

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



HORIZONTAL STANDARD  
NORME HORIZONTALE

**Industrial systems, installations and equipment and industrial products –  
Structuring principles and reference designations –  
Part 2: Classification of objects and codes for classes**

**Systèmes industriels, installations et appareils, et produits industriels –  
Principes de structuration et désignations de référence –  
Partie 2: Classification des objets et codes pour les classes**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**INDUSTRIAL SYSTEMS, INSTALLATIONS  
AND EQUIPMENT AND INDUSTRIAL PRODUCTS –  
STRUCTURING PRINCIPLES AND REFERENCE DESIGNATIONS –****Part 2: Classification of objects and codes for classes**

## FOREWORD

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International Standard IEC 81346-2 has been prepared by IEC technical committee 3: Information structures and elements, identification and marking principles, documentation and graphical symbols, in cooperation with ISO technical committee 10: Technical product documentation.

It is published as a double logo standard.

It has the status of a horizontal standard in accordance with IEC Guide 108.

This second edition cancels and replaces the first edition published in 2009. This edition constitutes a technical revision.

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

- a) The entry classes of the classification scheme have been defined to reflect the “inherent function” of the object classified;
- b) The classes are defined to align with the principles of ISO 22274 and ISO 704;
- c) A three-level classification scheme has been defined, which provides a greater flexibility for the designer in some technical fields;
- d) Classes are defined by their definition and provided with a preferred term. Examples are provided if needed;
- e) A separate classification scheme for spaces has been provided.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
3/1393/FDIS	3/1402/RVD

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

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

A list of all parts in the IEC 81346 series, published under the general title *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
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- amended.

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## INTRODUCTION

The aim of this document is to establish classification schemes for objects with assigned letter codes for the defined classes, which can be applied throughout all technical areas, e.g. electric, mechanical, process and civil engineering as well as all branches of industry, e.g. energy, chemical, construction, automotive, shipbuilding and marine. The letter codes are intended for use with the rules for the construction of reference designations in accordance with IEC 81346-1 and other parts of the ISO/IEC 81346 series. The letter codes can also be used "stand-alone" as a generic type designation where a type of component is to be indicated, for example in specifications.

The classification scheme in Clause 5 of this document is an enumerative and faceted classification scheme with the inherent function as the entry class. It is made in accordance with the rules in ISO 704 and the guidelines in ISO 22274.

At the entry level, as shown in Table 1, the inherent function is used to narrow down the areas of applicability of the individual classes to a manageable size. For the sub-divisions of the entry classes, faceted approaches are applied to specify the nature of the concepts contained in the leaf classes.

By applying this method, this document provides stable class codes for objects (including systems and system elements), which are independent of how the objects are used or applied in any design during the entire lifecycle.

Any class is defined by its definition only. Users should select the appropriate class for their object to be classified based on the definition, and not rely upon the class name or the examples.

[IEC 81346-2:2019](https://standards.iteh.ai/catalog/standards/sist/6ae88f05-e5ea-4b25-a027-3ca8c616a9cd/iec-81346-2-2019)

<https://standards.iteh.ai/catalog/standards/sist/6ae88f05-e5ea-4b25-a027-3ca8c616a9cd/iec-81346-2-2019>

# INDUSTRIAL SYSTEMS, INSTALLATIONS AND EQUIPMENT AND INDUSTRIAL PRODUCTS – STRUCTURING PRINCIPLES AND REFERENCE DESIGNATIONS –

## Part 2: Classification of objects and codes for classes

### 1 Scope

This part of IEC 81346 establishes classification schemes with defined object classes and their associated letter codes, and is primarily intended for use in reference designations and for designation of generic types.

The classification schemes are applicable for objects in all technical disciplines and all branches of industry.

This document is a horizontal publication also intended for use by technical committees in preparation of publications related to reference designations in accordance with the principles laid down in IEC Guide 108.

### 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.

[IEC 81346-2:2019](https://standards.iteh.ai/catalog/standards/sist/6ae88f05-e5ea-4b25-a027-3ca8c616a9cd/iec-81346-2-2019)

<https://standards.iteh.ai/catalog/standards/sist/6ae88f05-e5ea-4b25-a027-3ca8c616a9cd/iec-81346-1-2009>, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 1: Basic rules*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 81346-1 and the following apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.1

##### **inherent function**

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

Note 1 to entry: Inherent is regarded as existing in something as a permanent, essential, or characteristic attribute.

#### 3.2

##### **classification scheme**

descriptive information for an arrangement or division of objects into groups based on criteria such as characteristics, which the objects have in common

Note 1 to entry: A classification scheme is a concept system used for classifying some objects.



[SOURCE: ISO/IEC 11179-1:2015, 3.3.4, modified – examples deleted.]

### 3.3

#### **class of object**

set of objects characterized by the same inherent function

### 3.4

#### **space**

limited three-dimensional extent defined physically or notionally

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

### 3.5

#### **type-of relation**

relation between two classes where the characteristics defining one of the classes includes that of the other class and at least one additional delimiting characteristic

Note 1 to entry: This term corresponds to the term "generic relation" defined in ISO 1087-1:2000, 3.2.21.

### 3.6

#### **part-of relation**

relation between two classes where one of the classes constitutes the whole and the other class a part of that whole

Note 1 to entry: This term corresponds to the term "partitive relation" defined in ISO 1087-1:2000, 3.2.22.

Note 2 to entry: Part-of relation is also known as partitive relation, part-whole relation or whole-part relation.

Note 3 to entry: See also IEC 81346-1.

### 3.7

#### **activity space**

space defined by the spatial extension of an activity

Note 1 to entry: A spatial extension of an activity, for example, a table or a bed, and the activity space around them.

[SOURCE: ISO 12006-2:2015, 3.1.9]

### 3.8

#### **built space**

space defined by built or natural environment or both, intended for user activity or equipment

Note 1 to entry: A built space is, for example, a room defined by floor, ceiling, and wall, or a footpath, or power-line corridor defined by a natural forest.

Note 2 to entry: Spaces occupied by construction elements are known as construction spaces, and are handled as properties of construction elements themselves.

[SOURCE: ISO 12006-2:2015, 3.4.4]

## 4 Classification principles

### 4.1 General

The purpose of classifying is to distinguish among objects in a collection based on differentiation of characteristics of interest. Classes are organized in type-of relations and are defined by different values of a specific characteristic of interest.

The classification in this document is made with an entry class based on function in a broad sense. This is in accordance with ISO 22274:2013, 5.4.4 which recommends an enumerative and faceted classification system with an entry class.

When a class code is applied in a reference designation, the purpose is to classify the occurrence of the object, not the individual, as described in IEC 81346-1:2009, 4.8 and Table 1 (general rules). In such a situation, the object is generally specified and assigned its inherent function in the design stage of the project. Classes can also be used by manufacturers to show multiple potential use of a product. In this way, the classification can enhance searchability.

The class name (preferred term) assigned to the classes and the examples of terms provided in this document are based on the inherent function of an object, i.e. independent of any application.

This classification scheme ensures a life cycle stable class code, as the stable object occurrence is classified by the stable inherent function of the object occurrence: A stake is a stake, a door is a door and so on, no matter what individual is used to realize the occurrence.

Objects related to a class may be considered as a discrete collection of objects, and may therefore be further classified into sub-classes based on the differentiation of a specific characteristic. In this document, this has resulted in a classification scheme starting with classes representing general types based on function in a broad sense (1<sup>st</sup> letter code), continuing into classes representing types that are more specialized in two steps, represented by 2<sup>nd</sup> and 3<sup>rd</sup> class code.

All examples and terms in the classification scheme of this document are recognized as being used to name a member of their class. As different branches have different usage of terminology, the same example or term might occur in different classes.

#### 4.2 Relation between classification and composition

IEC 81346-1 defines rules on how an object may be structured into its constituent objects resulting in a composition hierarchy. For the purpose of classifying objects, this document defines classes and codes that results in a classification hierarchy, see Figure 1, which is a copy of Figure 2 in 4.2 of ISO 12006-2:2015.

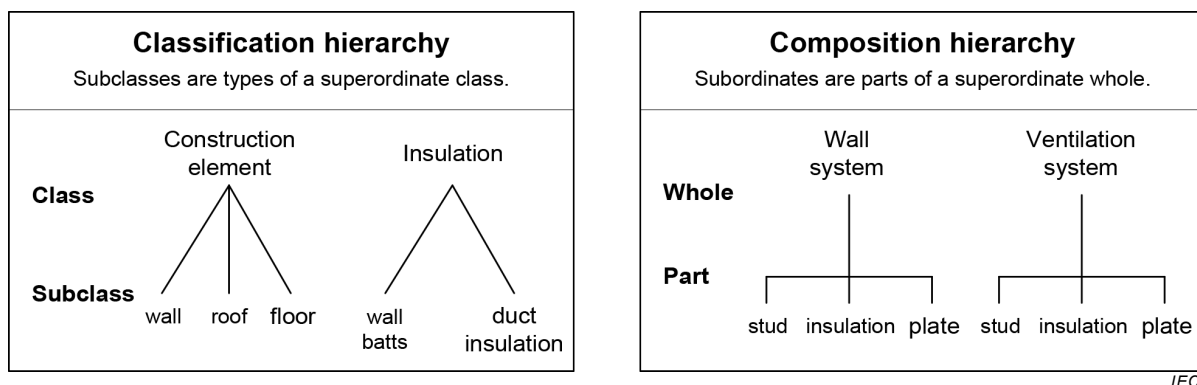


Figure 1 – Illustration of a classification hierarchy and a composition hierarchy

#### 4.3 Classification schemes of this document

This document provides different classification schemes of objects primarily intended for use in reference designations, based on the basic requirements given in Annex E. The provided classification schemes are:

- inherent function of objects, see Clause 5;
- spaces, see Clause 6;
- infrastructure objects, see Clause 7.

The content of any class is determined by the definition of the class only. A preferred term determines the class in daily use and forms part of the definition of subclasses. The classification tables of this document are considered to be complete, and therefore no “miscellaneous” or “other” classes are present. If no appropriate class for an object-of-interest can be found on a sub or sub-sub level, objects shall be classified to the higher level i.e. to the sub-class or entry class.

This document provides classification schemes with multiple classification levels. The user may choose to apply letter codes using

- a single letter, representing the entry class; or
- two letter code, representing a sub-class in the scheme; or
- three letter code, representing a sub-sub-class in the scheme.

## 5 Classification scheme for the inherent function of objects

### 5.1 General

The classification scheme defined in this clause is based on the inherent function of objects.

The classification scheme has a hierarchical classification structure that constitute three levels from top to lower.

The entry classes and their respective subclasses are defined considering the inherent function of objects, based on the knowledge of the use of objects in existing designs, and the classification schemes defined in IEC 81346-2:2009.

NOTE 1 When the classification scheme shown in Table 1 and Table 2 refer to high voltage (HV) or low voltage (LV), high voltage is considered to be any voltage  $> 1\,000\text{ V AC}$  or  $> 1\,500\text{ V DC}$ . Low voltage is considered to be any voltage  $\leq 1\,000\text{ V AC}$  or  $\leq 1\,500\text{ V DC}$ . These voltage limits are in accordance with IEC 61140.

NOTE 2 In Annex D the difference between the classification scheme and classes in IEC 81346-2:2009 and the classification scheme and classes of this publication is given.

### 5.2 Entry classes

Table 1 defines the entry classes for the classification scheme for inherent function of objects.

**Table 1 – Entry classes**

Class code	Class definition	Class name
<b>B</b>	object for picking up information and providing a representation	sensing object
<b>C</b>	object for storing for subsequent retrieval	storing object
<b>E</b>	object for emitting	emitting object
<b>F</b>	object for protecting against the effects of dangerous or undesirable conditions	protecting object
<b>G</b>	object for providing a controllable flow	generating object
<b>H</b>	object for treating matter	matter processing object
<b>K</b>	object for treating input signals and providing an appropriate output	information processing object
<b>M</b>	object for providing mechanical movement or force	driving object
<b>N</b>	object for enclosing partly or fully another object	covering object
<b>P</b>	object for providing perceptible information	presenting object
<b>Q</b>	object for controlling access or flow	controlling object
<b>R</b>	object for restricting or stabilising	restricting object
<b>S</b>	object for detecting a human action and providing an appropriate response	human interaction object
<b>T</b>	object for transforming	transforming object
<b>U</b>	object for localising of other objects	holding object
<b>W</b>	object for leading from one place to another	guiding object
<b>X</b>	object for interfacing an object	interfacing object
The letters A, I and O shall not be used as a class code. The letters D, J, L, V, Y and Z are reserved for future standardization.		

Each class defined in Table 1 is in this document associated with a set of predefined subclasses allowing a more detailed characterization of an object, if required. The definitions of subclasses of objects (sub-class and sub-sub-class) are presented in Table 2 and Table 3 together with their associated letter codes.

NOTE Subclasses do not define a new level in a composition structure, i.e. they do not describe a subdivision of the object. Class and subclass refer to the same object.

Annex B illustrates how the classes in Table 1 relate to a generic process.

### 5.3 Complete classification scheme

Table 2 shows the first two levels of the classification scheme for inherent function of object, while Table 3 shows all the three levels defined.

Numerals below class code in Table 2 and Table 3 show the level in the classification structure, that is, level 1, 2 and 3 mean entry class, sub-class and sub-sub class respectively, see Annex A.

Table 2 – First two levels of the classification scheme for inherent function of objects

Class code	Class definition		Class name (preferred term)	Examples of terms	Criteria for definition of subclasses
	1	2			
<b>B</b>		<i>object for picking up information and providing a representation</i>	sensing object		Kind of quantity
	<b>BA</b>	<i>sensing object for electric potential</i>	electric potential sensing object	coupling capacitor, measuring voltage relay, measuring voltage transformer, voltage relay, voltage transformer	Kind of output signal
	<b>BB</b>	<i>sensing object for resistivity or conductivity</i>	resistivity sensing object	electric resistivity detector, electric resistivity sensor, thermal resistivity detector, thermal resistivity detector	Kind of flow and output signal
	<b>BC</b>	<i>sensing object for electric current</i>	electric current sensing object	electronic overload relay, measuring current relay, measuring current transformer, overload relay	Kind of output signal
	<b>BD</b>	<i>sensing object for density</i>	density sensing object	aerometer, density sensor, density switch, density transformer, hydrometer	Kind of output signal
	<b>BE</b>	<i>sensing object for field</i>	field sensing object	electric field detector, electric field sensor, magnetic field detector, magnetic field sensor, reed relay, reed switch	Kind of output signal
	<b>BF</b>	<i>sensing object for flow</i>	flow sensing object	flow sensor, flow switch, flow transmitter, gas flow sensor, gas flow switch, liquid flow sensor, matter flow sensor, matter flow switch, water flow sensor	Kind of output signal
	<b>BG</b>	<i>sensing object of spatial dimension and/or position</i>	physical dimension sensing object	2D-scanner, 3D-scanner, alignment sensor, alignment threshold detector, angle switch, angle transmitter, coordinates scanner, distance switch, distance transmitter, end stop, laser distance sensing switch, laser distance sensor, laser scanner, movement detector, movement sensor (PIR), object scanner, position sensor, position switch, position transmitter, presence indicator, presence locator, radar, rotary encode, visibility sensor, wind direction indicator, wind direction sensor	Kind being sensed and kind of output signal
	<b>BH</b>	<i>sensing object for energy</i>	energy sensing object	condensate sensor, electric energy meter, energy cooling meter, energy meter, energy sensor, flow energy meter, gas energy meter, kWh sensor, thermal energy meter	Kind of energy
	<b>BJ</b>	<i>sensing object for power</i>	power sensing object	kW meter, power limit switch, power meter	Kind of output signal
	<b>BK</b>	<i>sensing object for time</i>	time sensing object	Clock, time counter, time information device, time sensor, timer switch	Kind of output signal
	<b>BL</b>	<i>sensing object for level</i>	level sensing object	level sensor, level switch, level transmitter, liquid level sensor, liquid level switch	Kind of output signal

Class code		Class definition	Class name (preferred term)	Examples of terms	Criteria for definition of subclasses
1	2				
	<b>BM</b>	<i>sensing object</i> for humidity	humidity sensing object	humidity sensor, humidity switch, humidity transmitter	Kind of output signal
	<b>BP</b>	<i>sensing object</i> for pressure	pressure sensing object	absolute pressure sensor, absolute pressure switch, absolute pressure transmitter, differential pressure sensor, differential pressure switch, differential pressure transmitter, manometer, pressure monitor, pressure sensor, pressure switch, pressure transducer, relative pressure detector, relative pressure sensor, relative pressure switch	Kind of output signal
	<b>BQ</b>	<i>sensing object</i> for substance concentration	concentration sensing object	CO concentration sensor, CO <sub>2</sub> concentration sensor, concentration sensor, concentration detection switch, fog detector, fog sensor, gas detector, gas sensor, liquid detector, liquid sensor, NH <sub>3</sub> concentration sensor, petrol concentration sensor, smoke detector, smoke sensor, smoke switch, solid matter detector, solid matter sensor, turbidity detector, turbidity sensor, visibility detector, visibility sensor	Kind of object and kind of output signal
	<b>BR</b>	<i>sensing object</i> for radiation	radiation sensing object	electromagnetic wave detector, electromagnetic wave sensor, Geiger meter, gamma-radiation detector, IR- sensor, light curtain, light detector, light sensor, light transmitter, line detector, low-light relays, lux sensor, photocell, radar-sensor, radiation counter, radiation detector, UV-sensor	Kind of radiation and kind of output signal
	<b>BS</b>	<i>sensing object</i> for time-rate	time-rating object	accelerometer relay, accelerometer transmitter, cycle rate detecting switch, cycle rate sensor, cycle rate transmitter, frequency transmitter, movement detector, movement transmitter, rotation speed relay, rotation speed sensor, seismic sensor, seismic switch, shake switch, speed detecting switch, speed sensing transmitter, speed sensor, tachometer	Kind of time object sensed and kind of output signal
	<b>BT</b>	<i>sensing object</i> for temperature	temperature sensing object	temperature detector, temperature sensor, temperature switch, temperature transmitter	Kind of output signal
	<b>BU</b>	<i>sensing object</i> for multiple quantities	multi-quantity sensing object	Buchholz relay, distance protection relay, impedance protection relay, multi-detector, multi- sensor, multi- sensor switch, negative phase-sequence relay	Kind of output signal
	<b>BW</b>	<i>sensing object</i> for weight, force or torque	force sensing object	force detecting switch, force sensor, force value transmitter, load cell, torque sensor, torque switch, torque value transmitter, weight detecting switch, weight sensor, weight transmitter	Kind of object sensed and kind of output signal

Class code	Class definition		Class name (preferred term)	Examples of terms	Criteria for definition of subclasses
	1	2			
<b>B</b>	<b>BX</b>	sensing object of sound and/or visual appearance	audio-visual sensing object	alarm microphone, acoustic detector, acoustic sensor, acoustic survey device, camera, CCTV, face recognition device, finger-print reader, glass breakage detector, image sensor, image detector, iris reader, microphone, profile control, PTZ camera, scanner, video camera	Kind of output signal
	<b>BY</b>	sensing object of stored information	information sensing object	barcode reader, chip card reader, chip reader, electromagnetic reader, magnetic stripe reader, optical disk reader, optical reader, RFC reader, RFID reader, QR-reader, tape reader	Kind of method
	<b>BZ</b>	sensing object for incidents or amounts	incident sensing object	counter, matter detector, person detector, presence detector, threshold counter	Kind of incidents or amounts sensed
<b>C</b>		object for storing for subsequent retrieval	storing object		Kind of object being stored and the method applied
	<b>CA</b>	storing object for electric energy within an electrostatic field	capacitive storing object	capacitor	Kind of method applied
	<b>CB</b>	storing object for electric energy within an electromagnetic field	inductive storing object	inductor	Kind of method applied
	<b>CC</b>	storing object for electric energy within an electrochemical substance	electrochemical storing object	rechargeable battery	Kind of method applied
	<b>CF</b>	storing object for information	information storing object	information storing media, seat	Kind of method applied
	<b>CL</b>	storing object for matters or persons within a stationary open enclosure	open stationary storing object	bed, bunker, chair, cistern, couch, pit, pool, shelf	Kind of method applied
	<b>CM</b>	storing object for matters within a stationary closed enclosure	enclosed stationary storing object	box, cabinet, cupboard, tank	Kind of matters stored
	<b>CN</b>	storing object for matters or persons within a moveable closed enclosure	moveable storing object	container, drum, elevator bucket, excavator bucket, gas cylinder, lift car	Kind of matters stored
	<b>CP</b>	storing object of thermal energy	thermal energy storing object	calorifier, crystalline tank, gas tank, liquid tank, matter tank	Kind of thermal energy
	<b>CQ</b>	storing object of mechanical energy	mechanical energy storing object	counterweight, elevated mass, flywheel, rubber band, spring	Kind of mechanical energy