
Carbon and low alloy cast steels for general applications

Aciers moulés au carbone et faiblement alliés d'usage général

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 14737:2021

<https://standards.iteh.ai/catalog/standards/sist/5a7b8fbd-5cbd-4e4a-a6a7-aea2954d2650/iso-14737-2021>



iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO 14737:2021

<https://standards.iteh.ai/catalog/standards/sist/5a7b8fbd-5cbd-4e4a-a6a7-aea2954d2650/iso-14737-2021>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 General conditions for delivery	1
5 Chemical composition	1
6 Heat treatment	1
7 Mechanical properties	1
8 Test methods	2
9 Supplementary requirements	2
10 Marking	2
Annex A (informative) Guidance data for welding	7
Annex B (informative) UNS cast grades similar to ISO cast grades	8
Bibliography	9

iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO 14737:2021

<https://standards.iteh.ai/catalog/standards/sist/5a7b8fbd-5cbd-4e4a-a6a7-aea2954d2650/iso-14737-2021>

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 11, *Steel castings*.

<https://standards.iteh.ai/catalog/standards/sist/5a7b8fbd-5cbd-4e4a-a6a7-205d13205d13>

This third edition cancels and replaces the second edition (ISO 14737:2015), which has been technically revised. The main changes compared to the previous edition are as follows:

- new Note was inserted in the Scope; previous Note 1 for [Annex B](#) was renumbered as Note 2;
- “Terms and Definitions” added as new [Clause 3](#); subsequent Clauses were renumbered;
- footnote “a” to limit Cr, Mo, Ni, V, and Cu was added to GE200, GS200, GE240, and GS240 in [Table 1](#). This makes it consistent with EN 10293;
- correction of thickness, t , for G10MnMoV6-3 in [Table 2](#);
- correction of tempering temperature range for G25NiCrMo2-2.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Carbon and low alloy cast steels for general applications

1 Scope

This document specifies requirements for carbon and low alloy cast steel grades for general applications.

NOTE 1 [Annex A](#) provides guidance on welding.

NOTE 2 [Annex B](#) gives information on ISO grade designation and available UNS numbers which are similar to the ISO grade designation.

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.

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

ISO 4990, *Steel castings — General technical delivery requirements*

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

3 Terms and definitions

No terms and definitions are listed in this document.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 General conditions for delivery

Steel castings supplied in accordance with this document shall conform to the applicable requirements of ISO 4990, including the supplementary requirements that are indicated in the inquiry and purchase order.

5 Chemical composition

The chemical composition shall conform to the values given in [Table 1](#).

6 Heat treatment

The type of heat treatment is left to the discretion of the manufacturer unless otherwise agreed upon at the time of inquiry and order. Heat treatment described in [Table 2](#) is for information only.

7 Mechanical properties

Mechanical properties are given in [Table 2](#) and are subject to an agreement at the time of inquiry and order.

ISO 14737:2021(E)

Unless otherwise specified (see ISO 4990), the thickness of the test block shall be 28 mm minimum.

Properties at thicknesses greater than the maximum thickness in [Table 2](#) may be lower and are subject to an agreement between manufacturer and purchaser.

8 Test methods

8.1 The tensile test shall be performed in accordance with ISO 6892-1.

8.2 The impact test shall be performed in accordance with ISO 148-1.

9 Supplementary requirements

A list of supplementary requirements which may be used at the option of the purchaser is given in ISO 4990.

10 Marking

Marking shall be as specified in ISO 4990.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 14737:2021](#)

<https://standards.iteh.ai/catalog/standards/sist/5a7b8fbd-5cbd-4e4a-a6a7-aea2954d2650/iso-14737-2021>

Table 1 — Chemical composition, mass fraction in %

Grade designation Name	Grade designation Number	C	Si	Mn	P	S	Cr	Mo	Ni	V	Cu
GE200	1.0420	—	—	—	0,035	0,030	0,30 ^a	0,12 ^a	0,40 ^a	0,03 ^a	0,30 ^a
GS200	1.0449	0,18	0,60	1,20	0,030	0,025	0,30 ^a	0,12 ^a	0,40 ^a	0,03 ^a	0,30 ^a
GE240	1.0446	—	—	—	0,035	0,030	0,30 ^a	0,12 ^a	0,40 ^a	0,03 ^a	0,30 ^a
GS240	1.0455	0,23	0,60	1,20	0,030	0,025	0,30 ^a	0,12 ^a	0,40 ^a	0,03 ^a	0,30 ^a
GS270	1.0454	0,24	0,60	1,30	0,030	0,025	0,30 ^a	0,12 ^a	0,40 ^a	0,03 ^a	0,30 ^a
GS340	1.0467	0,30	0,60	1,50	0,030	0,025	0,30 ^a	0,12 ^a	0,40 ^a	0,03 ^a	0,30 ^a
G28Mn6	1.1165	0,25 to 0,32	0,60	1,20 to 1,80	0,035	0,030	0,30	0,15	0,40	0,05	0,30
G28MnMo6	1.5433	0,25 to 0,32	0,60	1,20 to 1,60	0,025	0,025	0,30	0,20 to 0,40	0,40	0,05	0,30
G20Mo5	1.5419	0,15 to 0,23	0,60	0,50 to 1,00	0,025	0,020 ^b	0,30	0,40 to 0,60	0,40	0,05	0,30
G10MnMoV6-3	1.5410	0,12	0,60	1,20 to 1,80	0,025	0,020	0,30	0,20 to 0,40	0,40	0,05 to 0,10	0,30
G20NiCrMo2-2	1.6741	0,18 to 0,23	0,60	0,60 to 1,00	0,035	0,030	0,40 to 0,60	0,15 to 0,25	0,40 to 0,70	0,05	0,30
G25NiCrMo2-2	1.6744	0,23 to 0,28	0,60	0,60 to 1,00	0,035	0,030	0,40 to 0,60	0,15 to 0,25	0,40 to 0,70	0,05	0,30
G30NiCrMo2-2	1.6778	0,28 to 0,33	0,60	0,60 to 1,00	0,035	0,030	0,40 to 0,60	0,15 to 0,25	0,40 to 0,70	0,05	0,30
G17CrMo5-5	1.7357	0,15 to 0,20	0,60	0,50 to 1,00	0,025	0,020 ^b	1,00 to 1,50	0,45 to 0,65	0,40	0,05	0,30
G17CrMo9-10	1.7379	0,13 to 0,20	0,60	0,50 to 0,90	0,025	0,020 ^b	2,00 to 2,50	0,90 to 1,20	0,40	0,05	0,30
G26CrMo4	1.7221	0,22 to 0,29	0,60	0,50 to 0,80	0,025	0,020 ^b	0,80 to 1,20	0,15 to 0,30	0,40	0,05	0,30
G34CrMo4	1.7230	0,30 to 0,37	0,60	0,50 to 0,80	0,025	0,020 ^b	0,80 to 1,20	0,15 to 0,30	0,40	0,05	0,30
G42CrMo4	1.7231	0,38 to 0,45	0,60	0,60 to 1,00	0,025	0,020 ^b	0,80 to 1,20	0,15 to 0,30	0,40	0,05	0,30
G30CrMoV6-4	1.7725	0,27 to 0,34	0,60	0,60 to 1,00	0,025	0,020 ^b	1,30 to 1,70	0,30 to 0,50	0,40	0,05 to 0,15	0,30
G35CrNiMo6-6	1.6579	0,32 to 0,38	0,60	0,60 to 1,00	0,025	0,020 ^b	1,40 to 1,70	0,15 to 0,35	1,40 to 1,70	0,05	0,30
G30NiCrMo7-3	1.6572	0,28 to 0,33	0,60	0,60 to 0,90	0,035	0,030	0,70 to 0,90	0,20 to 0,30	1,65 to 2,00	0,05	0,30
G40NiCrMo7-3	1.6573	0,38 to 0,43	0,60	0,60 to 0,90	0,035	0,030	0,70 to 0,90	0,20 to 0,30	1,65 to 2,00	0,05	0,30
G32NiCrMo8-5-4	1.6570	0,28 to 0,35	0,60	0,60 to 1,00	0,020	0,015	1,00 to 1,40	0,30 to 0,50	1,60 to 2,10	0,05	0,30

Single values indicate maximums.

^a Cr + Mo + Ni + V + Cu, max. 1,00 %.^b For castings of ruling thickness < 28 mm, S ≤ 0,030 % is permitted.

Table 2 — Mechanical properties at room temperature (Non-mandatory)

Grade designation		Symbol ^c	Heat treatment		Mechanical properties				
			Normalizing or Austenitizing °C	Tempering °C	Thickness <i>t</i> mm	<i>R</i> _{p0,2} min. MPa	<i>R</i> _m MPa	<i>A</i> min. %	<i>KV</i> min. J
Name	No.								
GE200	1.0420	+N	900 to 980		≤ 300	200	380 to 530	25	27
GS200	1.0449	+N	900 to 980		≤ 100	200	380 to 530	25	35
GE240	1.0446	+N	900 to 980		≤ 300	240	450 to 600	22	27
GS240	1.0455	+N	880 to 980		≤ 100	240	450 to 600	22	31
GS270	1.0454	+N	880 to 960		≤ 100	270	480 to 630	18	27
GS340	1.0467	+N	880 to 960		≤ 100	340	550 to 700	15	20
G28Mn6	1.1165	+N	880 to 950		≤ 250	260	520 to 670	18	27
		+QT1		630 to 680	≤ 100	450	600 to 750	14	35
		+QT2		580 to 630	≤ 50	550	700 to 850	10	31
G28MnMo6	1.5433	+QT1	880 to 950	630 to 680	≤ 50	500	700 to 850	12	35
				≤ 100	480	670 to 830	10	31	
		+QT2		580 to 630	≤ 100	590	850 to 1 000	8	27
G20Mo5	1.5419	+QT	920 to 980	650 to 730	≤ 100	245	440 to 590	22	27
G10MnMoV6-3	1.5410	QT1	950 to 980	640 to 660	≤ 50	380	500 to 650	22	60
					50 < <i>t</i> ≤ 100	350	480 to 630	22	60
					100 < <i>t</i> ≤ 150	330	480 to 630	20	60
					150 < <i>t</i> ≤ 250	330	450 to 600	18	60
		≤ 50		500	600 to 750	18	60		
		50 < <i>t</i> ≤ 100		400	550 to 700	18	60		
		100 < <i>t</i> ≤ 150		380	500 to 650	18	60		
		150 < <i>t</i> ≤ 250		350	460 to 610	18	60		
		QT3 ^a		740 to 760 + 600 to 650	<i>t</i> ≤ 100	400	520 to 650	22	27 ^b 60
		G20NiCrMo2-2		1.6741	+NT	900 to 980	610 to 660	<i>t</i> ≤ 100	200
+QT1	600 to 650		430		700 to 850		15		25
+QT2	500 to 550		540		820 to 970		12		25
G25NiCrMo2-2	1.6744	+NT	900 to 980	580 to 630	<i>t</i> ≤ 100	240	600 to 750	18	10
		+QT1		600 to 650		500	750 to 900	15	25
		+QT2		550 to 600		600	850 to 1 000	12	25

Normalise +N
 Normalise and temper +NT
 Quench and temper +QT
^a Double temper.
^b -20 °C test temperature.
^c Number 1, 2 or 3 after "T" indicates a different tempering temperature.

Table 2 (continued)

Grade designation		Symbol ^c	Heat treatment		Mechanical properties							
			Normalizing or Austenitizing °C	Tempering °C	Thickness <i>t</i> mm	$R_{p0,2}$ min. MPa	R_m MPa	A min. %	KV min. J			
Name	No.											
G30NiCrMo2-2	1.6778	+NT	900 to 980	600 to 650	$t \leq 100$	270	630 to 780	18	10			
		+QT1		600 to 650		540				820 to 970	14	25
		+QT2		550 to 600		630						
G17CrMo5-5	1.7357	+QT	920 to 960	680 to 730	$t \leq 100$	315	490 to 690	20	27			
G17CrMo9-10	1.7379	+QT	930 to 970	680 to 740	$t \leq 150$	400	590 to 740	18	40			
G26CrMo4	1.7221	+QT1	880 to 950	600 to 650	$t \leq 100$	450	600 to 750	16	40			
					$100 < t \leq 250$	300	550 to 700	14	27			
		+QT2	880 to 950	550 to 600	$t \leq 100$	550	700 to 850	10	18			
G34CrMo4	1.7230	+NT	880 to 950	600 to 650	$t \leq 100$	270	630 to 780	16	10			
						540	700 to 850	12	35			
		+QT1			$100 < t \leq 150$	480	620 to 770	10	27			
					$150 < t \leq 250$	330	620 to 770	10	16			
G42CrMo4	1.7231	+QT2	900 to 980	550 to 600	$t \leq 100$	650	830 to 980	10	27			
		+NT		630 to 680	$t \leq 100$	300	700 to 850	15	10			
						600	800 to 950	12	31			
		+QT1		600 to 650	$100 < t \leq 150$	550	700 to 850	10	27			
				880 to 950	$150 < t \leq 250$	350	650 to 800	10	16			
G30CrMoV6-4	1.7725	+QT1	880 to 950	600 to 650	$t \leq 100$	700	850 to 1 000	14	45			
							550	750 to 900	12	27		
						$150 < t \leq 250$	350	650 to 800	12	20		
		+QT2		530 to 600	$t \leq 100$	750	900 to 1 100	12	31			
G35CrNiMo6-6	1.6579	+N	860 to 920	600 to 650	$t \leq 150$	550	800 to 950	12	31			
							500	750 to 900	12	31		
		QT1			$t \leq 100$	700	850 to 1 000	12	45			
					$100 < t \leq 150$	650	800 to 950	12	35			
					$150 < t \leq 250$	650	800 to 950	12	30			
		+QT2			510 to 560	$t \leq 100$	800	900 to 1 050	10	35		
Normalise +N Normalise and temper +NT Quench and temper +QT a Double temper. b -20 °C test temperature. c Number 1, 2 or 3 after "T" indicates a different tempering temperature.												

Table 2 (continued)

Grade designation		Symbol ^c	Heat treatment		Mechanical properties				
			Normalizing or Austenitizing °C	Tempering °C	Thickness <i>t</i> mm	<i>R</i> _{p0,2} min. MPa	<i>R</i> _m MPa	<i>A</i> min. %	<i>KV</i> min. J
Name	No.								
G30NiCrMo7-3	1.6572	+NT	900 to 980	630 to 680	<i>t</i> ≤ 100	550	760 to 900	12	10
		+QT1		580 to 630		690	930 to 1 100	10	25
		+QT2				795	1 030 to 1 200	8	25
G40NiCrMo7-3	1.6573	+NT	900 to 980	630 to 680	<i>t</i> ≤ 100	585	860 to 1 100	10	10
		+QT1		580 to 630		760	1 000 to 1 140	8	25
		+QT2				795	1 030 to 1 200	8	25
G32NiCr-Mo8-5-4	1.6570	+QT1	880 to 920	600 to 650	<i>t</i> ≤ 100	700	850 to 1 000	16	50
				100 < <i>t</i> ≤ 250	650	820 to 970	14	35	
		+QT2		500 to 550	<i>t</i> ≤ 100	950	1 050 to 1 200	10	35

Normalise +N

Normalise and temper +NT

Quench and temper +QT

^a Double temper.

^b -20 °C test temperature.

^c Number 1, 2 or 3 after "T" indicates a different tempering temperature.

<https://standards.iteh.ai/catalog/standards/sist/5a7b8fbd-5cbd-4e4a-a6a7-aea2954d2650/iso-14737-2021>
 ISO 14737:2021
 (standards.iteh.ai)