
Corrosion-resistant cast steels for general applications

Aciers moulés résistant à la corrosion pour applications courantes

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 11972:2023](https://standards.iteh.ai/catalog/standards/sist/eecf9d69-d7ee-45a0-aa2d-557ba3c3e06e/iso-11972-2023)

<https://standards.iteh.ai/catalog/standards/sist/eecf9d69-d7ee-45a0-aa2d-557ba3c3e06e/iso-11972-2023>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 11972:2023](https://standards.iteh.ai/catalog/standards/sist/eecf9d69-d7ee-45a0-aa2d-557ba3c3e06e/iso-11972-2023)

<https://standards.iteh.ai/catalog/standards/sist/eecf9d69-d7ee-45a0-aa2d-557ba3c3e06e/iso-11972-2023>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

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 reference.....	1
3 Terms and definitions.....	1
4 General conditions for delivery.....	1
5 Chemical composition.....	1
6 Mechanical properties.....	1
7 Heat treatment.....	1
8 Supplementary requirements.....	5
Annex A (informative) UNS cast grades similar to ISO cast grades.....	6
Bibliography.....	7

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 11972:2023](https://standards.iteh.ai/catalog/standards/sist/eecf9d69-d7ee-45a0-aa2d-557ba3c3e06e/iso-11972-2023)

<https://standards.iteh.ai/catalog/standards/sist/eecf9d69-d7ee-45a0-aa2d-557ba3c3e06e/iso-11972-2023>

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).

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. ISO shall not be held responsible for identifying any or all such patent rights.

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 SC11, *Steel castings*.

This third edition cancels and replaces the second edition (ISO 11972:2015), 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;
- the title for [Table 1](#) has been changed;
- supplementary requirements (see [Clause 8](#)) has been updated;
- the document has been editorially revised to conform to the most recent version of the ISO/IEC Directives, Part 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.

Corrosion-resistant cast steels for general applications

1 Scope

This document specifies cast steels for general corrosion-resistant applications. The grades covered by this document represent types of alloy steel castings suitable for broad ranges of application which are intended for a wide variety of corrosion applications.

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

2 Normative reference

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 conditions*

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 for delivery

Materials furnished according to this document shall conform to the applicable requirements of ISO 4990 including the supplementary requirements that are indicated on the inquiry and purchase order.

5 Chemical composition

The steel shall conform to the requirements for chemical composition specified in [Table 1](#).

6 Mechanical properties

Steel used for castings shall conform to the mechanical property requirements given in [Table 2](#) up to the maximum ruling thickness. Verification of impact tests is not required except when indicated by the customer. Test blocks used to verify mechanical properties shall not have a thickness exceeding 150 mm. For samples removed from castings, the mechanical properties required shall be agreed between the manufacturer and purchaser.

7 Heat treatment

Castings shall be heat-treated in accordance with the requirements in [Table 3](#).

Table 1 — Chemical composition, mass fraction in %

Grade designation		Chemical composition								
Name	Number	C	Si	Mn	P	S	Cr	Mo	Ni	Others
GX12Cr12	1.4011	0,15	1,0	1,0	0,035	0,025	11,5 to 13,5	0,50	1,0	
GX7CrNiMo12-1	1.4008	0,10	1,0	1,0	0,035	0,025	12,0 to 13,5	0,20 to 0,50	1,0 to 2,0	
GX4CrNi13-4 (QT1)	1.4317	0,06	1,0	1,0	0,035	0,025	12,0 to 13,5	0,70	3,5 to 5,0	
GX4CrNi13-4 (QT2)										
GX4CrNiMo16-5-1	1.4405	0,06	0,8	1,0	0,035	0,025	15,0 to 17,0	0,70 to 1,50	4,0 to 6,0	
GX2CrNi19-11	1.4309	0,03	1,5	2,0	0,035	0,025	18,0 to 20,0	–	9,0 to 12,0	N: 0,20
GX2CrNi19-11	1.4487	0,03	1,5	1,5	0,040	0,030	18,0 to 20,0	–	9,0 to 12,0	N: 0,12 to 0,20
GX5CrNi19-10	1.4308	0,07	1,5	1,5	0,040	0,030	18,0 to 20,0	–	8,0 to 11,0	
GX5CrNiNb19-11	1.4552	0,07	1,5	1,5	0,040	0,030	18,0 to 20,0	–	9,0 to 12,0	8 × C ≤ Nb ≤ 1,00
GX2CrNiMo19-11-2	1.4409	0,03	1,5	2,0	0,035	0,025	18,0 to 20,0	2,00 to 2,50	9,0 to 12,0	N: 0,20
GX2CrNiMoN19-11-2	1.4490	0,03	1,5	2,0	0,035	0,030	18,0 to 20,0	2,00 to 2,50	9,0 to 12,0	N: 0,12 to 0,20
GX4CrNiMoN26-5-2	1.4474	0,05	1,0	2,0	0,035	0,025	25,0 to 27,0	1,30 to 2,00	4,5 to 6,5	N: 0,12 to 0,20
GX5CrNiMo19-11-2	1.4408	0,07	1,5	1,5	0,040	0,030	18,0 to 20,0	2,00 to 2,50	9,0 to 12,0	
GX5CrNiMoNb19-11-2	1.4581	0,07	1,5	1,5	0,040	0,030	18,0 to 20,0	2,00 to 2,50	9,0 to 12,0	8 × C ≤ Nb ≤ 1,00
GX2CrNiMo19-11-3	1.4518	0,03	1,5	1,5	0,040	0,030	18,0 to 20,0	3,00 to 3,50	9,0 to 12,0	
GX2CrNiMoN19-11-3	1.4508	0,03	1,5	1,5	0,040	0,030	18,0 to 20,0	3,00 to 3,50	9,0 to 12,0	N: 0,10 to 0,20
GX2CrNiMoN22-5-3	1.4470	0,03	1,0	2,0	0,035	0,025	21,0 to 23,0	2,50 to 3,50	4,5 to 6,5	N: 0,12 to 0,20
GX2CrNiMoN25-7-3	1.4417	0,03	1,0	1,5	0,030	0,020	24,0 to 26,0	3,00 to 4,00	6,0 to 8,5	Cu: 1,00 N: 0,15 to 0,25 W 1,00
GX2CrNiMoN26-7-4	1.4469	0,03	1,0	1,0	0,035	0,025	25,0 to 27,0	3,00 to 5,00	6,0 to 8,0	N: 0,12 to 0,22 Cu 1,30
GX5CrNiMo19-11-3	1.4412	0,07	1,5	1,5	0,040	0,030	18,0 to 20,0	3,00 to 3,50	10,0 to 13,0	
GX2NiCrMoCuN 25-20-6	1.4588	0,02	1,0	2,00	0,035	0,020	19,0 to 21,0	6,00 to 7,00	24,0 to 26,0	N: 0,10 to 0,25 Cu: 0,50 to 1,50
GX2CrNiMoCuN 20-18-6	1.4557	0,02	1,0	1,20	0,030	0,010	19,5 to 20,5	6,00 to 7,00	17,5 to 19,5	N: 0,18 to 0,24 Cu: 0,50 to 1,00
GX2CrNiMoCuN 25-6-3-3	1.4517	0,03	1,0	1,50	0,035	0,025	24,5 to 26,5	2,50 to 3,50	5,0 to 7,0	N: 0,12 to 0,22 Cu: 2,75 to 3,50
GX3CrNiMoCuN26-6-3	1.4515	0,03	1,0	2,00	0,030	0,020	24,5 to 26,5	2,50 to 3,50	5,5 to 7,0	N: 0,12 to 0,25 Cu: 0,80 to 1,30
GX2CrNiMoN25-6-3	1.4468	0,03	1,0	2,0	0,035	0,025	24,5 to 26,5	2,50 to 3,50	5,5 to 7,0	N: 0,12 to 0,25

NOTE A single value in this table indicates the maximum limit.

Table 2 — Mechanical properties at room temperature^b

Grade designation		$R_{p0,2}$	R_m	A	AV	Maximum ruling thickness
Name	Number	Min. MPa	min. MPa	min. %	min. J	
GX12Cr12	1.4011	450	620	15	20	150
GX7CrNiMo12-1	1.4008	440	590	15	27	300
GX4CrNi13-4 (QT1)	1.4317	550	750	15	50	300
GX4CrNi13-4 (QT2)		830	900	12	35	300
GX4CrNiMo16-5-1	1.4405	540	760	15	60	300

^a The minimum $R_{p1,0}$ value is 25 MPa higher.
^b 1 MPa = 1 N/mm²