

# INTERNATIONAL STANDARD

# ISO 14737

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## Cast non-alloy and low alloy steels for general applications

*Aciers moulés non alliés et faiblement alliés pour applications générales*

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Reference number  
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## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 14737 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 11, *Steel castings*.

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# Cast non-alloy and low alloy steels for general applications

## 1 Scope

This International Standard specifies requirements for cast non-alloy and low alloy steel grades for general applications.

## 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.

ISO 148:1983, *Steel — Charpy impact test (V-notch)*

ISO 4990:1986, *Steel castings — General technical delivery requirements*

ISO 6892:1998, *Metallic materials — Tensile testing at ambient temperature*

## 3 General conditions for delivery

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

## 4 Chemical composition

The chemical composition shall conform to the values given in Table 1.

## 5 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. The information for heat treatment described in Table 2 is for information only.

## 6 Mechanical properties

Mechanical properties are given in Table 2 and shall be subject to an agreement at the time of inquiry and order.

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.

## 7 Test methods

7.1 Tensile testing shall be performed in accordance with ISO 6892.

7.2 Impact testing shall be performed in accordance with ISO 148.

## 8 Supplementary requirements

This international standard also specifies a group of supplementary requirements, which may be applied to steel castings. These requirements are provided for use when additional testing or inspection is desired and apply only when individually specified by the purchaser.

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

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Table 1 — Steel grades and chemical composition (cast analysis), % by mass

Designation	Analyses										
	C	Si max.	Mn	P max.	S max.	Cr	Mo	Ni	V	Cu max.	
GS 200	0,18 max.	0,60	1,20 max.	0,030	0,025	0,30 max. <sup>a</sup>	0,12 max. <sup>a</sup>	0,40 max. <sup>a</sup>	0,03 max. <sup>a</sup>	0,30 <sup>a</sup>	
GS 230	0,22 max.	0,60	1,20 max.	0,030	0,025	0,30 max. <sup>a</sup>	0,12 max. <sup>a</sup>	0,40 max. <sup>a</sup>	0,03 max. <sup>a</sup>	0,30 <sup>a</sup>	
GS 270	0,24 max.	0,60	1,30 max.	0,030	0,025	0,30 max. <sup>a</sup>	0,12 max. <sup>a</sup>	0,40 max. <sup>a</sup>	0,03 max. <sup>a</sup>	0,30 <sup>a</sup>	
GS 340	0,30 max.	0,60	1,50 max.	0,030	0,025	0,30 max. <sup>a</sup>	0,12 max. <sup>a</sup>	0,40 max. <sup>a</sup>	0,03 max. <sup>a</sup>	0,30 <sup>a</sup>	
G20Mn5	0,17 to 0,23	0,60	1,00 to 1,60	0,030	0,020 <sup>b</sup>	0,30 max.	0,15 max.	0,80 max.	0,05 max.	0,30	
G28Mn6	0,25 to 0,32	0,60	1,20 to 1,80	0,030	0,025	0,30 max.	0,15 max.	0,40 max.	0,05 max.	0,30	
G28MnMo6	0,25 to 0,32	0,60	1,20 to 1,60	0,025	0,025	0,30 max.	0,20 to 0,40	0,40 max.	0,05 max.	0,30	
G20Mo5	0,15 to 0,23	0,60	0,50 to 1,00	0,025	0,020 <sup>b</sup>	0,30 max.	0,40 to 0,60	0,40 max.	0,05 max.	0,30	
G10MnMoV6-3	0,12 max.	0,60	1,20 to 1,80	0,025	0,020	0,30 max.	0,20 to 0,40	0,40 max.	0,05 to 0,10	0,30	
G20NiCrMo2-2	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 max.	0,30	
G25NiCrMo2-2	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 max.	0,30	
G30NiCrMo2-2	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 max.	0,30	
G17CrMo5-5	0,15 to 0,20	0,60	0,50 to 1,00	0,025	0,020 <sup>b</sup>	1,00 to 1,50	0,45 to 0,65	0,40 max.	0,05 max.	0,30	
G17CrMo9-10	0,13 to 0,20	0,60	0,50 to 0,90	0,025	0,020 <sup>b</sup>	2,00 to 2,50	0,90 to 1,20	0,40 max.	0,05 max.	0,30	
G25CrMo4	0,22 to 0,29	0,60	0,50 to 0,80	0,025	0,020 <sup>b</sup>	0,80 to 1,20	0,15 to 0,25	0,40 max.	0,05 max.	0,30	
G32CrMo4	0,28 to 0,35	0,60	0,50 to 0,80	0,025	0,020 <sup>b</sup>	0,80 to 1,20	0,15 to 0,25	0,40 max.	0,05 max.	0,30	
G42CrMo4	0,38 to 0,45	0,60	0,60 to 1,00	0,025	0,020 <sup>b</sup>	0,80 to 1,20	0,15 to 0,25	0,40 max.	0,05 max.	0,30	
G50CrMo4	0,46 to 0,53	0,60	0,60 to 1,00	0,025	0,020 <sup>b</sup>	0,80 to 1,20	0,15 to 0,25	0,40 max.	0,05 max.	0,30	
G30CrNiMoV6-4	0,27 to 0,34	0,60	0,60 to 1,00	0,025	0,020 <sup>b</sup>	1,30 to 1,70	0,30 to 0,50	0,40 max.	0,05 to 0,15	0,30	
G35CrNiMo6-6	0,32 to 0,38	0,60	0,60 to 1,00	0,025	0,020 <sup>b</sup>	1,40 to 1,70	0,15 to 0,35	1,40 to 1,70	0,05 max.	0,30	
G30NiCrMo7-3	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 max.	0,30	
G40NiCrMo7-3	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 max.	0,30	
G32NiCrMo8-5-4	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 max.	0,30	

<sup>a</sup> Cr+Mo+Ni+V+Cu max. 1,00 %.

<sup>b</sup> For castings of ruling thickness < 28 mm, S ≤ 0,030 % is permitted.

**Table 2 — Mechanical properties at room temperature**  
(heat treatment for information only)

Designation	Heat treatment		Tempering °C	Thickness <i>t</i> mm	Mechanical properties			Impact test KJ/ min. J
	Symbol	Normalizing or Austenitizing °C			$R_{p0.2}$ min. MPa	$R_m$ MPa	<i>A</i> min. %	
GS 200	+N	900 to 980		$t \leq 100$	200	400 to 550	25	45
GS 230	+N	900 to 980		$t \leq 100$	230	450 to 600	22	45
GS 270	+N	880 to 960		$t \leq 100$	270	480 to 630	18	27
GS 340	+N	880 to 960		$t \leq 100$	340	550 to 700	15	20
G20Mn5	+N	900 to 980		$t \leq 30$	300	480 to 620	20	50
	+QT	900 to 980	610 to 660	$t \leq 100$	300	500 to 650	22	60
	+N			$t \leq 250$	260	520 to 670	18	31
G28Mn6	+QT1	880 to 950	630 to 680	$t \leq 100$	450	600 to 750	14	35
	+QT2		580 to 630	$t \leq 50$	550	700 to 850	10	31
	+QT1	880 to 950	630 to 680	$t \leq 50$	500	700 to 850	12	35
	+QT2		580 to 630	$t \leq 100$	480	670 to 830	10	31
G20Mo5	+QT	920 to 980	650 to 730	$t \leq 100$	590	850 to 1 000	8	27
				$t \leq 50$	245	440 to 590	22	27
				$50 < t \leq 100$	380	500 to 650	22	60
	+NT			$100 < t \leq 150$	350	480 to 630	22	60
				$150 < t \leq 250$	330	480 to 630	20	60
				$150 < t \leq 250$	330	450 to 600	18	60
				$t \leq 50$	500	600 to 750	18	60
				$50 < t \leq 100$	400	550 to 700	18	60
				$100 < t \leq 150$	380	500 to 650	18	60
				$150 < t \leq 250$	350	460 to 610	18	60
	+NT		610 to 660		200	550 to 700	18	10
	+QT1	900 to 980	600 to 650	$t \leq 100$	430	700 to 850	15	25
	+QT2		550 to 500		540	820 to 970	12	25
	+NT				240	600 to 750	18	10
	+QT1	900 to 980	500 to 650	$t \leq 100$	500	750 to 900	15	25
	+QT2		550 to 600		600	850 to 1 000	12	25
	+NT				270	630 to 780	18	10
	+QT1	900 to 980	600 to 650	$t \leq 100$	540	820 to 970	14	25
	+QT2		550 to 600		630	900 to 1050	11	25
	+QT	920 to 960	680 to 730	$t \leq 100$	315	490 to 690	20	27
	+QT	930 to 970	680 to 740	$t \leq 150$	400	590 to 740	18	40

Table 2 — (continued)

Designation	Heat treatment		Tempering °C	Thickness <i>t</i> mm	Mechanical properties			Impact test <i>KV</i> min. J
	Symbol	Normalizing or Austenitizing °C			<i>R</i> <sub>p0.2</sub> min. MPa	<i>R</i> <sub>m</sub> MPa	<i>A</i> min. %	
G25CrMo4	+QT1	900 to 950	600 to 650	<i>t</i> ≤ 100	450	600 to 750	16	40
	+QT2			100 < <i>t</i> ≤ 250	300	550 to 700	14	27
	+NT			<i>t</i> ≤ 100	550 to 600	550	700 to 850	10
G32CrMo4	+QT1	900 to 950	600 to 650	<i>t</i> ≤ 100	270	630 to 780	16	10
				100 < <i>t</i> ≤ 150	540	700 to 850	12	35
				150 < <i>t</i> ≤ 250	480	620 to 770	10	27
				<i>t</i> ≤ 100	330	620 to 770	10	16
G42CrMo4	+QT2	900 to 980	550 to 600	<i>t</i> ≤ 100	650	800 to 950	10	18
				100 < <i>t</i> ≤ 150	300	700 to 850	15	10
				150 < <i>t</i> ≤ 250	600	780 to 930	12	31
				<i>t</i> ≤ 100	550	700 to 850	10	27
G50CrMo4	+QT2	880 to 950	550 to 600	<i>t</i> ≤ 100	350	650 to 800	10	16
				100 < <i>t</i> ≤ 150	700	850 to 1 000	10	18
				150 < <i>t</i> ≤ 250	750	900 to 1 050	10	18
				<i>t</i> ≤ 100	700	850 to 1 000	14	45
G30CrMoV6-4	+QT1	880 to 950	600 to 650	<i>t</i> ≤ 100	550	750 to 900	12	27
				100 < <i>t</i> ≤ 150	350	650 to 800	12	20
				150 < <i>t</i> ≤ 250	750	900 to 1 100	12	31
				<i>t</i> ≤ 100	550	800 to 950	12	31
G35CrNiMo6-6	+N	860 to 920	600 to 650	<i>t</i> ≤ 150	500	750 to 900	12	31
				150 < <i>t</i> ≤ 250	700	850 to 1 000	12	45
				<i>t</i> ≤ 100	650	800 to 950	12	35
				100 < <i>t</i> ≤ 150	650	800 to 950	12	30
G30NiCrMo7-3	+QT2	900 to 980	510 to 560	<i>t</i> ≤ 100	800	900 to 1 050	10	35
				100 < <i>t</i> ≤ 150	550	760 to 900	12	10
				150 < <i>t</i> ≤ 250	690	930 to 1 100	10	25
				<i>t</i> ≤ 100	795	1 030 to 1 200	8	25
G40NiCrMo7-3	+NT	900 to 980	630 to 680	<i>t</i> ≤ 100	585	860 to 1 100	10	10
				100 < <i>t</i> ≤ 150	760	1 000 to 1 140	8	25
				150 < <i>t</i> ≤ 250	795	1 030 to 1 200	8	25
				<i>t</i> ≤ 100	700	850 to 1 000	16	50
G32NiCrMo8-5-4	+QT1	880 to 920	500 to 550	<i>t</i> ≤ 100	650	820 to 970	14	35
				100 < <i>t</i> ≤ 150	950	1 050 to 1 200	10	35
				150 < <i>t</i> ≤ 250				
				<i>t</i> ≤ 100				

a Cooling in liquid.