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Steels — Cast tool steels

Aciers — Aciers moulés à outil



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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.

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*.

This second edition cancels and replaces the first edition (ISO 10679:2010) which has been technically revised. It also incorporates the Technical Corrigendum ISO 10679:2010/Cor.1:2010. The main changes compared to the previous edition are as follows:

- Grade numbers have been added to [Tables 1](#) and [2](#) and [Annex A](#);
- When available, UNS numbers have been added to [Annex A](#).

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.

Steels — Cast tool steels

1 Scope

This document specifies tool steel compositions for castings.

NOTE [Annex A](#) 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 4990, *Steel castings — General technical delivery requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4990 apply.

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 Information to be supplied by the purchaser

The purchaser shall supply, in the enquiry and order, the following information:

- a) the grade required (see [Table 1](#));
- b) the heat treatment condition, including none or as-cast, for delivery to purchaser and, if required, Brinell hardness related to composition and heat treatment;
- c) the surfaces which will be machined by the purchaser or user;
- d) part drawings or solid model for each casting.

5 General conditions for delivery

Materials delivered in accordance with this document shall conform to the applicable requirements of ISO 4990, including the supplementary requirements that are indicated on the enquiry and purchase order. Welding may be carried out only when approved by the purchaser.

6 Chemical composition

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

7 Heat treatment

Heat treatment shall be agreed between the manufacturer and the purchaser. The annealing temperature and Brinell hardness given in [Table 2](#) are for information only.

8 Marking

Marking shall be as specified in ISO 4990.

9 Supplementary requirements

A list of normative supplementary requirements for use at the option of the purchaser is included in ISO 4990 and is ordinarily considered suitable for use with this document. The supplementary requirements shall only apply when agreed upon by the manufacturer and purchaser as specified on the enquiry and purchase order.

Other requirements may be specified upon agreement between the manufacturer and purchaser.

Table 1 — Chemical composition, mass fraction in %

Designation Name	Number	C	Si	Mn	P	S	Cr	Mo	Ni	V	Co	W
GX100CrMoV5-1	1.2370	0,95 to 1,05	≤1,50	≤0,75	≤0,03	≤0,030	4,75 to 5,50	0,90 to 1,40	—	0,20 to 0,50	—	—
GX150CrMoCoV12	1.2827	1,40 to 1,60	≤1,50	≤1,00	≤0,03	≤0,030	11,00 to 13,00	0,70 to 1,20	—	0,40 to 1,00	0,70 to 1,00	—
GX148CrCoMoNiV12-3	1.2828	1,35 to 1,60	≤1,50	≤0,75	≤0,03	≤0,030	11,00 to 13,00	0,70 to 1,20	0,40 to 0,60	0,35 to 0,55	2,50 to 3,50	—
G58SiMnMo8-3-5	1.2220	0,50 to 0,65	1,75 to 2,25	0,60 to 1,00	≤0,03	≤0,030	≤0,35	0,20 to 0,80	—	≤0,35	—	—
GX83WMoCrV6-5-4-2	1.2530	0,78 to 0,88	≤1,00	≤0,75	≤0,03	≤0,030	3,75 to 4,50	4,50 to 5,50	≤0,25	1,25 to 2,20	≤0,25	5,50 to 6,75
G50CrMo12-14	1.2350	0,45 to 0,55	0,60 to 1,00	0,40 to 0,80	≤0,03	≤0,030	3,00 to 3,50	1,20 to 1,60	—	—	—	—
GX35CrMoWV5-2	1.2349	0,30 to 0,40	≤1,50	≤0,75	≤0,03	≤0,030	4,75 to 5,75	1,25 to 1,75	—	0,20 to 0,50	—	1,00 to 1,70
GX37CrMoV5-2	1.2354	0,30 to 0,42	≤1,50	≤0,75	≤0,03	≤0,030	4,75 to 5,75	1,25 to 1,75	—	0,75 to 1,20	—	—
G93MnCrW5-3-2	1.2543	0,85 to 1,00	≤1,50	1,00 to 1,30	≤0,03	≤0,030	0,40 to 1,00	—	—	≤0,30	—	0,40 to 0,60
G105V	1.2829	1,00 to 1,10	0,10 to 0,60	0,10 to 0,40	≤0,030	≤0,020	—	—	—	0,10 to 0,20	—	—
G50WCrV8-4	1.2512	0,45 to 0,55	0,70 to 1,00	0,15 to 0,45	≤0,030	≤0,020	0,90 to 1,20	—	—	0,10 to 0,20	—	1,70 to 2,20
G60CoCrV8-4	1.2830	0,55 to 0,65	0,70 to 1,00	0,15 to 0,45	≤0,030	≤0,020	0,90 to 1,20	—	—	0,10 to 0,20	1,70 to 2,20	—
G103Cr6	1.2061	0,95 to 1,10	0,15 to 0,60	0,25 to 0,45	≤0,030	≤0,020	1,35 to 1,65	—	—	—	—	—
G21MnCr5-5	1.2111	0,18 to 0,24	0,15 to 0,60	1,10 to 1,40	≤0,030	≤0,020	1,00 to 1,30	—	—	—	—	—
G70MnMoCr9-12-4	1.2339	0,65 to 0,75	0,10 to 0,60	1,80 to 2,50	≤0,030	≤0,020	0,90 to 1,20	0,90 to 1,40	—	—	—	—
G90MnCrV8	1.2251	0,85 to 0,95	0,10 to 0,60	1,80 to 2,20	≤0,030	≤0,020	0,20 to 0,50	—	—	0,05 to 0,20	—	—
GX205Cr12	1.2075	1,90 to 2,20	0,10 to 0,60	0,20 to 0,60	≤0,030	≤0,020	11,00 to 13,00	—	—	—	—	—
GX215CrW12	1.2415	2,00 to 2,30	0,10 to 0,60	0,30 to 0,60	≤0,030	≤0,020	11,00 to 13,00	—	—	—	—	0,60 to 0,80
G35CrMo7-5	1.2374	0,30 to 0,40	0,30 to 0,70	0,60 to 1,00	≤0,030	≤0,020	1,50 to 2,00	0,35 to 0,55	—	—	—	—
G40CrMnNiMo8-6-4	1.2771	0,35 to 0,45	0,20 to 0,60	1,30 to 1,60	≤0,030	≤0,020	1,80 to 2,10	0,15 to 0,25	0,90 to 1,20	—	—	—
G45NiCrMo16-5-3	1.2774	0,40 to 0,50	0,10 to 0,60	0,20 to 0,50	≤0,030	≤0,020	1,20 to 1,50	0,15 to 0,35	3,80 to 4,30	—	—	—
GX39Cr14	1.2015	0,36 to 0,42	≤1,00	≤1,00	≤0,030	≤0,020	12,50 to 14,50	—	—	—	—	—
GX38CrMo17	1.4171	0,33 to 0,43	≤1,00	≤1,00	≤0,045	≤0,015	15,5 to 17,5	0,90 to 1,30	≤1,00	—	—	—
G55NiCrMoV7-4-5	1.2717	0,50 to 0,60	0,10 to 0,60	0,60 to 0,90	≤0,030	≤0,030	0,80 to 1,20	0,35 to 0,55	1,50 to 1,80	0,05 to 0,15	—	—
G32CrMoV12-28	1.2371	0,28 to 0,35	0,10 to 0,60	0,15 to 0,45	≤0,030	≤0,020	2,70 to 3,20	2,50 to 3,00	—	0,40 to 0,70	—	—

NOTE “—” indicates unspecified.

Table 1 (continued)

Designation Name	Number	C	Si	Mn	P	S	Cr	Mo	Ni	V	Co	W
GX37CrMoV5-1	1.2346	0,33 to 0,41	0,80 to 1,20	0,25 to 0,50	≤0,030	≤0,020	4,80 to 5,50	1,10 to 1,50	—	0,75 to 1,20	—	—
GX38CrMoV5-3	1.2372	0,35 to 0,40	0,30 to 0,60	0,30 to 0,50	≤0,030	≤0,020	4,80 to 5,20	2,70 to 3,20	—	0,40 to 0,60	—	—
GX30WCrV9-3	1.2508	0,25 to 0,35	0,10 to 0,60	0,15 to 0,45	≤0,030	≤0,020	2,50 to 3,20	—	—	0,30 to 0,50	—	8,50 to 9,50
G40CrCoWV17-17-17	1.2831	0,35 to 0,45	0,15 to 0,60	0,20 to 0,50	≤0,030	≤0,020	4,00 to 4,70	0,30 to 0,50	—	1,70 to 2,10	4,00 to 4,50	3,80 to 4,50

NOTE “—” indicates unspecified.

Table 2 — Heat treatment — Annealing

Designation		Minimum temperature	HBW maximum
Name	Number		
GX100CrMoV5-1	1.2370	845 °C	229
GX150CrMoCoV12	1.2827	870 °C	255
GX148CrCoMoNiV12-3	1.2828	870 °C	255
G58SiMnMo8-3-5	1.2220	775 °C	229
GX83WMoCrV6-5-4-2	1.2530	870 °C	241
G50CrMo12-14	1.2350	815 °C	223
GX35CrMoWV5-2	1.2349	845 °C	235
GX37CrMoV5-2	1.2354	845 °C	229
G93MnCrW5-3-2	1.2543	760 °C	212
G105V	1.2829	790 °C	212
G50WCrV8-4	1.2512	740 °C	229
G60CoCrV8-4	1.2830	790 °C	229
G103Cr6	1.2061	760 °C	223
G21MnCr5-5	1.2111	—	217
G70MnMoCr9-12-4	1.2339	760 °C	248
G90MnCrV8	1.2251	760 °C	229
GX205Cr12	1.2075	870 °C	248
GX215CrW12	1.2415	870 °C	255
G35CrMo7-5	1.2374	—	—
G40CrMnNiMo8-6-4	1.2771	—	—
G45NiCrMo16-5-3	1.2774	—	285
GX39Cr14	1.2015	—	241
GX38CrMo17	1.4171	—	—
G55NiCrMoV7-4-10	1.2717	—	248
G32CrMoV12-28	1.2371	—	229
GX37CrMoV5-1	1.2346	845 °C	229
GX38CrMoV5-3	1.2372	—	229
GX30WCrV9-3	1.2508	—	241
G40CrCoWV17-17-17	1.2831	—	260

NOTE “—” indicates unspecified.

Annex A (informative)

UNS cast grades similar to ISO cast grades

Table A.1 — UNS grades similar to ISO cast grades

Grade designation		UNS number (similar grade) ^a
Name	Number	
GX100CrMoV5-1	1.2370	T90102
GX150CrMoCoV12	1.2827	T90402
GX148CrCoMoNiV12-3	1.2828	T90405
G58SiMnMo8-3-5	1.2220	T91905
GX83WMoCrV6-5-4-2	1.2530	T11302
G50CrMo12-14	1.2350	T41907
GX35CrMoWV5-2	1.2349	T90812
GX37CrMoV5-2	1.2354	T90813
G93MnCrW5-3-2	1.2543	T91501
G105V	1.2829	T61203
G50WCrV8-4	1.2512	T41901
G60CoCrV8-4	1.2830	—
G103Cr6	1.2061	T61203
G21MnCr5-5	1.2111	T51620
G70MnMoCr9-12-4	1.2339	T30106
G90MnCrV8	1.2251	T31502
GX205Cr12	1.2075	T30403
GX215CrW12	1.2415	T30403
G35CrMo7-5	1.2374	T51620
G40CrMnNiMo8-6-4	1.2771	—
G45NiCrMo16-5-3	1.2774	—
GX39Cr14	1.2015	—
GX38CrMo17	1.4171	—
G55NiCrMoV7-4-5	1.2717	T61206
G32CrMoV12-28	1.2371	T20810
GX37CrMoV5-1	1.2346	T20813
GX38CrMoV5-3	1.2372	—
GX30WCrV9-3	1.2508	T20821
G40CrCoWV17-17-17	1.2831	T20819

NOTE The grade designations including the names and the numbers follow the rules of EN 10027-1 and EN 10027-2.

^a The similar UNS (Unified Numbering System) grades may not be equivalent to the grades in this document.

Bibliography

- [1] EN 10027-1, *Designation system for steels — Part 1: Steel names*
- [2] EN 10027-2, *Designation system for steels — Part 2: Steel numbers*

