

Industrial systems, installations and equipment and industrial products Structuring principles and reference designations

Part 1. Basic rules

The European Standard EN 61346-1 : 1996 has the status of a
British Standard

ICS 01.100; 29.020

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee GEL/3, Documentation and graphical symbols, upon which the following bodies were represented:

- British Photographic Association
- Consumer Policy Committee of BSI
- Federation of the Electronics Industry
- GAMBICA (BEAMA Ltd.)
- Transmission and Distribution Association (BEAMA Ltd.)

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 August 1996

© BSI 1996

The following BSI references relate to the work on this standard:
Committee reference GEL/3
Draft for comment 93/213663 DC

ISBN 0 580 26168 9

Amendments issued since publication

Amd. No.	Date	Text affected

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 61346-1	3

National foreword

This British Standard has been prepared by Technical Committee GEL/3 and is the English language version of EN 61346-1 : 1996, *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations Part 1: Basic rules*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 1346-1 : 1996 published by the International Electrotechnical Commission (IEC).

Cross-reference

Publication referred to	Corresponding British Standard
EN 23166 : 1994 (ISO 3166 : 1993)	BS EN 23166 : 1994 <i>Codes for the representation of names of countries</i>

Compliance with a British Standard does not of itself confer immunity from legal obligations.

ICS 29.020; 01.100.00

Descriptors: Reference designation, documentation, structuring principles, basic rules

English version

Industrial systems, installations and equipment and industrial
products
Structuring principles and reference designations
Part 1: Basic rules

(IEC 1346-1 : 1996)

Systèmes industriels, installations et appareils, et
produits industriels
Principes de structuration et désignation de
référence
Partie 1: Règles de base
(CEI 1346-1 : 1996)

Industrielle Systeme, Anlagen und Ausrüstungen
und Industrieprodukte
Strukturierungsprinzipien und
Referenzkennzeichnung
Teil 1: Allgemeine Regeln
(IEC 1346-1 : 1996)

This European Standard was approved by CENELEC on 1995-11-28. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

Foreword

The text of document 3B/144/FDIS, future edition 1 of IEC 1346-1, prepared by SC 3B, Documentation, of IEC TC 3, Documentation and graphical symbols and ISO TC 10, Technical drawings, product definitions and related documentation, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61346-1 on 1995-11-28.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1996-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-12-01

Annexes designated 'normative' are part of the body of the standard.

Annexes designated 'informative' are given for information only.

In this standard, annex ZA is normative and annexes A, B, C, D, E, F, and G are informative.

Annex ZA has been added by CENELEC.

Contents

	Page
Introduction	3
1 Scope	4
2 Normative references	4
3 Definitions	5
4 Structuring principles	6
4.1 General	6
4.2 Function-oriented structure	8
4.3 Product-oriented structure	9
4.4 Location-oriented structure	10
4.5 Object description and object occurrence in forming structures	11
5 Construction of reference designation	13
5.1 General	13
5.2 Format of reference designations	13
5.3 Additional aspects of the same type	17
5.4 Identifying objects using different aspects	20
5.5 Reference designation set	24
5.6 Reference designation group	26
6 Location designation	27
Annexes	
A (informative) Basic requirements and required properties of the reference designation system	28
B (informative) Examples of transitions from one aspect to another aspect	31
C (informative) Example of transition from one aspect to another aspect where the latter aspect has independent representations	36
D (informative) Example: reference designations within a system	37
E (informative) Letter codes of IEC 750	42
F (informative) Differences and similarities between the designation system defined in this standard, IEC 750, ISO 3511 and ISO/DIS 1219-2	44
G (informative) Bibliography	46
ZA (normative) Normative references to international publications with their corresponding European publications	47

INTRODUCTION

In connection with the design, engineering, realization, operation, maintenance and demolition, i.e. the life-cycle of a system, it is necessary to employ a number of identification systems for different purposes, for example:

- product (article) numbering system used for identification of types of products;
- serial number system used for identification of product individuals;
- order number system used for identification of orders/contracts;
- reference designation system used for identification of objects within a system/plant.

This part of IEC 1346 deals only with the reference designation system.

The following table relates the identification systems to their contexts. The shaded areas show the context of the reference designation system and the classification provided by the letter codes. The reference designation system is also used in manufacturing or operating companies for identification of occurrences of types.

Identifications and their contexts

Context	Types ¹⁾	Occurrences ²⁾ of types	Individuals ³⁾
The technical area in general	Letter codes for generic types	Not applicable	Not applicable
Manufacturing company	Type designations, article (parts) number.	Reference designation	Serial Number
Plants / systems project	Identity No. of typicals	Reference designation	Serial number, Order number, Inventory number.
Operating company	Internal parts number	Reference designation	Inventory number (serial number)
1) Type: a class of objects having the same set of characteristics. 2) Occurrence: the use of a type in a specific position in a plant or system. 3) Individual: one specimen of a type irrespective of where it is being used.			

It should be noted that this standard provides a number of possibilities for the construction of reference designations. For most applications, however, only a subset of the possibilities given need be used.

The basic requirements and the required properties of a reference designation system that form the basis for the reference designation system described in this standard are given in annex A. It is recommended to study this annex before reading the normative clauses of this standard. The annex contains a description of the properties of the reference designation system of this standard in a comparison with the required properties. A more comprehensive discussion of the basic concepts of the reference designation system can be found in IEC 1346-4 [3]¹.

Annex E contains a reproduction of the letter codes defined in table 1 of IEC 750 [1]. This annex will be removed in later editions of this standard when IEC 1346-2 is issued.

Annex F contains a short description of the differences and similarities between the reference designation system defined in this standard and those of IEC 750 [1], ISO 3511 [4] [5], and ISO DIS 1219-2 [6]. This annex will be removed in later editions of this standard.

¹ Figures in square brackets refer to the bibliography given in annex G.

INDUSTRIAL SYSTEMS, INSTALLATIONS AND EQUIPMENT AND INDUSTRIAL PRODUCTS – STRUCTURING PRINCIPLES AND REFERENCE DESIGNATIONS – Part 1: Basic rules

1 Scope

This part of IEC 1346 establishes general principles for describing the structure of information about systems and of the systems themselves.

Based on these principles, rules and guidance are given for the formulation of unambiguous reference designations for objects in any system.

The reference designation identifies objects for the purpose of correlating information about an object among different kinds of documents and the products implementing the system. For manufacturing, installation and maintenance purposes, the reference designation or part of it may also be shown on or near the physical part corresponding to the object.

The principles laid down are general and are intended to be applicable to all technical areas. They can be used for systems based on different technologies or for systems combining several technologies.

2 Normative references

The following normative documents contain provisions, which through reference in this text, constitute provisions of this part of IEC 1346. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 1346 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid normative documents.

IEC	1346-2	: 199x	<i>Structuring Principles and Reference Designations. Part 2: Classification of objects and codes for classes (under consideration)</i>
ISO/IEC	646	: 1991,	<i>Information technology - ISO 7-bit coded character set for information interchange</i>
ISO	3166	: 1993,	<i>Codes for the representation of names of countries</i>
ISO	4157-1	: 1980,	<i>Building drawings - Part 1: Designation of buildings and parts of buildings</i>
ISO	4157-2	: 1982,	<i>Technical drawings - Construction drawings - Designation of buildings and parts of buildings - Part 2: Designation of rooms and other areas</i>

3 Definitions

For the purposes of this part of IEC 1346, the following definitions apply.

3.1 object: Entity treated in the process of design, engineering, realization, operation, maintenance and demolition.

NOTES

- 1 The entity may refer to a physical or non-physical "thing", or to a set of information associated with it.
- 2 Depending on its purpose, an object may be viewed in different ways called "aspects" (see 3.3).

3.2 system: Set of interrelated objects.

NOTES

- 1 Examples of a system: a drive system, a water supply system, a stereo system, a computer.
- 2 When a system is part of another system, it may be considered as an object.

3.3 aspect: Specific way of selecting information on or describing a system or an object of a system.

NOTE - Such ways may be:

- what the system or object is doing (function viewpoint);
- how the system or object is constructed (product viewpoint);
- where the system or object is located (location viewpoint).

3.4 function: Purpose related to an object.

3.5 product: Intended or accomplished result of labour, or of a natural or artificial process.

NOTES

- 1 A product usually has a part number, order number, type designation, and/or a name.
- 2 A technical system or plant can be considered as a product.

3.6 structure: Organization of relations among objects of a system describing constituency—relations (consist of / is a part of).

3.7 reference designation: Identifier of a specific object with respect to the system of which the object is a constituent, based on one or more aspects of that system.

3.8 single-level reference designation: Reference designation assigned with respect to the object of which the specific object is a direct constituent.

3.9 multi-level reference designation: Reference designation derived from a structural path through an overall system.

3.10 reference designation set: Set of reference designations of which at least one unambiguously identifies the object of interest.

NOTE - Other members of the set need not necessarily identify the object of interest but other objects of which it is a constituent.

3.11 reference designation group: Set of reference designations that as a whole unambiguously identify the object of interest and where none of the reference designations in the set by themselves unambiguously identifies that object.

4 Structuring principles

4.1 General

In order for a system to be efficiently designed, manufactured, serviced or operated the system and the information about the system are normally divided into parts. Each of these parts can be further divided. This successive subdivision into parts and the organization of those parts is called structuring.

An established structure is reflected in:

- the structure of the information about the system, i.e. how the information is distributed among different documents and/or information systems;
- the structure of the contents within each document (see for example IEC 1082-1 [2]);
- the construction of reference designations (see clause 5).

It is, of course, also reflected in the system or installation itself.

A system, as well as each constituent object, can be viewed in many ways called aspects, as shown in figure 1, such as:

- what it does;
- how it is constructed;
- where it is located.

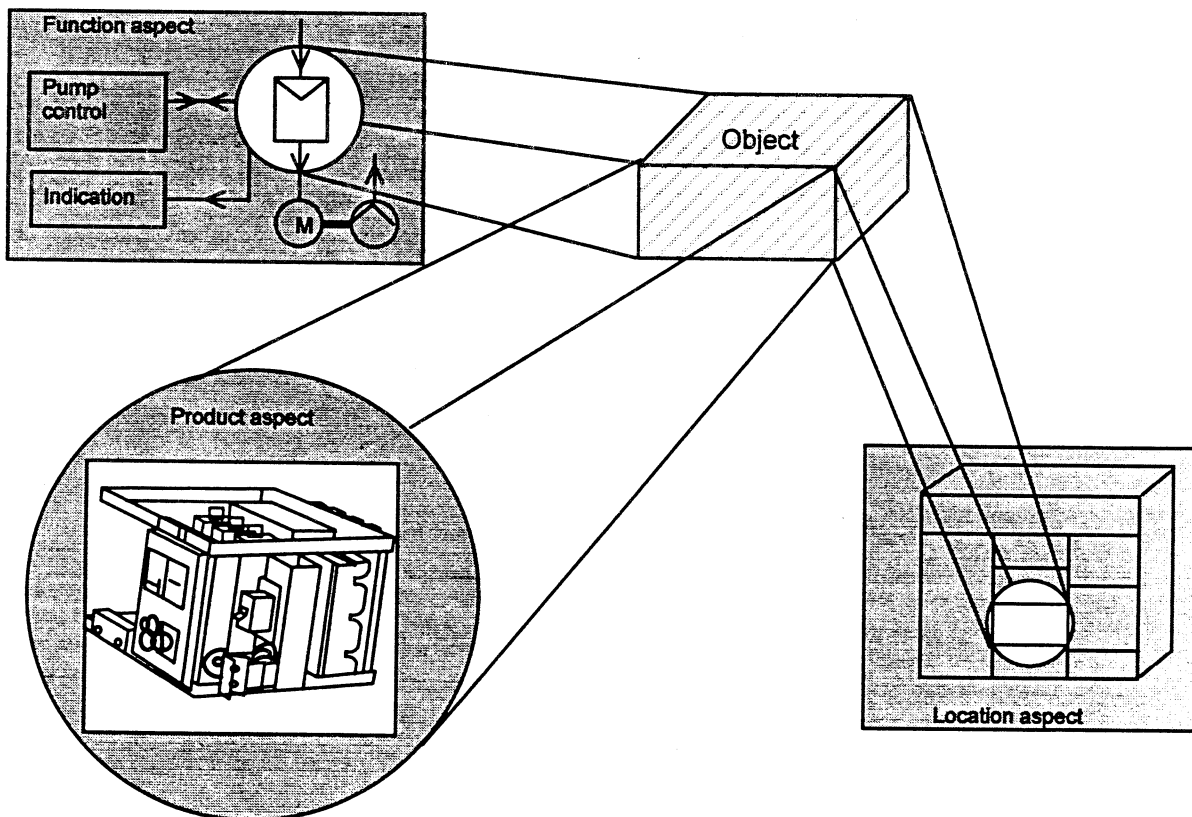


Figure 1 - Aspects of an object

The information of relevance and the structuring of objects within a system may differ considerably depending on the aspect applied. Each aspect will therefore require a separate structure.

With respect to the three types of aspects considered, this standard describes the corresponding structures:

- function-oriented structure (see 4.2);
- product-oriented structure (see 4.3);
- location-oriented structure (see 4.4).

Other types of aspects and structures exist, such as for project management and material classification, which may be the basis for other designation systems. These are not treated in this standard.

4.2 Function-oriented structure

A function-oriented structure is based on the purpose of a system. A function-oriented structure shows the subdivision of the system into constituent objects with respect to the function aspect, without necessarily taking into account the location and/or the products implementing the functions.

Documents giving information based upon a function-oriented structure describe, graphically and/or textually, how the functions of the system are divided into subfunctions that are combined to fulfil the intended purpose.

Figure 2 illustrates a function-oriented structure.

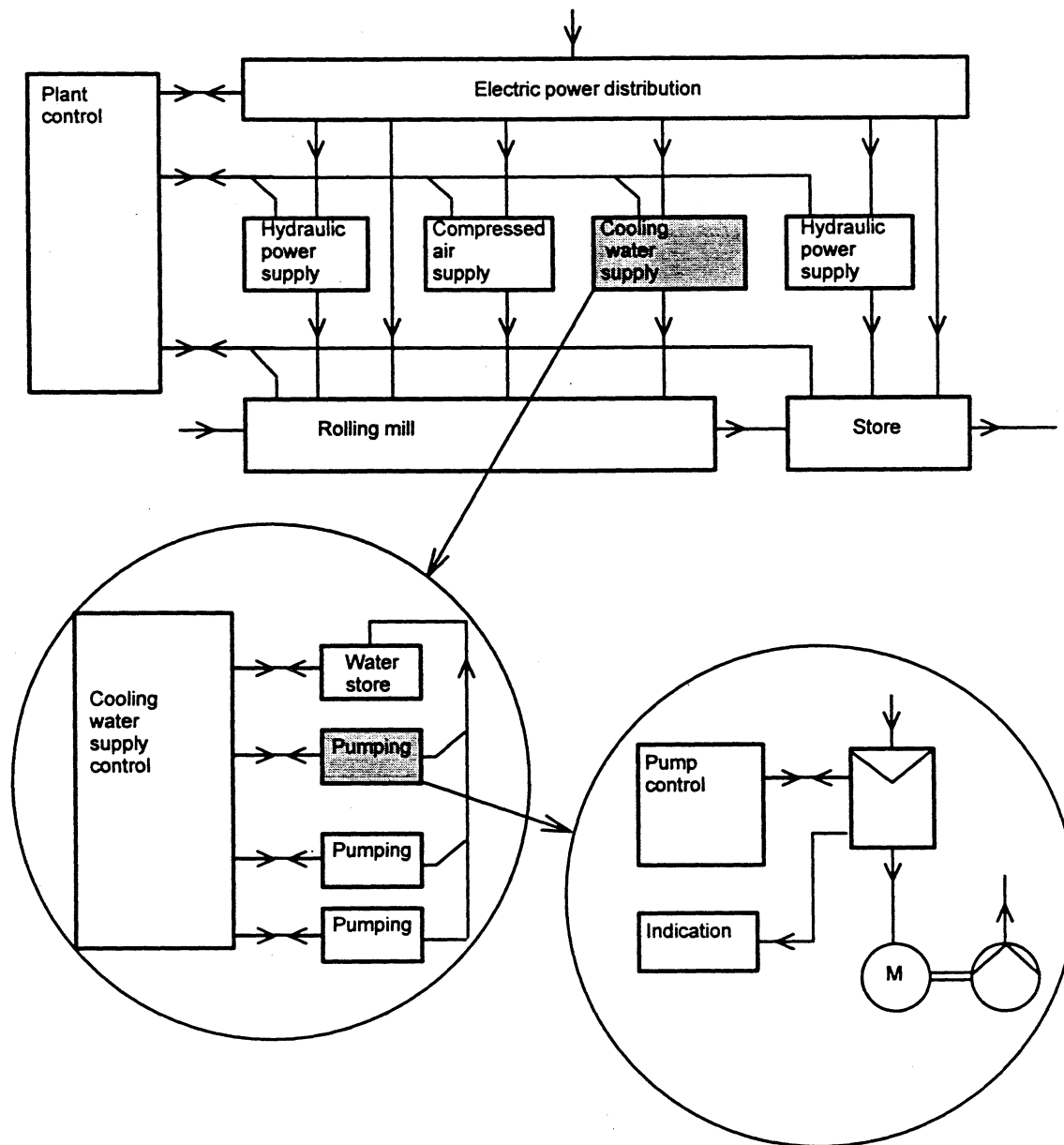


Figure 2 - Illustration of a function-oriented structure

4.3 Product-oriented structure

A product-oriented structure is based on the way a system is implemented, constructed or delivered using intermediate or final products. A product-oriented structure shows the subdivision of the system into constituent objects with respect to the product aspect without necessarily taking into account functions and/or locations. A product can implement one or more independent functions. A product can reside, alone or together with others, in one location. One product can also reside in more than one location (for example a stereo system, including its loud-speakers).

Documents giving information based upon a product-oriented structure describe, graphically and/or textually, how a product is divided into subproducts that are manufactured, assembled, or packaged together to implement or deliver the product.

Figure 3 illustrates a product-oriented structure.

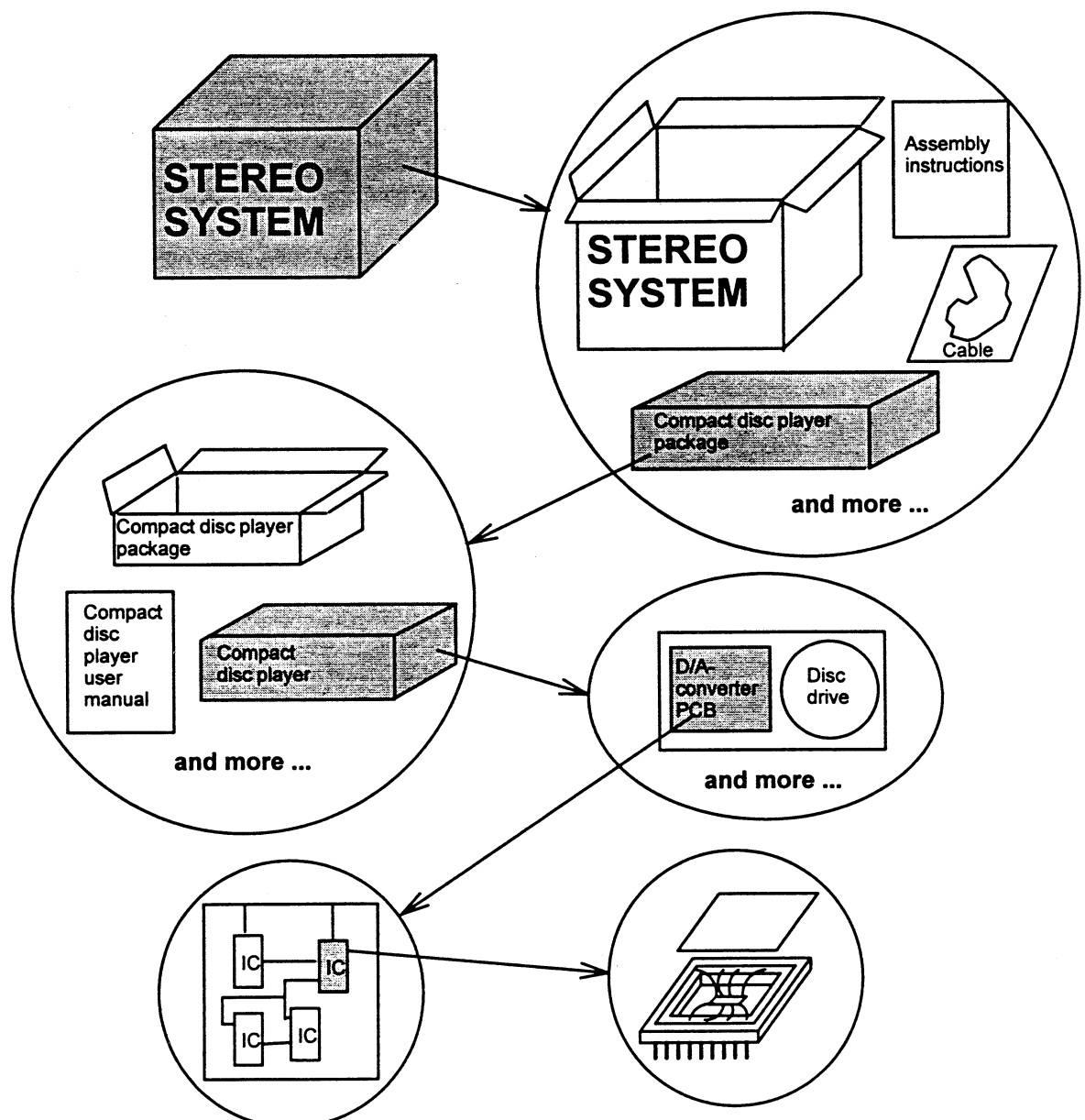


Figure 3 - Illustration of a product-oriented structure

4.4 Location-oriented structure

A location-oriented structure is based on the topographical layout of the system, and/or the environment in which the system is situated. A location-oriented structure shows the subdivision of the system into constituent objects with respect to the location aspect without necessarily taking into account products and/or functions. A location can contain any number of products.

In a location-oriented structure, locations may be subdivided successively, for example:

- ground area;
- building;
- floor;
- room / coordinates;
- location of an assembly or row of cubicles;
- location of a cubicle;
- location of a panel;
- printed circuit board slot;
- position on a board.

Documents giving information based upon a location-oriented structure describe, graphically and/or textually, where the products implementing a system are physically located.

Figure 4 illustrates a location-oriented structure.

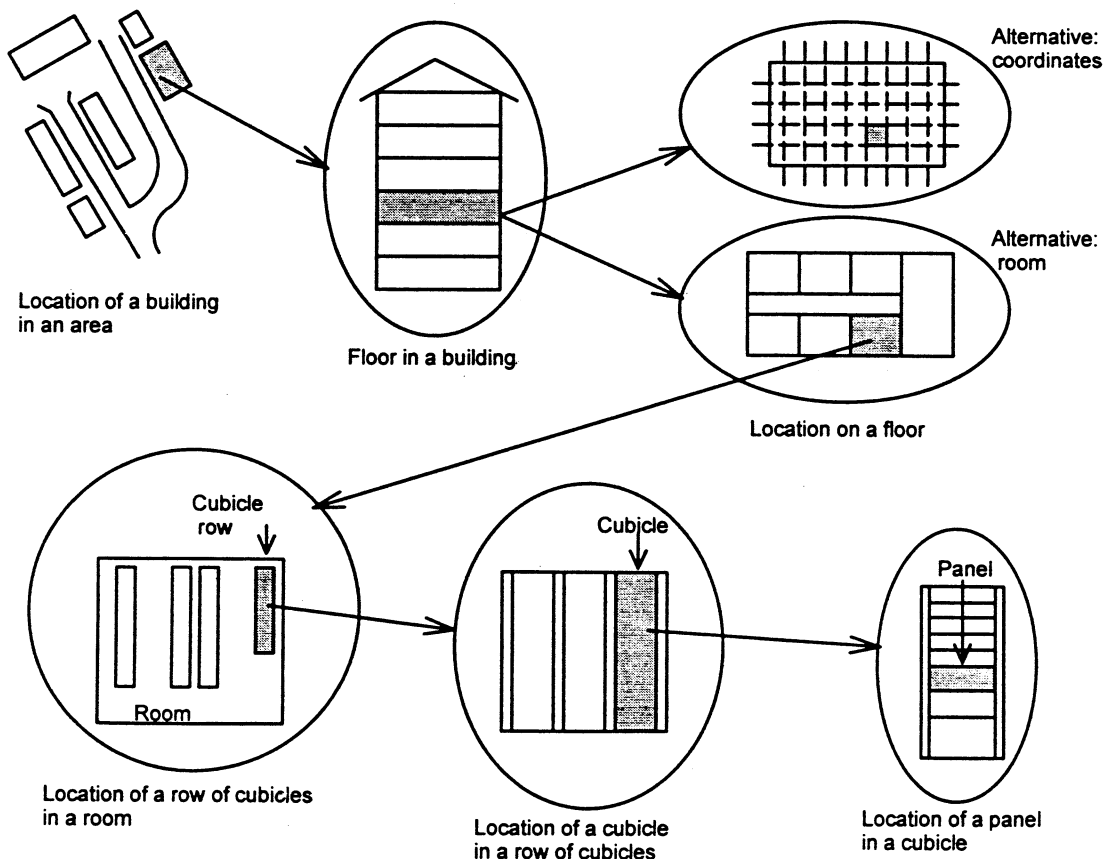


Figure 4 - Illustration of a location-oriented structure

4.5 Object description and object occurrence in forming structures

Any aspect of an object can be described in terms of the same aspect of other objects. These other objects become subobjects of the described object. The result from the successive subdivisions of the same aspect of the objects identified can be represented as a tree as shown in figure 5 .

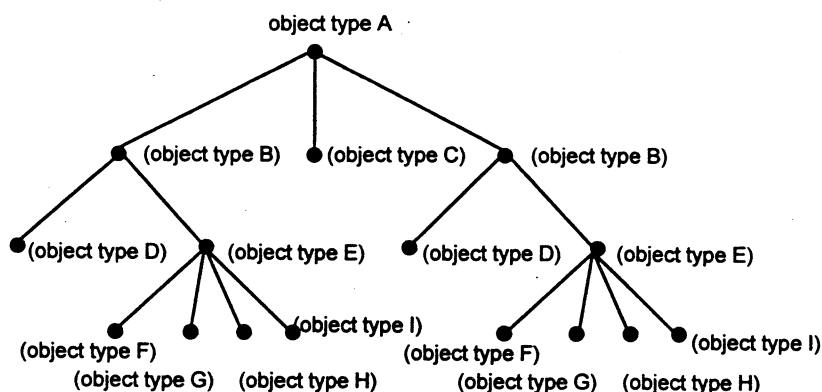


Figure 5 - Structure tree in one aspect of object type A

Another form for this structure tree is shown in figure 6.

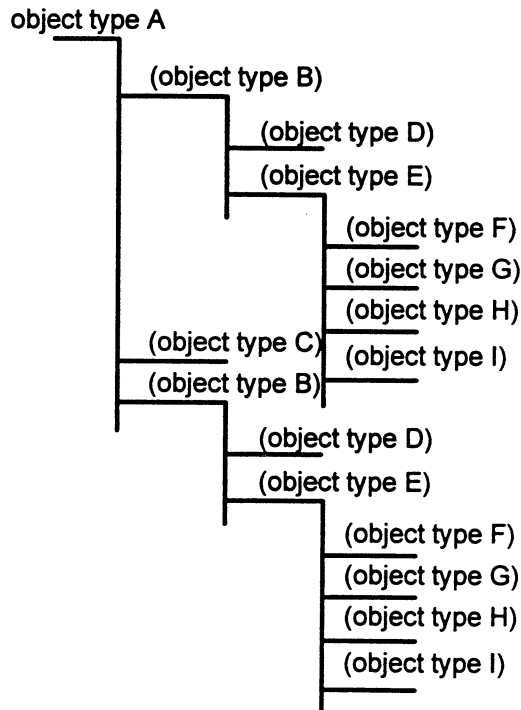


Figure 6 - Structure tree in one aspect of object type A

The procedure to achieve the structure tree as shown in figure 5 is normally performed stepwise. The following is an example of the procedure giving the structure tree shown in figure 5.

Figure 7 shows the subdivision of one aspect of the object type A. In the considered aspect, the object type A has three constituents. Two of these constituents are identical, referring to the same object type B.

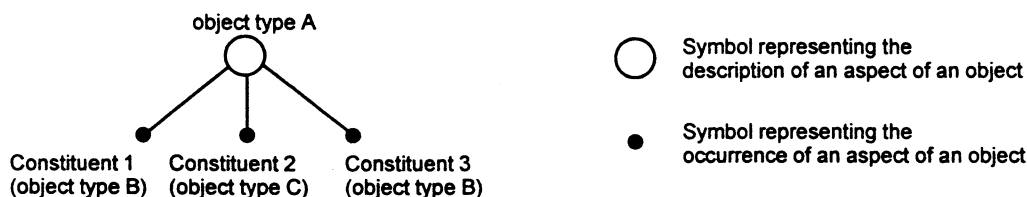


Figure 7 - Constituents in one aspect of object type A

Figure 8 shows the subdivision of the same aspect of the object type B. Object type B has two constituents in the considered aspect, one referring to the object type D and the other referring to the object type E.

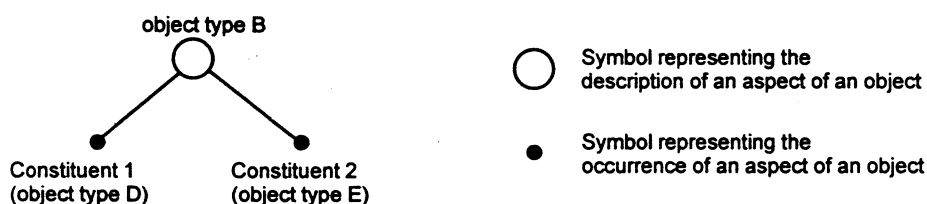


Figure 8 - Constituents in one aspect of object type B

The object type D has no constituents in the considered aspect, while object type E has four constituents as shown in figure 9.

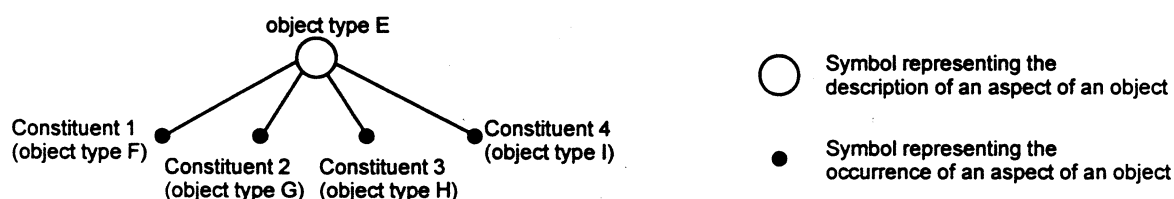


Figure 9 - Constituents in one aspect of object type E

The complete structure tree for an aspect of the object type A can then be constructed by concatenating the structure trees for the same aspect of object types identified, as shown in figure 10, and abbreviated shown in figure 5.

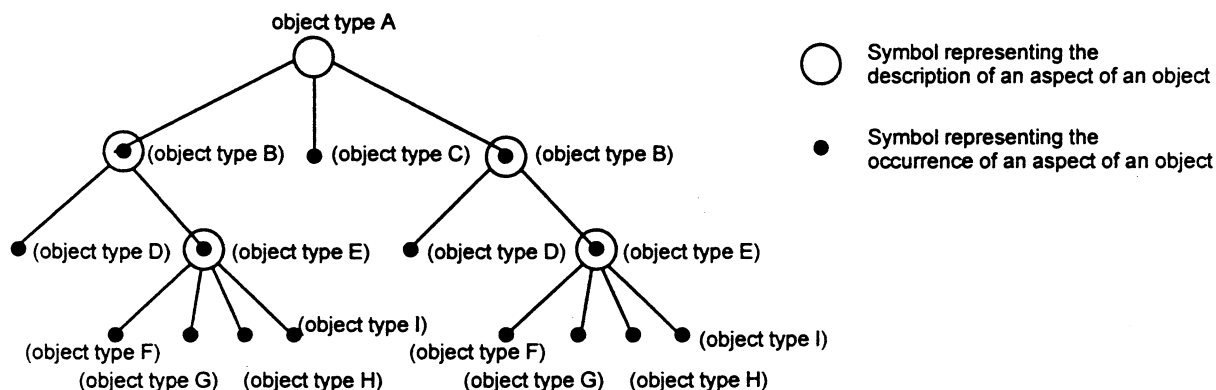


Figure 10 - Structure tree in one aspect of object type A

5 Construction of reference designation

5.1 General

A reference designation shall unambiguously identify an object of interest within the considered system. The nodes in tree-like structures such as the one shown in figure 5 represent these objects. The branches represent the subdivision of these objects into other objects (i.e. subobjects). Each object that occurs within another object shall be assigned a single-level reference designation unique with respect to the object in which it occurs. The object represented by the top node shall not be assigned a single-level reference designation.

NOTE - The object represented by the top node may have identifiers such as part number, order number, type number, or a name. See the introduction. The object represented by the top node is assigned a reference designation only when the system is integrated into a larger system.

5.2 Format of reference designations

5.2.1 Single-level reference designation

A single-level reference designation assigned to an object shall consist of a prefix sign followed either by:

- a letter code, or
- a letter code followed by a number, or
- a number.

For the types of aspects referred to in 4.1, the characters used in the prefix signs to be used to indicate a reference designation shall be:

- = when relating to the function aspect of the object;
- when relating to the product aspect of the object;
- + when relating to the location aspect of the object.

For computer implementations, the prefix signs shall be chosen from the G0-set of ISO/IEC 646 or equivalent international standards.

If both a letter code and a number are used, the number shall follow the letter code. In that case, the number shall distinguish between objects with the same letter code that are constituents of the same object.

If numbers by themselves or in combination with a letter code have significant meaning, the meaning shall be explained in the document or in supporting documentation.

Numbers may contain leading zeros. If leading zeros have significant meaning, the meaning shall be explained in the document or in supporting documentation.

In order to aid readability it is recommended that numbers and letter codes are kept as short as practicable.

Figure 11 show examples of single-level reference designations.

Function-oriented reference designation of an object	Product-oriented reference designation of an object	Location-oriented reference designation of an object
=A1 =ABC =123 =TXT12	-A1 -RELAY -561 -LET12	+G1 +RM +101 +RM101

Figure 11 - Examples of single-level reference designations