TECHNICAL REPORT

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Nickel and nickel alloys — Rules for material description based on chemical symbols

Nickel et alliages de nickel — Règles pour la description de matériaux basée sur les symboles chimiques

Reference number
ISO/TR 9721:1992(E)

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 main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

— type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;

— type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;

— type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/TR 9721, which is a Technical Report of type 2, was prepared by Technical Committee ISO/TC 155, *Nickel and nickel alloys*, Sub-Committee SC 2, *Wrought and cast nickel and nickel alloys*.

The identification or designation of materials is one of the important subjects of standardization. Two different possibilities always exist:

a) one is a material number usually with a fixed number of digits with respect to electronic data processing, e.g. according to ISO/TR 7003[1];

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Case Postale 56 • CH-1211 Genève 20 • Switzerland
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b) another is a material description based on the international chemical symbols.

As the "International Numbering System for Metals" is detailed in annex A to ISO/TR 7003:1990, it seems to be appropriate to publish the rules for the material description of nickel and nickel alloys based on chemical symbols as a Technical Report of type 2 first, for further consideration.

Annex A of this Technical Report is for information only.

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Nickel and nickel alloys — Rules for material description based on chemical symbols

1 Scope

This Technical Report covers the rules for the description of nickel and nickel alloys based on their chemical composition.

The rules of this Technical Report apply to the description of refined nickel, as well as of wrought and cast nickel and nickel alloys.

NOTE 1 In addition to the description system based on chemical symbols, a numerical system is currently being developed, see ISO/TR 7003[1].

2 Basis of description

2.1 The description of nickel and its alloys shall be based on the chemical composition limits.

2.2 All descriptions shall have the prefix "ISO". This prefix may be omitted for brevity in International Standards and also in correspondence where it is abvious that ISO descriptions are used.

2.3 International chemical symbols shall be used for the description of the base element and the major alloying elements, followed by numbers indicating the metal grade or indicating the nominal alloy content.

2.4 The assigment or revision of a material description shall be approved by Technical Committee ISO/TC 155, Nickel and nickel alloys.

3 Description of unalloyed nickel

The description of unalloyed nickel shall consist of the chemical symbol of nickel (Ni), followed by its percentage purity, expressed to one, two or more decimal places as required.

4 Description of alloys

4.1 The description for nickel alloys shall consist of the chemical symbols of the base element (Ni) and the alloying elements, followed preferably by whole numbers indicating their amount (if these elements are present in nominal amounts of about 1 % or more).

4.2 The alloying elements shall be listed according to the nominal alloy contents specified. The alloying elements shall be listed in decreasing order of percentages (e.g. NiCr15Fe8) or, if of equal percentage, in alphabetical order of the chemical symbols (e.g. NiCo20Cr20Mo5Ti2Al).

Due to similar composition limits, wrought and cast alloys may have the same description. Therefore cast alloys shall have the prefix "C-" for identification.

If varieties of an alloy are specified, these varieties shall be designated by a suffix to the base description or the following suffixes are defined:

"-LC" in the case of a low carbon content;

"-MC" in the case of a medium carbon content;

"-HC" in the case of a high carbon content;

"-HT" in the case of an application at a high temperature.

EXAMPLE

Ni99,0 and Ni99,0-LC

In a case where more than two alloying elements are present, it is not necessary to list all of the minor constituents in the description, except where they are essential for the proper identification of the alloy.

In all cases where two or more alloys have the same composition and differ only in the limits of an impurity, the symbol of the impurity element which is allowed