

SVENSK STANDARD

SS-EN 12513:2011



Fastställt/Approved: 2011-03-09
Publicerad/Published: 2011-03-30
Utgåva/Edition: 2
Språk/Language: engelska/English
ICS: 77.080.10

Gjutning – Vitjärn

Founding – Abrasion resistant cast irons

This preview is downloaded from www.sis.se. Buy the entire standard via <https://www.sis.se/std-76934>

Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.



Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00



Europastandarden EN 12513:2011 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 12513:2011.

Denna standard ersätter SS-EN 12513, utgåva 1.

The European Standard EN 12513:2011 has the status of a Swedish Standard. This document contains the official version of EN 12513:2011.

This standard supersedes the Swedish Standard SS-EN 12513, edition 1.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Gjutet järn och stål, SIS/TK 130.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD

EN 12513

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2011

ICS 77.080.10

Supersedes EN 12513:2000

English Version

Founding - Abrasion resistant cast irons

Fonderie - Fontes résistant à l'usure par abrasion

Gießereiwesen - Verschleißbeständige Gusseisen

This European Standard was approved by CEN on 8 January 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	6
6 Manufacture.....	6
6.1 General.....	6
6.2 Heat treatment.....	6
7 Requirements	7
7.1 Chemical composition	7
7.2 Brinell hardness.....	7
7.3 Microstructure.....	7
8 Sampling.....	7
8.1 Frequency of sampling for chemical analysis.....	7
8.2 Number and frequency of Brinell hardness tests	7
9 Test methods.....	8
9.1 Chemical analysis.....	8
9.2 Hardness test	8
9.3 Microstructure examination.....	8
10 Retests	9
10.1 Need for retests.....	9
10.2 Test validity	9
10.3 Nonconforming test results.....	9
10.4 Heat treatment of samples and castings.....	9
Annex A (informative) Heat treatment of abrasion resistant cast irons	12
Annex B (informative) Conversion between Brinell, Vickers and Rockwell C hardness	15
Annex C (informative) Relationship between relevant wall thickness and chemical composition for nickel-chromium cast irons	16
Annex D (informative) Typical microstructures of abrasion resistant cast irons.....	17
Annex E (informative) Comparison of abrasion resistant cast iron material designations according to EN 1560 and ISO/TR 15931.....	18
Annex F (informative) Significant technical changes between this European Standard and its previous edition	19
Bibliography.....	20

Foreword

This document (EN 12513:2011) 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 August 2011, and conflicting national standards shall be withdrawn at the latest by August 2011.

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 12513:2000.

Within its programme of work, Technical Committee CEN/TC 190 requested CEN/TC 190/WG 8 "High alloyed cast iron" to revise EN 12513:2000.

Annexes A, B, C, D and E are informative.

Annex F provides information about 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 United Kingdom.

Introduction

This European Standard deals with the classification of abrasion resistant white cast irons in accordance with their chemical composition and hardness. Such cast irons are widely used in the mining, earth moving, milling and manufacturing industries where high resistance to abrading minerals and other abrading solids is required.

The abrasion resistance of these cast irons depends on them having the appropriate structure and hardness for the application. These properties are obtained by careful control of the material composition and the processing route.

In this edition of EN 12513, the designation by symbol is based on Brinell hardness instead of Vickers hardness, because it corresponds better with the measurement method applied in practice.

In this European Standard a new designation system by number, as established in EN 1560, is given.

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

1 Scope

This European Standard defines the grades of abrasion resistant white cast irons. It specifies the grades in terms of:

- chemical composition;
- hardness.

The types of abrasion resistant white cast irons covered by this standard are:

- a) unalloyed or low alloy cast irons;
- b) nickel-chromium cast irons covering two general types:
 - 4 % Ni 2 % Cr cast irons;
 - 9 % Cr 5 % Ni cast irons;
- c) high chromium cast irons covering four ranges of chromium content:
 - 11 % < Cr ≤ 14 %;
 - 14 % < Cr ≤ 18 %;
 - 18 % < Cr ≤ 23 %;
 - 23 % < Cr ≤ 30 %.

This European Standard does not define the abrasion resistant grades of ausferritic spheroidal graphite cast irons which are subject of EN 1564.

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

3 Terms and definitions

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

3.1

unalloyed or low alloy abrasion-resistant cast iron

cast iron having a structure which consists of eutectic iron carbides in a predominantly pearlitic matrix

3.2

nickel-chromium abrasion-resistant cast iron

cast iron having a structure consisting of either

- simple eutectic carbides M_3C type ($M = Fe, Cr$) in a matrix which is predominantly martensitic, referred to as 4 % Ni 2 % Cr cast irons,

or

- complex eutectic carbides (M_7C_3 and M_3C) in a matrix which is predominantly martensitic, referred to as 9 % Cr 5 % Ni cast irons.

NOTE 1 Both of these materials can contain some bainite and retained austenite.

NOTE 2 All these grades referred to in this sub-clause are free of pearlite.

3.3

high chromium abrasion resistant cast iron

cast iron containing between 11 % and 30 % Cr having a structure consisting of complex carbides in a matrix which, in the hardened condition, is predominantly martensitic but which can also contain some austenite or other transformation products of austenite

3.4

relevant wall thickness

wall thickness representative for 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, in accordance with the designations given in Table 1 to Table 3.

NOTE Comparison of EN 12513 grade designations to the grades from the current ISO standard for abrasion resistant cast iron (ISO 21988) is given in Annex E.

5 Order information

The following information shall be supplied by the purchaser:

- a) the number of this European Standard (EN 12513);
- b) the designation of the material;
- c) any special requirements which have to be agreed upon between the manufacturer and the purchaser by the time of the acceptance of the order (see EN 1559-1 and EN 1559-3).

6 Manufacture

6.1 General

The manufacturing methods for abrasion-resistant cast irons, unless otherwise specified by the purchaser, shall be left to the discretion of the manufacturer.

The manufacturer shall ensure that the requirements of this European Standard are met for the material grade specified in the order.

6.2 Heat treatment

Unless otherwise specified by the purchaser castings can be supplied in one of the following conditions:

- as-cast;

- as-cast and stress relieved;
- hardened;
- hardened and stress relieved;
- soft annealed.

When it is required to machine castings produced in the high chromium cast iron grades, they can be ordered in the soft annealed condition. When the purchaser specifies delivery in the soft annealed condition any subsequent machining or heat treatment shall be the responsibility of the purchaser.

NOTE Annex A gives guidance on the types of heat treatment which can be used to obtain the required hardness, structure and properties.

7 Requirements

7.1 Chemical composition

The chemical composition of the grades of abrasion-resistant cast iron shall be in accordance with Tables 1, 2 or 3. Unless otherwise specified by the purchaser, the manufacturer shall choose the appropriate chemical composition to obtain the required properties of the casting.

NOTE Unless otherwise specified, other elements may be present, at the discretion of the manufacturer.

7.2 Brinell hardness

The Brinell hardness of the grades of abrasion-resistant cast iron shall be in accordance with Tables 1, 2 or 3.

7.3 Microstructure

Microstructure examination, if required, shall be agreed by the time of acceptance of the order. Where a microstructure examination is agreed, the location for sampling, the methods used to examine the microstructure, and acceptance criteria shall be subject to that agreement. The microstructure examination shall be performed in accordance with 9.3.

8 Sampling

8.1 Frequency of sampling for chemical analysis

Samples representative of the material shall be produced at a frequency in accordance with the process quality assurance procedures used by the manufacturer or as agreed with the purchaser.

Samples for chemical analysis shall be cast in a manner which ensures that their representative chemical composition can be determined.

8.2 Number and frequency of Brinell hardness tests

Unless otherwise specified by the purchaser by the time of acceptance of the order, the number and frequency of Brinell hardness tests shall be in accordance with the process quality assurance procedures used by the manufacturer.