



SLOVENSKI STANDARD

SIST EN 61175-1:2015

01-november-2015

Industrijski sistemi, inštalacije in oprema ter industrijski proizvodi, oznake signalov - 1. del: Osnovna pravila (IEC 61175-1:2015)

Industrial systems, installations and equipment and industrial products, designation of signals - Part 1: Basic rules (IEC 61175-1:2015)

Industrielle Systeme, Anlagen und Ausrüstungen und Industrieprodukte, Kennzeichnung von Signalen - Teil 1: Allgemeine Regeln (IEC 61175-1:2015)

Systèmes industriels, installations et appareils, et produits industriels, Désignations des signaux - Partie 1: Règles de base (IEC 61175-1:2015)

<https://standards.iteh.ai/catalog/standards/sist/af651d48-4f7e-4581-b2b0-2b8abd401629/sist-en-61175-1-2015>

Ta slovenski standard je istoveten z: **EN 61175-1:2015**

ICS:

29.020	Elektrotehnika na splošno	Electrical engineering in general
--------	---------------------------	-----------------------------------

SIST EN 61175-1:2015

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61175-1:2015

<https://standards.iteh.ai/catalog/standards/sist/af651d48-4f7e-4581-b2b0-2b8abd401629/sist-en-61175-1-2015>

EUROPEAN STANDARD

EN 61175-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2015

ICS 29.020

Supersedes EN 61175:2005

English Version

Industrial systems, installations and equipment and industrial products - Designation of signals - Part 1: Basic rules (IEC 61175-1:2015)

Systèmes, installations, appareils et produits industriels -
Désignation des signaux - Partie 1: Règles de base
(IEC 61175-1:2015)

Industrielle Systeme, Anlagen und Ausrüstungen und
Industrieprodukte, Kennzeichnung von Signalen -
Teil 1: Allgemeine Regeln
(IEC 61175-1:2015)

This European Standard was approved by CENELEC on 2015-06-25. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

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

SIST EN 61175-1:2015

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 61175-1:2015**European foreword**

The text of document 3/1214A/FDIS, future edition 1 of IEC 61175-1, prepared by IEC/TC 3 "Information structures and elements, identification and marking principles, documentation and graphical symbols" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61175-1:2015.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-03-25
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-06-25

This document supersedes EN 61175:2005.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

(standards.iteh.ai)

Endorsement notice

<https://standards.iteh.ai/catalog/standards/sist/af651d48-4f7e-4581-b2b0-2b8abd401629/sist-en-61175-1-2015>

The text of the International Standard IEC 61175-1:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60027	NOTE	Harmonized in EN 60027 series.
IEC 60445	NOTE	Harmonized as EN 60445.
IEC 60447	NOTE	Harmonized as EN 60447.
IEC 60747	NOTE	Harmonized in EN 60747 series.
IEC 61131	NOTE	Harmonized in EN 61131 series.
IEC 61355-1	NOTE	Harmonized as EN 61355-1.
IEC 61360-1	NOTE	Harmonized as EN 61360-1.
IEC 61666	NOTE	Harmonized as EN 61666.
IEC 61850	NOTE	Harmonized in EN 61850 series.
IEC 62491	NOTE	Harmonized as EN 62491.

IEC 62744	NOTE	Harmonized as EN 62744.
IEC 81346-2	NOTE	Harmonized as EN 81346-2.
IEC 80000	NOTE	Harmonized in EN 80000 series.
ISO 21549-7:2007	NOTE	Harmonized as EN ISO 21549-7:2007 (not modified).
ISO 80000	NOTE	Harmonized in EN ISO 80000 series.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 61175-1:2015

<https://standards.iteh.ai/catalog/standards/sist/af651d48-4f7e-4581-b2b0-2b8abd401629/sist-en-61175-1-2015>

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61082-1	-	Preparation of documents used in electrotechnology - Part 1: Rules	EN 61082-1	-
IEC 81346-1	-	Industrial systems, installations and equipment and industrial products - Structuring principles and reference designations - Part 1: Basic rules	EN 81346-1	-
IEC/TS 62720	-	Identification of units of measurement for computer-based processing	-	-



IEC 61175-1

Edition 1.0 2015-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE



HORIZONTAL STANDARD
NORME HORIZONTALE

**Industrial systems, installations and equipment and industrial products –
Designation of signals – (standards.iteh.ai)
Part 1: Basic rules**

**Systèmes, installations, appareils et produits industriels –
Désignation des signaux –
Partie 1: Règles de base**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.020

ISBN 978-2-8322-2677-3

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	8
3 Terms and definitions	8
4 Basic principles	11
4.1 General principles on signal transfer and signal naming.....	11
4.2 Signal classification	12
4.3 Signal name domain	13
5 Designation of signals	14
5.1 Structure of the signal designation	14
5.1.1 General	14
5.1.2 Object designation.....	15
5.1.3 Prefix.....	15
5.1.4 Signal name	16
5.1.5 Signal connection identifier.....	19
5.1.6 Signal connection characteristics.....	19
5.2 Recommended characters	19
5.3 Forming signal designations.....	20
5.3.1 Reporting signals.....	20
5.3.2 Controlling signals	25
6 Identification of signals in the signal connection network.....	26
6.1 General.....	26
6.2 Pre-defined signal names	27
6.3 Grouping of signals.....	28
6.3.1 General	28
6.3.2 Packaging of signals in signal carrying medium	28
6.3.3 Grouping of signals for presentation	29
7 Signal identification in interfaces for data exchange	29
7.1 General.....	29
7.2 Interface between electric circuit and programmable devices, I/O	29
7.3 Interface for logic communication.....	29
8 Signal presentation.....	29
8.1 Representation vs. presentation of a signal designation.....	29
8.2 Human machine interface, HMI	30
8.3 Presentation in documentation.....	30
8.4 Presentation of metadata for signals	31
Annex A (normative) Letter codes for use in signal names	33
A.1 Letter codes for variables.....	33
A.2 Letter codes used as modifiers	34
A.3 Identification of certain designated conductors.....	34
Annex B (informative) Binary logic representation	35
B.1 General.....	35
B.2 Negated signal.....	35
Annex C (informative) Examples for signal lists including signal connection identifiers.....	37

C.1	Presentation of voltage measurement signal, class M	37
C.2	Presentation of a controlling signal, class C	39
Annex D (informative)	Generic communication needs in a process	40
D.1	Process model	40
D.2	Signal connection and signal presentation media	40
D.2.1	General	40
D.2.2	Wiring	41
D.2.3	Internal bus	41
D.2.4	External bus	41
D.2.5	Presentation in the human interface, HMI	41
D.2.6	Other human presentation	41
D.3	Applicability of signal designations	42
D.3.1	In electrical system	42
D.3.2	In control devices (with internal numerical communication)	42
D.3.3	In external communication	42
D.3.4	In the HMI	42
Annex E (informative)	Restructuring of information for communication purposes	43
E.1	General	43
E.2	Data objects	43
E.2.1	Packing of data	43
E.2.2	Object designation and address structure	43
E.2.3	Information content (Information object)	44
E.2.4	Descriptive parameters	44
Annex F (normative)	Data element type definitions	46
F.1	General	46
F.2	Source definitions of DETs and classes of DETs in this part of IEC 61175	46
F.2.1	Definitions of classes of DETs	46
F.2.2	Definition of DETs associated with class AAF525	47
F.2.3	Definition of DETs associated with class AAF526	47
Bibliography	48
Figure 1	– Illustration of relationship of terminology	7
Figure 2	– Signal with source and destination(s)	11
Figure 3	– Information object transmitted via different signal carrying and connection media	11
Figure 4	– Different signals caused by processing/logical linking	12
Figure 5	– Relation between controlling and reporting signals	13
Figure 6	– Object serving as signal name domain	14
Figure 7	– Signal designation and signal connection identification	15
Figure 8	– Signal name structure	16
Figure 9	– Examples of reporting type of signals	21
Figure 10	– Example of an indication signal	22
Figure 11	– Example of an event signal	22
Figure 12	– Example of measuring signals	23
Figure 13	– Example of an analogue measuring signal transmitted in different forms	23
Figure 14	– Example of signal connection characteristics related to measuring signals	24
Figure 15	– Example of power supply designation	24

Figure 16 – Examples of typical controlling type of signals.....	25
Figure 17 – Example of a command signal.....	26
Figure 18 – Example of a signal for setting value.....	26
Figure 19 – Signal connection identifiers in a single connection network.....	27
Figure 20 – Example of signal connection identifiers in a current measuring circuit.....	27
Figure 21 – Signal connection identifiers by internal signal name.....	28
Figure 22 – Use of concatenated reference designations in a plant.....	31
Figure 23 – Metadata representing a signal and corresponding XML file.....	32
Figure B.1 – Signal states of binary signals.....	35
Figure B.2 – Example of a negated signal.....	36
Figure C.1 – Voltage measurement, reporting signal class M.....	38
Figure C.2 – Command signal for a disconnector, controlling signal class C.....	39
Figure D.1 – Communication model based on IEC 81346-2.....	40
Figure E.1 – Communication of the signal information as attribute to a data object.....	43
Table 1 – Letter codes for signal classes.....	17
Table 2 – Examples of short names.....	17
Table 3 – Examples of basic signal names.....	18
Table A.1 – Letter codes for variables based on International Standard 80000, Quantities and units.....	33
Table A.2 – Letter codes used as modifiers.....	34
Table A.3 – Identification of certain designated conductors.....	34
Table E.1 – Data attribute examples.....	45

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL SYSTEMS, INSTALLATIONS AND
EQUIPMENT AND INDUSTRIAL PRODUCTS –
DESIGNATION OF SIGNALS –**

Part 1: Basic rules

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61175-1 has been prepared by IEC technical committee 3: Information structures and elements, identification and marking principles, documentation and graphical symbols.

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

This first edition cancels and replaces the second edition of IEC 61175 published in 2005. This edition constitutes a technical revision.

Further parts of IEC 61175 may be added as Technical Specifications relating to different domains. Additional parts may be application guides for designation of signals in specific applications such as communication protocols and other software systems.

This edition includes the following significant technical changes with respect to IEC 61175:2005:

- an improved description of the principles for use; and
- a strict separation between the physical aspect of a signal and its associated information, focusing on the latter.

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

FDIS	Report on voting
3/1214A/FDIS	3/1221/RVD

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

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

A list of all parts in the IEC 61175 series, published under the general title *Industrial systems, installations and equipment and industrial products – Designation of signals*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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.

ITh STANDARD PREVIEW

(standards.iteh.ai)

[SIST EN 61175-1:2015](https://standards.iteh.ai/catalog/standards/sist/af651d48-4f7e-4581-b2b0-2b8abd401629/sist-en-61175-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/af651d48-4f7e-4581-b2b0-2b8abd401629/sist-en-61175-1-2015>

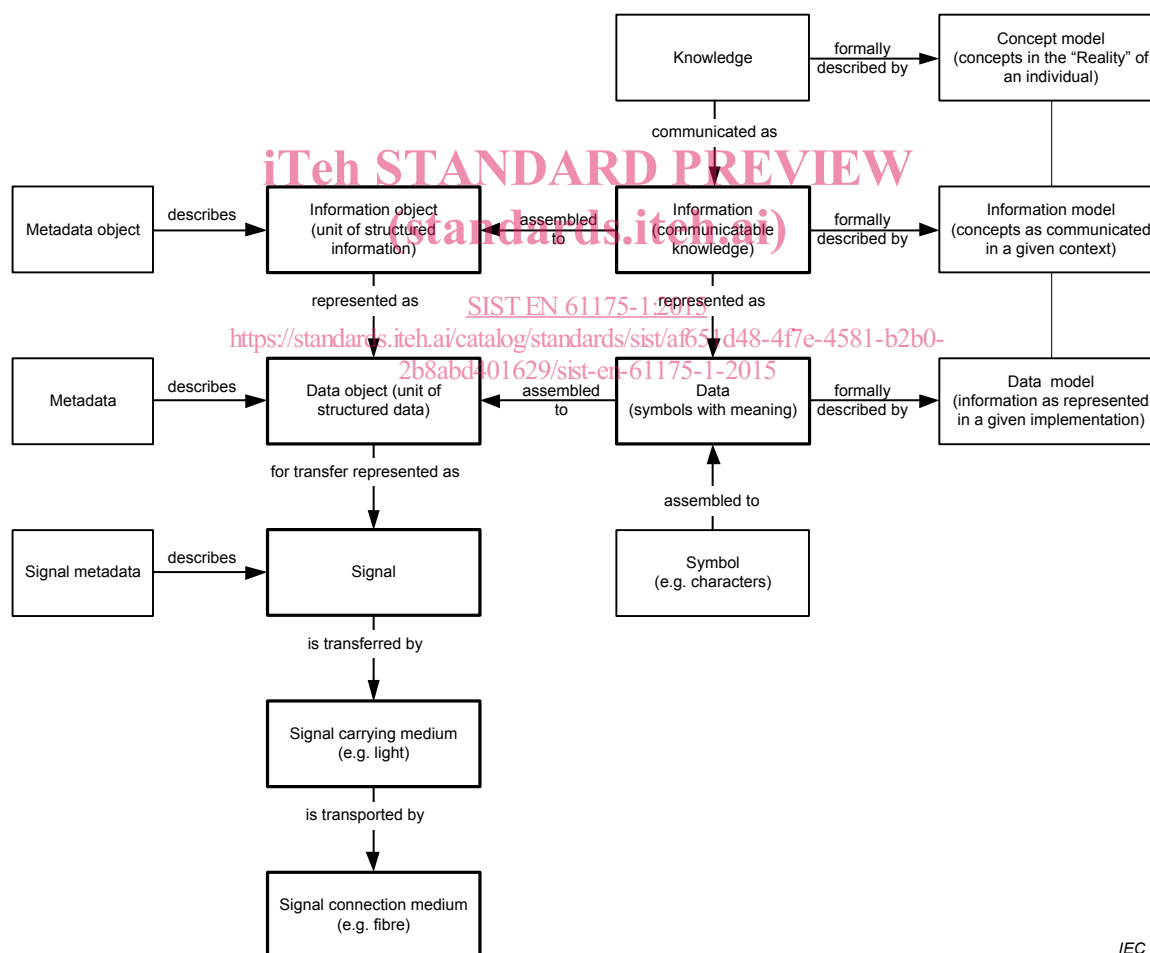
IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The intention of this part of IEC 61175 is to establish rules and requirements for the designation of signals, and furthermore to make recommendations on useful presentations of these.

Basically, a signal designation is associated with the signal over its whole lifetime, which means from the beginning of the design stage until the signal is no longer needed.

The change of medium for the transfer of a signal because of a physical rebuilding of an installation will not cause a change of the identification of this signal if its semantic meaning is maintained. Signals represent information. For communication purposes the information has to be represented as data. The information can be more or less complex. In simple cases, the information can be represented as a single Boolean variable, without internal structure. In more complex cases, like in computer communication via data networks, the information can be packaged in more complex objects, with internal structure, which are transferred with suitable protocols. The implementation can be done in different ways depending on which technology, protocol, etc. is being used. Figure 1 illustrates the terminology.



IEC

Figure 1 – Illustration of relationship of terminology

The principles described in this part of IEC 61175 are closely related to other International Standards such as IEC 81346-1, IEC 81346-2, IEC 61666 and IEC 81714-3. An information model for the interrelations is provided in IEC TS 62771.

INDUSTRIAL SYSTEMS, INSTALLATIONS AND EQUIPMENT AND INDUSTRIAL PRODUCTS – DESIGNATION OF SIGNALS –

Part 1: Basic rules

1 Scope

This part of IEC 61175 provides rules for the composition of designations for the identification of signals and signal connections. This includes the designation of power supply.

This part of IEC 61175 is applicable to all types of signals within an industrial system, installation and equipment and industrial products. It deals with the information aspect of signals and not with their physical implementation.

Excluded from the scope are general rules for the presentation of information in human machine interfaces. This part of IEC 61175 is also not applicable for the identification of wiring, terminals, piping and other hardware connections.

NOTE For the purpose of marking of wires, see IEC 62491.

This horizontal standard is primarily intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 108.

One of the responsibilities of a technical committee is, wherever applicable, to make use of horizontal standards in the preparation of its publications. The contents of this horizontal standard will not apply unless specifically referred to or included in the relevant publications.

2 Normative references

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

IEC 61082-1, *Preparation of documents used in electrotechnology – Part 1: Rules*

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

IEC 62720, *Identification of units of measurement for computer-based processing*

3 Terms and definitions

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

3.1

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 with it.

[SOURCE: IEC 81346-1:2009, definition 3.1]

3.2 information object

fixed and structured amount of information that can be managed and interchanged as a unit among users and systems

Note 1 to entry: This unit need not be human perceptible. Information objects are often stored as data.

Note 2 to entry: “Users” refers in this definition to users of information and “systems” refers to systems managing information and documentation.

3.3 data object

collection of data that has an agreed grouping between the sender and the receiver and can be identified as a complete entity

[SOURCE: ISO 21549-7:2007, 3.12, modified — “Natural grouping” has been changed to “agreed grouping between sender and receiver”.]

3.4 signal

agreed representation of an information object conveyed among objects

Note 1 to entry: The agreed representation is a data object. The information object can be used to express a binary state or analogue variable or have a more complex structure.

Note 2 to entry: The representations of the information object e.g. potential level, current level, data format, protocol, etc., are conveyed in a suitable signal connection medium.

Note 3 to entry: Complex information objects usually need a number of successive conversions until they reach a representation suitable for transfer in a signal connection medium.

Note 4 to entry: The agreement between sender(s) and receiver(s) is necessary in order to generate and interpret the representation correctly. In simple cases it is implicit, in other cases it has to be explicitly specified as a protocol, etc.

Note 5 to entry: The representations of the information object can be conveyed directly from source to destination (synchronous communication) on the signal connection medium, or intermediately stored (by the sender) in a place where the intended receivers can get them (asynchronous communication).

3.5 signal name

identifier of the information object represented by a signal

3.6 signal designation

unambiguous identifier of a signal within a system

3.7 object designation

identifier of a specific object in a given context

EXAMPLES Reference designation, type number, serial number, name.

[SOURCE: IEC 61355-1:2008, definition 3.13]

3.8 reference designation

identifier of a specific object formed with respect to the system of which the object is a constituent, based on one or many aspects of that system