IEC 61360-5

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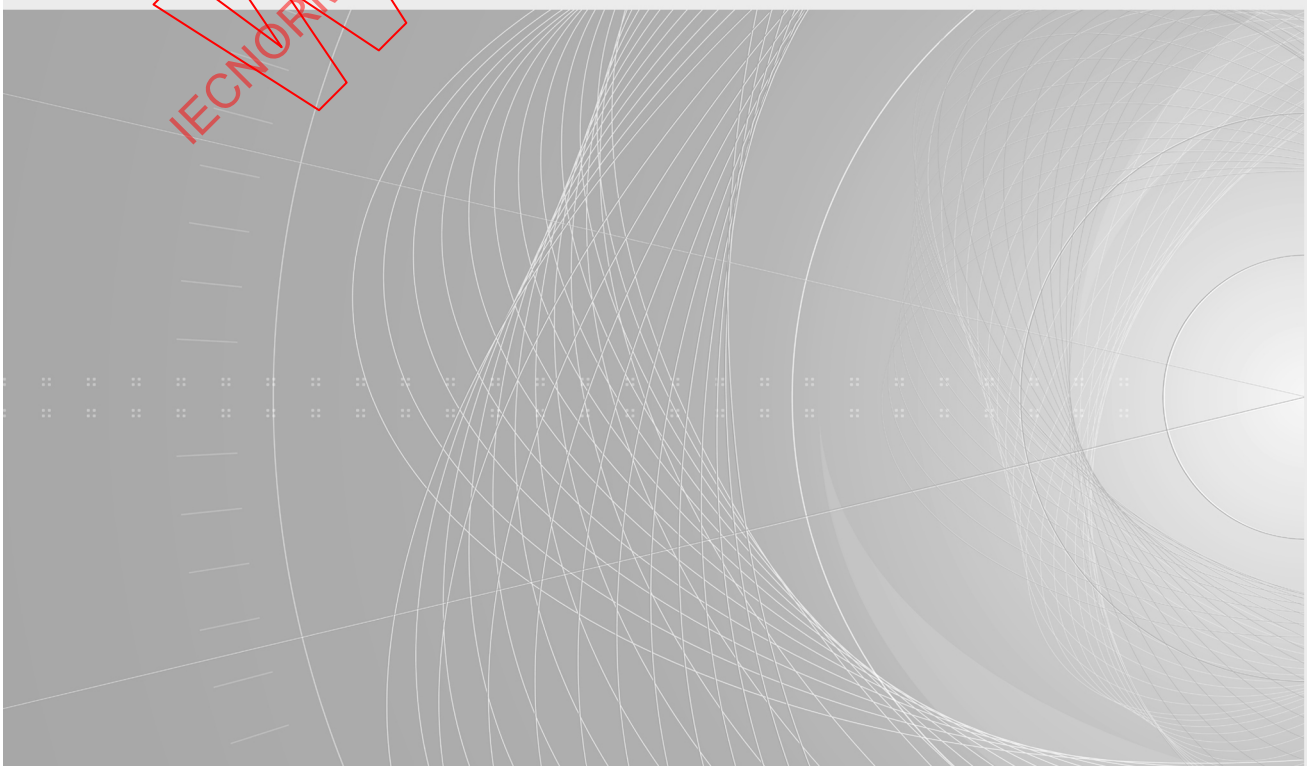
INTERNATIONAL STANDARD

NORME INTERNATIONALE

Standard data element types with associated classification scheme for electric components –
Part 5: Extensions to the EXPRESS dictionary schema

Types normalisés d'éléments de données avec plan de classification pour composants électriques –
Partie 5: Extensions au schéma du dictionnaire EXPRESS



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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.

This bilingual version, published in 2011-04, corresponds to the English version.

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.

The French version of this standard has not been voted upon.

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 the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

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 IEC 61360-2:2002
(which is duplicated for convenience in informative Annex D of ISO 13584-42:1998)

ISO13584_IEC61360_dictionary_schema IEC 61360-2:2002
(which is duplicated for convenience in informative Annex D of ISO 13584-42:1998)

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_protocols 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 **external_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.1 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.

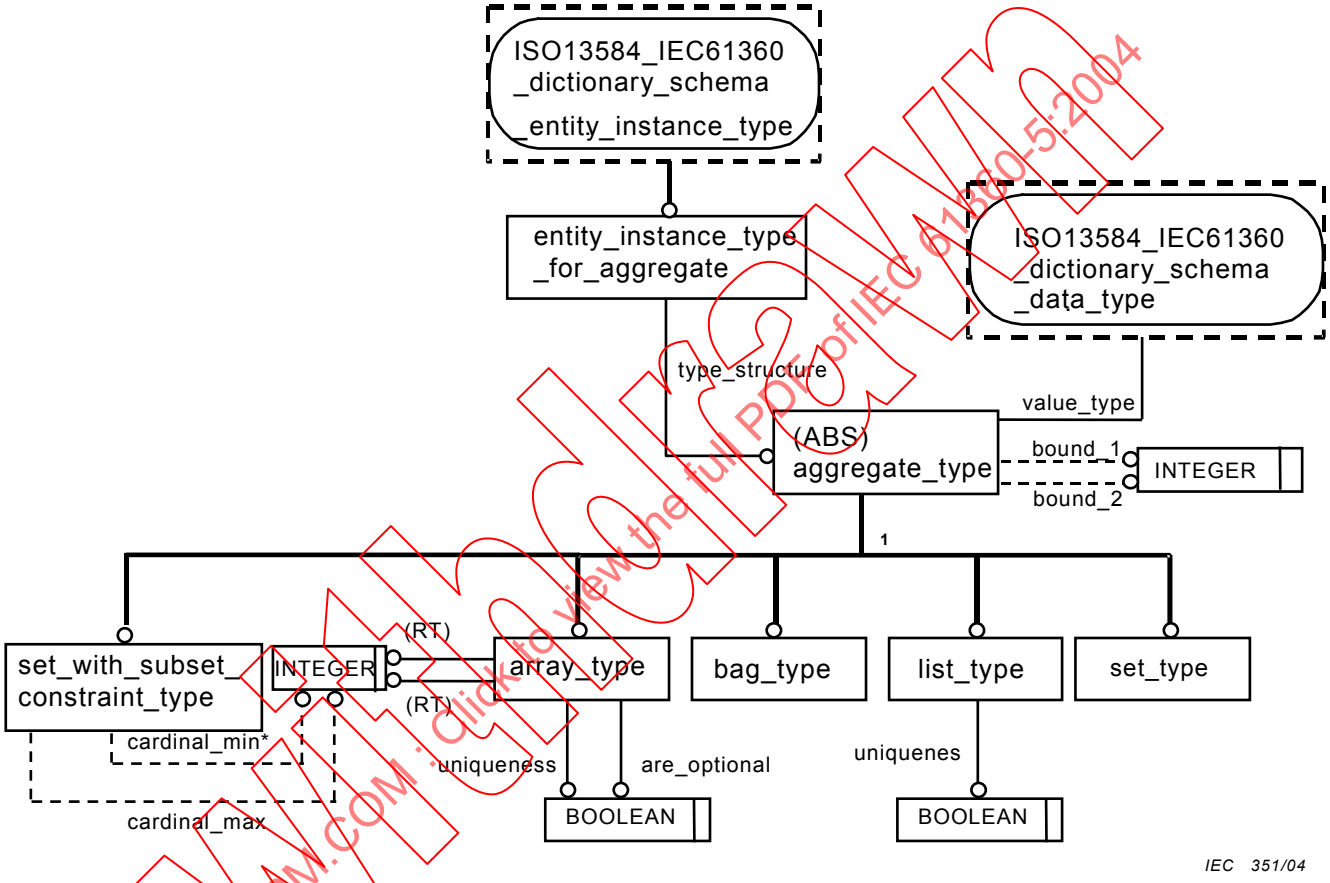

Figure F.1 – ISO13584_IEC61630_dictionary_aggregate_extension_schema diagram

Bibliography

ISO 8859-1:1998, *Information technology – 8-bit single-byte coded graphic character sets – Part 1: Latin alphabet No. 1*

ISO 10303-21:2002, *Industrial automation systems and integration – Product data representation and exchange – Part 21: Implementation methods: Clear text encoding of the exchange structure*

ISO 10303-41:2000, *Industrial automation systems and integration – Product data representation and exchange – Part 41: Integrated generic resources: Fundamentals of product description and support*

ISO 10303-42:2003, *Industrial automation systems and integration – Product data representation and exchange – Part 42: Integrated generic resources: Geometric and topological representation*

ISO 10303-43:2000, *Industrial automation systems and integration – Product data representation and exchange – Part 43: Integrated generic resources: Representation structures*

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

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

TYPES NORMALISÉS D'ÉLÉMENTS DE DONNÉES AVEC PLAN DE CLASSIFICATION POUR COMPOSANTS ÉLECTRIQUES –

Partie 5: Extensions au schéma du dictionnaire EXPRESS

AVANT-PROPOS

1) La Commission Electrotechnique Internationale (CEI) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de la CEI). La CEI a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, la CEI – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de la CEI"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec la CEI, participent également aux travaux. La CEI collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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La Norme internationale CEI 61360-5 a été établie par le sous-comité 3D: Ensembles de données pour bibliothèques, du comité d'études 3 de la CEI: Structures d'informations, documentation et symboles graphiques.

La présente version bilingue, publiée en 2011-04, correspond à la version anglaise.

Le texte anglais de cette norme est issu des documents 3D/128/FDIS et 3D/129/RVD.

Le rapport de vote 3D/129/RVD donne toute information sur le vote ayant abouti à l'approbation de cette norme.

La version française de cette norme n'a pas été soumise au vote.

Cette publication a été rédigée selon les Directives ISO/CEI, Partie 2.

La CEI 61360 comprend les parties suivantes, sous le titre général *Types normalisés d'éléments de données avec plan de classification pour composants électriques:*

– Partie 1: Définitions – Principes et méthodes
– Partie 2: Schéma du dictionnaire EXPRESS
– Partie 3: Procédures de maintenance et de validation
– Partie 4: Collection de référence CEI de types normalisés d'éléments de données, de classes de composants et de termes
– Partie 5: Extensions au schéma du dictionnaire EXPRESS

Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de la CEI sous "http://webstore.iec.ch" dans les données relatives à la publication recherchée. A cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

INTRODUCTION

Pour comprendre les ressources génériques utilisées dans la présente partie de la série CEI 61360, la connaissance d'EXPRESS, comme défini dans l'ISO 10303-11:1994, est nécessaire. Une connaissance de base de l'ISO 13584-24:2003, et de l'ISO 13584-42:1998 est également nécessaire.

Les ressources génériques spécifiées dans ce document ont été élaborées grâce à un effort conjugué du Comité technique ISO 184/Sous-comité 4/Groupe de travail 2 et du Sous-comité 3D de la CEI. Elles sont destinées à être documentées aussi bien dans la présente partie de la CEI 61360 que dans l'ISO 13584. Les deux comités ont convenu de ne pas changer et/ou de modifier les schémas EXPRESS indépendamment l'un de l'autre afin de garantir l'harmonisation et la réutilisabilité du travail des deux comités. En conséquence, il convient d'envoyer les demandes d'amendements aux deux comités. Il convient que ces demandes soient adoptées par les deux comités avant de modifier les schémas EXPRESS.

Ce document est entièrement compatible avec les parties 42 et 25 de l'ISO 13584.

Ce document contient les extensions à ISO13584_IEC61360_dictionary_schema commun (CEI 61360-2) qui sont générées pour satisfaire aux besoins de l'utilisateur.

Les parties suivantes sont recopiées de l'ISO 13584-25 et apparaissent dans la CEI 61360-5 comme suit:

ISO 13584-25	CEI 61360-5
Article 6	Annexe A (informative)
Article 8	Annexe B (informative)
Annexe C	Annexe C (informative)
Annexe D	Annexe D (informative)
Annexe E	Annexe E (informative)
Figure F.1	Annexe F (informative)

TYPES NORMALISÉS D'ÉLÉMENTS DE DONNÉES AVEC PLAN DE CLASSIFICATION POUR COMPOSANTS ÉLECTRIQUES –

Partie 5: Extensions au schéma du dictionnaire EXPRESS

1 Domaine d'application et objet

Le domaine d'application de la présente partie de la CEI 61360 est l'extension du schéma du dictionnaire commun ISO/CEI à la définition des concepts utilisés dans la CEI 61360-1 mais qui ne sont pas traités par les modèles d'information spécifiés dans la CEI 61360-2.

L'objet de la présente norme est de fournir un modèle formel pour les données conformément au domaine d'application mentionné ci-dessus et ainsi, de fournir, avec la CEI 61360-2, un moyen de représentation interprétable par l'ordinateur et d'échange de toutes les données en conformité avec la CEI 61360-1.

Le schéma du dictionnaire commun ISO/CEI tel que défini dans la CEI 61360-2 est le schéma du dictionnaire commun ISO/CEI fondé sur l'intersection des domaines d'application des deux normes de base.

- CEI 61360-1;
- ISO 13584-42

et il en facilite l'harmonisation.

Citation d'une partie correspondante du domaine d'application et de l'objet de la CEI 61360-1:

La présente partie de la CEI 61360 donne une base solide pour la définition claire et non ambiguë des propriétés caractéristiques (types d'éléments de données) de tous les éléments des systèmes électrotechniques depuis les composants de base jusqu'aux sous-ensembles et aux systèmes complets. Bien qu'ils aient été conçus à l'origine dans l'optique de fournir une base pour l'échange d'information sur les composants électriques/électroniques, il est admis d'utiliser les principes et les méthodes contenus dans la présente norme dans des domaines autres que ceux de la conception d'origine comme les ensembles de composants et les systèmes et les sous-systèmes électrotechniques.

Citation d'une partie correspondante de l'introduction de l'ISO 13584-42:

La présente partie de l'ISO 13584 fournit des règles et des directives pour que les fournisseurs de données de bibliothèque créent des hiérarchies de familles de composants selon une méthodologie commune destinée à assurer la cohérence entre plusieurs fournisseurs. Ces règles concernent ce qui suit: la méthode de regroupement de composants en familles de composants afin de former une hiérarchie; les éléments du dictionnaire qui décrivent les familles et les propriétés des composants.

La CEI 61360-2 fournit un modèle commun d'informations pour les travaux des deux comités, permettant ainsi de mettre en œuvre des systèmes de dictionnaires traitant les données délivrées selon l'une ou l'autre des normes élaborées par les deux comités.

La présente partie de la CEI 61360 fournit un Modèle d'informations intégrées de bibliothèque (liim) qui, avec les ressources de la CEI 61360-2, de l'ISO 13584 et de l'ISO 10303, permet la modélisation et l'échange d'informations du dictionnaire en conformité avec la CEI 61360-1.

2 Références normatives

Les documents de référence suivants sont indispensables pour l'application du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

CEI 61360-1:2002, *Types normalisés d'éléments de données avec plan de classification pour composants électriques – Partie 1: Définitions – Principes et méthodes*

CEI 61360-2:2002, *Types normalisés d'éléments de données avec plan de classification pour composants électriques – Partie 2: Schéma d'un dictionnaire EXPRESS*

IEC 61360-4:1997, *Types normalisés d'éléments de données avec plan de classification pour composants électriques – Partie 4:Collection de référence CEI des types normalisés d'éléments de données, des classes de composants et des termes*

ISO 10303-11:1994, *Systèmes d'automatisation industrielle et intégration – Représentation et échange de données de produits – Partie 11: Méthodes de description: Manuel de référence du langage EXPRESS*

ISO 13584-1:2001, *Systèmes d'automatisation industrielle et intégration – Bibliothèque de composants – Partie 1: Aperçu et principes fondamentaux*

ISO 13584-24:2003, *Systèmes d'automatisation industrielle et intégration – Bibliothèque de composants – Partie 24: Ressource logique: Modèle logique de fournisseur*

ISO 13584-25, *Systèmes d'automatisation industrielle et intégration – Bibliothèque de composants – Partie 25: Ressource logique: Modèle logique de fournisseur avec des valeurs d'ensemble et un contenu explicite* [1]

ISO 13584-42:1998, *Systèmes d'automatisation industrielle et intégration – Bibliothèque de composants – Partie 42: Méthodologie descriptive: Méthodologie appliquée à la structuration des familles de pièces*

3 Termes, définitions et abréviations

Pour les besoins du présent document, les termes et définitions donnés dans la CEI 61360-1, la CEI 61360-2, l'ISO 13584-24 ainsi que les suivants s'appliquent. Certaines de ces définitions sont répétées par commodité.

NOTE Les définitions copiées textuellement à partir d'autres normes sont suivies d'une référence à la norme source, entre crochets. Les définitions qui ont été adaptées à partir d'autres normes sont suivies d'une note explicative.

3.1
propriété applicable
propriété définie pour une certaine famille de composants et qui doit s'appliquer à tout composant appartenant à cette famille de composants

[ISO 13584-24:2003, définition 3.3]

EXEMPLE Pour une famille générique de vis, le diamètre fileté est une propriété applicable. Cette caractéristique s'applique à n'importe quelle vis.

---

1 À publier.

3.2
unité sémantique de base
BSU[2]
entité permettant une identification absolue et universelle de certains objets du domaine d'application (par exemple classes, types d'éléments de données)

[CEI 61360-2-2002, définition 2.1]

3.3
extension de classe
ensemble de toutes les instances satisfaisant à la définition de classe

[ISO 13584-24:2003, définition 3.13]

3.4
schéma du dictionnaire commun
modèle d'information pour un dictionnaire, utilisant le langage de modélisation EXPRESS

[CEI 61360-2-2002, définition 2.3]

NOTE Le schéma du dictionnaire commun est appelé formellement ISO13584_IEC61360_dictionary_schema et il est indiqué dans la CEI 61360-2:2002. Ce schéma est dupliqué à l'Annexe D de l'ISO 13584-42:1998.

3.5
classe de conformité
sous-ensemble d'une norme pour lequel la conformité peut être déclarée

[ISO 13584-24:2003, définition 3.17]

3.6
exigence de conformité
définition textuelle précise d'une caractéristique qui doit être présente dans une mise en œuvre conforme

[ISO 10303-1:1994, définition 3.2.13]

3.7
élément de dictionnaire
ensemble d'attributs constituant la description dans le dictionnaire de certains objets du domaine d'application (par exemple, classes, types d'éléments de données)

[CEI 61360-2-2002, définition 2.2]

3.8
type d'élément de données
DET[3]
unité de données pour laquelle l'identification, la description et la représentation de la valeur ont été spécifiées

[CEI 61360-1-2002, définition 2.3]

3.9
type de données
ensemble de valeurs autorisées d'un type d'élément de données

[CEI 61360-2-2002, définition 2.4]

---

[2] BSU = *Basic Semantic Unit*.

[3] DET = *Data Element Type*.

NOTE Dans la CEI, le **data_type** qui est soit une unité de mesure, soit un domaine de valeurs, est défini séparément pour chaque type d'élément de données.

3.10
famille de composants
famille simple ou générique de composants

[ISO 13584-24:2003, définition 3.40]

3.11
modèle fonctionnel
données de bibliothèque représentant une catégorie de représentation d'un composant dans une bibliothèque intégrée

[ISO 13584-1:2001, définition 3.1.3]

3.12
vue fonctionnelle
donnée représentant une catégorie de représentation d'un composant dans les données de produit

[ISO 13584-1:2001, définition 3.1.4]

NOTE La structure d'une vue fonctionnelle ne dépend pas du composant qu'elle représente.

3.13
modèle général
donnée de bibliothèque comportant la définition et l'identité d'un composant dans une bibliothèque intégrée

[ISO 13584-1:2001, définition 3.1.5]

3.14
famille générique de composants
regroupement de familles simples ou génériques de composants réalisé en vue d'une classification ou de la factorisation d'informations communes

[ISO 13584-24:2003, définition 3.44]

3.15
fichier de livraison de bibliothèque
population d'instances d'entités EXPRESS conforme à un modèle d'informations intégrées de bibliothèque et représentée selon l'une des méthodes de mise en œuvre spécifiées dans l'ISO 10303

[ISO 13584-24:2003, définition 3.68]

NOTE Un fichier de livraison de bibliothèque spécifie la structure et le contenu d'une bibliothèque de fournisseur. Il peut faire référence à des fichiers externes de bibliothèque.

3.16
composant de bibliothèque
composant associé à un ensemble de données le représentant dans une bibliothèque

[ISO 13584-1:2001, définition 3.1.13]

3.17
données de composant de bibliothèque
données représentant un composant dans une bibliothèque

[ISO 13584-1:2001, définition 3.1.14]

3.18
contexte d'échange de bibliothèque
ensemble constitué d'un fichier de livraison de bibliothèque et de zéro, un ou plusieurs fichiers externes de bibliothèque représentant ensemble une bibliothèque de fournisseur

[ISO 13584-24:2003, définition 3.70]

3.19
fichier externe de bibliothèque
fichier, référencé d'après un fichier de livraison de bibliothèque, contribuant à la définition d'une bibliothèque de fournisseur

[ISO 13584-24:2003, définition 3.71]

NOTE La structure et le format d'un fichier externe de bibliothèque sont spécifiés dans le fichier de livraison de bibliothèque qui le référence.

3.20
modèle d'informations intégrées de bibliothèque
LIIM[4]
schéma EXPRESS intégrant des constructions de ressources de différents schémas EXPRESS pour représenter des bibliothèques de fournisseurs en vue d'un échange et associé à des exigences de conformité

[ISO 13584-24:2003, définition 3.72]

3.21
spécification de bibliothèque d'une classe
représentation explicite d'une extension de classe dans une bibliothèque de fournisseur

[ISO 13584-24:2003, définition 3.76]

NOTE 1 Dans la série ISO 13584, chaque classe est définie intentionnellement par un élément du dictionnaire. Seules les classes dont le fournisseur désire qu'elles représentent explicitement les instances possibles sont associées à une spécification de bibliothèque.

NOTE 2 Dans l'ISO 13584-24, la spécification de bibliothèque d'une classe consiste en un ensemble contenant toutes les instances différentes possibles.

3.22
composant
matériau ou élément fonctionnel destiné à constituer un composant de produits différents

[ISO 13584-1:2001, définition 3.1.16]

3.23
propriété
information pouvant être représentée par un type d'élément de données

[ISO 13584-42:1998, définition 3.4.10]

3.24
catégorie de représentation
abstraction utilisée pour distinguer plusieurs exigences d'utilisateur possibles concernant la représentation d'un composant

[ISO 13584-1:2001, définition 3.1.20]

---

4 LIM = *Library Integrated Information Model*.

NOTE Dans le modèle défini dans la série de normes ISO 13584 cette distinction s'exprime formellement en termes de nom logique de vue et en termes de variables de contrôle de vue.

3.25
construction de ressource
collection d'entités, types, fonctions, règles et références du langage EXPRESS, définissant ensemble une description valide de donnée

[ISO 13584-24:2003, définition 3.97]

3.26
famille simple de composants
ensemble de composants dont chaque composant peut être décrit par le même groupe de propriétés

[ISO 13584-24:2003, définition 3.98]

3.27
bibliothèque de fournisseur
ensemble de données et éventuellement de programmes, pour lesquels le fournisseur est défini et décrivant dans le format normalisé défini dans l'ISO 13584 un ensemble de composants et/ou un ensemble de représentations de composants

[ISO 13584-1:2001, définition 3.1.22]

3.28
bibliothèque d'utilisateur
informations résultant de l'intégration d'une ou plusieurs bibliothèques de fournisseur par le système de gestion de bibliothèque et éventuellement d'une adaptation ultérieure effectuée par l'utilisateur

[ISO 13584-1:2001, définition 3.1.23]

3.29
protocole d'échange de vue
VEP[5]
partie de l'ISO 13584 décrivant l'utilisation de constructions de ressources et d'interfaces de transmission de représentation satisfaisant à l'exigence concernant les informations pour l'échange d'une catégorie de représentation de composants

[ISO 13584-24:2003, définition 3.107]

3.30
propriété visible
propriété définie pour une certaine famille de composants et qui peut ou non s'appliquer aux différents composants de cette famille de composants

[ISO 13584-24:2003, définition 3.109]

EXEMPLE Pour une famille générique de vis, la longueur non filetée est une propriété visible: elle est clairement définie pour toute vis, mais seules les vis ayant une partie non filetée ont une valeur pour cette propriété.

NOTE Le code de la classe où une propriété est définie comme visible fait partie de l'identification du type d'élément de données représentant cette propriété.

3.31
classe racine CEI
classe qui est la superclasse de toutes les classes définies dans la CEI 61360-4; son code de classe est « AAA000 » et sa version est « 001 »

---

[5] VEP = *View Exchange Protocol.*

[CEI 61360-2-2002, définition 2.5]

3.32
type d'élément de données applicable
type d'élément de données défini pour une certaine classe de composants et s'appliquant à tout composant appartenant à cette classe de composants

[CEI 61360-2-2002, définition 2.6]

3.33
type d'élément de données visible
type d'élément de données défini pour une certaine classe de composants et pouvant ou non s'appliquer aux différents composants de cette classe de composants

NOTE 1 Le code de la classe où un type d'élément de données est défini comme visible fait partie de l'identification de ce type d'élément de donnée.

NOTE 2 Dans la CEI, tous les types d'élément de données sont définis comme visibles au niveau de la classe racine, c'est-à-dire la superclasse à la fois de la classe de composants et de la classe de matériaux.

4 Structure de la CEI 61360-5

La CEI 61360-5 comporte deux parties principales:

- la partie de ressources génériques fournit des constructions de ressources pour représenter des types de données agrégées. Les types et les valeurs de données agrégées sont modélisés en totale conformité avec le langage EXPRESS.
- le modèle d'informations intégrées de bibliothèque rassemble la construction de ressources ci-dessus avec d'autres constructions de ressources génériques de la CEI 61360-2 et de différentes parties de l'ISO 13584 et de l'ISO 10303 en un schéma unique pour représenter des dictionnaires pouvant inclure des types de données agrégées.

4.1 Ressource générique

La ressource générique contient le schéma EXPRESS

ISO13584_IEC61360_dictionary_aggregate_extension_schema.

Ce schéma fournit des constructions de ressources qui sont de nature générique. Il peut être utilisé en dehors de la série CEI 61360 et en particulier dans toutes les applications utilisant un dictionnaire de données conforme à la série CEI 61360.

Il fournit les constructions de ressources nécessaires pour décrire les types de données correspondant aux types de données agrégées comme défini dans le langage EXPRESS. Il définit des ressources permettant de décrire les types de données matricielles, de sac et d'ensemble. Ces types de données complètent les types de données déjà définis dans l'**ISO13584_ISO61360_dictionary_schema** publié dans la CEI 61360-2:2002.

4.2 Modèle d'informations intégrées de bibliothèque

4.2.1 Généralités

Le modèle d'informations intégrées de bibliothèque spécifié dans la présente partie de la CEI 61360, regroupe les constructions de ressources génériques définies dans la présente partie de la CEI 61360 avec d'autres constructions de ressources génériques de la CEI 61360-2 et diverses autres parties de l'ISO 13584 et de l'ISO 10303 en un schéma unique pour représenter des dictionnaires en vue d'un échange. Le modèle d'informations intégrées de bibliothèque a été élaboré conjointement entre l'ISO et la CEI. En vue de

l'échange d'informations de dictionnaires conformes à la CEI 61360-1, quatre types d'échange seulement sont applicables pour la CEI 61360-5 et sont définis ci-dessous. Les autres types d'échange sont définis dans l'ISO 13584-25.

- Les dictionnaires définissant des hiérarchies de classes d'éléments, pouvant être des composants, des matériaux ou d'autres éléments, avec des propriétés structurées agrégées utilisant uniquement les constructions de ressources EXPRESS définies dans le schéma du dictionnaire commun de l'ISO/CEI ou dans l'**ISO13584_IEC61360_dictionary_aggregate _extension_schema** défini dans la présente partie de la CEI 61360, correspondent à la classe de conformité 1;
- Les dictionnaires définissant des hiérarchies de classes d'éléments, pouvant être des composants, des matériaux, des propriétés ou d'autres éléments, utilisant l'extension du schéma du dictionnaire commun ISO/CEI défini dans l'ISO 13584-24, mais sans description de représentations d'éléments et de catégories de représentations d'éléments et sans propriétés structurées agrégées, correspondent à la case de conformité 2;
- Les dictionnaires définissant des hiérarchies de classes d'éléments, de représentations d'éléments et de catégories de représentations d'éléments, avec des propriétés structurées agrégées, correspondent à la classe de conformité 3;
- Les dictionnaires avec le même domaine d'application que la classe de conformité 3 mais avec au maximum deux niveaux d'imbrication pour les propriétés structurées agrégées, correspondent à la classe de conformité 4;

Chacun des types ci-dessus de contexte d'échange correspond à une classe de conformité du modèle intégré de bibliothèque « ISO13584_25_IEC61360_5_liim_schema ». Chaque classe de conformité spécifie les exigences de conformité pour les mises en œuvre déclarant la conformité à cette classe de conformité. Dans la présente partie de la CEI 61360, chaque sous-ensemble définissant une classe de conformité est défini au moyen d'une liste d'entités. Une mise en œuvre déclarant la conformité à toute classe de conformité doit prendre en charge toutes les entités énumérées pour cette classe de conformité et les constructions associées.

Le modèle intégré de bibliothèque « ISO13584_25_IEC61360_5_liim_schema » est défini au moyen d'un ensemble d'entités, types et constructions associées, traitant les exigences à la fois du Comité technique ISO 184/Sous-comité 4/Groupe de travail 2 et du sous-comité CEI 3D et en conséquence, est plus large que la simple classe de conformité CEI.

4.2.2 Classe de conformité 1: dictionnaires minimums

La classe de conformité 1 prend en charge les exigences d'informations pour l'échange de définitions de hiérarchies de classes d'éléments, où les éléments peuvent être des composants ou des matériaux. Elle autorise l'échange de tous les éléments de dictionnaire du schéma du dictionnaire ISO/CEI (CEI 61360-2) et des éléments de dictionnaire qui peuvent avoir des valeurs structurées agrégées conformément à l'Annexe A de la présente partie de la CEI 61360. La classe de conformité 1 est associée à des méthodes de mise en œuvre pour le fichier de livraison de bibliothèque. Les exigences de conformité à la classe de conformité 1 sont définies en B.3.1 de la présente partie de la CEI 61360.

4.2.3 Classe de conformité 2: dictionnaires de classes d'éléments

La classe de conformité 2 prend en charge les exigences d'informations pour l'échange de définitions de hiérarchies de classes d'éléments, où les éléments peuvent être des composants, des matériaux ou des caractéristiques, dont les propriétés peuvent ne pas avoir des valeurs structurées agrégées. La classe de conformité 2 est associée à un ensemble de données normalisées définissant les formats des fichiers externes de bibliothèque pouvant être référencés par un fichier de livraison de bibliothèque conforme à la classe de conformité 2 et avec des méthodes de mise en œuvre pour le fichier de livraison de bibliothèque. Les exigences de conformité à la classe de conformité 2 sont définies en B.3.2 de la présente partie de la CEI 61360.

4.2.4 Classe de conformité 3: dictionnaires complets

La classe de conformité 3 prend en charge les exigences d'informations pour échanger des définitions de hiérarchies de classes d'éléments, où les éléments peuvent être des composants, des matériaux ou des propriétés, avec les définitions des représentations de ces classes d'éléments et avec des définitions des catégories de représentation de ces classes d'éléments. Les propriétés de l'ensemble de ces classes peuvent avoir des valeurs structurées agrégées. La classe de conformité 3 est associée à un ensemble de données normalisées définissant les formats des fichiers externes de bibliothèque pouvant être référencés par un fichier de livraison de bibliothèque conforme à la classe de conformité 3 et avec des méthodes de mise en œuvre pour le fichier de livraison de bibliothèque. Les exigences de conformité à la classe de conformité 3 sont définies en B.3.3 de la présente partie de la CEI 61360.

4.2.5 Classes de conformité 4: dictionnaires complets avec valeurs agrégées imbriquées limitées

La classe de conformité 4 prend en charge les exigences d'informations correspondant à la classe de conformité 3 avec une restriction. Les valeurs agrégées impliquées dans la classe de conformité 4 ne doivent pas être imbriquées plus de deux fois. Les exigences de conformité à la classe de conformité 4 sont définies en B.3.4 de la présente partie de la CEI 61360.

En se fondant sur le même modèle intégré de bibliothèque « ISO13584_25_IEC61360_5_liim_schema » cinq classes de conformité supplémentaires sont définies pour l'échange de bibliothèques et/ou instances de composants. On peut trouver ces définitions dans l'ISO 13584-25.

5 Exigences

Les exigences de la présente norme doivent être satisfaites en conformité avec les Articles et Annexes appropriés de l'ISO 13584-25.

Par commodité, ces Articles et Annexes sont reproduits ci-dessous dans les Annexes informatives à la présente norme comme suit:

Annexe A:
Modèle d'informations EXPRESS pour le type de données agrégées; [Article 6 de l'ISO 13584-25]

Annexe B:
Définition du modèle intégré de bibliothèque « ISO13584_25_IEC61360_5_liim_schema », et définitions des classes de conformité; [Article 8 de l'ISO 13584-25]

Annexe C:
Modèle d'informations intégrées de bibliothèque « ISO13584_25_IEC61360_5_liim_schema », liste étendue; [Annexe C de l'ISO 13584-25]

Annexe D:
Exigences de données normalisées pour le modèle d'informations intégrées de bibliothèque « ISO13584_25_IEC61360_5_liim_schema » [Annexe D de l'ISO 13584-25]

Annexe E:
Exigences de mise en œuvre pour le modèle d'informations intégrées de bibliothèque « ISO13584_25_IEC61360_5_liim_schema », définissant la présente partie de la CEI 61360-5; [Annexe E de l'ISO 13584-25]

Annexe F:
Diagramme EXPRESS pour les types de données agrégées. [Annexe F1 de l'ISO 13584-25].

Annexe A
(informative)

ISO13584_IEC61360_dictionary_aggregate_extension_schema

A.1 Généralités

La présente Annexe définit les exigences pour l'**ISO13584_IEC61360_dictionary_aggregate_extension_schema**. La déclaration EXPRESS suivante présente l'**ISO13584_IEC61360_dictionary_aggregate_extension_schema** et identifie les références externes nécessaires.

Spécification EXPRESS:

```
*)
SCHEMA ISO13584_IEC61360_dictionary_aggregate_extension_schema;

REFERENCE FROM ISO13584_IEC61360_dictionary_schema(
     data_type,
     entity_instance_type);

(*
```

NOTE On peut trouver le schéma référencé ci-dessus dans les documents suivants:
ISO13584_IEC61360_dictionary_schema CEI 61360-2:2002
(qui est dupliqué par commodité dans l'Annexe informative D de l'ISO 13584-42:1998.)

A.2 Présentation de l'ISO13584_IEC61360_dictionary_aggregate_extension_schema

L'**ISO13584_IEC61360_dictionary_aggregate_extension_schema** fournit le modèle d'informations pour l'extension au schéma du dictionnaire commun ISO/CEI permettant d'utiliser les listes, ensembles, sacs, matrices et ensembles de sous-ensembles de types de données simples ou complexes.

Cette extension est réalisée en deux étapes.

- l'entité **entity_instance_type_for_aggregate** fournit le moyen de référencer les entités définies par EXPRESS spécifiant des types de données agrégées. L'entité **entity_instance_type_for_aggregate** est un sous-type de l'entité **entity_instance_type**;

NOTE L'entité **entity_instance_type** est définie dans la CEI 61630-2 et dupliquée dans l'ISO 13584-42.

- les entités spécifiant des types de données agrégées sont ensuite modélisées par l'entité **aggregate_type** et ses spécialisations.

A.3 Définitions de l'entité ISO13584_IEC61360_dictionary_aggregate_extension_schema

Les définitions de types d'entités suivantes décrivent les ressources nécessaires pour coder des types agrégés.

A.3.1 Entité aggregate_entity_instance_type

L'entité **entity_instance_type_for_aggregate** fournit les définitions de référencement des types de données pouvant être exprimées comme des listes, ensembles, sacs ou matrices de valeurs simples ou complexes. Elle est définie en référençant un **aggregate_type** défini dans ce schéma.

Spécification EXPRESS:

```
*)
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;
(*
```

Définition des attributs:

type_structure: aggregate_type référencé et porté par entity_instance_type.

Propositions formelles:

WR1: l'attribut **type_name** de l'**entity_instance type** doit contenir la chaîne « ISO13584_IEC61360_DICTIONARY_AGGREGATE_EXTENSION_SCHEMA.AGGREGATE_TYPE ».

A.3.2 Entité aggregate_type

L'entité **aggregate_type** fournit la définition des types de données pouvant être exprimées comme des listes, ensembles, sacs ou matrices de valeurs simples ou complexes.

Spécification EXPRESS:

```
*)
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;
(*
```

Définition des attributs:

value_type: est le type de valeur (simple ou complexe) utilisé pour chaque élément de l'agrégat.

bound_1: entier facultatif définissant la limite inférieure du type agrégé défini.

bound_2: entier facultatif définissant la limite supérieure du type agrégé défini.

Propositions formelles:

WR1: **bound_1** ne peut pas être supérieur à **bound_2**.

A.3.3 Entité list_type

L'entité **list_type** fournit la définition des types de données pouvant être exprimés par des listes ordonnées de valeurs dans lesquelles une duplication peut ou non être autorisée.

Spécification EXPRESS:

```
*)
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;
(*
```

Définition des attributs:

uniqueness: indicateur indiquant si tous les éléments de la liste doivent être uniques (vrai) ou si des duplications sont autorisées (faux).

Propositions formelles:

WR1: si la limite supérieure **bound_2** de l'attribut facultatif de la liste définie existe, ceci implique que l'attribut facultatif de limite inférieure **bound_1** de la liste définie existe également.

WR2: si la limite inférieure **bound_1** de l'attribut facultatif de la liste définie existe, elle est alors supérieure ou égale à 0.

A.3.4 Entité set_type

L'entité **set_type** assure la définition des types de données pouvant être exprimés comme des collections non ordonnées de valeurs dans lesquelles aucune duplication ne peut exister.

Spécification EXPRESS:

```
*)
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;
(*
```

Propositions formelles:

WR1: si la limite supérieure **bound_2** de l'attribut facultatif de la liste définie existe, ceci implique que l'attribut facultatif de limite inférieure bound_1 de la liste définie existe également.

WR2: si la limite inférieure **bound_1** de l'attribut facultatif de la liste définie existe, elle est alors supérieure ou égale à 0.

A.3.5 Entité bag_type

L'entité **bag_type** assure la définition des types de données pouvant être exprimés comme des collections non ordonnées de valeurs dans lesquelles une duplication peut exister.

Spécification EXPRESS:

```
*)
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;
(*
```

Propositions formelles:

WR1: si la limite supérieure **bound_2** de l'attribut facultatif de la liste définie existe, ceci entraîne que l'attribut facultatif de limite inférieure **bound_1** de la liste définie existe également.

WR2: si la limite inférieure **bound_1** de l'attribut facultatif de la liste définie existe, elle est alors supérieure ou égale à 0.

A.3.6 Entité array_type

L'entité **array_type** fournit la définition des types de données pouvant être exprimées sous la forme d'une matrice de valeurs. Un type de données matricielles comporte pour son domaine une collection indexée de taille fixe d'éléments semblables. Les limites inférieures et supérieures qui sont des valeurs entières définissent la gamme de valeurs d'index et ainsi la taille de chaque collection de matrices. Une définition de type de données matricielles peut spécifier facultativement qu'une valeur matricielle ne peut pas contenir d'éléments dupliqués.

Spécification EXPRESS:

```
*)
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;
(*
```

Définition des attributs:

bound_1: entier définissant l'indice inférieur du type agrégé défini.

bound_2: entier définissant l'indice supérieur du type agrégé défini.

uniqueness: indique si tous les éléments de la matrice doivent être présents (faux) ou si certains éléments de la matrice peuvent être manquants (vrai).

are_optional: indique si tous les éléments de la matrice doivent être présents (faux) ou si certains éléments de la matrice peuvent être manquants (vrai).

A.3.7 Entité set_with_subset_constraint_type

L'entité **set_with_subset_constraint_type** fournit la définition des types de données pouvant être exprimées comme un ensemble de valeurs dont des sous-ensembles peuvent être extraits. Les dimensions des sous-ensembles autorisés sont définies par leurs valeurs minimales et maximales. Si ces dimensions n'existent pas, un quelconque sous-ensemble est autorisé.

NOTE Le contexte dans lequel des sous-ensembles peuvent être extraits ne fait pas partie du domaine d'application de la partie de l'ISO 13584.

Spécification EXPRESS:

```
*)
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;
(*
```

Définition des attributs:

cardinal_min: taille minimale des sous-ensembles pouvant être extraits.

cardinal_max: taille maximale des sous-ensembles pouvant être extraits.

Propositions formelles:

WR1: la taille minimale des sous-ensembles pouvant être extraits **cardinal_min** doit être inférieure ou égale à la taille maximale des sous-ensembles pouvant être extraits **cardinal_max**.

WR2: la taille maximale des sous-ensembles pouvant être extraits de l'ensemble ne doit pas être supérieure à la taille maximale de l'ensemble lui-même.

WR3: la taille minimale des sous-ensembles pouvant être extraits de l'ensemble ne doit pas être supérieure à la taille minimale de l'ensemble lui-même.

```
*)
END_SCHEMA;
-- ISO13584_IEC61360_dictionary_aggregate_extension_schema

(*
```

Annexe B
(informative)

Modèle d'informations intégrées de bibliothèque 25

B.1 Généralités

La conformité au modèle d'informations intégrées de bibliothèque LIIM 25 comporte la satisfaction aux exigences d'informations énoncées dans le schéma **ISO13584_25_IEC61360_5_liim_schema** présenté à l'Article B.2, aux exigences de prise en charge des données normalisées énoncées dans le schéma **ISO13584_25_IEC61360_5_conformance_schema** présenté à l'Annexe D, aux exigences de la ou des méthodes de mise en œuvre prises en charge et aux exigences correspondantes des références normatives.

Une mise en œuvre doit prendre en charge au moins la méthode de mise en œuvre suivante: ISO 10303-21. Les exigences concernant les méthodes de mise en œuvre sont spécifiées à l'Annexe E.

Le schéma **ISO13584_25_IEC61360_5_liim_schema** fournit un certain nombre d'options pouvant être prises en charge par une mise en œuvre. Ces options ont été regroupées en classes de conformité. Neuf classes de conformité sont définies. Des options sont définies par chaque classe et peuvent être sélectionnées par une mise en œuvre. La conformité à une classe de conformité particulière nécessite que toutes les entités **ISO13584_25_IEC61360_5_liim_schema**, types et contraintes associés définis en tant que partie de la classe, soient pris en charge ensemble avec les données normalisées associées à la classe.

NOTE 1 La prise en charge des données normalisées associées à une classe est assurée par la règle globale spécifiée dans **ISO13584_25_IEC61360_5_conformance_schema.**

Le schéma de numérotation des classes de conformité est le suivant:

- classe 1: **dictionary_element**s minimums du schéma du dictionnaire commun ISO/CEI avec plus de types agrégés;

NOTE 2 Le schéma du dictionnaire commun ISO/CEI est défini par le **ISO13584_IEC61360_dictionary_schema** documenté dans l'ISO 13584-42:1998.

- classe 2: **dictionary_element**s du schéma du dictionnaire étendu sans modèles fonctionnels et vues fonctionnelles et sans types agrégés;

NOTE 3 Le schéma du dictionnaire étendu est défini par l'**ISO13584_extended_dictionary_schema** documenté dans l'ISO 13584-24.

- classe 3: **dictionary_element**s du schéma du dictionnaire étendu avec modèles fonctionnels, vues fonctionnelles et types agrégés;
- classe 4: identique à la classe 3 mais avec types agrégés imbriqués limités;
- classe 5: **dictionary_element**s du schéma du dictionnaire étendu sans modèles fonctionnels et classes de vues fonctionnelles et sans types et valeurs agrégés, mais avec description explicite de **class_extension**s pour les classes de la bibliothèque;
- classe 6: **dictionary_element**s du schéma du dictionnaire étendu avec modèles fonctionnels et vues fonctionnelles, types et valeurs agrégés et avec description explicite de **class_extension**s pour les classes de la bibliothèque;
- classe 7: identique à la classe 6 mais avec types et valeurs agrégés imbriqués limités;
- classe 10: instances d'éléments et instances de représentations d'éléments sans définition dans le dictionnaire et sans structure de bibliothèque;

- classe 11: instances d'éléments et instances de représentations d'éléments avec définition dans le dictionnaire mais sans structure de bibliothèque;

NOTE 4 Les valeurs d'attributs pour les entités **external_file_protocol** n'appartenant pas aux données normalisées définies à l'Annexe D de la présente partie de la CEI 61360 ou aux données normalisées définies dans une partie de la série de protocoles d'échange de vue de l'ISO 13584 sont soumises à accord préalable entre l'expéditeur et le récepteur. Elles ne font pas partie du domaine d'application de la présente norme.

NOTE 5 Les seuls fichiers pouvant être référencés comme **http_file**s dans les classes de conformité 2 à 8 et 10 à 11 du modèle d'informations intégrées de bibliothèque 25 sont les fichiers dont le type et le sous-type MIME:

- soit correspondent aux spécifications accessibles au public, soit
- associées à des lecteurs du domaine public disponibles sur Internet.

Le Tableau B.1 représente les possibilités de prises en charge des différentes classes de conformité du modèle d'informations intégrées de bibliothèque 25.

Tableau B.1 – Options de conformité du modèle d'informations intégrées de bibliothèque 25

Possibilités	Éléments du dictionnaire				
Classe de conformité	Définitions du dictionnaire de classes d'éléments	Définitions du dictionnaire des représentations de classes d'éléments et des catégories de représentations	Propriétés structurées agrégées	Spécification de bibliothèque (extension de classe)	Représentation d'instance
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 Liste restreinte de l'ISO13584_25_IEC61360_5_liim_schema

Cet Article spécifie le schéma EXPRESS utilisant des éléments de la série de ressources intégrées de la série ISO 10303 et de la série de ressources logiques et de méthodologies de description des parties de l'ISO 13584 définissant les exigences du modèle d'informations intégrées de bibliothèque LIIM25 spécifié dans la présente partie de la CEI 61360.

NOTE 1 La série de ressources intégrées de l'ISO 10303 est constituée de l'ISO 10303-4x et de l'ISO 10303-1xx. La série de ressources logiques des parties de l'ISO 13584 est constituée de l'ISO 13584-2x et la série de méthodologies de description des parties de l'ISO 13584 est constituée de l'ISO 13584-4x.

La liste EXPRESS étendue de l'**ISO13584_25_IEC61360_5_liim_schema**, avec les contraintes supplémentaires définies dans l'**ISO13584_25_IEC61360_5_conformance_schema**, est présentée à l'Annexe A de l'ISO 13584-25. Le schéma résultant, appelé **ISO13584_25_IEC61360_5_library_implicit_schema**, est le modèle d'informations de bibliothèques de fournisseurs référençant le modèle d'informations intégrées de bibliothèque LIIM 25 qui n'est pas spécifié dans la présente partie de la CEI 61360, car il ne fait pas partie du domaine d'application de la présente norme.

NOTE 2 Le modèle d'informations des bibliothèques intégrées ne fait pas partie du domaine d'application de la présente norme.

Spécification EXPRESS:

```
*)
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 On peut trouver les schémas référencés ci-dessus dans les documents suivants:

ISO13584_IEC61360_dictionary_schema CEI 61360-2:2002
(dupliqué par commodité dans l'Annexe informative D de l'ISO 13584-42:1998),

ISO13584_IEC61360_language_resource_schema CEI 61360-2:2002
(dupliqué par commodité dans l'Annexe informative D de l'ISO 13584-42:1998),

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 Exigences des classes de conformité

B.3.1 Classe de conformité 1: dictionnaires minimums

La classe de conformité 1 traite les mises en œuvre qui sont destinées à prendre en charge les exigences communes énoncées dans le schéma du dictionnaire ISO/CEI et son extension qui traite les types et les valeurs de données agrégées. Une mise en œuvre de la classe de conformité 1 du modèle d'informations intégrées de bibliothèque 25 doit prendre en charge les entités et constructions associées qui suivent.

```
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 Classe de conformité 2: dictionnaires de classes d'éléments

La classe de conformité 2 traite les mises en œuvre prenant en charge les **dictionary_element**s du schéma du dictionnaire étendu sans modèles fonctionnels et classes de vues fonctionnelles et sans types agrégés. Une mise en œuvre de la classe de conformité 2 du modèle d'informations intégrées de bibliothèque 25 doit prendre en charge les entités et constructions associées qui suivent.

```
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 Classe de conformité 3: dictionnaires complets

La classe de conformité 3 traite les mises en œuvre prenant en charge la classe de conformité 2 et prenant en charge à la fois les classes de modèles fonctionnels et de vues fonctionnelles et les types de données agrégées. Une mise en œuvre de la classe de conformité 3 du modèle d'informations intégrées de bibliothèque 25 doit prendre en charge toute les entités prises en charge par la classe de conformité 2, plus les entités et constructions associées qui suivent.

```
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 Classes de conformité 4: dictionnaires complets avec valeurs agrégées imbriquées limitées

La classe de conformité 4 traite les mises en œuvre qui prennent en charge toutes les entités et constructions associées définies pour la classe de conformité 3 mais avec la restriction que le niveau d'imbrication des agrégats est limité à 2 par la règle **nesting_level_aggregate_limit_rule** définie à l'Annexe D.

B.3.5 Classe de conformité 5: bibliothèques de classes d'éléments

La classe de conformité 5 traite les mises en œuvre qui prennent en charge la classe de conformité 2 et la description explicite des extensions de classes d'éléments au moyen de la définition de leur ensemble d'instances. La classe de conformité 5 ne prend pas en charge les instances de modèles fonctionnels, ni les valeurs structurées agrégées. Une mise en œuvre de la classe de conformité 5 du modèle d'informations intégrées de bibliothèque 25 doit prendre en charge les entités définies pour la classe de conformité 2, plus les entités et constructions associées qui suivent.

```
    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 Classe de conformité 6: bibliothèques complètes

La classe de conformité 6 traite les mises en œuvre qui prennent en charge la classe de conformité 5 une description plus explicite des extensions de classes de modèles fonctionnels et les valeurs de préparations structurées agrégées. Une mise en œuvre de la classe de conformité 6 du modèle d'informations intégrées de bibliothèque 25 doit prendre en charge toute les entités prises en charge par la classe de conformité 5, plus les entités et constructions associées qui suivent:

```
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 Classes de conformité 7: bibliothèques complètes avec valeurs agrégées imbriquées limitées

La classe de conformité 7 traite les mises en œuvre qui prennent en charge toutes les entités et constructions associées définies pour la classe de conformité 6 mais avec la restriction que le niveau d'imbrication des agrégats est limité à 2 par la règle **nesting_level_aggregate_limit_rule** définie à l'Annexe D.

B.3.8 Classe de conformité 10: instances de bibliothèque

La classe de conformité 10 traite les mises en œuvre qui prennent en charge la description des instances de classes d'éléments ou des instances de représentations d'éléments sans définition dans le dictionnaire et sans structure de bibliothèque. Une mise en œuvre de la classe de conformité 10 du modèle d'informations intégrées de bibliothèque 25 doit prendre en charge toute les entités et constructions associées qui suivent.

NOTE La classe de conformité 10 ne nécessite l'utilisation d'aucune entité de **dictionnaire** ou **bibliothèque** si aucun protocole d'échange de vue n'est utilisé pour la représentation des instances.

```
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
```