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English Version

Founding - Designation system for cast iron - Material symbols and material numbers

Fonderie - Système de désignation pour la fonte -
Désignation symbolique et numérique

Gießereizeichen - Bezeichnungssystem für Gusseisen -
Werkstoffkurzzeichen und Werkstoffnummern

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 190.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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Contents

Page

Foreword.....	3
Introduction	4
1 Scope	5
2 Terms and definitions	5
3 Designation of cast iron materials by symbols	5
3.1 General.....	5
3.2 Material symbol structure	5
4 Designation of cast iron materials by numbers	9
4.1 General.....	9
4.2 Material number structure	9
Annex A (normative) Overall structure for designation of cast iron materials by symbols.....	11
Annex B (normative) Overall structure for designation of cast iron materials by numbers	14
Annex C (informative) Significant technical changes between this European Standard and the previous edition	15
Bibliography	16

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SIST EN 1560:2011

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Foreword

This document (prEN 1560:2009) has been prepared by Technical Committee CEN/TC 190 “Foundry technology”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1560:1997.

Annex C provides details of significant technical changes between this European standard and the previous edition.

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prEN 1560:2009 (E)

Introduction

Cast iron materials can be designated either by symbols or by numbers for all grades. For the material number it is based on the structure and rules of EN 10027–2.

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1 Scope

This European Standard establishes a material designation system either by symbols or by numbers for cast iron.

The designation system by symbols is applicable to

- a) standardized cast iron materials (see 2.1);
- b) non-standardized cast iron materials (see 2.2).

The designation system by numbers is only applicable to standardized cast iron materials (see 2.1).

NOTE The standardized designation by symbols does not necessarily imply that the material is standardized.

2 Terms and definitions

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

2.1

standardized cast iron material

cast iron material which has been specified in a European Standard

2.2

non-standardized cast iron material

cast iron material which has not been specified in a European Standard, but is manufactured and/or used in CEN member countries

3 Designation of cast iron materials by symbols

3.1 General

There shall be only one designation by symbols for each cast iron material.

3.2 Material symbol structure

3.2.1 Overall structure

The designation by symbols shall occupy a maximum of six positions, some of which need not be used. There shall be no spaces between any of the used positions.

- Position 1: EN- (see 3.2.2);
- Position 2: Symbol for cast iron (see 3.2.3);
- Position 3: Symbol for graphite structure (see 3.2.4);
- Position 4: Symbol for microstructure or macrostructure (see 3.2.5);
- Position 5: Symbol for classification either by mechanical properties or by chemical composition (see 3.2.6);

prEN 1560:2009 (E)

— Position 6: Symbol for additional requirements (see 3.2.7).

The whole structure of the designation system by symbols is shown in annex A.

3.2.2 Position 1

The prefix EN- shall only be used for standardized materials.

NOTE If the European material standard (e.g. EN 1561) is presented in association with the material symbol (e.g. EN-GJL-150), then the prefix EN of the symbol designation may be omitted (e.g. EN 1561-GJL-150).

3.2.3 Position 2

The symbol GJ with G for cast and J for iron shall be used.

3.2.4 Position 3

If the graphite structure is to be specified, then the appropriate letter given in Table 1 shall be used.

Table 1 — Graphite structure

L	Lamellar
S	Spheroidal
M	Temper carbon (malleable) ^a
V	Vermicular
N	Free of graphite (hard), ledeburitic
Y	Special structure, identified in the relevant material standard
^a Including whiteheart malleable cast irons	

3.2.5 Position 4

If it is necessary to identify cast iron materials additionally by the microstructure or the macrostructure the supplementary letters given in Table 2 shall suffix the letters given in Table 1 as appropriate.

Table 2 — Microstructure or macrostructure

A	Austenite
F	Ferrite
P	Perlite
M	Martensite
L	Ledeburite
Q	Quenched
T	Quenched and tempered
B	Blackheart ^a
W	Whiteheart ^a
^a Only for malleable cast irons	

If it is not necessary to identify cast iron materials additionally by the microstructure or the macrostructure, then position 4 shall not be used.

3.2.6 Position 5

3.2.6.1 General

Position 5 shall be used to classify the material either by mechanical properties or by chemical composition. It shall be separated from the last used position by a hyphen.

3.2.6.2 Classification by mechanical properties

Cast iron materials classified by their mechanical properties shall be designated by figures relating to mechanical properties and, if applicable, by the letter C if the material standard permits the use of a sample cut from a casting. (see Table 3) and/or letters RT and LT relating to the temperature of measurement of the impact resistance value (see Table 4).

Table 3 — Letter describing the production of the sample

C	Sample cut from a casting
(blank)	Cast sample

NOTE The former designation differentiated between separately cast samples and cast on samples. Cast sample now include separately cast samples, cast on sample and side-by-side cast sample thus reflecting the material properties in the relevant wall thickness of the casting.

—

— Tensile strength

The tensile strength shall be indicated by the appropriate minimum value of the grade in newtons per square millimetre, e.g.

EN-GJL-150C;

EN-GJL-150;

— Elongation

If required, the elongation shall be indicated by the appropriate minimum value of the grade in percent, which follows the indication of the minimum tensile strength. It shall be separated from the other symbols in position 5 by a hyphen, e.g.

EN-GJS-350-22C;

EN-GJMW-450-7;

— Impact resistance

If impact resistance is required the test temperature used to determine its value shall be indicated by the letters given in Table 4.

The letters given in Table 4, if required, shall follow the figures of mechanical properties. It shall be separated from the other symbols in position 5 by a hyphen, e.g.

EN-GJS-400-18-RT;

EN-GJS-350-22-LT.

Table 4 — Test temperature range used to determine the impact resistance value

RT	Room temperature
LT	Low temperature

— Hardness

When cast iron materials are classified by hardness this shall be indicated by one of the three following symbols:

- a) HB for Brinell hardness;
- b) HV for Vickers hardness;
- c) HR for Rockwell hardness.

These letters shall be followed by two or three figures representing the hardness range, e.g.

EN-GJL-HB155;

EN-GJS-HB230;

EN-GJN-HV350.

3.2.6.3 Classification by chemical composition

3.2.6.3.1 Low alloyed grades

When there is a need to specify the chemical elements with one decimal digit, then the symbols in position 5 shall be as follows:

- a) Classification without indication of carbon content

Chemical symbols of significant alloying elements in the sequence of falling contents of the elements. The average contents of these elements shall be indicated in percentage multiplied by the factor 10. The digits for these values shall be separated from each other by a hyphen, e.g.

EN-GJS-SiMo35-7;

- b) Classification with indication of the carbon content

When the indication of the carbon content is required, it shall be indicated by its percentage times 100 (e.g. 300 for 3 %), preceding the chemical symbols in position 5.

All other indications of chemical composition shall follow the system according to 3.2.6.3 1 a), e.g.

EN-GJS-320SiMo45-10.

3.2.6.3.2 High alloyed grades

When the average content of at least one alloying element is ≥ 5 % and there is no need to classify one of the chemical elements with one decimal digit, then the letter X shall be the first symbol in position 5. The remaining symbols in position 5 shall be as follows:

- a) Classification without indication of carbon content