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EUROPEAN STANDARD

EN 1560

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 1997

ICS 77.080.10

Descriptors: foundry engineering, cast iron, grades: quality, designation, numerical designation, symbols, user supplier relations

English version

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

Fonderie - Système de désignation pour la fonte - Gießereiwesen - Bezeichnungssystem für Gußeisen  
- Désignation symbolique et numérique - Werkstoffkurzzeichen und Werkstoffnummern

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

The European Standards exist 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 Central Secretariat 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.

**CEN**

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

**Central Secretariat: rue de Stassart,36 B-1050 Brussels**

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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 190 "Foundry technology", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by December 1997, and conflicting national standards shall be withdrawn at the latest by December 1997.

Within its programme of work, Technical Committee CEN/TC 190 requested CEN/TC 190/WG 1.11 "Cast iron – Designation and special technical delivery conditions" to prepare the following standard:

EN 1560

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

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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## Introduction

Cast iron materials can be designated either by symbols or by numbers for all grades. For the material number it is based on annex A to ISO/TR 7003 : 1990 in which a unique number is allocated to one cast iron grade.

## 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 3.1);
- b) non-standardized cast iron materials (see 3.2).

The designation system by numbers is only applicable to standardized cast iron materials (see 3.1).

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

## 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.

EN 1559-1 : 1997

Founding – Technical conditions of delivery – Part 1: General

NOTE: Informative references to documents used in the preparation of this standard, and cited at the appropriate places in the text, are listed in a bibliography, see annex A.

## 3 Definitions

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

### 3.1 standardized cast iron material

Cast iron material which has been specified in a European Standard.

### 3.2 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.

## 4 Designation of cast iron materials by symbols

### 4.1 General

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

## 4.2 Material symbol structure

### 4.2.1 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 4.2.2);
- Position 2: Symbol for cast iron (see 4.2.3);
- Position 3: Symbol for graphite structure (see 4.2.4);
- Position 4: Symbol for microstructure or macrostructure (see 4.2.5);
- Position 5: Symbol for classification either by mechanical properties or by chemical composition (see 4.2.6);
- Position 6: Symbol for additional requirements (see 4.2.7).

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

### 4.2.2 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).

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### 4.2.3 Position 2

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The symbol GJ with G for cast and J for iron shall be used. 1560-1998

### 4.2.4 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) <sup>1)</sup>
V	Vermicular
N	Free of graphite (hard), ledeburitic
Y	Special structure, identified in the relevant material standard
<sup>1)</sup> Including whiteheart malleable cast irons	

#### 4.2.5 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	Pearlite
M	Martensite
L	Ledeburite
Q	Quenched
T	Quenched and tempered
B	Blackheart <sup>1)</sup>
W	Whiteheart <sup>1)</sup>
<sup>1)</sup> 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.

#### 4.2.6 Position 5

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##### 4.2.6.1 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.

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##### 4.2.6.2 Classification by mechanical properties

Cast iron materials classified by their mechanical properties shall be designated by figures relating to mechanical properties and by letters relating to the method of production of the test sample (see table 3) and/or relating to the temperature of measurement of the impact resistance value (see table 4).

**NOTE:** The letters C and U are only used when the material standard permits the choice of the method of production of test samples.

**Table 3: Letters describing the production of the test samples**

S	Separately cast test sample
U	Cast-on test sample
C	Test sample cut from a 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-150S;  
EN-GJV-400U.

## – 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-450-7S;  
EN-GJS-350-22U.

## – 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-400-18S-RT;  
EN-GJS-350-22U-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:

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- HB for Brinell hardness;
  - HV for Vickers hardness;
  - 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.

**4.2.6.3 Classification by chemical composition**

When cast iron materials are to be classified by their chemical composition, then the letter X shall be the first symbol in position 5. The remaining symbols in position 5 shall be as follows:

- Classification without indication of carbon content

The letter X shall be followed by the chemical symbols of significant alloying elements in the sequence of falling contents of the elements. The contents of these elements shall be indicated in percentage, rounded to a whole number. The digits for the percentages shall be separated from each other by a hyphen, e.g.

EN-GJL-XNiMn13-7;

- 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 %), following the letter X.

All other indications of chemical composition shall follow the system according to 4.2.6.3 a), e.g.

EN-GJN-X300CrNiSi9-5-2.