



NSAI
Standards

Irish Standard
I.S. EN 1563:2011

Founding - Spheroidal graphite cast irons

I.S. EN 1563:2011

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWIFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces:
EN 1563:1997

This document is based on: EN 1563:2011
Published: 3 January, 2012

This document was published under the authority of the NSAI and comes into effect on:
3 January, 2012

ICS number:
77.080.10

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

English Version

Founding - Spheroidal graphite cast irons

Fonderie - Fontes à graphite sphéroïdal

Gießereiwesen - Gusseisen mit Kugelgraphit

This European Standard was approved by CEN on 12 November 2011.

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

This European Standard exists 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
Foreword	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Designation	6
5 Order information	7
6 Manufacture	7
7 Requirements	7
7.1 General	7
7.2 Ferritic to pearlitic spheroidal graphite cast irons	8
7.3 Solid solution strengthened ferritic spheroidal graphite cast irons	11
8 Sampling	12
8.1 General	12
8.2 Cast samples	13
8.3 Samples cut from a casting	14
9 Test methods	19
9.1 Tensile test	19
9.2 Impact test	20
9.3 Hardness test	21
9.4 Graphite structure examination	21
10 Retests	21
10.1 Need for retests	21
10.2 Test validity	22
10.3 Non-conforming test results	22
10.4 Heat treatment of samples and castings	22
11 Inspection documentation	22
Annex A (informative) Additional information on solid solution strengthened ferritic spheroidal graphite cast irons	23
Annex B (informative) Guidance values for mechanical properties measured on test pieces machined from samples cut from the castings	27
Annex C (informative) Guidance values for hardness	29
Annex D (informative) Nodularity	31
Annex E (informative) Additional information on mechanical and physical properties	32
Annex F (informative) Fracture toughness, impact energy and ductility of spheroidal graphite cast irons	34
Annex G (normative) Sectioning procedure for cast samples	38
Annex H (informative) Comparison of spheroidal graphite cast iron material designations according to EN 1560 [1] and ISO/TR 15931 [24]	39
Annex I (informative) Un-notched impact test	40
Annex J (informative) Significant technical changes between this European Standard and the previous edition	42
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EC Directive 97/23/EC	44
Bibliography	45

Foreword

This document (EN 1563:2011) 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 June 2012, and conflicting national standards shall be withdrawn at the latest by June 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 1563:1997.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive 97/23/EC, see informative Annex ZA, which is an integral part of this document.

Within its programme of work, Technical Committee CEN/TC 190 requested CEN/TC 190/WG 7 “Spheroidal graphite, silicon molybdenum and austempered ductile iron” to revise EN 1563:1997.

Annex J 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

The properties of spheroidal graphite cast irons depend on their structure.

Spheroidal graphite cast irons covered by this European Standard are divided in two groups:

- 1) ferritic to pearlitic spheroidal graphite cast irons which were in the previous standard;
- 2) solid-solution strengthened ferritic spheroidal graphite cast irons which were not in the previous standard.

The two groups present specific properties, for example:

- the ferritic grades of the first group present the highest impact energy;
- the pearlite containing grades are more suitable for wear resistance applications;
- the solid-solution strengthened ferritic grades present for an equivalent tensile strength a higher proof strength and a higher elongation than that of the ferritic to pearlitic grades;
- a significant property of these solid-solution strengthened ferritic grades is the reduced hardness variation resulting in an improved machinability.

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.

The material grade is defined by mechanical properties measured on machined test pieces prepared from cast samples.

If hardness or un-notched impact energy are a requirement of the purchaser as being important for the application, then Annex C or Annex I provide means for its determination.

It is well known that tensile properties and hardness of spheroidal graphite cast irons are interrelated. When considered by the purchaser as being important for the application, both tensile and hardness properties may be specified.

Further technical data on spheroidal graphite cast irons is given in Annexes A, E and F.

In this European Standard a new designation system by number, as established in EN 1560:2011 [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.

Some spheroidal graphite cast iron grades can be used for pressure equipment.

The permitted material grades of spheroidal graphite cast iron for pressure applications and the conditions for their use are given in specific product or application standards.

For the design of pressure equipment, specific design rules apply.

Annex ZA gives information relating to the conformance of permitted spheroidal graphite cast iron grades to the Pressure Equipment Directive 97/23/EC.

1 Scope

This European Standard defines the grades and the corresponding requirements for spheroidal graphite cast irons.

This European Standard specifies 2 groups of spheroidal graphite cast iron grades by a classification based on mechanical properties measured on machined test pieces prepared from cast samples. The first group deals with ferritic to pearlitic grades. The second group deals with solid-solution strengthened ferritic grades.

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 cover all aspects of:

- ausferritic spheroidal graphite cast irons which are specified in EN 1564 [5];
- low alloyed ferritic spheroidal graphite cast irons which are specified in EN 16124 [6];
- austenitic cast irons which are specified in EN 13835 [7];
- spheroidal graphite cast irons used for pipes, fittings and their joints which are the subject of EN 545 [8], EN 598 [9] and EN 969 [10];
- the grades of spheroidal graphite cast iron as specified in EN 545 which are used for products such as industrial valves, non industrial manually operated shut-off valves and flanges and their joints, which are the subject of the applicable European product standards.

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 764-5:2002, *Pressure Equipment — Part 5: Compliance and Inspection — Documentation of Materials*

EN 10204:2004, *Metallic products — Types of inspection documents*

EN ISO 148-1:2010, *Metallic materials — Charpy impact test — Part 1: Test method (ISO 148-1:2009)*

EN ISO 945-1:2008, *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)*

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

3 Terms and definitions

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

3.1

spheroidal graphite cast iron

cast material, iron, carbon and silicon-based, the carbon being present mainly in the form of spheroidal graphite particles

NOTE Spheroidal graphite cast iron is also known as ductile iron, and less commonly as nodular iron.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-