SLOVENSKI STANDARD
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Numerical designation systems for metallic materials - Review of existing systems and recommendation for new systems

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CEN

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

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Numerical designation systems for metallic materials. Review of existing systems and recommendations for new systems

Foreword

This CEN Report was prepared by the CEN/BT/WG79 and agreed at its meeting on 1994.06.08 and adopted by the CEN/BT on 1994-10-14.

Based on a resolution of CEN/BT, July 28 1993, (BT 134/1993), CEN/BT/WG79 was established to examine the question of the coordination of material designations etc.

CEN/BT/WG79 had its first meeting 1993-10-08 in Brussels, where they recommended the following to CEN/BT:

> "Having regard to the cost, time and disruption to industry it was agreed that the designation systems already in place, i.e adopted European Standards or in an advanced stage of preparation cannot be changed except as determined by the technical committee concerned.
>
> In order that purchasers of materials have a good understanding of the various numerical designation systems, a CEN-report should be prepared setting out the principles of those designation systems for metallic materials already in place, i.e. adopted European standards and those in an advanced stage of preparation.
>
> The CEN-Report should include a recommendation for a general pattern based on the existing systems and which should be used when considering designation systems for new standardized materials."

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At its meeting 1993-10-26/28 in Brussels, CEN/BT requested that WG79 should prepare a CEN-Report according to its recommendation.

Introduction

In order to identify metallic materials it is necessary to have short designations for ordering, instructions, inspection documents, information in drawings etc. Technical committees therefore have defined designation systems and part of this designation is the material designation.

Generally those systems are separated in two different types, name (symbol) systems and numbering systems.

Name (symbol) systems are used as an abbreviated identification of the material and gives an identification of application, composition and properties depending on the material. Name (symbol) systems are normally an alternative system to the numbering systems and their use is at the discretion of the user.

Numbering systems are established in order to get as far as possible a restricted number of digits which make them suitable for computerization.

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This will give no information directly as to which type of grade, alloying elements etc. which are present. Numbering systems may include both figures and letters. In fact letters will give greater capacity in the system and is of no disadvantage for computerization.

Some purchasers of materials especially those who use different types of materials such as steel, cast iron, aluminium, copper, plastics, etc, have expressed need for a uniform pattern with similar designations for different types of material. Such a pattern should also be suitable for computerization and should also simplify designations used in drawings, purchasing documents etc.

This CEN Report deals only with numbering systems.

1 Scope

This CEN Report gives the principles of numerical designation systems for metallic materials already in place and which are falling into a general pattern and gives recommendations for how this general pattern should be used when evaluating designation systems for new metals to be standardized.

For a general pattern it is not necessary to describe in detail the structure of numerical designations for different grades and conditions. This task is the responsibility of the technical committee concerned, and is normally defined in a European Standard.

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2 References

This CEN Report refers to a number of documents. Their references are cited at the appropriate places in the text and the publications are listed as follows.

EN 515	Aluminium and aluminium alloys - Wrought products - Temper designations
prEN 1780-1	Aluminium and aluminium alloys - Designation of unalloyed and alloyed aluminium ingots for remelting, master alloys and castings - Part 1: Numerical designation system
EN 1173*)	Copper and copper alloys - Material condition or temper designation
EN 1412*)	Copper and copper alloys - European numbering system
EN 2032-1	Aerospace series - Metallic materials - Part 1: Designation
EN 10027-2	Designation system for steel - Numerical system
EN...*)	Aluminium and aluminium alloys - Designation of unalloyed and alloyed aluminium ingots for remelting, master alloys and castings - Part 1: Numerical designation system (00132068)

*) In course of preparation

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ECISS IC 10	Designation system for steel. Additional symbols for steel names
EN1560*)	Founding - Designation system for cast iron - Material symbols and material numbers (00190019)
EN...*)	Magnesium and magnesium alloys - Magnesium and magnesium alloy ingots and castings - Designation system (00190028)
EN...*)	Magnesium and magnesium alloys - Magnesium alloy ingots and castings - General (00190022)
ISO/TR7003	Unified format for the designation of metals

3 Principal European numerical designation systems now in place

3.1 Numbering systems other than for aerospace materials

3.1.1 Steel

The numbering system for steels was developed by ECISS/TC 7 and is defined in EN 10 027-2. Steel numbers established according to this system have a fixed number of digits, the structure of which is shown in figure 1.

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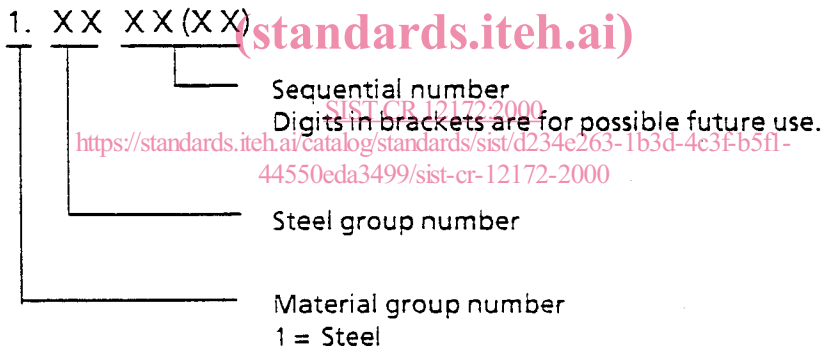

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Figure 1. Structure of steel numbers

The first group (1.) indicates steel. Numbers 2 to 9 as a first digit may be used for other metals but no other metals committee has up to now taken the advantage of using this type of indication.

The second group indicates the steel group as set out in EN 10027-2 at table 1, in which two digits are assigned to steels, eg structural steels (01), tool steels (15), stainless steels (41), nitriding steels (85).

The third group indicates sequential numbers assigned by a European Registration Office and identifies steels within the steel group: as yet only two digits are used: the digits in brackets (see figure 1) are for possible future use.

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3.1.2 Aluminium

Numerical systems for aluminium and aluminium alloys, based on ISO/TR 7003 have been established by CEN/TC 132 and are defined in EN 573-1 for wrought materials and in EN...(00132068) for cast materials.

The material number for aluminium and aluminium alloys consists of 9 or 10 charachters structured as follows:

- in positions 1 and 2 the prefix "EN" is used.
- position 3 is a blank.
- in position 4, the letter A is indicating an aluminium material (in accordance with ISO/TR 7003).
- in position 5, a letter indicating the product form (e.g. W for wrought materials, C for cast materials).
- in position 6 a dash "-" is used.
- in position 7 - 10 (11) four (or five) characters giving an indication of major alloying elements. In case of wrought materials the number in positions 7 to 10 is identical to the relevant AA (The Aluminium Association, Washington) material number.

  Example: EN AW-3103

Temper designations, which are not part of the material number, are defined in EN 515 and consist of up to four characters, in some cases six characters.

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3.1.3 Magnesium

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A numerical system for magnesium and magnesium alloys, based on ISO/TR 7003, has been established by CEN/TC 190 and is defined in EN...*) (00190028).

The designation comprises 10 positions, composed of captial alphabetic letters for positions 1, 2, 4, 5, a hyphen for position 3 and Arabic numeric characters for positions 6 to 10.

- in position 1 to 3 the prefix "EN-" is used.
- in position 4; the letter M is used to indicate magnesium.
- in position 5; a letter is used to indicate the product form.
- in position 6 to 10; five figures are used to indicate the composition:
  - position 6 indicates the major alloying element;
  - positions 7 and 8 indicate the alloy group;
  - position 9 indicates the alloy subgroups;
  - position 10 is used to differentiate the alloys.

EXAMPLE: EN-MB21210

Temper designations, which are not part of the material number, are defined in EN...*) (00190022)

*) In course of preparation

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3.1.4 Copper

A numerical system for copper and copper alloys, based on ISO/TR7003, has been established by CEN/TC 133 and is defined in EN 1412.

The material number for copper and copper alloys consists of 6 characters structured as follows:

- in position 1; the letter C indicating a copper material (in accordance with ISO/TR 7003)
- in position 2; a letter indicating the product form(e.g. W for wrought materials, C for cast materials)
- in position 3 to 5; numbers which have no particular significance;
- in position 6; a letter indicating the material group.

EXAMPLE: CW508L

Temper designations which are not part of the material number are defined in prEN 1173 and consists normally of one letter and three or four digits and sometimes with an additional suffix letter.

3.1.5 Cast iron

A numerical system for cast iron, based on ISO/TR7003, has been established by CEN/TC190 and is defined in EN 1560.

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The material number for cast iron consists of 9 characters structured as follows:

- in positions 1 to 3; the prefix EN-.
- in postion 4 the letter J to indicate cast iron (in accordance with ISO/TR7003).
- in position 5; a letter to indicate the graphite structure.
- in position 6; a number to indicate the main characteristic of the cast iron.
- in position 7 and 8; numbers to indicate individual materials;
- in position 9; a number to indicate specific requirements.

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EXAMPLE: EN-JL2171
NOTE. No temper designations are used.

3.2 Designations used in EN aerospace standards

The designation system for metallic materials used in aerospace construction has been developed by AECMA Technical Committee C5 and is defined in EN 2032-1.

The designation system defines, by one system of digits, all metallic materials having the same basic chemical composition but does not take into account:

- any option concerning the minor elements,
- the method of melting,
- the heat treatment,
- the form