

Metallivalu. Hallmalmid

Founding - Grey cast irons

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 1561:2011 sisaldab Euroopa standardi EN 1561:2011 ingliskeelset teksti.

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English Version

Founding - Grey cast irons

Fonderie - Fontes à graphite lamellaire

Gießereiwesen - Gusseisen mit Lamellengraphit

This European Standard was approved by CEN on 17 September 2011.

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Foreword

This document (EN 1561:2011) 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of an identical text or by endorsement, at the latest by April 2012, and conflicting national standards shall be withdrawn at the latest by April 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1561:1997.

Within its programme of work, Technical Committee CEN/TC 190 requested CEN/TC 190/WG 5 "Grey cast iron and compacted graphite cast iron" to revise EN 1561:1997.

Annex G provides details of significant technical changes between this European Standard and the previous edition.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard deals with the classification of grey cast irons, subdivided into two groups, specified by their tensile strength or hardness, respectively.

The properties of grey cast iron depend on the form and distribution of the graphite and the structure of the matrix.

In the previous edition of EN 1561, the designation by symbol was based on the minimum tensile strength to be obtained in the separately cast sample with 30 mm diameter. In Table 1 of this previous edition, the corresponding mandatory minimum tensile strength values, which should be obtained for relevant wall thicknesses up to 300 mm, in a cast-on sample were given.

For castings which have been designed before the date of issue of this standard, it is furthermore possible to determine the tensile strength of the specified grey cast iron grade by using separately cast samples with a diameter of 30 mm, irrespective of the relevant wall thickness.

In this case, the mandatory minimum values for the tensile strength, as specified in the previous edition (EN 1561:1997) of this standard, are given in Annex A, Table A.1 (bold figure in the material designation).

In this edition of EN 1561, the designation by symbol is based on the minimum tensile strength to be obtained in a cast sample, which diameter corresponds to the relevant wall thickness of the casting. This applies to a maximum relevant wall thickness of 50 mm.

Compared with the previous edition of this standard, for relevant wall thicknesses from 50 mm to 200 mm, the relationship with the 30 mm separately cast sample has been abandoned and instead of that, cast-on samples with a size corresponding to the relevant wall thickness ranges are specified. Additionally the minimum tensile properties to be obtained in these cast-on samples, are increased.

In this standard a new designation system by number, as established in EN 1560 [1], is given.

NOTE This designation system by number is based on the structure and rules of EN 10027-2 [2] and so corresponds with the European numbering system for steel and other materials.

The mechanical properties of the material can be evaluated on machined test pieces prepared from:

- separately cast samples;
- side by side cast samples;
- cast-on samples;
- samples cut from a casting.

Hardness of the material can also be evaluated on the casting.

However, for many applications tensile strength or hardness are not the only interesting or determining properties. Other mechanical or physical properties can be decisive for the use of grey cast irons, for example: thermal capacity, thermal diffusivity, damping capacity or thermo-cycle fatigue.

Therefore, Annex A (informative) provides additional information of interest to casting designers.

1 Scope

This European Standard specifies the properties of unalloyed and low-alloyed grey cast irons used for castings, which have been manufactured in sand moulds or in moulds with comparable thermal behaviour.

This European Standard specifies the characterizing properties of grey cast irons by either

- a) the tensile strength of cast samples, or
- b) the hardness measured on the castings or on a cast-on knob.

If agreed by the manufacturer and the purchaser, the combination of both tensile strength from option a) and hardness from option b) may be specified.

This European Standard specifies six grades of grey cast iron by a classification based on tensile strength measured on machined test pieces prepared from cast samples (see Table 1) and six grades of grey cast iron by a classification based on Brinell hardness (see Table 2).

This European Standard does not cover technical delivery conditions for iron castings; see EN 1559-1 [3] and EN 1559-3 [4].

This European Standard does not apply to grey cast irons used for pipes and fittings according to EN 877 [5].

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 10204, *Metallic products — Types of inspection documents*

EN ISO 945-1, *Microstructure of cast irons — Part 1: Graphite classification by visual analysis (ISO 945-1:2008)*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2005)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2009)*

3 Terms and definitions

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

3.1

grey cast iron

cast material, mainly iron and carbon based, carbon being present mainly in the form of flake (lamellar) graphite particles

NOTE 1 Grey cast iron is also known as flake graphite cast iron, and less commonly as lamellar graphite cast iron.

NOTE 2 Graphite form, distribution and size are specified in EN ISO 945-1.

3.2

cast sample

quantity of material cast to represent the cast material, including separately cast sample, side by side cast sample and cast-on sample