

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Standard data elements types with associated classification scheme for electric items –

Part 1: Definitions – Principles and methods

Types normalisés d'éléments de données avec plan de classification pour composants électriques –

Partie 1: Définitions – Principes et méthodes



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CONTENTS

FOREWORD.....	5
1 General	7
1.1 Scope.....	7
1.2 ISO/IEC EXPRESS information model	7
1.3 Normative references	8
2 Terms and definitions	9
3 Dictionary identification	13
3.1 Dictionary supplier.....	13
3.2 Code	14
3.3 Version number	14
3.4 Date of current version	14
3.5 Revision number	14
4 Data element type specification attributes	15
4.1 Information model of a data element type	16
4.2 Identifying attributes.....	17
4.2.1 Code	19
4.2.2 Version number	19
4.2.3 Revision number.....	20
4.2.4 Preferred name	21
4.2.5 Synonymous name	21
4.2.6 Visible from class	21
4.2.7 Short name.....	21
4.2.8 Preferred letter symbol	23
4.2.9 Synonymous letter symbol.....	24
4.3 Semantic attributes	24
4.3.1 Definition.....	25
4.3.2 Note	26
4.3.3 Remark.....	26
4.3.4 Formula.....	26
4.3.5 Figure.....	26
4.3.6 Source document of data element type definition.....	26
4.4 Value attributes	27
4.4.1 Data type.....	28
4.4.2 Value format.....	30
4.4.3 Data type dependencies	32
4.4.4 Unit of measure	32
4.4.5 Value list	33
4.4.6 Referenced class identifier	34
4.5 Administrative attributes	35
4.5.1 Status level	35
4.5.2 Published in.....	36
4.5.3 Published by.....	36
4.5.4 Proposed on.....	36
4.5.5 Released on	36
4.5.6 Version initiated on.....	36
4.5.7 Version released on.....	37
4.5.8 TRANSLATION DATA.....	37

4.5.9	Obsolete from	37
4.6	Relationship attributes	37
4.6.1	Condition data element type	38
4.6.2	Data element type class	38
5	Translation data	39
5.1	Administrative translation data attributes	39
5.1.1	Translation revision	39
5.1.2	Language	40
5.1.3	Date of current translation revision	40
5.1.4	Responsible translator coded	40
5.1.5	Responsible translator	40
5.2	Language dependent attributes of a data element type	40
5.3	Language dependent attributes of an item class	41
5.4	Language dependent attributes of a drawing	41
6	Data element type classification	41
6.1	Objective	41
6.2	General principles	41
6.3	Quantitative data element types	42
6.4	Non-quantitative data element types	43
7	Item class specification	43
7.1	Use of auxiliary schemes for classification and coding of values	45
7.2	Item class specification attributes	46
7.3	Information model of an item class	46
7.4	Identifying attributes	47
7.4.1	Code	47
7.4.2	Version number	48
7.4.3	Revision number	48
7.4.4	Preferred name	49
7.4.5	Coded name	49
7.4.6	Synonymous name	49
7.5	Semantic attributes	50
7.5.1	Definition	50
7.5.2	Note	50
7.5.3	Remark	50
7.5.4	Drawing reference	50
7.5.5	Source document of class definition	51
7.6	Administrative attributes	51
7.7	Relationship attributes	52
7.7.1	Classifying data element type	52
7.7.2	Applicable data element type	53
7.7.3	Superclass	53
7.7.4	Subclass	53
8	Drawing specification attributes	53
8.1	Information model of a drawing	54
8.1.1	Code	54
8.1.2	Version number	54
8.1.3	Revision number	55
8.1.4	Drawing title	55
8.1.5	Descriptive designator	55

8.1.6 File name	56
8.1.7 File format	56
8.2 Administrative attributes	57
Annex A (normative) Characters from ISO/IEC 10646-1	58
Annex B (normative) Survey of type classification codes of quantitative data element types	62
Annex C (normative) Survey of type classification codes of non-quantitative data element types (main class A)	72
Annex D (informative) Example of a feature class construct	73
Annex E (informative) Rules for defining new versions and/or revision of dictionary elements	77
Annex F (informative) Classifying DETs	80
Annex G (informative) Conventions for names and definitions	81
Bibliography	84
Figure 1 – Information model principle	17
Figure 2 – Identifying attributes for data element type	18
Figure 3 – Semantic attributes for data element type	24
Figure 4 – Value attributes for data element type	27
Figure 5 – Attributes of the value list for data element type	27
Figure 6 – Administrative attributes for data element type	35
Figure 7 – Relationship attributes for data element type	37
Figure 8 – Administrative attributes for translation data	39
Figure 9 – Classification tree	44
Figure 10 – Identifying attributes for item class	47
Figure 11 – Semantic attributes for item class	50
Figure 12 – Administrative attributes for item class	51
Figure 13 – Class relationships	52
Figure 14 – Identifying attributes for drawing	54
Figure 15 – Administrative attributes for drawing	57
Table 1 – List of attributes of data element types as defined in IEC 61360-1 and their equivalent in IEC 61360-2	15
Table 2 – Global unique identification	18
Table 3 – Transliteration	23
Table 4 – Data type dependencies	32
Table 5 – Survey of main classes and categories of data element types	42
Table 6 – List of attributes of item class as defined in IEC 61360-1 and their equivalent in IEC 61360-2	46
Table 7 – List of attributes of drawing	53
Table A.1 – Group 00 – Plane 00	59
Table C.1 – Survey of type classification codes of non-quantitative data element types (main class A)	72
Table E.1 – Overview of configuration management in DET updating operations	78
Table E.2 – Overview of configuration management in class updating operations	79
Table G.1 – Example of the DET name structure for electrical quantitative DETs	83

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**STANDARD DATA ELEMENTS TYPES WITH ASSOCIATED
CLASSIFICATION SCHEME FOR ELECTRIC ITEMS –****Part 1: Definitions –
Principles and methods**

FOREWORD

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International Standard IEC 61360-1 has been prepared by subcommittee 3D, Data sets for libraries, of IEC technical committee 3: Information structures, documentation and graphical symbols.

This third edition cancels and replaces the second edition published in 2002, and its Amendment 1(2003). It is a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- extended administrative data for status and source of content;
- support of multiple language variants for data element types and classes;
- support for multiple alternative units for data element types;
- improved conventions for definition writing based on ISO 704 and ISO/IEC 11179-4;
- enhanced definitions and descriptions.

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

FDIS	Report on voting
3D/169/FDIS	3D/172/RVD

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

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

A list of all parts of the IEC 61360 series can be found, under the general title *Standard data elements types with associated classification scheme for electric items*, on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

Withdrawn

STANDARD DATA ELEMENTS TYPES WITH ASSOCIATED CLASSIFICATION SCHEME FOR ELECTRIC ITEMS –

Part 1: Definitions – Principles and methods

1 General

1.1 Scope

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 sub-assemblies 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.

In addition, this standard provides for establishing a classification hierarchy and the allocation of applicable and relevant properties to each of the classes so established in order to describe fully the characteristics of objects belonging to that class.

Use of this standard facilitates the exchange of data describing electrotechnical systems through a defined structure for the information to be exchanged in a computer-sensible form. Each property to be exchanged will have an unambiguously defined meaning and consistent naming, where relevant a defined value list, a prescribed format and defined units of measure for all quantitative values. There is also provision for:

- control of changes to definitions of the properties through version and revision numbers;
- inclusion of notes and remarks to clarify and help in the application of the definitions;
- indication of the sources of definitions and value lists;
- associated figures and formulae.

NOTE IEC TCs and SCs, or other organizations may take this part of IEC 61360 as a basis for the development of their own dictionaries.

1.2 ISO/IEC EXPRESS information model

Closely associated with this part of IEC 61360 is IEC 61360-2. This part contains the information model, using the EXPRESS modelling language. In this model, the definition and structure of IEC 61360-1 is formalized and presented in a computer-sensible form. Use of this information model allows dictionary information to be exchanged between different systems using the STEP physical file format as defined in ISO 10303-21.

This information model has also been accepted as the common information model with ISO/TC184/SC4 and is reproduced as ISO 13584-42. Use may be made of other standards in the ISO 13584 series of standards for extension of the concepts defined in this standard. In particular ISO 13584-24 contains provisions which allow:

- extensions of the class structure to include feature and functional model classes;
- tabulation of properties;
- functional relationships among properties;
- references to graphical information;
- structuring of parts libraries.

NOTE This part of IEC 61360 is intended to be compliant with the upcoming Edition 3 of IEC 61360-2 and Edition 2 of ISO 13584-42.

1.3 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 60027 (all parts), *Letter symbols to be used in electrical technology*

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

IEC 61360-4, *Standard data element types with associated classification scheme for electric components – Part 4: IEC reference collection of standard data element types and component classes* (available in English only)¹

IEC 60747(all parts), *Semiconductor devices*

IEC 60748(all parts), *Semiconductor devices – Integrated circuits*

ISO 31(all parts), *Quantities and units*

ISO 639-1, *Codes for the representation of names of languages – Part 1: Alpha-2 code*

ISO 704, *Terminology work – Principles and methods*

ISO 843:1997, *Information and documentation – Conversion of Greek characters into Latin characters*

ISO 2382 (all parts), *Information processing systems – Vocabulary*

ISO 3166 (all parts), *Codes for the representation of names of countries and their subdivisions*

ISO 6093, *Information processing – Representation of numerical values in character strings for information interchange*

ISO 8601, *Data elements and interchange formats – Information interchange – Representation of dates and times*

ISO 9735, *Electronic data interchange for administration, commerce and transport (EDIFACT) – Application level syntax rules*²

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

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

¹ This publication was withdrawn and replaced by IEC CDD (see bibliography)..

² This normative reference is based on the Trade Data Elements Directory (TD ED) of the United Nations Economic Commission for Europe (UNECE), Trade Facilitation.

ISO 13584-26, *Industrial automation systems and integration – Parts library – Part 26: Logical resource: Information supplier identification*

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

ISO 13731, *Ergonomics of the thermal environment – Vocabulary and symbols*

ISO/IEC 6523-1, *Information technology – Structure for the identification of organizations and organization parts – Part 1: Identification of organization identification schemes*

ISO/IEC 10646-1, *Information technology – Universal Multiple-Octet Coded Character set (UCS) – Part 1: Architecture and Basic Multilingual Plane*

ISO/IEC 11179-3, *Information technology – Metadata registries (MDR) – Part 3: Registry metamodel and basic attributes*

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE The definitions are presented in a logical order, an alphabetic list is included.

Alphabetic list of the terms

applicable data element type	2.23
attribute	2.12
classification	2.9
classifying data element type	2.8
component	2.17
computer-sensible information	2.22
condition data element type	2.7
data element type	2.3
data element type class	2.4
drawing	2.28
electric component	2.18
electric item	2.14
entity	2.1
feature	2.20
geometry	2.21
item	2.13
item class	2.15
limiting value	2.33
material	2.19
maximum value (max)	2.30
minimum value (min)	2.29
nominal value (nom)	2.32
non-quantitative data element type	2.6
outline style	2.10

package	2.27
product	2.16
quantitative data element type	2.5
relation	2.2
shape	2.25
subclass	2.10
superclass	2.11
typical value (typ)	2.31
visible data element type	2.24

2.1

entity

any concrete or abstract object of interest, including relations among things

2.2

relation

observed connection between *entities*

2.3

data element type

DET

unit of data for which the identification, description and value representation have been specified

2.4

data element type class

class of data element types with same type of representation, or description or value representation

2.5

quantitative data element type

data element type with a numerical value representing a measurable physical quantity, a quantity of information or a count of objects

2.6

non-quantitative data element type

data element type which identifies or describes an object by means of codes, abbreviations, names, references or descriptions

2.7

condition data element type

data element type whose value affects the value of another data element type

NOTE 1 A condition data element type has only a meaning when it is used in combination with another data element type.

NOTE 2 A condition data element type forms not a part of the classification tree and can be used on every level of the classification.

2.8

classifying data element type

data element type applicable for a particular item class, addressing a single elementary attribute of that item and having a homogeneous complementary value list, whose values define the item subclasses

2.9**classification**

systematic division of a set of items into subsets according to their difference in some predetermined characteristics

2.10**subclass**

class that is one step below another class in a characterization hierarchy or in a classification hierarchy

[ISO 13584-42]

2.11**superclass**

class that is one step above another class in a characterization hierarchy or in a classification hierarchy

NOTE All parts that belong to a class also belong to its superclass.

[ISO 13584-42]

2.12**attribute**

any one of the properties to describe an entity, possibly involving one or more other entities

2.13**item**

a thing whose description can be captured by a class structure and a set of data element types

NOTE Included are basic components to sub-assemblies and full systems.

2.14**electric item**

electric component, device or system

2.15**item class**

set of items of which each item can be described by the same group of data element types

2.16**product**

result of labour or of a natural or industrial process

2.17**component**

industrial product which serves a specific function or functions, which is not decomposable or physically divisible and which is intended for use in a higher order assembled product

2.18**electric component**

component with conductive terminals through which voltages or currents may be applied or delivered

NOTE Electric components and electric transducers are included in this definition.

2.19**material**

basic matter (as metal, wood, plastic, fibre) from which the greater part of something physical is made

2.20

feature

aspect of an item that can be captured by a class structure and set of data element types and that cannot exist independently of the item

[ISO 13584-24, 3.41, modified]

2.21

geometry

surface shape (as of a mechanical part or a crystal)

2.22

computer-sensible information

information which can be exchanged and manipulated with the interactive use of computer systems, programs and procedures

2.23

applicable data element type

data element type defined for an item class and which applies to all items belonging to that class

2.24

visible data element type

data element type that has a definition meaningful in the scope of a given item class, but that may or may not apply to the various products belonging to this class

NOTE Within IEC 61360-4, all data element types are defined as visible at the level of the root class, that is the superclass of the component class, material class, geometry class and feature class.

2.25

shape

external form of a component package as given by the set of data element types

2.26

outline style

physical information enclosing the apparently plane figure presented by any object to sight, contour and/or external boundary of a component

2.27

package

term applied to an electric or electromechanical component which covers the physical outline of the component, including terminals and any protective material or casing

2.28

drawing

illustration of the meaning of a group of data element types describing the geometrical characteristics of an item

2.29

minimum value

min

lowest value specified of a quantity, established for a specified set of operating conditions at which a component, device or equipment can operate and performs according to specified requirements

2.30**maximum value****max**

highest value specified of a quantity, established for a specified set of operating conditions at which a component, device or equipment can operate and performs according to specified requirements

2.31**typical value****typ**

commonly encountered value of a quantity used for specification purposes, established for a specified set of operating conditions of a component, device, equipment, or system

2.32**nominal value****nom**

value of a quantity used to designate and identify a component, device, equipment, or system

NOTE The nominal value is generally a rounded value.

[IEV 151-16-09]

2.33**limiting value**

greatest or smallest admissible value of a quantity in a specification of a component, device, equipment, or system beyond which it will be damaged resulting in permanent unwanted changes of functional or physical characteristics influencing its performance

[IEV 151-16-10, modified]

3 Dictionary identification

The IEC Component Data Dictionary (IEC CDD) contains a collection of classes and data element types. All individual dictionary items are uniquely identified which includes the version as a record of significant changes to a dictionary item. The identification of a dictionary item is therefore not dependent on a publication of the dictionary at a particular point in time.

For use of the dictionary contents in communication between business parties, it can be helpful to identify the complete set of dictionary items as a reference and to avoid having to specify each individual dictionary item in the agreement for what items are communicated. For this reason the IEC CDD will be identified by the following attributes:

3.1 Dictionary supplier

Attribute name:	dictionary supplier
Attribute definition:	identification of any organization authorized to register dictionary items
Comments:	the identifier is specified in ISO 13584-26. The source identification for the IEC 61360 reference dictionary is: "0112/2///61360_4" the source identification of the standard does not include an edition number contrary to what ISO 13584-26 has defined
Obligation:	mandatory
Character type of values:	fixed code as defined above. The slash "/" separator is used in a physical file in accordance with ISO 10303-21. In other mediums such as XML other separators may be used

3.2 Code

Attribute name: code
 Attribute definition: unique code of the dictionary entity
 Comments: the code for the IEC Component Data Dictionary is: "IEC CDD"
 Obligation: mandatory
 Character type of values: those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

3.3 Version number

Attribute name: version number
 Attribute definition: number used to control the versions of the IEC Component Data Dictionary (IEC CDD)
 Comments: the version number of the dictionary shall consist of 6 digits. Although the common ISO/IEC EXPRESS information model allows more digits, within the IEC system only 6 digits shall be used. Consecutive version numbers shall be issued in ascending order. A new version of the dictionary may be generated if at least one class or data element type is added or when changes are made affecting their version number. When a new version of the dictionary is issued, this version contains all changes that happened since publication of the last version.
 NOTE Intermediate changes of the dictionary may be traced by checking the attribute "date of current version".
 Obligation: mandatory
 Character type of values: digits 0 through 9

3.4 Date of current version

Attribute name: date of current version
 Attribute definition: date associated with the present content of the IEC Component Data Dictionary (IEC CDD)
 Comments: the date information of the dictionary shall consist of 10 digits. Whenever the content of the dictionary is modified, the value of the attribute shall be updated.
 EXAMPLE "1994-03-21".
 Obligation: mandatory
 Character type of values: digits 0 through 9 and "-"

3.5 Revision number

Attribute name: revision number
 Attribute definition: number used for administrative control of the IEC Component Data Dictionary (IEC CDD)
 Comments: the revision number of the dictionary occurrence shall consist of two digits. Although the common ISO/IEC EXPRESS information model allows more digits, within the IEC system only 2 digits shall be used. Consecutive revision numbers shall be issued in ascending order. The dictionary, unique by its identifier, only one revision number is current at any moment.
 A new revision number of the dictionary shall be generated if an attribute of a dictionary item is changed which neither affects the use (communication, data base definitions etc.) nor the meaning of the dictionary item, or when editorial changes of typing and spelling errors have been implemented.

The revision number will be reset to the starting number 01 when the version number is changed

Obligation: mandatory

Character type of values: digits 0 through 9

4 Data element type specification attributes

In this clause, the various attributes of data element types as encountered in the specifications are explained. For a list of these attributes, see Table 1. These attributes are related to identification, description, value of data element types and to relationships between data element types.

For the representation of the attributes of the data element types, in general upper-case letters and lower-case letters are used according to the existing international standards from which the attributes are taken. When no standard exists, the commonly used IEC methodology is followed (IEC 60027 series and IEC 60148). Characters are compliant with the character set as defined in Annex A.

Table 1 – List of attributes of data element types as defined in IEC 61360-1 and their equivalent in IEC 61360-2

Attribute names in IEC 61360-1	Attribute names in IEC 61360-2	Subclause number
Code	code	4.2.1
Version number	version	4.2.2
Revision number	revision	4.2.3
Preferred name	preferred_name	4.2.4
Synonymous name	synonymous_name	4.2.5
Visible from class	name_scope	4.2.6
Short name	short_name	4.2.7
Preferred letter symbol	preferred_symbol	4.2.8
Synonymous letter symbol	synonymous_symbol	4.2.9
Definition	definition	4.3.1
Note	note	4.3.2
Remark	remark	4.3.3
Formula	formula	4.3.4
Figure	figure	4.3.5
Source document of data element type definition	source_doc_of_definition	4.3.6
Data type	data_type	4.4.1
Value format	value_format	4.4.2
Unit of measure	unit	4.4.4
Value list	value_domain	4.4.5
Value	dic_value	4.4.5.1
Value code	value_code	4.4.5.2
Value meaning	preferred_name of meaning	4.4.5.3
Source document(s) of value list(s)	source_doc_of_value_domain	4.4.5.4
Referenced class identifier	domain of class_instance_type	4.4.6
Status level	a	4.5.1

Attribute names in IEC 61360-1	Attribute names in IEC 61360-2	Subclause number
Published in	a	4.5.2
Published by	a	4.5.3
Proposed on	a	4.5.4
Released on	date_of_original_definition	4.5.5
Version initiated on	a	4.5.6
Version released on	date_of_current_version	4.5.7
Obsolete from	a	4.5.9
Condition data element type	condition_DET	4.6.1
Data element type class	det_classification	4.6.2
Translation revision	a	5.1.1
Language	a	5.1.2
Date of current translation revision	a	5.1.3
Responsible translator coded	a	5.1.4
Responsible translator	a	5.1.5
^a Not defined in IEC 61360-2.		

4.1 Information model of a data element type

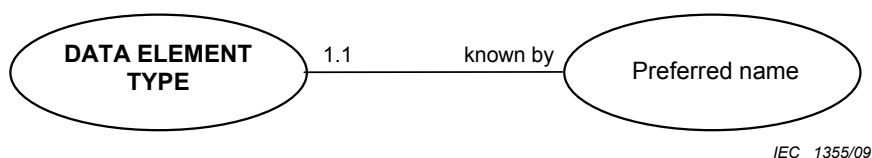
Based on the principles as described in ISO/IEC 11179-3, the attributes of a data element type are divided into four main groups:

- identifying related attributes;
- semantic related attributes;
- value related attributes;
- relationship attributes of a data element type related to relations among entities.

In the following subclauses the attributes are specified and clarified by the information models.

The information models (entity-relation diagrams), given in Figure 2 to Figure 15, of a data element type shall be read as follows:

- from inside outwards starting with the entity in bold capital letters;
- entities and (related) information objects are indicated by ellipses;
- relation between an entity and its related information object(s) is indicated by the line between those ellipses;
- text accompanying the line describes cardinality and semantic of the relation;
- combination of a relation and an information object with name in lower case letters constitutes an attribute of the associated entity;
- combination of a relation and an information object with name in upper case letters constitutes a relationship to an associated entity;
- two figures separated by a dot indicate the cardinality of the relation: the first digit indicates the minimum number of occurrences, the second one the maximum number of occurrences of the associated information object;
- semantic description and corresponding occurrence indications are positioned on the same side of the relation-line.



IEC 1355/09

Figure 1 – Information model principle

Entity: DATA ELEMENT TYPE
 Relation: known by
 Related entity: preferred name
 Attribute: known by preferred name

NOTE The attribute is composed of the relation and the relevant entity

Cardinality: 1.1 (one and not more than one)

4.2 Identifying attributes

To identify a data element type uniquely within the IEC Component Data Dictionary (IEC CDD) and for electronic information exchange, a language independent combination of characters shall be used.

The identifier of a data element type shall consist of the combination of the six-character data element type code, followed by a hyphen followed by the three-digit version number of the data element type. The identifier shall be used for the identification of different occurrences of the same data element type code.

To make such an identifier in the reference dictionary globally unique, a registration authority identification has to be defined and added to the identifier. The registration authority identification concept is explained and defined in ISO/IEC 6523-1. At first, an organization identification scheme is selected from the schemes registered as part of the standard using the International Code Designator (ICD). Then, within this scheme, a particular organization is identified with the Organization Identifier (OI).

For the IEC reference dictionary, the ICD code 0112 is used which stands for: "Registration of Standardization Organization". For the Organization Identifier (OI), number 2 is used which stands for: "IEC".

Altogether, the source identification for the IEC Component Data Dictionary (IEC CDD) is: "0112/2///61360_4".

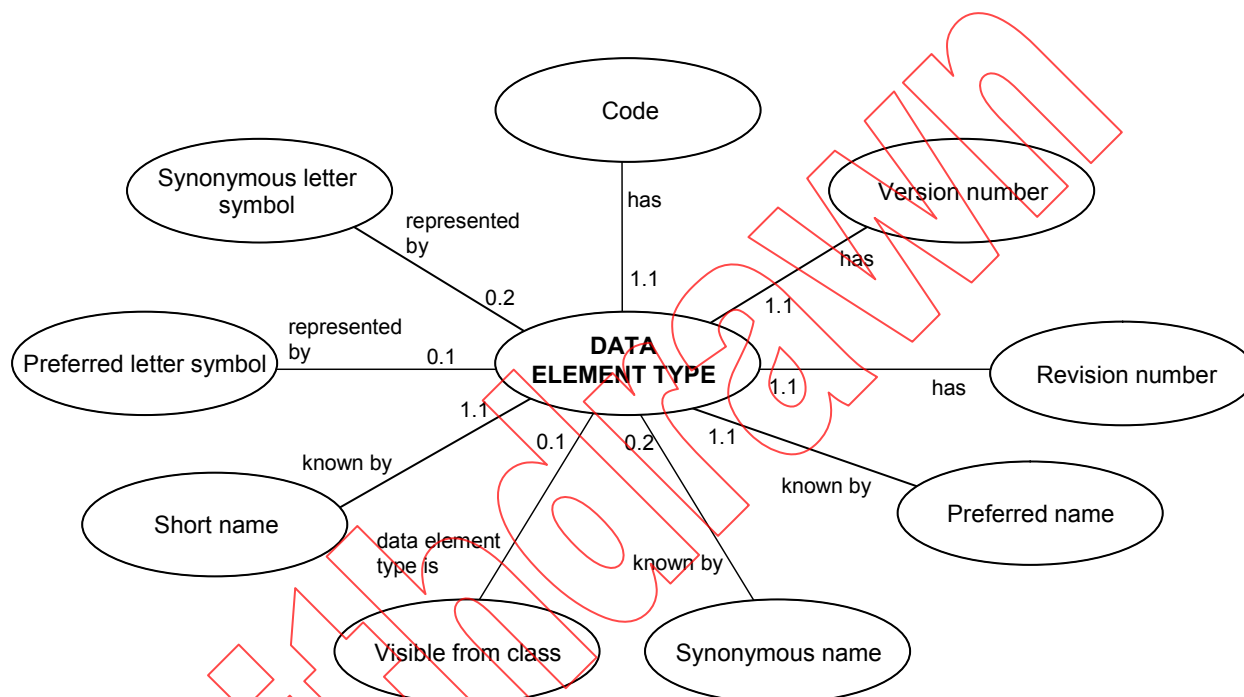
The added "61360_4" at the end is the Standards Identifier (SI) which is described in ISO 13584-26 as an extension to ISO/IEC 6523-1. An example of the full globally unique identification of a particular data element type is: "0112/2///61360_4.AAA000-001.AAF307-005".

Here, AAA000-001, is the identification of the class in which data element type AAF307-005 is defined (made visible) in the IEC reference dictionary.

Table 2 – Global unique identification

Data element name	Description	Obligation	Data type	Maximum length
International Code Designator (ICD)	Identification of an organization identification scheme	Mandatory	Integer	4
Organization Identifier (OI)	Identification of an organization within an identification scheme	Mandatory	String	35

Figure 2 shows the possible attributes of a data element used to identify a data element type.



IEC 1356/09

Figure 2 – Identifying attributes for data element type

4.2.1 Code

Attribute name:	code
Attribute definition:	unique six-character code of a data element type
Comments:	the first three characters shall be alphabetic, the last three numeric(format AAANN). The character "X"³ shall not be used as first character. The codes are issued sequential and should not have any relationship with the meaning of the data element types. In case of at least one attribute of the data element type, which affects the meaning and/or communication of the data element type is changed, a new (other) data element type, having a new code, shall be defined. Such attributes are: – definition⁴; – unit of measure; – condition data element type⁵; – value code; Whether the code should be changed, so that a new data element type is generated, or whether the version number of a data element type should be changed, shall be determined for each case separately. – data type.
Obligation:	mandatory
Character type of values:	upper-case Latin letters A through Z (to avoid misunderstanding, the upper-case Latin letters O and I shall not be used) digits 0 through 9

4.2.2 Version number

Attribute name:	version number
Attribute definition:	number used to control the versions of a data element type
Comments:	the version number of a data element type shall consist of three digits. Although the common ISO/IEC EXPRESS information model allows more digits, within the IEC system only 3 digits shall be used. Consecutive version numbers shall be issued in ascending order. A new version of the data element type shall be generated if at least one attribute of the data element type is changed which affects the use (communication, data base definition, etc.) but which does not affect the meaning of that data element type. Those attributes or related entities which, when changed, will result in a version change are:

³ For local or private use within users environment, codes starting with XAA up to and including codes start with XZZ may be used and are therefore excluded from the IEC reference collection of standard data element types IEC 61360-4.

⁴ Extending the semantic context of a data element type which does not violate the originally defined meaning by including another component class in the definition, results in a version change.

⁵ Removing the relation to a condition DET will result in a change of the code.

- preferred name
- preferred letter symbol
- note
- value code⁶
- value meaning
- value format⁷
- short name
- condition data element type⁸
- reference class identifier
- visible from class⁹
- applicable class

Obligation: mandatory

Character type of values: digits 0 through 9

NOTE "Applicable class" addresses the item class entity referenced by the inverse attribute applicable data element type (see Figure 13).

4.2.3 Revision number

Attribute name: revision number

Attribute definition: number used for administrative control of a data element type

Comments: the revision number of a data element type occurrence shall consist of two digits. Although the common ISO/IEC EXPRESS information model allows more digits, within the IEC system only 2 digits shall be used. Consecutive revision numbers shall be issued in ascending order. Per data element type, unique by its identifier, only one revision number is current at any moment. A new revision number of a data element type shall be generated if an attribute of the data element type is changed which neither affects the use (communication, data base definitions etc.) nor the meaning of the data element type, or when editorial changes of typing and spelling errors have been implemented. Those attributes which, when changed, will result in a revision change are:

- synonymous name
- synonymous letter symbol
- remark
- formula
- figure
- source document of DET definition
- source document of value list
- spelling error in the text of the definition
- data element type class

the revision number will be reset to the starting number 01 when the version number is changed

Obligation: mandatory

Character type of values: digits 0 through 9

⁶ The addition of a new code and associated meaning, and semantic type changes to the meaning of an existing code result in a version change. In case a code is modified, it should be decided if a new data element type is issued on a case-by-case basis

⁷ It is only allowed to extend the length of the value format, all other changes result in a change of the code.

⁸ The addition of an optional condition DET or a version change of the condition DET results in a version change of the dependent DET. It is only allowed to add an optional condition to a dependent DET. It is further not allowed to add a condition to a non-dependent DET.

⁹ Only modification of the item class referenced by attribute visible class is allowed, i.e. version change or revision change.

4.2.4 Preferred name

Attribute name:	preferred name
Attribute definition:	single-word or multi-word designation assigned to a data element type
Comments:	the preferred name of a data element type shall be identical to the name as used in international standards, if available. It is advised to keep the length of the preferred name limited within 35 characters although its length can be extended up to 255 characters
Obligation:	mandatory
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.2.5 Synonymous name

Attribute name:	synonymous name
Attribute definition:	single-word or multi-word designation that differs from the given preferred name but represents the same data element type concept
Comments:	the number of synonymous names shall be limited to two. For pragmatic reasons, the length of the synonymous name shall be limited to 70 characters
Obligation:	optional
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.2.6 Visible from class

Attribute name:	visible from class
Attribute definition:	item class that has a scope in which the data element type is meaningful, but the various products belonging to that class may or may not be defined by this data element type NOTE 1 The concept of a visible data element type allows sharing the definition of a data element type among item classes where this data element type does not necessarily apply. NOTE 2 All visible data element types of an item class are also visible properties for its subclasses.
Obligation:	conditional
Condition:	in case of IEC 61360-4 libraries, the attribute may be omitted. In all other cases, the attribute is mandatory NOTE 3 Within IEC 61360-4, each data element type is defined as visible at the level of the root class.
Character type of values:	identical to the identifier of an item class

4.2.7 Short name

Attribute name:	short name
Attribute definition:	shortened representation of the preferred name of the data element type
Comments:	The first character of the short name shall be a letter: – preceded by a "@" character for a condition data element type; – preceded by a "\$" character when defining a specific Greek letter (if applicable the "@" character precedes the "\$" character).

For quantitative data element types, the short name shall be derived from the preferred letter symbol in compliance with the following rules:

- Greek letters that are graphically identical to Latin letters are not converted;
- specific Greek letters shall be represented by a single Latin letter according to Table 3 (Table 1 of ISO 843). For retranslation, the translated Greek letters shall be preceded by a dollar "\$" character;
- characters from the character set of ISO/IEC 10646-1, as defined in Annex A, shall be represented by its UNICODE hexadecimal identifier preceded by an number sign "#" character.

EXAMPLE 1 letter symbol; $\varnothing$ ---->> short name: #2300.

- superscripts shall be indicated by Latin letter(s) preceded by two asterisk "*" characters followed by a closing curly bracket "}" after the superscript;

EXAMPLE 2 letter symbol; α^b ---->> short name: \$a*b}.

- subscripts shall be indicated by Latin letter(s) preceded by an underline "_" character followed by a closing curly bracket "}" after the subscript.

EXAMPLE 3 λ_{peak} ---->> short name: \$I_peak}.

For non-quantitative data element types the short name shall be a short representation of the preferred name. The length of the short name of a data element type shall be limited to 18 characters. This short name shall be unique within each item class.

Obligation:

mandatory

Character type of values:

conforming with those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

Table 3 – Transliteration

	GREEK CHARACTER		LATIN CHARACTER	
	Upper case	Lower case	Upper case	Lower case
1	A	α	A	a
2	B	β	B	b
3	Γ	γ	G	g
4	Δ	δ	D	d
5	E	ε	E	e
6	Z	ζ	Z	z
7	H	η	I	i
8	Θ	θ	TH	th
9	I	ι	Ī	ī
10	K	κ	K	k
11	Λ	λ	L	l
12	M	μ	M	m
13	N	ν	N	n
14	Ξ	ξ	X	x
15	O	ο	O	o
16	Π	π	P	p
17	Ρ	ρ	R	r
18	Σ	σ, ς	S	s, s
19	T	τ	T	t
20	Υ	υ	Y	y
21	Φ	φ	F	f
22	Χ	χ	CH	ch
23	Ψ	ψ	PS	ps
24	Ω	ω	Ō	ō

NOTE In case the character set does not support the overline character, the apostrophe character shall be used instead of the overline character.

4.2.8 Preferred letter symbol

Attribute name: preferred letter symbol

Attribute definition: mark or characters used as a sign for expressing an object, for example the characters standing for chemical elements in the periodic system (Ag = silver) or the characters standing for electrical concepts (f = frequency, T_{amb} = ambient temperature)

Comments: the preferred letter symbol of a data element type shall be identical to the letter symbol of IEC 60027 series, IEC 60747 series, IEC 60748 series, or ISO 31 series, the latter being replaced by the ISO/IEC 80000 series. For additional letter symbols concerning thermal environment, ISO 13731 shall be consulted. The first character of the preferred letter symbol of a condition data element type shall be a " @ "

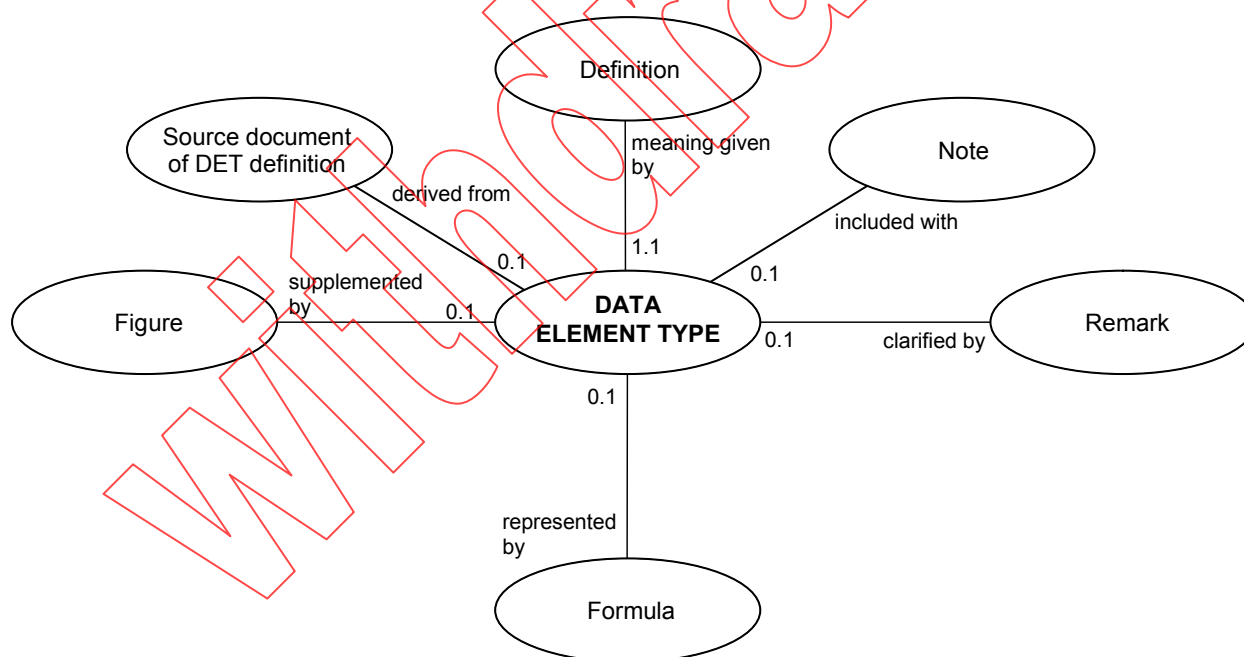
Obligation: optional
 Character type of values: those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.2.9 Synonymous letter symbol

Attribute name: synonymous letter symbol
 Attribute definition: mark or characters used as a sign for expressing some object that differs from the preferred letter symbol but represents the same data element type concept
 Comments: synonymous letter symbols are sometimes inevitable for historical reasons. The number of synonymous letter symbols shall be limited to two. The first character of the synonymous letter symbol of a condition data element type shall be a "@"
 Obligation: optional
 Character type of values: those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.3 Semantic attributes

Figure 3 shows the possible attributes of a data element type used to clarify the semantics of a data element type.



IEC 1357/09

Figure 3 – Semantic attributes for data element type

4.3.1 Definition

Attribute name: definition

Attribute definition: statement that describes the meaning of a data element type in an unambiguous and unique manner to permit its differentiation from all other data element types

EXAMPLE 1 Definition of the quantitative data element type "arcing distance":

arcing distance

value of the shortest distance in air external to the insulator between metallic parts normally having the operating voltage between them

Comments: conventions and requirements:

- a) The definition of a data element type shall be derived from the original definition as appearing in the latest corresponding IEC or ISO standards, if available.
- b) ISO 704 and ISO/IEC 11179-4 standards should be used as a basis for the writing of the definition.
- c) The unit of measure of the DET shall not be included in the DET definition.
- d) If the Level type attribute is specified, the level information need not be repeated in the definition.
- e) The semantic context(s) should be included in the DET definition, if this is essential for the understanding of its meaning.
- f) If the concept requires a limitation of its applicability this shall be explicitly expressed in the definition.

EXAMPLE 2 There exist different semantics by using the term "rated voltage", within products ≥ 1 kV, the terms rated voltage express the maximum voltage for which a product is being designed and can be operated (see IEC 60694). This is currently not applicable to products less than 1kV.

- g) If dependency relations are inherent part of the concept, these shall be included in the definition.

EXAMPLE 3 Definition of the quantitative data element type "reverse recovery time":

reverse recovery time

value of the time required for the reverse current of a diode to recover to a specified value, when switched from a specified forward current to a specified reverse voltage, at specified conditions

- h) In the case conditions are specified, the definition ends with the wording "at specified condition(s)".
- i) If the concept represents a kind of average value, the method of calculating the average shall be designated, by using a word that designates the method, such as "arithmetic mean", "geometric mean", "median", or "mode", either in the preferred name or in the definition.

NOTE A DET standardized under former editions of IEC 61360-1 may be updated only in case of change requests.

Obligation: mandatory

Character type of values: those characters from the character set of ISO/IEC 10646-1 defined in Annex A

4.3.2 Note

Attribute name:	note
Attribute definition:	statement which provides further information on the definition, which is essential to the understanding of that definition
Comments:	EXAMPLE The data element type reverse recovery time is further clarified by a note: "The reverse recovery time is measured as the time interval between t_0 , the point where the forward current crosses the zero current axis, and the instant when for decreasing values of i_R a line through the points for 0,9 I_{RM} and 0,25 I_{RM} crosses the zero current axis."
Obligation:	optional
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.3.3 Remark

Attribute name:	remark
Attribute definition:	explanatory text to further clarify the meaning of the definition
Comments:	remarks shall not influence the meaning of the definition
Obligation:	optional
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.3.4 Formula

Attribute name:	formula
Attribute definition:	rule or statement in mathematical form expressing semantics of a quantitative data element type
Comments:	a formula shall not change any essential information of the meaning of that definition. The graphical representation of a formula shall be stored in a file in a general available format. Methods of referencing to such a file are in detailed described in ISO 13584-24.
Obligation:	optional
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A. The required control functions should be taken from ISO/IEC 6429.

4.3.5 Figure

Attribute name:	figure
Attribute definition:	illustration to clarify the meaning of the definition of a data element type
Comments:	a figure shall not change any essential information of the meaning of that definition. A graphical representation of a figure shall be stored in a file in a general available file format. Methods of referencing to such a file are in detail described in ISO 13584-24.
Obligation:	optional

4.3.6 Source document of data element type definition

Attribute name:	source document of data element type definition
Attribute definition:	reference to the source document from which the data element type definition was derived
Comments:	the document shall be recognized by the ISO and/or IEC committee concerned as having wide acceptance and authoritative status as well as being publicly available.

The value of this attribute shall have a maximum length of 80 characters.

Obligation: optional

Character type of values: those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.4 Value attributes

Figure 4 shows the attributes related to the value of the data element types.

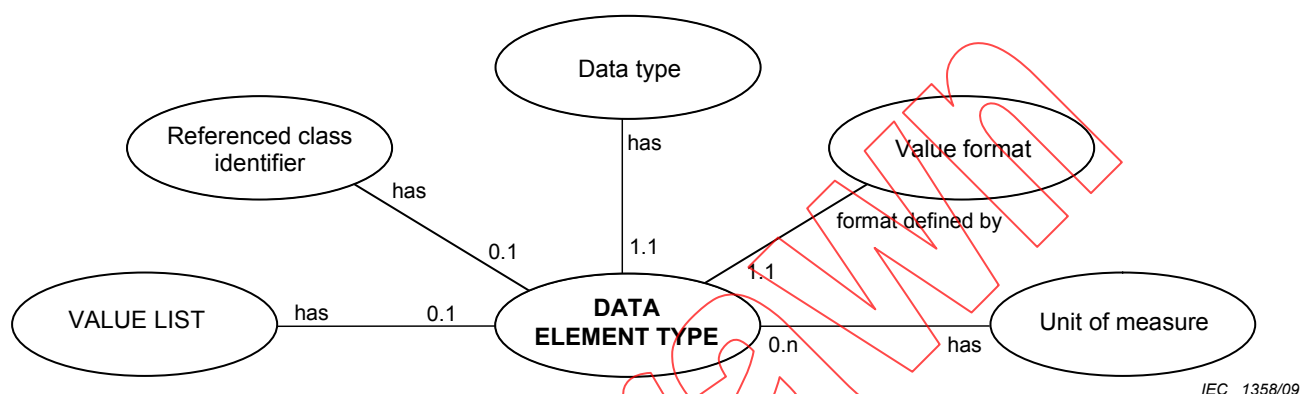


Figure 4 – Value attributes for data element type

Every data element type has a value domain, which defines a range of permissible values being implicit by the value format or explicit by listing the possible values.

For quantitative data element types, such a domain can be expressed either as a value range with limits within all values must lie or a set or list of discrete possible values.

For non-quantitative data element types, the value domain can be expressed as mentioning permissible values in the form of text strings.

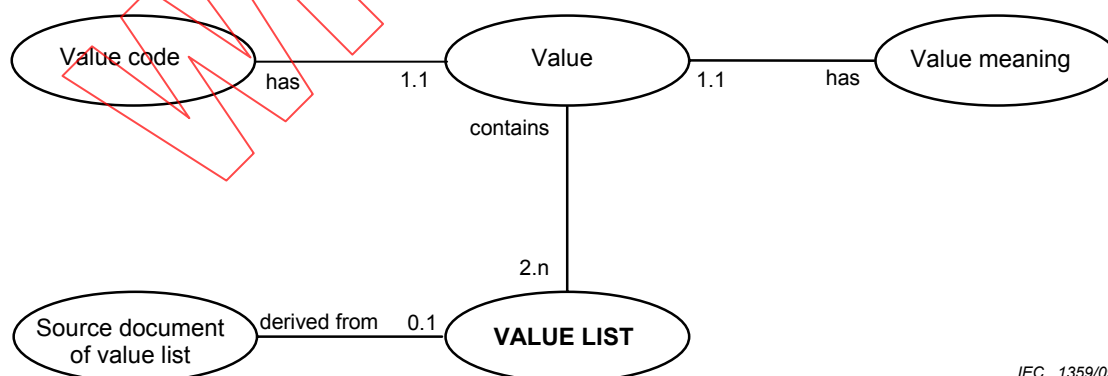


Figure 5 – Attributes of the value list for data element type

In this International standard, no mechanism is given for defining value ranges for quantitative data element types.

For non-quantitative data element types, a mechanism using values, represented by value codes and associated value meanings, is defined as described in 4.4.5.1

It is noted that in many cases a value domain may be undefined, unknown or infinite. In such cases, a value list is not specified in a data element type definition. For classifying data element types, a value list shall be specified.

4.4.1 Data type

Attribute name:	data type
Attribute definition:	identifies a specific property of the value of a data element type
Comments:	data types are divided into two groups: a) simple type: all simple data types contain single values. b) complex type: all complex data types may contain multiple values. The complex data types are: – level type; – class instance type; – list type; – set type; – bag type; – array type.
Obligation:	mandatory
Character type of value:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.4.1.1 Simple type

A data type specifying that the value of the data element type is a single value. The value format shall be defined according to 4.4.2. For a simple type, the allowed data values are:

- string type;
- non-quantitative code type;
- real measure type;
- integer measure type;
- integer;
- real;
- boolean type.

4.4.1.2 Complex type

A data type that specifies that the value of the data element type may be a construct of two or more associated values.

4.4.1.2.1 Level type

Complex type indicating that the value of the data element type consists of one up to four real measure or integer measure values which define a characteristic of an item in the fixed sequence: minimum, nominal, typical, maximum.

As the interpretation of the values relies on the fixed sequence of the levels, all levels specified for a data element type have to be reported at electronic exchange. There is no obligation to fill all levels with actual values although it is advised to do so for data consistency reasons.

EXAMPLE 1 In the case of transmitting the
— MIN value, each of the other values are transmitted with a NIL value.
Example in ISO 10303-21 syntax: "(45,50, NIL, NIL, NIL)";
— MIN and MAX values, each of the other values are transmitted with a NIL value.
Example in ISO 10303-21 syntax: "(45,50, NIL, NIL, 95,95)".

The particular separator sign used in exchange to separate the values of the defined levels depends on the exchange mechanism. In ISO 10303-21 syntax, the values are separated by a comma sign “,”.

It is advised that the use of the level type be restricted to those DETs that are applicable in domains where the reporting of multiple values on a single characteristic is recognized as common practice and requested, as is true for the electronic component industry.

Limiting values can be expressed by defining a specific data element type specifying the levels minimum and/or maximum.

An example clarifying how to interpret the level types is given below:

EXAMPLE 2 A 12 V (nominal) car battery has 6 cells with a typical voltage of about 2,2 V each, giving a typical battery voltage of about 13,5 V. On charge, the voltage may reach a maximum of about 14,5 V but it is considered fully discharged when the voltage falls below a minimum of 12,5 V.

A specific use of level type is the concept of limiting value. When the qualification “limiting” is added to the DET, which can be expressed in the definition, the name and symbol of this value specifies a threshold beyond which the device will be damaged resulting in permanent unwanted changes of functional or physical characteristics influencing the performance of the device. In case of the car battery example, the limiting value might be specified at a maximum of 16,5 V.

In the context of the limiting values, the level types nominal and typical do not apply.

4.4.1.2.2 Class instance type

Complex type which indicates that this data element type provides a link to a class containing a collection of one or more data element types in any part of the classification hierarchy. The value of the DET consists of the class identifier of the class to which the link is made. All properties in the class, to which the link is made, become properties of the class in which the class instance type is used and are inherited by all subclasses of that class.

For a DET of type class instance type, only the string “class reference identifier” is allowed as content of the value format.

NOTE Use of the class instance type effectively allows an extension of the data element types available through use of the feature class. An example is given in Annex D.

4.4.1.2.3 List type

Complex type indicating that the value of the data element type is in the form of an ordered collection of data types, in which duplicate values may or may not be allowed. The list type can be nested, but shall not exceed two levels. The value format applicable to each element of the list shall be defined according to 4.4.2. For a simple type, the allowed data values are:

- string type;
- non-quantitative code type;
- real measure type;
- integer measure type;
- boolean type.

4.4.1.2.4 Set type

Complex type indicating that the value of the data element type is in the form of an unordered collection of data types, in which no duplicate elements shall exist. The set type can be nested, but shall not exceed two levels.

The value format applicable to each element of the list shall be defined according to 4.4.2. For a simple type, the allowed data values are:

- string type;
- non-quantitative code type;
- real measure type;
- integer measure type;
- boolean type.

4.4.1.2.5 Bag type

Complex type indicating that the value of the data element type is in the form of an unordered collection of data types, in which duplicate elements are allowed. The bag type can be nested, but shall not exceed two levels. The value format applicable to each element of the bag shall be defined according to 4.4.2. For a simple type, the allowed data values are:

- string type;
- non-quantitative code type;
- real measure type;
- integer measure type;
- boolean type.

4.4.1.2.6 Array type

Complex type indicating that the value of the data element type is a collection of data types in the form of a one-dimensional array so that an individual element within the array can be identified by a numeric index. The array type can be nested, but shall not exceed two levels. The value format applicable to each element of the array shall be defined according to 4.4.2. For a simple type, the allowed data values are:

- string type;
- non-quantitative code type;
- real measure type;
- integer measure type;
- boolean type;
- array.

4.4.2 Value format

Attribute name:	value format
Attribute definition:	specification of the type and length of the representation of the value of a data element type
Obligation:	mandatory
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A
Comments:	the value format is specified as part of a data element type and can be used at implementation level for purposes of data consistency and data error checking in electronic exchange. Although the value format is mandatory to define at the standards level, at implementation level, e.g. in the set-up of product

information databases or electronic exchange, it can be treated as a default format that can be used as-is, re-defined (restricted or extended) or ignored entirely dependent on the requirements and context in which the information is used.

For data element types of which the data-type is the complex type `class_instance_type`, the value formats are not required as they are defined by data element types in the referenced class (4.4.6). The value of this attribute shall have a maximum length of 80 characters. The value format shall be defined according to the definition below:

a) Non-quantitative data value format types:

- A = alphabetic, letters only
- M = mixed, all characters allowed
- N = numeric, digits only
- X = alphanumeric
- B = binary, 0 or 1

b) Quantitative data value format types in accordance with ISO 6093

- NR1 = integers
- NR2 = rational numbers with decimal-mark (reals)
- NR3 = rational numbers with decimal-mark and exponent-mark (floating point)
- S¹⁰ = signed (positive or negative)
- . = decimal-mark
- E = exponent-mark, base 10; (A)E(B) represents the value $A \times 10^B$

c) Field length

The field length of a non-quantitative data value shall be indicated by a number (e.g. 17). A variable field length shall start with two dots. The following preferred standard formats derived from ISO 9735 and ISO 6093 have been defined:

A..3	N..3	X..3	M..3	B 1
A..8	N..8	X..8	M..8	
A..17	N..17	X..17	M..17	
A..35	N..35	X..35	M..35	
A..(nx35)	N..(nx35)	X..(nx35)	M..(nx35)	

A fixed-field length shall start with one space (examples: A 3 - N 8 - X 17 - M 35, etc.). In these formats, no special characters shall be allowed.

The field length of a quantitative data value shall be indicated by a combination of digits and characters (e.g. 3.3ES2). A variable field length shall start with two dots. The following preferred standard formats derived from ISO 9735 and ISO 6093 have been defined:

NR1..4	positive integers
NR1 S..4	positive or negative integers
NR2..3.3	positive reals
NR2 S..3.3	positive or negative reals
NR3..3.3ES2	floating point, positive
NR3 S..3.3ES2	floating point, positive or negative

A fixed-field length shall start with one space (examples: NR1 4 NR1 S 4 etc.). In these formats, no special characters shall be allowed.

¹⁰ In addition to ISO 6093, the sign "S" is used as a marker for "signed" (should read "sign").

4.4.3 Data type dependencies

Below an overview is given of the allowed combinations of DET type, data type, data value and value format.

- An allowed combination is indicated as: “√”;
- A combination that is not allowed is indicated with a hyphen sign: “-”
- When a combination is not applicable, it is indicated as: “na”.

When defining a new DET, the following sequential steps can be taken to define the complete data type by process of elimination in the given sequence:

- a) choose DET type;
- b) choose data type;
- c) choose data value;
- d) choose value format.

Table 4 – Data type dependencies

		DET type		Data type			Value format
		Property	Condition	Simple type	Level type	Array, List, Set, Bag	
Data type	Simple type	√	√	na	-	-	A, M, N, X, B, NR1, NR2, NR3
	Level type	√	-	-	na	√	NR1, NR2, NR3
	Array, List, Set, Bag	√	-	-	-	√ ^a	A, M, N, X, B, NR1, NR2, NR3
Data value	String	√	√	√	-	√	A, M, N, X, B
	Non-quantitative code	√	√	√	-	√	A, M, N, X, B
	Real measure	√	√	√	√	√	NR2, NR3
	Integer measure	√	√	√	√	√	NR1
	Boolean	√	√	√	-	√	B

^a Only the combinations “array of array”, “list of list”, “set of set”, or “bag of bag” are permitted.

4.4.4 Unit of measure

Attribute name: unit of measure
 Attribute definition: prescription of the unit in which the value of a quantitative data element type shall be expressed
 Comments: conventions and requirements:

- a) preference shall be given to SI-units without decimal multiplier prefixes as defined in ISO 31 series (being currently replaced by ISO/IEC 80000 series) and to units listed in the Annex B of this standard.

- b) alternative units may be supplied in addition to a preferred (default) unit. Such alternative units may or may not be SI units.

NOTE 1 Alternate units allow the recommendation of further units in addition to the preferred (default) unit provided within the IEC CDD. Reasons to choose an alternative unit are cases such as specific measurement principles, particular application domains, or special judicial systems.

EXAMPLE Use of bar, psi, or Torr instead of Pa.

- c) The conversion of DETs to a different unit is outside the scope of this part of IEC 61360.
- d) Quantitative DETs of type `Class_instance_type` shall not carry a unit as the units of measure are already defined by the DETs in the referenced classes.
- e) It is out of scope of this part to prescribe the use of a specific unit for transaction purposes including possible prefixes.

NOTE 2 It is strongly recommended not to specify the same concept in different data elements if only the prefixes of the related units are different. Exceptions may occur if certain units are very common in particular business domains, such as nm (nanometer) in semiconductor manufacturing or kV (kiloVolt) in power distribution area.

NOTE 3 Units kept in IEC CDD are for information only. The definition of the units employed is in scope of other standards, such as ISO 31 series, ISO/IEC 80000 series, or ISO 1000.

NOTE 4 It is envisaged to establish a separate ISO/ IEC repository to manage quantities and units which then may be accessed using methods and identifiers defined in ISO 29002 series. Care should be taken to provide the required referencing techniques in IEC CDD.

Obligation: conditional

Condition: unit of measure shall be specified for quantitative data element types

Character type of values: those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.4.5 Value list

Attribute name: value list

Attribute definition: set of representations of permissible values of a data element type

Obligation: conditional

Condition: value list shall be specified for classifying data element types. For non-classifying data element, types a value list may be specified.

4.4.5.1 Value

Attribute name: value

Attribute definition: representation of a permissible instance of a data element type as an element of a value list

Comments: the value of non-quantitative data element types shall be composed of the attributes: value code and value meaning

Obligation: conditional

Condition: for classifying data element types, the values are mandatory

4.4.5.2 Value code

Attribute name:	value code
Attribute definition:	coded representation of a permissible value of a non-quantitative data element type
Comments:	the value code of a classifying data element type shall be the same as the coded name of the item class or feature class which is created by that classifying data element type. The value code of a classifying (non-quantitative) data element type shall have a maximum length of 18 alphanumeric characters. The value code of the other non-quantitative data element types shall be abbreviated for communication efficiency.
Obligation:	conditional
Condition:	if there is a value, the value code shall be specified
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.4.5.3 Value meaning

Attribute name:	value meaning
Attribute definition:	descriptive part of a permissible value of a non-quantitative data element type
Comments:	for classifying data element types, the value meaning shall be defined in the note attribute of the class that has been defined by this classifying data element type The value of this attribute shall have a maximum length of 70 characters
Obligation:	conditional
Condition:	if there is a value, the value meaning shall be specified
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.4.5.4 Source document of value list

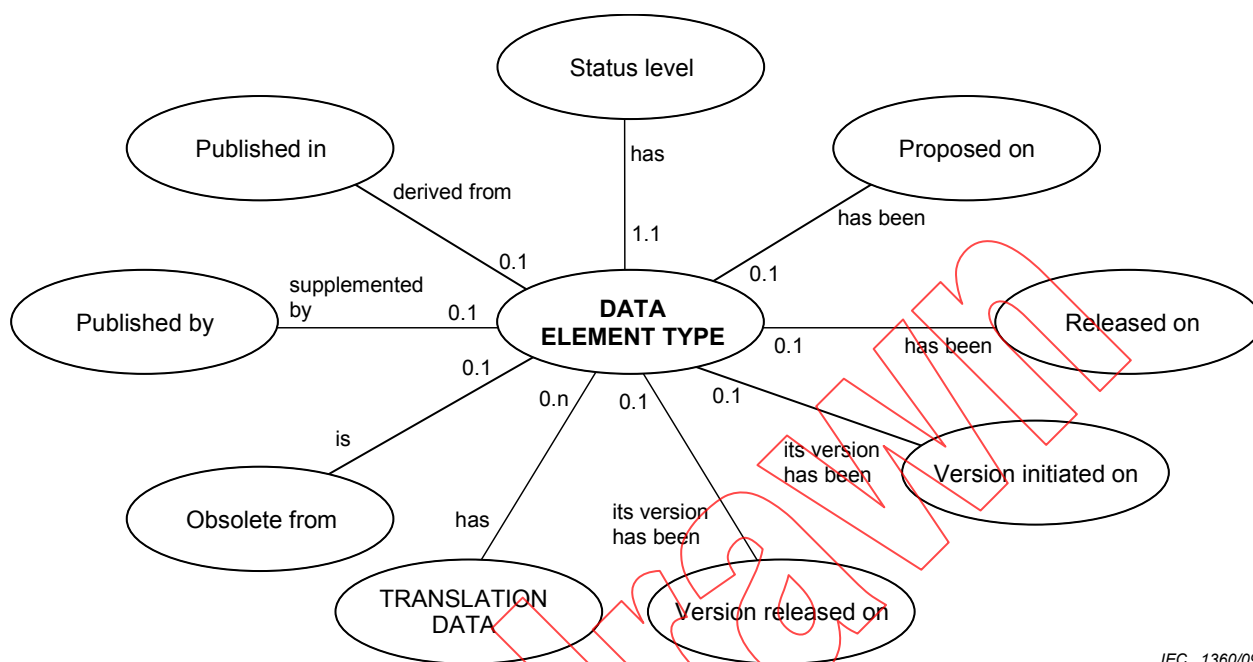
Attribute name:	source document of the value list
Attribute definition:	reference to the source document, generally an international standard, from which the value list was derived
Comments:	the value of this attribute shall have a maximum length of 80 characters
Obligation:	optional
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.4.6 Referenced class identifier

Attribute name:	referenced class identifier
Attribute definition:	class identifier as defined in 7.4
Comments:	the class referenced will contain a set of related data element types. The data element type from which the reference is made shall not have either a value format or unit of measure. These attributes will be defined by the data element types in the referenced class.
Obligation:	conditional
Condition:	a referenced class identifier shall be supplied when the data type of a data element type is a class instance type
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.5 Administrative attributes

Figure 6 shows the possible attributes of a data element type used to administer a data element type.



IEC 1360/09

Figure 6 – Administrative attributes for data element type

4.5.1 Status level

Attribute name: status level

Attribute definition: name of phase related to the life cycle of the item

Comments: NOTE 1 Values in accordance with document 3/663/INF.

the following status levels can be assigned

Proposed

status level of a new *item* from its registration and identification in the database, until it has been accepted for work and a resolution has been reached on how to proceed following the preliminaries

Draft

status level of a new *item* that has been accepted for work following the preliminaries with either the *normal or extended database procedure*, until the moment a decision has been taken on whether or not it is to be part of the standard

NOTE 2 The transition to *draft* is from *proposed*.

Standard

status level of a new *item* that has been released for use as part of the standard

NOTE 3 The transition to *standard* is from *draft*.

Obsolete – reference only

status level of an *item* that is no longer part of the standard, irrespective of reason

NOTE 4 The transition to *obsolete – reference only* is from *standard*. On the item page a note or a reference to a replacing item further indicates the reason for obsolescence.

Rejected

status of an *item* that has been entered into the database as part of a change request, but has not been approved to be part of the standard

NOTE 5 The transition to *rejected* is either from *proposed* or from *draft*.

Obligation: mandatory
Character type of values: those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.5.2 Published in

Attribute name: published in
Attribute definition: identity number of publicly available document in which the data element type and its definition were first published

NOTE Edition number and/or year should be included as appropriate.

Obligation: optional
Example: "IEC CDD"
Character type of values: those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.5.3 Published by

Attribute name: published by
Attribute definition: organization responsible for the publication as defined by "published in"
Obligation: optional
Example: "IEC"
Character type of values: those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

4.5.4 Proposed on

Attribute name: proposed on
Attribute definition: date when the item was first added to the dictionary with status level "proposed"
Obligation: optional
Example: "1997-04-01"
Character type of values: date format according to YYYY-MM-DD as specified by ISO 8601

4.5.5 Released on

Attribute name: released on
Attribute definition: date when the item was made available as a standardized item
Obligation: conditional
Example: "1997-08-03"
Character type of values: date format according to YYYY-MM-DD as specified by ISO 8601

4.5.6 Version initiated on

Attribute name: version initiated on
Attribute definition: date when the change leading to a new version was initiated

Obligation: optional
 Example: "2004-02-05"
 Character type of values: date format according to YYYY-MM-DD as specified by ISO 8601

4.5.7 Version released on

Attribute name: version released on
 Attribute definition: date when the new version was released
 Obligation: conditional
 Example: "2004-05-03"
 Character type of values: date format according to YYYY-MM-DD as specified by ISO 8601

4.5.8 TRANSLATION DATA

Attribute name: TRANSLATION DATA
 Attribute definition: see Clause 5
 Obligation: conditional
 Condition: mandatory for language variants other than English
 Example: ---
 Character type of values: see Clause 5

NOTE Translated DETs carry the same identifying attributes as their corresponding English reference DETs including the content of the attributes version number and revision number. The design histories of the translations may be tracked by the attributes translation revision (see 5.1.1).

4.5.9 Obsolete from

Attribute name: obsolete from
 Attribute definition: date when the item was considered obsolete (for whatever reason, including replacement)
 Obligation: conditional
 Example: "2005-06-28"
 Character type of values: date format according to YYYY-MM-DD as specified by ISO 8601

4.6 Relationship attributes

Data element types in general shall be regarded as characteristic properties of objects. Both the objects (items) and their data element types shall be classified according to their type. Data element types may be related because these:

- are of the same data element type class;
- apply to the same item class (or material class, or feature class);
- refer to a condition data element type. If a data element type is conditioned by more than one condition data element type, then all conditions shall be satisfied simultaneously;
- apply to the same feature class.



IEC 1361/09

Figure 7 – Relationship attributes for data element type

4.6.1 Condition data element type

Attribute name:	condition data element type
Attribute definition:	data element type that affects the value of another data element type
Comments:	many data element types have values which depend on the value(s) of one or more independent data element types (called "condition data element types"). This data element type has only a meaning when it is used in combination with a another data element type The definition of a condition data element type shall always contain the phrase "as a variable". When the value of a condition data element type is given as a range, it shall be specified by two condition data element types, representing the upper and lower bound of this range.
Obligation:	optional
Character type of values:	identical to the identifier of a data element type

4.6.2 Data element type class

Attribute name:	data element type class
Attribute definition:	class of similar data element types
Comments:	the data element type classification is described in detail in Clause 6
Obligation:	mandatory
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

Withdrawing

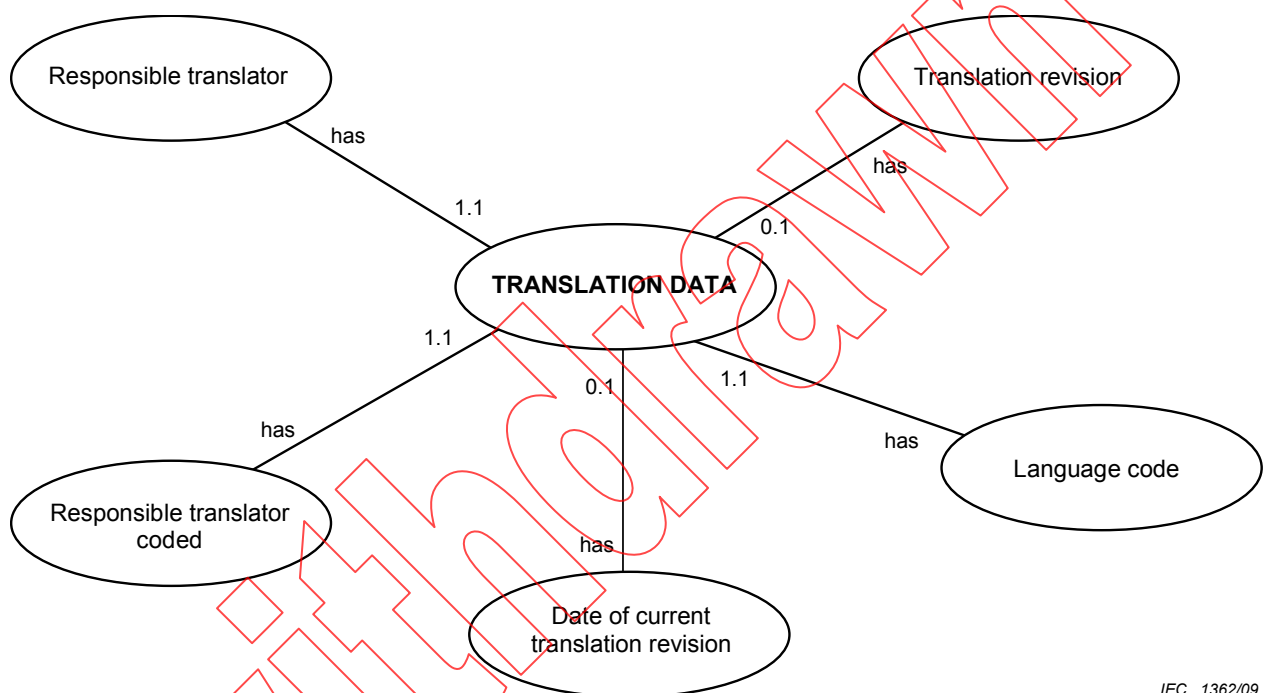
5 Translation data

Figure 8 shows the attributes that are defined on translation data. These attributes are maintained for each translation that is defined on the level of an item.

A data element type in a language version other than English shall only be prepared if previously the English reference version is available as a released item.

NOTE 1 Due to delays in the preparation of national language versions, users may face inconsistencies between the English reference version and additional language variants.

NOTE 2 The hosting of the data of national language variants is entrusted by the National Committees to reside at the IEC CO premises.



IEC 1362/09

Figure 8 – Administrative attributes for translation data

5.1 Administrative translation data attributes

5.1.1 Translation revision

Attribute name:	translation revision
Attribute definition:	the revision number of the corresponding translation to administer changes on a translation
Obligation:	optional
Example:	"01"
Character type of values:	digits 0 to 9

5.1.2 Language

Attribute name:	language code
Attribute definition:	code of the language in which the translated text of language dependent attributes is written
Comments:	language code is taken from the two-letter language code according to ISO 639-1 followed by an intermediate blank and extended with the two-letter country code according to ISO 3166 series to enable the possibility to distinguish between particular variants within one language
Obligation:	optional
Example:	"de DE"
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

5.1.3 Date of current translation revision

Attribute name:	date of current translation revision
Attribute definition:	date of the last revision of the corresponding translation
Obligation:	optional
Example:	"2005-06-28"
Character type of values:	date format according to YYYY-MM-DD as specified by ISO 8601

5.1.4 Responsible translator coded

Attribute name:	responsible translator
Attribute definition:	coded identification of the organization responsible for the translation
Comments:	the identifier is specified in ISO 13584-26
Obligation:	optional
Example:	"0112/2"
Character type of values:	fixed code as defined above. The slash "/" separator is used in a Step Physical File. In other mediums such as XML, other separators may be used.

5.1.5 Responsible translator

Attribute name:	published by
Attribute definition:	the organization responsible for the translation
Comments:	an IEC National Committee is made responsible for a translation and is identified by its corresponding two-letter country code.
Obligation:	optional
Example:	"DKE DE"
Character type of values:	those characters from the character set of ISO/IEC 10646-1, as defined in Annex A

5.2 Language dependent attributes of a data element type

The following attributes of a data element type are language dependent and can be translated. The set of translated language dependent attributes of a data element type is represented by the entity "translation data" (see Figure 8).

- preferred name;
- synonymous name;
- short name;

- definition;
- note;
- remark;
- value meaning.

5.3 Language dependent attributes of an item class

The following attributes of an item class are language dependent and can be translated. The set of translated language dependent attributes of an item class is represented by the entity “translation data” (see Figure 8):

- preferred name;
- synonymous name;
- definition;
- note;
- remark.

5.4 Language dependent attributes of a drawing

The following attributes of a drawing are language dependent and can be translated. The set of translated language dependent attributes of an item class is represented by the entity “translation data” (see Figure 8).

- drawing title.

6 Data element type classification

6.1 Objective

Data element types shall be classified in order to make large collections of data element types more manageable. This has been implemented by dividing the subject field from the generic to the specific, bringing related concepts together (e.g. referring to the same physical quantity like temperature, voltage, capacitance, etc.) and making orientation easier. The field of interest is primarily divided into a number of classes; they are complementary, i.e. they cover in their totality the whole field without any overlap.

The data element type classification is provided to help with a number of tasks:

- to analyse data element type collections;
- to define unambiguously data element types;
- to control the use of data element types;
- to fix the list of validity of the attributes of data element types.

6.2 General principles

The data element type classification system shall consist of main classes, classes and in some cases subclasses, identified by an upper-case letter and two digits respectively, according to the kind of data they represent.

There shall be two general categories of data element types:

- quantitative data element types, also called measures, to represent the values of a measurable property or phenomenon of a thing. These data element types shall belong to the main classes C, E, etc. Within this general category, physical and non-physical measures shall be distinguished according to the table given in Annex B;
- non-quantitative data element types, also called identifications and indicators, to represent identifications of subjects or indications of the properties of a data element type. These

shall be implemented by means of codes, names, descriptions, etc. These data element types belong to main class A.

6.3 Quantitative data element types

The quantitative data element types shall be classified into main classes according to their measure concepts or quantities. There shall be main classes for physical measures and for non-physical measures. Within the category non-physical measures, one shall distinguish between the sub-category financial measures and other measures in accordance with Table 5.

Table 5 – Survey of main classes and categories of data element types

Non-quantitative data element types	Main class	Description/subjects
	A	Identifications and indicators
Quantitative data element types	Main class	Description/subjects
Physical measures:	C	Physical chemistry and molecular physics
	E	Electricity and magnetism
	F	Periodic and related phenomena
	G	Acoustics
	H	Heat
	J	Information
	K	Mechanics
	L	Light and related electromagnetic radiations
	T	Space and time
	U	Atomic and nuclear physics
	V	Nuclear reactions and ionizing radiations
Non-physical measures:	W	Solid-state physics
Financial measures	M	Financial amounts
	P	Financial rates: prices, tariffs
Other measures:	Q	Denumerable quantities, counts
	R	Business ratios, percentages

The classification of physical quantitative data element types shall closely follow the structure of ISO 31 series using the following general rules:

- the classification shall have two levels:
 - main classes;
 - classes identified by a single capital and two numerical digits respectively.
- the main classes, except main class J, shall correspond to the chapters of ISO 31 series reflecting main areas of physics, for example space and time, mechanics, heat, etc.;
- the main classes shall be subdivided into classes of physical quantities exactly as in ISO 31 series for example T10: velocity, K01: mass, H12: thermal resistance;
- the main class J shall be subdivided into classes based on definitions from ISO 2382 series.

In addition the following specific rules apply:

- e) for quantities occurring in various parts of ISO 31 series, their complete physical context shall be decisive for the classification, for example wavelengths of light and sound are classified in class L03 or G05 respectively;
- f) ISO classes containing a physical constant shall not be used, for example E32/ L06: speed of light, L18: Stefan-Boltzmann constant;
- g) dimensionless ratios of identical quantities, expressed as fractions or percentages and not contained in Annex B, shall be classified in the same class as the quantity from which they originate;

EXAMPLE Current gain of a transistor is classified as E01.

- h) derived quantities not occurring in ISO 31 series shall be classified in the class of the numerator, for example steepness of a voltage pulse (in V/s) in class E06.

A complete list of data element type classification codes of quantitative data element types, in alphabetical order of the main class character is given in the Annex B.

6.4 Non-quantitative data element types

The values of the non-quantitative data element types shall represent identifications of subjects like places, organisations, persons, messages, documents, etc., or indications of the properties of the data element type. As a result these data element types belong to the main class A and shall further be classified in classes according to their subject, identified by two additional numerical digits. A survey of this classification is given in the Annex C.

7 Item class specification

For the classification of items, the principle of dividing the whole set of items into parts as defined in 2.9 shall be applied repeatedly, thereby creating a hierarchical tree of several classes. The tree will start with the so-called rootclass and consists further of superclasses and subclasses. Classification principles:

- a superclass shall have two or more subclasses;
- a superclass shall have one classifying data element type to define these subclasses;
- a subclass shall have one superclass;
- a subclass itself becomes a superclass when it has subclasses.

The IEC reference collection is the preferred name of the superclass at the highest level in the IEC classification tree as defined in IEC 61360-4. This class (IEC rootclass) has no superclass; it is itself a superclass and has only subclasses. The goal of the classification is to arrange the data element types in an unambiguous and structured way.

Each data element type is defined as visible at the level of the root class. This implies that the data element type may be defined as applicable at any class in the classification tree.

NOTE 1 Dictionaries based on standards other than IEC 61360-4 may apply a different strategy for the visibility of data element types.

Each data element type shall be applicable to a range of items, determined by class, subclass, etc. A data element type, which is applicable to any class, shall be also applicable to all subclasses of that class. Data element types, which are only applicable for a limited number of subclasses, should be repeated in each relevant subclass.

In this way, a family-tree structure is created with nodes, branches and leaves as shown in Figure 9. In this figure, each leaf shows, as dots, the collection of data element types which are applicable for the class which it represents and among which is the classifying data element type (if any) which defines the subclasses on the level below. However, the data

element types applicable in a class include also those inherited from higher classes, so where a leaf is shown as empty the corresponding class nevertheless contains all the inherited data element types. Classifying data element types are indicated by black dots, corresponding to the nodes of the tree, and the branches correspond to their values, the value meanings of which are defined in the note attribute of the class that has been defined by the classifying data element type.

The classification of items described here is set up along the following lines:

- a) from the collection of data element types applicable at a particular leaf, one data element type is assigned to be a classifying one. This data element type is chosen because the value list of this classifying data element type has the property that it can be used to divide the set of items at that level into subsets of which each item can be described by the same group of data element types;
- b) the hierarchical order of the data element types is determined by "inheritance" so that data element types applicable at a specific level also apply to all lower levels, unless the data element type cannot be applied owing to its definition, to lower levels, for instance data element type "overall diameter" can apply only to items with a cylindrical shape. The classification ends at that level where no further significant division of items can be made;

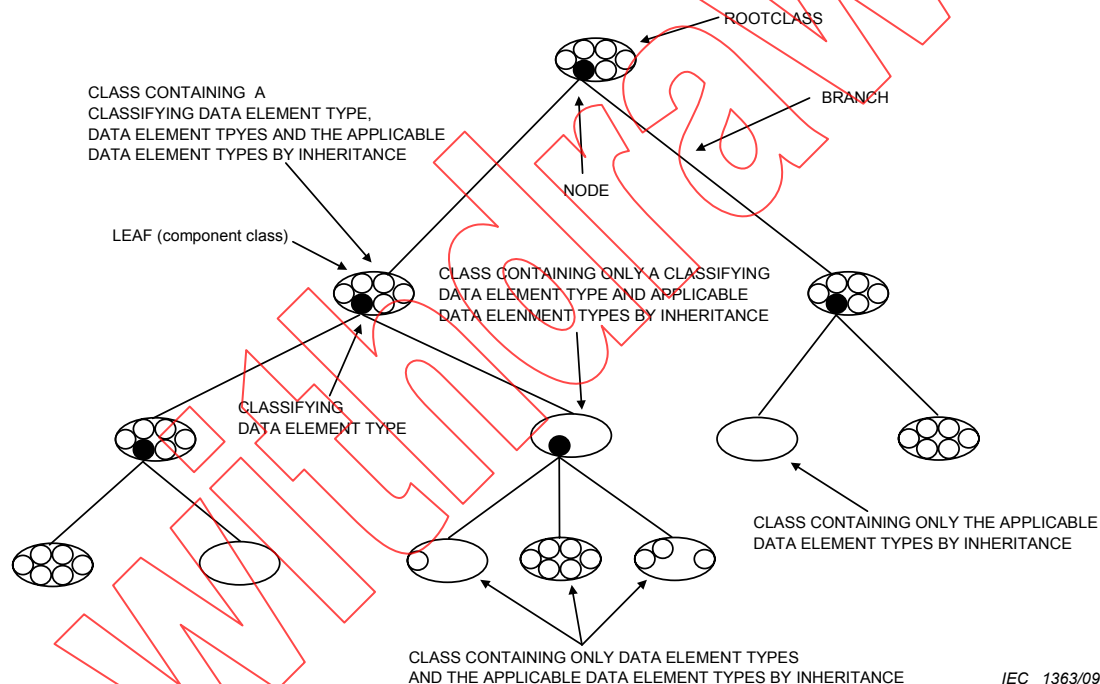


Figure 9 – Classification tree

- c) the classifying data element types, applicable at particular nodes in the tree, shall have the following properties:

- each one addresses a single elementary attribute and not a combination of different attributes, i.e. they have homogeneous value lists;
- the subclasses defined by the values of a classifying data element type are complementary; they cover in their totality the whole field completely and without overlap. So-called multiple value fields, where two or more values apply at the same time, are not allowed. Classifying data element types have always the data type value: non-quantitative code type;
- the value codes of classifying data element types shall be unique within the whole classification scheme;
- no garbage subclasses, called "miscellaneous", "remaining", "various" are allowed;
- any relevant attribute may be used in the classification; their choice and order are determined by whether or not they lead to specific data element types which are relevant to the users;

- the attribute used in this classification is mostly related to functionality, but other attributes such as technology, application, material, geometry also occur; the choice varies between items of different type;
- a classifying data element types is generally of the non-quantitative type.

d) for all data element types, the visibility and the applicability are defined:

- all data element types are defined as being visible at the root level of the IEC reference collection. This implies that a data element type may be used throughout the whole IEC reference collection;

NOTE 2 Dictionaries based on standards other than IEC 61360-4 may apply a different strategy for the visibility of data element types.

- a data element type is defined as being applicable at the level of a class where it is defined as describing data element type and/or by inheritance;
- a condition data element type only becomes applicable when it is referenced by another data element type that depends on it;

e) the terms which define the branches of the tree, being a value of the appropriate classifying data element, have the following properties:

- they are significant: no vague or ambiguous terms such as "general purpose", "economical", "high speed", etc. are allowed;
- they have a clearly defined objective meaning;
- they conform to international standards where available;
- they are free from synonymy: where synonyms do occur, one term is selected as the preferred name and the others refer to it;
- the specific meaning of homonyms is explained by context indications.

7.1 Use of auxiliary schemes for classification and coding of values

To ensure consistency and comprehensibility of data element types, the use of coding systems and classification schemes for definitional parts of data element types and their associated values is recommended. The example below demonstrates the use of a classification scheme to specify the shapes of package outlines.

NOTE When used, auxiliary schemes should be referenced in the note attribute.

EXAMPLE The classification scheme for the shapes of package outlines is based on the following three characteristics of the package according to the codes defined in IEC 60191-4:

- outline style;
- terminal position;
- terminal form.

Based on these characteristics, five levels of classification are defined as follows:

- level 1: outline style;
- level 2: terminal position;
- level 3: terminal form;
- level 4: terminal variant;
- level 5: body variant (optional).

The specification of each class at the lowest level of the classification tree of the component package shapes contains an attribute which makes a reference to a unique drawing. This associated drawing contains the graphical representation of the data element types describing the characteristic dimension parameters of that specific component package geometry.

Each drawing is unambiguously identified by an identifier. Also associated with each drawing is a descriptive designator which is derived from the coded name of the relevant class in the component package classification tree (see 8.1.5).

7.2 Item class specification attributes

In this clause, the various attributes of classes as encountered in the specifications are explained. For a list of these attributes, see Table 6. These attributes are related to identification, description and to relationships between classes and data element types.

Table 6 – List of attributes of item class as defined in IEC 61360-1 and their equivalent in IEC 61360-2

Attribute names in IEC 61360-1	Attribute names in IEC 61360-2	Subclause number
Code	code	7.4.1
Version number	version	7.4.2
Revision number	revision	7.4.3
Preferred name	preferred_name	7.4.4
Coded name	short_name	7.4.5
Synonymous name	synonymous_name	7.4.6
Definition	definition	7.5.1
Note	note	7.5.2
Remark	remark	7.5.3
Drawing reference	simplified_drawing	7.5.4
Source document of class definition	source_doc_of_definition	7.5.5
Classifying data element type	a	7.7.1
Applicable data element type	described_by	7.7.2
Superclass	its_superclass	7.7.3
Subclass	subclasses	7.7.4
Status level	a	4.5.1
Published in	a	4.5.2
Published by	a	4.5.3
Proposed on	a	4.5.4
Released on	date_of_original_definition	4.5.5
Version initiated on	a	4.5.6
Version released on	date_of_current_version	4.5.7
Obsolete from	a	4.5.9
Translation revision	a	5.1.1
Language	a	5.1.2
Date of current translation revision	a	5.1.3
Responsible translator coded	a	5.1.4
Responsible translator	a	5.1.5
^a Not defined in IEC 61360-2.		

7.3 Information model of an item class

An item class is a set of items of which each item can be described by the same group of data element types obtained by inheritance

The attributes of an item class are divided into two main groups:

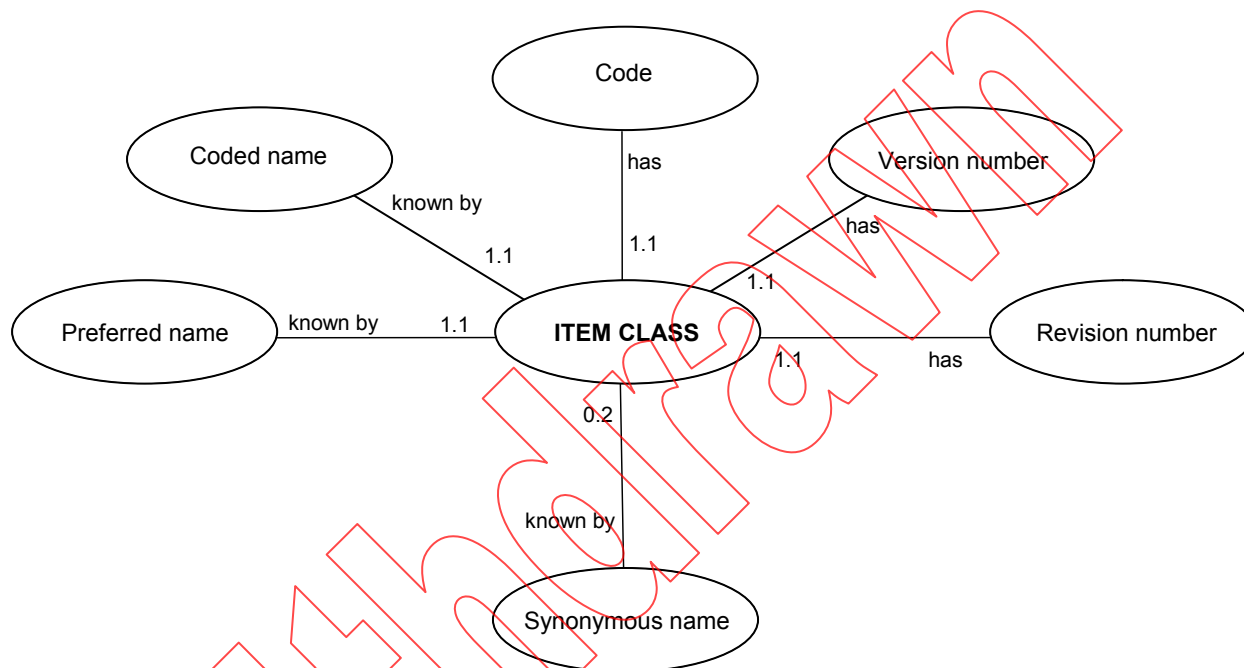
- identifying attributes;
- semantic attributes.

The information models (entity-relation diagrams) of an item class, given in Figure 10 and Figure 11, should be read following the same rules as described in 4.1 for a data element type.

7.4 Identifying attributes

To identify a class uniquely within a class dictionary, a language-independent combination of characters shall be used.

The identifier of a class shall consist of the combination of the six-character item class code, followed by a hyphen followed by the three-digit version number of the class.



IEC 1364/09

Figure 10 – Identifying attributes for item class

7.4.1 Code

Attribute name:	code
Attribute definition:	unique six-character code of an item class
Comments:	the first three characters shall be alphabetic, the last three numeric (format AAANNN). The character "X"¹¹ shall not be used as first character. The codes are issued chronologically and should not have any relationship with the meaning of the item class In case of at least one attribute of the items class, which affects the meaning and/or communication of the items class, changed, a new (other) item class, having a new code, shall be defined. Such an attribute is: – definition.
Obligation:	mandatory
Character type of values:	upper-case Latin letters A through Z (to avoid misunderstanding,

¹¹ For local or private use within users environment, codes starting with XAA up to and including codes starting with XZZ may be used and are therefore excluded from the IEC reference collection of standard data element types IEC 61360-4.

the upper-case Latin letters O and I shall not be used);
digits 0 through 9

7.4.2 Version number

Attribute name: version number
Attribute definition: number used to indicate the versions of an item class during its life cycle
Comments: the version number of an item class shall consist of three digits. Although the common ISO/IEC EXPRESS information model allows more digits, within the IEC system only 3 digits shall be used. Consecutive version numbers shall be issued in ascending order. A new version of the class shall be generated if at least one attribute of the class is changed which affects the use (communication, data base definition etc.) but which does not affect the meaning of that class. Those attributes which, when changed, will result in a version change are:
– preferred name;
– coded name;
– drawing reference;
– note.
In addition, the version number of a class shall be changed when a new describing data element type is added to that class. If the added data element type is a classifying data element type this implies that subclasses are defined to that class
Obligation: mandatory
Character type of values: digits 0 through 9

7.4.3 Revision number

Attribute name: revision number
Attribute definition: number used for administrative control of an item class
Comments: the revision number of an item class shall consist of two numerical characters. Consecutive revision numbers shall be issued in ascending order. For each item class with a unique identifier, only one revision number is current at any one time. A new revision number of an item class shall be generated if an attribute of the item class is changed which neither affects the use (communication, data base definitions etc.) nor the meaning of the items class, or when editorial changes of typing and spelling errors have been implemented. Those attributes which, when changed, will result in a revision change are:
– note;
– remark;
– source document of class definition;
– synonymous name.
Obligation: mandatory
Character type of values: digits 0 through 9