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

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*.

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.

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.[a]	0,12 max.[a]	0,40 max.[a]	0,03 max.[a]	0,30[a]
GS 230	0,22 max.	0,60	1,20 max.	0,030	0,025	0,30 max.[a]	0,12 max.[a]	0,40 max.[a]	0,03 max.[a]	0,30[a]
GS 270	0,24 max.	0,60	1,30 max.	0,030	0,025	0,30 max.[a]	0,12 max.[a]	0,40 max.[a]	0,03 max.[a]	0,30[a]
GS 340	0,30 max.	0,60	1,50 max.	0,030	0,025	0,30 max.[a]	0,12 max.[a]	0,40 max.[a]	0,03 max.[a]	0,30[a]
G20Mn5	0,17 to 0,23	0,60	1,00 to 1,60	0,030	0,020[b]	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[b]	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[b]	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[b]	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[b]	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[b]	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[b]	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[b]	0,80 to 1,20	0,15 to 0,25	0,40 max.	0,05 max.	0,30
G30CrMoV6-4	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 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[b]	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

[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
(heat treatment for information only)

Designation	Heat treatment			Mechanical properties				
	Symbol	Normalizing or Austenitizing °C	Tempering °C	Thickness t mm	Tensile test $R_{p0,2}$ min. MPa	Tensile test R_m MPa	Tensile test A min. %	Impact test KV min. J
GS 200	+N	900 to 980		$t \leqslant 100$	200	400 to 550	25	45
GS 230	+N	900 to 980		$t \leqslant 100$	230	450 to 600	22	45
GS 270	+N	880 to 960		$t \leqslant 100$	270	480 to 630	18	27
GS 340	+N	880 to 960		$t \leqslant 100$	340	550 to 700	15	20
G20Mn5	+N	900 to 980		$t \leqslant 30$	300	480 to 620	20	50
	+QT	900 to 980	610 to 660	$t \leqslant 100$	300	500 to 650	22	60
G28Mn6	+N	880 to 950		$t \leqslant 250$	260	520 to 670	18	31
	+QT1		630 to 680	$t \leqslant 100$	450	600 to 750	14	35
	+QT2		580 to 630	$t \leqslant 50$	550	700 to 850	10	31
G28MnMo6	+QT1	880 to 950	630 to 680	$t \leqslant 50$	500	700 to 850	12	35
				$t \leqslant 100$	480	670 to 830	10	31
	+QT2		580 to 630	$t \leqslant 100$	590	850 to 1 000	8	27
G20Mo5	+QT	920 to 980	650 to 730	$t \leqslant 100$	245	440 to 590	22	27
G10MnMoV6-3	+NT	950 to 980	640 to 660	$t \leqslant 50$	380	500 to 650	22	60
				$50 < t \leqslant 100$	350	480 to 630	22	60
				$100 < t \leqslant 150$	330	480 to 630	20	60
				$150 < t \leqslant 250$	330	450 to 600	18	60
	+QT[a]			$t \leqslant 50$	500	600 to 750	18	60
				$50 < t \leqslant 100$	400	550 to 700	18	60
				$100 < t \leqslant 150$	380	500 to 650	18	60
				$150 < t \leqslant 250$	350	460 to 610	18	60
G20NiCrMo2-2	+NT	900 to 980	610 to 660	$t \leqslant 100$	200	550 to 700	18	10
	+QT1		600 to 650		430	700 to 850	15	25
	+QT2		550 to 500		540	820 to 970	12	25
G25NiCrMo2-2	+NT	900 to 980	580 to 630	$t \leqslant 100$	240	600 to 750	18	10
	+QT1		500 to 650		500	750 to 900	15	25
	+QT2		550 to 600		600	850 to 1 000	12	25
G30NiCrMo2-2	+NT	900 to 980	600 to 650	$t \leqslant 100$	270	630 to 780	18	10
	+QT1		600 to 650		540	820 to 970	14	25
	+QT2		550 to 600		630	900 to 1050	11	25
G17CrMo5-5	+QT	920 to 960	680 to 730	$t \leqslant 100$	315	490 to 690	20	27
G17CrMo9-10	+QT	930 to 970	680 to 740	$t \leqslant 150$	400	590 to 740	18	40

Table 2 — *(continued)*

Designation	Heat treatment			Mechanical properties				
	Symbol	Normalizing or Austenitizing °C	Tempering °C	Thickness t mm	Tensile test $R_{p0,2}$ min. MPa	Tensile test R_m MPa	Tensile test A min. %	Impact test KV min. J
G25CrMo4	+QT1	900 to 950	600 to 650	$t \leqslant 100$	450	600 to 750	16	40
				$100 < t \leqslant 250$	300	550 to 700	14	27
	+QT2		550 to 600	$t \leqslant 100$	550	700 to 850	10	18
G32CrMo4	+NT	900 to 950	600 to 650	$t \leqslant 100$	270	630 to 780	16	10
	+QT1				540	700 to 850	12	35
				$100 < t \leqslant 150$	480	620 to 770	10	27
				$150 < t \leqslant 250$	330	620 to 770	10	16
	+QT2		550 to 600	$t \leqslant 100$	650	800 to 950	10	18
G42CrMo4	+NT	900 to 980	630 to 680	$t \leqslant 100$	300	700 to 850	15	10
	+QT1	880 to 950	600 to 650		600	780 to 930	12	31
				$100 < t \leqslant 150$	550	700 to 850	10	27
				$150 < t \leqslant 250$	350	650 to 800	10	16
	+QT2		550 to 600	$t \leqslant 100$	700	850 to 1 000	10	18
G50CrMo4	+QT	850 to 900	570 to 620	$t \leqslant 100$	750	900 to 1 050	10	18
G30CrMoV6-4	+QT1	880 to 950	600 to 650	$t \leqslant 100$	700	850 to 1 000	14	45
				$100 < t \leqslant 150$	550	750 to 900	12	27
				$150 < t \leqslant 250$	350	650 to 800	12	20
	+QT2		530 to 600	$t \leqslant 100$	750	900 to 1 100	12	31
G35CrNiMo6-6	+N	860 to 920	600 to 650	$t \leqslant 150$	550	800 to 950	12	31
				$150 < t \leqslant 250$	500	750 to 900	12	31
	+QT1			$t \leqslant 100$	700	850 to 1 000	12	45
				$100 < t \leqslant 150$	650	800 to 950	12	35
				$150 < t \leqslant 250$	650	800 to 950	12	30
	+QT2		510 to 560	$t \leqslant 100$	800	900 to 1050	10	35
G30NiCrMo7-3	+NT	900 to 980	630 to 680	$t \leqslant 100$	550	760 to 900	12	10
	+QT1				690	930 to 1 100	10	25
	+QT2		580 to 630		795	1 030 to 1 200	8	25
G40NiCrMo7-3	+NT	900 to 980	630 to 680	$t \leqslant 100$	585	860 to 1 100	10	10
	+QT1				760	1 000 to 1 140	8	25
	+QT2		580 to 630		795	1 030 to 1 200	8	25
G32NiCrMo8-5-4	+QT1	880 to 920	600 to 650	$t \leqslant 100$	700	850 to 1000	16	50
				$100 < t \leqslant 250$	650	820 to 970	14	35
	+QT2		500 to 550	$t \leqslant 100$	950	1 050 to 1 200	10	35

[a] Cooling in liquid.