IEC 81346-2

Edition 1.0 2009-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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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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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX X

ICS 01.110; 29.020

ISBN 978-2-88910-786-5

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 81346-2 has been prepared by IEC technical committee 3: Information structures, documentation and graphical symbols and ISO technical committee 10: Technical product documentation.

It is published as a double logo standard.

This edition cancels and replaces the first edition of IEC 61346-2, published in 2000 and the first edition of IEC/PAS 62400, published in 2005.

This edition includes the following technical changes with respect to IEC 61346-2 Ed.1:

- all rules concerning the application of letter codes have been removed as these should be included in another publication dealing with the application of letter codes within reference designations;

and, with respect to IEC/PAS 62400 Ed.1:

- the definitions of the sub-classes have been reviewed and made consistent;
- the basis for the sub-classification is indicated;
- some new subclasses for class B and class P have been added;
- the table of terms sorted according to the two-letter code has been removed;

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

FDIS	Report on voting
3/945/FDIS	3/957RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table. In ISO, the standard has been approved by 12 members out of 13 having cast a vote.

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

A list of all parts of IEC 81346 series, formerly IEC 61346 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.

Future standards in this series will carry the new general number 81346. Numbers of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under “http://webstore.iec.ch” in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

0.1 General

The aim of this part of IEC 81346 is to establish classification schemes for objects with associated letter codes which can be applied throughout all technical areas, e.g. electrical, mechanical and civil engineering as well as all branches of industry, e.g. energy, chemical industry, building technology, shipbuilding and marine technology. The letter codes are intended for use with the rules for the construction of reference designations in accordance with IEC 81346-1.

Annex A illustrates how objects may be classified according to their intended purpose or task related to a generic process.

Annex B illustrates how objects may be classified according to their position in an infrastructure.

0.2 Basic requirements for this standard

The basic requirements were developed during the preparation of IEC 61346-2 Ed. 1, and accepted by vote by the national committees.

NOTE These basic requirements concern the development of the letter code classification system in this standard and not its application. They are therefore not normative vis-à-vis the application of this standard.

(1) Letter codes shall be based on a classification scheme.

(2) A classification scheme is the set of definitions for the types of objects (for example, a classification scheme for function types containing the definition of the different function types of objects).

(3) A classification scheme shall allow for hierarchical classification of types of objects, i.e. subclasses and superclasses.

(4) A letter code for a type of object shall be independent of the actual position of the instances of that type of object in a system.

(5) Distinct classes shall be defined on each level of the classification scheme.

(6) The definitions of the classes of a particular level within a classification scheme shall have a common basis (for example, a classification scheme that, on one level, classifies objects according to colour shall not contain classes that classify objects by shape). The basis, however, may vary from one level to another.

(7) A letter code should indicate the type of object and not an aspect of this object.

(8) A classification scheme shall allow for expansion in order to take into account future development and needs.

(9) A classification scheme shall be usable within all technical areas without favouring a specific area.

(10) It shall be possible to use the letter codes consistently throughout all technical areas. The same type of object should preferably have only one letter code independent of the technical area where it is being used.

(11) It should be possible to indicate in a letter code from which technical area the object originates, if this is wanted.

(12) A classification scheme should reflect the practical application of letter codes.

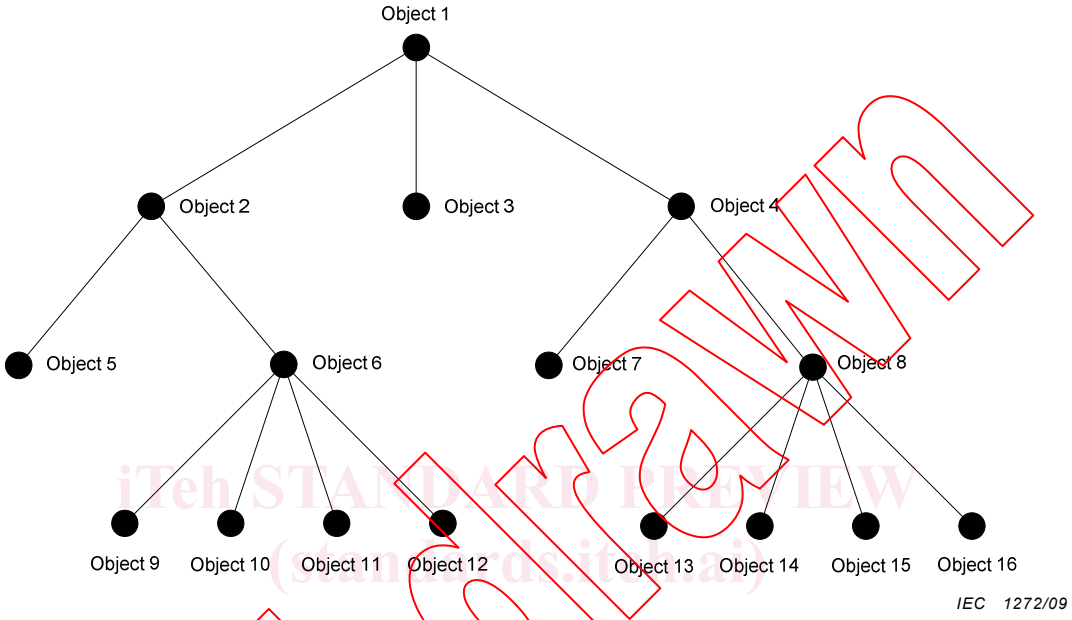
(13) Letter codes should not be mnemonic, as this cannot be implemented consistently throughout a classification scheme and for different languages.

(14) Letter codes shall be formed using capital letters from the Latin alphabet, excluding I and O due to possible confusion with the digits 1 (one) and 0 (zero).

(15) Different classification schemes shall be allowed and be applicable for the same type of object.

(16) Objects may be classified for example according to function types, shapes, colours, or material. This means that the same type of object may be assigned different letter codes according to the different classification schemes.

(17) Objects that are directly constituents of another object using the same aspect shall be assigned letter codes according to the same classification scheme as shown in Figure 1. See also Figure A.1.



Objects 2, 3, and 4, which are direct constituents of object 1, shall be assigned letter codes from the same classification scheme.

Objects 5 and 6, which are direct constituents of object 2, shall be assigned letter codes from the same classification scheme.

Objects 7 and 8, which are direct constituents of object 4, shall be assigned letter codes from the same classification scheme.

Objects 9, 10, 11, and 12, which are direct constituents of object 6, shall be assigned letter codes from the same classification scheme.

Objecst 13, 14, 15, and 16, which are direct constituents of object 8, shall be assigned letter codes from the same classification scheme.

Figure 1 – Constituent objects

(18) If products from different manufacturers are combined into a new product, the constituents of this product may be assigned codes according to different classification schemes.

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 International Standard 81346, published jointly by IEC and ISO defines classes and subclasses of objects based on a purpose- or task-related view of the objects, together with their associated letter codes to be used in reference designations.

The classification is applicable for objects in all technical areas, e.g. electrical, mechanical and civil engineering as well as all branches of industry, e.g. energy, chemical industry, building technology, shipbuilding and marine technology, and can be used by all technical disciplines in any design process.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 14617-6:2002 *Graphical symbols for diagrams – Part 6: Measurement and control functions*

3 Terms and definitions

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

4 Classification principles

4.1 General

The principle of classification of objects is based on viewing each object as a means for performing an activity often with input and output (see Figure 2). In this respect, the internal structure of an object is not important.

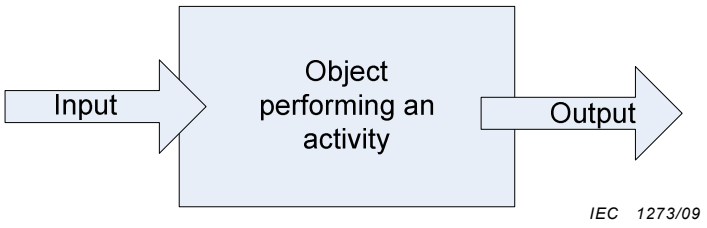


Figure 2 – The basic concept

Annex A shows the generic process model used for the establishment of the classification scheme based on intended purpose or task as shown in Table 1.

An alternative classification according to purpose or task in the special case of an object regarded as part of an infrastructure is presented in Table 3.

Each class defined in Table 1 is in this standard associated with a set of predefined subclasses allowing a more detailed characterization of a component, if required.. The definitions of subclasses of objects are presented in Table 2 together with their associated letter codes of class and subclass.

NOTE 1 Subclasses do not define a new level in a structure, i.e. they do not describe a subdivision of the object. Class and subclass refer to the same object.

NOTE 2 The use of subclasses for the coding of technical attributes should be avoided, as this is a separate kind of information presented in the documentation, for example in a technical specification or in a parts list.

4.2 Assigning objects to classes

For the assignment of objects (i.e. components belonging to the system under consideration) to classes, the following rules apply:

Rule 1 For the classification of objects according to their intended purpose or task, main classes and letter codes in accordance with Table 1 or Table 3 shall be applied.

Rule 2 For assigning an object to a class according to Table 1 or Table 3, the object shall be viewed with respect to its intended purpose or task, as a component in the system under consideration, without considering the means for implementation (e.g. the kind of product).

EXAMPLE The desired purpose of an object is “heating”. A possible component required to fulfil this is a “heater”. According to Table 1, this object is clearly related to class E. It is not of importance, or simply not known at an early stage of a design process, how the required purpose is realized. This needed component may be satisfied by using a gas or oil burner or an electric heater (which all may be products delivered by others). In the case of an electric heater, the heat may be produced by a product called electric resistor. This product may, in other cases, be classified by its purpose “restricting a flow” according to class R if that describes it use as a component in those contexts.

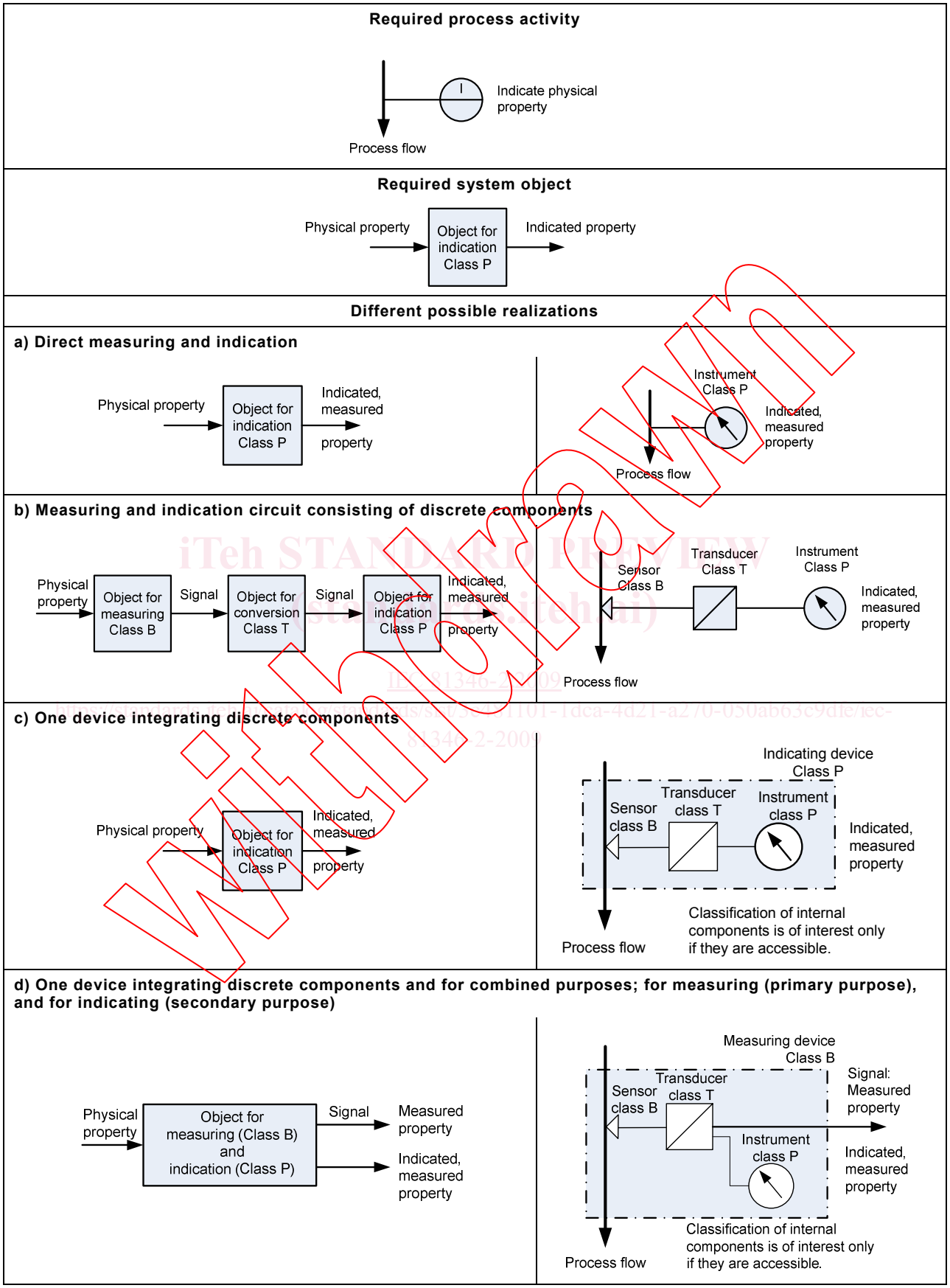
It is the component that is classified – not the product used for implementation!

Rule 3 For objects with more than one intended purpose or task, the object shall be classified according to the intended purpose or task considered to be the main one.

Rule 4 The class with letter code A according to Table 1 shall only be applied for objects with no explicit main purpose or task.

EXAMPLE A flow rate recorder stores measured values for later use but, at the same time, delivers an output in visible form. If storing is regarded as the main purpose, the object is related to class C of Table 1. If the indication of measured values is regarded as the main purpose, the object is related to class P. If the two purposes are considered equally valid, the object is related to class A.

Figure 3 illustrates the principle of assigning classes to objects in the case of a measuring circuit. The left-hand side illustrates how the requirements are turned into objects with input and output. On the right-hand side, the used components are shown.



NOTE The classes are taken from Table 1.

IEC 1274/09

Figure 3 – Classification of objects in a measuring circuit

5 Classes of objects

5.1 Classes of objects according to intended purpose or task

Table 1 constitutes the main classification method applicable for any object from any field of technology.

The most important element in the table is the description of the intended purpose or task of an object to which it is to be referred when searching for an appropriate class for an object.

Table 1 – Classes of objects according to their intended purpose or task
(Codes A to D)

Code	Intended purpose or task of object	Examples of terms describing the intended purpose or task of objects	Examples of typical mechanical/fluid components	Examples of typical electrical components
A	Two or more purposes or tasks NOTE This class is only for objects for which no main intended purpose or task can be identified.			
B	Converting an input variable (physical property, condition or event) into a signal for further processing	Detecting Measuring (picking-up of values) Monitoring Sensing Weighing (picking-up of values)	Orifice plate (for measuring) Sensor	Buchholz relay Current transformer Flame detector Measuring relay Measuring shunt (resistance) Microphone Movement detector Overload relay Photocell Position switch Proximity sensor Proximity switch Smoke sensor Tachometer Temperature sensor Video camera Voltage transformer
C	Storing of energy, information or material	Recording Storing	Barrel Buffer Cistern Container Hot water accumulator Paper reel stand Tank	Buffer battery Capacitor Event recorder (mainly for storing purposes) Hard disk Magnetic tape recorder (mainly for storing purposes) Memory RAM Storage battery Video recorder (mainly for storing purposes) Voltage recorder (mainly for storing purposes)
D	*Reserved for future standardization*			

Table 1 *(continued, codes E to J)*

Code	Intended purpose or task of object	Examples of terms describing the intended purpose or task of objects	Examples of typical mechanical/fluid components	Examples of typical electrical components
E	*Providing radiant or thermal energy*	Cooling Heating Lighting Radiating	Boiler Freezer Furnace Gas lamp Heater Heat exchanger Nuclear reactor Paraffin lamp Radiator Refrigerator	Boiler Electrical heater Electrical radiator Fluorescent lamp Lamp Lamp bulb Laser Luminaire Maser
F	Direct protection (self-acting) of a flow of energy, signals, personnel or equipment from dangerous or unwanted conditions Including systems and equipment for protective purposes	Absorbing Guarding Preventing Protecting Securing Shielding	Airbag Guard Rupture disc Safety belt Safety valve	Cathodic protection anode Faraday cage Fuse Miniature circuit-breaker Surge arrester Thermal overload release
G	Initiating a flow of energy or material Generating signals used as information carriers or reference source	Generating	Blower Conveyor, (driven) Fan Pump Vacuum pump Ventilator	Dry cell battery Dynamo Fuel cell Generator Rotating generator Signal generator Solar cell Wave generator
H	Producing a new kind of material or product	Assembling Crushing Disassembling Fractionating Material removing Milling Mixing Producing Pulverizing	Component insertion machine Crusher Mixer	Absorption washer Centrifuge Crusher Distillation column Emulsifier Fermenter Magnetic separator Mill Pellet maker Rake Reactor Separator Sintering facility
I	*Not to be applied*	---	---	---
J	*Reserved for future standardization*			