SLOVENSKI STANDARD
SIST EN 10293:2015

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Jekleni ulitki - Jekleni ulitki za splošne tehnične namene

Steel castings - Steel castings for general engineering uses

Stahlguss - Stahlguss für allgemeine Anwendungen

Aciers moulés - Aciers moulés d'usage général

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Steel castings - Steel castings for general engineering uses

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This European Standard was approved by CEN on 5 December 2014.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 10293:2015) has been prepared by Technical Committee ECISS/TC 111 “Steel castings and forgings”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by July 2015 and conflicting national standards shall be withdrawn at the latest by July 2015.

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 10293:2005.

In comparison with EN 10293:2005, the following significant technical changes were made:

— Alignment with the structure of EN 1559-1:2011, "*Founding - Technical conditions of delivery - Part 1: General*" and EN 1559-2:2014 "*Founding - Technical conditions of delivery - Part 2: Additional requirements for steel castings*";

— New grades (GE270, GE320 and GE360) added.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document retains the same format for clauses as EN 1559-1:2011 and EN 1559-2:2014. It should be used in conjunction with these standards. Where no text is given under a paragraph heading, the corresponding paragraph of EN 1559-1:2011 and EN 1559-2:2014 applies.

The structure of this document is as follows:

— clauses and subclauses preceded by ■ indicates no additional conditions to EN 1559-1[1)] and EN 1559-2[1)] ;

— clauses and subclauses marked with a single dot • indicate that the conditions shall be agreed at the time of enquiry and order;

— subclauses marked with two dots •• indicate that conditions may be agreed at the time of enquiry and order (optional);

— subclauses without dot marking are mandatory.

1) When a complementary information is given in a clause or subclause of this document (versus the same clause or subclause of EN 1559-1:2011 or EN 1559-2:2014) it is preceded by “in addition to EN 1559-2:2014”.

1 Scope

This European Standard applies to steel castings:

— for general engineering uses. Its uses include machinery (mechanical, electrical...), automotive industries, railroad, armament, agricultural equipment, mining, etc.

In cases where castings are joined by welding by the founder, this document applies.

In cases where castings are welded:

— to wrought products (plates, tubes, forgings...), or

— by non-founders,

this document does not apply.

2 Normative references

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

EN 1559-2:2014, *Founding — Technical conditions of delivery — Part 2: Additional requirements for steel castings*

■ 3 Terms and definitions

• 4 Information to be supplied by the purchaser

In cases of grades with different mechanical properties relating to heat treatment conditions the purchaser shall specify the heat treatment symbol (see Clause 5).

5 Designation

In addition to EN 1559-2:2014:

— for a steel grade which can be delivered to different strength levels, according to the heat treatment, a suffix shall be added in accordance with Table 3. For example: G26CrMo4 +QT1.

6 Manufacture

6.1 Manufacturing process

■ 6.1.1 Melting

6.1.2 Heat treatment

Unless otherwise agreed, the type of heat treatment shall comply with Table 3.

6.2 Welding operations

■ 6.2.1 General

6.2.2 Production welding

In addition to EN 1559-2:2014:

— information on preheat and interpass temperatures as well as on postweld heat-treatment and the corresponding welding groups as defined in EN ISO 11970 is given in Annex A.

■ 6.3 Further processing

7 Requirements

■ 7.1 General

7.2 Material

7.2.1 Chemical composition

In addition to EN 1559-2:2014:

— the chemical composition determined by a cast analysis shall conform to the values given in Table 1;

— elements unspecified in Table 1 of this document shall not be intentionally added without agreement of the purchaser other than for the purpose of finishing the heat. If not otherwise agreed the maximum values in % (by mass) given in Table 2 shall be applicable;

— permissible deviations between the specified cast analysis and the product analysis are indicated in Table 1 of EN 1559-2:2014.

Table 1 — Chemical composition (cast analysis), (% by mass)

Designation		C		Si	Mn		P	S	Cr		Mo		Ni		V		W
Name	Number	min.	max.	max.	min.	max.	max.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max
GE200	1.0420	-	-	-	-	-	0,035	0,030	-	-	-	-	-	-	-	-	-
GS200	1.0449	-	0,18	0,60	-	1,20	0,030	0,025	-	-	-	-	-	-	-	-	-
GE240	1.0446	-	-	-	-	-	0,035	0,030	-	-	-	-	-	-	-	-	-
GS240	1.0455	-	0,23	0,60	-	1,20	0,030	0,025	-	-	-	-	-	-	-	-	-
GE270	1.0454	-	-	-	-	-	0,035	0,030	-	-	-	-	-	-	-	-	-
GE300	1.0558	-	-	-	-	-	0,035	0,030	-	-	-	-	-	-	-	-	-
GE320	1.0591	-	-	-	-	-	0,035	0,030	-	-	-	-	-	-	-	-	-
GE360	1.0597	-	-	-	-	-	0,035	0,030	-	-	-	-	-	-	-	-	-
G17Mn5	1.1131	0,15	0,20	0,60	1,00	1,60	0,020 [a]	0,020 [b]	--	-	-	-	-	-	-	-	-
G20Mn5	1.6220	0,17	0,23	0,60	1,00	1,60	0,020 [a]	0,020 [b]	-	-	-	-	-	0,80	-	-	-
G24Mn6	1.1118	0,20	0,25	0,60	1,50	1,80	0,020 [a]	0,015	-	-	-	-	-	-	-	-	-
G28Mn6	1.1165	0,25	0,32	0,60	1,20	1,80	0,035	0,030	-	-	-	-	-	-	-	-	-
G20Mo5	1.5419	0,15	0,23	0,60	0,50	1,00	0,025	0,020 [b]	-	-	0,40	0,60	-	-	-	-	-
G10MnMoV6-3	1.5410	-	0,12	0,60	1,20	1,80	0,025	0,020	-	-	0,20	0,40	-	-	0,05	0,10	-
G15CrMoV6-9	1.7710	0,12	0,18	0,60	0,60	1,00	0,025	0,020 [b]	1,30	1,80	0,80	1,00	-	-	0,15	0,25	-
G17CrMo5-5	1.7357	0,15	0,20	0,60	0,50	1,00	0,025	0,020 [b]	1,00	1,50	0,45	0,65	-	-	-	-	-
G17CrMo9-10	1.7379	0,13	0,20	0,60	0,50	0,90	0,025	0,020 [b]	2,00	2,50	0,90	1,20	-	-	-	-	-
G26CrMo4	1.7221	0,22	0,29	0,60	0,50	0,80	0,025	0,020 [b]	0,80	1,20	0,15	0,30	-	-	-	-	-
G34CrMo4	1.7230	0,30	0,37	0,60	0,50	0,80	0,025	0,020 [b]	0,80	1,20	0,15	0,30	-	-	-	-	-
G42CrMo4	1.7231	0,38	0,45	0,60	0,60	1,00	0,025	0,020 [b]	0,80	1,20	0,15	0,30	-	-	-	-	-
G30CrMoV6-4	1.7725	0,27	0,34	0,60	0,60	1,00	0,025	0,020 [b]	1,30	1,70	0,30	0,50	-	-	0,05	0,15	-
G35CrNiMo6-6	1.6579	0,32	0,38	0,60	0,60	1,00	0,025	0,020 [b]	1,40	1,70	0,15	0,35	1,40	1,70	-	-	-

Designation		C		Si	Mn		P	S	Cr		Mo		Ni		V		W
Name	Number	min.	max.	max.	min.	max.	max.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max
G9Ni14	1.5638	0,06	0,12	0,60	0,50	0,80	0,020	0,015	-	-	-	-	3,00	4,00	-	-	-
GX9Ni5	1.5681	0,06	0,12	0,60	0,50	0,80	0,020	0,020	-	-	-	-	4,50	5,50	-	-	-
G20NiMoCr4	1.6750	0,17	0,23	0,60	0,80	1,20	0,025	0,015 [b]	0,30	0,50	0,40	0,80	0,80	1,20	-	-	-
G32NiCrMo8-5-4	1.6570	0,28	0,35	0,60	0,60	1,00	0,020	0,015	1,00	1,40	0,30	0,50	1,60	2,10	-	-	-
G17NiCrMo13-6	1.6781	0,15	0,19	0,50	0,55	0,80	0,015	0,015	1,30	1,80	0,45	0,60	3,00	3,50	-	-	-
G30NiCrMo14	1.6771	0,27	0,33	0,60	0,60	1,00	0,030	0,020	0,80	1,20	0,30	0,60	3,00	4,00	-	-	-
GX3CrNi13-4	1.6982	-	0,05	1,00	-	1,00	0,035	0,015	12,00	13,50	-	0,70	3,50	5,00	-	-	-
GX4CrNi13-4	1.4317	-	0,06	1,00	-	1,00	0,035	0,025	12,00	13,50	-	0,70	3,50	5,00	-	-	-
GX4CrNi16-4	1.4421	-	0,06	0,80	-	1,00	0,035	0,020	15,50	17,50	-	0,70	4,00	5,50			-
GX4CrNiMo16-5-1	1.4405	-	0,06	0,80	-	1,00	0,035	0,025	15,00	17,00	0,70	1,50	4,00	6,00	-	-	-
GX23CrMoV12-1	1.4931	0,20	0,26	0,40	0,50	0,80	0,030	0,020	11,30	12,20	1,00	1,20	-	1,00	0,25	0,35	0,50

[a] P ≤ 0,025 % is permitted if agreed between purchaser and manufacturer.

[b] For castings of ruling thickness < 28 mm, S ≤ 0,030 % is permitted.

Table 2 — Maximum contents of unspecified elements (% by mass)

Steel types	Cr	Mo	Ni	V	Cu	Cr + Mo + Ni + V + Cu
Non alloy steels	0,30	0,12	0,40	0,03	0,30	1,00
Alloy steels	0,30	0,15	0,40	0,05 [a]	0,30	–
[a] 0,08 % V for steels with Cr ≥ 10 % by mass.						

7.2.2 Mechanical properties

In addition to EN 1559-2:2014:

7.2.2.1 The mechanical properties shall conform to the values given in Table 3.

These values apply up to the maximum wall thickness given in Table 3. They are verified on test blocks of relevant thickness (see 8.4.1 of EN 1559-2:2014). In all cases, the maximum wall thickness of test blocks shall be limited to 150 mm.

• In cases where the ruling thickness defined by the purchaser is above the maximum thickness given in Table 3, the foreseeable lowering of the mechanical properties shall be agreed.

7.2.2.2 The yield strength values at room temperature correspond to 0,2 % proof strength (*Rp*0,2).

•• **7.2.2.3** In cases where two impact values are given, at test temperature specified in Table 3 the purchaser shall state which impact value is required. If there is no such statement in the enquiry and order the impact test shall be conducted at room temperature.