SLOVENSKI STANDARD
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Livarstvo - Litine z ausferitnim sferoidnim grafitom

Founding - Ausferritic spheroidal graphite cast irons

Gießereiwesen - Ausferritisches Gusseisen mit Kugelgraphit

Fonderie - Fontes ausferritiques à graphite sphéroïdal

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EUROPEAN STANDARD

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Founding - Ausferritic spheroidal graphite cast irons

Fonderie - Fontes ausferritiques à graphite sphéroïdal

Gießereiwesen - Ausferritisches Gusseisen mit Kugelgraphit

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European foreword

This document (EN 1564:2026) 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of an identical text or by endorsement, at the latest by May 2027, and conflicting national standards shall be withdrawn at the latest by May 2027.

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

This document supersedes EN 1564:2011.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

Annex L provides details of significant technical changes between this document and the previous edition (see Table L.1).

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Introduction

Ausferritic spheroidal graphite cast iron is a cast alloy, iron, carbon and silicon based, the carbon being present mainly in the form of spheroidal graphite particles.

NOTE 1 Ausferritic spheroidal graphite cast iron is also known as austempered ductile iron (ADI).

Compared with the spheroidal graphite cast irons as specified in EN 1563:2018 [2], this material combines higher strength and toughness properties as a result of the ausferritic matrix structure.

This document classifies ausferritic spheroidal graphite cast irons in accordance with the mechanical properties of the material.

The mechanical properties of these ausferritic spheroidal graphite cast irons depend on the graphite and the matrix structure.

The required structure is obtained by selecting the appropriate composition and subsequent processing.

The mechanical properties of the material can be evaluated on machined test pieces prepared from cast samples or samples cut from a casting.

Five grades of ausferritic spheroidal graphite cast iron are defined by the mechanical properties measured on machined test pieces prepared from cast samples. When, for these grades, hardness is a requirement of the purchaser as being important for the application, Annex D provides guidance values for hardness.

Two grades of ausferritic spheroidal graphite cast iron are defined in Annex A in accordance with their hardness. These cast irons are used in applications (e.g. mining, earth moving) where high abrasion resistance is required.

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NOTE 2 This designation system by number is based on the principles and the structure as set out in EN 10027-2:2015 [3] and so corresponds with the European numbering system for steel and other materials.

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Ausferritic spheroidal graphite cast iron grades EN-GJS-800-10, EN-GJS-900-8 and EN-GJS-1050-6 can be used for pressure equipment.

The permitted material grades of ausferritic 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.

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1 Scope

This document specifies the grades and the corresponding requirements for ausferritic spheroidal graphite cast irons.

This document specifies five grades of ausferritic spheroidal graphite cast iron by a classification based on mechanical properties measured on machined test pieces prepared from cast samples. One grade also has additional but optional requirements for room temperature and notched-impact.

This document also specifies two grades by a classification as a function of hardness.

This document does not cover technical delivery conditions for iron castings.

NOTE For further details, see EN 1559-1:2011 and EN 1559-3:2011.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 764-5:2014, *Pressure equipment — Part 5: Inspection documentation of metallic materials and compliance with the material specification*

EN 1559-1:2011, *Founding — Technical conditions of delivery — Part 1: General*

EN 1559-3:2011, *Founding — Technical conditions of delivery — Part 3: Additional requirements for iron castings*

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

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EN ISO 148-1:2016, *Metallic materials — Charpy pendulum impact test — Part 1: Test method (ISO 148-1:2016)*

EN ISO 945-1:2019, *Microstructure of cast irons — Part 1: Graphite classification by visual analysis (ISO 945-1:2019)*

EN ISO 6506-1:2014, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2014)*

EN ISO 6892-1:2019, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2019)*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

3.1
ausferritic spheroidal graphite cast iron
cast material, iron, carbon and silicon based with the carbon being present mainly in the form of spheroidal graphite particles, with an ausferritic matrix structure

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3.2
graphite spheroidizing treatment
operation that brings the liquid iron into contact with a substance to produce graphite in the predominantly spheroidal (nodular) form during solidification

Note 1 to entry: This operation is often followed by a second one called inoculation.

3.3
austemper heat treatment of spheroidal graphite cast iron
process, consisting of heating the castings above the A_{C1} temperature and holding a sufficient time to increase the carbon content of the austenite, followed by cooling at a rate sufficient to avoid the formation of pearlite and transforming the matrix structure for a time and a temperature (above the martensite start temperature) sufficient to produce the desired properties

Note 1 to entry: This process produces a microstructure that consists predominantly of ferrite and austenite. This microstructure is called ausferrite.

3.4
cast sample
quantity of material cast to represent the cast material, including separately cast sample, side by side cast sample and cast-on sample

3.5
separately cast sample
sample cast in a separate sand mould under representative manufacturing conditions and material grade

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3.6
side-by-side cast sample
sample cast in the mould alongside the casting, with a joint running system

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3.7
cast-on sample
sample attached directly to the casting

3.8
relevant wall thickness
wall thickness representative of the casting, defined for the determination of the size of the cast samples to which the mechanical properties apply

4 Designation

The material shall be designated either by symbol or by number as given in Table 1, Table 2 or Table A.1.

In the case of samples cut from the casting the letter C is added at the end of the designation by symbol, as given in EN 1560:2011 [1].

NOTE The comparison of this document grade designations with the grades from the ISO standard for ausferritic spheroidal graphite cast irons, ISO 17804:2020 [6], is given in Annex B.

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5 Order information

The following information shall be specified in the order:

a) a reference of this document including its year of publication, i.e. EN 1564:2026;

b) the designation of the material;

c) the relevant wall thickness of the casting;

d) any special requirements, such as dimensions of test pieces, casting defects, types of test samples.

All requirements shall be agreed at the time of acceptance of the order, such as technical delivery conditions according to EN 1559-1:2011 and EN 1559-3:2011.

6 Manufacture

Unless otherwise agreed at the time of order, the method of manufacture of ausferritic spheroidal graphite cast irons and heat treatment shall ensure that the requirements of this document are met.

7 Requirements

7.1 General

The property values apply to ausferritic spheroidal graphite cast irons cast in sand moulds or moulds of comparable thermal behaviour. Subject to amendments to be agreed upon in the order, they shall apply to castings obtained by alternative methods.

The material designation shall be based on the minimum mechanical properties obtained in cast samples with a thickness or diameter of 25 mm. The designation shall be irrespective of the type of cast sample.

Mechanical properties shall be wall thickness dependant as shown in Table 1.

NOTE Tensile testing requires sound test pieces in order to guarantee pure uni-axial stress during the test.

7.2 Test pieces machined from cast samples

7.2.1 General

The mechanical properties of ausferritic spheroidal graphite cast iron test pieces shall be as specified in Table 1. For the additional but optional notched impact requirement, refer to Table 2.

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Table 1 — Mechanical properties measured on test pieces machined from cast samples

Material designation		Relevant wall thickness [a] t mm	0,2 % proof strength $R_{p0,2}$ MPa	Tensile strength R_m MPa	Elongation A %
Symbol	Number		min.	min.	min.
EN-GJS-800-10 EN-GJS-800-10-RT [b]	5.3400 5.3401	$t \leq 30$	500	800	10
		$30 < t \leq 60$		750	6
		$60 < t \leq 100$		720	5
EN-GJS-900-8	5.3402	$t \leq 30$	600	900	8
		$30 < t \leq 60$		850	5
		$60 < t \leq 100$		820	4
EN-GJS-1050-6	5.3403	$t \leq 30$	700	1 050	6
		$30 < t \leq 60$		1 000	4
		$60 < t \leq 100$		970	3
EN-GJS-1200-3	5.3404	$t \leq 30$	850	1 200	3
		$30 < t \leq 60$		1 170	2
		$60 < t \leq 100$		1 140	1
EN-GJS-1400-1	5.3405	$t \leq 30$	1 100	1 400	1
		$30 < t \leq 60$		To be specified in the order.	
		$60 < t \leq 100$			

NOTE 1 The relevant wall thickness does not affect the minimum 0,2 % proof strength provided the heat treatment parameters and alloying are adjusted as a function of the relevant wall thickness.

NOTE 2 Guidance values for Brinell hardness for these grades are given in Annex D.

[a] For relevant wall thicknesses more than 100 mm, the type and size of the cast sample and the minimum values to be obtained shall be specified.

[b] RT corresponds to Room temperature.

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7.2.2 Impact energy

The impact energy values given in Table 2 at room temperature shall be applicable to EN-GJS-800-10-RT only.

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