INTERNATIONAL STANDARD

ISO 81346-12

First edition
2018-05

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

Part 12: Construction works and building services

Systèmes industriels, installations et appareils, et produits industriels — Principes de structurations et désignations de référence —

Partie 12: Travaux de construction et services bâtiment

Reference number
ISO 81346-12:2018(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 10, *Process plant documentation*, in cooperation with Technical Committee IEC/TC 3, *Information structures and elements, identification and marking principles, documentation and graphical symbols*.

Documents in the 80000 to 89999 range of reference numbers are developed by collaboration between ISO and IEC.

IEC 81346 consists of the following basic parts, under the general title *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations*:

— *Part 1: Basic rules*

— *Part 2: Classification of objects and codes for classes*

A list of all parts in the ISO 81346 series can be found on the ISO website.

Introduction

This document considers and supports the planning, erection, utilization and operation of construction works. The application of a reference designation system for construction works (RDS-CW) may lead to restructuring and reorientation of these activities and thereby offers the potential for increasing efficiency and economization. The following advantages of designation systems will become increasingly important in the future.

— The reference designation system can be applied in several technical fields in the same way and is not designed only for one. So, technical, structural and constructive objects, for example, can be treated in the same way – a basis for company-wide synergy effects.

— The reference designation system allows for integrating any kind of systems and components without changing the once defined designations.

— The reference designation is not bound to a fixed structural pattern. Thus the designation system is vertically and horizontally expansible, which makes the interpretability in some cases quite complex. Therefore an exact and computer-interpretable documentation and description is essential.

— The application of different aspects allows for designation of system elements by function, realizing products or location independently of each other.

— The different aspects in structuring and the possibility of creating relations between objects represented in these structures offer search and filter criteria and information correlations in a much greater variety than before.

Users of this document will be able to manage object occurrences and related properties in a more efficient and consistent way. When implemented, information across various data processing systems can be handled in an unambiguous way. Other well-known information structures besides the reference designation structures in this document are:

— organization structures;

— utilization structures;

— cost structures;

— performance structures;

— real estate structures.

These and other structures can be linked to each other, or to the reference-designation-based structures, so that requirements of flexibility and individuality can be fulfilled.

New three-letter codes are used according to IEC 3/1224A/CD (IEC 81346-2:2009), Table 3.

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

Part 12:
Construction works and building services

1 Scope

This document establishes rules for structuring of systems and the formulation of reference designations and provides classes for systems in the field of construction works and building services. This document also specifies a classification of objects and corresponding letter codes for use in reference designations of object occurences.

This document is not intended for manufacturers or system-related designations of individuals (e.g. inventory number or serial number) or for product types (e.g. article number or parts number).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 4157-2:1998, *Construction drawings — Designation systems — Part 2: Room names and numbers*

ISO 15519-1, *Specification for diagrams for process industry — Part 1: General rules*

IEC 61082-1, *Preparation of Documents used in electrotechnology — Part 1: Rules*

IEC 81346-1:2009, *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 1: Basic rules*

IEC 81346-2:2009, *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 2: Classification of objects and codes for classes*

IEC 61175-1, *Industrial systems, installations and equipment and industrial products — Designation of signals*

IEC 61355-1:2008, *Classification and designation of documents for plants, systems and equipment — Part 1: Rules and classification tables*

IEC 61666, *Industrial systems, installations and equipment and industrial products — Identification of terminals within a system*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
aspect
specified way of viewing an object

[SOURCE: IEC 81346-1:2009, 3.3]

3.2
building
construction works that has the provision of shelter for its occupants or contents as one of its main purposes, usually partially or totally enclosed and designed to stand permanently in one place

Note 1 to entry: A building is a type of construction entity.

[SOURCE: ISO 6707-1:2017, 3.1.1.3, modified — Note 1 to entry has been revised.]

3.3
building services
utilities and installations supplied and distributed within a building such as electricity, gas, heating, water and communications

[SOURCE: ISO 16484-2:2004, 3.33, modified — the abbreviated term "BS" has been deleted.]

3.4
component
product used as a constituent in an assembled product, system or plant

[SOURCE: IEC 81346-1:2009, 3.7]

3.5
construction element
constituent of a construction entity with a characteristic function, form, or position

Note 1 to entry: ISO 12006-2:2015, Table 1 classifies examples by function or form or position or any combination of these.

[SOURCE: ISO 12006-2:2015, 3.4.3, modified — Note 1 to entry revised.]

3.6
construction entity
independent unit of the built environment with a characteristic form and spatial structure, intended to serve at least one function or user activity

Note 1 to entry: A construction entity is the basic unit of the built environment. It is recognizable as a physically independent construction even though a number of construction entities might be seen as parts of a particular construction complex. Ancillary works such as access roads, landscaping or service connections may be regarded as part of a construction entity. Conversely, when ancillary works are of sufficient scale they may be regarded as construction entities in their own right.

[SOURCE: ISO 12006-2:2015, 3.4.2]

3.7
construction works
everything that is constructed or results from construction operations

Note 1 to entry: In ISO 12006-2:2015, the term "construction result" is used instead of the term "construction works". Construction result is defined as "construction object which is formed or changed in state as the result of one or more construction processes using one or more construction resources."

[SOURCE: ISO 6707-1:2017, 3.1.1.1, modified — Note 1 to entry has been added.]

3.8
kind of document
type of document defined with respect to its specified content of information and form of presentation

Note 1 to entry: Sometimes the term 'document type' is used for the same concept.

[SOURCE: IEC 61355-1:2008, 3.6]

3.9
equipment
aggregation of functional elements or assembly of components and modules that belong together in one physical unit of a plant or in a functional unit of a system

[SOURCE: ISO 16484-2:2004, 3.73]

3.10
function
intended or accomplished purpose or task

[SOURCE: IEC 81346-1:2009, 3.5]

3.11
functional system
object with characteristics which predominantly represents an overall inherent function

3.12
inherent function
function of an object, independent of any application of the object

Note 1 to entry: Oxford Dictionaries (https://en.oxforddictionaries.com) defines "inherent" as "existing in something as a permanent, essential, or characteristic attribute".

3.13
object
entity treated in a process of development, implementation, usage and disposal

Note 1 to entry: The object may refer to a physical or non-physical "thing", i.e. anything that might exist, exists or did exist.

Note 2 to entry: The object has information associated to it.

Note 3 to entry: Object is considered any part of the perceivable or conceivable world in ISO 12006-2:2015, 3.1.1.

[SOURCE: IEC 81346-1:2009, 3.1, modified — Note 3 to entry has been added.]

3.14
plant
assembly of different systems on a specific site

[SOURCE: IEC 61355-1:2008, 3.10]

3.15
point of installation
system on or in which components are installed

EXAMPLE Switch built into a wall system or built into a cabinet.

3.16
product
intended or accomplished result of labour, or of a natural or artificial process

[SOURCE: IEC 81346-1:2009, 3.6]

3.17
site of installation
space in which systems or components are physically located

EXAMPLE Cabinet located in a technical room.

3.18
space
limited three-dimensional extent defined physically or notionally

[SOURCE: ISO 12006-2:2015, 3.1.8]

3.19
structure
organization of relations among objects of a system describing constituency relations (consist-of/is-a-part-of)

[SOURCE: IEC 81346-1:2009, 3.9]

3.20
system
set of interrelated objects considered in a defined context as a whole and separated from their environment

Note 1 to entry: A system is generally defined with the view of achieving a given objective, e.g. by performing a definite function.

Note 2 to entry: Elements of a system may be natural or man-made material objects, as well as modes of thinking and the results thereof (e.g. forms of organization, mathematical methods, programming languages).

Note 3 to entry: The system is considered to be separated from the environment and from the other external systems by an imaginary surface, which cuts the links between them and the system.

Note 4 to entry: When a system is part of another system, it may be considered as an object as defined in this document.

[SOURCE: IEC 81346-1:2009, 3.2, modified — Note 4 deleted and Note 5 renumbered.]

3.21
technical system
object with characteristics which predominantly represents a coherent technical solution with an inherent function

4 Structuring

4.1 General

To administer a (technical) system and its information in the various life cycle phases (e.g. basic data collection, planning, construction, operation, dismantling and disposal), it is necessary to divide the system into several (sub)systems (objects) – that is to structure it. The structuring is performed stepwise, either in a top-down or bottom-up manner, resulting in a tree-like structure (see also IEC 81346-1:2009, 5.1 and 5.2).

The process of structuring is carried out according to the following aspects:

— the function aspect – what an object is intended to do or what it actually does;

— the product aspect – by which means an object does what it is intended to do;

— the location aspect – intended or actual space of the object;

— the type aspect – to which group with identical properties an object belongs.

Because of the different information contents, a separate structure for each aspect may be needed – especially if the application of aspects should be consequent.

By building relations between the above named structures, characteristic information can be assembled and task-related conclusions on an object stated, such as information about the location of the object or a product that implements two different functions.

To differentiate between the different aspects, the following prefixes shall be used according to IEC 81346-1:

— "=" (equal) when relating to the function aspect;

— "–" (minus) when relating to the product aspect;

— "+" (plus) when relating to the location aspect;

— "%" (percent) when relating to the type aspect.

4.2 Function-oriented structure

The function-oriented consideration is important for the full life cycle of a system, for example system design, design of process and control functions, commissioning and also for locating failures of function, service operations and optimization works during system operation.

The function-oriented structure is based on the purpose of a system and helps to understand and to structure any system without taking the physical solution or location of the object into consideration. The functional reference designation (=) can be shown in any kind of document, but is typically applied in schematic and non-scaled documents, for example overview diagram, process diagram, function diagram, and circuit diagram.

4.3 Product-oriented structure

The product-oriented structure describes how a system is implemented and assembled. The structure shows the partitioning of a system into single objects with regard to the product aspect independently of where the product is located and which function it fulfils.

In the context of the product aspect, terms of tangible products include plant complex, plant, technical equipment, component, wall, column and slab.

A product can realize one or more functions, for example a heat exchanger can heat or cool, and an ornament can be used for covering and for providing a presentation of some artwork. Several control functions can be implemented in one control system unit.

A product can, alone or together with others, be located at one or more locations, for example a measuring system with location of measuring unit and displaying unit or a duct system extended to several different locations.

With regard to the structuring and assessment of objects in planning and implementation as preparation of the operation phase, the product-oriented aspect is important, for example for assembling and maintenance.

The product reference designation (-) can be shown in any kind of document, but is typically applied in scaled documents and descriptions, for example product description, construction drawing assembly drawing, explosion drawing, network part drawing and maintenance instruction.

In the building industry a further distinction is made between construction products (e.g. ceilings, walls or columns) and products of the building services (e.g. filters, pumps, chillers or boilers).

4.4 Location-oriented structure

The location-oriented structure is based on the topographical structure of a system and/or the environment where the system is located. The structure shows the partitioning of a system with regard to the location aspect. An object in a location-oriented structure can incorporate any number of products and functions.

An object represented in the location-oriented structure can be, for example, a site, a construction complex, a construction entity (a building), a part of a building, a storey or a room as well as an outside areas such as a green area, a park area, a parking area, a street or a sidewalk. For a product composed of a row of cabinets, a cabinet or a row inside a cabinet, each of these may be considered as a location.

The location-oriented structure will be used in planning, erecting and managing of buildings, rooms or areas as well as for locating objects to be assembled or maintained.

The location reference designation (+) can be shown in any kind of document, but is typically applied in scaled documents and descriptions, for example a site plan, floor plan, sectional drawing, elevation drawing, ground plan, arrangement drawing or installation drawing.

4.5 Type-oriented structure

The type aspect enables creation of user-specific types of objects, classified according to IEC 81346-2 or ISO 81346-12.

The type designation designates a group of objects and not a specific single occurrence. However, a group of type objects is also considered to be an occurrence in accordance with IEC 81346-1, and can be designated by the type aspect.

The type aspect is used to designate a collection of objects within a specific class which have specific properties in common. The common properties are selected by the user, and may be one, two or multiple properties. Table 6 and Annex B show examples of designations made with the type aspect.

The specific meaning of any type designation shall be explained within the supporting documents of a project.

The type-oriented reference designation (%) can be shown in any kind of document, but is typically applied in object libraries and bill of quantities.

5 Reference designation

5.1 General

System models are often partitioned according to part-of relations in a tree-like structure. To address any sub-system within such a model, a reference designation in accordance with IEC 81346-1 shall be provided.

A single-level reference designation shall consist of a prefix followed by either:

— a letter code followed by a number;

— a letter code; or

— a number.

The letter code shall represent the class of the object designated. The number shall distinguish between occurrences of the same class.

For designation of objects within a type-, function- or product-oriented structure, the single level reference designation shall consist of a prefix followed by a letter code followed by a number.

By means of classifying, objects are assigned to a class of objects, but no properties are described or a detailed typecast carried out. Letter codes for object classes are given in Tables A.1 to A.2 in Annex A and in IEC 81346-2.

If the number of characters in a reference designation needs to be limited due to project or IT-system-related circumstances, such limitations shall not impair the possibility for design of systems-of-systems.

For the presentation of reference designations, the requirement in IEC 81346-1:2009, 9.1 shall be followed.

For presentation techniques within documents, including simplification methods, the requirements in ISO 15519-1 and IEC 61082-1 apply. For labelling, the requirements in IEC 81346-1:2009, Clause 10 apply.

If other presentation methods are needed, the method applied shall be described in the supporting documentation.

5.2 Systems

The concept of system shall not be linked to any specific domain, but is to be used in a broad sense. In the context of this document, all objects are seen as systems.

The system approach allows a designer to handle wholes (as distinct from parts). By identifying related systems, the relationships among these can be determined and monitored, for example to ensure that all systems operate correctly.

A system-of-systems brings together a set of systems for a task that none of the systems can accomplish on its own. This is reflected in a multi-level reference designation.

NOTE Further information on systems can be found in ISO 12006-2 and ISO/IEC/IEEE 15288.

5.3 Identification of top nodes

In the context of this document, each domain within construction works shall be considered as an independent system.

If there is a need to recognize the different domains with respect to reference designations, the concept of the top node identifier as specified in IEC 81346-1:2009, 9.3 shall be applied.

For the identification of the different domains within construction works, the letter codes provided in Table 1 shall be applied.

Table 1 — Letter codes for domains to be applied as top node identifiers

Letter code (abbreviation)	Domain
A	Activity space
B	Built space
C	Construction complex
D	Construction aid
E	Construction entity
G	Construction agent
L	Construction element
P	Construction product
R	Construction process
S	Storey
Z	Zone
NOTE The terms for the domains are taken from ISO 12006-2:2015.	

If a top node identifier is to be presented together with a reference designation, it shall be presented within "< ... >" (angle-brackets), preceding the reference designations within the system the top node represents. See Figure 1.

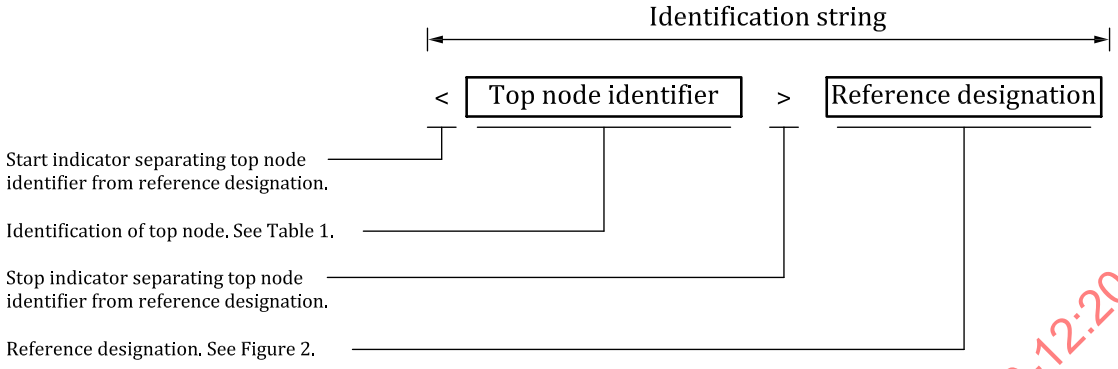

Figure 1 — Appliance of top node identifier

Examples of application of top node identifiers are illustrated in Table 2.

Table 2 — Examples of application of top node identifiers

Object	Reference designation including top node
Construction element: [L] Door no. 5: QQC5[a]	<L>−QQC5
Built space: [B] Control equipment space no. 3: DBA03[b]	<B>−DBA03
Activity space: [A] Office no. 12: BAA12[b]	<A>−BAA12
[a] Class code according to IEC 81346-2:2009, Table 3. [b] Class code according to IEC 81346-2:2009, Table 4.	

5.4 Designation of objects

With the reference designation, the designation of the object-of-interest is given within an aspect of the system-of-interest.

In the context of this document, the following apply.

— For the designation of objects recognized as functional systems, letter codes in accordance with Annex A, Table A.1, shall be applied.

— For the designation of objects recognized as technical systems, letter codes in accordance with Annex A, Table A.2, shall be applied.

— For all other objects the letter codes provided in IEC 81346-2:2009, Table 3 shall be applied.

Figure 2 illustrates the reference designation layout.

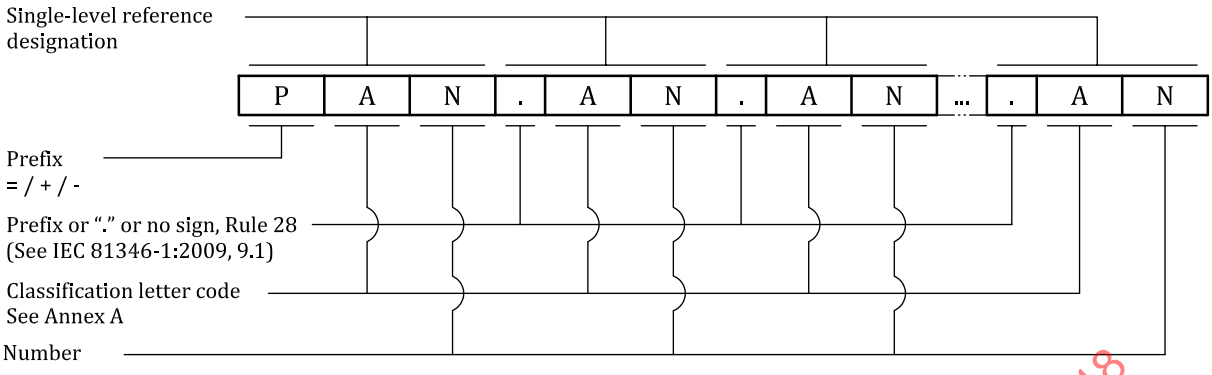

Figure 2 — Reference designation layout

When using numbers, appliance of preceding zeros (e.g. "01" or "001") shall have no specific meaning if applied.

Letter codes shall be one, two or three letters, representing a class of a functional system (one letter), a class of a technical system (two letters) or a construction element (three letters), depending on the object designated. The designation of any system and its constituents depends on the complexity of the system, which is reflected within the reference designation. If the design is simple (e.g. just a collection of doors), a designation for the component shall be sufficient to designate the object unambiguously (single-level reference designation). If the complexity increases (e.g. systems containing subsystems), the system and its constituents is designated (multi-level reference designation). See examples in Table 3.

Table 3 — Examples of objects/object systems

Object (system)	Reference designation
Stairway construction no. 1	–AF1
Door no. 5	–QQC5
Wall construction no. 1 Part of wall system no. 1	–B1.AD1 or –B1–AD1 or –B1AD1
Door no. 2 Part of wall construction no. 3 Part of wall system no. 1	–B1.AD3.QQC2 or –B1–AD3–QQC2 or –B1AD3QQC2
Ventilation plant no. 4 Part of ventilation system no. 1	=J1.HF4 or =J1=HF4 or =J1HF4

Table 3 *(continued)*

Object (system)	Reference designation
Pressure switch no. 21 Part of filter system no. 1 Part of ventilation plant no. 3 Part of ventilation system no. 2	=J2.HF3.KC1.BPD21 or =J2=HF3=KC1=BPD21 or =J2HF3KC1BPD21
Switch no. 6 Part of lighting system no. 2 Part of power supply system no. 1 Part of electrical system no. 2	=K2.HG1.HH2.SJA6 or =K2=HG1=HH2=SJA6 or =K2HG1HH2SJA6
Card reader no. 3 Access control system no. 4	=KL4.BYA3 or =KL4=BYA3 or =KL4BYA3

Annex B gives application examples of reference designations in systems of construction works and building services.

5.5 Designation of locations

5.5.1 General

In the location-oriented designation two aspects are distinguished by different prefixes:

— The aspect represented by single prefix "+" shall represent the point of installation in a system.

Examples in the area of construction works are beams, mounting rails anchorages, sanitary objects and floor boxes. Examples in the area of services are pipes, cabinets, mounting racks, operating panels or operator stations.

— The aspect represented by double prefix "++" shall represent the site of installation within spaces.

Examples are site, property, building, storey and room.

5.5.2 Point of installation

It is sometimes useful to use one system to host parts of other systems. Examples of such scenarios are when an electrical switch is installed in a wall, or a temperature sensor from one system is installed in another system.

In such cases, the system which hosts the installed objects shall also be designated by using the point of installation designation represented by the prefix "+" (plus).

Table 4 shows different examples of location designations based on the structuring and designation rules of IEC 81346-1.

Table 4 — Examples of point of installation designations

Object	Reference designation
= (function aspect) Switch no. 6 Part of lighting system no. 2 Part of power supply system no. 1 Part of electrical system no. 2 / The object is installed in: + (point of location aspect) Wall construction no. 1 Part of wall system no. 1	=K2.HG1.HH2.SJA6 / +B1.AD1 or =K2=HG1=HH2=SJA6 / +B1+AD1 or =K2HG1HH2SJA6 / +B1AD1
= (function aspect) Temperature transmitter no. 02 Part of BMS system no. 2 Part of automation system no. 1 / The object is installed in: + (point of location aspect) Duct 25 Part of air distribution system 12 Part of ventilation system 1	=L1.LC2.BTB02 / +J1.JJ12.WPB25 or =L1=LC2=BTB02 / +J1+JJ12+WPB25 or =L1LC2BTB02 / +J1JJ12WPB25

5.5.3 Site of installation

The designation of construction complex, construction entity, storeys, zones, built spaces and activity spaces shall be done by using the site of installation designation represented by the prefix "++" (plus-plus).

Table 5 shows different possibilities of location designations based on the structuring and designation rules of IEC 81346-1.

Numbering of built spaces and activity spaces shall follow the requirements in ISO 4157-2:1998, 4.4.

Letter codes indicating the class of space objects may be chosen from the classification scheme given in IEC 81346-2:2009

Table 5 — Examples of site of installation designations

Object	Reference designation
Area 1 Part of office no. 231 Part of floor no. 10 Part of building 7 Part of site 121	++121.7.10.BAA231.1
Shaft 123 Part of floor no. 11 Part of building no. 23	++23.01.EBB123
Room 201 Part of floor 10 Part of section 2 Part of building 15	++15.2.10.AAA201
Area 01 Part of control equipment space no. 03 Part of building no. 7 Part of site no. 25	++25.7.DBA03.01

6 Specific designations

6.1 Designation of signals

Designation of signals shall be in accordance with IEC 61175-1. See also explanations given in Annex C.

6.2 Designation of terminals

Designation of terminals shall be in accordance with IEC 61666. See also explanations given in Annex C.

6.3 Designation of documents

Designation of documents shall be in accordance with IEC 61355-1. See also explanations given in Annex C.

7 Designation of types

For the purpose of identification of a group of generic or project-specific objects within the same class, a type designation is applied. The type aspect uses prefix percent "%" in front of the classification letter code applied for the object. See Figure 3.

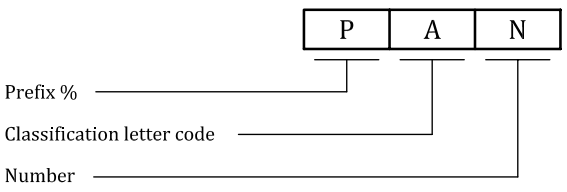

Figure 3 — Designation of types

The applied type designation shall identify a set of objects with identical values for a selected set of properties. The specific meaning of the type designation shall be explained within the supporting documents. See examples in Table 6 and Annex B.

NOTE Common properties are considered to be a set of properties with identical values.

Table 6 — Examples of type designations

Object (project-specific object type)	Name of type	Reference designation
Wall system type no. 1	Façade wall	%B1
Wall system type no. 2	Inner walls	%B2
Heating supply system type no. 1	Heat exchanger system	%HD1
Heating supply system type no. 2	District heating system	%HD2
Window type no. 1	Left-hinged window	%QQA1
Window type no. 2	Top-hinged window	%QQA2
Power socket type no. 1	3-pin with earth plug	%XDB1
Power socket type no. 2	5-pin with earth plug	%XDB2
NOTE Examples of types are currently under development and are expected to be published, possibly as an informative document, as soon as the necessary basis has been included in IEC 81346-1 and IEC 81346-2.		

8 Designations and properties of objects

If a property belonging to an object needs to be presented, the property shall be presented in parenthesis preceded by the object designation. It is recognized that national classification systems exist. Properties can thus be based on national classification tables or relevant international de-facto property data sets. See Figure 4 and Table 7 for examples.

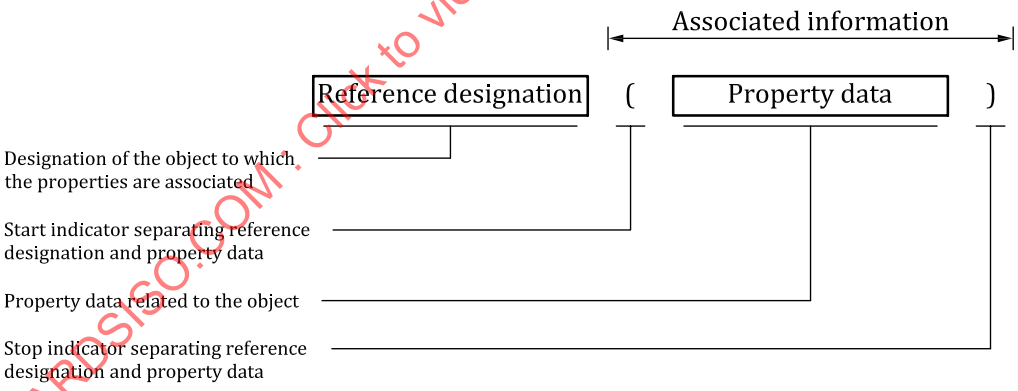

Figure 4 — Reference designation with object property information

Table 7 — Examples of adding properties

Object	Property	Property data and reference	Reference designation with property information
Roof structure no. 5	Type	Timber structure	–BE5 (timber structure)
Beam no. 32	Material	Wood	–ULE32 (wood)
Door no. 2	Work result classification code	Plastic-laminated-faced wood doors OmniClass[a] 22–08 14 23 16	–QQC02 (22–08 14 23 16)
Wall construction no. 2	Systems classification code	Concrete form masonry unit wall system Uniclass 2015[b] Ss_25_11_15	–AD2 (Ss_25_11_15)
LED lamp type 3	Trade item	GU 10, 2700 K, 350 lm GTIN[c]	%EAC03 (08718696483848)
Pump no. 2	Capacity (pressure, volume flow)	0,5 bar, 20 m^3/h	=GPA02 (0,5 bar, 20 m^3/h)

[a] US classification system.

[b] UK classification system.

[c] Global Trade Item Number (GTIN-13 number).

Annex A
(normative)

Classification letter codes

A.1 Classes of functional systems

NOTE The classification tables for building systems (Tables A.1 and A.2) are developed in accordance with the rules and guidelines given in ISO 704 and ISO 22274.

Table A.1 — Classes of functional systems based on inherent functions

	Class	Preferred term	Definition	Examples of terms
	Space systems		**Functional systems creating space**	—
	A	Ground system	Space system which terminates a construction entity downwards	Ground, courtyard, lawn, road embankment
	B	Wall system	Space system which forms and separates space vertically	Wall, facade, facade system
	C	Slab system	Space system which forms and separates space horizontally	Floor, ground floor roofing
	D	Roof system	Space system which terminates a construction entity upwards	Roof, roofing
	Installation systems		**Functional systems providing services**	—
	E	Gas and air system	Installation system which supplies technical gases or technical air	Equipment for gas and air, gas, air
	F	Water and fluid system	Installation system which supplies domestic water, technical water or other liquid	Water, liquid
	G	Drainage and waste system	Installation system which discharges liquid or disposes of waste	Drainage, waste
	H	Cooling and/or heating system	Installation system which supplies cooling and/or heating	Heating, chilling
	I	Not to be applied		
	J	Ventilation system	Installation system which supplies air exchange	Ventilation
	K	Electrical system	Installation system which supplies electrical energy	Electricity production plant, power supply system, electrical system, routing system
	L	Automation system	Installation system which controls, adjusts and monitors technical systems in a context	Control system, monitoring system, alarm system, BMS system, texting system, traffic control system

Table A.1 *(continued)*

	Class	Preferred term	Definition	Examples of terms
	M	Information and communication system	Installation system which provides communications between persons or technical systems	Communication equipment, IT systems, IT equipment, ICT system
	N	Transportation system	Installation system which transports goods or persons	Transport system, transport, lift, goods lift, escalator, elevator
	O	Not to be applied		
	P	Security and safety system	Installation system which protects any object from danger and damage	Sprinkler, fire fighting, intrusion control, emergency lighting, fire ventilation, perimeter security
	Q	Lighting system	Installation system for light management	Electrical lighting, daylight system, sunblind, blackout
	R	Railroad system	Installation system guiding and directing track-bound vehicles	Railroad
Fit-out systems			**Functional systems fitting out spaces**	—
	S	Arrangement system	Fit-out system which equips a construction entity and its spaces with fittings and equipment	Fitting out rooms, furnishing solutions
	T,...,Z	Reserved		

A.2 Classes of technical systems

Table A.2 — Classes of technical systems based on inherent functions

Class	Sub class	Preferred term	Definition	Examples of terms
A_		**Assembly system**	Technical system which constitutes a layered construction	
	AA	Pavement construction	Assembly system forming areas for transport	Surface, pavement
	AB	Foundation construction	Assembly system forming separation towards underground	Foundation
	AC	Slab construction	Assembly system forming horizontal separation	Slab
	AD	Wall construction	Assembly system forming vertical separation	Wall, window slot, door slot
	AE	Roof construction	Assembly system terminating a construction entity upwards	Roof
	AF	Stairway construction	Assembly system establishing a step-wise link between two or more levels	Staircase, stair
	AG	Ramp construction	Assembly system establishing a step-free link between two or more levels	Ramp
	AH	Balcony	Assembly system that creates an adjoining outer user space built into wall system or roof system	Exterior corridor
	AI	Not to be used		

Table A.2 *(continued)*

Class	Sub class	Preferred term	Definition	Examples of terms
	AJ	Bay window	Assembly system that creates an extended inner user space built into wall system	
	AK	Dormer	Assembly system that creates an extended inner user space built into roof system	
	AL	Roof tower	Assembly system that creates an extended inner user space built on top of roof system or construction entity	
	AM	Light well	Assembly system that creates an extended space for light transmission	
	AN, ..., AZ	Reserved		
B_		**Structural system**	Technical system which forms structural construction	
	BA	Groundworks structure	Structural system forming a regulated volume of underground	Terrain, groundworks
	BB	Foundation structure	Structural system connecting a construction entity with the underground	Foundation
	BC	Slab structure	Structural system in a horizontal separation	
	BD	Wall structure	Structural system in a vertical separation	
	BE	Roof structure	Structural system terminating a construction entity upwards	
	BF	Floor structure	Structural system terminating a space downwards	Floor
	BG	Ceiling structure	Structural system terminating a space upwards	Ceiling
	BH	Routing structure	Structural system supporting supply or distribution system	Cable routing
	BJ, ..., BZ	Reserved		
C_		**Ground surface construction system**	Technical construction system forming ground-based areas	
	CA	Subgrade construction	Ground surface construction system which gives support to other constructions	
	CB	Ground superstructure construction	Ground surface construction system for hard covered outdoor space	
	CC	Traffic island construction	Ground surface construction system for traffic separation area	
	CD	Side area construction	Ground surface construction system for safety zone for traffic	
	CE	Railway embankment construction	Ground surface construction system for railway track support	
	CF	Vegetation area construction	Ground surface construction system for vegetation areas	

Table A.2 *(continued)*

Class	Sub class	Preferred term	Definition	Examples of terms
	CG	Water management construction	Ground surface construction system for transport, storage or infiltration of water, or for space along water or over water	
	CH	Pipe ditch system	Ground surface construction system for refilled media excavation	
	CI	Not to be used		
	CJ	Foundation and ground support construction	Ground surface construction system which carries vertical or horizontal load	
	CK	Terrain stairway/Terrain ramp construction	Ground surface construction system which connects spaces at different levels	
	CL	Terrain wall construction	Ground surface construction system which separates spaces	
D_		**Railway track construction system**	Technical system which guides rail bound vehicles	
	DA	Ballasted railway track construction	Railway track construction system with two rails, on ballast	
	DB	Non-ballasted railway track construction	Railway track construction system with two rails, without ballast	
	DC	Monorail construction	Railway track construction system with one rail	
E_, ..., G_		Reserved		
H_		**Supply system**	Technical system supplying consumption	
	HA	Gas and air supply system	Supply system for process gas	Gas system, air system, vacuum, clean air, pressurized air, energy gas, medical gas, steam
	HB	Liquid supply system	Supply system for liquid	Water system, fuel system
	HC	Cooling supply system	Supply system for cooling	Cooling plant, cooling exchanger system
	HD	Heating supply system	Supply system for heating	Heat production system, heat exchanger system, mixer
	HE	Combined heating and cooling supply system	Supply system for cooling and heating	Heat pump plant
	HF	Ventilation supply system	Supply system for ventilation	Ventilation unit
	HG	Power supply system	Supply system for electrical energy	Electrical supply system, emergency supply system, back-up supply system

Table A.2 *(continued)*

Class	Sub class	Preferred term	Definition	Examples of terms
	HH	Lighting system	Supply system for lighting	Safety lighting, emergency lighting system, cleaners' lighting, daylight system
	HI	Not to be used		
	HJ	Signal supply system	Supply system for signals	Utilities boundary point, data network, booking system, telephone exchange, PABX
	HK, ..., HZ	Reserved		
I_		**Not to be used**		
J_		**Transporting system**	Technical system which brings something from one place to another	
	JA	Gas distribution system	Transport system for gas	Gas distribution
	JB	Water distribution system	Transport system for water	Water distribution, watering system
	JC	Chemical distribution system	Transport system for flammable or other chemical liquids	Alcohol distribution system
	JD	Liquids outflow system	Transport system for liquid waste	Wastewater collection, drainage water system, rainwater system
	JE	Solids outflow system	Transport system for solid waste	Waste management system, laundry suction system
	JF	Cooling distribution system	Transport system for cooling	Cooling distribution
	JG	Heating distribution system	Transport system for heating	Heating distribution
	JH	Combined heat and cooling distribution system	Transport system for cooling and heating	Combined system
	JI	Not to be used		
	JJ	Air distribution system	Transport system for air	Air system, fresh air system, supply air system, smoke extraction system, fire ventilation
	JK	Power distribution system	Transport for electrical energy	Electrical distribution system, electrical system, power supply system
	JL	Signal distribution system	Transport system for signals	Data distribution system, telephone signal distribution, paging signal, induction loop system, hearing loop system

Table A.2 *(continued)*

Class	Sub class	Preferred term	Definition	Examples of terms
	JM	Passenger transportation system	Transport system for persons	Elevator, escalator, travellator
	JN	Goods transportation system	Transport system for solid goods or packets	Freight elevator, hoist, crane, conveyor belt, letter shoot
	JP, ..., JZ	Reserved		
K_		**Treatment system**	Technical system which provides treatment	
	KA	Solar screening system	Treatment system limiting or excluding solar heat gain	Solar screening, blinding
	KB	Opening control system	Treatment system for automatic control of openings	Smoke ventilation, natural ventilation
	KC	Filter system	Treatment system for separating solid particles from liquid or air flow	Filtration equipment
	KD	Separator system	Treatment system for separating substances	Separation unit
	KE	Mixing system	Treatment system for adding substances	Chemicals system, water treatment equipment, water treatment system, blending system
	KF	Pump system	Treatment system for increasing pressure in a flow of liquid	Wet well, pumping equipment
	KG	Pressure and expansion system	Treatment system for stabilizing pressure and volume in liquid or in gas flow	Pressure vessel system, expansion system
	KH	Transformer system	Treatment system for transforming electrical energy	Converter system, inverter system
	KI	Not to be used		
	KJ	Antenna system	Treatment system for bidirectional transforming between radio waves and electrical signals	Antenna unit
	KK	Weather station system	Treatment system for transforming weather-related information into electrical signals	Weather station
	KL	Access control system	Treatment system for physical separation of a flow of persons or items	Gate, speed lane, gate control, key management
	KM, ..., KZ	Reserved		
L_		**Monitoring and control system**	Technical system which monitors and/or controls events and processes	
	LA	Gas alarm system	Monitoring system which raises an alarm on the occurrence of hazardous gases	Aspiration system
	LB	Fire alarm system	Monitoring system which raises an alarm in the presence of smoke or fire	Automatic fire alarm system

Table A.2 *(continued)*

Class	Sub class	Preferred term	Definition	Examples of terms
	LC	Automation system	Monitoring system which automates processes in buildings and process plants in a central unit	BMS system, SCADA, ACMS, control system, room control, traffic control system
	LD	Access monitor system	Monitoring system which ensures authorized access for persons to an area or a construction entity	Perimeter security
	LE	Alarm system	Monitoring system which raises an alarm in the presence of dangerous or undesirable conditions	Burglar-proofing system, AIA system (Automatic Intruder Alarm), perimeter security
	LF	Video surveillance system	Monitoring system which provides remote visual monitoring	Perimeter security, CCTV system
	LG, ..., LZ	Reserved		
M_		**Information presenting system**	Technical system which presents information	
	MA	Warning system	Information presenting system which produces a fixed sound or voice messages to warn of hazardous conditions	Patient warning signal, disabled alarm system
	MB	Audio-video system	Information presenting system which produces images and/or sounds	PA system, AV system
	MC	Traffic control system	Information presenting system which controls traffic	
	MD	Time system	Information presenting system for time	Time recording, clock system, clock display, central clock system
	ME	Sign system	Information presenting system which provides instruction in a written or symbolic form	
	MF, ..., MZ	Reserved		
N_		Reserved		
O_		Not to be used		
P_		**Protection system**	Self-acting technical system which protects against danger or unwanted conditions	
	PA	Fire protection system	Protection system by opening or closing doors and windows in the event of a fire	
	PB	Firefighting system	Protection system against fire by extinguishing	
	PC	Earthing system	Protection system against dangerous electrical currents by earthing of electrical systems	

Table A.2 *(continued)*

Class	Sub class	Preferred term	Definition	Examples of terms
	PD	Lightning protection system	Protection system against lightning by earthing of electrical systems	Lightning system
	PE	Cathodic protection system	Protection system for metal constructions against corrosion by corrosion protection	
	PF, ..., PZ	Reserved		
Q_		**Storage system**	Technical system which stores information, energy or substances	
	QA	Meter system	Storage system for metered consumption information	Metering system, meter, energy measurement system
	QB	Gas and air storage system	Storage system for air and gases	Gas storage
	QC	Liquid storage system	Storage system for liquids	Buffer system, tank array, collection system
	QD	Energy storage system	Storage system for energy	Buffer system, energy storage
	QE, ..., QZ	Reserved		
R_		**Furnishing system**	Technical system which fits out space or construction elements in a construction entity	
	RA	Planting system	Furnishing system in the form of vegetation	Planting, tree, bush, plant
	RB	Furniture system	Furnishing system in the form of fixed or moveable construction elements	Fixtures, furniture, effects, movable property
	RC	Equipment system	Furnishing system in the form of tools used in a particular situation	Equipment, technical equipment, apparatus, tool
	RD, ..., RZ	Reserved		
S_, ..., Z_		Reserved		

A.3 Classes for basic functions and products

See IEC 81346-2:2009, Table 3.

Annex B
(informative)

Examples of application

B.1 General

The examples provided in this Annex serve to illustrate the principles of systems and their constituents in the context of this document. The examples do not represent a standardized or preferred system design, nor do they intend to regularise the design of any system. The prefix "%" is used in this Annex as an exemplary type designation, recognizing that it is not yet included in both IEC 81346-1 and IEC 81346-2.

B.2 Construction works

B.2.1 Classes of construction works

Figure B.1 shows an example of a landscaped terrain classified as a ground system (class A). The various examples of reference designations (single-level and multi-level) in the product aspect (prefix "-") are given.

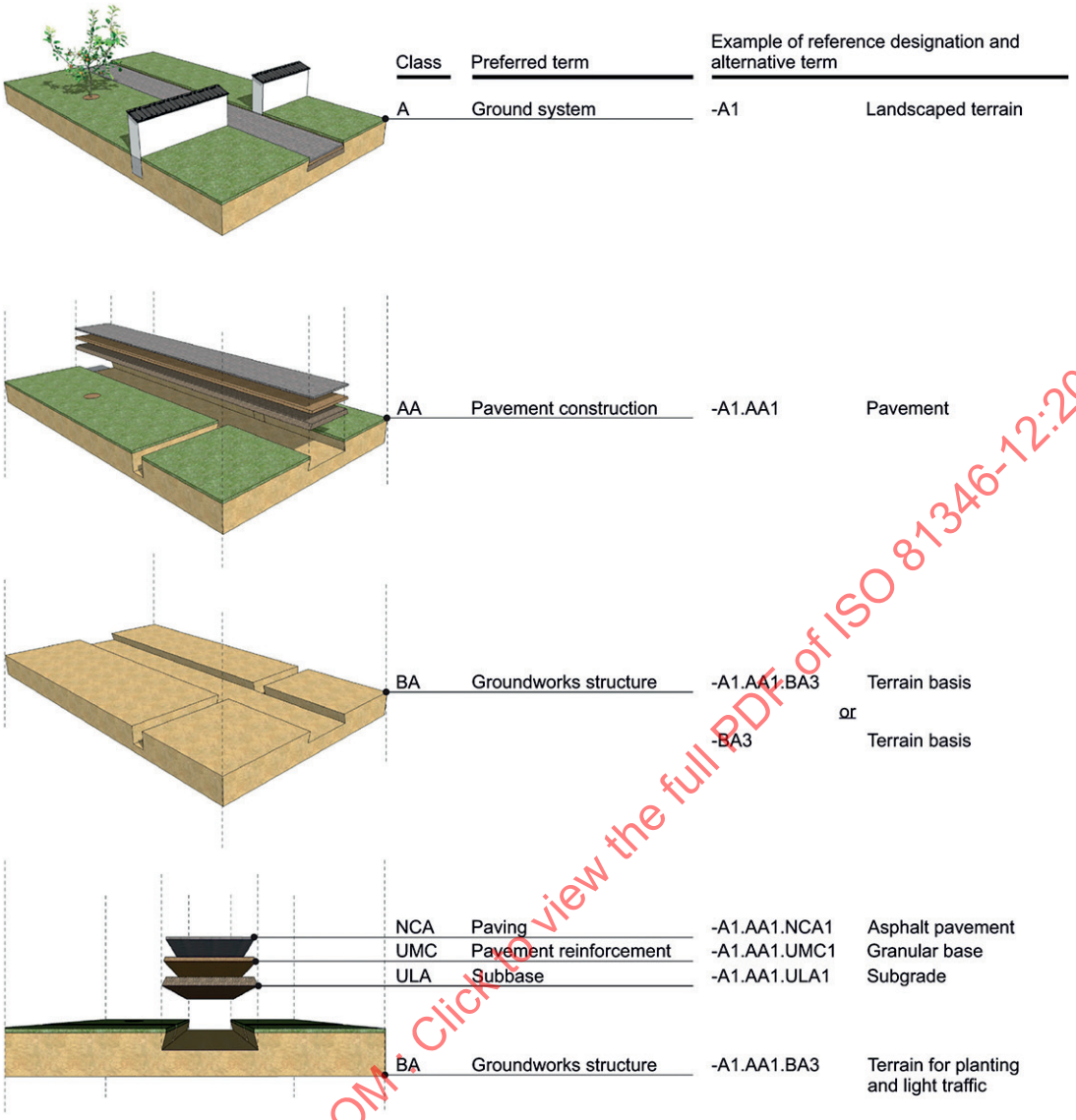

Figure B.1 — Illustration of a ground system and its constituents

Figure B.2 shows an example of a landscaped terrain classified as a ground system (class A). The examples of a wall with multi-level reference designations are shown in the product aspect (prefix "-").

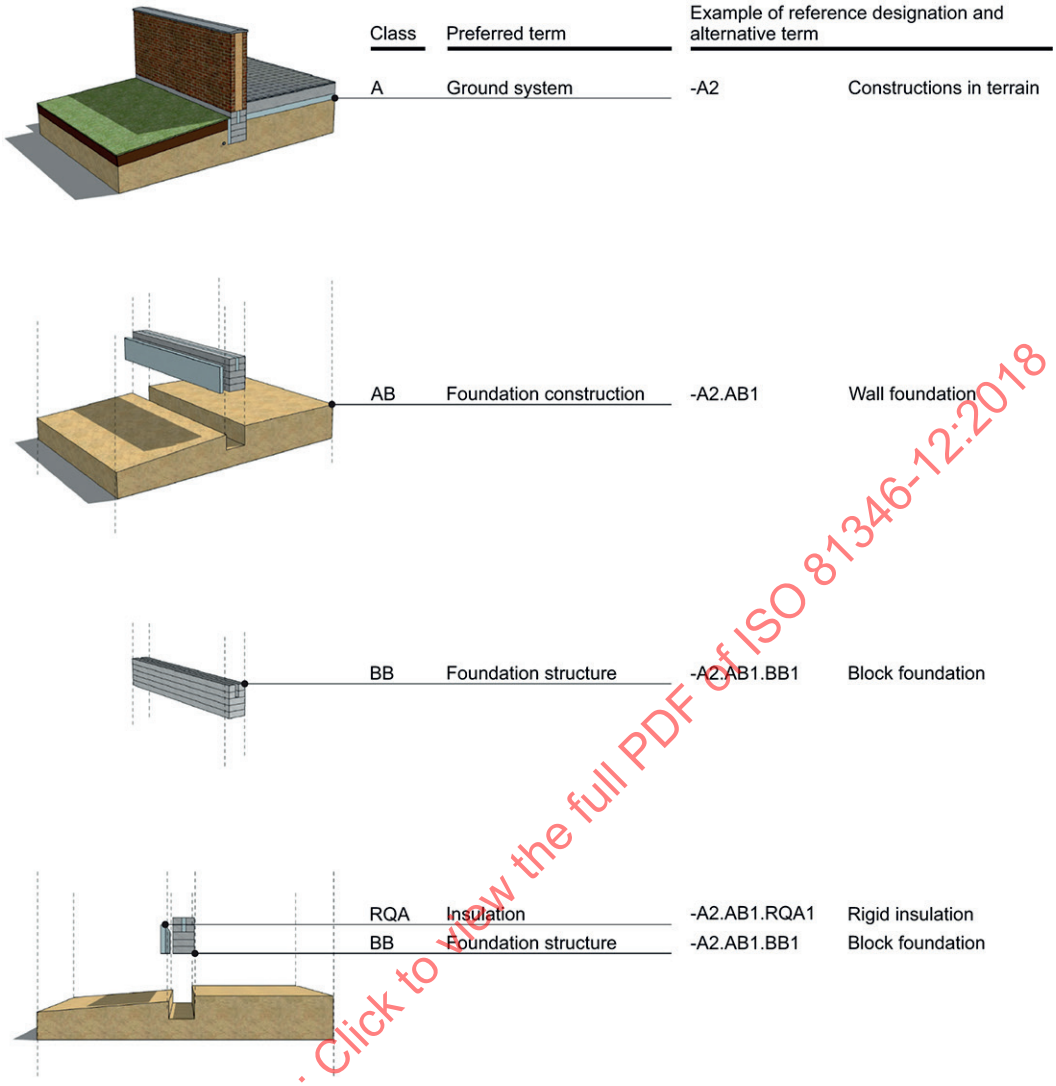

Figure B.2 — Designation of a wall in a terrain system

Figure B.3 shows the decomposition of a wall system in two technical systems: a wall construction (class AD) and a wall structure (class BD). Examples of reference designations and alternative daily-use terms are given. The examples of reference designations apply the product aspect (prefix "-") and the type aspect (prefix "%").

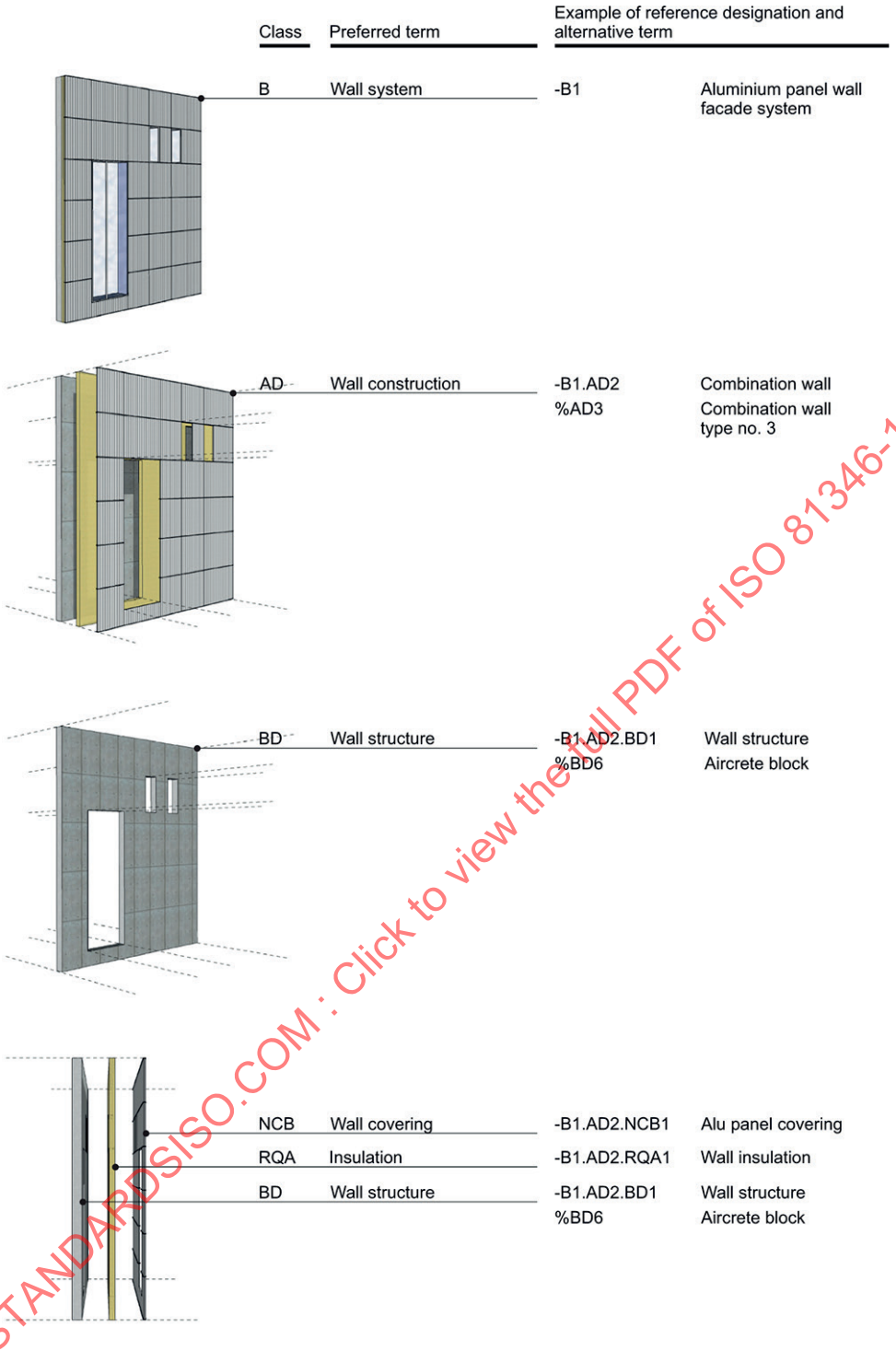

Figure B.3 — Examples of a wall and its classified constituents

Figure B.4 shows the decomposition of a glass facade, classified as a wall system (class B). Examples of reference designations and alternative daily-use terms are given. The examples of reference designations apply the product aspect (prefix "-") and the type aspect (prefix "%").

Figure B.4 — Examples of reference designations of a glass facade

Figure B.5 shows the decomposition of a slab, classified as a slab system (class C). Examples of reference designations and alternative daily-use terms are given. The examples of reference designations apply the product aspect (prefix "-") and the type aspect (prefix "%").

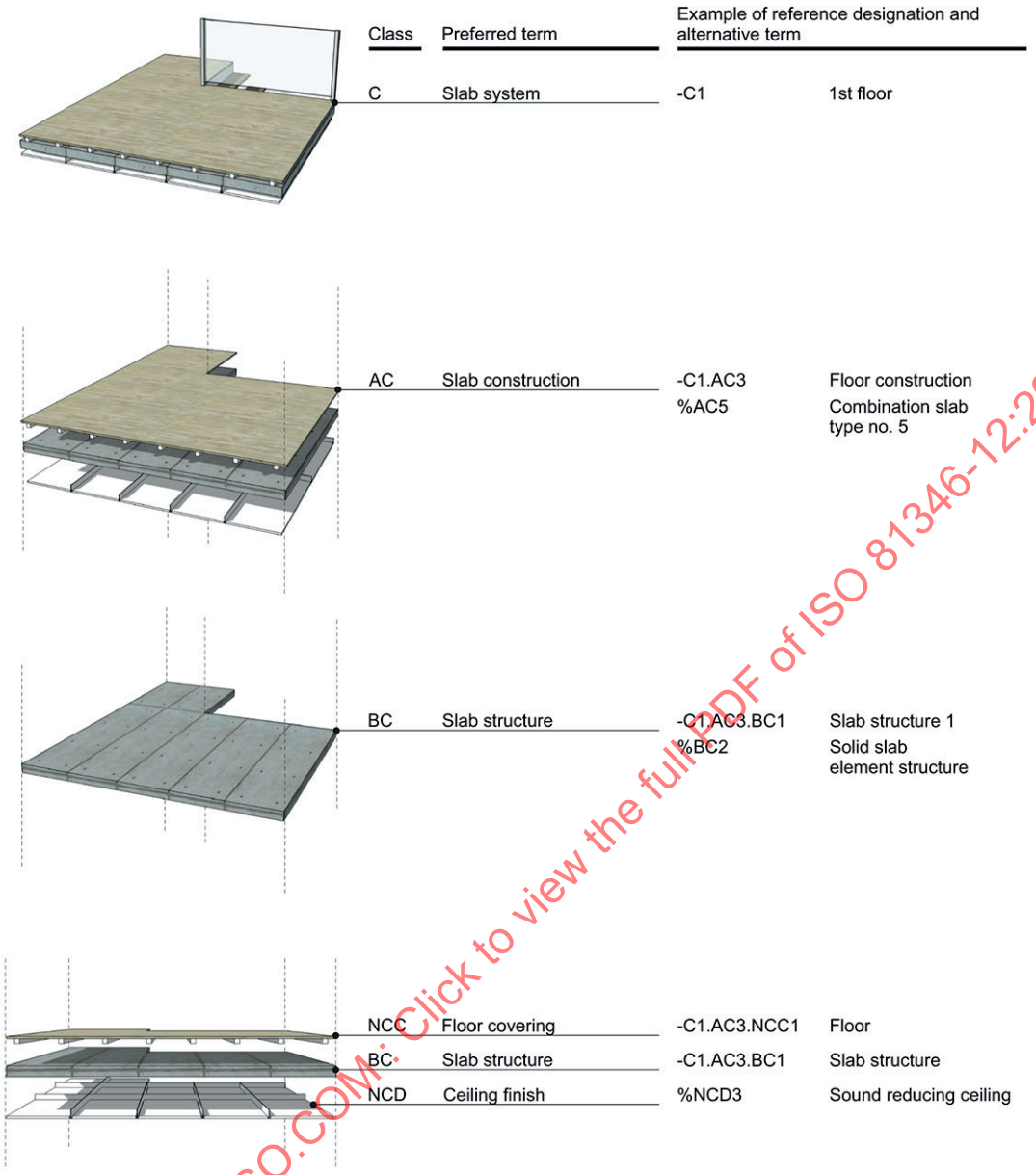

Figure B.5 — Examples of reference designations of a slab system

Figure B.6 shows the decomposition of a roof, classified as a roof system (class D). Examples of reference designations and alternative daily-use terms are given. The examples of reference designations apply the product aspect (prefix "-") and the type aspect (prefix "%").

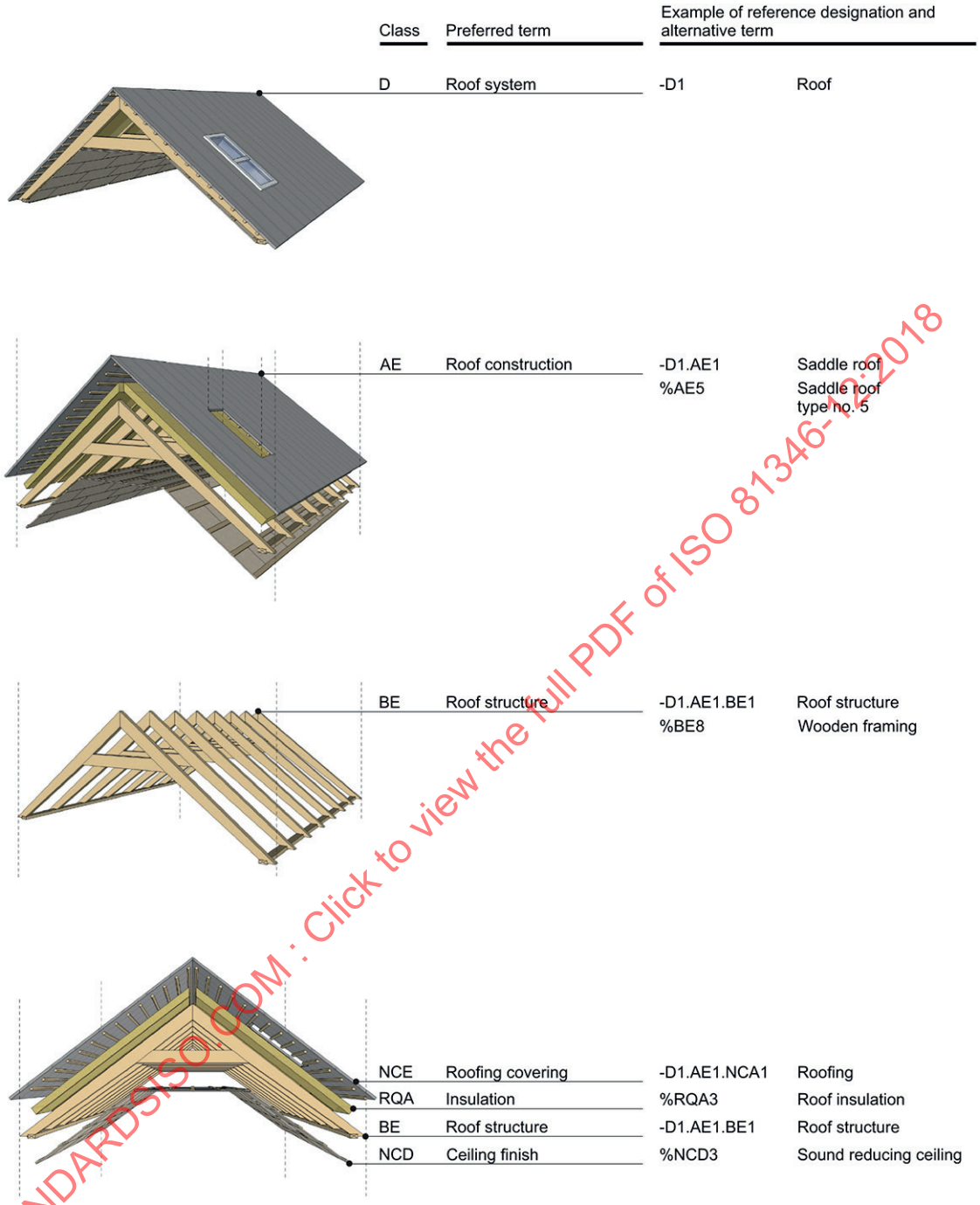

Figure B.6 — Examples of reference designations of a roof system

Figure B.7 shows the decomposition of a construction complex (a building) in four functional system classes: a ground system (class A), a wall system (class B), a slab system (class C) and a roof system (class D). Examples of reference designations and alternative daily-use terms are given. The examples of reference designations apply the product aspect (prefix "-") and the type aspect (prefix "%").

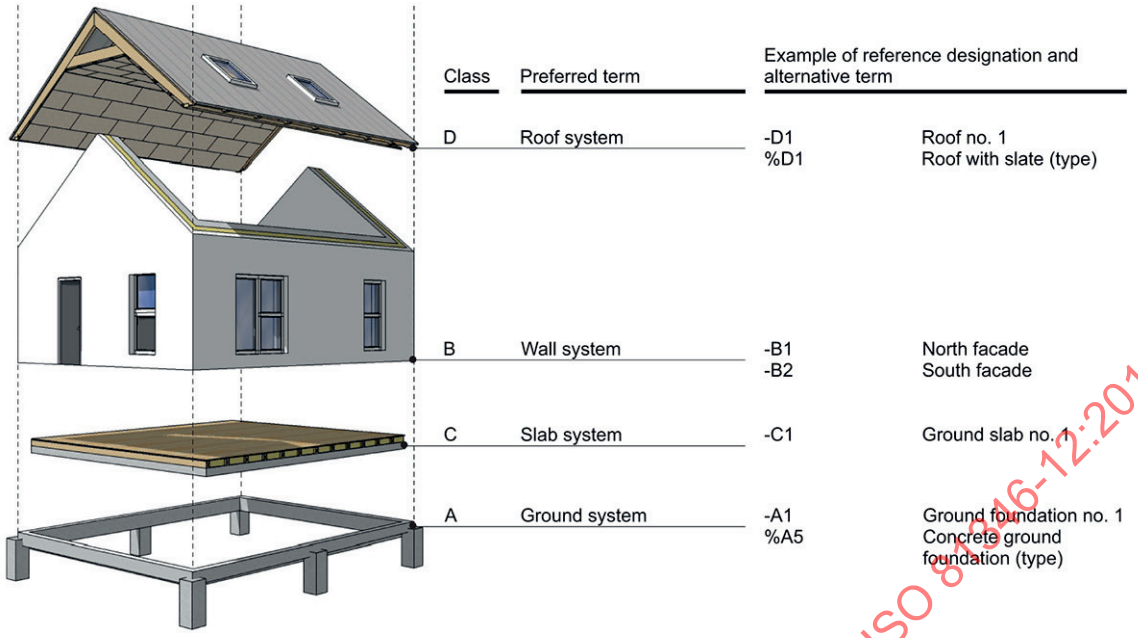

Figure B.7 — Example of a building subdivided into systems

As an example for the designation of a technical system, Figure B.8 shows a furniture system (class RB). An example of a reference designation with daily-use terms is given. The example of reference designation applies the type aspect (prefix "%").

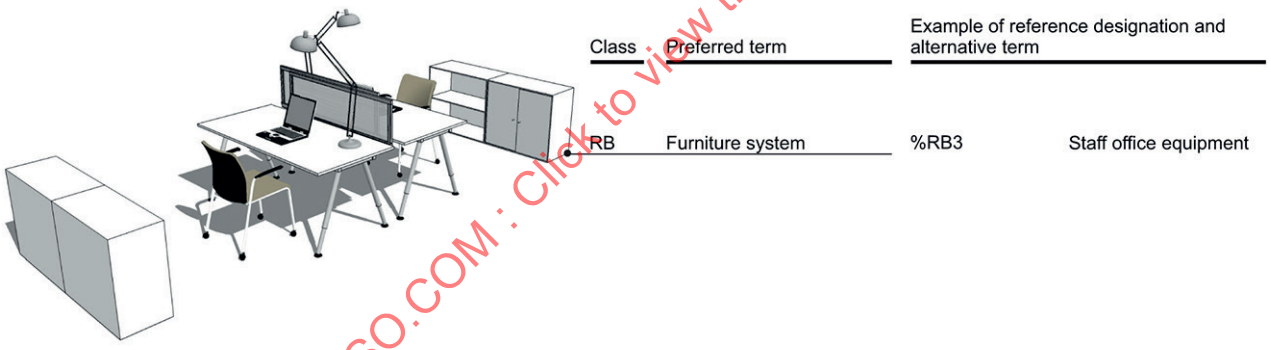

Figure B.8 — Identification of a furniture system

Figure B.9 shows the designation of construction works using a multi-level reference designation of the product-oriented structure.

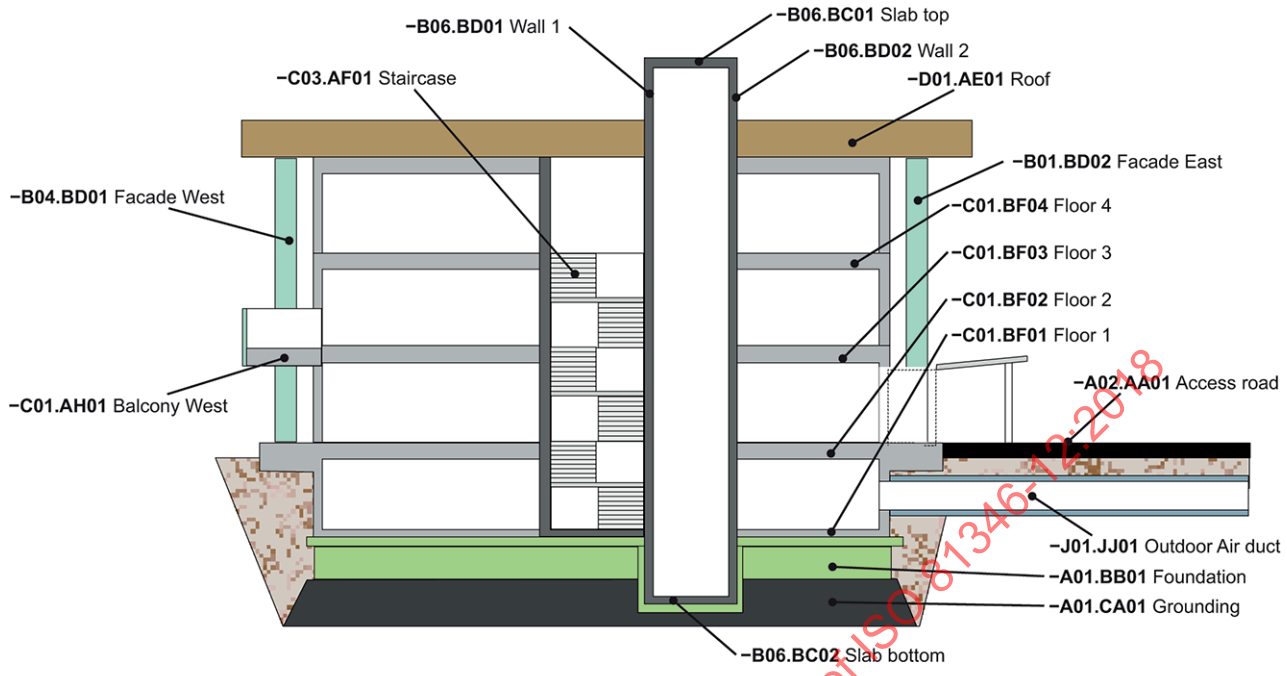

Figure B.9 — Graphical representation of construction works

B.2.2 Classes of components and sub-components of construction works

Figure B.10 shows the product-oriented structure and designation of components and sub-components of construction works using a single-level and multi-level reference designation.

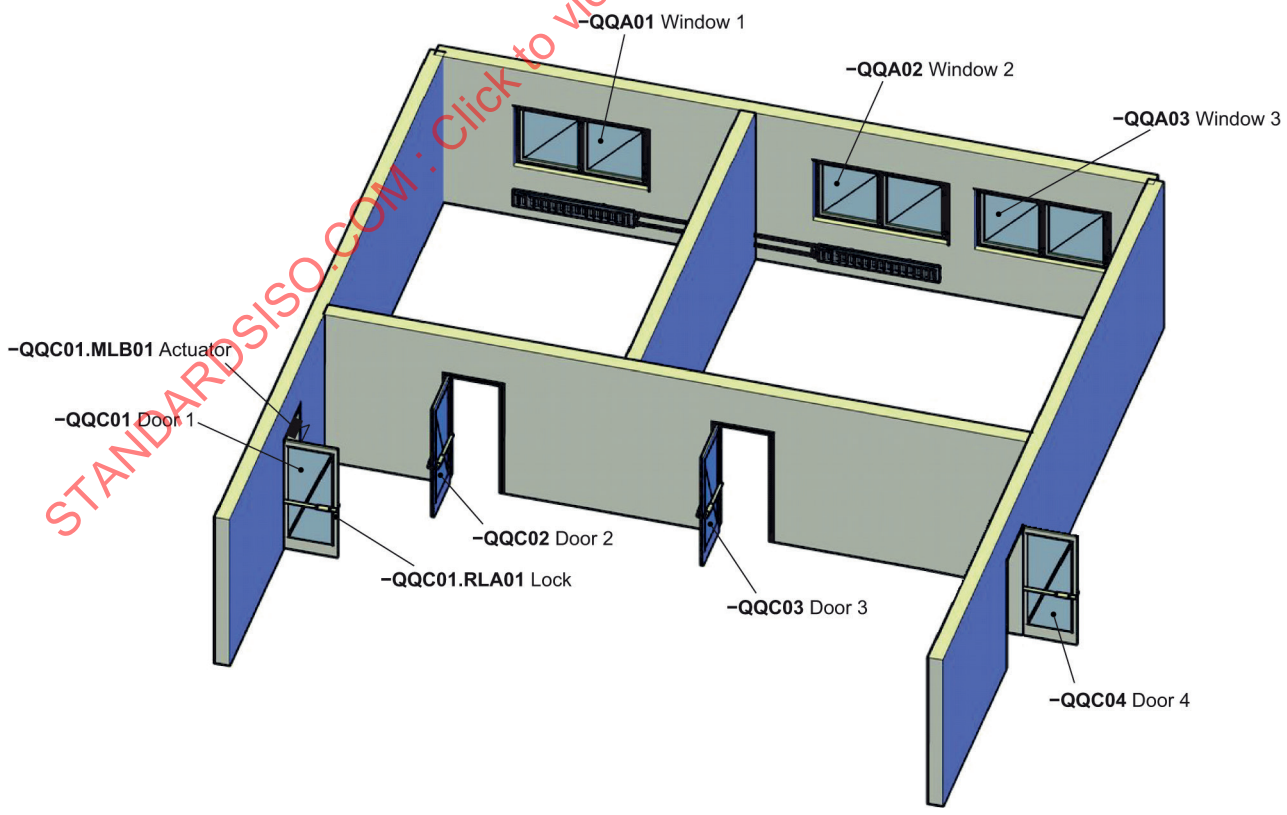

Figure B.10 — Graphical representation of components and sub-components of construction works

B.3 Building services

B.3.1 Heating, ventilation and air conditioning (HVAC)

Figure B.11 shows function-oriented designated objects of a HVAC-system. Figure B.12 shows product-oriented designated objects of an air handling unit. Figure B.13 shows a tree structure of the air handling unit represented in Figure B.12.

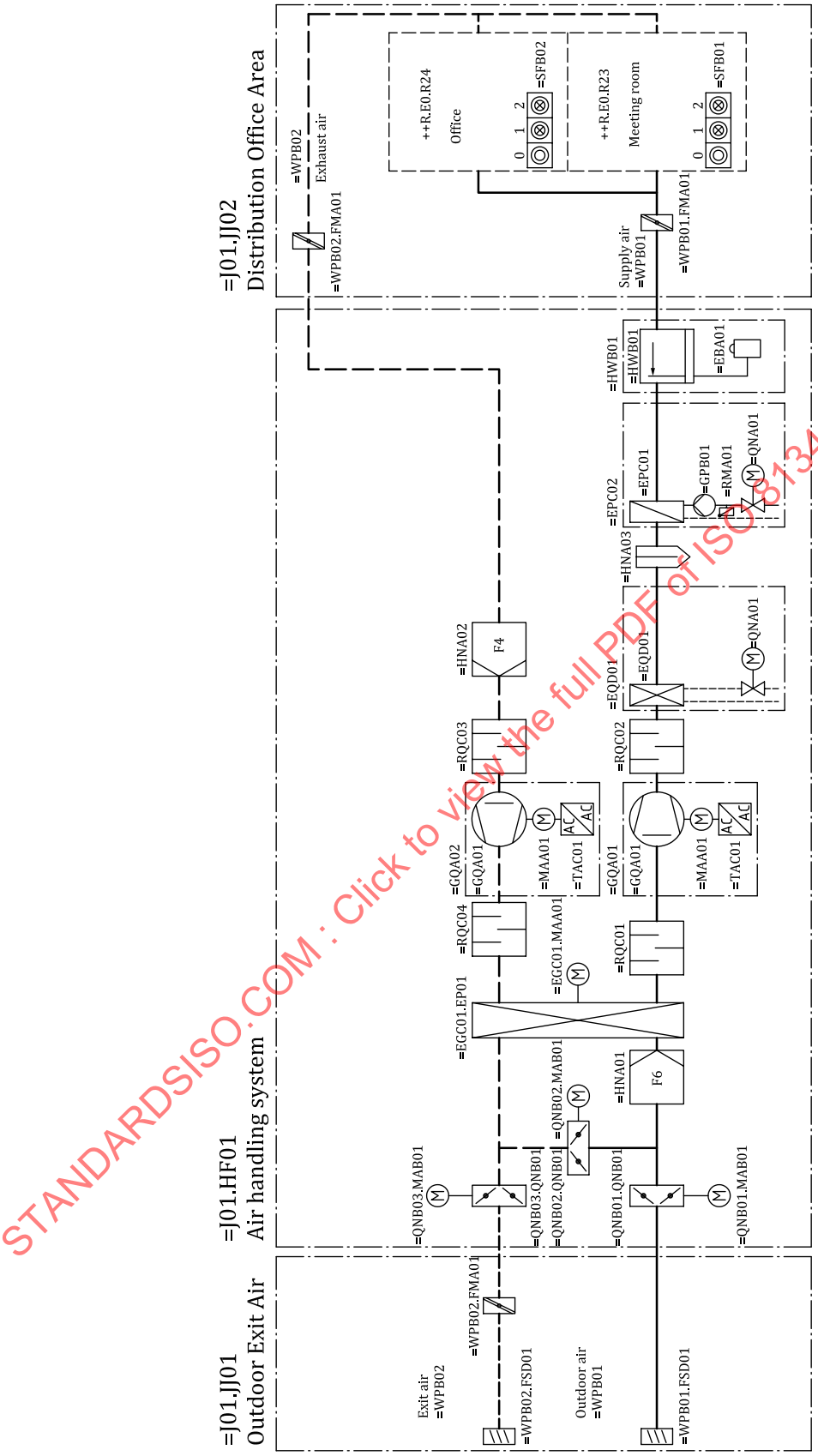

Figure B.11 — Graphical representation of an air conditioning system

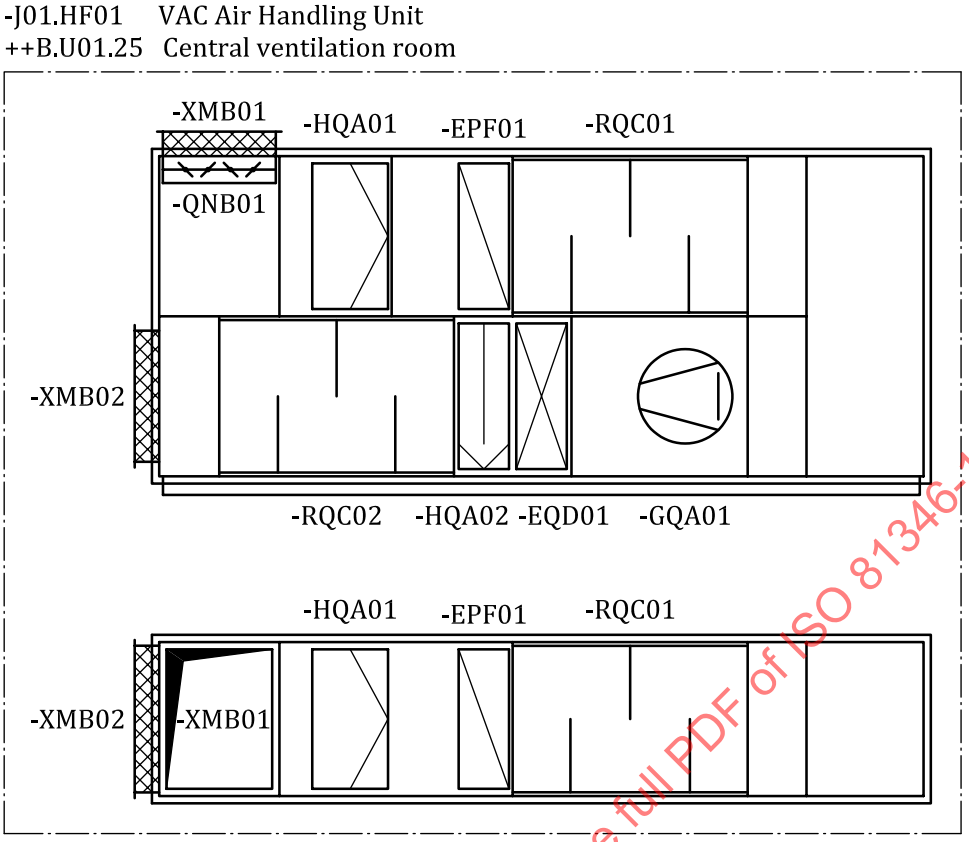

Figure B.12 — Graphical representation of an air handling unit

–J01.HF01
VAC Air handling unit

–UNA01 Construction frame
–XMB01 Connection outdoor air duct
–XMB02 Connection supply air duct
–QNB01 Outdoor air control flap
–HQA01 Outdoor air filter
–HQA02 Mist eliminator
–EPF01 Air heater
–RQC01 Exhaust air silencer
–RQC02 Supply air silencer
–GQA01 Supply air fan
–EQD01 Air cooler

Figure B.13 — Tree structure of the product-oriented structure of the air handling unit represented in Figure B.12

B.3.2 Automation system

Figure B.14 shows function-oriented designated objects of an area control system. In Figure B.15 different aspects of this area control system are represented as a tree structure.

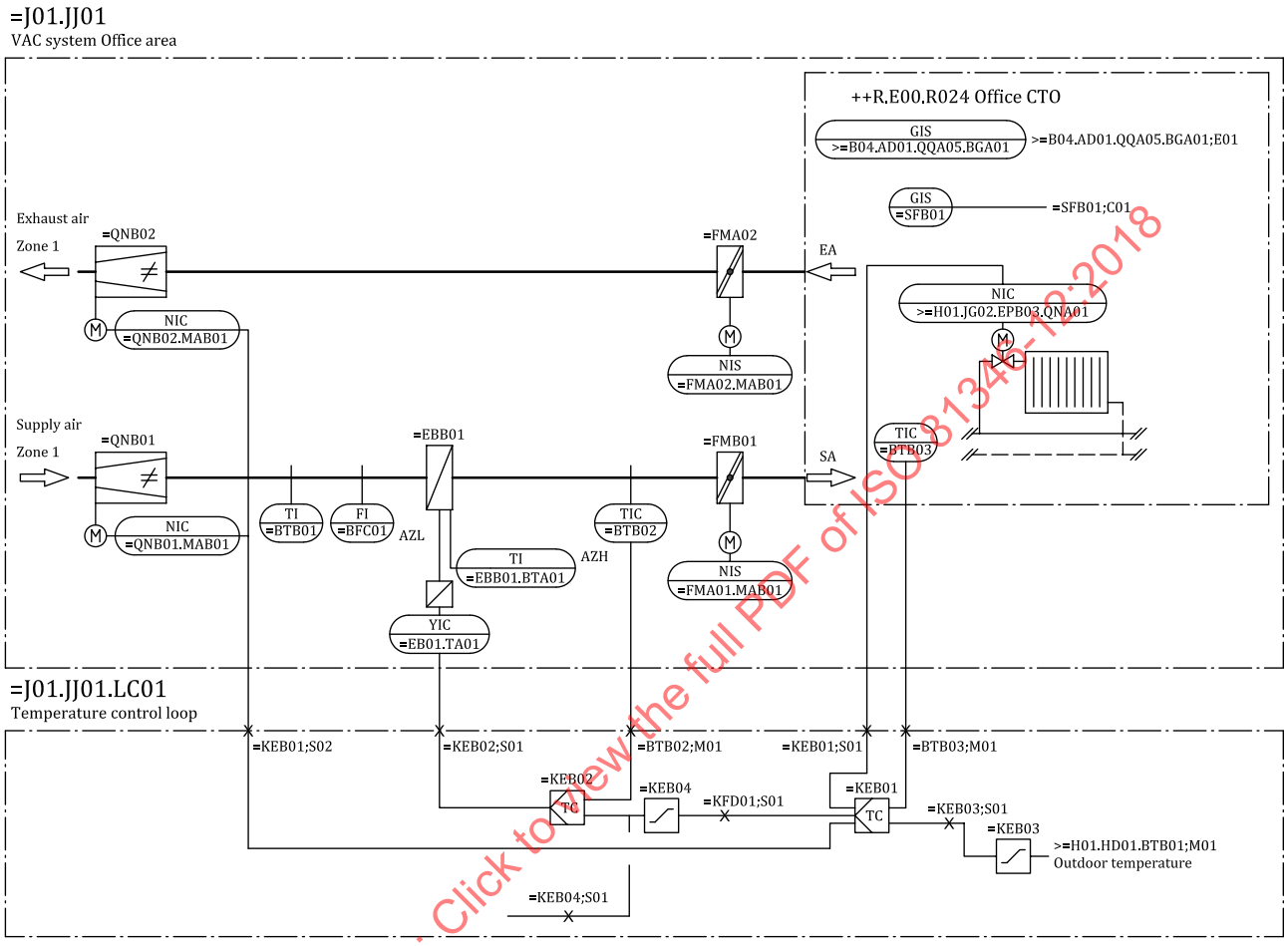

Figure B.14 — Graphical representation of an area control system

NOTE 1 According to IEC 81346-1:2009, Rule 30, "If it is necessary to indicate that the shown reference designation is the complete one with respect to the top-node in the actual presentation context, the character ">" (greater than) shall be presented in front on the reference designation."

The character " > " (greater than) is not part of the reference designation.

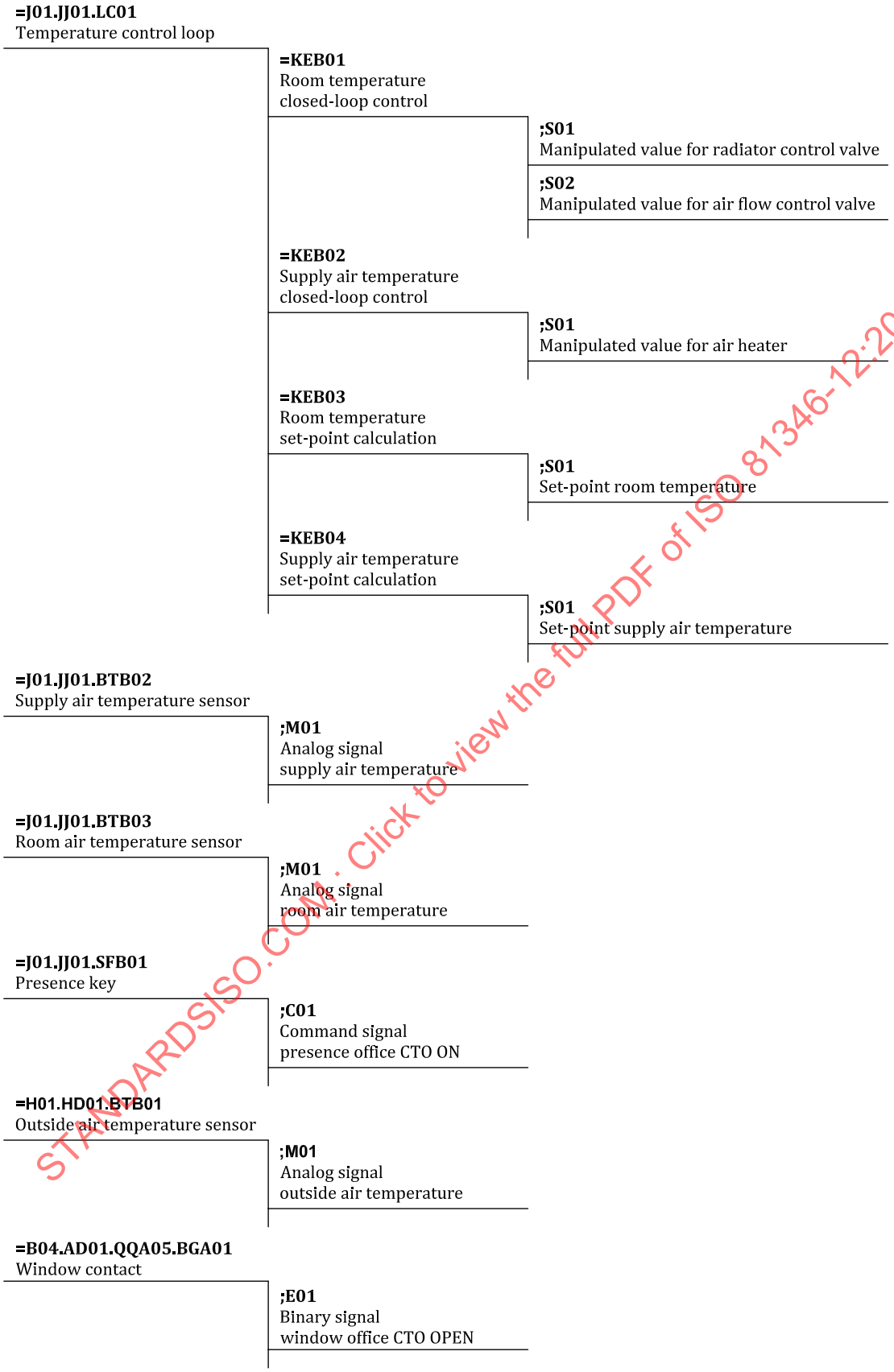

Figure B.15 — Tree structure of the function-oriented structure of the area control system with signal designation according to Figure B.14

NOTE 2 Not all objects shown in Figure B.14 are represented in Figure B.15.

B.3.3 Cooling system

Figure B.16 shows the function-oriented designated objects of a cooling supply system.

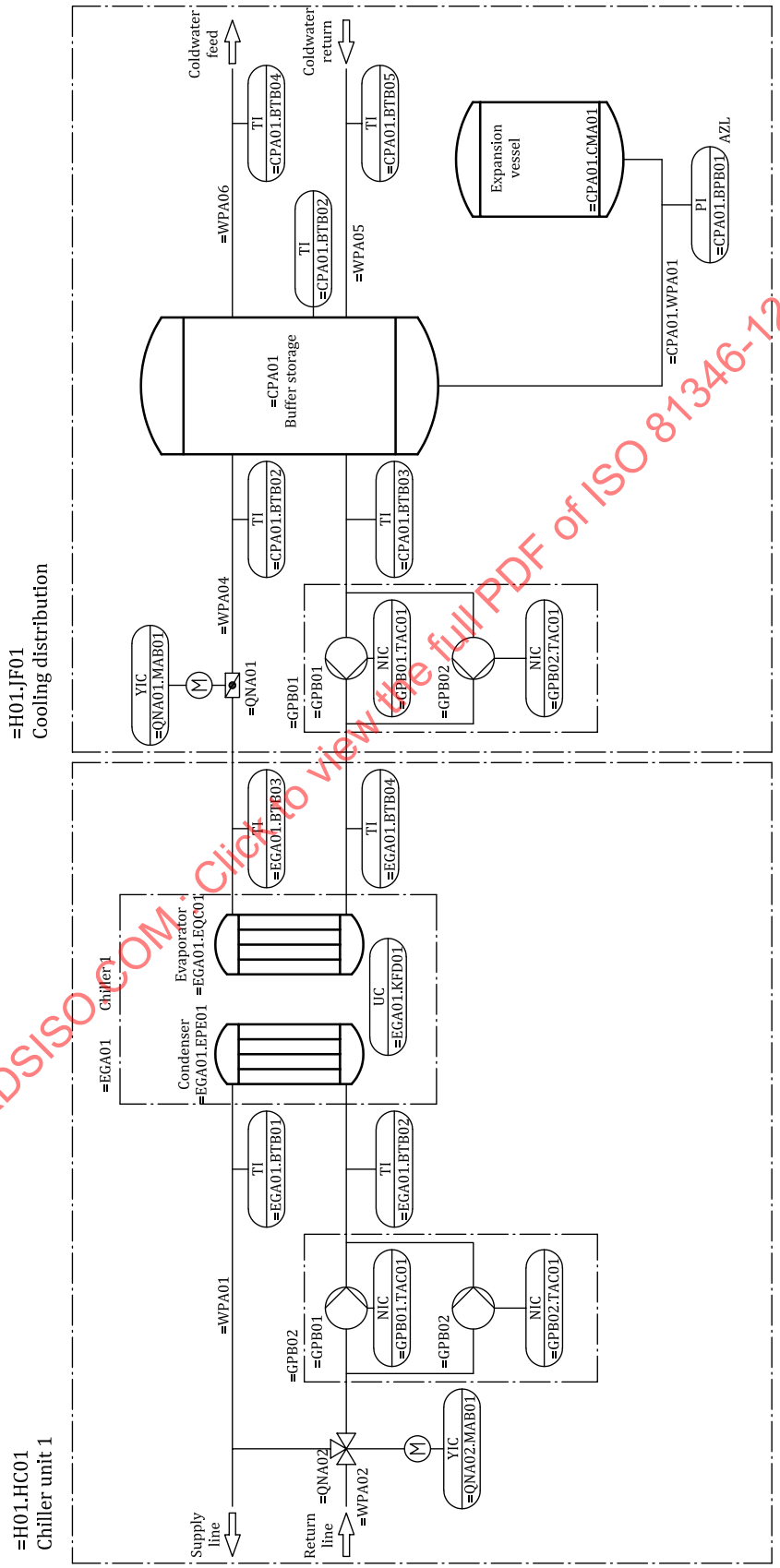

Figure B.16 — Graphical representation of a cooling supply system

B.3.4 Heating system

Figure B.17 shows the possibility to view and designate one and the same object according to different aspects. In Figure B.18 the tree structure of the heating system is shown.

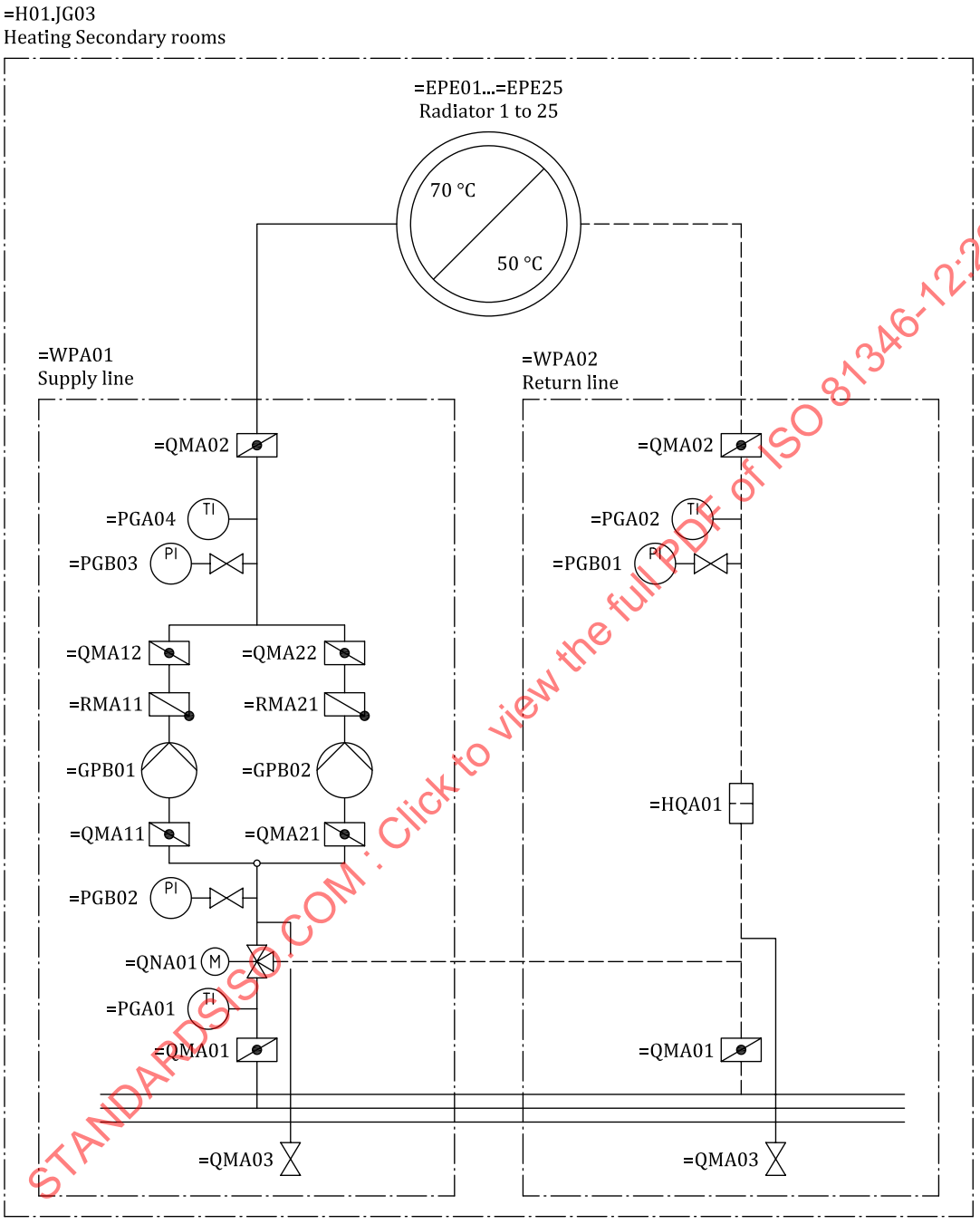

Figure B.17 — Graphical representation of a heating supply system