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## Heat-resistant cast steels and alloys for general applications

*Aciers et alliages moulés réfractaires destinés à des applications  
générales*

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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 document 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](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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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](http://www.iso.org/iso/foreword.html).

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

This third edition cancels and replaces the second edition (ISO 11973:2015), which has been technically revised.

The main changes are as follows:

- the mandatory Terms and definitions clause (see [Clause 3](#)) has been added and subsequent clauses have been renumbered;
- [Clause 4](#) has been updated to add a reference to [Annex A](#);
- the title for [Table 1](#) has been changed;
- supplementary requirements (see [Clause 9](#)) has been updated.

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](http://www.iso.org/members.html).

# Heat-resistant cast steels and alloys for general applications

## 1 Scope

This document specifies chemical composition and mechanical properties of cast steels and alloys for heat-resistant service.

## 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

No terms and definitions are listed in this document.

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

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

## 4 General conditions of delivery

Materials furnished in conformity 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. Similar UNS numbers to the grades in this document are included in [Annex A](#).

## 5 Heat treatment

The grades GX40CrSi13, GX40CrSi17, GX30CrSi7, GX40CrSi24, GX40CrSi28, and GX130CrSi29 may be annealed at a temperature of 800 °C to 850 °C. If required, GX30CrSi7 may also be supplied in the as-cast condition. Other grades produced according to this document do not require heat treatment. If heat treatment is required, the treatment should be established by agreement between the manufacturer and the purchaser, and should be specified in the purchase contract.

## 6 Chemical composition

The chemical composition of the alloys shall comply with the values given in [Table 1](#).

## 7 Mechanical properties

Mechanical testing at room temperature shall be performed if agreed upon between the manufacturer and purchaser the material shall conform to the requirements listed in [Table 2](#).

## 8 Maximum use temperature

Limited information on maximum use temperatures are included in [Table 2](#). These values are intended to allow comparison of grades. The actual conditions of service shall be considered when selecting a grade including the composition of the environment and service mechanical loading.

## 9 Supplementary requirements

A list of standardized supplementary requirements for use on the option of the purchaser is included in ISO 4990.

**Table 1 — Chemical composition, mass fraction in %**

Grade designation		C	Si	Mn	P	S	Cr	Mo	Ni	Others
Name	Number									
GX30CrSi7	1.4710	0,20 0,35	1,0 2,5	0,5 1,0	0,035	0,030	6,0 8,0	0,15	0,5	
GX40CrSi13	1.4729	0,30 0,50	1,0 2,5	1,0	0,040	0,030	12,0 14,0	0,15	0,5	
GX40CrSi17	1.4740	0,30 0,50	1,0 2,5	1,0	0,040	0,030	16,0 19,0	0,50	1,0	
GX40CrSi24	1.4745	0,30 0,50	1,0 2,5	1,0	0,040	0,030	23,0 26,0	0,50	1,0	
GX40CrSi28	1.4776	0,30 0,50	1,0 2,5	1,0	0,040	0,030	27,0 30,0	0,50	1,0	
GX130CrSi29	1.4777	1,20 1,40	1,0 2,5	0,5 1,0	0,035	0,030	27,0 30,0	0,50	1,0	
GX25CrNiSi18-9	1.4825	0,15 0,35	0,5 2,5	2,0	0,040	0,030	17,0 19,0	0,50	8,0 10,0	
GX25CrNiSi20-14	1.4832	0,15 0,35	0,5 2,5	2,0	0,040	0,030	19,0 21,0	0,50	13,0 15,0	
GX40CrNiSi22-10	1.4826	0,30 0,50	1,0 2,5	2,0	0,040	0,030	21,0 23,0	0,50	9,0 11,0	
GX40CrNiSiNb24-24	1.4855	0,30 0,50	1,0 2,5	2,0	0,040	0,030	23,0 25,0	0,50	23,0 25,0	Nb: 0,80-1,80
GX40CrNiSi25-12	1.4837	0,30 0,50	1,0 2,5	0,5 2,0	0,040	0,030	24,0 27,0	0,50	11,0 14,0	
GX40CrNiSi25-20	1.4848	0,30 0,50	1,0 2,5	2,0	0,040	0,030	24,0 27,0	0,50	19,0 22,0	
GX40CrNiSi27-4	1.4823	0,30 0,50	1,0 2,5	1,5	0,040	0,030	25,0 28,0	0,50	3,0 6,0	
GX50NiCrCo20-20-20	1.4874	0,35 0,65	1,0	2,0	0,040	0,030	19,0 22,0	2,50 3,00	18,0 22,0	Co: 18,5 -22,0 Nb: 0,75 - 1,25 W: 2,0- 3,0
GX10NiCrSiNb32-20	1.4859	0,05 0,15	0,5 1,5	2,0	0,040	0,030	19,0 21,0	0,50	31,0 33,0	Nb: 0,50 -1,50
GX40NiCrSi35-17	1.4806	0,30 0,50	1,0 2,5	2,0	0,040	0,030	16,0 18,0	0,50	34,0 36,0	
GX40NiCrSi35-26	1.4857	0,30 0,50	1,0 2,5	2,0	0,040	0,030	24,0 27,0	0,50	33,0 36,0	
GX40NiCrSiNb35-26	1.4852	0,30 0,50	1,0 2,5	2,0	0,040	0,030	24,0 27,0	0,50	33,0 36,0	Nb: 0,80-1,80

NOTE A single value is the maximum limit.

<sup>a</sup> Balance.