



SLOVENSKI STANDARD SIST EN 2032-1:2004

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Aerospace series - Metallic materials - Part 1: Conventional designation

Aerospace series - Metallic materials - Part 1: Conventional designation

Luft- und Raumfahrt - Metallische Werkstoffe - Teil 1: Konventionelle Bezeichnung

Série aérospatiale - Matériaux métalliques - Partie 1: Désignation conventionnelle

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ICS:

49.025.05 Železove zlitine na splošno Ferrous alloys in general

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Aerospace series - Metallic materials - Part 1: Conventional designation

Série aérospatiale - Matériaux métalliques - Partie 1:
Désignation conventionnelle

Luft- und Raumfahrt - Metallische Werkstoffe - Teil 1:
Konventionelle Bezeichnung

This European Standard was approved by CEN on 2 May 2001.

CEN 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 Management Centre or to any CEN 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 CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2002, and conflicting national standards shall be withdrawn at the latest by June 2002.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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0 Introduction

This standard is part of the series of EN metallic materials standards for aerospace applications. The general organization of this series is described in EN 4258.

1 Scope

This standard specifies the rules for establishing the conventional designation of unalloyed, commercially pure and alloyed metallic materials used for aerospace applications.

NOTE The relationship between former AECMA designations and the new designations according to this standard is given in TR 3900.

2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 31-8	Quantities and units - Part 8 : Physical chemistry and molecular physics
EN 1780-1	Aluminium and aluminium alloys - Designation of unalloyed aluminium and alloyed aluminium ingots for remelting, master alloys and castings - Part 1: Numerical designation system
EN 4258	Aerospace series - Metallic materials - General organization of standardization - Links between types of EN standards and their use https://standards.iteh.ai/catalog/standards/sist/7dd17ead-8a77-4809-b0f0-add961621a61-2032-1-2004
EN 4500-1	Aerospace series - Metallic materials - Rules for drafting and presentation of material standards - Part 1: General rules ¹⁾
EN 10020	Definition and classification of grades of steel
TR 3900	Aerospace series - Metallic materials - Relationship between AECMA designation systems ²⁾
TR 4242	Aerospace series - Metallic materials - List of EN standardized commercially pure metals and alloys - Relationship between chemical compositions and conventional designation ³⁾

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 structural material

material used for the manufacture of a specific component of an aerospace system, structure or engine.

3.2 alloying element

see EN 4500-1.

1) Published as AECMA Prestandard at the date of publication of this standard

2) Published as AECMA Technical Report at the date of publication of this standard

3) In preparation at the date of publication of this standard

3.3

unalloyed metal

metal that contains no alloying elements and with a total impurity content less than 0,5 %.

NOTE For the applications of this standard, a so-called "commercially pure" metal is not considered as unalloyed metal and its designation shall be chosen according to the same rules as those of the relevant metallic alloys.

3.4

cast material

material resulting from the bulk solidification of a previously homogeneous liquid metal

3.5

cast + wrought material

material resulting from further solid state working of cast material

3.6

powder metallurgy material

material divided into solid particles at least in the first step of its solid state processing

3.7

steel

iron base material alloyed with carbon the content of which is generally lower than 2 %

3.8

unalloyed steel

see EN 10020.

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3.9

low alloy steel

steel alloyed with one or several metallic elements, the mean value of the content of each being less than 5 % and the content of at least one being higher than the carbon content

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[a172997843e/sist-en-2032-1-2004](https://standards.iteh.ai/catalog/standards/sist/7dd17ead-8a77-4809-b0f0-a172997843e/sist-en-2032-1-2004)

3.10

high alloy, ferritic or martensitic steel

steel alloyed with one or several metallic elements, the mean value of the content of at least one of which is equal to or higher than 5 % and the crystalline structure of which contains less than 40 % of austenite in its condition of use

3.11

high alloy, austenitic or austenitic-ferritic steel

steel alloyed with one or several metallic elements, the mean value of the content of at least one of which is equal to or higher than 5 % and the crystalline structure of which contains 40 % austenite or more in its condition of use

3.12

joining material

material used for the metallurgical assembly of several parts of an aerospace system

3.13

filler metals for welding

joining material solidus temperature of which is close to or the same as the solidus temperature of the materials to be joined.

3.14

filler metals for brazing

joining material solidus temperature of which is significantly lower than the solidus temperature of the materials to be joined.

4 Principle

4.1 General

The conventional designation defines by one series of characters (letters, figures, dashes) all metallic materials having the same basic chemical composition (see 4.2 and 4.4) without taking into account:

- any option concerning other elements than alloying elements,
- the method of melting;
- the heat treatment;
- the form.

NOTE The method of melting may induce variations in the mass content of one or several alloying elements. These variations are not considered significant and shall not be taken into consideration.

In addition, one character indicates the method of production for structural materials or the use for joining materials (see 4.3).

Regardless of this character, the conventional designation is unique for one basic chemical composition, except for certain filler metals for brazing (see 6.2.2.2 and 6.2.2.3).

The designation of each material comprises nine characters, divided into three groups, the contents of each of them is as in 4.2 to 4.5.

4.2 Base metal

A group of three characters consisting of:

- the symbol of the base metal in accordance with ISO 31-8, but written entirely in capital letters,
- dash(es) for completion to three characters.

4.3 Method of production or use

A capital letter from the following series.

Structural material -----	}	C for cast material;
		P for cast + wrought material;
		R for powder metallurgy material;
Joining material -----	}	W for filler metals for welding;
		B for filler metals for brazing.

4.4 Basic chemical composition (base metal excluded)

A group of five characters:

4.4.1 In the case of unalloyed materials, the first three characters indicate information as in 5.1.

4.4.2 In the case of metallic alloys, with the exception of all aluminium base materials (see 5.3), the first three characters indicate the alloying elements (one, two or three) considered significant (see 5.1, 5.2 and 5.4 to 6.2). If the chemical composition is such that there is only one or two alloying elements, the remaining character(s) is (are) a zero.

The use of this group of three characters is defined in each of the relevant following clauses.

4.4.3 The last two of this group of five characters (or the last character in the case of cast aluminium base alloys, see 5.3.2) form a serial number starting at 01 (or 1 in the case of cast aluminium base alloys, see 5.3.2). This serial number shall be changed every time the first three and the last five characters already allocated do not fit the new basic chemical composition to be designated.

4.5 Mass content of an alloying element

It shall be determined as the arithmetical mean of the limits of its range. If two alloying elements have the same mass content, they shall be written according to the alphabetical order of their international symbol.

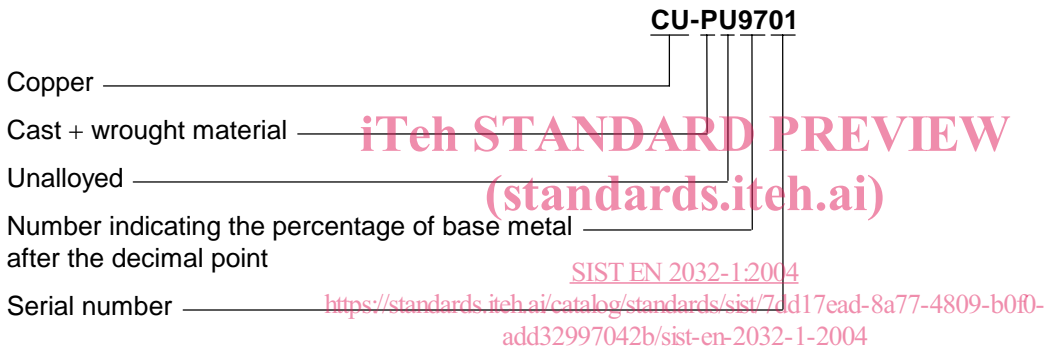
5 Structural materials

5.1 Unalloyed metals

With the exception of aluminium base materials (see 5.3), the group of five characters of the designation comprises from left to right:

- a capital letter U symbolic of this category,
- a number indicating the percentage of base metal after the decimal point, completed with zero if necessary,
- last two characters as a serial number.

EXAMPLE: Cast + wrought copper 99,97 % pure



NOTE In this example, the chemical composition is unique and the serial number can only be 01.

5.2 Nickel base or cobalt base alloys

The group of five characters of the designation comprises from left to right:

- a) an indication of the chromium mass content by one capital letter:
 - D for alloys which have a chromium mass content < 15 %,
 - H for alloys which have a chromium mass content ≥ 15 %,
- b) one or two characters indicating in decreasing order of their mass content the one or two alloying elements of highest mass content other than chromium, in accordance with table 1,

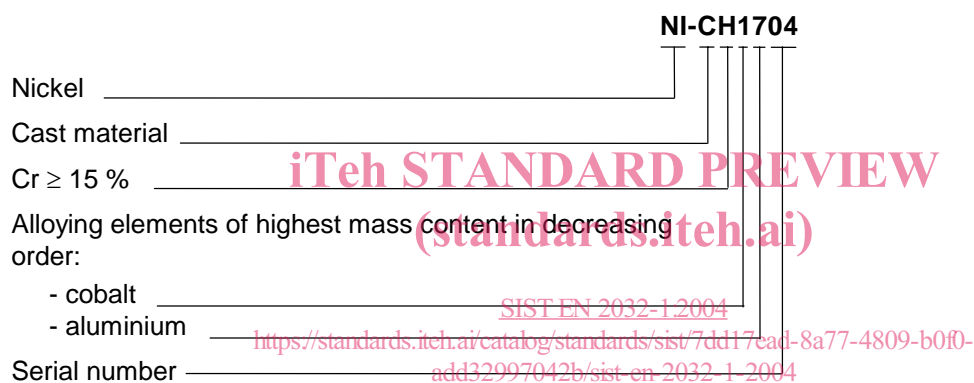
NOTE When only one reference is needed, the following character is a zero (see 4.4).

- c) last two characters as a serial number.

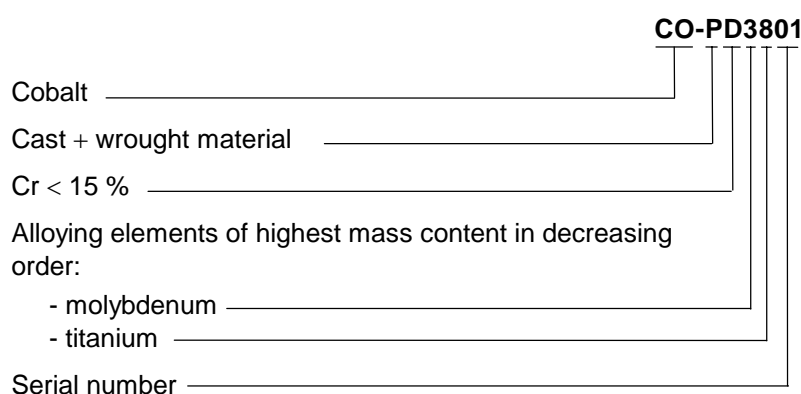
**Table 1 – List of alloying element references
for nickel and cobalt base alloys**

Reference	Element
1	Ni or Co
2	Fe
3	Mo
4	W
5	Ta
6	Nb
7	Al
8	Ti
9	Miscellaneous

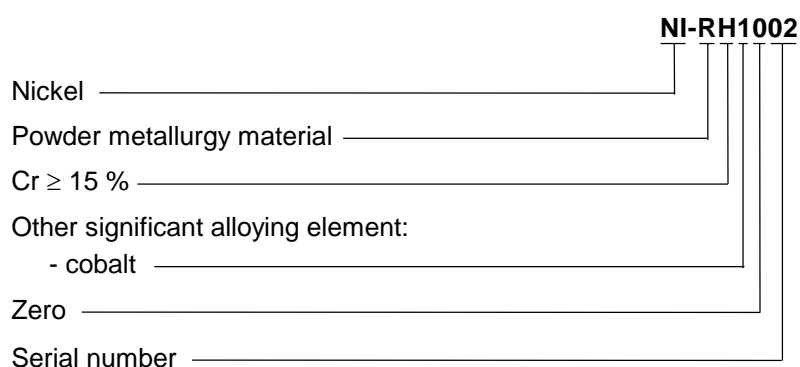
EXAMPLE 1: Cast nickel base alloy



EXAMPLE 2: Cast + wrought cobalt base alloy



EXAMPLE 3: Powder metallurgy nickel base alloy



5.3 Aluminium base materials

5.3.1 All materials other than cast materials

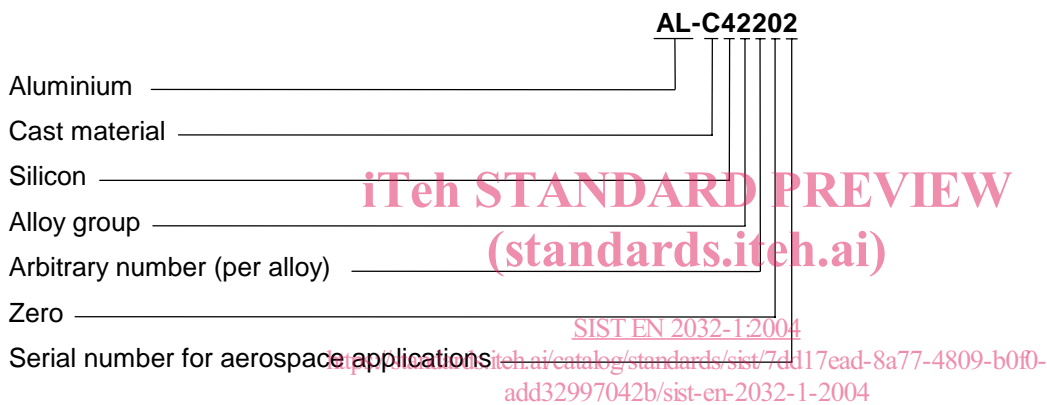
The group of five characters in the designation consists of the ALUMINUM ASSOCIATION ⁴⁾ designation completed if necessary by a dash. This applies to both commercially pure aluminium and aluminium alloys.

EXAMPLES: AL-P1050A
AL-P2024-
AL-P2618A
AL-R5091-
AL-W5183-
AL-B4043-

5.3.2 Cast materials

The group of five characters in the designation conforms to EN 1780-1 for the first four characters, the fifth character being a serial number for aerospace applications (see 4.4.3).

EXAMPLE: Cast aluminium base alloy



5.4 Steels

5.4.1 Unalloyed steels

The group of five characters in the designation comprises from left to right:

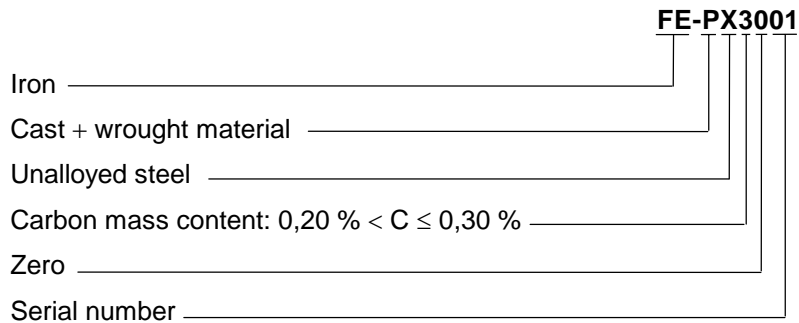
- a capital letter X symbolic of this category,
- one character indicating the carbon mass content according to table 2,
- a zero (see 4.4),
- last two characters as a serial number.

**Table 2 – List of carbon mass content references
for unalloyed steels**

Reference	Carbon mass content %
1	C ≤ 0,10
2	0,10 < C ≤ 0,20
3	0,20 < C ≤ 0,30
4	0,30 < C ≤ 0,40
5	0,40 < C ≤ 0,60
6	0,60 < C ≤ 0,80
7	0,80 < C ≤ 1,00
8	C > 1,00

4) ALUMINUM ASSOCIATION, Inc., 900 19th Street N.W., Washington, D.C. 20006

EXAMPLE: Unalloyed cast + wrought steel



NOTE In this example, the chemical composition is unique and the serial number can only be 01.

5.4.2 Low alloy steels

The group of five characters in the designation comprises from left to right:

- a capital letter L symbolic of this category,
- two characters indicating in decreasing order of their mass content the two alloying elements of highest mass content, in accordance with table 3,
- last two characters as a serial number.

**Table 3 List of alloying element references
for low alloy steels**

Reference	Element
1	Cr
2	Ni
3	Nb
4	V
5	Mo
6	Ti
7	Si
8	Mn
9	Miscellaneous

EXAMPLE 1: Cast low alloy steel

