

Founding - Low alloyed ferritic spheroidal graphite cast iron for elevated temperature applications

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ICS 77.080.10

English Version

Founding - Low-alloyed ferritic spheroidal graphite cast irons for elevated temperature applications

Fonderie - Fontes ferritiques à graphite sphéroïdal faiblement alliées pour applications à haute température

Gießereiwesen - Niedriglegiertes ferritisches Gusseisen mit Kugelgraphit für Anwendungen bei höheren Temperaturen

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Foreword

This document (EN 16124:2011) 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of an identical text or by endorsement, at the latest by May 2012, and conflicting national standards shall be withdrawn at the latest by May 2012.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.

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 prepare EN 16124.

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 classifies low-alloyed ferritic spheroidal graphite cast irons, principally used for their heat and oxidation resistance properties.

NOTE Ferritic spheroidal graphite cast irons alloyed with silicon and molybdenum is also known as SiMo cast irons.

Due to the ferritic structure and the silicon and molybdenum content, these cast irons allow producing castings which are resistant to distortion and oxidation at high temperatures.

Nine grades of low-alloyed ferritic spheroidal graphite cast iron are defined by their silicon and molybdenum content.

Typical applications for the first three grades are medium to heavy castings like turbine housings and compressor parts. The other six grades are mainly applied for exhaust manifolds and turbocharger parts in automotive applications.

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

Additional information on technical properties for low-alloyed ferritic spheroidal graphite cast iron is given in Annex B and Annex C.

1 Scope

This European Standard defines the grades and the corresponding requirements for low-alloyed ferritic spheroidal graphite cast irons for elevated temperature applications.

These requirements are specified in terms of

- chemical composition: as given for each of the grades,
- graphite form and matrix structure: spheroidal graphite in a predominantly ferritic matrix,
- mechanical properties measured on machined test pieces prepared from cast samples.

This European Standard does not cover technical delivery conditions for iron castings, see EN 1559-1 [1] and EN 1559-3 [2].

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 945-1:2008, *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, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*

3 Terms and definitions

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

3.1

low alloyed ferritic spheroidal graphite cast iron

cast iron material with carbon mainly present in the form of spheroidal graphite particles, alloyed with silicon in order to produce a predominantly ferritic matrix and alloyed with molybdenum to improve mechanical properties at elevated temperatures

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 This operation is often followed by a second one called inoculation.

3.3

cast sample

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

3.4

separately cast sample

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