definitions of item class representations and representation categories	Aggregate structured properties		
1	x		x		
2	x				
3	x	x	x		
4	x	x	x		
5	x			x	x
6	x	x	x	x	x
7	x	x	x	x	x
10			x		x
11	x	x	x		x

B.2 ISO13584_25_IEC61360_5_liim_schema short listing

This Clause specifies the EXPRESS schema that uses elements from the integrated resource series of the ISO 10303 series and from the logical resource and description methodology series of parts of ISO 13584 to define the requirements of the library integrated information model LIIM25 specified in this part of IEC 61360.

NOTE 1 The integrated resource series of ISO 10303 are ISO 10303-4x and ISO 10303-1xx. The logical resource series of parts of ISO 13584 are ISO 13584-2x and the description methodology series of parts of ISO 13584 are ISO 13584-4x.

The expanded EXPRESS listing of the **ISO13584_25_IEC61360_5_liim_schema**, with the additional constraints defined in **ISO13584_25_IEC61360_5_conformance_schema**, is presented in Annex A of ISO 13584-25. The resulting schema, called **ISO13584_25_IEC61360_5_library_implicit_schema**, is the information model of supplier libraries that reference the library integrated information model LIIM 25 is not specified in this part of IEC 61360, as it is outside the scope of this standard.

NOTE 2 The information model of integrated libraries is outside the scope of this standard.

EXPRESS specification:

```
*)
SCHEMA ISO13584_25_IEC61360_5_liim_schema;

USE FROM ISO13584_IEC61360_dictionary_schema
     (axis1_placement_type,
     axis2_placement_2d_type,
     axis2_placement_3d_type,
```

```
      boolean_type,
      class_BSU,
      class_instance_type,
      class_value_assignment,
      complex_type,
      component_class,
      condition_DET,
      data_type_BSU,
      data_type_element,
      dates,
      dependent_P_DET,
      dic_unit,
      dic_value,
      entity_instance_type,
      identified_document,
      int_currency_type,
      int_measure_type,
      int_type,
      integer_type,
      item_class,
      item_names,
      label_with_language,
      level_type,
      material_class,
      mathematical_string,
      named_type,
      non_dependent_P_DET,
      non_quantitative_code_type,
      non_quantitative_int_type,
      non_si_unit,
      number_type,
      placement_type,
      property_BSU,
      property_DET,
      real_currency_type,
      real_measure_type,
      real_type,
      string_type,
      supplier_BSU,
      supplier_element,
      value_domain);

USE FROM ISO13584_IEC61360_language_resource_schema
      (global_language_assignment,
      present_translations,
      translated_label,
      translated_text);

USE FROM ISO13584_instance_resource_schema
      (null_value,
      primitive_value,
      null_or_primitive_value,
      simple_value,
      null_or_simple_value,
      number_value,
      null_or_number_value,
      integer_value,
      null_or_integer_value,
      real_value,
      null_or_real_value,
      boolean_value,
      null_or_boolean_value,
      translatable_string_value,
      translated_string_value,
      string_value,
      null_or_translatable_string_value,
      complex_value,
      null_or_complex_value,
      entity_instance_value,
      null_or_entity_instance_value,
      defined_entity_instance_value,
```

```
        controlled_entity_instance_value,
        STEP_entity_instance_value,
        PLIB_entity_instance_value,
        property_or_data_type_BSU,
        level_spec_value,
        null_or_level_spec_value,
        int_level_spec_value,
        null_or_int_level_spec_value,
        real_level_spec_value,
        null_or_real_level_spec_value,
        property_value,
        context_dependent_property_value,
        dic_class_instance,
        null_or_dic_class_instance,
        dic_component_instance,
        dic_feature_instance,
        dic_material_instance,
        lib_component_instance,
        lib_feature_instance,
        lib_material_instance,
        dic_f_model_instance,
        lib_f_model_instance);

    USE FROM ISO13584_IEC61360_dictionary_aggregate_extension_schema
        (entity_instance_type_for_aggregate,
        list_type,
        set_type,
        bag_type,
        array_type,
        set_with_subset_constraint_type);

    USE FROM ISO13584_extended_dictionary_schema
        (dictionary,
        dictionary_in_standard_format,
        library_iim_identification,
        view_exchange_protocol_identification,
        representation_type,
        geometric_representation_context_type,
        representation_reference_type,
        program_reference_type,
        program_library_BSU,
        document_BSU,
        supplier_program_library_relationship,
        class_document_relationship,
        representation_P_DET,
        class_related_dictionary_element,
        program_library_element,
        document_element,
        document_element_with_http_access,
        document_element_with_translated_http_access,
        referenced_document,
        referenced_graphics,
        feature_class,
        functional_model_class,
        fm_class_view_of,
        functional_view_class,
        non_instantiable_functional_view_class,
        view_control_variable_range,
        item_class_case_of,
        component_class_case_of,
        material_class_case_of,
        feature_class_case_of,
        a_posteriori_case_of,
        a_posteriori_view_of);

    USE FROM ISO13584_external_file_schema
        (standard_simple_program_protocol,
        non_standard_simple_program_protocol,
        linked_interface_program_protocol,
        standard_data_protocol,
        non_standard_data_protocol,
```

```
      http_protocol,
      program_library_content,
      document_content,
      representation_reference,
      program_reference,
      property_value_external_item,
      message,
      illustration,
      A6_illustration,
      A9_illustration,
      translated_external_content,
      not_translated_external_content,
      not_translatable_external_content,
      language_specific_content,
      external_file_unit,
      http_file,
      http_class_directory,
      simple_program_protocol);

USE FROM ISO13584_aggregate_value_schema
      (aggregate_entity_instance_value,
      list_value,
      set_value,
      bag_value,
      array_value,
      set_with_subset_constraint_value);

USE FROM ISO13584_library_content_schema
      (library,
      library_in_standard_format,
      explicit_item_class_extension,
      explicit_functional_model_class_extension,
      property_classification,
      property_value_recommended_presentation);

USE FROM measure_schema
      (amount_of_substance_measure,
      area_measure,
      context_dependent_measure,
      context_dependent_unit,
      conversion_based_unit,
      count_measure,
      derived_unit,
      derived_unit_element,
      dimensional_exponents,
      electric_current_measure,
      global_unit_assigned_context,
      length_measure,
      length_measure_with_unit,
      length_unit,
      luminous_intensity_measure,
      mass_measure,
      measure_value,
      measure_with_unit,
      named_unit,
      numeric_measure,
      parameter_value,
      plane_angle_measure,
      positive_length_measure,
      positive_plane_angle_measure,
      ratio_measure,
      si_unit,
      solid_angle_measure,
      thermodynamic_temperature_measure,
      time_measure,
      volume_measure);

USE FROM person_organization_schema
      (address,
      organization,
      person);
```

```
    USE FROM date_time_schema
         (date,
         date_and_time,
         local_time,
         calendar_date,
         ordinal_date,
         week_of_year_and_day_date);

    USE FROM geometry_schema
         (axis1_placement,
         axis2_placement_2D,
         axis2_placement_3D,
         geometric_representation_context,
         placement);

    USE FROM representation_schema
         (representation,
         representation_context,
         representation_item);

    USE FROM application_context_schema
         (application_context,
         application_context_element,
         application_protocol_definition);

    END_SCHEMA; -- ISO13584_25_IEC61360_5_liim_schema
    (*
```

NOTE 3 The schemas referenced above can be found in the following documents:

ISO13584_IEC61360_dictionary_schema (which is duplicated for convenience in informative Annex D of ISO 13584-42:1998),	IEC 61360-2:2002
ISO13584_IEC61360_language_resource_schema (which is duplicated for convenience in informative Annex D of ISO 13584-42:1998),	IEC 61360-2:2002
ISO13584_instance_resource_schema	ISO 13584-24:2003,
ISO13584_IEC61360_dictionary_aggregate_extension_schema	ISO 13584-25:2004
ISO13584_extended_dictionary_schema	ISO 13584-24:2003,
ISO13584_external_file_schema	ISO 13584-24:2003,
ISO13584_aggregate_value_schema	ISO 13584-25:2004
ISO13584_library_content_schema	ISO 13584-24:2003,
measure_schema	ISO 10303-41:2000**,**
person_organization_schema	ISO 10303-41:2000,
date_time_schema	ISO 10303-41:2000,
geometry_schema	ISO 10303-42:2000,
representation_schema	ISO 10303-43:2000,
application_context_schema	ISO 10303-41:2000.

B.3 Conformance class requirements

B.3.1 Conformance class 1: minimal dictionaries

Conformance class 1 addresses those implementations that are intended to support the common requirements stated in the ISO/IEC dictionary schema and its extension which handles aggregate data types and values. An implementation of conformance class 1 of library integrated information model 25 shall support the following entities and related constructs.

```
    FROM ISO13584_IEC61360_dictionary_schema
         supplier_BSU
         supplier_element
         class_BSU
```

```
      item_class
      component_class
      material_class
      property_BSU
      property_DET
      condition_DET
      dependent_P_DET
      non_dependent_P_DET
      class_value_assignment
      data_type_BSU
      data_type_element
      number_type
      int_type
      int_measure_type
      int_currency_type
      integer_type
      non_quantitative_int_type
      real_type
      real_measure_type
      real_currency_type
      boolean_type
      string_type
      non_quantitative_code_type
      complex_type
      level_type
      class_instance_type
      entity_instance_type
      placement_type
      axis1_placement_type
      axis2_placement_2d_type
      axis2_placement_3d_type
      named_type
      value_domain
      dic_value
      non_si_unit
      dic_unit
      dates
      identified_document
      item_names
      label_with_language
      mathematical_string

FROM ISO13584_IEC61360_language_resource_schema
      global_language_assignment
      present_translations
      translated_label
      translated_text

FROM         ISO13584_IEC61360_dictionary_aggregate_extension_schema
      aggregate_entity_instance_type
      list_type
      set_type
      bag_type
      array_type
      set_with_subset_constraint_type

FROM measure_schema
      amount_of_substance_measure
      area_measure
      context_dependent_measure
      context_dependent_unit
      conversion_based_unit
      count_measure
      derived_unit
      derived_unit_element
      dimensional_exponents
      electric_current_measure
      global_unit_assigned_context
      length_measure
      length_measure_with_unit
      length_unit
```

```
        luminous_intensity_measure
        mass_measure
        measure_value
        measure_with_unit
        named_unit
        numeric_measure
        parameter_value
        plane_angle_measure
        positive_length_measure
        positive_plane_angle_measure
        ratio_measure
        si_unit
        solid_angle_measure
        thermodynamic_temperature_measure
        time_measure
        volume_measure

    FROM person_organization_schema
        address
        organization
```

B.3.2 Conformance class 2: dictionaries of items classes

Conformance class 2 addresses those implementations that support **dictionary_element**s from the extended dictionary schema without functional model and functional view classes and without aggregate types. An implementation of conformance class 2 of library integrated information model 25 shall support the following entities and related constructs.

```
    FROM ISO13584_IEC61360_dictionary_schema
        supplier_BSU
        supplier_element
        class_BSU
        item_class
        component_class
        material_class
        property_BSU
        property_DET
        condition_DET
        dependent_P_DET
        non_dependent_P_DET
        class_value_assignment
        data_type_BSU
        data_type_element
        number_type
        int_type
        int_measure_type
        int_currency_type
        integer_type
        non_quantitative_int_type
        real_type
        real_measure_type
        real_currency_type
        boolean_type
        string_type
        non_quantitative_code_type
        complex_type
        level_type
        class_instance_type
        entity_instance_type
        placement_type
        axis1_placement_type
        axis2_placement_2d_type
        axis2_placement_3d_type
        named_type
        value_domain
        dic_value
        non_si_unit
        dic_unit
        dates
```

```
      identified_document
      item_names
      label_with_language
      mathematical_string

FROM ISO13584_IEC61360_language_resource_schema
      global_language_assignment
      present_translations
      translated_label
      translated_text

FROM ISO13584_extended_dictionary_schema
      dictionary
      dictionary_in_standard_format
      library_iim_identification
      view_exchange_protocol_identification
      document_BSU
      class_document_relationship
      representation_P_DET
      class_related_dictionary_element
      document_element
      document_element_with_http_access
      documented_element_with_translated_http_access
      referenced_document
      referenced_graphics
      feature_class
      item_class_case_of
      component_class_case_of
      material_class_case_of
      feature_class_case_of
      a_posteriori_case_of
      a_posteriori_view_of

FROM ISO13584_external_file_schema
      standard_data_protocol
      non_standard_data_protocol
      http_protocol
      document_content
      translated_external_content
      not_translated_external_content
      not_translatable_external_content
      language_specific_content
      external_file_unit
      http_file
      http_class_directory
      simple_program_protocol

FROM measure_schema
      amount_of_substance_measure
      area_measure
      context_dependent_measure
      context_dependent_unit
      conversion_based_unit
      count_measure
      derived_unit
      derived_unit_element
      dimensional_exponents
      electric_current_measure
      global_unit_assigned_context
      length_measure
      length_measure_with_unit
      length_unit
      luminous_intensity_measure
      mass_measure
      measure_value
      measure_with_unit
      named_unit
      numeric_measure
      parameter_value
      plane_angle_measure
      positive_length_measure
```

```
        ratio_measure
        si_unit
        solid_angle_measure
        thermodynamic_temperature_measure
        time_measure
        volume_measure

    FROM person_organization_schema
        address
        organization
```

B.3.3 Conformance class 3: complete dictionaries

Conformance class 3 addresses those implementations that support conformance class 2 and that support both functional model and functional view classes and aggregate data types. An implementation of conformance class 3 of library integrated information model 25 shall support all the entities supported by conformance class 2 plus the following entities and related constructs.

```
    FROM ISO13584_extended_dictionary_schema
        representation_type
        geometric_representation_context_type
        representation_reference_type
        supplier_program_library_relationship
        functional_model_class
        fm_class_view_of
        functional_view_class
        non_instantiable_functional_view_class
        view_control_variable_range

    FROM ISO13584_external_file_schema
        standard_simple_program_protocol
        non_standard_simple_program_protocol
        linked_interface_program_protocol
        program_library_content
        representation_reference
        program_reference

    FROM        ISO13584_IEC61360_dictionary_aggregate_extension_schema
        aggregate_entity_instance_type
        list_type
        set_type
        bag_type
        array_type
        set_with_subset_constraint_type
```

B.3.4 Conformance class 4: complete dictionaries with limited nested aggregate values

Conformance class 4 addresses those implementations that support all the entities and associated constructs defined for conformance class 3 but with the restriction that the level of nesting of aggregates is limited to 2 by the **nesting_level_aggregate_limit_rule** rule defined in Annex D.

B.3.5 Conformance class 5: libraries of item classes

Conformance class 5 addresses those implementations that support conformance class 2 and explicit description of item class extensions by means of definition of their set of instances. Conformance class 5 does not support functional model instances, nor aggregate-structured values. An implementation of conformance class 5 of library integrated information model 25 shall support the entities defined for conformance class 2 plus following entities and related constructs.

```
    FROM ISO13584_extended_dictionary_schema
```

```
FROM ISO13584_external_file_schema
     property_value_external_item,
     message,
     illustration,
     A6_illustration,
     A9_illustration,

FROM ISO13584_instance_resource_schema
     null_value
     primitive_value
     null_or_primitive_value
     simple_value
     null_or_simple_value
     number_value
     null_or_number_value
     integer_value
     null_or_integer_value
     real_value
     null_or_real_value
     boolean_value
     null_or_boolean_value
     translatable_string_value
     translated_string_value
     string_value
     null_or_translatable_string_value
     complex_value
     null_or_complex_value
     entity_instance_value
     null_or_entity_instance_value
     defined_entity_instance_value
     controlled_entity_instance_value
     STEP_entity_instance_value
     PLIB_entity_instance_value
     property_or_data_type_BSU
     level_spec_value
     null_or_level_spec_value
     Int_level_spec_value
     null_or_int_level_spec_value
     real_level_spec_value
     null_or_real_level_spec_value
     property_value
     context_dependent_property_value
     dic_class_instance
     null_or_dic_class_instance
     dic_component_instance
     dic_feature_instance
     dic_material_instance
     lib_component_instance
     lib_feature_instance
     lib_material_instance

FROM ISO13584_library_content_schema
     library
     library_in_standard_format
     explicit_item_class_extension
     property_classification
     property_value_recommended_presentation


FROM person_organization_schema
     person

FROM date_time_schema
     date
     date_and_time
     local_time
     calendar_date
     ordinal_date
     week_of_year_and_day_date

FROM geometry_schema
```

```
        axis1_placement
        axis2_placement_2D
        axis2_placement_3D
        geometric_representation_context
        placement

    FROM representation_schema
        representation
        representation_context
        representation_item

    FROM application_context_schema
        application_context
        application_context_element
        application_protocol_definition
```

B.3.6 Conformance class 6: complete libraries

Conformance class 6 addresses those implementations that support conformance class 5 more explicit description of functional model class extensions and aggregate-structured prepares values. An implementation of conformance class 6 of library integrated information model 25 shall support all the entities supported by conformance class 5 plus the following entities and related constructs.

```
    FROM ISO13584_extended_dictionary_schema
        representation_type
        geometric_representation_context_type
        representation_reference_type
        supplier_program_library_relationship
        program_reference_type
        program_library_BSU
        program_library_element
        functional_model_class
        fm_class_view_of
        functional_view_class
        non_instantiable_functional_view_class
        view_control_variable_range
        a_posteriori_view_of

    FROM ISO13584_external_file_schema
        standard_simple_program_protocol
        non_standard_simple_program_protocol
        linked_interface_program_protocol
        program_library_content
        representation_reference
        program_reference

    FROM ISO13584_instance_resource_schema
        dic_f_model_instance
        lib_f_model_instance

    FROM ISO13584_library_content_schema
        explicit_functional_model_class_extension

    FROM ISO13584_IEC61360_dictionary_aggregate_extension_schema
        entity_instance_type_for_aggregate
        list_type
        set_type
        bag_type
        array_type
        set_with_subset_constraint_type

    FROM ISO13584_aggregate_value_schema
        (aggregate_entity_instance_value
        list_value
        set_value
        bag_value
        array_value
        set_with_subset_constraint_value
    FROM person_organization_schema
```

```
      person

FROM date_time_schema
      date
      date_and_time
      local_time
      calendar_date
      ordinal_date
      week_of_year_and_day_date
```

B.3.7 Conformance class 7: complete libraries with limited nested aggregate values

Conformance class 7 addresses those implementations that support all the entities and associated constructs defined for conformance class 6 but with the restriction that the level of nesting of aggregates is limited to 2 by the **nesting_level_aggregate_limit_rule** rule defined in Annex D.

B.3.8 Conformance class 10: library instances

Conformance class 10 addresses those implementations that support description of item class instances or of item representation instances without dictionary definition and without library structure. An implementation of conformance class 10 of library integrated information model 25 shall support all the following entities and related constructs.

NOTE Conformance class 10 does not need the use of any **dictionary** or **library** entity if no view exchange protocol is used, for instance representation.

```
FROM ISO13584_IEC61360_dictionary_schema
      supplier_BSU
      supplier_element
      class_BSU
      property_BSU
      data_type_BSU
      dic_value
      dates
      identified_document
      item_names
      label_with_language
      mathematical_string

FROM ISO13584_IEC61360_language_resource_schema
      global_language_assignment
      present_translations
      translated_label
      translated_text

FROM ISO13584_instance_resource_schema
      null_value
      primitive_value
      null_or_primitive_value
      simple_value
      null_or_simple_value
      number_value
      null_or_number_value
      integer_value
      null_or_integer_value
      real_value
      null_or_real_value
      boolean_value
      null_or_boolean_value
      translatable_string_value
      translated_string_value
      string_value
      null_or_translatable_string_value
      complex_value
      null_or_complex_value
      entity_instance_value
```

```
        null_or_entity_instance_value
        defined_entity_instance_value
        controlled_entity_instance_value
        STEP_entity_instance_value
        PLIB_entity_instance_value
        property_or_data_type_BSU
        level_spec_value
        null_or_level_spec_value
        Int_level_spec_value
        null_or_int_level_spec_value
        real_level_spec_value
        null_or_real_level_spec_value
        property_value
        context_dependent_property_value
        dic_class_instance
        null_or_dic_class_instance
        dic_component_instance
        dic_feature_instance
        dic_material_instance
        lib_component_instance
        lib_feature_instance
        lib_material_instance
        dic_f_model_instance
        lib_f_model_instance

    FROM ISO13584_extended_dictionary_schema
        dictionary
        dictionary_in_standard_format
        library_iim_identification
        view_exchange_protocol_identification
        program_library_BSU
        document_element
        document_element_with_http_access
        documented_element_with_translated_http_access
        referenced_document
        referenced_graphics
        document_BSU
        class_document_relationship

    FROM ISO13584_external_file_schema
        http_protocol
        document_content
        translated_external_content
        not_translated_external_content
        not_translatable_external_content
        language_specific_content
        external_file_unit
        http_file
        property_value_external_item

    FROM ISO13584_aggregate_value_schema
        aggregate_entity_instance_value
        list_value
        set_value
        bag_value
        array_value
        set_with_subset_constraint_value

     FROM ISO13584_library_content_schema
        library
        library_in_standard_format

    FROM person_organization_schema
        address
        organization
        person

    FROM date_time_schema
        date
        date_and_time
        local_time
```

```
      calendar_date
      ordinal_date
      week_of_year_and_day_date
```

B.3.9 Conformance class 11: library instances with associated dictionary definitions

Conformance class 11 addresses those implementations that support description of item class instances or of item representation instances with dictionary definition but without library structure. An implementation of conformance class 11 of library integrated information model 25 shall support all the entities defined for conformance class 10 plus the following entities and related constructs.

NOTE Conformance class 11 does not need the use of any **dictionary** or **library** entity if no view exchange protocol is used for instance representation.

```
FROM ISO13584_IEC61360_dictionary_schema
     item_class
     component_class
     material_class
     property_DET
     condition_DET
     dependent_P_DET
     non_dependent_P_DET
     class_value_assignment
     data_type_element
     number_type
     int_type
     int_measure_type
     int_currency_type
     integer_type
     non_quantitative_int_type
     real_type
     real_measure_type
     real_currency_type
     boolean_type
     string_type
     non_quantitative_code_type
     complex_type
     level_type
     class_instance_type
     entity_instance_type
     placement_type
     axis1_placement_type
     axis2_placement_2d_type
     axis2_placement_3d_type
     named_type
     value_domain
     non_si_unit
     dic_unit

FROM ISO13584_extended_dictionary_schema
     representation_P_DET
     class_related_dictionary_element
     feature_class
     item_class_case_of
     component_class_case_of
     material_class_case_of
     feature_class_case_of
     a_posteriori_case_of
     a_posteriori_view_of
     representation_type
     geometric_representation_context_type
     representation_reference_type
     supplier_program_library_relationship
     functional_model_class
     fm_class_view_of
     functional_view_class
     non_instantiable_functional_view_class
```

```
        view_control_variable_range

    FROM ISO13584_external_file_schema
        standard_data_protocol
        non_standard_data_protocol
        http_class_directory
        simple_program_protocol
        standard_simple_program_protocol,
        non_standard_simple_program_protocol,
        linked_interface_program_protocol
        representation_reference
        program_reference

    FROM measure_schema
        amount_of_substance_measure
        area_measure
        context_dependent_measure
        context_dependent_unit
        conversion_based_unit
        count_measure
        derived_unit
        derived_unit_element
        dimensional_exponents
        electric_current_measure
        length_measure
        length_measure_with_unit
        length_unit
        luminous_intensity_measure
        mass_measure
        measure_value
        measure_with_unit
        named_unit
        numeric_measure
        parameter_value
        plane_angle_measure
        positive_length_measure
        positive_plane_angle_measure
        ratio_measure
        si_unit
        solid_angle_measure
        thermodynamic_temperature_measure
        time_measure
        volume_measure

    FROM ISO13584_IEC61360_dictionary_aggregate_extension_schema
        aggregate_entity_instance_type
        list_type
        set_type
        bag_type
        array_type
        set_with_subset_constraint_type

    FROM geometry_schema
        axis1_placement
        axis2_placement_2D
        axis2_placement_3D
        geometric_representation_context
        placement

    FROM representation_schema
        representation
        representation_context
        representation_item

    FROM application_context_schema
        application_context
        application_context_element
        application_protocol_definition
```

Annex C
(informative)

ISO13584_25_IEC61360_5_library_implicit_schema expanded listing

This Annex references a listing of the complete EXPRESS schemas specified in Annex B of this part of IEC 61360 without comments or other explanatory text but with the additional constraints defined in **ISO13584_25_IEC61360_5_conformance_schema** defined in Annex D. The name of this schema is **ISO13584_25_IEC61360_5_library_implicit_schema**. This listing incorporates all the elements that the corresponding short form schema in Annex B uses from other schemas into a single schema without any external references

This schema may be used:

- to exchange libraries that reference the **ISO13584_25_IEC61360_5_liim_schema** and its associated **ISO13584_25_IEC61360_5_conformance_schema**, but that do not reference any view exchange protocol, and
- to exchange libraries that reference the **ISO13584_25_IEC61360_5_liim_schema** and its associated **ISO13584_25_IEC61360_5_conformance_schema**, and that do reference some view exchange protocols; in this case, the constraints defined in these view exchange protocols are not checked.

This schema may also be completed to check the constraints defined in all the referenced view exchange protocols using the following process for each referenced view exchange protocol.

Assume that V1 is a referenced view exchange protocol and that it specifies two constraint schemas of which schema names are S1_V1, S2_V1.

a) Check that all the entities referenced in the S1_V1 schema and in the S2_V1 schema already exist in the **ISO13584_25_IEC61360_5_library_implicit_schema**, otherwise reference to the library integrated information model 25 and to the view exchange protocol S1 by a same library delivery file is not allowed.

   NOTE 1 The information model of a library delivery file and the entities it may contain are specified by a library integrated information model. A view exchange protocol may only add constraints.

b) Build the long form of the S1_V1 schema and give to the resulting schema the same name: "S1_V1".

c) Build the long form of the S2_V1 schema and give to the resulting schema the same name: "S2_V1".

d) Replace everywhere in the long form of the S1_V1 schema, the string "S1_V1" by '**ISO13584_25_IEC61360_5_library_implicit_schema**' with the same case.

e) Replace everywhere in the long form of the S2_V1 schema, the string "S2_V1" by '**ISO13584_25_IEC61360_5_library_implicit_schema**' with the same case.

f) Add the content of the long form of the S1_V1 schema to the content of the **ISO13584_25_IEC61360_5_library_implicit_schema**, removing possible duplicates.

g) Add the content of the long form of the S2_V1 schema to the content of the **ISO13584_25_IEC61360_5_library_implicit_schema**, removing possible duplicates.

When the above process is performed for view exchange protocols V1, V2,...Vn, the resulting **ISO13584_25_IEC61360_5_library_implicit_schema** may be used for exchanging any library that references the **ISO13584_25_IEC61360_5_liim_schema** and its associated **ISO13584_25_IEC61360_5_conformance_schema** as its library integrated information model, and that references whole or part of the V1, V2,...Vn view exchange protocols set. This schema also includes the constraints of all the referenced view exchange protocols.

The listing of the **ISO13584_25_IEC61360_5_library_implicit_schema** schema is available in computer-interpretable form and can be found at the following URL:

http://www.tc184-sc4.org/EXPRESS/

If there is difficulty accessing these sites contact ISO Central Secretariat or contact the ISO Technical Committee 184/Subcommittee 4 Secretariat directly at: sc4sec@tc184-sc4.org

NOTE 2 The information provided in computer-interpretable form at the above URLs is normative.

NOTE 3 If some errors are identified in the EXPRESS code during the ballot process, the description of these errors, together with the corrections recommended for PLIB implementations by the part editors can be found at the following URL: http://www.lisi.ensma.fr/ftp/pub/PLIB_release_notes/Part25/Part25-IS/

Annex D
(informative)

Standard data requirements for library integrated information model 25

D.1 General

Standard data are the entity instances that shall be recognized by any implementation compliant with ISO 13584 in general that claims conformance to some conformance class of some library integrated information model or view exchange protocol of the ISO 13584 series.

Standard data must be specified by each library integrated information model and by each view exchange protocol. For each conformance class, each expanded listing in this Annex incorporates all the elements that the corresponding short form schema, specified in Annex B, uses from other schemas into a single schema without any external references to each of these schemas.

Standard data may include:

- instances of **basic_semantic_unit**s, associated with the corresponding **dictionary_ element** and possibly with a **content_item**;
- instances of external_file_protocols, and
- instances of other entities required to define the previous entity instances.

Recognition of a received **basic_semantic_unit** means that the corresponding **basic_ semantic_unit** shall be already stored in the user library, together with a corresponding **dictionary_element** and possibly a **content_item** as specified in the view exchange protocol or library integrated information model standard data. This implies that a reference to a value-equal **basic_semantic_unit** in a supplier library is interpreted as a reference to the pre-existing **basic_semantic_unit**.

NOTE 1 Examples of **basic_semantic_unit**s that may be defined as standard data in a view exchange protocol include the **class_BSU** that identifies the functional view class which may be defined by the view exchange protocol and the **property_BSU** that identifies the view control variable of this functional view class.

Recognition of an external file protocol means that external files that reference an **external_file_protocol** that is value equal, shall be processed by an implementation that recognize this **external_file_protocol**.

NOTE 2 An example of an external file protocol that may be defined as standard data by a view exchange protocol or a library integrated information model is ISO 8859-1 that specifies a 8-bit single byte coded graphics character set for Latin alphabet N°1.

Standard data are specified by means of a set of constraints that shall be fulfilled by any library that claims conformance to some conformance class of LIIM 25. The following standard data are specified by library integrated information model 25.

D.2 Constraints on a library delivery file for referencing library integrated information model 25

This Clause defines **library_iim_identification** instance values that are allowed for use in a library delivery file to reference library integrated information model 25 defined in this part of IEC 61360.

The set of allowed values is defined by means of Table D.1 that specifies for each conformance class the allowed values of **library_iim_identification.name** and

library_iim_identification.application, and by means of one EXPRESS schema that contains a global rule. This rule shall be fulfilled by any library delivery file that references library integrated information model 25, defined in this part of IEC 61360 in any of its conformance class. The goal of this rule is to specify the allowed values for the other attributes of **library_iim_identification** that shall be used to reference library integrated information model 25, by means of relationships with **view_exchange_protocol_ identification.name** and **view_exchange_protocol_identification.application**.

This rule is included in the **ISO13584_25_IEC61360_5_library_implicit_schema** specified in D.5.1.

D.3 Conformance class specification table

Table D.1 specifies the values of **library_iim_identification.name** and **library_iim_ identification.application** that are allowed for use in a **library_iim_identification** to reference library integrated information model 25 in any of its conformance classes.

Table D.1 – ISO 13584 LIIM 25 conformance class specification

Conformance class	library_iim_identification.name mandatory value	library_iim_identification.application mandatory value
2	'ISO13584_25_IEC61360_5'	'2'
3	'ISO13584_25_IEC61360_5'	'3'
4	'ISO13584_25_IEC61360_5'	'4'
5	'ISO13584_25_IEC61360_5'	'5'
6	'ISO13584_25_IEC61360_5'	'6'
7	'ISO13584_25_IEC61360_5'	'7'
10	'ISO13584_25_IEC61360_5'	'10'
11	'ISO13584_25_IEC61360_5'	'11'

NOTE 1 Conformance class 1 is not explicitly specified because it does not reference the **library_iim_ identification** entity data type. Consequently, no standard data will be specified for conformance class 1. Conformance classes 10 and 11 are explicitly specified because they may (optionally) reference the **library_iim_identification** entity data type

NOTE 2 The **allowed_reference_to_LIIM_25_rule**, **allowed_entity_instance_type_in_LIIM_25_rule** and **allowed_language_assignement_rule** rules apply to all the elements involved in the definitions of conformance classes 1 to 7 and 10 to 11. However, the **allowed_reference_to_LIIM_25_rule** has no effect on conformance classes 1 and may have no effect on conformance classes 10 and 11, since these latter may not involve **library_iim_identification** in their exchange context.

D.4 Standard data for conformance class 2 to 7 and 10 to 11 (all the conformance classes but conformance class 1)

D.4.1 General

This Clause specifies the constraints on a library delivery file conform to the library integrated model LIIM 25.

The **library_iim_identification** instance values allowed for use in a library delivery file conform to the library integrated model LIIM 25 defined in this part of IEC 61360 in any conformance class 2 to 7 and 10 to 11 shall obey the constraints defined in the following EXPRESS schema.

EXPRESS specification:

```
*)
SCHEMA ISO13584_25_IEC61360_5_conformance_schema;
```

```
USE FROM ISO13584_IEC61360_language_resource_schema(
     translated_label,
     present_translations,
     global_language_assignment);

USE FROM ISO13584_IEC61360_dictionary_aggregate_extension_schema(
     aggregate_type,
     entity_instance_type);

USE FROM ISO13584_extended_dictionary_schema(
     data_exchange_specification_identification,
     library_iim_identification);

USE FROM ISO13584_external_file_schema(
     external_file_protocol);
(*
```

NOTE The schema used above can be found in the following documents:

ISO13584_IEC61360_language_resource_schema (which is duplicated for convenience in informative Annex D of ISO 13584-42:1998)	IEC 61360-2:2002
ISO13584_IEC61360_dictionary_schema (which is duplicated for convenience in informative Annex D of ISO 13584-42:1998)	IEC 61360-2:2002
ISO13584_extended_dictionary_schema	ISO 13584-24: :2003.
ISO13584_external_file_schema	ISO 13584-24: :2003.

D.4.2 Allowed_reference_to_LIIM_25_rule rule

The **allowed_reference_to_LIIM_25_rule** rule defines a formal constraint and an informal constraint on **library_iim_identification**s to be allowed for use to reference conformance classes 1 to 7 and 10 to 11 of library integrated model LIIM 25 defined in this part of IEC 61360. A **library_iim_identification** is allowed for use to reference conformance classes 2 to 7 and 10 to 11 of library integrated model LIIM 25 if the following conditions hold:

- the **name** attribute of the **library_iim_identification** that references library integrated model LIIM 25 shall be equal to 'ISO13584_25_IEC61360_5', and
- the **status** attribute of the **library_iim_identification** shall be equal to either, ‘WD’ or 'CD' or 'DIS' or 'FDIS' or 'IS' or 'TS' or 'PAS' or 'ITA', and
- the application attribute of the library_iim_identification shall have the value '2', '3', ‘4’, ‘5’, ‘6’, '7', ‘10’ or '11', and
- the value the external_file_protocols referenced by the external_file_protocols attribute of the library_iim_identification shall fulfil the constraints required by the compliant_external_file_protocol_25 function.

Moreover, a **library_iim_identification** is allowed for use to reference conformance classes 2 to 7 and 10 to 11 of library integrated model LIIM 25 if one of the two following conditions hold concerning the **http_file**s that may be referenced directly or indirectly from the **library_iim_identification**:

- either each referenced **http_file** it is associated with a **mime** attribute and an **exchange_format** attribute corresponding to MIME type and subtype that correspond to a specification that is publicly available, or
- it is associated with a **mime** attribute and an **exchange_format** attribute corresponding to MIME type and subtype that correspond to a specification that is associated with public domain Internet-available readers.

Reference to **http_file**s corresponding to other MIME types and subtypes may only be done by private agreement between the sender and the receiver and are outside the scope of this standard. This is documented as an informal proposition **IP1** in **allowed_reference_to_LIIM_25_rule** rule.

EXPRESS specification:

```
*)
RULE allowed_reference_to_LIIM_25_rule FOR (
     library_iim_identification);
WHERE
     WR1: QUERY( liim_id <* library_iim_identification |

     ((liim_id\data_exchange_specification_identification.status
               = 'WD') OR

     (liim_id\data_exchange_specification_identification.status
               = 'CD') OR

     (liim_id\data_exchange_specification_identification.status
               = 'DIS') OR

     (liim_id\data_exchange_specification_identification.status
               = 'FDIS') OR

     (liim_id\data_exchange_specification_identification.status
               = 'IS') OR

     (liim_id\data_exchange_specification_identification.status
               = 'TS') OR

     (liim_id\data_exchange_specification_identification.status
               = 'PAS') OR

     (liim_id\data_exchange_specification_identification.status
               = 'ITA'))
          AND
          (liim_id\data_exchange_specification_identification.name
               = 'ISO13584_25_IEC61360_5')
          AND
          is_correct_liim_25_application_value(liim_id)
          AND
          (QUERY( efp <*
               liim_id\data_exchange_specification_identification
               .external_file_protocols
               | NOT(compliant_external_file_protocol_25([efp]))
               ) = []))
          = QUERY( liim_id <* library_iim_identification |

     (liim_id\data_exchange_specification_identification.name
               = 'ISO13584_25_IEC61360_5'));
END_RULE; -- allowed_reference_to_LIIM_25_rule
(*
```

Formal proposition:

WR1: when referencing library integrated model LIIM 25 defined in this part of IEC 61360, the **library_iim_identification.name** shall have ‘ISO13584_25_IEC61360_5’ as its value, **library_iim_identification.status** shall be equal to either 'WD', 'CD' or 'DIS' or 'FDIS' or 'IS' or ‘TS’ or ‘PAS’ or ‘ITA’, the **library_iim_identification.application** shall have ‘2', '3', ‘4’, ‘5’, ‘6’, '7', ‘10’ or ‘11’ as its value, and the **library_iim_identification.external_file_protocols** shall fulfill the constraint specifications required by the **compliant_external_file_protocol_25** function defined below.

Informal proposition:

IP1: when it references library integrated model LIIM 25 defined in this part of IEC 61360 in one of the conformance classes 2, 3, 4, 5, 6 or 7, a **library_iim_identification** may only reference, directly or indirectly, **http_file**s characterized by MIME types and subtypes that either correspond to specifications that are publicly available, or to specifications that are associated with public domain Internet-available readers.

D.4.3 Allowed_entity_instance_type_in_LIIM_25_rule rule

The **allowed_entity_instance_type_in_LIIM_25_rule** rule defines a formal constraint for the consistent **entity_instance_type** allowed data types.

For the purpose of the LIIM 25, solely the following **entity_instance_data_type** data types issued from the STEP resources are allowed:

- the **entity_instance_type** data type which refer to an entity **representation**;
- the entity_instance_type data type which refer to an entity representation_context;
- the entity_instance_type data type which refer to an entity geometric_representation_ context;
- the **entity_instance_type** data type which refer to an entity **representation_item**;
- the **entity_instance_type** data type which refer to an entity **date**;
- the **entity_instance_type** data type which refer to an entity **ordinal_date**;
- the **entity_instance_type** data type which refer to an entity **calendar_date**;
- the **entity_instance_type** data type which refer to an entity **local_time**;
- the entity_instance_type data type which refer to an entity week_of_year_and_day_date;
- the **entity_instance_type** data type which refer to an entity **date_and_time**;
- the **entity_instance_type** data type which refer to an entity **person**;
- the **entity_instance_type** data type which refer to an entity **organization**;
- the **entity_instance_type** data type which refer to an entity **address.**

For the purposes of the LIIM 25, solely the following entity_instance_data_type data types issued from the PLIB resources are allowed

- the entity_instance_type data type which refer to an entity representation_reference;
- the **entity_instance_type** data type which refer to an entity **program_reference**;
- the entity_instance_type data type which refer to an entity property_value_external_item.

EXPRESS specification:

```
*)
RULE allowed_entity_instance_type_in_LIIM_25_rule FOR (
     entity_instance_type);
WHERE
     WR1: QUERY( x<*entity_instance_type |
          NOT(
          ('REPRESENTATION_SCHEMA.REPRESENTATION'
               IN X.type_name)
               OR
          ('REPRESENTATION_SCHEMA.REPRESENTATION_CONTEXT'
               IN X.type_name)
               OR
          ('GEOMETRY_SCHEMA.GEOMETRIC_REPRESENTATION_CONTEXT'
               IN X.type_name)
               OR
          ('REPRESENTATION_SCHEMA.REPRESENTATION_ITEM'
               IN X.type_name)
               OR
          ('DATE_TIME_SCHEMA.DATE' IN X.type_name)
               OR
          ('DATE_TIME_SCHEMA.DATE_AND_TIME' IN X.type_name)
               OR
          ('DATE_TIME_SCHEMA.LOCAL_TIME' IN X.type_name)
               OR
          ('DATE_TIME_SCHEMA.CALENDAR_TIME' IN X.type_name)
               OR
```

```
            ('DATE_TIME_SCHEMA.ORDINAL_TIME' IN X.type_name)
                OR
            ('DATE_TIME_SCHEMA.WEEK_OF_YEAR_AND_DAY_TIME'
                IN X.type_name)
                OR
            (' PERSON_ORGANIZATION_SCHEMA.PERSON'
                IN X.type_name)
                OR
            (' PERSON_ORGANIZATION _SCHEMA.ORGANIZATION'
                IN X.type_name)
                OR
            (' PERSON_ORGANIZATION_SCHEMA.ADDRESS'
                IN X.type_name)
                OR
            ('ISO13584_EXTERNAL_FILE_SCHEMA.PROGRAM_REFERENCE'
                IN X.type_name)
                OR
            ('ISO13584_EXTERNAL_FILE_SCHEMA.REPRESENTATION_REFERENCE'
                IN X.type_name)
                OR

       ('ISO13584_EXTERNAL_FILE_SCHEMA.PROPERTY_VALUE_EXTERNAL_ITEM'
                 IN X.type_name)
            )) = [];
END_RULE; -- allowed_entity_instance_type_in_LIIM_25_rule
(*
```

Formal proposition:

WR1: when referencing library integrated model LIIM 25 defined in this part of IEC 61360, the **entity_instance_type.type_name** shall refer to **entity_instance_type** data types allowed in the exchange context defined by this part of IEC 61360.

D.4.4 Allowed_language_assignement_rule rule

The **allowed_language_assignement_rule** rule ensures that either an instance of **global_language_assignment** is available in the library delivery file or there exist one or several instances of **present_translation**s, but not both.

EXPRESS specification:

```
*)
RULE allowed_language_assignment_rule FOR (present_translations,
                                    global_language_assignment);
     WHERE
     WR1: (QUERY (x <*  global_language_assignment | TRUE)= [])
     XOR
          (QUERY(x<* present_translations | TRUE)=[]
          ) ;

END_RULE; -- Allowed_language_assignment
(*
```

Formal proposition:

WR1: no instance of **global_language_assignment** is available in the exchange file when there exist one or several instances of **present_translation**s

D.4.5 Compliant_http_protocol_25 function

The **compliant_http_protocol_25** function checks whether an **external_file_protocol** may be referenced as the HTTP protocol by a **library_iim_identification** that references library integrated model LIIM 25 in any of its conformance classes, or not. It returns TRUE if the given **external_file_protocol** is allowed for reference, otherwise, it returns FALSE. An **external_file_protocol** may be referenced as the HTTP protocol by a **library_iim_**

identification that reference library integrated model LIIM 25 in any of its conformance classes if the following conditions hold:

- the external_file_protocol shall be an http_protocol, and
- the **organisation** attribute of the **external_file_protocol** shall reference an organization of which the **id** attribute equals to 'IAB' and the **name** attribute equals to 'Internet Architecture Board', and
- the **protocol_name** attribute of the **external_file_protocol** shall equal to 'HTTP' or to ‘HTTPS’, and
- the **designation** attribute of the **external_file_protocol** shall reference an **item_names** for which the **preferred_name** attribute equals to 'Hypertext Transfer Protocol' and the **short_name** attribute equals to 'RFC' followed by four digits and possibly some other characters.

EXPRESS specification:

```
*)
FUNCTION  compliant_http_protocol_25(ef  :  external_file_protocol):
BOOLEAN;

LOCAL
     ok: BOOLEAN := TRUE;
END_LOCAL;

IF (('ISO13584_EXTERNAL_FILE_SCHEMA'
     + '.HTTP_PROTOCOL' IN TYPEOF(ef)) AND
     (ef.organisation.id = 'IAB') AND
     (ef.organisation.name = 'Internet Architecture Board') AND
     ((ef.protocol_name = 'HTTP')
          OR (ef.protocol_name = 'HTTPS'))AND
     (ef.designation.preferred_name
     = 'Hypertext Transfer Protocol'))
THEN
     IF
'ISO13584_IEC61360_LANGUAGE_RESOURCE_SCHEMA.TRANSLATED_LABEL'
          IN TYPEOF(ef.designation.short_name)
     THEN
          REPEAT i:= 1 TO SIZEOF(ef.designation.short_name
                    \translated_label.labels);
               IF (ef.designation.short_name\translated_label.
                    labels[i] LIKE 'RFC####&')
               THEN
                    ok := ok AND TRUE;
               ELSE
                    ok := OK AND FALSE;
               END_IF;
          END_REPEAT;
          RETURN(OK);
     ELSE
          IF (ef.designation.short_name LIKE 'RFC####&')
          THEN
               RETURN(TRUE);
          ELSE
               RETURN(FALSE);
          END_IF;
     END_IF;
ELSE
     RETURN(FALSE);
END_IF;

END_FUNCTION; -- compliant_http_protocol_25
(*
```

D.4.6 Compliant_8859_1_protocol_25 function

The **compliant_8859_1_protocol_25** function checks whether an **external_file_protocol** may be referenced as the ISO 8859-1 protocol by a **library_iim_identification** that references library integrated model LIIM 25 in any of its conformance classes, or not. It returns TRUE if the given **external_file_protocol** is allowed for reference, otherwise, it returns FALSE. An **external_file_protocol** may be referenced as the ISO 8859-1 protocol by a **library_iim_identification** that represents reference library integrated model LIIM 25 in any of its conformance classes, if the following conditions hold:

- the external_file_protocol shall be a standard_data_protocol, and
- the organization attribute of the **external_file_protocol** shall reference an organization of which the **id** attribute equals to 'ISO' and the **name** attribute equals to 'International Organisation for Standardization', and
- the **protocol_name** attribute of the **external_file_protocol** shall equal to 'ISO_8859_1', and
- the **designation** attribute of the **external_file_protocol** shall reference an **item_names** for which the **preferred_name** attribute equals to 'Latin alphabet No 1' and the **short_name** attribute equals to 'ISO 8859-1'.

EXPRESS specification:

```
*)
FUNCTION compliant_8859_1_protocol_25(ef: external_file_protocol)
     : BOOLEAN;

IF (('ISO13584_EXTERNAL_FILE_SCHEMA'
     + '.STANDARD_DATA_PROTOCOL' IN TYPEOF(ef)) AND
     (ef.organisation.id = 'ISO') AND
     (ef.organisation.name
     = 'International Organisation for Standardization') AND
     (ef.protocol_name = 'ISO_8859_1') AND
     (ef.designation.preferred_name
     = 'Latin alphabet No 1') AND
     (ef.designation.short_name = 'ISO 8859-1'))
THEN
     RETURN(TRUE);
ELSE
     RETURN(FALSE);
END_IF;
END_FUNCTION; -- compliant_8859_1_protocol_25
(*
```

D.4.7 Compliant_external_file_protocol_25 function

The **compliant_external_file_protocol_25** function checks whether all the **external_file_protocol**s of a set of **external_file_protocol**s may be referenced as a library integrated model LIIM 25 by a **library_iim_identification** that references library integrated model LIIM 25 in one of its conformance classes 1 to 4, or not. It returns TRUE if all the **external_file_protocol**s of a set of **external_file_protocol**s are allowed for reference, otherwise, it returns FALSE.

An **external_file_protocol** may be referenced by a **library_iim_identification** that represents conformance class 1 to 4 of library integrated model LIIM 25 if it may be referenced:

- either as the HTTP protocol, or
- as the ISO 8859-1 protocol.

NOTE In extended conformance classes of library integrated model LIIM 25, any other e**xternal_file_protocol** may be referenced, subject to private agreement between the sender and the receiver.

EXPRESS specification:

```
*)
FUNCTION compliant_external_file_protocol_25(
     s: SET [0:?] OF external_file_protocol): BOOLEAN;

REPEAT i := 1 TO SIZEOF(s);
     IF NOT (compliant_8859_1_protocol_25(s[i])
               OR compliant_http_protocol_25(s[i]))
     THEN
          RETURN(FALSE);
     END_IF;
END_REPEAT;

RETURN(TRUE);

END_FUNCTION; -- compliant_external_file_protocol_25
(*
```

D.4.8 Is_correct_liim_25_application_value function

The **is_correct_liim_25_application_value** function checks that the **liim_id library_iim_ identification** is compatible with the conformance classes associated to the LIMM 25.

EXPRESS specification:

```
*)
FUNCTION is_correct_liim_25_application_value(
     liim_id: library_iim_identification): BOOLEAN;

IF EXISTS(liim_id\data_exchange_specification_identification.
     application)
     AND
     (((liim_id\data_exchange_specification_identification.
          application[1]='2')
          OR
     (liim_id\data_exchange_specification_identification.
          application[1]='3')
          OR
     (liim_id\data_exchange_specification_identification.
          application[1]='4')
          OR
     (liim_id\data_exchange_specification_identification.
          application[1]='5')
          OR
     (liim_id\data_exchange_specification_identification.
          application[1]='6')
          OR
     (liim_id\data_exchange_specification_identification.
          application[1]='7'))
     AND
     (liim_id\data_exchange_specification_identification.
          Application LIKE '#'))
     OR
     ((liim_id\data_exchange_specification_identification.
          application[1]='1')
          AND
     ((liim_id\data_exchange_specification_identification.
          application[2]='0')
     OR
     (liim_id\data_exchange_specification_identification.
          application[2]='1')))

THEN
     RETURN(TRUE);
ELSE
     RETURN(FALSE);
END_IF;
END_FUNCTION; -- is_correct_liim_25_application_value
```

```
(*
```

D.5 Additional constraint for conformance classes 4 and 7

This Clause specifies the additional constraint on a library delivery file conform to conformance classes 4 and 7 associated to the library integrated model LIIM 25.

D.5.1 nesting_level_aggregate_limit_rule rule

The **nesting_level_aggregate_limit_rule** rule checks that the level of nested elements in the aggregate values is limited to 2.

This rule is applied for each instance of the entity **aggregate_type**. The Boolean function **no_more_than_two_nested_levels** is used as a filter for each instance of the **aggregate_type** entity.

EXPRESS specification:

```
*)
RULE nesting_level_aggregate_limit_rule FOR
               (library_iim_identification,
                   aggregate_type);
     WHERE
     WR1: NOT (QUERY( liim_id <* library_iim_identification |

     (liim_id\data_exchange_specification_identification.name
              = 'ISO13584_25_IEC61360_5')
              AND
              ((liim_id\data_exchange_specification_identification.
              application[1]='4')
              OR
              (liim_id\data_exchange_specification_identification.
              application[1]='7'))) <> [])
          OR
              (QUERY (x <*  aggregate_type | NOT
              no_more_than_two_nested_levels(x))= []);
END_RULE; -- nesting_level_aggregate_limit_rule
 (*
```

D.5.2 no_more_than_two_nested_levels function

The **no_more_than_two_nested_levels** function checks that an aggregate value does not contain more than two levels of aggregate values.

EXPRESS specification:

```
*)
FUNCTION            no_more_than_two_nested_levels(typ           :
aggregate_type):BOOLEAN;


IF NOT ('ISO13584_IEC61360_DICTIONARY_AGGREGATE_EXTENSION_SCHEMA.'+
     'ENTITY_INSTANCE_TYPE_FOR_AGGREGATE' IN
     TYPEOF(typ.value_type))
THEN -- level 1 is not an aggregate
     RETURN (TRUE);
END_IF;

-- level 1 is an aggregate

IF NOT ('ISO13584_IEC61360_DICTIONARY_AGGREGATE_EXTENSION_SCHEMA.'+
          'ENTITY_INSTANCE_TYPE_FOR_AGGREGATE' IN
          TYPEOF(typ.value_type.type_structure.value_type))
THEN -- level 2 is not an aggregate
```

```
     RETURN (TRUE);
END_IF;

-- Level 2 is an aggregate
RETURN(FALSE);

END_FUNCTION; -- more_than_two_nested_levels
(*

*)
END_SCHEMA; --ISO13584_25_IEC61360_5_conformance_schema
(*
```

Annex E
(informative)

Implementation method specific requirements for the library integrated information model 25

Conformance to the library integrated information model 25 shall be realized in one or more implementation methods. The implementation methods define what types of exchange behaviour is required with respect to exchange protocols.

One implementation method is defined for the library delivery file: ISO 10303-21.

The implementation methods for the possible external files referenced from the library delivery file and whose **external_file_protocol** belong to the standard data of the library integrated information model 25 are defined by the standard referenced in this **external_file_protocol**, possibly further specified as part of the description of the library integrated information model standard data (see Annex B of ISO 13584-25).

For the exchange structure, the file format of the library delivery file shall be encoded according to the syntax and EXPRESS language mapping defined in ISO 10303-21 for the schema defined in Annex A of ISO 13584-25. The header of the exchange structure shall identify use of ISO 13584-25 by the schema names 'ISO13584_25_IEC61360_5_ library_implicit_schema'.

NOTE Identification of the library delivery file is done by separate agreement between the sender and the receiver and is outside the scope of ISO 13584-25.

Annex F
(informative)

EXPRESS_G diagram

Figure F corresponds to the EXPRESS schema given in Annex A. The diagram uses the EXPRESS-G graphical notation for the EXPRESS language, which is defined in Annex A of ISO 10303-11.

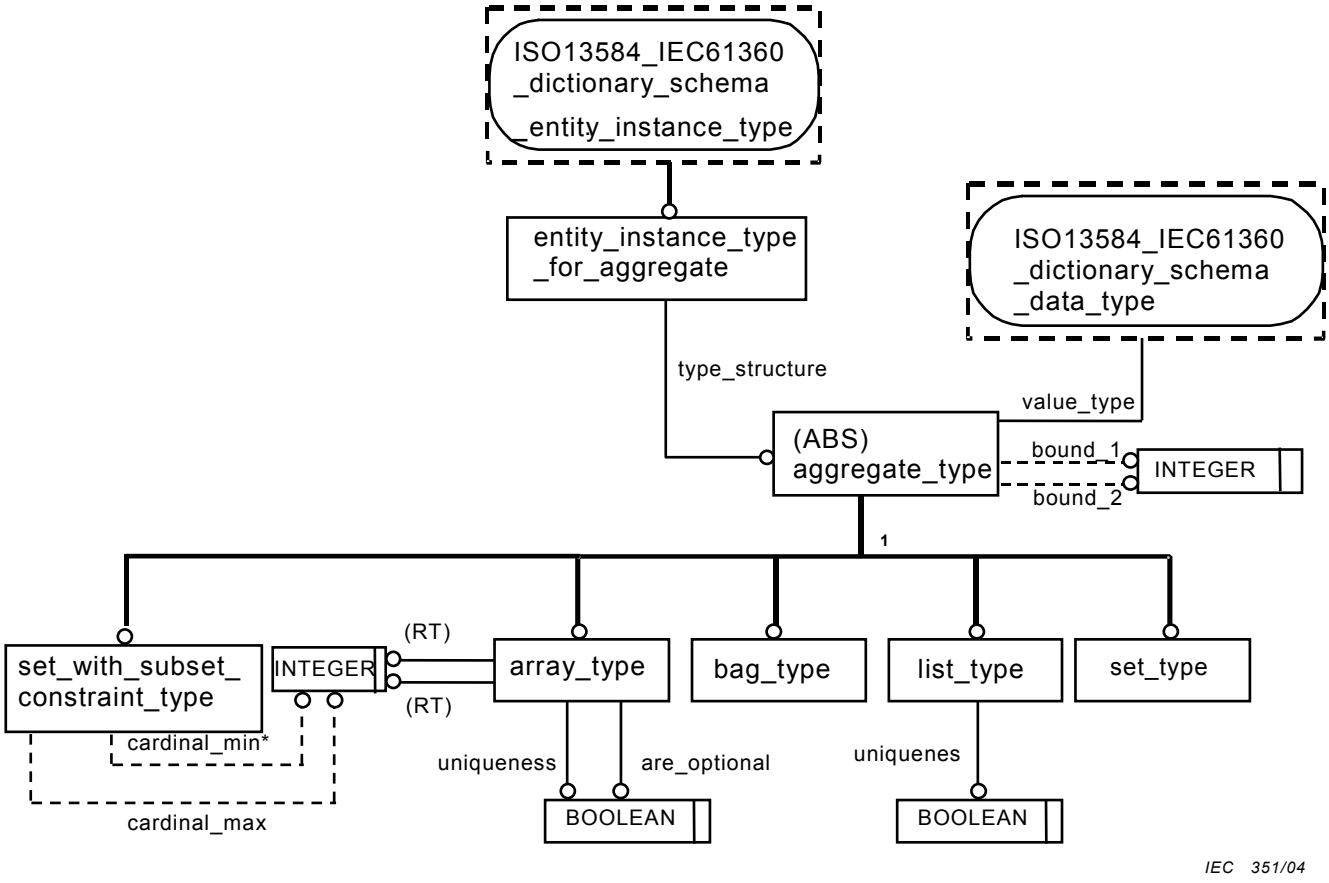

Figure F.1 – ISO13584_IEC61630_dictionary_aggregate_extension_schema diagram

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RFC 2068:1997, *Hypertext transfer protocol HTTP/1.1*

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standard is too academic ❑
standard is too superficial ❑
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