
Stainless steels — Chemical composition

Aciers inoxydables — Composition chimique





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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 17, *Steel*, Subcommittee SC 4, *Heat treatable and alloy steels*.

This second edition cancels and replaces the first edition (ISO 15510:2010), which has been technically revised.

Stainless steels — Chemical composition

1 Scope

This International Standard lists the chemical compositions of stainless steels agreed by ISO/TC 17/SC 4, mainly on the basis of a composition of the specifications in existing ISO, ASTM, EN, JIS, and GB (Chinese) standards. They apply to all wrought product forms including ingots and semi-finished material.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 4949, *Steel names based on letter symbols*

ISO 6929, *Steel products — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definition given in ISO 6929 and the following apply.

3.1

stainless steel

steel with at least 10,5 % (mass fraction) Cr and maximum 1,2 % (mass fraction) C

Note 1 to entry: For the classification of stainless steels according to their structure, composition and application, see [Annex C](#).

4 Chemical composition

The chemical composition of stainless steels approved by ISO/TC 17/SC 4 is given in Table 1.

WARNING — Due to hazardous effects to health and environmental problems of lead (Pb), it is recommended to use steels with sulfur additions instead. These steels generally have comparable properties relating to machinability.

NOTE If, in special cases, for example, an ISO committee charged with the establishment or revision of a standard for a specific product or application of stainless steels sees the necessity of deviating from the specifications in Table 1, it should inform ISO/TC 17/SC 4 (Secretariat's address: FES/DIN, Postfach 10 51 45, 40042 Düsseldorf, Germany) of the reasons for this and try, before such deviations are considered, to achieve consensus for a corresponding modification to Table 1.

5 Designation of comparable steels

For the steel grades covered by this International Standard, the steel names as given in the tables are allocated in accordance with ISO/TS 4949.

For the steel grades covered by this International Standard, the steel numbers as given in the tables are based on a 10-digit code presented in 4 subgroups of digits: 4 digits-3 digits-2 digits-1 digit.

XXXX-YYY-ZZ-A

The steel number of each grade is based on a decision of the ISO/TC 17/SC 4 group, taking into account several commonly used existing standards and designations.

In particular, the principles below have been used for the steel numbers.

- The first subgroup contains four digits and is comparable to the European designation (EN numbers): keeping the number on the right side and dropping the “1”.
- The second subgroup contains three digits and refers, in most cases, to the three middle digits of the UNS number used by ASTM. In the case of the ISO designation, contrary to the UNS system, no letter (an S or an N in the case of stainless steels) is used as a start. This 3-digit subgroup allows reference to the obsolete AISI numbers or to the numerical part of the standard designations used in other countries, such as Japan (JIS) and China (GB).
- The third subgroup contains two digits. In most cases, similar principles to those used in the UNS have been adopted. Care should be taken because some differences can exist among UNS, Chinese, and ISO designations (see Table 2). The principles stated in Table 2 apply within each YYY series.
- The last digit is a single letter that allows the reader to identify, in a simple way, if the grade composition corresponds exactly to that included in one or more of the four existing standard practices from Europe, the USA, Japan, or China. If the composition is a compromise between several standards, it is then a new and genuine ISO composition. The last digit of the ISO designation is then I (see Table 3).

Table 4 gives complementary explanations for the use of the ISO numbering system through examples.

Tables A.1, A.2, and A.3 in [Annex A](#) give the designations of stainless steels which are listed in other designation systems and are identical or comparable to the grades in Table 1. In Table A.1, the sequence of steels is the same as in Table 1. In Table A.2, the sequence is given in the order of the three middle digits defined by the first three UNS numbers. In Table A.3, the sequence is given in the order of the European system.

Table B.1 in [Annex B](#) gives a list where the steel grades of Table 1 are to be found in other International Standards.

Table D.1 in [Annex D](#) comprises density values for the steels given in Table 1.

NOTE 1 To compare similar grades, it is necessary to check each element before making a substitution.

NOTE 2 Steels in this International Standard and in ISO 16143-1 to ISO 16143-3 are listed according to a line number (see Table A.1) with the following rules. The primary rule is ordering by austenitic steels (without Mo), austenitic steels with Mo, austenitic steels with Ni/Co as the main alloying elements, austenitic-ferritic (duplex) steels first without Mo then with Mo, ferritic steels first without Mo then with Mo, martensitic steels first without Mo then with Mo and precipitation-hardening steels without and with Mo. The secondary rule is ordering by the line numbers as given in Table A.1. The line number consists of two letters, two digits, and a last letter. For the first letter ‘a’ means for austenitic steels, ‘d’ for duplex steels, ‘f’ for ferritic steels, ‘m’ for martensitic steels and ‘p’ for precipitation-hardening steels. The second letter means ‘P’ for pure without Mo, ‘M’ for molybdenum and ‘N’ for Ni/Co as the main alloying element. The next two digits are the sum of the main alloying elements of Cr, Mo and Ni/Mn/Co (for the ferritic and martensitic steels it is only the sum of Cr and Mo). The last digit stands for the relative C-content (‘A’ means low carbon and ‘Z’ means high carbon). Although, for example, for the first some 25 austenitic steels are strictly ordered by this criteria it is not consequently applied when grouping of steel grades with the same characteristics seems to be beneficial, like austenitic-manganese-alloyed steels or steels of the AISI 316 series. The line number is by no means a steel designation and it is not for commercial purposes.

Table 1 — International agreed specifications for the composition of stainless steels (applicable for cast analysis)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
a) Austenitic steels												
X5CrNi17-7	4319-301-00-I	AP24H	0,07	1,00	2,00	0,045	0,030 ^b	16,0 to 18,0	—	6,0 to 8,0	0,10	—
X12CrNi17-7	4310-301-09-X	AP24N	0,15	1,00	2,00	0,045	0,030	16,0 to 18,0	—	6,0 to 8,0	—	—
X2CrNi18-7	4318-301-53-I	AP25A	0,030	1,00	2,00	0,045	0,015	16,0 to 18,5	—	6,0 to 8,0	0,10 to 0,20	—
X6CrNiCu17-8-2	4567-304-76-I	AP25J	0,08	1,70	3,00	0,045	0,030	15,0 to 18,0	—	6,0 to 9,0	—	Cu: 1,00 to 3,0
X10CrNi18-8	4310-301-00-I	AP26L	0,05 to 0,15	2,00	2,00	0,045	0,030 ^b	16,0 to 19,0	0,80	6,0 to 9,5	0,10	—
X2CrNi18-9	4307-304-03-I	AP27B	0,030	1,00	2,00	0,045	0,030 ^b	17,5 to 19,5	—	8,0 to 10,5 ^c	0,10	—
X7CrNi18-9	4948-304-09-I	AP27L	0,04 to 0,10	1,00	2,00	0,045	0,030 ^b	17,5 to 19,5	—	8,0 to 11,0	0,10	—
X9CrNi18-9	4325-302-00-E	AP27N	0,030 to 0,15	1,00	2,00	0,045	0,030	17,0 to 19,0	—	8,0 to 10,0	0,10	—
X10CrNi18-9	4305-303-00-I	AP27M	0,12	1,00	2,00	0,060	≥0,15	17,0 to 19,0	—	8,0 to 10,0	0,10	Cu: ^e
X12CrNiSe18-9	4625-303-23-X	AP27O	0,15	1,00	2,00	0,20	0,060	17,0 to 19,0	—	8,0 to 10,0	—	Se: ≥0,15
X12CrNiSi18-9-3	4326-302-15-I	AP27P	0,15	2,00 to 3,00	2,00	0,045	0,030	17,0 to 19,0	—	8,0 to 10,0	—	—
X2CrNi18-9	4311-304-53-I	AP27A	0,030	1,00	2,00	0,045	0,030 ^b	17,5 to 19,5	—	8,0 to 11,0	0,12 to 0,22	—
X6CrNiCu18-9-2	4567-304-98-X	AP27J	0,08	1,00	2,00	0,045	0,030	17,0 to 19,0	—	8,0 to 10,5	—	Cu: 1,00 to 3,0
X3CrNiCu18-9-4	4567-304-30-I	AP27F	0,04	1,00	2,00	0,045	0,030 ^b	17,0 to 19,0	—	8,0 to 10,5	0,10	Cu: 3,0 to 4,0
X6CrNiCuSi18-9-2	4570-303-31-I	AP27I	0,08	1,00	2,00	0,045	≥0,15	17,0 to 19,0	0,60	8,0 to 10,0	0,10	Cu: 1,40 to 1,80
X12CrNiCuSi18-9-3	4667-303-76-J	AP27Q	0,15	1,00	3,00	0,20	≥0,15	17,0 to 19,0	—	8,0 to 10,0	—	Cu: 1,50 to 3,5
X5CrNi19-9	4315-304-51-I	AP28F	0,08	1,00	2,50	0,045	0,030	18,0 to 20,0	—	7,0 to 10,5	0,10 to 0,30	— ^f
X3CrNiCu19-9-2	4560-304-75-E	AP28D	0,035	1,00	1,50 to 2,00	0,045	0,015	18,0 to 19,0	—	8,0 to 9,0	0,10	Cu: 1,50 to 2,00
X6CrNiCu19-9-1	4649-304-76-J	AP28I	0,08	1,00	2,00	0,045	0,030	18,0 to 20,0	—	8,0 to 10,5	—	Cu: 0,70 to 1,30
X5CrNiCu19-6-2	4640-304-76-E	AP28L	0,030 to 0,08	0,50	1,50 to 4,0	0,045	0,015	18,0 to 19,0	—	5,5 to 6,9	0,03 to 0,11	Cu: 1,30 to 2,00
X5CrNi18-10	4301-304-00-I	AP28E	0,07	1,00	2,00	0,045	0,030 ^b	17,5 to 19,5	—	8,0 to 10,5 ^c	0,10	—
X6CrNiTi18-10	4541-321-00-I	AP28G	0,08	1,00	2,00	0,045	0,030 ^b	17,0 to 19,0	—	9,0 to 12,0 ^c	—	Ti: 5 × C to 0,70
X7CrNiTi18-10	4940-321-09-I	AP28O	0,04 to 0,10	1,00	2,00	0,045	0,030 ^b	17,0 to 19,0	—	9,0 to 12,0 ^c	—	Ti: 5 × C to 0,80
X6CrNiTiB18-10	4941-321-09-I	AP28J	0,04 to 0,08	1,00	2,00	0,035	0,015	17,0 to 19,0	—	9,0 to 12,0	—	Ti: 5 × C to 0,70 B: 0,001 5 to 0,005 0

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
X6CrNiNb18-10	4550-347-00-I	AP28H	0,08	1,00	2,00	0,045	0,030 ^b	17,0 to 19,0	—	9,0 to 12,0 ^c	—	Nb: 10 × C to 1,00
X7CrNiNb18-10	4912-347-09-I	AP28K	0,04 to 0,08	1,00	2,00	0,045	0,030 ^b	17,0 to 19,0	—	9,0 to 12,0 ^c	—	Nb: 10 × C to 1,00
X2CrNiCu19-10	4650-304-75-E	AP29A	0,030	1,00	2,00	0,045	0,015	18,5 to 20,0	—	9,0 to 10,0	0,08	Cu: 1,00
X2CrNi19-11	4306-304-03-I	AP30A	0,030	1,00	2,00	0,045	0,030 ^b	18,0 to 20,0	—	10,0 to 12,0 ^c	0,10	—
X6CrNi18-12	4303-305-00-I	AP30I	0,08	1,00	2,00	0,045	0,030 ^b	17,0 to 19,0	—	10,5 to 13,0	0,10	—
X8CrNiNb16-13	4961-347-77-E	AP29L	0,04 to 0,10	0,30 to 0,60	1,50	0,035	0,015	15,0 to 17,0	—	12,0 to 14,0	—	Nb: 10 × C to 1,20
X6CrNiSiN19-10	4818-304-15-E	AP29J	0,04 to 0,08	1,00 to 2,00	1,00	0,045	0,015 ^b	18,0 to 20,0	—	9,0 to 11,0	0,12 to 0,20	Ce: 0,03 to 0,08
X40CrNiWS15-14-3-2	4867-316-77-J	AP29P	0,35 to 0,45	1,50 to 2,50	0,60	0,040	0,030	14,0 to 16,0	—	13,0 to 15,0	—	W: 2,00 to 3,00
X6CrNiSi18-13-4	4884-305-00-X	AP31H	0,08	3,0 to 5,0	2,00	0,045	0,030	15,0 to 20,0	—	11,5 to 15,0	—	—
X7CrNiSiN18-13-4	4835-308-15-U	AP32N	0,05 to 0,10	1,40 to 2,00	0,80	0,040	0,030	20,0 to 22,0	—	10,0 to 12,0	0,14 to 0,20	Ce: 0,03 to 0,08
X15CrNiSi20-12	4828-305-09-I	AP32R	0,20	1,50 to 2,50	2,00	0,045	0,030	19,0 to 21,0	—	11,0 to 13,0	0,10	—
X1CrNiSi18-15-4	4361-306-00-E	AP33A	0,015	3,7 to 4,5	2,00	0,025	0,010	16,5 to 18,5	0,20	14,0 to 16,0	0,10	—
X8CrMnCuN17-8-3	4597-204-76-I	AP25L	0,10	2,00	6,5 to 9,0	0,040	0,030	15,0 to 18,0	1,00	3,00	0,10 to 0,30	Cu: 2,00 to 3,5
X8CrMnNi19-6-3	4376-201-00-E	AP28P	0,10	1,00	5,0 to 8,0	0,045	0,015	17,0 to 20,5	—	2,00 to 4,5	0,30	—
X3CrMnNiCu15-8-5-3 ^l	4615-201-75-E ^l	AP28C	0,030	1,00	7,0 to 9,0	0,040	0,010	14,0 to 16,0	0,80	4,5 to 6,0	0,02 to 0,06	Cu: 2,0 to 4,0
X12CrMnNiN17-7-5	4372-201-00-I	AP29O	0,15 ^g	1,00	5,5 to 7,5	0,045	0,030 ^b	16,0 to 18,0	—	3,5 to 5,5	0,05 to 0,25	—
X2CrMnNiN17-7-5	4371-201-53-I	AP29B	0,030	1,00	6,0 to 8,0	0,045	0,015	16,0 to 17,5	—	3,5 to 5,5	0,15 to 0,25	Cu: 1,00
X6CrNiMnCu17-8-4-2	4617-201-76-J	AP29I	0,08	1,70	3,0 to 5,0	0,045	0,030	15,0 to 18,0	—	6,0 to 9,0	—	Cu: 1,00 to 3,0
X9CrMnNiCu17-8-5-2	4618-201-76-E	AP30L	0,10	1,00	5,5 to 9,5	0,070	0,010	16,5 to 18,5	—	4,5 to 5,5	0,15	Cu: 1,00 to 2,50
X12CrMnNiN18-9-5	4373-202-00-I	AP32O	0,15	1,00	7,5 to 10,0	0,060	0,030	17,0 to 19,0	—	4,0 to 6,0	0,15 to 0,30	—
X11CrNiMnN19-8-6	4369-202-91-I	AP33L	0,07 to 0,15	0,50 to 1,00	5,0 to 7,5	0,030	0,015	17,5 to 19,5	—	6,5 to 8,5	0,20 to 0,30	—
X13CrMnNiN18-13-2	4020-241-00-X	AP33M	0,15	1,00	11,0 to 14,0	0,045	0,030	16,5 to 19,0	—	0,5 to 2,5	0,20 to 0,45	—
X6CrMnNiCuN18-12-4	4646-240-76-E	AP34H	0,02 to 0,10	1,00	10,5 to 12,5	0,050	0,015	17,0 to 19,0	0,50	3,5 to 4,5	0,20 to 0,30	Cu: 1,50 to 3,0
X6CrMnNiN18-13-3	4378-240-00-X	AP34I	0,08	1,00	11,5 to 14,5	0,060	0,030	17,0 to 19,0	—	2,3 to 2,7	0,20 to 0,40	—

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
X53CrMnNiN21-9-4	4890-202-09-X	AP34V	0,48 to 0,58	0,35	8,0 to 10,0	0,040	0,030	20,0 to 22,0	—	3,25 to 4,5	0,35 to 0,50	—
X20CrNiN22-11	4824-308-09-I	AP33Q	0,15 to 0,25	1,00	1,00 to 1,60	0,040	0,030	20,5 to 22,5	—	10,0 to 12,0	0,15 to 0,30	—
X6CrNi23-13	4950-309-08-E	AP36J	0,04 to 0,08	0,70	2,00	0,035	0,015	22,0 to 24,0	—	12,0 to 15,0	0,10	—
X18CrNi23-13	4833-309-08-I	AP36R	0,20	1,00	2,00	0,045	0,030	22,0 to 24,0	—	12,0 to 15,0	0,10	—
X6CrNi25-20	4951-310-08-I	AP45L	0,04 to 0,10	0,70	2,00	0,035	0,015	24,0 to 26,0	—	19,0 to 22,0	0,10	—
X1CrNi25-21	4335-310-02-I	AP46A	0,020	0,25	2,00	0,025	0,010	24,0 to 26,0	0,20	20,0 to 22,0	0,10	—
X8CrNi25-21	4845-310-08-E	AP46L	0,10	1,50	2,00	0,045	0,030	24,0 to 26,0	—	19,0 to 22,0	0,10	—
X23CrNi25-21	4845-310-09-X	AP46O	0,25	1,50	2,00	0,040	0,030	24,0 to 26,0	—	19,0 to 22,0	—	—
X15CrNiSi25-21	4841-314-00-E	AP46R	0,20	1,50 to 2,50	2,00	0,045	0,015	24,0 to 26,0	—	19,0 to 22,0	0,10	—
b) Austenitic steels with Mo												
X10CrNiMoMnNbVB15-10-1	4982-215-00-E	AM32P	0,06 to 0,15	0,20 to 1,00	5,50 to 7,0	0,035	0,015	14,0 to 16,0	0,80 to 1,20	9,0 to 11,0	0,10	V: 0,15 to 0,40 Nb: 0,75 to 1,25 B: 0,003 to 0,009
X6CrNiCuSiMo19-10-3-2	4660-315-77-I	AM30J	0,08	0,50 to 2,50	2,00	0,045	0,030	17,0 to 20,5	0,50 to 1,50	8,5 to 11,5	—	Cu: 1,50 to 3,5
X6CrNiSiCuMo19-13-3-3-1	4648-315-77-I	AM33I	0,08	2,50 to 4,0	2,00	0,045	0,030	17,0 to 20,5	0,50 to 1,50	11,0 to 14,0	—	Cu: 1,50 to 3,5
X2CrNiMoN17-11-2	4406-316-53-I	AM30B	0,030	1,00	2,00	0,045	0,030 ^b	16,5 to 18,5	2,00 to 3,00	10,0 to 12,5 ^c	0,12 to 0,22	—
X3CrNiCuMo17-11-3-2	4578-316-76-E	AM30F	0,04	1,00	2,00	0,045	0,015	16,5 to 17,5	2,00 to 2,50	10,0 to 11,0	0,10	Cu: 3,0 to 3,5
X2CrNiMo17-12-2	4404-316-03-I	AM31A	0,030	1,00	2,00	0,045	0,030 ^b	16,5 to 18,5	2,00 to 3,00	10,0 to 13,0 ^c	0,10	—
X5CrNiMo17-12-2	4401-316-00-I	AM31I	0,08	1,00	2,00	0,045	0,030 ^b	16,0 to 18,0	2,00 to 3,00	10,0 to 13,0 ^c	0,10	—
X6CrNiMoTi17-12-2	4571-316-35-I	AM31F	0,08	1,00	2,00	0,045	0,030 ^b	16,5 to 18,5	2,00 to 2,50	10,5 to 13,5 ^c	—	Ti: 5 × C to 0,70
X6CrNiMoNb17-12-2	4580-316-40-I	AM31G	0,08	1,00	2,00	0,045	0,030 ^b	16,5 to 18,5	2,00 to 2,50	10,5 to 13,5	—	Nb: 10 × C to 1,00
X6CrNiMoCu18-12-2-2	4665-316-76-I	AM32I	0,08	1,00	2,00	0,045	0,030	17,0 to 19,0	1,20 to 2,75	10,0 to 14,0	—	Cu: 1,00 to 2,50

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
X2CrNiMo17-12-3	4432-316-03-I	AM32A	0,030	1,00	2,00	0,045	0,030 ^b	16,5 to 18,5	2,50 to 3,00	10,5 to 13,0 ^c	0,10	—
X3CrNiMo17-12-3	4436-316-00-I	AM32F	0,05	1,00	2,00	0,045	0,030 ^b	16,5 to 18,5	2,50 to 3,00	10,5 to 13,0 ^c	0,10	—
X2CrNiMoN17-12-3	4429-316-53-I	AM32B	0,030	1,00	2,00	0,045	0,030 ^b	16,5 to 18,5	2,50 to 3,00	10,5 to 13,0 ^c	0,12 to 0,22	—
X6CrNiMoN17-12-3	4495-316-51-I	AM32H	0,08	1,00	2,00	0,045	0,030	16,0 to 18,0	2,00 to 3,0	10,0 to 14,0	0,10 to 0,22	—
X6CrNiMoS17-12-3	4494-316-74-I	AM32K	0,08	1,00	2,00	0,045	≥0,10	16,0 to 18,0	2,00 to 3,0	10,0 to 14,0	—	—
X3CrNiMo18-12-3	4449-316-76-E	AM33F	0,035	1,00	2,00	0,045	0,015	17,0 to 18,2	2,25 to 2,75	11,5 to 12,5	0,08	Cu: 1,00
X3CrNiMoBN17-13-3	4910-316-77-E	AM33G	0,04	0,75	2,00	0,035	0,015	16,0 to 18,0	2,00 to 3,0	12,0 to 14,0	0,10 to 0,18	B: 0,001 5 to 0,005 0
X2CrNiMoCu18-14-2-2	4647-316-75-X	AM34A	0,030	1,00	2,00	0,045	0,030	17,0 to 19,0	1,20 to 2,75	12,0 to 16,0	—	Cu: 1,00 to 2,50
X2CrNiMo17-14-3	4435-316-03-X	AM34C	0,030	1,00	2,00	0,045	0,030	16,0 to 18,0	2,0 to 3,0	12,0 to 15,0	—	—
X2CrNiMo18-14-3	4435-316-91-I	AM35A	0,030	1,00	2,00	0,045	0,030	17,0 to 19,0	2,50 to 3,00	12,5 to 15,0	0,10	—
X30CrCrNiMoPB20-11-2	4879-317-77-I	AM33R	0,25 to 0,35	1,00	1,20	0,18 to 0,25	0,030	19,0 to 21,0	1,8 to 2,50	10,0 to 12,0	—	B: 0,001 to 0,010
X2CrNiMoN18-12-4	4434-317-53-I	AM34B	0,030	1,00	2,00	0,045	0,030 ^b	17,5 to 20,0	3,00 to 4,0	11,0 to 14,0 ^c	0,10 to 0,20	—
X2CrNiMoN17-13-5	4439-317-26-E	AM35B	0,030	1,00	2,00	0,045	0,015	16,5 to 18,5	4,0 to 5,0	12,5 to 14,5	0,12 to 0,22	—
X6CrNiMo19-13-4	4445-317-00-U	AM36I	0,08	1,00	2,00	0,045	0,030	18,0 to 20,0	3,0 to 4,0	11,0 to 15,0	0,10	—
X2CrNiMo19-14-4	4438-317-03-I	AM37A	0,030	1,00	2,00	0,045	0,030 ^b	17,5 to 20,0	3,0 to 4,0	12,0 to 15,0	0,10	—
X2CrNiMoN18-15-5	4483-317-26-I	AM38A	0,030	1,00	2,00	0,045	0,030	17,0 to 20,0	4,0 to 5,0	13,5 to 17,5	0,10 to 0,20	—
X3CrNiMo18-16-5	4476-317-92-X	AM39F	0,04	1,00	2,50	0,045	0,030	16,0 to 19,0	4,0 to 6,0	15,0 to 17,0	—	—
X4CrNiMoN25-14-1	4496-309-51-I	AM40F	0,06	1,50	2,00	0,045	0,030	23,0 to 26,0	0,50 to 1,20	12,0 to 16,0	0,25 to 0,40	—
X1CrNiMoCuN20-18-7	4547-312-54-I	AM45A	0,020	0,70	1,00	0,035	0,015	19,5 to 20,5	6,0 to 7,0	17,5 to 18,5	0,18 to 0,25	Cu: 0,50 to 1,00
X1CrNiMoN25-22-2	4466-310-50-E	AM49A	0,020	0,70	2,00	0,025	0,010	24,0 to 26,0	2,00 to 2,50	21,0 to 23,0	0,10 to 0,16	—

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
X1CrNiMoCuNW24-22-6	4659-312-66-I	AM52B	0,020	0,70	2,0 to 4,0	0,030	0,010	23,0 to 25,0	5,5 to 6,5	21,0 to 23,0	0,35 to 0,50	Cu: 1,00 to 2,00 W: 1,50 to 2,50
X1CrNiMoCuN24-22-8	4652-326-54-I	AM54A	0,020	0,50	2,0 to 4,0	0,030	0,005	23,0 to 25,0	7,0 to 8,0	21,0 to 23,0	0,45 to 0,55	Cu: 0,30 to 0,60
X2CrNiMnMoN25-18-6-5	4565-345-65-I	AM54B	0,030	1,00	5,0 to 7,0	0,030	0,015	24,0 to 26,0	4,0 to 5,0	16,0 to 19,0	0,30 to 0,60	Nb: 0,15
c) Austenitic steels with Ni/Co as main alloying elements												
X3NiCr18-16	4389-384-00-I	AN34F	0,04	1,00	2,00	0,045	0,030 ^b	15,0 to 17,0	—	17,0 to 19,0	0,10	—
X1NiCrMoCu22-20-5-2	4656-089-04-I	AN47A	0,020	1,00	2,00	0,040	0,030	19,0 to 21,0	4,0 to 5,0	21,0 to 23,0	0,10	Cu: 1,00 to 2,00
X1NiCrMoCu25-20-5	4539-089-04-I	AN50A	0,020	0,75	2,00	0,035	0,015	19,0 to 22,0	4,0 to 5,0	23,5 to 26,0	0,15	Cu: 1,00 to 2,00
X1NiCrMoCuN25-20-7	4529-089-26-I	AN52A	0,020	0,75	2,00	0,035	0,015	19,0 to 21,0	6,0 to 7,0	24,0 to 26,0	0,15 to 0,25	Cu: 0,50 to 1,50
X2NiCrMoN25-21-7	4478-083-67-U	AN53A	0,030	1,00	2,00	0,040	0,030	20,0 to 22,0	6,0 to 7,0	23,5 to 25,5	0,18 to 0,25	Cu: 0,75
X1CrNiMoCuN25-25-5	4537-310-92-E	AN55A	0,020	0,70	2,00	0,030	0,010	24,0 to 26,0	4,7 to 5,7	24,0 to 27,0	0,17 to 0,25	Cu: 1,00 to 2,00
X5NiCrAlTi31-20	4958-088-77-E	AN51J	0,03 to 0,08	0,70	1,50	0,015	0,010	19,0 to 22,0	—	30,0 to 32,5	0,030	Al: 0,20 to 0,50 Co: 0,50 Cu: 0,50 Nb: 0,10 Ti: 0,20 to 0,50 Al+Ti: 0,70 Ni+Co: 30,0 to 32,5
X2NiCrAlTi32-20	4558-088-90-E	AN52B	0,030	0,70	1,00	0,020	0,015	20,0 to 23,0	—	32,0 to 35,0	—	Al: 0,15 to 0,45 Ti: [8 × (C+N)] to 0,60
X8NiCrAlTi32-20	4959-088-77-E	AN52L	0,05 to 0,10	0,70	1,50	0,015	0,010	19,0 to 22,0	—	30,0 to 34,0	0,030	Al: 0,20 to 0,65 Co: 0,50 Cu: 0,50 Ti: 0,20 to 0,65 Ni+Co: 30,0 to 34,0
X8NiCrAlTi32-21	4876-088-00-I	AN53L	0,10	1,00	1,50	0,015	0,015	19,0 to 23,0	—	30,0 to 34,0	—	Al: 0,15 to 0,60 Ti: 0,15 to 0,60 Cu: 0,70
X7NiCrAlTi33-21	4959-088-10-U	AN54L	0,05 to 0,10	1,00	1,50	0,045	0,015	19,0 to 23,0	—	30,0 to 35,0	—	Cu: 0,75 Fe: ≥39,5 Ti: 0,15 to 0,60 Al: 0,15 to 0,60

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
X8NiCrAlTi33-21	4959-088-11-U	AN54M	0,06 to 0,10	1,00	1,50	0,040	0,015	19,0 to 23,0	—	30,0 to 35,0	—	Cu: 0,75 Fe: ≥39,5 Ti: 0,15 to 0,60 Al: 0,15 to 0,60 Al+Ti: 0,85 to 1,2
X13NiCr35-16	4864-083-77-X	AN510	0,15	1,50	2,00	0,040	0,030	14,0 to 17,0	—	33,0 to 37,0	—	—
X4NiCrCuMo35-20-4-3	4657-080-20-U	AN58F	0,07	1,00	2,00	0,045	0,035	19,0 to 21,0	2,00 to 3,00	32,0 to 38,0	—	Cu: 3,0 to 4,0 Nb: (8 × C) to 1,00
X6NiCrSiN35-25	4854-353-15-E	AN60J	0,04 to 0,08	1,20 to 2,00	2,00	0,040	0,015	24,0 to 26,0	—	34,0 to 36,0	0,12 to 0,20	Ce: 0,03 to 0,08
X1NiCrMoCu31-27-4	4563-080-28-I	AN62A	0,020	0,70	2,00	0,030	0,010	26,0 to 28,0	3,0 to 4,0	30,0 to 32,0	0,10	Cu: 0,70 to 1,50
X12CrNiCo-MoWMMnNb21-20-20-3-3-2	4971-314-79-I	AN64R	0,08 to 0,16	1,00	1,00 to 2,00	0,035	0,015	20,0 to 22,5	2,50 to 3,5	19,0 to 21,0	0,10 to 0,20	Co:18,5 to 21,0 W: 2,00 to 3,0 Nb: 0,75 to 1,25
X1NiCrMoMnN34-27-6-5 ^l	4479-089-36-U ^l	AN72A	0,020	0,50	4,0 to 6,0	0,025	0,010	26,0 to 28,0	5,0 to 6,0	33,0 to 35,0	0,30 to 0,50	Cu: 0,50
d) Austenitic-ferritic (duplex) steels												
X2CrNiN22-2 ^l	4062-322-02-U ^l	DP24A	0,030	1,00	2,00	0,040	0,010	21,5 to 24,0	0,45	1,00 to 2,90	0,16 to 0,28	—
X2CrCuNiN23-2-2 ^l	4669-322-76-E ^l	DP25A	0,045	1,00	1,00 to 3,00	0,040	0,030	21,5 to 24,0	0,50	1,00 to 3,00	0,12 to 0,20	Cu: 1,60 to 3,00
X2CrMnNiN21-5-1 ^l	4162-321-01-E ^l	DP27F	0,040	1,00	4,0 to 6,0	0,040	0,015	21,0 to 22,0	0,10 to 0,80	1,35 to 1,90	0,20 to 0,25	Cu: 0,10 to 0,80
X2CrNiN23-4	4362-323-04-I	DP27B	0,030	1,00	2,00	0,035	0,015	22,0 to 24,5	0,10 to 0,60	3,5 to 5,5	0,05 to 0,20	Cu: 0,10 to 0,60
e) Austenitic-ferritic (duplex) steels with Mo												
X2CrMnNiMoN21-5-3	4482-320-01-X	DM29A	0,030	1,00	4,0 to 6,0	0,035	0,030	19,5 to 21,5	0,10 to 0,60	1,50 to 3,50	0,05 to 0,20	Cu: 1,00
X2CrNiMoSiMnN19-5-3-2-2	4424-315-00-I	DM29B	0,030	1,40 to 2,00	1,20 to 2,00	0,035	0,030	18,0 to 19,0	2,50 to 3,0	4,3 to 5,2	0,05 to 0,10	—
X2CrNiMoN22-5-3 ^h	4462-318-03-I	DM30A	0,030	1,00	2,00	0,035	0,015	21,0 to 23,0	2,50 to 3,5	4,5 to 6,5	0,10 to 0,22	—
X6CrNiMo26-4-2	4480-329-00-U	DM32F	0,08	0,75	1,00	0,040	0,030	23,0 to 28,0	1,00 to 2,00	2,5 to 5,0	—	—
X22CrNiMnMoCuN24-4-3-2 ^l	4662-824-41-X ^l	DM33A	0,030	0,70	2,50 to 4,0	0,035	0,005	23,0 to 25,0	1,00 to 2,00	3,0 to 4,5	0,20 to 0,30	Cu: 0,10 to 0,80

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
X3CrNiMoN27-5-2	4460-312-00-I	DM34F	0,050	1,00	2,00	0,035	0,030 ^b	25,0 to 28,0	1,30 to 2,00	4,5 to 6,5	0,05 to 0,20	—
X2CrNiMoCuN25-6-3	4507-325-20-I	DM34A	0,030	0,70	2,00	0,035	0,015	24,0 to 26,0	3,0 to 4,0	6,0 to 8,0	0,20 to 0,30	Cu: 1,00 to 2,50
X3CrNiMoCuN26-6-3-2	4507-325-50-X	DM35F	0,04	1,00	1,50	0,040	0,030	24,0 to 27,0	2,9 to 3,9	4,5 to 6,5	0,10 to 0,25	Cu: 1,50 to 2,50
X2CrNiMoN25-7-3	4481-312-60-J	DM35A	0,030	1,00	1,50	0,040	0,030	24,0 to 26,0	2,50 to 3,5	5,5 to 7,5	0,08 to 0,30	—
X2CrNiMoN25-7-4	4410-327-50-E	DM36A	0,030	1,00	2,00	0,035	0,015	24,0 to 26,0	3,0 to 4,5	6,0 to 8,0	0,24 to 0,35	—
X2CrNiMoCuWN25-7-4	4501-327-60-I	DM36B	0,030	1,00	1,00	0,030	0,010	24,0 to 26,0	3,0 to 4,0	6,0 to 8,0	0,20 to 0,30	Cu: 0,50 to 1,00 W: 0,50 to 1,00
X2CrNiMoN29-7-2 ^l	4477-329-06-E ^l	DM38A	0,030	0,80	0,80 to 1,50	0,030	0,030	28,0 to 30,0	1,50 to 2,60	5,8 to 7,5	0,30 to 0,40	Cu: 0,80
X2CrNiMoCoN28-8-5-1 ^l	4658-327-07-U ^l	DM42A	0,030	0,50	1,50	0,035	0,010	26,0 to 29,0	4,0 to 5,0	5,5 to 9,5	0,30 to 0,50	Cu: 1,00 Co: 0,50 to 2,00
X2CrNiMoN31-8-4 ^l	4485-332-07-U ^l	DM43A	0,030	0,80	1,50	0,035	0,010	29,0 to 33,0	3,0 to 5,0	6,0 to 9,0	0,40 to 0,60	Cu: 1,00
f) Ferritic steels												
X2Cr12	4030-410-90-X	FP12A	0,030	1,00	1,00	0,040	0,030	11,0 to 13,5	—	—	—	—
X2CrTi12 ^{mn}	4512-409-10- _{Imm}	FP12B	0,030	1,00	1,00	0,040	0,030 ^b	10,5 to 12,5	—	0,50	0,030	Ti: 6 × (C+N) to 0,65
X2CrNi12	4003-410-77-I	FP12C	0,030	1,00	2,00	0,040	0,015	10,5 to 12,5	—	0,30 to 1,10	0,030	—
X2CrMnNiTi12	4600-410-70-E	FP12D	0,030	1,00	1,00 to 2,50	0,015	0,015	11,0 to 13,0	—	0,30 to 1,00	0,025	Ti: 6 × C to 0,35
X6CrNiTi12	4516-409-75-I	FP12F	0,08	1,00	2,00	0,040	0,015	10,5 to 12,5	—	0,50 to 1,50	0,030	Ti: 0,05 to 0,35
X6Cr13	4000-410-08-I	FP13G	0,08 ⁱ	1,00	1,00	0,040	0,030 ^b	11,5 to 14,0	—	0,75	—	—
X6CrAl13	4002-405-00-I	FP13H	0,08	1,00	1,00	0,040	0,030 ^b	11,5 to 14,0	—	—	—	Al: 0,10 to 0,30
X10CrAlSi13	4724-405-77-I	FP13L	0,12	0,70 to 1,40	1,00	0,040	0,015	12,0 to 14,0	—	1,00	—	Al: 0,70 to 1,20
X10Cr15	4012-429-00-X	FP15L	0,12	1,00	1,00	0,040	0,030	14,0 to 16,0	—	—	—	—
X1CrNb15	4595-429-71-I	FP15A	0,020	1,00	1,00	0,035	0,015	14,0 to 16,0	—	—	0,020	Nb: 0,20 to 0,60
X6Cr17	4016-430-00-I	FP17I	0,08 ⁱ	1,00	1,00	0,040	0,030 ^b	16,0 to 18,0	—	—	—	—
X7Cr17	4004-430-20-I	FP17L	0,09	1,50	1,50	0,040	≥0,15	16,0 to 18,0	0,60	—	—	—
X2CrTi17	4520-430-70-I	FP17A	0,025	0,50	0,50	0,040	0,015	16,0 to 18,0	—	—	0,015	Ti: 8 × (C+N) to 0,60 ^d

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
X2CrNb17	4510-430-36-X	FP17B	0,030	0,75	1,00	0,040	0,030	16,0 to 19,0	—	—	—	Nb or Ti: 0,10 to 1,00
X3CrTi17	4510-430-35-I	FP17F	0,05	1,00	1,00	0,040	0,030 ^b	16,0 to 19,0	—	—	0,030	Ti: 0,15 to 0,75 ^d
X3CrNb17	4511-430-71-I	FP17G	0,05	1,00	1,00	0,040	0,015	16,0 to 18,0	—	—	0,030	Nb: 12 × C to 1,00
X6CrNi17-1	4017-430-91-E	FP17H	0,08	1,00	1,00	0,040	0,015	16,0 to 18,0	—	1,20 to 1,60	—	—
X2CrCuTi18	4664-430-75-J	FP18A	0,025	1,00	1,00	0,040	0,030	16,0 to 20,0	—	—	0,025	Ti: 8 × (C+N) to 0,80 ^d Cu: 0,30 to 0,80
X2CrTiNb18	4509-439-40-X	FP18B	0,030	1,00	1,00	0,040	0,015	17,5 to 18,5	—	—	—	Ti: 0,10 to 0,60 Nb: 0,30+3 × C to 1,00
X10CrAlSi18	4742-430-77-I	FP18N	0,12	0,70 to 1,40	1,00	0,040	0,015	17,0 to 19,0	—	1,00	—	Al: 0,70 to 1,20
X8CrAl19-3	4764-442-72-J	FP19N	0,10	1,50	1,00	0,040	0,030	17,0 to 21,0	—	—	—	Al: 2,00 to 4,0
X2CrNbTi20	4607-445-00-E	FP20A	0,030	1,00	1,00	0,040	0,015	18,5 to 20,5	—	—	0,030	Nb: 1,00 Ti: [4 × (C+N)+0,15] to 0,80 ^d
X2CrTi21	4611-445-70-E ¹	FP21A	0,030	1,00	1,00	0,050	0,050	19,0 to 22,0	0,50	0,50	—	Cu: 0,50, Al: 0,05 Ti: [4 × (C+N)+0,20] to 1,00 ^d
X2CrNbCu21	4621-445-00-E	FP21B	0,030	1,00	1,00	0,040	0,015	20,0 to 21,5	—	—	0,030	Cu: 0,10 to 1,00 Nb: 0,20 to 1,00
X2CrTiCu22	4621-443-30-J	FP22A	0,025	1,00	1,00	0,040	0,030	20,0 to 23,0	—	—	0,025	Cu: 0,30 to 0,80 Ti: 8 × (C+N) to 0,80 ^d
X2CrTi24 ¹	4613-446-70-E ¹	FP24A	0,030	1,00	1,00	0,050	0,050	22,0 to 25,0	0,50	0,50	—	Cu: 0,50, Al: 0,05 Ti: [4 × (C+N)+0,20] to 1,00 ^d
X10CrAlSi25	4762-445-72-I	FP25N	0,12	0,70 to 1,40	1,00	0,040	0,015	23,0 to 26,0	—	1,00	—	Al: 1,20 to 1,70
X15CrN26	4749-446-00-I	FP26R	0,20	1,00	1,00	0,040	0,030	24,0 to 28,0	—	1,00	0,15 to 0,25	—
g) Ferritic steels with Mo												
X5CrNiMoTi15-2	4589-429-70-E	FM16H	0,08	1,00	1,00	0,040	0,015	13,5 to 15,5	0,20 to 1,20	1,00 to 2,50	—	Ti: 0,30 to 0,50
X6CrMoS17	4105-430-20-X	FM17K	0,08	1,50	1,50	0,040	0,15 to 0,35	16,0 to 18,0	0,20 to 0,60	—	—	—

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
X6CrMo17-1	4113-434-00-I	FM18I	0,08	1,00	1,00	0,040	0,030 ^b	16,0 to 18,0	0,75 to 1,40	—	—	—
X6CrMoNb17-1	4526-436-00-I	FM18J	0,08	1,00	1,00	0,040	0,015	16,0 to 18,0	0,80 to 1,40	—	0,040	Nb: 5xC to 1,00
X2CrMo19	4609-436-77-J	FM19B	0,025	1,00	1,00	0,040	0,030	17,0 to 20,0	0,40 to 0,80	—	0,025	Ti+Nb+Zr: 8x(C+N) to 0,80
X2CrMoNbTi18-1	4513-436-00-J	FM19A	0,025	1,00	1,00	0,040	0,030	16,0 to 19,0	0,75 to 1,50	—	0,025	Ti+Nb+Zr: 8x(C+N) to 0,80
X2CrMoTi18-2	4521-444-00-I	FM20B	0,025	1,00	1,00	0,040	0,015	17,0 to 20,0	1,75 to 2,50	—	0,030	Ti: $\geq 4x(C+N)$ and 0,15 $\leq Ti \leq 0,80$ d
X2CrMoTiS18-2	4523-182-35-I	FM20C	0,030	1,00	0,50	0,040	0,15 to 0,35	17,5 to 19,0	2,00 to 2,50	—	—	Ti: 0,30 to 0,80 (C+N) $\leq 0,040$
X2CrMo23-1	4128-445-92-J	FM24B	0,025	1,00	1,00	0,040	0,030	21,0 to 24,0	0,70 to 1,50	—	0,025	—
X2CrMo23-2	4129-445-92-J	FM25A	0,025	1,00	1,00	0,040	0,030	21,0 to 24,0	1,50 to 2,50	—	0,025	—
X1CrMo26-1	4131-446-92-C	FM27A	0,010	0,40	0,40	0,030	0,020	25,0 to 27,5	0,75 to 1,50	—	0,015	—
X2CrMoNi27-4-2	4750-446-60-U	FM31A	0,030	1,00	1,00	0,040	0,030	25,0 to 28,0	3,0 to 4,0	1,00 to 3,5	0,040	(Ti + Nb): 0,20 + 6 x (C+N) to 1,00
X1CrMo30-2	4135-447-92-C	FM32A	0,010	0,40	0,40	0,030	0,020	28,5 to 32,0	1,50 to 2,50	—	0,015	—
h) Martensitic steels												
X12Cr13	4006-410-00-I	MP13B	0,08 to 0,15	1,00	1,50	0,040	0,030 ^b	11,5 to 13,5	—	0,75	—	—
X12CrS13	4005-416-00-I	MP13C	0,08 to 0,15	1,00	1,50	0,040	$\geq 0,15$	12,0 to 14,0	0,60	—	—	—
X13CrPb13	4642-416-72-J	MP13A	0,15	1,00	1,00	0,040	0,030	11,5 to 13,5	—	—	—	Pb: 0,05 to 0,30
X15Cr13	4024-410-09-E	MP13F	0,12 to 0,17	1,00	1,00	0,040	0,015	12,0 to 14,0	—	—	—	—
X20Cr13	4021-420-00-I	MP13I	0,16 to 0,25	1,00	1,50	0,040	0,030 ^b	12,0 to 14,0	—	—	—	—
X30Cr13	4028-420-00-I	MP13M	0,26 to 0,35	1,00	1,50	0,040	0,030 ^b	12,0 to 14,0	—	—	—	—
X33CrS13	4029-420-20-I	MP13N	0,25 to 0,40	1,00	1,50	0,060	$\geq 0,15$	12,0 to 14,0	0,60	0,60	—	—
X33CrPb13	4643-420-72-J	MP13O	0,26 to 0,40	1,00	1,00	0,040	0,030	12,0 to 14,0	—	—	—	Pb: 0,05 to 0,30
X39Cr13	4031-420-00-I	MP13P	0,36 to 0,42	1,00	1,00	0,040	0,030 ^b	12,5 to 14,5	—	—	—	—
X46Cr13	4034-420-00-I	MP13Q	0,43 to 0,50	1,00	1,00	0,040	0,030 ^b	12,5 to 14,5	—	—	—	—

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
X46CrS13	4035-420-74-E	MP13R	0,43 to 0,50	1,00	2,00	0,040	0,15 to 0,35	12,5 to 14,0	—	—	—	—
X52Cr13	4038-420-00-I	MP13U	0,48 to 0,55	1,00	1,00	0,040	0,030 ^b	12,5 to 14,5	—	—	—	—
X60Cr13	4039-420-09-I	MP13V	0,56 to 0,65	1,00	1,00	0,040	0,030 ^b	12,5 to 14,5	—	—	—	—
X17CrNi16-2	4057-431-00-X	MP16G	0,12 to 0,22	1,00	1,50	0,040	0,030	15,0 to 17,0	—	1,50 to 2,50	—	—
X33Cr16	4058-429-99-I	MP16O	0,25 to 0,40	1,00	1,00	0,040	0,030	15,0 to 17,0	—	—	—	—
X14CrS17	4019-430-20-I	MP17F	0,10 to 0,17	1,00	1,50	0,040	≥0,15	16,0 to 18,0	0,60	—	—	—
X68Cr17	4040-440-02-X	MP17U	0,60 to 0,75	1,00	1,00	0,040	0,030	16,0 to 18,0	0,75	0,60	—	—
X85Cr17	4041-440-03-X	MP17V	0,75 to 0,95	1,00	1,00	0,040	0,030	16,0 to 18,0	0,75	0,60	—	—
X110Cr17	4023-440-04-I	MP17W	0,95 to 1,20	1,00	1,00	0,040	0,030	16,0 to 18,0	0,75	0,60	—	—
X110CrS17	4025-440-74-X	MP17Z	0,95 to 1,20	1,00	1,25	0,060	≥0,15	16,0 to 18,0	0,75	0,60	—	—
X80CrSiNi20-2	4766-440-77-X	MP20U	0,75 to 0,85	1,75 to 2,25	0,20 to 0,60	0,030	0,030	19,0 to 20,50	—	1,15 to 1,65	—	—
i) Martensitic steels with Mo												
X18CrMnMoNbVN12	4916-600-77-I	MM12G	0,15 to 0,20	0,50	0,50 to 1,00	0,040	0,030	10,0 to 13,0	0,30 to 0,90	0,60	0,05 to 0,10	Nb: 0,20 to 0,60 V: 0,10 to 0,40
X23CrMoWMnNiV12-1-1	4929-422-00-I	MM13J	0,20 to 0,25	0,50	0,50 to 1,00	0,040	0,025	11,0 to 12,5	0,75 to 1,25	0,50 to 1,00	—	V: 0,20 to 0,30 W: 0,75 to 1,25
X22CrMoV12-1	4923-422-77-E	MM13H	0,18 to 0,24	0,50	0,40 to 0,90	0,025	0,015	11,0 to 12,5	0,8 to 1,2	0,30 to 0,80	—	V: 0,25 to 0,35
X13CrMo13	4119-410-92-C	MM13G	0,08 to 0,18	0,60	1,00	0,040	0,030	11,5 to 14,0	0,30 to 0,60	—	—	—
X38CrMo14	4419-420-97-E	MM14P	0,36 to 0,42	1,00	1,00	0,040	0,015	13,0 to 14,5	0,60 to 1,00	—	—	—
X55CrMo14	4110-420-69-E	MM14U	0,48 to 0,60	1,00	1,00	0,040	0,015	13,0 to 15,0	0,50 to 0,80	—	—	V: 0,15
X3CrNiMo13-4	4313-415-00-I	MM14A	0,05	0,70	0,50 to 1,00	0,040	0,015	12,0 to 14,0	0,30 to 1,00	3,5 to 4,5	—	—
X50CrMoV15	4116-420-77-E	MM15U	0,45 to 0,55	1,00	1,00	0,040	0,015	14,0 to 15,0	0,50 to 0,80	—	0,15	V: 0,10 to 0,20
X2CrNiMoV13-5-2	4415-415-92-E	MM15A	0,030	0,50	0,50	0,040	0,015	11,5 to 13,5	1,50 to 2,50	4,5 to 6,5	—	Ti: 0,010 V: 0,10 to 0,50

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
X4CrNiMo16-5-1	4418-431-77-E	MM17A	0,06	0,70	1,50	0,040	0,015	15,0 to 17,0	0,80 to 1,50	4,0 to 6,0	≥0,020	—
X39CrMo17-1	4122-434-09-I	MM18R	0,33 to 0,45	1,00	1,50	0,040	0,015	15,5 to 17,5	0,80 to 1,30	1,00	—	—
X40CrMoVN16-2	4123-431-77-E	MM18T	0,35 to 0,50	1,00	1,00	0,040	0,015	14,0 to 16,0	1,00 to 2,50	0,50	0,10 to 0,30	V: 1,50
j) Precipitation-hardening steels												
X5CrNiCuNb16-4	4542-174-00-I	PP20I	0,07	1,00	1,50	0,040	0,030 ^b	15,0 to 17,0	0,60	3,0 to 5,0	—	Cu: 3,0 to 5,0 Nb: 0,15 to 0,45
X7CrNiAl17-7	4568-177-00-I	PP24L	0,09	1,00	1,00	0,040	0,015	16,0 to 18,0	—	6,5 to 7,8 ^k	—	Al: 0,70 to 1,50
k) Precipitation-hardening steels with Mo												
X5CrNiMoCuNb14-5	4594-155-92-E	PM21I	0,07	0,70	1,00	0,040	0,015	13,0 to 15,0	1,20 to 2,00	5,0 to 6,0	—	Cu: 1,20 to 2,00 Nb: 0,15 to 0,60
X1CrNiMoAlTi12-9-2	4530-455-77-E	PM23A	0,015	0,10	0,10	0,010	0,005	11,5 to 12,5	1,85 to 2,15	8,5 to 9,5	0,01	Ti: 0,28 to 0,37 Al: 0,60 to 0,80
X1CrNiMoAlTi12-10-2	4596-455-77-E	PM24A	0,015	0,10	0,10	0,010	0,005	11,5 to 12,5	1,85 to 2,15	9,2 to 10,2	0,02	Ti: 0,28 to 0,40 Al: 0,80 to 1,10
X8CrNiMoAl15-7-2	4532-157-00-I	PM24M	0,10	1,00	1,20	0,040	0,015	14,0 to 16,0	2,00 to 3,00	6,5 to 7,8	—	Al: 0,75 to 1,50
X3CrNiMoAl13-8-3	4534-138-00-X	PM24H	0,05	0,10	0,20	0,010	0,008	12,3 to 13,2	2,00 to 3,00	7,5 to 8,5	0,010	Al: 0,90 to 1,35
X9CrNiMoN17-5-3	4457-350-00-X	PM25M	0,07 to 0,11	0,50	0,50 to 1,25	0,040	0,030	16,0 to 17,0	2,5 to 3,2	4,0 to 5,0	0,07 to 0,13	—
X2CrNiMoCuAlTi12-9-4-3 ^e	4645-469-10-U ⁱ	PM25A	0,030	0,70	1,00	0,030	0,015	11,0 to 13,0	3,5 to 5,0	8,0 to 10,0	—	Al: 0,15 to 0,50 Cu: 1,50 to 3,5 Ti: 0,50 to 1,20
X6NiCrTiMoVB25-15-2 ^j	4980-662-86-X ⁱ	PM42J	0,08	1,00	2,00	0,040	0,030	13,5 to 16,0	1,00 to 1,50	24,0 to 27,0	—	Ti: 1,90 to 2,35 Al: 0,35 V: 0,10 to 0,50 B: 0,001 to 0,010
X4NiCrMoTiMn-SiB26-14-3-2	4644-662-20-U	PM43J	0,08	0,40 to 1,00	0,40 to 1,00	0,040	0,030	12,0 to 15,0	2,0 to 3,5	24,0 to 28,0	—	Ti: 1,80 to 2,10 Al: 0,35 B: 0,001 to 0,010

Table 1 (continued)

Steel designation			% (mass fraction) ^a									
ISO name	ISO number	Line number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Others
^a Maximum values unless indicated otherwise.												
^b Particular ranges of sulfur mass fraction can provide improvement of particular properties. For machinability, a controlled sulfur mass fraction of 0,015 % to 0,030 % is recommended. For weldability, a controlled sulfur mass fraction of 0,008 % to 0,020 % can be beneficial. For polishability, a controlled sulfur mass fraction of 0,015 % maximum is recommended.												
^c Where, for special reasons (e.g. hot workability or low magnetic permeability), it is necessary to minimize the ferrite content, the maximum nickel mass fraction can be increased by the following amounts:												
— by 0,50 % for steels X2CrNi18-9, X5CrNi18-10, X6CrNiMoTi17-12-2;												
— by 1,00 % for steels X6CrNiTi18-10, X7CrNiTi18-10, X6CrNiNb18-10, X7CrNiNb18-10, X2CrNi19-11, X2CrNiMo17-11-2, X5CrNiMo17-12-2, X3CrNiMo17-12-3, X2CrNiMoN18-12-4;												
— by 1,50 % for steels X2CrNiMo17-12-2, X2CrNiMo17-12-3.												
^d Stabilization can be obtained by the use of titanium and/or niobium and/or zirconium. The equivalence shall be the following: Nb [% (mass fraction)] = Zr [% (mass fraction)] = 7/4 Ti [% (mass fraction)].												
^e Copper can be added up to 1,00 %. If it is added, it must be reported in the inspection document, provided such a document has been ordered.												
^f Nb can be added up to 0,15 %.												
^g For pressure purposes, a carbon limit of C ≤ 0,07 % is allowed.												
^h For special applications, the lower limits of N, Cr, and Mo can be limited to 0,14 %, 22,0 %, and 3,0 %.												
ⁱ For certain applications, e.g. weldability or high-strength wire, a maximum of 0,12 % C can be agreed upon.												
^j Steel grade 4980-662-86-X is also used as cryogenic steel grade with number 4606-662-86-X.												
^k By special agreement, the steel, when intended for cold deformation, can also be ordered with 7,00 % to 8,30 % Ni.												
^l Patented grade.												
^m S40900 (4512-409-00-I) has been replaced by S40910, S40920 and S40930. Unless otherwise specified in the ordering information, an order specifying S40900 shall be satisfied by any one of S40910 [with Ti: 6 × (C+N) to 0,50, Nb: ≤ 0,17], S40920 [with 8 × (C+N) ≤ Ti: 0,15 to 0,50 and Nb: ≤ 0,10] or S40930 [with 0,08 + 8 × (C+N) ≤ (Nb +Ti) ≤ 0,75 and Ti ≥ 0,05] at the option of the seller. Material meeting the requirements of S40910, S40920, and S40930 can, at the option of the manufacturer, be certified as S40900.												
Steel grade 4512-409-10-I is also used as heat-resistant steel grade with number 4720-409-00-I and can be found in ISO 4955.												

Table 2 — Principles used for allocation of the last two digits of the ISO steel numbers according to this International Standard (for information only)

Last two digits	Allocation
03, 90	Low carbon
91	Low carbon, increased nickel
25, 50, 54, 92	Low carbon, increased molybdenum
93	Low carbon, increased nickel and molybdenum
53, 50, 54, 94	Low carbon, increased nitrogen
95	Low carbon, increased molybdenum and nitrogen
00, 96	Normal carbon
97	Normal carbon, increased molybdenum
51, 98	Normal carbon, increased nitrogen
02, 09	High carbon
35, 36, 70	Titanium addition
40, 41, 42, 71	Niobium (columbium) addition
23, 72	Addition of cerium or aluminium or silicon or selenium or lead
73	High carbon, increased nickel
20, 74	Sulfur addition
75	Low carbon, copper addition
76	Normal carbon, copper addition
77	Miscellaneous
78	Miscellaneous
79	Miscellaneous

Table 3 — Rules for allocating the last letter of the ISO steel numbers according to this International Standard

Last digit A	Allocation
E	Grade origin is a standard in Europe and grade is defined by the "Stahl-Eisen-Liste".
U	Grade origin is a standard in the United States of America and grade is defined by an existing UNS number.
J	Grade origin is a standard in Japan (appears in a JIS standard).
C	Grade origin is a standard in China (appears in a Chinese National Standard).
I	First definition of the composition in this International Standard.
X	Grade composition fulfils 2 or more of the above E, U, J, C criteria.

Table 4 — Examples of ISO steel numbers according to this International Standard

ISO number	Explanations
4307-304-03-I	The designation ends with I: composition is defined by this International Standard: — this is a “compromise” composition between existing standards; — the composition defined in Europe as EN 1.4307 and in the US as S30403 are considered as close matches to this ISO grade. NOTE As stated in Tables A.1 to A.3: standardized compositions that are close matches also exist in the JIS standard (grade SUS304L) and in the Chinese National Standard (grade S30403). Ending of the designation with 03 refers to the low carbon content.
4325-302-00-E	The designation ends with E: grade origin is a European standard: — the ISO composition is identical to the existing standardized European grade: 1.4325; — the composition defined by UNS grade S30200 is a close match to this ISO grade. NOTE As stated in Tables A.1 to A.3: standardized compositions that are close matches also exist in the JIS standard (grade SUS302) and in the Chinese standard (Chinese grade S30210). The steel composition should also be checked with former AISI 302, now designated as S30200 under the UNS system.
4959-088-10-U	The designation ends with U: grade origin is a standard of the USA: — the ISO composition is identical to the existing standardized grade UNS N08810; — the composition defined in Europe as EN 1.4959 is a close match to this ISO grade. NOTE As stated in Tables A.1 to A.3: standardized compositions that are close matches also exist in the JIS standard (grade NCF800H). Grade UNS N08810 is listed in Table A.3.
4494-316-74-J	The designation ends with J: grade origin is a Japanese standard: — the ISO composition is identical to the existing SUS316F grade standardized by JIS as shown in Tables A.1 to A.3; — the composition defined in Europe as EN 1.4494 is a close match to this ISO grade. NOTE Ending of the designation with 74 refers to the addition of sulfur.
4040-440-02-X	The designation ends with X: grade origin is a standard of China and of Japan: — the ISO composition is identical to the existing Chinese standardized grade S44070 listed in GB/T20878 and is identical to Japanese grade SUS440A listed in a JIS standard; — the composition defined in Europe as 1.4040 in the “Stahl-Eisen-Liste” and is identical to the ISO grade; — the composition defined in UNS as S44002 has a wider match to this ISO grade. NOTE Ending of the designation with 02 refers to a high carbon level.
4665-316-76-J	The designation ends with J: grade origin is a Japanese standard: — the ISO composition is identical to the existing SUS316J1 grade standardized by JIS; — the composition is introduced in the “Stahl-Eisen-Liste” as grade 1.4665; — ending with the digits 76 refers to the addition of Cu compared to the general 316 grades.