TECHNICAL REPORT

ISO/TR 13567-3

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Technical product documentation — Organization and naming of layers for CAD —

Part 3: Application of ISO 13567-1 and ISO 13567-2

Document technique de produits — Organisation et dénomination des couches de CAO —

Partie 3: Application de l'ISO 13567-1 et de l'ISO 13567-2

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Foreword

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

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

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this part of ISO/TR 13567 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 13567-3 was prepared by Technical Committee ISO/TC 10, *Technical drawings, product definition and related documentation,* Subcommittee SC 8, *Construction documentation*. It provides a guide to the application of the requirements of ISO 13567-1 and ISO 13567-2.

ISO 13567 consists of the following parts, under the general title *Technical product documentation — Organization and naming of layers for CAD*:

— *Part 1: Overview and principles*

— *Part 2: Concepts, format and codes used in construction documentation*

— *Part 3: Application of ISO 13567-1 and ISO 13567-2*

Introduction

This Technical Report is of value for the following reasons:

— Mandatory and optional layer name fields, together with default field sizes and, in certain cases default codes, are detailed in ISO 13567-2. However, the coding of certain layer name fields is not included in the standard, as it is recognized that for these specific fields the coding is more appropriately determined at national or project level.

— ISO 13567-2 also requires that the order of fields in a layer name, and the number of characters for each field, should be maintained as noted in the standard, unless an alternative is specifically agreed by the project parties. Furthermore, it is required that the layer name standard used is documented in a way that assures future retrieval of the layer structured information.

— This Technical Report provides detailed guidelines on how to document project specific layer structure and coding conforming to the requirements of ISO 13567-1 and ISO 13567-2. It also addresses the commonly employed practice of incorporating constant elements of the layer name coding in the name of the file containing these layers.

Technical product documentation — Organization and naming of layers for CAD —

Part 3:
Application of ISO 13567-1 and ISO 13567-2

1 Scope

This part of ISO 13567 provides a guide to the application of the requirements of ISO 13567-1 and ISO 13567-2 and in particular as a guide to documenting and communicating specific CAD layer name structure and coding complying with those standards. ISO 13567 consists of three parts dealing with organization and naming of layers for CAD. ISO 13567-1 has general application, while ISO 13567-2 details the concepts, formats, and codes to be used for naming of CAD layers employed in the preparation of construction documentation. This Technical Report deals with the mechanics of documenting and communicating the specific structure and coding used in an application of the layer name standard.

2 Conformance to ISO 13567-1 and ISO 13567-2

ISO 13567-1 and ISO 13567-2 provide a detailed definition of structure and coding of the CAD layer names to be used on construction projects. The standard specifies a default structure and coding rules, but also allow for national and project specific implementations, which vary from the default.

The following sections describe the differences between a layer naming system using the ISO 13567-1 and ISO 13567-2 default structure and coding (*Default conformance*) and a system which uses a project specific application of the standard (*Conceptual conformance*).

2.1 Default conformance

Default conformance to ISO 13567-2 requires that all of the mandatory and optional codes defined in the standard be used in the order specified, with the default field sizes, and using those codes set out in the standard. The optional fields need only be included up to the last used field with the underline character "_" used to fill unused internal layer name fields.

Default conformance provides a layer name convention which, in the absence of an agreed project alternative, is assumed to be the format used on the project.

An example of a layer name structure which satisfies the requirements of the standard using *Default conformance,* is shown in Figure 1.

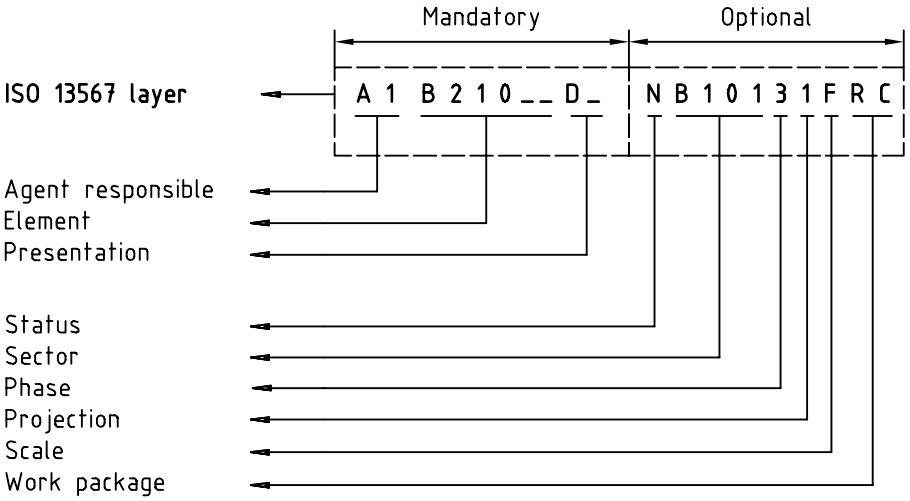

Figure 1 — Example of a "Default conformance" layer name structure

As *Default conformance* requires that the default field sizes be used, and that all fields be used in the order listed in the standard, it will usually lead to sparse and inelegant layer names which would not have strong user support and it is therefore not expected to be used in normal working situations.

However, a *Default conformance* definition is needed to provide a "neutral" framework to which alternative layer definitions can be converted when data is to be archived, and to provide a base definition which can be used in the absence of either a national standard or an agreed layer naming convention for a project.

In other words, *Default conformance* is a common starting point for defining national or project standards.

2.2 Conceptual conformance

2.2.1 Layer name fields

Conceptual conformance to ISO 13567-2 is designed to allow national standards bodies (or projects where agreement is reached between the parties) to implement layer naming conventions which satisfy the requirements of the standard while using alternative and more convenient layer naming structures and codes.

Conceptual conformance requires that the mandatory fields be always used, but allows for varying the number of optional fields and the order of these fields, and for varying the size of all fields from the default field sizes. However, the conceptual content of each field cannot be varied from the definitions in ISO 13567-2.

An example of the syntax of a layer name using a structure, which satisfies the requirements of the standard using *Conceptual conformance,* is shown in Figure 2.

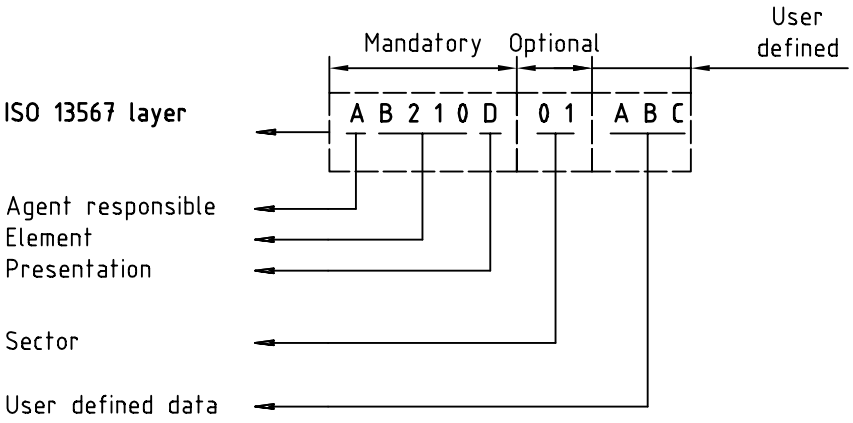

Figure 2 — Example of "Conceptual conformance" layer name structure

2.2.2 Coding for file names and layer names

In a construction industry design project CAD files are the basic package containing graphic information, whereas layers are the principle means of categorising the graphic data within the CAD files.

Layer names conforming to the requirements of ISO 13567-2 provide a comprehensive mechanism for categorizing data within CAD files. However, by using file names in conjunction with layer names it is possible to reduce duplication of coding information and to facilitate ordered use of reference files on a project.

Typically the file name may include one or more codes for particular layer name fields where these codes would be constant for all layers contained in the CAD file. In such a situation the fields in question are omitted from the layer name, and the file name and layer name are read together to fully describe the contents of a particular layer in the file.

Using a combined file name and layer name convention is clearly in conformance with the requirements of ISO 13567-2, provided the coded information can be translated into a *Default Conformance* layer name structure, if required.

This Technical Report includes an example (in annex A) of definition and communication of codes, which are to be coded in the file name instead of the layer name and thus constant for all layers in a CAD file.

3 Structure and coding of CAD layer names

3.1 Minimum documentation requirements

To adequately document the structure and coding of a naming system for CAD layers (or combined naming system for CAD files and layers) as used on a project it is necessary to provide the following:

3.1.1 A link to ISO 13567-2 subclause number for each CAD layer name field

The concept, format and code for each of the mandatory layer name fields are specified in clause 6 of ISO 13567-2. Similarly, the details for each of the optional layer name fields are specified in clause 7 of that standard.

The documentation of the project specific CAD layer naming system must identify those fields used in the layer name by direct reference of the given field name to the relevant ISO 13567-2 subclause.

3.1.2 The size of the layer name fields

ISO 13567-2 details default sizes for each layer name field. However, since the order and size of each field may be varied from these defaults, it is necessary to clearly document the size used for each field to ensure accurate interpretation of each field value.

The documentation of the project specific CAD layer naming system must identify the size in character positions of each field used. This information is supplied in conjunction with the given field name and ISO 13567-2 subclause reference.

3.1.3 The order of the layer name fields

Layer name fields may be reordered in another order than the default order detailed in ISO 13567-2 to suit project requirements. However, it would be appropriate to use the fields in the order in which they are defined in the standard (in particular the mandatory fields), unless specific circumstances require an alternative order. The order, in which each field appears in the layer name (or in the file name if appropriate) for a specific application of the standard, needs to be documented.

The documentation of the project specific CAD layer naming system must identify the order in which the fields used in the layer name (or file name) are stored by listing or tabulation of the fields in that order.

3.1.4 The valid code values for each layer name field and their descriptions

ISO 13567-2 specifies default and reserved code values to be used in certain layer name fields. All codes used in a project need to be documented together with an appropriate description of each code for interpretation purposes.

The documentation of the project specific CAD layer naming system must identify all values, which are valid for each layer name field. Each such code must be documented with an appropriate description. Where a hierarchy of codes is employed, to provide a variable level of detail in a field, this hierarchy must be documented using a parent/child metaphor such as indenting or branching.

3.2 Layer definition file

In order that the layer naming system definition to be used on a project can be documented and communicated without ambiguity, it is necessary to have an agreed format for the *Layer definition file* document. This format must fulfil each of the requirements on structure and coding of CAD layer names as outlined in the previous section.

The tabbed text file format detailed in clause A.4 of has been chosen for this purpose as it satisfies the listed requirements, facilitates use of file names with layer names, can be created/edited using any standard text editor, and can be read directly by a person without the need for any computer software.

An added benefit of having an agreed format for the *Layer definition file* is that it will encourage CAD software vendors to support this format in their product development.

EXAMPLE

Coding of the layer definition of a project example:

An example of a CAD layer naming system for a project is described and documented in annex A using the *Layer definition file* format specified below. This example of a layer naming system is included solely for demonstration purposes, and neither the field order, field size, codes used or descriptions have any status other than being demonstration materials.

The *Layer definition file* format used in this example satisfies each of the minimum documentation requirements identified in subclause 3.1.

Layer definition file format:

— Records are single lines of text.

— Data fields in a record are separated by tab characters.

— A pair of adjacent forward slashes “//” at the start of any data field means that the remainder of the record is a comment statement only and is not to be interpreted. Comments can be complete records or can be trailing data fields on an interpreted record.

— The end of the layer definition information in the file is indicated by the first blank or empty record or by the physical end of file.

— The first data field of any non-comment record is interpreted as the corresponding clause number of ISO 13567-2. The record is then recognized as a *Layer name clause record*. If the text in this first data field does not correspond to one of the clause numbers in the standard it is interpreted as being a user defined layer name field.

— The order in which *Layer name clause records* appear in the *Layer definition file* determines the order in which the clauses are represented in the full layer name.

— The second data field of a *Layer name clause record* is the descriptive name given to the specific clause for the project.

— The third data field of a *Layer name clause record* specifies the number of characters which are allocated in the layer name (or file name) to this layer name field.

  — If the third data field contains only an integer value, then this is the number of characters allocated to the particular clause in the full layer name.

  — If the third data field contains a text string of the general form ??AA, then the particular clause is coded in the file name, not in the full layer name. Any leading “?” characters are place holders to indicate the location of the code in the file name and the number of consecutive “A” characters, and their position in the text string, indicates the number of characters allocated to the particular clause in the file name and their location.

  — If the third data field contains a text string of the general form ??A2, then the particular clause is coded partially in the file name and partially in the full layer name. The location and number of “A” characters in the text string indicate the location and number of characters allocated to the particular clause in the file name and the trailing integer indicates the number of additional characters allocated to the clause in the full layer name.

— All records following a particular layer name field definition and immediately up to the next layer name field definition, or the end of the layer definition information, are interpreted as coding records for that layer name field.

— Coding records will always have a tab character in one or more leading data fields, and these will be followed by a valid code data field for the particular layer name field, which in turn is followed by an optional description data field for this code.

— First level coding records always have the code in the second data field of the record (following a tab character in the first data field of the record).

— A hierarchy of coding records is represented by nesting the child codes for a particular layer field code in the records immediately after that code. The nesting is achieved by shifting the child code fields and their description fields one data field to the right relative to the parent code data field.

Annex A

Example of definition and coding of layer names for a project

A.1 Description of an example of a layer name system for a project

The project example uses the three mandatory layer name fields and two of the optional layer name fields as detailed in ISO 13567-2. The standard subclause numbers, given names and sizes for each of the layer name fields in the order in which they appear in the layer name, are listed in the following table. Note, however, that subclause 6.1 “Agent Responsible” is to be coded as characters 3 and 4 of the CAD file name and will not appear in the layer names in the CAD file.

A.2 Layer name structure, field order and field size

The order and size of the layer name fields are:

ISO 13567-2 Subclause	Given description for field	Coding of field	Size of field
6.1	Agent responsible	File name	2
6.2	Element	Layer name	3
6.3	Presentation	Layer name	2
7.2	Sector	Layer name	4
7.1	Status	Layer name	1

A.3 Valid codes for each subclause

A.3.1 Subclause 6.1 Agent responsible

The valid codes for *Agent responsible* together with their descriptions to be used on this project are:

Valid code	Agent responsible description
-	Manufacturer
A-	Architect
B-	Building surveyor
I-	Interior designer
S-	Structural engineer

A.3.2 Subclause 6.2 Element

The valid codes for *Element* together with their descriptions are tabulated below. A hierarchy of codes exists for this field, where the first digit in each code provides the coarsest definition and the third digit provides the finest definition.

Valid codes	Element description
---	All elements
2--	Primary elements
200	General primary elements
21-	External walls
210	General external walls
211	Complete walls – cavity and inner walls
212	Outer leaf of external walls
213	Inner leaf of external walls
214	Curtain walls
22-	Internal walls
220	General internal walls
221	Complete internal walls
226	Internal framing and cladding
23-	Floors
230	General floors
232	Slab floors, monolithic floors
234	Composite, assembled floors
237	Balconies, galleries
240	Stairs
3--	Secondary elements
300	General secondary elements
310	External wall completion
320	Internal wall completion
330	Floor completion
340	Balustrades, handrails
350	Ceilings
370	Roof completion
7--	Fittings and furniture
700	General fittings and furniture
710	Circulation fittings
720	Rest and work fittings
730	Kitchens, culinary fittings
740	Sanitary fittings
750	Cleaning fittings
760	Storage fittings
770	Special activity fittings
780	Loose fittings

A.3.3 Subclause 6.3 Presentation

The valid codes for *Presentation* together with their descriptions are tabulated below. For this field the *Whole model and drawing*, *Model* and *Page/paper* codes are the coarsest definition with the other codes providing finer definition of the *Model* and *Page/paper* codes.

Valid code	Presentation description
--	Whole model and drawing
M-	Model
E-	Model element graphics
A-	Model annotation
G-	Model grid
U-	Model user
P-	Page/paper
B-	Page/paper border
V-	Page/paper text
I-	Page/paper tabular information

A.3.4 Subclause 7.2 Sector

The valid codes for *Sector* together with their descriptions are:

Valid code	Sector description
----	Whole project
01A-	First floor of zone A
02AB	First floor of zone A in block B

A.3.5 Subclause 7.1 Status

Finally, the valid codes for *Status* together with their descriptions are:

Valid code	Status description
-	Whole project
N	New work
E	Existing to remain
R	Existing to be removed
O	Existing to be moved (original position)
F	Existing to be moved (final position)
T	Temporary work

A.4 Layer definition file

The following data file is the encapsulation of the example of a project layer system as described above.

Leading tabs on a line in the text file are represented as ⇒

Note the use of "//" characters to indicate full line comments and trailing comments.

Note also the coding for subclause 6.1 indicating the allocation of characters 3 and 4 of the file name to this field.

Examples of valid file names and layer names based on the layer definition file example would be:

EXAMPLE 1

File name	X1A-001	
Layer name	21-M-01A-N	
??A-???	Architect	(Agent responsible – subclause 6.1)
21-	External walls	(Element – subclause 6.2)
M-	Model	(Presentation – subclause 6.3)
01A-	First floor of zone A	(Sector – subclause 7.2)
N	New work	(Status – subclause 7.1)

EXAMPLE 2

File name	Y3S-999	
Layer name	232A-02B-E	
??S-???	Structural engineer	(Agent responsible – subclause 6.1)
232	Slab floors, monolithic floors	(Element – subclause 6.2)
A-	Annotation	(Presentation – subclause 6.3)
02B-	Second floor of zone B	(Sector – subclause 7.2)
E	Existing to remain	(Status – subclause 7.1)

An example of a layer definition file would be:

EXAMPLE 3

// Layer definition file for the project example described in this paper. The "//" at the start of this line indicates that the complete line is a comment.

// A "//" can be placed on any line after the required layer definition data. Any text placed after the "//" will be treated as a comment.

6.1 Agent responsible ??AA // Agent responsible specified in characters 3 and 4 of the file name.

⇒ -- Manufacturer
⇒ A- Architect
⇒ B- Building surveyor
⇒ I- Interior designer
⇒ S- Structural engineer

//

6.2 Element 3 // Element codes specified by first three characters in layer name.

⇒ --- All elements
⇒ 2-- Primary elements
⇒ ⇒ 200 General primary elements
⇒ ⇒ 21- External walls
⇒ ⇒ ⇒ 210 General external walls
⇒ ⇒ ⇒ 211 Complete walls - cavity and inner walls
⇒ ⇒ ⇒ 212 Outer leaf of external walls
⇒ ⇒ ⇒ 213 Inner leaf of external walls
⇒ ⇒ ⇒ 214 Curtain walls
⇒ ⇒ 22- Internal walls
⇒ ⇒ ⇒ 220 General internal walls
⇒ ⇒ ⇒ 221 Complete internal walls
⇒ ⇒ ⇒ 226 Internal framing and cladding
⇒ ⇒ 23- Floors
⇒ ⇒ ⇒ 230 General floors
⇒ ⇒ ⇒ 232 Slab floors, monolithic floors
⇒ ⇒ ⇒ 234 Composite, assembled floors
⇒ ⇒ ⇒ 237 Balconies, galleries
⇒ ⇒ 240 Stairs
⇒ 3-- Secondary elements
⇒ ⇒ 300 General secondary elements
⇒ ⇒ 310 External wall completion
⇒ ⇒ 320 Internal wall completion
⇒ ⇒ 330 Floor completion
⇒ ⇒ 340 Balustrades, handrails
⇒ ⇒ 350 Ceilings
⇒ ⇒ 370 Roof completion

	⇒	7--		Fittings and furniture	
	⇒		⇒	700	General fittings and furniture
	⇒		⇒	710	Circulation fittings
	⇒		⇒	720	Rest and work fittings
	⇒		⇒	730	Kitchens, culinary fittings
	⇒		⇒	740	Sanitary fittings
	⇒		⇒	750	Cleaning fittings
	⇒		⇒	760	Storage fittings
	⇒		⇒	770	Special activity fittings
	⇒		⇒	780	Loose fittings

//

6.3	Presentation	2	// Presentation codes specified by characters 4 and 5 in layer name.	
⇒	--	Whole model and drawing		
⇒	M-	Model		
⇒		⇒	E-	Element graphics
⇒		⇒	A-	Annotation
⇒		⇒	G-	Grid
⇒		⇒	U-	User
⇒	P-	Page/paper		
⇒		⇒	B-	Border
⇒		⇒	V-	Text
⇒		⇒	I-	Tabular information

//

7.2	Sector	4	// Sector specified by chars 6-9 in layer name. Subclause 7.2 placed before 7.1
⇒	----	Whole project	
⇒	01A-	First floor of zone A	
⇒	02AB	First floor of zone A in block B	

//

7.1	Status	1	// Status specified by character 10 in layer name.
⇒	-	Whole project	
⇒	N	New work	
⇒	E	Existing to remain	
⇒	R	Existing to be removed	
⇒	O	Existing to be moved (original position)	
⇒	F	Existing to be moved (final position)	
⇒	T	Temporary work	

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