BS ISO 15510:2014

BSI Standards Publication

Stainless steels — Chemical composition

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of ISO 15510:2014. It supersedes BS ISO 15510:2010 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/105, Steels for Heat Treatment, Alloy Steels, Free-Cutting Steels and Stainless Steels.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2014

ISBN 978 0 580 80915 6
ICS 77.140.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 May 2014.

Amendments/corrigenda issued since publication

Date	Text affected

BS ISO 15510:2014

INTERNATIONAL STANDARD

ISO 15510

Second edition
2014-05-15

Stainless steels — Chemical composition

Aciers inoxydables — Composition chimique

Reference number
ISO 15510:2014(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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.

INTERNATIONAL STANDARD ISO 15510:2014(E)

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 Dusseldorf, 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 austentic steels (without Mo), austenitic steels with Mo, austentic 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-maganese-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	—	—
X2CrNiN18-7	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	—
X10CrNiS18-9	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	—	—
X2CrNiN18-9	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
X6CrNiCuS18-9-2	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
X12CrNiCuS18-9-3	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
X5CrNiN19-9	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
X6CrNiSiNCe19-10	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
X40CrNiWSi15-14-3-2	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	—	—
X7CrNiSiNCe21-11	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-J	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 to17,5	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 to18,5	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-J	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 to18,5	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-J	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-J	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-J	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-J	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	AN51O	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
X6NiCrSiNCe35-25	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-MoWMnNNb21-20-20-3-3-2	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	—	—
X2CrNiMnMoCuN24-4-3-2[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-I[mn]	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	—	—	—	—
X7CrS17	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[l]	4611-445-70-E[l]	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[l]	4613-446-70-E[l]	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: ≥ 4x (C+N) and 0,15 ≤Ti ≤ 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) ≤ 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 × (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	≥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	≥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-J	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-J	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[l]	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[j]	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, X2CrNiMoN17-11-2, X5CrNiMo17-12-2, X3CrNiMo17-12-3, X2CrNiMoN17-12-3, 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, 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.

[n] 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.

Annex A
(informative)

Designation of the steels given in Table 1 and of comparable grades covered in various designation systems

Table A.1 — Designations of the steels given in Table 1 and of comparable grades covered in various designation systems

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
a) Austenitic steels										
4319-301-00-I	X5CrNi17-7	AP24H	S30100	W	1.4319	I	SUS301	W	S30110	W
4310-301-09-X	X12CrNi17-7	AP24N	S30100	I	(1.43XX)	I	SUS301	I	—	—
4318-301-53-I	X2CrNiN18-7	AP25A	S30153	W	1.4318	N	SUS301L	W	S30153	W
4567-304-76-I	X6CrNiCu17-8-2	AP25J	—	—	1.4567	W	SUS304J1	I	S30480	W
4310-301-00-I	X10CrNi18-8	AP26L	S30100	W	1.4310	N	—	—	S30110	W
4307-304-03-I	X2CrNi18-9	AP27B	S30403	W	1.4307	N	SUS304L	W	S30403	W
4948-304-09-I	X7CrNi18-9	AP27L	S30409	W	1.4948	W	SUS304H	W	S30409	W
4325-302-00-E	X9CrNi18-9	AP27N	S30200	W	1.4325	I	SUS302	W	S30210	W
4305-303-00-I	X10CrNiS18-9	AP27M	S30300	W	1.4305	W	SUS303	W	S30317	W
4625-303-23-X	X12CrNiSe18-9	AP27O	S30323	I	1.4625	I	SUS303Se	I	S30327	I
4326-302-15-I	X12CrNiSi18-9-3	AP27P	S30215	W	(1.4326)	I	SUS302B	I	S30240	N
4311-304-53-I	X2CrNiN18-9	AP27A	S30453	W	1.4311	N	SUS304LN	W	S30453	W
4567-304-98-X	X6CrNiCu18-9-2	AP27J	—	—	1.4567	W	SUS304J3	I	S30480	I
4567-304-30-I	X3CrNiCu18-9-4	AP27F	S30430	W	(1.4567)	N	SUSXM7	W	S30488	W
4570-303-31-I	X6CrNiCuS18-9-2	AP27I	S30331	I	1.4570	N	—	—	—	—
4667-303-76-J	X12CrNiCuS18-9-3	AP27Q	—	—	1.4667	I	SUS303Cu	I	—	—
4315-304-51-I	X5CrNiN19-9	AP28F	S30451	N	1.4315	W	SUS304N1 SUS304N2	I N	S30458	W
4560-304-75-E	X3CrNiCu19-9-2	AP28D	—	—	1.4560	I	—	—	—	—
4649-304-76-J	X6CrNiCu19-9-1	AP28I	—	—	1.4649	I	SUS304Cu	I	S30488	W
4640-304-76-E	X5CrNiCu19-6-2	AP28L	—	—	1.4640	I	—	—	—	—
4301-304-00-I	X5CrNi18-10	AP28E	S30400	W	1.4301	I	SUS304	W	S30408	W
4541-321-00-I	X6CrNiTi18-10	AP28G	S32100	W	1.4541	I	SUS321	W	S32168	W
4940-321-09-I	X7CrNiTi18-10	AP28O	S32109	W	1.4940	N	SUS321H	W	S32169	N

Table A.1 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4941-321-09-I	X6CrNiTiB18-10	AP28J	S32109	W	1.4941	W	—	—	S32169	W
4550-347-00-I	X6CrNiNb18-10	AP28H	S34700	I	1.4550	N	SUS347	W	S34778	N
4912-347-09-I	X7CrNiNb18-10	AP28K	S34709	W	1.4912	N	SUS347H	W	S34779	W
4650-304-75-E	X2CrNiCu19-10	AP29A	—	—	1.4650	I	SUS304L	W	S30403	W
4306-304-03-I	X2CrNi19-11	AP30A	S30403	W	1.4306	N	SUS304L	W	S30403	N
4303-305-00-I	X6CrNi18-12	AP30I	S30500	W	1.4303	N	SUS305	W	S30510	W
4961-347-77-E	X8CrNiNb16-13	AP29L	—	—	1.4961	I	—	—	—	—
4818-304-15-E	X6CrNiSiNCe19-10	AP29J	S30415	W	1.4818	I	—	—	S30450	N
4867-316-77-J	X40CrNiWSi15-14-3-2	AP29P	—	—	(1.4867)	I	SUH31	I	—	—
4884-305-00-X	X6CrNiSi18-13-4	AP31H	S30500	W	(1.4884)	I	SUSXM15J1	I	S38148	I
4835-308-15-U	X7CrNiSiNCe21-11	AP32N	S30815	I	1.4835	N	—	—	—	—
4828-305-09-I	X15CrNiSi20-12	AP32R	—	—	1.4828	N	—	—	—	—
4361-306-00-E	X1CrNiSi18-15-4	AP33A	—	—	1.4361	I	—	—	—	—
4597-204-76-I	X8CrMnCuN17-8-3	AP25L	—	—	1.4597	N	—	—	—	—
4376-201-00-E	X8CrMnNi19-6-3	AP28P	—	—	1.4376	I	—	—	—	—
4615-201-75-E	X3CrMnNiCu15-8-5-3	AP28C	—	—	(1.4615)	I	—	—	—	—
4372-201-00-I	X12CrMnNiN17-7-5	AP29O	S20100	N	1.4372	N	SUS201	W	S35350	N
4371-201-53-I	X2CrMnNiN17-7-5	AP29B	S20153	N	1.4371	N	—	—	—	—
4617-201-76-J	X6CrNiMnCu17-8-4-2	AP29I	—	—	1.4617	I	SUS304J2	I	—	—
4618-201-76-E	X9CrMnNiCu17-8-5-2	AP30L	—	—	1.4618	I	—	—	—	—
4373-202-00-I	X12CrMnNiN18-9-5	AP32O	S20200	W	1.4373	N	SUS202	W	S35450	N
4369-202-91-I	X11CrNiMnN19-8-6	AP33L	—	—	1.4369	I	—	—	—	—
4020-241-00-X	X13CrMnNiN18-13-2	AP33M	—	—	1.4020	I	—	—	—	—
4646-240-76-E	X6CrMnNiCuN18-12-4	AP34H	—	—	1.4646	I	—	—	—	—
4378-240-00-X	X6CrMnNiN18-13-3	AP34I	—	—	1.4378	I	—	—	—	—
4890-202-09-X	X53CrMnNiN21-9-4	AP34V	—	—	1.4890	I	SUH35	I	S35650	I
4824-308-09-J	X20CrNiN22-11	AP33Q	—	—	1.4824	I	SUH37	I	S30850	W
4950-309-08-E	X6CrNi23-13	AP36J	S30908	W	1.4950	I	SUS309S	W	S30908	W
4833-309-08-I	X18CrNi23-13	AP36R	S30908	W	1.4833	N	SUH309	W	S30908	W

Table A.1 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4951-310-08-I	X6CrNi25-20	AP45L	S31008	W	1.4951	N	SUS310S	W	S31008	W
4335-310-02-I	X1CrNi25-21	AP46A	S31002	W	1.4335	I	—	—	—	—
4845-310-08-E	X8CrNi25-21	AP46L	S31008	W	1.4845	I	SUS310S	W	S31008	N
4845-310-09-X	X23CrNi25-21	AP46O	S31008	W	1.4845	N	SUH310	I	S31020	I
4841-314-00-E	X15CrNiSi25-21	AP46R	S31400	N	1.4841	I	—	—	—	—
b) Austenitic steels with Mo										
4982-215-00-E	X10CrNiMoMnNbVB15-10-1	AM32P	S21500	N	1.4982	I	—	—	—	—
4660-315-77-I	X6CrNiCuSiMo19-10-3-2	AM30J	—	—	1.4660	I	SUS315J1	N	—	—
4648-315-77-I	X6CrNiSiCuMo19-13-3-3-1	AM33I	—	—	1.4648	I	SUS315J2	W	—	—
4406-316-53-I	X2CrNiMoN17-11-2	AM30B	S31653	W	1.4406	N	SUS316LN	W	S31653	N
4578-316-76-E	X3CrNiCuMo17-11-3-2	AM30F	—	—	1.4578	I	—	—	—	—
4404-316-03-I	X2CrNiMo17-12-2	AM31A	S31603	W	1.4404	N	SUS316L	W	S31603	N
4401-316-00-I	X5CrNiMo17-12-2	AM31I	S31600	W	1.4401	N	SUS316	W	S31608	N
4571-316-35-I	X6CrNiMoTi17-12-2	AM31F	S31635	W	1.4571	N	SUS316Ti	W	S31668	W
4580-316-40-I	X6CrNiMoNb17-12-2	AM31G	S31640	W	1.4580	N	—	—	S31678	W
4665-316-76-J	X6CrNiMoCu18-12-2-2	AM32I	—	—	1.4665	I	SUS316J1	I	—	—
4432-316-03-I	X2CrNiMo17-12-3	AM32A	S31603	W	1.4432	I	SUS316L	W	S31603	W
4436-316-00-I	X3CrNiMo17-12-3	AM32F	S31600	W	1.4436	I	SUS316	W	S31608	W
4429-316-53-I	X2CrNiMoN17-12-3	AM32B	S31653	W	1.4429	N	SUS316LN	W	S31653	N
4495-316-51-J	X6CrNiMoN17-12-3	AM32H	S31651	N	(1.4495)	I	SUS316N	I	S31658	N
4494-316-74-J	X6CrNiMoS17-12-3	AM32K	—	—	(1.4494)	I	SUS316F	I	—	—
4449-316-76-E	X3CrNiMo18-12-3	AM33F	—	—	1.4449	I	—	—	—	—
4910-316-77-E	X3CrNiMoBN17-13-3	AM33G	—	—	1.4910	I	—	—	—	—
4647-316-75-X	X2CrNiMoCu18-14-2-2	AM34A	—	—	(1.4647)	I	SUS316J1L	I	S31683	I
4435-316-03-X	X2CrNiMo17-14-3	AM34C	—	—	(1.44xx)	I	SUS316L	I	—	—
4435-316-91-I	X2CrNiMo18-14-3	AM35A	—	—	1.4435	N	SUS316L	W	S31603	W
4879-317-77-J	X30CrNiMoPB20-11-2	AM33R	—	—	(1.4879)	I	SUH38	I	—	—
4434-317-53-I	X2CrNiMoN18-12-4	AM34B	S31753	W	1.4434	N	SUS317LN	W	S31753	W
4439-317-26-E	X2CrNiMoN17-13-5	AM35B	S31726	N	1.4439	I	—	—	S31723	W
4445-317-00-U	X6CrNiMo19-13-4	AM36I	S31700	I	(1.4445)	I	SUS317	W	S31708	N
4438-317-03-I	X2CrNiMo19-14-4	AM37A	S31703	W	1.4438	W	SUS317L	W	S31703	W

Table A.1 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4483-317-26-I	X2CrNiMoN18-15-5	AM38A	S31726	W	(1.4483)	I	—	—	S31723	N
4476-317-92-X	X3CrNiMo18-16-5	AM39F	—	—	(1.4476)	I	SUS317J1	I	S31794	I
4496-309-51-J	X4CrNiMoN25-14-1	AM40F	—	—	(1.4496)	I	SUS317J2	I	—	—
4547-312-54-I	X1CrNiMoCuN20-18-7	AM45A	S31254	W	1.4547	N	SUS312L	W	S31252	N
4466-310-50-E	X1CrNiMoN25-22-2	AM49A	S31050	W	1.4466	I	—	—	S31053	W
4659-312-66-I	X1CrNiMoCuNW24-22-6	AM52B	S31266	W	1.4659	I	—	—	—	—
4652-326-54-I	X1CrNiMoCuN24-22-8	AM54A	S32654	N	1.4652	I	—	—	S32652	N
4565-345-65-I	X2CrNiMnMoN25-18-6-5	AM54B	S34565	W	1.4565	I	—	—	S34553	N
c) Austenitic steels with Ni/Co as main alloying elements										
4389-384-00-I	X3NiCr18-16	AN34F	S38400	W	(1.4389)	I	SUS384	W	S38408	W
4656-089-04-I	X1NiCrMoCu22-20-5-2	AN47A	N08904	N	(1.4656)	I	—	—	S39042	N
4539-089-04-I	X1NiCrMoCu25-20-5	AN50A	N08904	W	1,4539	N	SUS890L	W	S39042	N
4529-089-26-I	X1NiCrMoCuN25-20-7	AN52A	N08926	W	1,4529	N	—	—	—	—
4478-083-67-U	X2NiCrMoN25-21-7	AN53A	N08367	I	(1.4478)	I	SUS836L	W	—	—
4537-310-92-E	X1CrNiMoCuN25-25-5	AN55A	—	—	1,4537	I	—	—	—	—
4958-088-77-E	X5NiCrAlTi31-20	AN51J	—	—	1,4958	I	—	—	—	—
4558-088-90-E	X2NiCrAlTi32-30	AN52B	—	—	1,4558	I	—	—	—	—
4959-088-77-E	X8NiCrAlTi32-20	AN52L	—	—	1,4959	I	—	—	—	—
4876-088-00-I	X8NiCrAlTi32-21	AN53L	N08800	W	1,4876	N	NCF800	W	—	—
4959-088-10-U	X7NiCrAlTi33-21	AN54L	N08810	I	1,4959	N	NCF800H	N	—	—
4959-088-11-U	X8NiCrAlTi33-21	AN54M	N08811	I	1.4959	W	—	—	—	—
4864-083-77-X	X13NiCr35-16	AN51O	—	—	1.4864	N	SUH 330	I	S33010	I
4657-080-20-U	X4NiCrCuMo35-20-4-3	AN58F	N08020	I	(1.4657)	I	—	—	—	—
4854-353-15-E	X6NiCrSiNCe35-25	AN60J	S35315	N	1.4854	I	—	—	—	—
4563-080-28-I	X1NiCrMoCu31-27-4	AN62A	N08028	W	1.4563	I	—	—	—	—
4971-314-79-I	X12CrNiCo-MoWMnNNb21-20-20-3-3-2	AN64R	—	—	1.4971	N	SUH661	W	—	—
4479-089-36-U	X1NiCrMoMnN34-27-6-5	AN72A	N08936	I	(1.4479)	I	—	—	—	—

Table A.1 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
d) Austenitic-ferritic (duplex) steels										
4062-322-02-U	X2CrNiN22-2	DP24A	S32202	N	1.4062	I	—	—	—	—
4669-322-76-E	X2CrCuNiN23-2-2	DP25A	—	—	1.4669	I	—	—	—	—
4162-321-01-E	X2CrMnNiN21-5-1	DP27F	S32101	N	1.4162	I	—	—	—	—
4362-323-04-I	X2CrNiN23-4	DP27B	S32304	W	1.4362	I	—	—	S23043	W
e) Austenitic-ferritic (duplex) steels with Mo										
4482-320-01-X	X2CrMnNiMoN21-5-3	DM29A	—	—	1.4482	I	—	—	—	—
4424-315-00-I	X2CrNiMoSiMnN19-5-3-2-2	DM29B	S31500	N	1.4424	N				
4462-318-03-I	X2CrNiMoN22-5-3	DM30A	S32205	N	1.4462	I	SUS329J3L	W	S22053	N
4480-329-00-U	X6CrNiMo26-4-2	DM32F	S32900	I	(1.4480)	I	SUS329J1	W	—	—
4662-824-41-X	X2CrNiMnMoCuN24-4-3-2	DM33A	—	—	1.4662	I	—	—	—	—
4460-312-00-I	X3CrNiMoN27-5-2	DM34F	S31200	W	1.4460	I	—	—	S22553	W
4507-325-20-I	X2CrNiMoCuN25-6-3	DM34A	S32520	W	1.4507	I	—	—	S25554	—
4507-325-50-X	X3CrNiMoCuN26-6-3-2	DM35F	S32550	I	1.4507	W	—	—	S25554	I
4481-312-60-J	X2CrNiMoN25-7-3	DM35A	S31260	W	(1.4481)	I	SUS329J4L	I	S22583	W
4410-327-50-E	X2CrNiMoN25-7-4	DM36A	S32750	W	1.4410	I	—	—	S25073	W
4501-327-60-I	X2CrNiMoCuWN25-7-4	DM36B	S32760	I	1.4501	N	—	—	S27603	N
4477-329-06-E	X2CrNiMoN29-7-2	DM38A	S32906	N	1.4477	I	—	—	—	—
4658-327-07-U	X2CrNiMoCoN28-8-5-1	DM42A	S32707	I	1.4658	I	—	—	—	—
4485-332-07-U	X2CrNiMoN31-8-4	DM43A	S33207	I	(1.4485)	I	—	—	—	—
f) Ferritic steels										
4030-410-90-X	X2Cr12	FP12A	—	—	(1.4030)	I	SUS410L	I	S11203	
4512-409-10-I	X2CrTi12	FP12B	S40900	W	1.4512	N	SUH409L	W	S11163	
4003-410-77-I	X2CrNi12	FP12C	S41003	N	1.4003	N	—	—	S11213	
4600-410-70-E	X2CrMnNiTi12	FP12D	—	—	1.4600	I	—	—	—	
4516-409-75-I	X6CrNiTi12	FP12F	S40975	W	1.4516	N	—	—	—	
4000-410-08-I	X6Cr13	FP13G	S41008	W	1.4000	N	SUS410S	N	S41008	N
4002-405-00-I	X6CrAl13	FP13H	S40500	W	1.4002	N	SUS405	W	S11348	N
4724-405-77-I	X10CrAlSi13	FP13L	—	—	1.4724	N	—	—	—	—

Table A.1 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4012-429-00-X	X10Cr15	FP15L	S42900	I	(1.4012)	I	SUS429	I	S11510	I
4595-429-71-I	X1CrNb15	FP15A	—	—	1.4595	N	—	—	—	—
4016-430-00-I	X6Cr17	FP17I	S43000	W	1.4016	I	SUS430	W	S11710	W
4004-430-20-I	X7CrS17	FP17L	S43020	W	(1.4004)	I	SUS430F	W	S11717	W
4520-430-70-I	X2CrTi17	FP17A	—	—	1.4520	N	SUS430LX	W	—	—
4510-430-36-X	X2CrNb17	FP17B	—	—	1.4510	N	SUS430LX	I	S11863	I
4510-430-35-I	X3CrTi17	FP17F	S43035	W	1.4510	N	SUS430LX	W	S11863	W
4511-430-71-I	X3CrNb17	FP17G	—	—	1.4511	N	SUS430LX	W	—	—
4017-430-91-E	X6CrNi17-1	FP17H	—	—	1.4017	I	—	—	—	—
4664-430-75-J	X2CrCuTi18	FP18A	—	—	(1.4664)	I	SUS430J1L	I	—	—
4509-439-40-X	X2CrTiNb18	FP18B	S43940	I	1.4509	N	SUS430LX	W	S11873	I
4742-430-77-I	X10CrAlSi18	FP18N	—	—	1.4742	N	—	—	—	—
4764-442-72-J	X8CrAl19-3	FP19N	—	—	(1.4764)	I	SUH21	I	—	—
4607-445-00-E	X2CrNbTi20	FP20A	—	—	1,4607	I	—	—	—	—
4611-445-70-E	X2CrTi21	FP21A	—	—	1.4607	I	—	—	—	—
4621-445-00-E	X2CrNbCu21	FP21B	S44500	W	(1.4621)	I	—	—	—	—
4621-443-30-J	X2CrTiCu22	FP22A	—	—	(1.4621)	N	SUS443J1	I	—	—
4613-446-70-E	X2CrTi24	FP24A	—	—	1.4607	I	—	—	—	—
4762-445-72-I	X10CrAlSi25	FP25N	—	—	1.4762	N	—	—	—	—
4749-446-00-I	X15CrN26	FP26R	S44600	W	1.4749	W	SUH446	W	S12550	W
g) Ferritic steels with Mo										
4589-429-70-E	X5CrNiMoTi15-2	FM16H	—	—	1.4589	I	—	—	—	—
4105-430-20-X	X6CrMoS17	FM17K	—	—	1.4105	I	—	—	—	—
4113-434-00-I	X6CrMo17-1	FM18I	S43400	W	1.4113	N	SUS434	W	S11790	W
4526-436-00-I	X6CrMoNb17-1	FM18J	S43600	W	1.4526	N	—	—	S11770	W
4609-436-77-J	X2CrMo19	FM19B	—	—	(1.4609)	I	SUS436J1L	I	—	—
4513-436-00-J	X2CrMoNbTi18-1	FM19A	S43600	W	(1.4513)	N	SUS436L	I	S11862	W
4521-444-00-I	X2CrMoTi18-2	FM20B	S44400	W	1.4521	N	SUS444	W	S11972	W
4523-182-35-I	X2CrMoTiS18-2	FM20C	S18235	W	1.4523	I	—	—	—	—

Table A.1 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4128-445-92-J	X2CrMo23-1	FM24B	—	—	(1.4128)	I	SUS445J1	I	—	—
4129-445-92-J	X2CrMo23-2	FM25A	—	—	(1.4129)	I	SUS445J2	I	—	—
4131-446-92-C	X1CrMo26-1	FM27A	S44627	W	(1.4131)	I	SUSXM27	N	S12791	I
4750-446-60-U	X2CrMoNi27-4-2	FM31A	S44660	I	(1.4750)	I	—	—	—	—
4135-447-92-C	X1CrMo30-2	FM32A	S44700	N	(1.4135)	I	SUS447J1	N	S13091	I
h) Martensitic steels										
4006-410-00-I	X12Cr13	MP13B	S41000	W	1.4006	I	SUS410	W	S41010	W
4005-416-00-I	X12CrS13	MP13C	S41600	W	1.4005	N	SUS416	W	S41617	N
4642-416-72-J	X13CrPb13	MP13A	—	—	(1.4642)	I	SUS410F2	I	—	—
4024-410-09-E	X15Cr13	MP13F	—	—	1.4024	I	SUS410	W	—	—
4021-420-00-I	X20Cr13	MP13I	S42000	W	1.4021	I	SUS420J1	N	S42020	N
4028-420-00-I	X30Cr13	MP13M	S42000	W	1.4028	I	SUS420J2	W	S42030	N
4029-420-20-I	X33CrS13	MP13N	S42020	W	1.4029	N	SUS420F	N	S42037	N
4643-420-72-J	X33CrPb13	MP13O	—	—	(1.4643)	I	SUS420F2	I	—	—
4031-420-00-I	X39Cr13	MP13P	S42000	W	1.4031	I	—	—	S42040	W
4034-420-00-I	X46Cr13	MP13Q	S42000	W	1.4034	I	—	—	S42040	W
4035-420-74-E	X46CrS13	MP13R	—	—	1.4035	I	—	—	—	—
4038-420-00-I	X52Cr13	MP13U	S42000	W	(1.4038)	I	—	—	—	—
4039-420-09-I	X60Cr13	MP13V	—	—	(1.4039)	I	—	—	—	—
4057-431-00-X	X17CrNi16-2	MP16G	S43100	W	1.4057	I	SUS431	W	S43120	I
4058-429-99-J	X33Cr16	MP16O	—	—	(1.4058)	I	SUS429J1	I	—	—
4019-430-20-I	X14CrS17	MP17F	S43020	W	(1.4019)	I	—	—	S11717	W
4040-440-02-X	X68Cr17	MP17U	S44002	W	(1.4040)	I	SUS440A	I	S44070	I
4041-440-03-X	X85Cr17	MP17V	S44003	W	(1.4041)	I	SUS440B	I	S44080	I
4023-440-04-I	X110Cr17	MP17W	S44004	W	(1.4023)	I	SUS440C	N	S44096	N
4025-440-74-X	X110CrS17	MP17Z	—	—	(1.4025)	I	SUS440F	I	S44097	I

Table A.1 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4766-440-77-X	X80CrSiNi20-2	MP20U	—	—	(1.4766)	I	SUH4	I	S48380	I
i) Martensitic steels with Mo										
4916-600-77-J	X18CrMnMoNbVN12	MM12G	—	—	(1.4916)	I	SUH 600	I	S46250	N
4929-422-00-I	X23CrMoWMnNiV12-1-1	MM13J	S42200	W	(1.4929)	I	SUH 616	N	S47220	N
4923-422-77-E	X22CrMoV12-1	MM13H	—	—	1.4923	I	—	—	—	—
4119-410-92-C	X13CrMo13	MM13G	—	—	(1.4119)	I	SUS410J1	N	S45710	I
4419-420-97-E	X38CrMo14	MM14P	—	—	1.4419	I	—	—	S45830	W
4110-420-69-E	X55CrMo14	MM14U	—	—	1.4110	I	—	—	—	—
4313-415-00-I	X3CrNiMo13-4	MM14A	S41500	W	1.4313	N	SUSF6NM	W	S41595	W
4116-420-77-E	X50CrMoV15	MM15U	—	—	1.4116	I	—	—	—	—
4415-415-92-E	X2CrNiMoV13-5-2	MM15A	—	—	1.4415	I	—	—	—	—
4418-431-77-E	X4CrNiMo16-5-1	MM17A	—	—	1.4418	I	—	—	—	—
4122-434-09-I	X39CrMo17-1	MM18R	—	—	1.4122	I	—	—	—	—
4123-431-77-E	X40CrMoVN16-2	MM18T	—	—	1.4123	I	—	—	—	—
j) Precipitation-hardening steels										
4542-174-00-I	X5CrNiCuNb16-4	PP20I	S17400	W	1.4542	N	SUS630	W	S51740	W
4568-177-00-I	X7CrNiAl17-7	PP24L	S17700	N	1.4568	N	SUS631	W	S51770	N
k) Precipitation-hardening steels with Mo										
4594-155-92-E	X5CrNiMoCuNb14-5	PM21I	—	—	1.4594	I	—	—	—	—
4530-455-77-E	X1CrNiMoAlTi12-9-2	PM23A	—	—	1.4530	I	—	—	—	—
4596-455-77-E	X1CrNiMoAlTi12-10-2	PM24A	—	—	1.4596	I	—	—	—	—
4532-157-00-I	X8CrNiMoAl15-7-2	PM24M	S15700	N	1.4532	N	—	—	S51570	
4534-138-00-X	X3CrNiMoAl13-8-3	PM24H	S13800	I	1.4534	N	—	—	S51380	
4457-350-00-X	X9CrNiMoN17-5-3	PM25M	(S35000)	I	(1.4457)	W	—	—	S51750	I
4645-469-10-U	X2CrNiMoCu AlTi12-9-4-3	PM25A	(S46910)	I	(1.4645)	I	—	—	—	—
4980-662-86-X	X6NiCrTiMoVB25-15-2	PM42J	(S66286)	I	1.4980	N	SUH660	I	S51525	W
4644-662-20-U	X4NiCrMoTiMnSiB26-14-3-2	PM43J	(S66220)	I	(1.4644)	I	—	—	—	—

Table A.1 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
NOTE The grades given in this table are comparable to those given in Table 1. However, to compare similar grades, it is necessary to check each element before making a substitution.										
[a] See the sources in the Bibliography.										
[b] US steel listed in ASTM A959 and in UNS; if the steel number is given in brackes then the steel has only a UNS number.										
[c] European steel listed in EN 10088-1:2005 and in the "Stahl-Eisen-Liste"; if the steel number is given in brackets then the steel is only listed in the "Stahl-Eisen-Liste".										
[d] Japanese Industrial Standard.										
[e] Chinese steel of ISC number listed in GB/T20878.										
[f] I = identical steel to ISO steel grade; *N* = steel grade with closer match of composition, but not identical; W = wider match.										

Table A.2 — Designations of the steels given in Table 1 and of comparable grades covered in various designation systems listed according to the three middle digits defined by the first three UNS numbers

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
a) Austenitic steels										
4372-201-00-I	X12CrMnNiN17-7-5	AP29O	S20100	N	1.4372	N	SUS201	W	S35350	N
4376-201-00-E	X8CrMnNi19-6-3	AP28P	—	—	1.4376	I	—	—	—	—
4371-201-53-I	X2CrMnNiN17-7-5	AP29B	S20153	N	1.4371	N	—	—	—	—
4615-201-75-E	X3CrMnNiCu15-8-5-3	AP28C	—	—	(1.4615)	I	—	—	—	—
4618-201-76-E	X9CrMnNiCu17-8-5-2	AP30L	—	—	(1.4618)	I	—	—	—	—
4617-201-76-J	X6CrNiMnCu17-8-4-2	AP29I	—	—	(1.4617)	I	SUS304J2	I	—	—
4373-202-00-I	X12CrMnNiN18-9-5	AP32O	S20200	W	1.4373	N	SUS202	W	S35450	N
4890-202-09-X	X53CrMnNiN21-9-4	AP34V	—	—	(1.4890)	I	SUH35	I	S35650	I
4369-202-91-I	X11CrNiMnN19-8-6	AP33L	—	—	1.4369	I	—	—	—	—
4597-204-76-I	X8CrMnCuN17-8-3	AP25L	—	—	1.4597	N	—	—	—	—
4378-240-00-X	X6CrMnNiN18-13-3	AP34I	—	—	1.4378	I	—	—	—	—
4646-240-76-E	X6CrMnNiCuN18-12-4	AP34H	—	—	1.4646	I	—	—	—	—
4020-241-00-X	X13CrMnNiN18-13-2	AP33M	—	—	1.4020	I	—	—	—	—
4319-301-00-I	X5CrNi17-7	AP24H	S30100	W	1.4319	I	SUS301	W	S30110	W
4310-301-00-I	X10CrNi18-8	AP26L	S30100	W	1.4310	N	—	—	S30110	W
4310-301-09-X	X12CrNi17-7	AP24N	S30100	I	(1.43XX)	I	SUS301	I	—	—
4318-301-53-I	X2CrNiN18-7	AP25A	S30153	W	1.4318	N	SUS301L	W	S30153	W
4325-302-00-E	X9CrNi18-9	AP27N	S30200	W	1.4325	I	SUS302	W	S30210	W

Table A.2 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4326-302-15-I	X12CrNiSi18-9-3	AP27P	S30215	W	(1.4326)	I	SUS302B	I	S30240	N
4305-303-00-I	X10CrNiS18-9	AP27M	S30300	W	1.4305	W	SUS303	W	S30317	W
4625-303-23-X	X12CrNiSe18-9	AP27O	S30323	I	(1.4625)	I	SUS303Se	I	S30327	I
4570-303-31-I	X6CrNiCuS18-9-2	AP27I	S30331	I	1.4570	N	—	—	—	—
4667-303-76-J	X12CrNiCuS18-9-3	AP27Q	—	—	(1.4667)	I	SUS303Cu	I	—	—
4301-304-00-I	X5CrNi18-10	AP28E	S30400	W	1.4301	I	SUS304	W	S30408	W
4307-304-03-I	X2CrNi18-9	AP27B	S30403	W	1.4307	N	SUS304L	W	S30403	W
4306-304-03-I	X2CrNi19-11	AP30A	S30403	W	1.4306	N	SUS304L	W	S30403	N
4948-304-09-I	X7CrNi18-9	AP27L	S30409	W	1.4948	W	SUS304H	W	S30409	W
4818-304-15-E	X6CrNiSiNCe19-10	AP29J	S30415	W	1.4818	I	—	—	S30450	N
4567-304-30-I	X3CrNiCu18-9-4	AP27F	S30430	W	(1.4567)	N	SUSXM7	W	S30488	W
4315-304-51-I	X5CrNiN19-9	AP28F	S30451	N	1.4315	W	SUS304N1 SUS304N2	I N	S30458	W
4311-304-53-I	X2CrNiN18-9	AP27A	S30453	W	1.4311	N	SUS304LN	W	S30453	W
4560-304-75-E	X3CrNiCu19-9-2	AP28D	—	—	1.4560	I	—	—	—	—
4650-304-75-E	X2CrNiCu19-10	AP29A	—	—	1.4650	I	SUS304L	W	S30403	W
4567-304-76-I	X6CrNiCu17-8-2	AP25J	—	—	1.4567	W	SUS304J1	I	S30480	W
4649-304-76-J	X6CrNiCu19-9-1	AP28I	—	—	(1.4649)	I	SUS304Cu	I	S30488	W
4640-304-76-E	X5CrNiCu19-6-2	AP28L	—	—	1.4640	I	—	—	—	—
4567-304-98-X	X6CrNiCu18-9-2	AP27J	—	—	1.4567	W	SUS304J3	I	S30480	I
4303-305-00-I	X6CrNi18-12	AP30I	S30500	W	1.4303	N	SUS305	W	S30510	W
4884-305-00-X	X6CrNiSi18-13-4	AP31H	S30500	W	(1.4884)	I	SUSXM15J1	I	S38148	I
4828-305-09-I	X15CrNiSi20-12	AP32R	—	—	1.4828	N	—	—	—	—
4361-306-00-E	X1CrNiSi18-15-4	AP33A	—	—	1.4361	I	—	—	—	—
4824-308-09-J	X20CrNiN22-11	AP33Q	—	—	(1.4824)	I	SUH37	I	S30850	W
4835-308-15-U	X7CrNiSiNCe21-11	AP32N	S30815	I	1.4835	N	—	—	—	—
4950-309-08-E	X6CrNi23-13	AP36J	S30908	W	1.4950	I	SUS309S	W	S30908	W
4833-309-08-I	X18CrNi23-13	AP36R	S30908	W	1.4833	N	SUH309	W	S30908	W
4335-310-02-I	X1CrNi25-21	AP46A	S31002	W	1.4335	I	—	—	—	—

Table A.2 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4845-310-08-E	X8CrNi25-21	AP46L	S31008	W	1.4845	I	SUS310S	W	S31008	N
4951-310-08-I	X6CrNi25-20	AP45L	S31008	W	1.4951	N	SUS310S	W	S31008	W
4845-310-09-X	X23CrNi25-21	AP46O	S31008	W	1.4845	N	SUH310	I	S31020	I
4841-314-00-E	X15CrNiSi25-21	AP46R	S31400	N	1.4841	I	—	—	—	—
4867-316-77-J	X40CrNiWSi15-14-3-2	AP29P	—	—	(1.4867)	I	SUH31	I	—	—
4541-321-00-I	X6CrNiTi18-10	AP28G	S32100	W	1.4541	I	SUS321	W	S32168	W
4940-321-09-I	X7CrNiTi18-10	AP28O	S32109	W	1.4940	N	SUS321H	W	S32169	N
4941-321-09-I	X6CrNiTiB18-10	AP28J	S32109	W	1.4941	W	—	—	S32169	W
4550-347-00-I	X6CrNiNb18-10	AP28H	S34700	I	1.4550	N	SUS347	W	S34778	N
4912-347-09-I	X7CrNiNb18-10	AP28K	S34709	W	1.4912	N	SUS347H	W	S34779	W
4961-347-77-E	X8CrNiNb16-13	AP29L	—	—	1.4961	I	—	—	—	—
b) Austenitic steels with Mo										
4982-215-00-E	X10CrNiMoMnNbVB15-10-1	AM32P	S21500	N	1.4982	I	—	—	—	—
4496-309-51-J	X4CrNiMoN25-14-1	AM40F	—	—	(1.4496)	I	SUS317J2	I	—	—
4466-310-50-E	X1CrNiMoN25-22-2	AM49A	S31050	W	1.4466	I	—	—	S31053	W
4547-312-54-I	X1CrNiMoCuN20-18-7	AM45A	S31254	W	1.4547	N	SUS312L	W	S31252	N
4659-312-66-I	X1CrNiMoCuNW24-22-6	AM52B	S31266	W	1.4659	I	—	—	—	—
4660-315-77-I	X6CrNiCuSiMo19-10-3-2	AM30J	—	—	(1.4660)	I	SUS315J1	N	—	—
4648-315-77-I	X6CrNiSiCuMo19-13-3-3-1	AM33I	—	—	(1.4648)	I	SUS315J2	W	—	—
4436-316-00-I	X3CrNiMo17-12-3	AM32F	S31600	W	1.4436	I	SUS316	W	S31608	W
4401-316-00-I	X5CrNiMo17-12-2	AM31I	S31600	W	1.4401	N	SUS316	W	S31608	N
4432-316-03-I	X2CrNiMo17-12-3	AM32A	S31603	W	1.4432	I	SUS316L	W	S31603	W
4404-316-03-I	X2CrNiMo17-12-2	AM31A	S31603	W	1.4404	N	SUS316L	W	S31603	N
4435-316-03-X	X2CrNiMo17-14-3	AM34C	—	—	(1.44xx)	I	SUS316L	I	—	—
4571-316-35-I	X6CrNiMoTi17-12-2	AM31F	S31635	W	1.4571	N	SUS316Ti	W	S31668	W
4580-316-40-I	X6CrNiMoNb17-12-2	AM31G	S31640	W	1.4580	N	—	—	S31678	W
4495-316-51-J	X6CrNiMoN17-12-3	AM32H	S31651	N	(1.4495)	I	SUS316N	I	S31658	N
4429-316-53-I	X2CrNiMoN17-12-3	AM32B	S31653	W	1.4429	N	SUS316LN	W	S31653	N
4406-316-53-I	X2CrNiMoN17-11-2	AM30B	S31653	W	1.4406	N	SUS316LN	W	S31653	N
4494-316-74-J	X6CrNiMoS17-12-3	AM32K	—	—	(1.4494)	I	SUS316F	I	—	—
4647-316-75-X	X2CrNiMoCu18-14-2-2	AM34A	—	—	(1.4647)	I	SUS316J1L	I	S31683	I

Table A.2 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4578-316-76-E	X3CrNiCuMo17-11-3-2	AM30F	—	—	1.4578	I	—	—	—	—
4665-316-76-J	X6CrNiMoCu18-12-2-2	AM32I	—	—	(1.4665)	I	SUS316J1	I	—	—
4449-316-76-E	X3CrNiMo18-12-3	AM33F	—	—	1.4449	I	—	—	—	—
4910-316-77-E	X3CrNiMoBN17-13-3	AM33G	—	—	1.4910	I	—	—	—	—
4435-316-91-I	X2CrNiMo18-14-3	AM35A	—	—	1.4435	N	SUS316L	W	S31603	W
4445-317-00-U	X6CrNiMo19-13-4	AM36I	S31700	I	(1.4445)	I	SUS317	W	S31708	N
4438-317-03-I	X2CrNiMo19-14-4	AM37A	S31703	W	1.4438	W	SUS317L	W	S31703	W
4483-317-26-I	X2CrNiMoN18-15-5	AM38A	S31726	W	(1.4483)	I	—	—	S31723	N
4439-317-26-E	X2CrNiMoN17-13-5	AM35B	S31726	N	1.4439	I	—	—	S31723	W
4434-317-53-I	X2CrNiMoN18-12-4	AM34B	S31753	W	1.4434	N	SUS317LN	W	S31753	W
4879-317-77-J	X30CrNiMoPB20-11-2	AM33R	—	—	(1.4879)	I	SUH38	I	—	—
4476-317-92-X	X3CrNiMo18-16-5	AM39F	—	—	(1.4476)	I	SUS317J1	I	S31794	I
4652-326-54-I	X1CrNiMoCuN24-22-8	AM54A	S32654	N	1.4652	I	—	—	S32652	N
4565-345-65-I	X2CrNiMnMoN25-18-6-5	AM54B	S34565	W	1.4565	I	—	—	S34553	N
c) Austenitic steels with Ni/Co as main alloying elements										
4657-080-20-U	X4NiCrCuMo35-20-4-3	AN58F	N08020	I	(1.4657)	I	—	—	—	—
4563-080-28-I	X1NiCrMoCu31-27-4	AN62A	N08028	W	1.4563	I	—	—	—	—
4478-083-67-U	X2NiCrMoN25-21-7	AN53A	N08367	I	(1.4478)	I	SUS836L	W	—	—
4864-083-77-X	X13NiCr35-16	AN51O	—	—	1.4864	N	SUH 330	I	S33010	I
4876-088-00-I	X8NiCrAlTi32-21	AN53L	N08800	W	1.4876	N	NCF800	W	—	—
4959-088-10-U	X7NiCrAlTi33-21	AN54L	N08810	I	1.4959	N	NCF800H	N	—	—
4959-088-11-U	X8NiCrAlTi33-21	AN54M	N08811	I	1.4959	W	—	—	—	—
4958-088-77-E	X5NiCrAlTi31-20	AN51J	—	—	1.4958	I	—	—	—	—
4959-088-77-E	X8NiCrAlTi32-20	AN52L	—	—	1.4959	I	—	—	—	—
4558-088-90-E	X2NiCrAlTi32-30	AN52B	—	—	1.4558	I	—	—	—	—
4539-089-04-I	X1NiCrMoCu25-20-5	AN50A	N08904	W	1.4539	N	SUS890L	W	S39042	N
4656-089-04-I	X1NiCrMoCu22-20-5-2	AN47A	N08904	N	(1.4656)	I	—	—	S39042	N
4529-089-26-I	X1NiCrMoCuN25-20-7	AN52A	N08926	W	1.4529	N	—	—	—	—

Table A.2 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4479-089-36-U	X1NiCrMoMnN34-27-6-5	AN72A	N08936	I	(1.4479)	I	—	—	—	—
4537-310-92-E	X1CrNiMoCuN25-25-5	AN55A	—	—	1.4537	I	—	—	—	—
4971-314-79-I	X12CrNiCo-MoWMnNNb21-20-20-3-3-2	AN64R	—	—	1.4971	N	SUH661	W	—	—
4854-353-15-E	X6NiCrSiNCe35-25	AN60J	S35315	N	1.4854	I	—	—	—	—
4389-384-00-I	X3NiCr18-16	AN34F	S38400	W	(1.4389)	I	SUS384	W	S38408	W
d) Austenitic-ferritic (duplex) steels										
4162-321-01-E	X2CrMnNiN21-5-1	DP27F	S32101	N	1.4162	I	—	—	—	—
4062-322-02-U	X2CrNiN22-2	DP24A	S32202	N	1.4062	I	—	—	—	—
4669-322-76-E	X2CrCuNiN23-2-2	DP25A	—	—	1.4669	I	—	—	—	—
4362-323-04-I	X2CrNiN23-4	DP27B	S32304	W	1.4362	I	—	—	S23043	W
e) Austenitic-ferritic (duplex) steels with Mo										
4460-312-00-I	X3CrNiMoN27-5-2	DM34F	S31200	W	1.4460	I	—	—	S22553	W
4481-312-60-J	X2CrNiMoN25-7-3	DM35A	S31260	W	(1.4481)	I	SUS329J4L	I	S22583	W
4424-315-00-I	X2CrNiMoSiMnN19-5-3-2-2	DM29B	S31500	N	1.4424	N				
4462-318-03-I	X2CrNiMoN22-5-3	DM30A	S32205	N	1.4462	I	SUS329J3L	W	S22053	N
4482-320-01-X	X2CrMnNiMoN21-5-3	DM29A	—	—	1.4482	I	—	—	—	—
4507-325-20-I	X2CrNiMoCuN25-6-3	DM34A	S32520	W	1.4507	I	—	—	S25554	—
4507-325-50-X	X3CrNiMoCuN26-6-3-2	DM35F	S32550	I	1.4507	W	—	—	S25554	I
4658-327-07-U	X2CrNiMoCoN28-8-5-1	DM42A	S32707	I	1.4658	I	—	—	—	—
4410-327-50-E	X2CrNiMoN25-7-4	DM36A	S32750	W	1.4410	I	—	—	S25073	W
4501-327-60-I	X2CrNiMoCuWN25-7-4	DM36B	S32760	I	1.4501	N	—	—	S27603	N
4480-329-00-U	X6CrNiMo26-4-2	DM32F	S32900	I	(1.4480)	I	SUS329J1	W	—	—
4477-329-06-E	X2CrNiMoN29-7-2	DM38A	S32906	N	1.4477	I	—	—	—	—
4485-332-07-U	X2CrNiMoN31-8-4	DM43A	S33207	I	(1.4485)	I	—	—	—	—
4662-824-41-X	X2CrNiMnMoCuN24-4-3-2	DM33A	—	—	1.4662	I	—	—	—	—
f) Ferritic steels										
4030-410-90-X	X2Cr12	FP12A	—	—	(1.4030)	I	SUS410L	I	S11203	I
4002-405-00-I	X6CrAl13	FP13H	S40500	W	1.4002	N	SUS405	W	S11348	N

Table A.2 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4724-405-77-I	X10CrAlSi13	FP13L	—	—	1.4724	N	—	—	—	—
4512-409-10-I	X2CrTi12	FP12B	S40900	W	1.4512	N	SUH409L	W	S11163	—
4516-409-75-I	X6CrNiTi12	FP12F	S40975	W	1.4516	N	—	—	—	—
4000-410-08-I	X6Cr13	FP13G	S41008	W	1.4000	N	SUS410S	N	S41008	N
4600-410-70-E	X2CrMnNiTi12	FP12D	—	—	1.4600	I	—	—	—	—
4003-410-77-I	X2CrNi12	FP12C	S41003	N	1.4003	N	—	—	S11213	N
4012-429-00-X	X10Cr15	FP15L	S42900	I	(1.4012)	I	SUS429	I	S11510	I
4595-429-71-I	X1CrNb15	FP15A	—	—	1.4595	N	—	—	—	—
4016-430-00-I	X6Cr17	FP17I	S43000	W	1.4016	I	SUS430	W	S11710	W
4004-430-20-I	X7CrS17	FP17L	S43020	W	(1.4004)	I	SUS430F	W	S11717	W
4510-430-35-I	X3CrTi17	FP17F	S43035	W	1.4510	N	SUS430LX	W	S11863	W
4510-430-36-X	X2CrNb17	FP17B	—	—	1.4510	N	SUS430LX	I	S11863	I
4520-430-70-I	X2CrTi17	FP17A	—	—	1.4520	N	SUS430LX	W	—	—
4511-430-71-I	X3CrNb17	FP17G	—	—	1.4511	N	SUS430LX	W	—	—
4664-430-75-J	X2CrCuTi18	FP18A	—	—	(1.4664)	I	SUS430J1L	I	—	—
4742-430-77-I	X10CrAlSi18	FP18N	—	—	1.4742	N	—	—	—	—
4017-430-91-E	X6CrNi17-1	FP17H	—	—	1.4017	I	—	—	—	—
4509-439-40-X	X2CrTiNb18	FP18B	S43940	I	1.4509	N	SUS430LX	W	S11873	I
4764-442-72-J	X8CrAl19-3	FP19N	—	—	(1.4764)	I	SUH21	I	—	—
4621-443-30-J	X2CrTiCu22	FP22A	—	—	(1.4621)	N	SUS443J1	I	—	—
4607-445-00-E	X2CrNbTi20	FP20A	—	—	1.4607	I	—	—	—	—
4621-445-00-E	X2CrNbCu21	FP21B	S44500	W	(1.4621)	I	—	—	—	—
4611-445-70-E	X2CrTi21	FP21A	—	—	1.4607	I	—	—	—	—
4762-445-72-I	X10CrAlSi25	FP25N	—	—	1.4762	N	—	—	—	—
4749-446-00-I	X15CrN26	FP26R	S44600	W	1.4749	W	SUH446	W	S12550	W
4613-446-70-E	X2CrTi24	FP24A	—	—	1.4607	I	—	—	—	—
g) Ferritic steels with Mo										
4523-182-35-I	X2CrMoTiS18-2	FM20C	S18235	W	1.4523	I	—	—	—	—
4589-429-70-E	X5CrNiMoTi15-2	FM16H	—	—	1.4589	I	—	—	—	—
4105-430-20-X	X6CrMoS17	FM17K	—	—	1.4105	I	—	—	—	—

Table A.2 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4113-434-00-I	X6CrMo17-1	FM18I	S43400	W	1.4113	N	SUS434	W	S11790	W
4526-436-00-I	X6CrMoNb17-1	FM18J	S43600	W	1.4526	N	—	—	S11770	W
4513-436-00-J	X2CrMoNbTi18-1	FM19A	S43600	W	(1.4513)	N	SUS436L	I	S11862	W
4609-436-77-J	X2CrMo19	FM19B	—	—	(1.4609)	I	SUS436J1L	I	—	—
4521-444-00-I	X2CrMoTi18-2	FM20B	S44400	W	1.4521	N	SUS444	W	S11972	W
4128-445-92-J	X2CrMo23-1	FM24B	—	—	(1.4128)	I	SUS445J1	I	—	—
4129-445-92-J	X2CrMo23-2	FM25A	—	—	(1.4129)	I	SUS445J2	I	—	—
4131-446-92-C	X1CrMo26-1	FM27A	S44627	W	(1.4131)	I	SUSXM27	N	S12791	I
4750-446-60-U	X2CrMoNi27-4-2	FM31A	S44660	I	(1.4750)	I	—	—	—	—
4135-447-92-C	X1CrMo30-2	FM32A	S44700	N	(1.4135)	I	SUS447J1	N	S13091	I
h) Martensitic steels										
4006-410-00-I	X12Cr13	MP13B	S41000	W	1.4006	I	SUS410	W	S41010	W
4024-410-09-E	X15Cr13	MP13F	—	—	1.4024	I	SUS410	W	—	—
4005-416-00-I	X12CrS13	MP13C	S41600	W	1.4005	N	SUS416	W	S41617	N
4642-416-72-J	X13CrPb13	MP13A	—	—	(1.4642)	I	SUS410F2	I	—	—
4021-420-00-I	X20Cr13	MP13I	S42000	W	1.4021	I	SUS420J1	N	S42020	N
4028-420-00-I	X30Cr13	MP13M	S42000	W	1.4028	I	SUS420J2	W	S42030	N
4031-420-00-I	X39Cr13	MP13P	S42000	W	1.4031	I	—	—	S42040	W
4034-420-00-I	X46Cr13	MP13Q	S42000	W	1.4034	I	—	—	S42040	W
f) Martensitic steels										
4038-420-00-I	X52Cr13	MP13U	S42000	W	(1.4038)	I	—	—	—	—
4039-420-09-I	X60Cr13	MP13V	—	—	(1.4039)	I	—	—	—	—
4029-420-20-I	X33CrS13	MP13N	S42020	W	1.4029	N	SUS420F	N	S42037	N
4643-420-72-J	X33CrPb13	MP13O	—	—	(1.4643)	I	SUS420F2	I	—	—
4035-420-74-E	X46CrS13	MP13R	—	—	1.4035	I	—	—	—	—
4058-429-99-J	X33Cr16	MP16O	—	—	(1.4058)	I	SUS429J1	I	—	—
4019-430-20-I	X14CrS17	MP17F	S43020	W	(1.4019)	I	—	—	S11717	W

Table A.2 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4057-431-00-X	X17CrNi16-2	MP16G	S43100	W	1.4057	I	SUS431	W	S43120	I
4040-440-02-X	X68Cr17	MP17U	S44002	W	(1.4040)	I	SUS440A	I	S44070	I
4041-440-03-X	X85Cr17	MP17V	S44003	W	(1.4041)	I	SUS440B	I	S44080	I
4023-440-04-I	X110Cr17	MP17W	S44004	W	(1.4023)	I	SUS440C	N	S44096	N
4025-440-74-X	X110CrS17	MP17Z	—	—	(1.4025)	I	SUS440F	I	S44097	I
4766-440-77-X	X80CrSiNi20-2	MP20U	—	—	(1.4766)	I	SUH4	I	S48380	I
i) Martensitic steels with Mo										
4119-410-92-C	X13CrMo13	MM13G	—	—	(1.4119)	I	SUS410J1	N	S45710	I
4313-415-00-I	X3CrNiMo13-4	MM14A	S41500	W	1.4313	N	SUSF6NM	W	S41595	W
4415-415-92-E	X2CrNiMoV13-5-2	MM15A	—	—	1.4415	I	—	—	—	—
4110-420-69-E	X55CrMo14	MM14U	—	—	1.4110	I	—	—	—	—
4116-420-77-E	X50CrMoV15	MM15U	—	—	1.4116	I	—	—	—	—
4419-420-97-E	X38CrMo14	MM14P	—	—	1.4419	I	—	—	S45830	W
4929-422-00-I	X23CrMoWMnNiV12-1-1	MM13J	S42200	W	(1.4929)	I	SUH 616	N	S47220	N
4923-422-77-E	X22CrMoV12-1	MM13H	—	—	1.4923	I	—	—	—	—
4418-431-77-E	X4CrNiMo16-5-1	MM17A	—	—	1.4418	I	—	—	—	—
4123-431-77-E	X40CrMoVN16-2	MM18T	—	—	1.4123	I	—	—	—	—
4122-434-09-I	X39CrMo17-1	MM18R	—	—	1.4122	I	—	—	—	—
4916-600-77-J	X18CrMnMoNbVN12	MM12G	—	—	(1.4916)	I	SUH 600	I	S46250	N
j) Precipitation-hardening steels										
4542-174-00-I	X5CrNiCuNb16-4	PP20I	S17400	W	1.4542	N	SUS630	W	S51740	W
4568-177-00-I	X7CrNiAl17-7	PP24L	S17700	N	1.4568	N	SUS631	W	S51770	N
k) Precipitation-hardening steels with Mo										
4534-138-00-X	X3CrNiMoAl13-8-3	PM24H	S13800	I	1.4534	N	—	—	S51380	
4594-155-92-E	X5CrNiMoCuNb14-5	PM21I	—	—	1.4594	I	—	—	—	—
4532-157-00-I	X8CrNiMoAl15-7-2	PM24M	S15700	N	1.4532	N	—	—	S51570	
4457-350-00-X	X9CrNiMoN17-5-3	PM25M	(S35000)	I	(1.4457)	W	—	—	S51750	I

Table A.2 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	ASTM A959/ **UNS**[b]		EN 10088-1:2005 **Number**[c]		**JIS**[d]		GB/T20878/ **ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4530-455-77-E	X1CrNiMoAlTi12-9-2	PM23A	—	—	1.4530	I	—	—	—	—
4596-455-77-E	X1CrNiMoAlTi12-10-2	PM24A	—	—	1.4596	I	—	—	—	—
4645-469-10-U	X2CrNiMoCu AlTi12-9-4-3	PM25A	(S46910)	I	(1.4645)	I	—	—	—	—
4644-662-20-U	X4NiCrMoTiMnSiB26-14-3-2	PM43J	(S66220)	I	(1.4644)	I	—	—	—	—
4980-662-86-X	X6NiCrTiMoVB25-15-2	PM42J	(S66286)	I	1.4980	N	SUH660	I	S51525	W

NOTE The grades given in Table A.2 are comparable to those given in Table 1. However, to compare similar grades, it is necessary to check each element before making a substitution.

[a] See the sources in the Bibliography.

[b] US steel listed in ASTM A959 and in UNS; if the steel number is given in brackets then the steel has only a UNS number.

[c] European steel listed in EN 10088-1:2005 and in the "Stahl-Eisen-Liste"; if the steel number is given in brackets then the steel is only listed in the "Stahl-Eisen-Liste".

[d] Japanese Industrial Standard.

[e] Chinese steel of ISC number listed in GB/T20878.

[f] I = identical steel to ISO steel grade; *N* = steel grade with closer match of composition, but not identical; W = wider match.

Table A.3 — Designations of the steels given in Table 1 and of comparable grades covered in various designation systems listed according to the European system

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	**ASTM A959/ UNS**[b]		**EN 10088-1:2005 Number**[c]		**JIS**[d]		**GB/T20878/ ISC**[e]	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
a) Austenitic steels										
4020-241-00-X	X13CrMnNiN18-13-2	AP33M	—	—	1.4020	I	—	—	—	—
4301-304-00-I	X5CrNi18-10	AP28E	S30400	W	1.4301	I	SUS304	W	S30408	W
4303-305-00-I	X6CrNi18-12	AP30I	S30500	W	1.4303	N	SUS305	W	S30510	W
4305-303-00-I	X10CrNiS18-9	AP27M	S30300	W	1.4305	W	SUS303	W	S30317	W
4306-304-03-I	X2CrNi19-11	AP30A	S30403	W	1.4306	N	SUS304L	W	S30403	N
4307-304-03-I	X2CrNi18-9	AP27B	S30403	W	1.4307	N	SUS304L	W	S30403	W
4310-301-00-I	X10CrNi18-8	AP26L	S30100	W	1.4310	N	—	—	S30110	W
4311-304-53-I	X2CrNiN18-9	AP27A	S30453	W	1.4311	N	SUS304LN	W	S30453	W
4315-304-51-I	X5CrNiN19-9	AP28F	S30451	N	1.4315	W	SUS304N1 SUS304N2	I N	S30458	W
4318-301-53-I	X2CrNiN18-7	AP25A	S30153	W	1.4318	N	SUS301L	W	S30153	W
4319-301-00-I	X5CrNi17-7	AP24H	S30100	W	1.4319	I	SUS301	W	S30110	W
4325-302-00-E	X9CrNi18-9	AP27N	S30200	W	1.4325	I	SUS302	W	S30210	W

Table A.3 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	**ASTM A959/ UNS[b]**		**EN 10088-1:2005 Number[c]**		**JIS[d]**		**GB/T20878/ ISC[e]**	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4326-302-15-I	X12CrNiSi18-9-3	AP27P	S30215	W	(1.4326)	I	SUS302B	I	S30240	N
4335-310-02-I	X1CrNi25-21	AP46A	S31002	W	1.4335	I	—	—	—	—
4361-306-00-E	X1CrNiSi18-15-4	AP33A	—	—	1.4361	I	—	—	—	—
4369-202-91-I	X11CrNiMnN19-8-6	AP33L	—	—	1.4369	I	—	—	—	—
4371-201-53-I	X2CrMnNiN17-7-5	AP29B	S20153	N	1.4371	N	—	—	—	—
4372-201-00-I	X12CrMnNiN17-7-5	AP29O	S20100	N	1.4372	N	SUS201	W	S35350	N
4373-202-00-I	X12CrMnNiN18-9-5	AP32O	S20200	W	1.4373	N	SUS202	W	S35450	N
4376-201-00-E	X8CrMnNi19-6-3	AP28P	—	—	1.4376	I	—	—	—	—
4378-240-00-X	X6CrMnNiN18-13-3	AP34I	—	—	1.4378	I	—	—	—	—
4310-301-09-X	X12CrNi17-7	AP24N	S30100	I	(1.43XX)	I	SUS301	I	—	—
4541-321-00-I	X6CrNiTi18-10	AP28G	S32100	W	1.4541	I	SUS321	W	S32168	W
4550-347-00-I	X6CrNiNb18-10	AP28H	S34700	I	1.4550	N	SUS347	W	S34778	N
4560-304-75-E	X3CrNiCu19-9-2	AP28D	—	—	1.4560	I	—	—	—	—
4567-304-30-I	X3CrNiCu18-9-4	AP27F	S30430	W	(1.4567)	N	SUSXM7	W	S30488	W
4567-304-76-I	X6CrNiCu17-8-2	AP25J	—	—	1.4567	W	SUS304J1	I	S30480	W
4567-304-98-X	X6CrNiCu18-9-2	AP27J	—	—	1.4567	W	SUS304J3	I	S30480	I
4570-303-31-I	X6CrNiCuS18-9-2	AP27I	S30331	I	1.4570	N	—	—	—	—
4597-204-76-I	X8CrMnCuN17-8-3	AP25L	—	—	1.4597	N	—	—	—	—
4615-201-75-E	X3CrMnNiCu15-8-5-3	AP28C	—	—	(1.4615)	I	—	—	—	—
4617-201-76-J	X6CrNiMnCu17-8-4-2	AP29I	—	—	(1.4617)	I	SUS304J2	I	—	—
4618-201-76-E	X9CrMnNiCu17-8-5-2	AP30L	—	—	(1.4618)	I	—	—	—	—
4625-303-23-X	X12CrNiSe18-9	AP27O	S30323	I	(1.4625)	I	SUS303Se	I	S30327	I
4640-304-76-E	X5CrNiCu19-6-2	AP28L	—	—	1.4640	I	—	—	—	—
4646-240-76-E	X6CrMnNiCuN18-12-4	AP34H	—	—	1.4646	I	—	—	—	—
4649-304-76-J	X6CrNiCu19-9-1	AP28I	—	—	(1.4649)	I	SUS304Cu	I	S30488	W
4650-304-75-E	X2CrNiCu19-10	AP29A	—	—	1.4650	I	SUS304L	W	S30403	W
4667-303-76-J	X12CrNiCuS18-9-3	AP27Q	—	—	(1.4667)	I	SUS303Cu	I	—	—
4818-304-15-E	X6CrNiSiNCe19-10	AP29J	S30415	W	1.4818	I	—	—	S30450	N
4824-308-09-J	X20CrNiN22-11	AP33Q	—	—	(1.4824)	I	SUH37	I	S30850	W
4828-305-09-I	X15CrNiSi20-12	AP32R	—	—	1.4828	N	—	—	—	—

Table A.3 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	**ASTM A959/ UNS[b]**		**EN 10088-1:2005 Number[c]**		**JIS[d]**		**GB/T20878/ ISC[e]**	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4833-309-08-I	X18CrNi23-13	AP36R	S30908	W	1.4833	N	SUH309	W	S30908	W
4835-308-15-U	X7CrNiSiNCe21-11	AP32N	S30815	I	1.4835	N	—	—	—	—
4841-314-00-E	X15CrNiSi25-21	AP46R	S31400	N	1.4841	I	—	—	—	—
4845-310-08-E	X8CrNi25-21	AP46L	S31008	W	1.4845	I	SUS310S	W	S31008	N
4845-310-09-X	X23CrNi25-21	AP46O	S31008	W	1.4845	N	SUH310	I	S31020	I
4867-316-77-J	X40CrNiWSi15-14-3-2	AP29P	—	—	(1.4867)	I	SUH31	I	—	—
4884-305-00-X	X6CrNiSi18-13-4	AP31H	S30500	W	(1.4884)	I	SUSXM15J1	I	S38148	I
4890-202-09-X	X53CrMnNiN21-9-4	AP34V	—	—	(1.4890)	I	SUH35	I	S35650	I
4912-347-09-I	X7CrNiNb18-10	AP28K	S34709	W	1.4912	N	SUS347H	W	S34779	W
4940-321-09-I	X7CrNiTi18-10	AP28O	S32109	W	1.4940	N	SUS321H	W	S32169	N
4941-321-09-I	X6CrNiTiB18-10	AP28J	S32109	W	1.4941	W	—	—	S32169	W
4948-304-09-I	X7CrNi18-9	AP27L	S30409	W	1.4948	W	SUS304H	W	S30409	W
4950-309-08-E	X6CrNi23-13	AP36J	S30908	W	1.4950	I	SUS309S	W	S30908	W
4951-310-08-I	X6CrNi25-20	AP45L	S31008	W	1.4951	N	SUS310S	W	S31008	W
4961-347-77-E	X8CrNiNb16-13	AP29L	—	—	1.4961	I	—	—	—	—
b) Austenitic steels with Mo										
4401-316-00-I	X5CrNiMo17-12-2	AM31I	S31600	W	1.4401	N	SUS316	W	S31608	N
4404-316-03-I	X2CrNiMo17-12-2	AM31A	S31603	W	1.4404	N	SUS316L	W	S31603	N
4406-316-53-I	X2CrNiMoN17-11-2	AM30B	S31653	W	1.4406	N	SUS316LN	W	S31653	N
4429-316-53-I	X2CrNiMoN17-12-3	AM32B	S31653	W	1.4429	N	SUS316LN	W	S31653	N
4432-316-03-I	X2CrNiMo17-12-3	AM32A	S31603	W	1.4432	I	SUS316L	W	S31603	W
4434-317-53-I	X2CrNiMoN18-12-4	AM34B	S31753	W	1.4434	N	SUS317LN	W	S31753	W
4435-316-91-I	X2CrNiMo18-14-3	AM35A	—	—	1.4435	N	SUS316L	W	S31603	W
4436-316-00-I	X3CrNiMo17-12-3	AM32F	S31600	W	1.4436	I	SUS316	W	S31608	W
4438-317-03-I	X2CrNiMo19-14-4	AM37A	S31703	W	1.4438	W	SUS317L	W	S31703	W
4439-317-26-E	X2CrNiMoN17-13-5	AM35B	S31726	N	1.4439	I	—	—	S31723	W
4445-317-00-U	X6CrNiMo19-13-4	AM36I	S31700	I	(1.4445)	I	SUS317	W	S31708	N
4449-316-76-E	X3CrNiMo18-12-3	AM33F	—	—	1.4449	I	—	—	—	—
4466-310-50-E	X1CrNiMoN25-22-2	AM49A	S31050	W	1.4466	I	—	—	S31053	W

Table A.3 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	**ASTM A959/ UNS[b]**		**EN 10088-1:2005 Number[c]**		**JIS[d]**		**GB/T20878/ ISC[e]**	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4476-317-92-X	X3CrNiMo18-16-5	AM39F	—	—	(1.4476)	I	SUS317J1	I	S31794	I
4483-317-26-I	X2CrNiMoN18-15-5	AM38A	S31726	W	(1.4483)	I	—	—	S31723	N
4494-316-74-J	X6CrNiMoS17-12-3	AM32K	—	—	(1.4494)	I	SUS316F	I	—	—
4495-316-51-J	X6CrNiMoN17-12-3	AM32H	S31651	N	(1.4495)	I	SUS316N	I	S31658	N
4496-309-51-J	X4CrNiMoN25-14-1	AM40F	—	—	(1.4496)	I	SUS317J2	I	—	—
4435-316-03-X	X2CrNiMo17-14-3	AM34C	—	—	(1.44xx)	I	SUS316L	I	—	—
4547-312-54-I	X1CrNiMoCuN20-18-7	AM45A	S31254	W	1.4547	N	SUS312L	W	S31252	N
4565-345-65-I	X2CrNiMnMoN25-18-6-5	AM54B	S34565	W	1.4565	I	—	—	S34553	N
4571-316-35-I	X6CrNiMoTi17-12-2	AM31F	S31635	W	1.4571	N	SUS316Ti	W	S31668	W
4578-316-76-E	X3CrNiCuMo17-11-3-2	AM30F	—	—	1.4578	I	—	—	—	—
4580-316-40-I	X6CrNiMoNb17-12-2	AM31G	S31640	W	1.4580	N	—	—	S31678	W
4647-316-75-X	X2CrNiMoCu18-14-2-2	AM34A	—	—	(1.4647)	I	SUS316J1L	I	S31683	I
4648-315-77-I	X6CrNiSiCuMo19-13-3-3-1	AM33I	—	—	(1.4648)	I	SUS315J2	W	—	—
4652-326-54-I	X1CrNiMoCuN24-22-8	AM54A	S32654	N	1.4652	I	—	—	S32652	N
4659-312-66-I	X1CrNiMoCuNW24-22-6	AM52B	S31266	W	1.4659	I	—	—	—	—
4660-315-77-I	X6CrNiCuSiMo19-10-3-2	AM30J	—	—	(1.4660)	I	SUS315J1	N	—	—
4665-316-76-J	X6CrNiMoCu18-12-2-2	AM32I	—	—	(1.4665)	I	SUS316J1	I	—	—
4879-317-77-J	X30CrNiMoPB20-11-2	AM33R	—	—	(1.4879)	I	SUH38	I	—	—
4910-316-77-E	X3CrNiMoBN17-13-3	AM33G	—	—	1.4910	I	—	—	—	—
4982-215-00-E	X10CrNiMoMnNbVB15-10-1	AM32P	S21500	N	1.4982	I	—	—	—	—
c) Austenitic steels with Ni/Co as main alloying elements										
4389-384-00-I	X3NiCr18-16	AN34F	S38400	W	(1.4389)	I	SUS384	W	S38408	W
4478-083-67-U	X2NiCrMoN25-21-7	AN53A	N08367	I	(1.4478)	I	SUS836L	W	—	—
4479-089-36-U	X1NiCrMoMnN34-27-6-5	AN72A	N08936	I	(1.4479)	I	—	—	—	—
4529-089-26-I	X1NiCrMoCuN25-20-7	AN52A	N08926	W	1.4529	N	—	—	—	—
4537-310-92-E	X1CrNiMoCuN25-25-5	AN55A	—	—	1.4537	I	—	—	—	—
4539-089-04-I	X1NiCrMoCu25-20-5	AN50A	N08904	W	1.4539	N	SUS890L	W	S39042	N
4558-088-90-E	X2NiCrAlTi32-30	AN52B	—	—	1.4558	I	—	—	—	—
4563-080-28-I	X1NiCrMoCu31-27-4	AN62A	N08028	W	1.4563	I	—	—	—	—
4656-089-04-I	X1NiCrMoCu22-20-5-2	AN47A	N08904	N	(1.4656)	I	—	—	S39042	N

Table A.3 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	**ASTM A959/ UNS[b]**		**EN 10088-1:2005 Number[c]**		**JIS[d]**		**GB/T20878/ ISC[e]**	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4657-080-20-U	X4NiCrCuMo35-20-4-3	AN58F	N08020	I	(1.4657)	I	—	—	—	—
4854-353-15-E	X6NiCrSiNCe35-25	AN60J	S35315	N	1.4854	I	—	—	—	—
4864-083-77-X	X13NiCr35-16	AN51O	—	—	1.4864	N	SUH 330	I	S33010	I
4876-088-00-I	X8NiCrAlTi32-21	AN53L	N08800	W	1.4876	N	NCF800	W	—	—
4958-088-77-E	X5NiCrAlTi31-20	AN51J	—	—	1.4958	I	—	—	—	—
4959-088-10-U	X7NiCrAlTi33-21	AN54L	N08810	I	1.4959	N	NCF800H	N	—	—
4959-088-11-U	X8NiCrAlTi33-21	AN54M	N08811	I	1.4959	W	—	—	—	—
4959-088-77-E	X8NiCrAlTi32-20	AN52L	—	—	1.4959	I	—	—	—	—
4971-314-79-I	X12CrNiCo-MoWMnNNb21-20-20-3-3-2	AN64R	—	—	1.4971	N	SUH661	W	—	—
d) Austenitic-ferritic (duplex) steels										
4062-322-02-U	X2CrNiN22-2	DP24A	S32202	N	1.4062	I	—	—	—	—
4162-321-01-E	X2CrMnNiN21-5-1	DP27F	S32101	N	1.4162	I	—	—	—	—
4362-323-04-I	X2CrNiN23-4	DP27B	S32304	W	1.4362	I	—	—	S23043	W
4669-322-76-E	X2CrCuNiN23-2-2	DP25A	—	—	1.4669	I	—	—	—	—
e) Austenitic-ferritic (duplex) steels with Mo										
4410-327-50-E	X2CrNiMoN25-7-4	DM36A	S32750	W	1.4410	I	—	—	S25073	W
4424-315-00-I	X2CrNiMoSiMnN19-5-3-2-2	DM29B	S31500	N	1.4424	N				
4460-312-00-I	X3CrNiMoN27-5-2	DM34F	S31200	W	1.4460	I	—	—	S22553	W
4462-318-03-I	X2CrNiMoN22-5-3	DM30A	S32205	N	1.4462	I	SUS329J3L	W	S22053	N
4477-329-06-E	X2CrNiMoN29-7-2	DM38A	S32906	N	1.4477	I	—	—	—	—
4480-329-00-U	X6CrNiMo26-4-2	DM32F	S32900	I	(1.4480)	I	SUS329J1	W	—	—
4481-312-60-J	X2CrNiMoN25-7-3	DM35A	S31260	W	(1.4481)	I	SUS329J4L	I	S22583	W
4482-320-01-X	X2CrMnNiMoN21-5-3	DM29A	—	—	1.4482	I	—	—	—	—
4485-332-07-U	X2CrNiMoN31-8-4	DM43A	S33207	I	(1.4485)	I	—	—	—	—
4501-327-60-I	X2CrNiMoCuWN25-7-4	DM36B	S32760	I	1.4501	N	—	—	S27603	N
4507-325-20-I	X2CrNiMoCuN25-6-3	DM34A	S32520	W	1.4507	I	—	—	S25554	—
4507-325-50-X	X3CrNiMoCuN26-6-3-2	DM35F	S32550	I	1.4507	W	—	—	S25554	I

Table A.3 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	**ASTM A959/ UNS[b]**		**EN 10088-1:2005 Number[c]**		**JIS[d]**		**GB/T20878/ ISC[e]**	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4658-327-07-U	X2CrNiMoCoN28-8-5-1	DM42A	S32707	I	1.4658	I	—	—	—	—
4662-824-41-X	X2CrNiMnMoCuN24-4-3-2	DM33A	—	—	1.4662	I	—	—	—	—
f) Ferritic steels										
4000-410-08-I	X6Cr13	FP13G	S41008	W	1.4000	N	SUS410S	N	S41008	N
4002-405-00-I	X6CrAl13	FP13H	S40500	W	1.4002	N	SUS405	W	S11348	N
4003-410-77-I	X2CrNi12	FP12C	S41003	N	1.4003	N	—	—	S11213	N
4004-430-20-I	X7CrS17	FP17L	S43020	W	(1.4004)	I	SUS430F	W	S11717	W
4012-429-00-X	X10Cr15	FP15L	S42900	I	(1.4012)	I	SUS429	I	S11510	I
4016-430-00-I	X6Cr17	FP17I	S43000	W	1.4016	I	SUS430	W	S11710	W
4017-430-91-E	X6CrNi17-1	FP17H	—	—	1.4017	I	—	—	—	—
4030-410-90-X	X2Cr12	FP12A	—	—	(1.4030)	I	SUS410L	I	S11203	I
4509-439-40-X	X2CrTiNb18	FP18B	S43940	I	1.4509	N	SUS430LX	W	S11873	I
4510-430-35-I	X3CrTi17	FP17F	S43035	W	1.4510	N	SUS430LX	W	S11863	W
4510-430-36-X	X2CrNb17	FP17B	—	—	1.4510	N	SUS430LX	I	S11863	I
4511-430-71-I	X3CrNb17	FP17G	—	—	1.4511	N	SUS430LX	W	—	—
4512-409-10-I	X2CrTi12	FP12B	S40900	W	1.4512	N	SUH409L	W	S11163	—
4516-409-75-I	X6CrNiTi12	FP12F	S40975	W	1.4516	N	—	—	—	—
4520-430-70-I	X2CrTi17	FP17A	—	—	1.4520	N	SUS430LX	W	—	—
4595-429-71-I	X1CrNb15	FP15A	—	—	1.4595	N	—	—	—	—
4600-410-70-E	X2CrMnNiTi12	FP12D	—	—	1.4600	I	—	—	—	—
4607-445-00-E	X2CrNbTi20	FP20A	—	—	1.4607	I	—	—	—	—
4611-445-70-E	X2CrTi21	FP21A	—	—	1.4607	I	—	—	—	—
4613-446-70-E	X2CrTi24	FP24A	—	—	1.4607	I	—	—	—	—
4621-443-30-J	X2CrTiCu22	FP22A	—	—	(1.4621)	N	SUS443J1	I	—	—
4621-445-00-E	X2CrNbCu21	FP21B	S44500	W	(1.4621)	I	—	—	—	—
4664-430-75-J	X2CrCuTi18	FP18A	—	—	(1.4664)	I	SUS430J1L	I	—	—
4724-405-77-I	X10CrAlSi13	FP13L	—	—	1.4724	N	—	—	—	—
4742-430-77-I	X10CrAlSi18	FP18N	—	—	1.4742	N	—	—	—	—
4749-446-00-I	X15CrN26	FP26R	S44600	W	1.4749	W	SUH446	W	S12550	W

Table A.3 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	**ASTM A959/ UNS[b]**		**EN 10088-1:2005 Number[c]**		**JIS[d]**		**GB/T20878/ ISC[e]**	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4762-445-72-I	X10CrAlSi25	FP25N	—	—	1.4762	N	—	—	—	—
4764-442-72-J	X8CrAl19-3	FP19N	—	—	(1.4764)	I	SUH21	I	—	—
g) Ferritic steels with Mo										
4105-430-20-X	X6CrMoS17	FM17K	—	—	1.4105	I	—	—	—	—
4113-434-00-I	X6CrMo17-1	FM18I	S43400	W	1.4113	N	SUS434	W	S11790	W
4128-445-92-J	X2CrMo23-1	FM24B	—	—	(1.4128)	I	SUS445J1	I	—	—
4129-445-92-J	X2CrMo23-2	FM25A	—	—	(1.4129)	I	SUS445J2	I	—	—
4131-446-92-C	X1CrMo26-1	FM27A	S44627	W	(1.41319	I	SUSXM27	N	S12791	I
4135-447-92-C	X1CrMo30-2	FM32A	S44700	N	(1.41359	I	SUS447J1	N	S13091	I
4513-436-00-J	X2CrMoNbTi18-1	FM19A	S43600	W	(1.4513)	N	SUS436L	I	S11862	W
4521-444-00-I	X2CrMoTi18-2	FM20B	S44400	W	1.4521	N	SUS444	W	S11972	W
4523-182-35-I	X2CrMoTiS18-2	FM20C	S18235	W	1.4523	I	—	—	—	—
4526-436-00-I	X6CrMoNb17-1	FM18J	S43600	W	1.4526	N	—	—	S11770	W
4589-429-70-E	X5CrNiMoTi15-2	FM16H	—	—	1.4589	I	—	—	—	—
4609-436-77-J	X2CrMo19	FM19B	—	—	(1.4609)	I	SUS436J1L	I	—	—
4750-446-60-U	X2CrMoNi27-4-2	FM31A	S44660	I	(1.4750)	I	—	—	—	—
h) Martensitic steels										
4005-416-00-I	X12CrS13	MP13C	S41600	W	1.4005	N	SUS416	W	S41617	N
4006-410-00-I	X12Cr13	MP13B	S41000	W	1.4006	I	SUS410	W	S41010	W
4019-430-20-I	X14CrS17	MP17F	S43020	W	(1.4019)	I	—	—	S11717	W
4021-420-00-I	X20Cr13	MP13I	S42000	W	1.4021	I	SUS420J1	N	S42020	N
4023-440-04-I	X110Cr17	MP17W	S44004	W	(1.4023)	I	SUS440C	N	S44096	N
4024-410-09-E	X15Cr13	MP13F	—	—	1.4024	I	SUS410	W	—	—
4025-440-74-X	X110CrS17	MP17Z	—	—	(1.4025)	I	SUS440F	I	S44097	I
4028-420-00-I	X30Cr13	MP13M	S42000	W	1.4028	I	SUS420J2	W	S42030	N
4029-420-20-I	X33CrS13	MP13N	S42020	W	1.4029	N	SUS420F	N	S42037	N
4031-420-00-I	X39Cr13	MP13P	S42000	W	1.4031	I	—	—	S42040	W
4034-420-00-I	X46Cr13	MP13Q	S42000	W	1.4034	I	—	—	S42040	W

Table A.3 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	**ASTM A959/ UNS[b]**		**EN 10088-1:2005 Number[c]**		**JIS[d]**		**GB/T20878/ ISC[e]**	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
4035-420-74-E	X46CrS13	MP13R	—	—	1.4035	I	—	—	—	—
4038-420-00-I	X52Cr13	MP13U	S42000	W	(1.4038)	I	—	—	—	—
4039-420-09-I	X60Cr13	MP13V	—	—	(1.4039)	I	—	—	—	—
4040-440-02-X	X68Cr17	MP17U	S44002	W	(1.4040)	I	SUS440A	I	S44070	I
4041-440-03-X	X85Cr17	MP17V	S44003	W	(1.4041)	I	SUS440B	I	S44080	I
4057-431-00-X	X17CrNi16-2	MP16G	S43100	W	1.4057	I	SUS431	W	S43120	I
4058-429-99-J	X33Cr16	MP16O	—	—	(1.4058)	I	SUS429J1	I	—	—
4642-416-72-J	X13CrPb13	MP13A	—	—	(1.4642)	I	SUS410F2	I	—	—
4643-420-72-J	X33CrPb13	MP13O	—	—	(1.4643)	I	SUS420F2	I	—	—
4766-440-77-X	X80CrSiNi20-2	MP20U	—	—	(1.4766)	I	SUH4	I	S48380	I
i) Martensitic steels with Mo										
4110-420-69-E	X55CrMo14	MM14U	—	—	1.4110	I	—	—	—	—
4116-420-77-E	X50CrMoV15	MM15U	—	—	1.4116	I	—	—	—	—
4119-410-92-C	X13CrMo13	MM13G	—	—	(1.4119)	I	SUS410J1	N	S45710	I
4122-434-09-I	X39CrMo17-1	MM18R	—	—	1.4122	I	—	—	—	—
4123-431-77-E	X40CrMoVN16-2	MM18T	—	—	1.4123	I	—	—	—	—
4313-415-00-I	X3CrNiMo13-4	MM14A	S41500	W	1.4313	N	SUSF6NM	W	S41595	W
4415-415-92-E	X2CrNiMoV13-5-2	MM15A	—	—	1.4415	I	—	—	—	—
4418-431-77-E	X4CrNiMo16-5-1	MM17A	—	—	1.4418	I	—	—	—	—
4419-420-97-E	X38CrMo14	MM14P	—	—	1.4419	I	—	—	S45830	W
4916-600-77-J	X18CrMnMoNbVN12	MM12G	—	—	(1.4916)	I	SUH 600	I	S46250	N
4923-422-77-E	X22CrMoV12-1	MM13H	—	—	1.4923	I	—	—	—	—
4929-422-00-I	X23CrMoWMnNiV12-1-1	MM13J	S42200	W	(1.4929)	I	SUH 616	N	S47220	N
j) Precipitation-hardening steels										
4542-174-00-I	X5CrNiCuNb16-4	PP20I	S17400	W	1.4542	N	SUS630	W	S51740	W
4568-177-00-I	X7CrNiAl17-7	PP24L	S17700	N	1.4568	N	SUS631	W	S51770	N

Table A.3 *(continued)*

Steel designations according to[a]										
ISO number	**ISO name**	**Line**	**ASTM A959/ UNS[b]**		**EN 10088-1:2005 Number[c]**		**JIS[d]**		**GB/T20878/ ISC[e]**	
				I/N/ W[f]		I/N/ W[f]		I/N/ W[f]		I/N/ W[f]
k) Precipitation-hardening steels with Mo										
4457-350-00-X	X9CrNiMoN17-5-3	PM25M	(S35000)	I	(1.4457)	W	—	—	S51750	I
4530-455-77-E	X1CrNiMoAlTi12-9-2	PM23A	—	—	1.4530	I	—	—	—	—
4532-157-00-I	X8CrNiMoAl15-7-2	PM24M	S15700	N	1.4532	N	—	—	S51570	
4534-138-00-X	X3CrNiMoAl13-8-3	PM24H	S13800	I	1.4534	N	—	—	S51380	
4594-155-92-E	X5CrNiMoCuNb14-5	PM21I	—	—	1.4594	I	—	—	—	—
4596-455-77-E	X1CrNiMoAlTi12-10-2	PM24A	—	—	1.4596	I	—	—	—	—
4644-662-20-U	X4NiCrMoTiMnSiB26-14-3-2	PM43J	(S66220)	I	(1.4644)	I	—	—	—	—
4645-469-10-U	X2CrNiMoCu AlTi12-9-4-3	PM25A	(S46910)	I	(1.4645)	I	—	—	—	—
4980-662-86-X	X6NiCrTiMoVB25-15-2	PM42J	(S66286)	I	1.4980	N	SUH660	I	S51525	W

NOTE The grades given Table A.3 are comparable to those given in Table 1. However, to compare similar grades, it is necessary to check each element before making a substitution.

[a] See the sources in the Bibliography.

[b] US steel listed in ASTM A959 and in UNS; if the steel number is given in brackes then the steel has only a UNS number.

[c] European steel listed in EN 10088-1:2005 and in the "Stahl-Eisen-Liste"; if the steel number is given in brackets then the steel is only listed in the "Stahl-Eisen-Liste".

[d] Japanese Industrial Standard.

[e] Chinese steel of ISC number listed in GB/T20878.

[f] I = identical steel to ISO steel grade; *N* = steel grade with closer match of composition, but not identical; W = wider match.

Annex B
(informative)

Designation of the steels given in Table 1 and of comparable grades covered in various International Standards

Table B.1 — Designations of the steels given in Table 1 and of comparable grades covered in various International Standards

Steel designations according to[a,b]										
ISO name	**ISO number**	**ISO 4954: 1993**	**ISO 4955: 2005**	**ISO 6931-1: 1994**	**ISO 6931-2: 2005**	**ISO 9327-5: 1999**	**ISO 9328-7: 2004**	**ISO 16143-1: 2014**	**ISO 16143-2: 2014**	**ISO 16143-3: 2014**
a) Austenitic steels										
X5CrNi17-7	4319-301-00-I	—	—	—	—	—	—	—	—	—
X12CrNi17-7	4310-301-09-X	—	—	—	—	—	—	X	—	—
X2CrNiN18-7	4318-301-53-I	—	—	—	—	—	X	—	—	—
X6CrNiCu17-8-2	4567-304-76-I	—	—	—	—	—	—	X	—	—
X10CrNi18-8	4310-301-00-I	X10CrNi18 9 E	—	X9CrNi18-8	X	—	—	X	X	X
X2CrNi18-9	4307-304-03-I	X2CrNi18 10E	—	—	—	X2CrNi18-10	X	X	X	x
X7CrNi18-9	4948-304-09-I	—	X	—	—	X	X6CrNi18-10	—	—	x
X9CrNi18-9	4325-302-00-E	—	—	—	—	—	—	X	—	—
X10CrNiS18-9	4305-303-00-I	—	—	—	—	—	—	—	X	X
X12CrNiSe18-9	4625-303-23-X	—	—	—	—	—	—	—	—	—
X12CrNiSi18-9-3	4326-302-15-I	—	—	—	—	—	—	X	—	—
X2CrNiN18-9	4311-304-53-I	—	—	—	—	X2CrNiN18-10	X2CrNiN18-10	X	X	—
X6CrNiCu18-9-2	4567-304-98-X	—	—	—	—	—	—	—	—	—
X3CrNiCu18-9-4	4567-304-30-I	X3CrNiCu18 9 3E	—	—	—	—	—	—	X	—
X6CrNiCuS18-9-2	4570-303-31-I	—	—	—	—	—	—	—	X	X
X12CrNiCuS18-9-3	4667-303-76-J	—	—	—	—	—	—	—	—	—
X5CrNiN19-9	4315-304-51-I	—	—	—	—	—	—	—	X	X
X3CrNiCu19-9-2	4560-304-75-E	—	—	—	—	—	—	—	—	—
X6CrNiCu19-9-1	4649-304-76-J	—	—	—	—	—	—	—	—	—
X5CrNiCu19-6-2	4640-304-76-E	—	—	—	—	—	—	—	—	—
X5CrNi18-10	4301-304-00-I	X5CrNi18 9E	—	—	X	X5CrNi18-9	X	X	X	X
X6CrNiTi18-10	4541-321-00-I	X6CrNiTi18 10E	—	—	—	X	X	X	X	X
X7CrNiTi18-10	4940-321-09-I	—	X	—	—	X	—	—	—	—
X6CrNiTiB18-10	4941-321-09-I	—	—	—	—	—	X	—	—	—
X6CrNiNb18-10	4550-347-00-I	—	X	—	—	X	X	X	X	—
X7CrNiNb18-10	4912-347-09-I	—	—	—	—	X	—	—	—	—
X2CrNiCu19-10	4650-304-75-E	—	—	—	—	—	—	—	—	—

Table B.1 *(continued)*

Steel designations according to[a,b]										
ISO name	**ISO number**	**ISO 4954: 1993**	**ISO 4955: 2005**	**ISO 6931-1: 1994**	**ISO 6931-2: 2005**	**ISO 9327-5: 1999**	**ISO 9328-7: 2004**	**ISO 16143-1: 2014**	**ISO 16143-2: 2014**	**ISO 16143-3: 2014**
X2CrNi19-11	4306-304-03-I	—	—	—	—	—	X	X	X	X
X6CrNi18-12	4303-305-00-I	X5CrNi18 12E	—	—	—	—	—	—	X	X
X8CrNiNb16-13	4961-347-77-E	—	—	—	—	—	X	—	—	—
X6CrNiSiNCe19-10	4818-304-15-E	—	X	—	—	—	—	—	—	—
X40CrNiWSi15-14-3-2	4867-316-77-J	—	—	—	—	—	—	—	—	—
X6CrNiSi18-13-4	4884-305-00-X	—	—	—	—	—	—	—	—	—
X7CrNiSiNCe21-11	4835-308-15-U	—	X	—	—	—	—	—	—	X
X15CrNiSi20-12	4828-305-09-I	—	X	—	—	—	—	—	—	—
X1CrNiSi18-15-4	4361-306-00-E	—	—	—	—	—	—	—	—	—
X8CrMnCuN17-8-3	4597-204-76-I	—	—	—	—	—	—	X	X	X
X8CrMnNI19-6-3	4376-201-00-E	—	—	—	—	—	—	—	—	—
X3CrMnNiCu15-8-5-3	4615-201-75-E	—	—	—	—	—	—	—	—	—
X12CrMnNiN17-7-5	4372-201-00-I	—	—	—	X	—	—	X	—	—
X2CrMnNiN17-7-5	4371-201-53-I	—	—	—	—	—	—	—	—	—
X6CrNiMnCu17-8-4-2	4617-201-76-J	—	—	—	—	—	—	—	—	—
X9CrMnNiCu17-8-5-2	4618-201-76-E	—	—	—	—	—	—	—	—	—
X12CrMnNiN18-9-5	4373-202-00-I	—	—	—	—	—	—	—	—	—
X11CrNiMnN19-8-6	4369-202-91-I	—	—	—	—	—	—	X	X	x
X13CrMnNiN18-13-2	4020-241-00-X	—	—	—	—	—	—	—	—	—
X6CrMnNiCuN18-12-4	4646-240-76-E	—	—	—	—	—	—	—	—	—
X6CrMnNiN18-13-3	4378-240-00-X	—	—	—	—	—	—	—	—	—
X53CrMnNiN21-9-4	4890-202-09-X	—	—	—	—	—	—	—	—	—
X20CrNiN22-11	4824-308-09-J	—	—	—	—	—	—	—	—	—
X6CrNi23-13	4950-309-08-E	—	—	—	—	—	X	—	—	—
X18CrNi23-13	4833-309-08-I	—	X	—	—	—	—	—	—	X
X6CrNi25-20	4951-310-08-I	—	—	—	—	—	X	X	—	—
X1CrNi25-21	4335-310-02-I	—	—	—	—	—	X	—	X	X
X8CrNi25-21	4845-310-08-E	—	X	—	—	X6CrNi25-21	—	—	—	—
X23CrNi25-21	4845-310-09-X	—	—	—	—	—	—	—	—	—

Table B.1 *(continued)*

Steel designations according to[a,b]										
ISO name	**ISO number**	**ISO 4954: 1993**	**ISO 4955: 2005**	**ISO 6931-1: 1994**	**ISO 6931-2: 2005**	**ISO 9327-5: 1999**	**ISO 9328-7: 2004**	**ISO 16143-1: 2014**	**ISO 16143-2: 2014**	**ISO 16143-3: 2014**
X15CrNiSi25-21	4841-314-00-E	—	—	—	—	—	—	—	—	—
b) Austenitic steels with Mo										
X10CrNiMoMnN-bVB15-10-1	4982-215-00-E	—	—	—	—	—	—	—	—	—
X6CrNiCuSiMo19-10-3-2	4660-315-77-I	—	—	—	—	—	—	—	—	
X6CrNiSi-CuMo19-13-3-3-1	4648-315-77-I	—	—	—	—	—	—	—	—	—
X2CrNiMoN17-11-2	4406-316-53-I	—	—	—	—	—	X	—	—	—
X3CrNiCuMo17-11-3-2	4578-316-76-E	—	—	—	—	—	—	—	—	—
X2CrNiMo17-12-2	4404-316-03-I	—	—	—	—	X	X	X	X	X
X5CrNiMo17-12-2	4401-316-00-I	X5CrNiMo17 12 2E	—	X5CrNiMo 17-12-2	X	X5CrNiMo 17-12	X	X	X	X
X6CrNiMoTi17-12-2	4571-316-35-I	X6CrNiMoTi17 12 2E	—	—	—	X6CrNiMoTi 17-12	X	X	X	X
X6CrNiMoNb17-12-2	4580-316-40-I	—	—	—	—	—	X	—	—	—
X6CrNiMoCu18-12-2-2	4665-316-76-J	—	—	—	—	—	—	—	—	—
X2CrNiMo17-12-3	4432-316-03-I	X2CrNiMo 17 13 3E	—	—	—	—	X	X	X	X
X3CrNiMo17-12-3	4436-316-00-I	—	—	—	—	—	X	X	X	X
X2CrNiMoN17-12-3	4429-316-53-I	X2CrNiMoN 17 13 3E	—	—	—	—	X2CrNiMoN 17-13-3	X	X	—
X6CrNiMoN17-12-3	4495-316-51-J	—	—	—	—	—	—	—	—	—
X6CrNiMoS17-12-3	4494-316-74-J	—	—	—	—	—	—	—	—	—
X3CrNiMo18-12-3	4449-316-76-E	—	—	—	—	—	—	—	—	—
X3CrNiMoBN17-13-3	4910-316-77-E	—	—	—	—	—	X	—	—	—
X2CrNiMoCu18-14-2-2	4647-316-75-X	—	—	—	—	—	—	—	—	—
X2CrNiMo17-14-3	4435-316-03-X	—	—	—	—	—	—	X	—	—
X2CrNiMo18-14-3	4435-316-91-I	—	—	—	—	—	X	X	X	X
X30CrNiMoPB20-11-2	4879-317-77-J	—	—	—	—	—	—	—	—	—
X2CrNiMoN18-12-4	4434-317-53-I	—	—	—	—	—	X	—	X	X
X2CrNiMoN17-13-5	4439-317-26-E	—	—	—	—	—	X	—	—	—

Table B.1 *(continued)*

Steel designations according to[a,b]										
ISO name	**ISO number**	**ISO 4954: 1993**	**ISO 4955: 2005**	**ISO 6931-1: 1994**	**ISO 6931-2: 2005**	**ISO 9327-5: 1999**	**ISO 9328-7: 2004**	**ISO 16143-1: 2014**	**ISO 16143-2: 2014**	**ISO 16143-3: 2014**
X6CrNiMo19-13-4	4445-317-00-U	—	—	—	—	—	—	—	—	—
X2CrNiMo19-14-4	4438-317-03-I	—	—	—	—	—	—	—	—	—
X2CrNiMoN18-15-5	4483-317-26-I	—	—	—	—	—	—	—	—	—
X3CrNiMo18-16-5	4476-317-92-X	—	—	—	—	—	—	—	—	—
X4CrNiMoN25-14-1	4496-309-51-J	—	—	—	—	—	—	—	—	—
X1CrNiMoCuN20-18-7	4547-312-54-I	—	—	—	—	—	X	—	X	X
X1CrNiMoN25-22-2	4466-310-50-E	—	—	—	—	—	X	X	X	X
X1CrNiMoCuNW24-22-6	4659-312-66-I	—	—	—	—	—	—	X	X	
X1CrNiMoCuN24-22-8	4652-326-54-I	—	—	—	—	—	—	X	—	
X2CrNiMnMoN25-18-6-5	4565-345-65-I	—	—	—	—	—	—	X	X	
c) Austenitic steels with Ni/Co as main alloying elements										
X3NiCr18-16	4389-384-00-I	—	—	—	—	—	—	—	—	—
X1NiCrMoCu22-20-5-2	4656-089-04-I	—	—	—	—	—	—	—	—	—
X1NiCrMoCu25-20-5	4539-089-04-I	—	—	—	—	X2NiCrMoCu 25-20-5	X	X	X	X
X1NiCrMoCuN25-20-7	4529-089-26-I	—	—	—	—	—	X	—	X	X
X2NiCrMoN25-21-7	4478-083-67-U	—	—	—	—	—	—	—	—	—
X1CrNiMoCuN25-25-5	4537-310-92-E	—	—	—	—	—	X	—	—	—
X5NiCrAlTi31-20	4958-088-77-E	—	—	—	—	—	X	—	—	—
X2NiCrAlTi32-20	4558-088-90-E	—	—	—	—	—	—	—	—	—
X8NiCrAlTi32-20	4959-088-77-E	—	—	—	—	—	X	—	—	—
X8NiCrAlTi32-21	4876-088-00-I	—	X	—	—	—	X	—	—	X
X7NiCrAlTi33-21	4959-088-10-U	—	—	—	—	—	—	—	—	—
X8NiCrAlTi33-21	4959-088-11-U	—	—	—	—	—	—	—	—	—
X13NiCr35-16	4864-083-77-X	—	—	—	—	—	—	—	—	—
X4NiCrCuMo35-20-4-3	4657-080-20-U	—	—	—	—	—	—	—	—	—
X6NiCrSiNCe35-25	4854-353-15-E	—	X	—	—	—	—	—	—	—
X1NiCrMoCu31-27-4	4563-080-28-I	—	—	—	—	—	X	X	X	X

Table B.1 *(continued)*

Steel designations according to[a,b]										
ISO name	**ISO number**	**ISO 4954: 1993**	**ISO 4955: 2005**	**ISO 6931-1: 1994**	**ISO 6931-2: 2005**	**ISO 9327-5: 1999**	**ISO 9328-7: 2004**	**ISO 16143-1: 2014**	**ISO 16143-2: 2014**	**ISO 16143-3: 2014**
X12CrNiCoMoWMnNN-b21-20-20-3-3-2	4971-314-79-I	—	—	—	—	—	—	—	—	—
X1NiCrMoMnN34-27-6-5	4479-089-36-U	—	—	—	—	—	—	—	—	—
d) Austenitic-ferritic (duplex) steels										
X2CrNiN22-2	4062-322-02-U	—	—	—	—	—	—	—	—	—
X2CrCuNiN23-2-2	4669-322-76-E	—	—	—	—	—	—	—	—	—
X2CrMnNiN21-5-1	4162-321-01-E	—	—	—	—	—	—	X	X	—
X2CrNiN23-4	4362-323-04-I	—	—	—	—	—	—	X	X	X
e) Austenitic-ferritic (duplex) steels with Mo										
X2CrMnNiMoN21-5-3	4482-320-01-X	—	—	—	—	—	—	—	—	—
X2CrNiMo-SiMnN19-5-3-2-2	4424-315-00-I	—	—	—	—	—	—	—	—	—
X2CrNiMoN22-5-3	4462-318-03-I	—	—	—	—	—	—	X	X	X
X6CrNiMo26-4-2	4480-329-00-U	—	—	—	—	—	—	—		
X2CrNiMnMo-CuN24-4-3-2	4662-824-41-X	—	—	—	—	—	—	X	X	—
X3CrNiMoN27-5-2	4460-312-00-I	—	—	—	—	—	—	—	X	—
X2CrNiMoCuN25-6-3	4507-325-20-I	—	—	—	—	—	—	X	—	—
X3CrNiMoCuN26-6-3-2	4507-325-50-X	—	—	—	—	—	—	—	—	—
X2CrNiMoN25-7-3	4481-312-60-J	—	—	—	—	—	—	—	X	—
X2CrNiMoN25-7-4	4410-327-50-E	—	—	—	—	—	—	X	X	X
X2CrNiMoCuWN25-7-4	4501-327-60-I	—	—	—	—	—	—	X	X	—
X2CrNiMoN29-7-2	4477-329-06-E	—	—	—	—	—	—	—	—	—
X2CrNiMoCoN28-8-5-1	4658-327-07-U	—	—	—	—	—	—	—	—	—
X2CrNiMoN31-8-4	4485-332-07-U	—	—	—	—	—	—	—	—	—
f) Ferritic steels										
X2Cr12	4030-410-90-X	—	—	—	—	—	—	—	—	—
X2CrTi12	4512-409-10-I	—	X	—	—	—	—	X	—	—
X2CrNi12	4003-410-77-I	—	—	—	—	—	X	X	—	—
X2CrMnNiTi12	4600-410-70-E	—	—	—	—	—	—	—	—	—

Table B.1 *(continued)*

Steel designations according to[a,b]										
ISO name	**ISO number**	**ISO 4954: 1993**	**ISO 4955: 2005**	**ISO 6931-1: 1994**	**ISO 6931-2: 2005**	**ISO 9327-5: 1999**	**ISO 9328-7: 2004**	**ISO 16143-1: 2014**	**ISO 16143-2: 2014**	**ISO 16143-3: 2014**
X6CrNiTi12	4516-409-75-I	—	—	—	—	—	X	—	—	—
X6Cr13	4000-410-08-I	—	X	—	—	—	—	—	—	—
X6CrAl13	4002-405-00-I	—	—	—	—	—	—	—	—	—
X10CrAlSi13	4724-405-77-I	—	X	—	—	—	—	—	—	—
X10Cr15	4012-429-00-X	—	—	—	—	—	—	—	—	—
X1CrNb15	4595-429-71-I	—	—	—	—	—	—	—	—	—
X6Cr17	4016-430-00-I	X6Cr17E	X	—	X	—	—	X	X	—
X7CrS17	4004-430-20-I	—	—	—	—	—	—	—	—	—
X2CrTi17	4520-430-70-I	—	—	—	—	—	X	—	—	—
X2CrNb17	4510-430-36-X	—	—	—	—	—	—	X	—	—
X3CrTi17	4510-430-35-I	—	X	—	—	—	X	X	—	—
X3CrNb17	4511-430-71-I	—	—	—	—	—	—	X	X	—
X6CrNi17-1	4017-430-91-E	—	—	—	—	—	—	—	—	—
X2CrCuTi18	4664-430-75-J	—	—	—	—	—	—	—	—	—
X2CrTiNb18	4509-439-40-X	—	X	—	—	—	X	—	—	—
X10CrAlSi18	4742-430-77-I	—	X	—	—	—	—	—	—	—
X8CrAl19-3	4764-442-72-J	—	—	—	—	—	—	—	—	—
X2CrNbTi20	4607-445-00-E	—	—	—	—	—	—	—	—	—
X2CrTi21	4611-445-70-E	—	—	—	—	—	—	—	—	—
X2CrNbCu21	4621-445-00-E	—	—	—	—	—	—	—	—	—
X2CrTiCu22	4621-443-30-J	—	—	—	—	—	—	—	—	—
X2CrTi24	4613-446-70-E	—	—	—	—	—	—	—	—	—
X10CrAlSi25	4762-445-72-I	—	X	—	—	—	—	—	—	—
X15CrN26	4749-446-00-I	—	X	—	—	—	—	—	—	X
g) Ferritic steels with Mo										
X5CrNiMoTi15-2	4589-429-70-E	—	—	—	—	—	—	—	—	—
X6CrMoS17	4105-430-20-X	—	—	—	—	—	—	—	—	—
X6CrMo17-1	4113-434-00-I	X6CrMo17 1E	—	—	—	—	—	—	X	X
X6CrMoNb17-1	4526-436-00-I	—	—	—	—	—	—	—	—	—

Table B.1 *(continued)*

Steel designations according to[a,b]										
ISO name	**ISO number**	**ISO 4954: 1993**	**ISO 4955: 2005**	**ISO 6931-1: 1994**	**ISO 6931-2: 2005**	**ISO 9327-5: 1999**	**ISO 9328-7: 2004**	**ISO 16143-1: 2014**	**ISO 16143-2: 2014**	**ISO 16143-3: 2014**
X2CrMo19	4609-436-77-J	—	—	—	—	—	—	—	—	—
X2CrMoNbTi18-1	4513-436-00-J	—	—	—	—	—	—	—	—	—
X2CrMoTi18-2	4521-444-00-I	—	—	—	—	—	X	—	—	—
X2CrMoTiS18-2	4523-182-35-I	—	—	—	—	—	—	—	—	X
X2CrMo23-1	4128-445-92-J	—	—	—	—	—	—	—	—	—
X2CrMo23-2	4129-445-92-J	—	—	—	—	—	—	—	—	—
X1CrMo26-1	4131-446-92-C	—	—	—	—	—	—	—	—	—
X2CrMoNi27-4-2	4750-446-60-U	—	—	—	—	—	—	—	—	—
X1CrMo30-2	4135-447-92-C	—	—	—	—	—	—	—	—	—
h) Martensitic steels										
X12Cr13	4006-410-00-I	X12Cr13E	—	—	—	—	—	X	X	X
X12CrS13	4005-416-00-I	—	—	—	—	—	—	—	X	X
X13CrPb13	4642-416-72-J	—	—	—	—	—	—	—	—	—
X15Cr13	4024-410-09-E	—	—	—	—	—	—	—	—	—
X20Cr13	4021-420-00-I	—	—	—	X	—	—	X	X	X
X30Cr13	4028-420-00-I	—	—	—	X	—	—	X	X	X
X33CrS13	4029-420-20-I	—	—	—	—	—	—	—	—	—
X33CrPb13	4643-420-72-J	—	—	—	—	—	—	—	—	—
X39Cr13	4031-420-00-I	—	—	—	X	—	—		—	—
X46Cr13	4034-420-00-I	—	—	—	—	—	—	—	—	—
X46CrS13	4035-420-74-E	—	—	—	—	—	—	—	—	—
X52Cr13	4038-420-00-I	—	—	—	—	—	—	—	—	—
X60Cr13	4039-420-09-I	—	—	—	—	—	—	—	—	—
X17CrNi16-2	4057-431-00-X	X19CrNi16 2E	—	—	—	—	—	—	—	X
X33Cr16	4058-429-99-J	—	—	—	—	—	—	—	X	—
X14CrS17	4019-430-20-I	—	—	—	—	—	—	—	X	X
X68Cr17	4040-440-02-X	—	—	—	—	—	—	—	—	—
X85Cr17	4041-440-03-X	—	—	—	—	—	—	—	—	—
X110Cr17	4023-440-04-I	—	—	—	—	—	—	—	—	—

Table B.1 *(continued)*

Steel designations according to[a,b]										
ISO name	**ISO number**	**ISO 4954: 1993**	**ISO 4955: 2005**	**ISO 6931-1: 1994**	**ISO 6931-2: 2005**	**ISO 9327-5: 1999**	**ISO 9328-7: 2004**	**ISO 16143-1: 2014**	**ISO 16143-2: 2014**	**ISO 16143-3: 2014**
X110CrS17	4025-440-74-X	—	—	—	—	—	—	—	—	—
X80CrSiNi20-2	4766-440-77-X	—	—	—	—	—	—	—	—	—
i) Martensitic steels with Mo										
X18CrMnMoNbVN12	4916-600-77-J	—	—	—	—	—	—	—	—	—
X23CrMoWMnNiV12-1-1	4929-422-00-I	—	—	—	—	—	—	—	—	—
X22CrMoV12-1	4923-422-77-E	—	—	—	—	—	—	—	—	—
X13CrMo13	4119-410-92-C	—	—	—	—	—	—	—	—	—
X38CrMo14	4419-420-97-E	—	—	—	—	—	—	—	—	—
X55CrMo14	4110-420-69-E	—	—	—	—	—	—	—	—	—
X3CrNiMo13-4	4313-415-00-I	—	—	—	—	—	X	—	X	—
X50CrMoV15	4116-420-77-E	—	—	—	—	—	—	—	—	—
X2CrNiMoV13-5-2	4415-415-92-E	—	—	—	—	—	—	—	—	—
X4CrNiMo16-5-1	4418-431-77-E	—	—	—	—	—	X	—	—	—
X39CrMo17-1	4122-434-09-I	—	—	—	—	—	—	—	X	—
X40CrMoVN16-2	4123-431-77-E	—	—	—	—	—	—	—	—	—
j) Precipitation-hardening steels										
X5CrNiCuNb16-4	4542-174-00-I	—	—	—	—	—	—	—	X	—
X7CrNiAl17-7	4568-177-00-I	—	—	X7CrNiAl17-7	X	—	—	X	X	X
k) Precipitation-hardening steels with Mo										
X5CrNiMoCuNb14-5	4594-155-92-E	—	—	—	—	—	—	—	—	—
X1CrNiMoAlTi12-9-2	4530-455-77-E	—	—	—	—	—	—	—	—	—
X1CrNiMoAlTi12-10-2	4596-455-77-E	—	—	—	—	—	—	—	—	—
X8CrNiMoAl15-7-2	4532-157-00-I	—	—	—	—	—	—	—	—	—
X3CrNiMoAl13-8-3	4534-138-00-X	—	—	—	—	—	—	—	—	—
X9CrNiMoN17-5-3	4457-350-00-X	—	—	—	—	—	—	—	—	—

Table B.1 *(continued)*

Steel designations according to[a,b]										
ISO name	**ISO number**	**ISO 4954: 1993**	**ISO 4955: 2005**	**ISO 6931-1: 1994**	**ISO 6931-2: 2005**	**ISO 9327-5: 1999**	**ISO 9328-7: 2004**	**ISO 16143-1: 2014**	**ISO 16143-2: 2014**	**ISO 16143-3: 2014**
X2CrNiMoC-uAlTi12-9-4-3	4645-469-10-U	—	—	—	—	—	—	—	—	—
X6NiCrTiMoVB25-15-2	4980-662-86-X	—	—	—	—	—	—	—	—	—
X4NiCrMoTiMn-SiB26-14-3-2	4644-662-20-U	—	—	—	—	—	—	—	—	—
NOTE The grades given in this table are comparable to those given in Table 1. However, it should be noted that their chemical compositions can vary.										
[a] See the sources in the Bibliography.										
[b] In the table, steel names which are identical to those mentioned in column 2 are marked in columns 4 to 12 with an X; otherwise the full steel name appears.										

Annex C
(informative)

Classification of grades

C.1 Stainless steels

Chromium is the main alloying element and the chromium not bound to carbon determines the corrosion resistance.

C.2 Ferritic steels

Ferritic corrosion-resistant steels have a carbon mass-fraction limit of 0,08 %. They are annealed at temperatures below that at which austenite is formed. This limit is generally 850 °C to 950 °C, depending on chemistry. Heat treatments at higher temperatures and the heat-affected zones of welds will contain austenite, which transforms to martensite on cooling. The extent of this effect depends upon the unstabilized carbon and nitrogen contents and the content of chromium and other alloying elements. The steels most liable to martensite transformation are called semi-ferritic steels.

The metallurgical structure is ferrite (alpha ferrite or delta ferrite), a body-centred cubic phase that is magnetic.

This structure is ductile in specific manufacturing conditions, especially in thin cross-sections.

The ferritic free-cutting grades most commonly used for bars include a sulfur addition greater than 0,15 % to facilitate machining. This sulfur addition causes some reduction of corrosion resistance.

Some ferritic steels have a relatively good weldability. In general, a low heat-input is advisable to avoid embrittlement due to excessive grain growth.

C.3 Martensitic steels

Martensitic steels have the highest carbon mass fractions, typically 0,08 % to 1,00 %. Their mechanical strength is developed by heat treatment consisting of quenching and tempering. These steels are magnetic.

Some grades include sulfur additions greater than 0,15 % for improved machinability.

In this case, it should be considered that corrosion resistance might be impaired.

In addition to the grades defined in this International Standard, there are grades intended for specific applications. For example, some of the steels specified for bearings are of compositions within the range of stainless steels.

C.4 Precipitation-hardening steels

Precipitation-hardening steels can have a high strength while retaining good corrosion resistance.

The high strength of these steels results from the precipitation of intermetallic compounds in the structure by a final heat treatment at relatively low temperature.

The specific heat-treatment conditions shall be adjusted, depending on the desired level of mechanical properties and the data provided by the manufacturers.

C.5 Austenitic steels

Austenitic steels are alloyed with a combination of nickel, manganese, copper, nitrogen, and carbon to produce the austenitic structure.

The metallurgical structure of these steels is austenite (gamma phase), a face-centred cubic crystal structure that is non-magnetic.

Some austenitic steels can become faintly magnetic as a result of the formation of martensite within the structure during deformation, or the formation of delta ferrite during solidification.

NOTE Martensitic structures can only be removed by solution annealing or could be significantly reduced by adjustment of elements like carbon, manganese, nitrogen and nickel.

Austenitic steels possess a good general corrosion resistance. Austenitic steels are not hardenable by heat treatment. Their strength can be increased by nitrogen additions or by cold working.

If the austenitic steels have a carbon mass fraction of 0,04 % or higher and cool slowly after heat treatment or welding (e.g. in thick sections), chromium carbides precipitate in the grain boundaries in a critical temperature range of approximately 600 °C to 800 °C. This causes intergranular corrosion in contact with acids and other corrosive media. There are two principal ways of avoiding this problem: by alteration according to the chemical analysis given in c) and d) below.

Austenitic steels have a good weldability.

Austenitic steels have excellent toughness. Some grades of austenitic steels are stable and tough at cryogenic temperatures.

According to the carbon content and the alloying elements, the austenitic steels can be classified as follows.

a) Austenitic steels without molybdenum

   These steels are typically more difficult to machine than ferritic or martensitic stainless steels. There are free machining variants of the austenitic stainless steels (S ≥ 0,15 %), but the sulfur causes some loss of corrosion resistance.

b) Austenitic molybdenum steels

   The addition of molybdenum generally improves the corrosion resistance, especially against chloride-induced pitting.

   Molybdenum-containing stainless steels are not recommended for nitric acid and nitrous gas environments.

c) Extra-low-carbon austenitic steels

   One method of avoiding intergranular corrosion as a result of welding is to make steels with low carbon (≤0,030 %), so that the precipitation of chromium carbide is delayed beyond the period of exposure associated with welding, and with stress relief when applied.

d) Stabilized austenitic steels

   The addition of titanium and/or niobium will prevent the formation of chromium carbides in heat-treatment, welding, or extended thermal-exposure applications.

e) Super-austenitic steels

   These steels are enriched in chromium and molybdenum contents and have a completely austenitic structure due to higher nickel and nitrogen contents. They have an excellent corrosion resistance in aggressive environments.

f) Comparison of methods of avoiding intergranular corrosion

Up to the 1960s, the stabilized steel "solution" to this problem was preferred, as it was difficult, expensive and unreliable to refine extra-low-carbon steels in the electric arc furnace. However, the technological advances in stainless steelmaking since then have enabled extra-low-carbon steels to be made more cheaply, quickly, and reliably than stabilized grades.

Further advice on steel selection is available from manufacturers. Whichever "solution" is chosen, the steel will be melted and processed to be free from the risk of intergranular corrosion in the delivery condition, and there should be no need to specify intergranular corrosion testing in most purchase specifications.

C.6 Austenitic-ferritic (duplex) steels

Duplex stainless steels typically have a higher chromium mass fraction (20 % to 30 %) with or without molybdenum additions up to 5 %, and a nickel mass fraction intermediate to those of ferritic and austenitic stainless steels. The metallurgical structure is typically 40 % to 60 % austenitic in a ferritic matrix. Nitrogen additions are essential to retaining toughness and corrosion resistance when these grades are welded without subsequent full annealing.

Their strength properties are higher than those of austenitic steels.

These steels have an especially good resistance to stress corrosion.

Sigma phase, and other phases that can seriously reduce toughness and corrosion resistance, are formed rapidly at 600 °C to 900 °C in these steels. Welds should be cooled rapidly through this range. A re-solution anneal and quench would be needed to remove these deleterious phases. Some duplex steels are, however, designed to minimize formation of secondary phases to avoid postweld heat treatment.

C.7 Creep-resisting steels

Variants of the steels described by Clauses C.1 to C.6, often with an increased carbon content, are used as creep-resisting steels.

C.8 Heat-resisting steels

These ferritic or austenitic types of steels are used in part for their excellent resistance to oxidation and to corrosion by high-temperature gases, and also for the fact that they retain their mechanical properties over a wide range of temperatures.

Annex D
(informative)

Density values for stainless steels

Table D.1 comprises density values for the steels given in Table 1.

Table D.1 — Density values

Steel designation		Density kg/dm^3
a) Austenitic steels		
X5CrNi17-7	4319-301-00-I	7,9
X12CrNi17-7	4310-301-09-X	7,9
X2CrNiN18-7	4318-301-53-I	7,9
X6CrNiCu17-8-2	4567-304-76-I	7,9
X10CrNi18-8	4310-301-00-I	7,9
X2CrNi18-9	4307-304-03-I	7,9
X7CrNi18-9	4948-304-09-I	7,9
X9CrNi18-9	4325-302-00-E	7,9
X10CrNiS18-9	4305-303-00-I	7,9
X12CrNiSe18-9	4625-303-23-X	7,9
X12CrNiSi18-9-3	4326-302-15-I	7,9
X2CrNiN18-9	4311-304-53-I	7,9
X6CrNiCu18-9-2	4567-304-98-X	7,9
X3CrNiCu18-9-4	4567-304-30-I	7,9
X6CrNiCuS18-9-2	4570-303-31-I	7,9
X12CrNiCuS18-9-3	4667-303-76-J	7,9
X5CrNiN19-9	4315-304-51-I	7,9
X3CrNiCu19-9-2	4560-304-75-E	7,9
X6CrNiCu19-9-1	4649-304-76-J	7,9
X5CrNiCu19-6-2	4640-304-76-E	7,9
X5CrNi18-10	4301-304-00-I	7,9
X6CrNiTi18-10	4541-321-00-I	7,9
X7CrNiTi18-10	4940-321-09-I	7,9
X6CrNiTiB18-10	4941-321-09-I	7,9
X6CrNiNb18-10	4550-347-00-I	7,9
X7CrNiNb18-10	4912-347-09-I	7,9
X2CrNiCu19-10	4650-304-75-E	7,9
X2CrNi19-11	4306-304-03-I	7,9
X6CrNi18-12	4303-305-00-I	7,9
X8CrNiNb16-13	4961-347-77-E	7,9
X6CrNiSiNCe19-10	4818-304-15-E	7,8

Table D.1 *(continued)*

Steel designation		Density kg/dm^3
X40CrNiWSi15-14-3-2	4867-316-77-J	—
X6CrNiSi18-13-4	4884-305-00-X	7,7
X7CrNiSiNCe21-11	4835-308-15-U	7,8
X15CrNiSi20-12	4828-305-09-I	7,9
X1CrNiSi18-15-4	4361-306-00-E	7,7
X8CrMnCuN17-8-3	4597-204-76-I	7,8
X8CrMnNI19-6-3	4376-201-00-E	7,9
X3CrMnNiCu15-8-5-3	4615-201-75-E	7,9
X12CrMnNiN17-7-5	4372-201-00-I	7,8
X2CrMnNiN17-7-5	4371-201-53-I	7,8
X6CrNiMnCu17-8-4-2	4617-201-76-J	7,9
X9CrMnNiCu17-8-5-2	4618-201-76-E	7,7
X12CrMnNiN18-9-5	4373-202-00-I	7,8
X11CrNiMnN19-8-6	4369-202-91-I	7,9
X13CrMnNiN18-13-2	4020-241-00-X	7,8
X6CrMnNiCuN18-12-4	4646-240-76-E	7,7
X6CrMnNiN18-13-3	4378-240-00-X	7,8
X53CrMnNiN21-9-4	4890-202-09-X	7,8
X20CrNiN22-11	4824-308-09-J	7,9
X6CrNi23-13	4950-309-08-E	7,9
X18CrNi23-13	4833-309-08-I	7,9
X6CrNi25-20	4951-310-08-I	7,9
X1CrNi25-21	4335-310-02-I	7,9
X8CrNi25-21	4845-310-08-E	7,9
X23CrNi25-21	4845-310-09-X	7,9
X15CrNiSi25-21	4841-314-00-E	7,9
b) Austenitic steels with Mo		
X10CrNiMoMnNbVB15-10-1	4982-215-00-E	8,0
X6CrNiCuSiMo19-10-3-2	4660-315-77-I	7,9
X6CrNiSiCuMo19-13-3-3-1	4648-315-77-I	7,9
X2CrNiMoN17-11-2	4406-316-53-I	8,0
X3CrNiCuMo17-11-3-2	4578-316-76-E	8,0
X2CrNiMo17-12-2	4404-316-03-I	8,0
X5CrNiMo17-12-2	4401-316-00-I	8,0
X6CrNiMoTi17-12-2	4571-316-35-I	8,0
X6CrNiMoNb17-12-2	4580-316-40-I	8,0
X6CrNiMoCu18-12-2-2	4665-316-76-J	8,0
X2CrNiMo17-12-3	4432-316-03-I	8,0
X3CrNiMo17-12-3	4436-316-00-I	8,0
X2CrNiMoN17-12-3	4429-316-53-I	8,0

Table D.1 *(continued)*

Steel designation		Density kg/dm^3
X6CrNiMoN17-12-3	4495-316-51-J	8,0
X6CrNiMoS17-12-3	4494-316-76-J	8,0
X3CrNiMo18-12-3	4449-316-76-E	8,0
X3CrNiMoBN17-13-3	4910-316-77-E	8,0
X2CrNiMoCu18-14-2-2	4647-316-75-X	8,0
X2CrNiMo17-14-3	4435-316-03-X	8,0
X2CrNiMo18-14-3	4435-316-91-I	8,0
X30CrNiMoPB20-11-2	4879-317-77-J	7,9
X2CrNiMoN18-12-4	4434-317-53-I	8,0
X2CrNiMoN17-13-5	4439-317-26-E	8,0
X6CrNiMo19-13-4	4445-317-00-U	8,0
X2CrNiMo19-14-4	4438-317-03-I	8,0
X2CrNiMoN18-15-5	4483-317-26-I	8,0
X3CrNiMo18-16-5	4476-317-92-X	8,0
X4CrNiMoN25-14-1	4496-309-51-J	7,9
X1CrNiMoCuN20-18-7	4547-312-54-I	8,0
X1CrNiMoN25-22-2	4466-310-50-E	8,0
X1CrNiMoCuNW24-22-6	4659-312-66-I	8,2
X2CrNiMnMoN25-18-6-5	4565-345-65-I	8,0
X1CrNiMoCuN24-22-8	4652-326-54-I	8,0
c) Austenitic steels with Ni/Co as main alloying elements		
X3NiCr18-16	4389-384-00-I	8,0
X1NiCrMoCu22-20-5-2	4656-089-04-I	8,0
X1NiCrMoCu25-20-5	4539-089-04-I	8,0
X1NiCrMoCuN25-20-7	4529-089-26-I	8,1
X2NiCrMoN25-21-7	4478-083-67-U	8,1
X1CrNiMoCuN25-25-5	4537-310-92-E	8,1
X5NiCrAlTi31-20	4958-088-77-E	8,0
X2NiCrAlTi32-20	4558-088-90-E	8,0
X8NiCrAlTi32-20	4959-088-77-E	8,0
X8NiCrAlTi32-21	4876-088-00-I	8,0
X7NiCrAlTi33-21	4959-088-10-U	8,0
X8NiCrAlTi33-21	4959-088-11-U	8,0
X13NiCr35-16	4864-083-77-X	8,1
X4NiCrCuMo35-20-4-3	4657-080-20-U	8,1
X6NiCrSiNCe35-25	4854-353-15-E	7,9
X1NiCrMoCu31-27-4	4563-080-28-I	8,0
X12CrNiCo-MoWMnNNb21-20-20-3-3-2	4971-314-79-I	8,3
X1NiCrMoMnN34-27-6-5	4479-089-36-U	8,1

Table D.1 *(continued)*

Steel designation		Density kg/dm^3
d) Austenitic-ferritic steels		
X2CrNiN22-2	4062-322-02-U	7,8
X2CrCuNiN23-2-2	4669-322-76-E	7,8
X2CrMnNiN21-5-1	4162-321-01-E	—
X2CrNiN23-4	4362-323-04-I	7,8
e) Austenitic-ferritic steels with Mo		
X2CrMnNiMoN21-5-3	4482-320-01-X	7,8
X2CrNiMoSiMnN19-5-3-2-2	4424-315-00-I	7,8
X2CrNiMoN22-5-3	4462-318-03-I	7,8
X6CrNiMo26-4-2	4480-329-00-U	7,8
X2CrNiMnMoCuN24-4-3-2	4662-824-41-X	7,8
X3CrNiMoN27-5-2	4460-312-00-I	7,8
X2CrNiMoCuN25-6-3	4507-325-20-I	7,8
X3CrNiMoCuN26-6-3-2	4507-325-50-X	7,8
X2CrNiMoN25-7-3	4481-312-60-J	7,8
X2CrNiMoN25-7-4	4410-327-50-E	7,8
X2CrNiMoCuWN25-7-4	4501-327-60-I	7,8
X2CrNiMoN29-7-2	4477-329-06-E	7,7
X2CrNiMoCoN28-8-5-1	4658-327-07-U	7,8
X2CrNiMoN31-8-4	4485-332-07-U	7,8
f) Ferritic steels		
X2Cr12	4030-410-90-X	7,7
X2CrTi12	4512-409-10-I	7,7
X2CrNi12	4003-410-77-I	7,7
X2CrMnNiTi12	4600-410-70-E	7,7
X6CrNiTi12	4516-409-75-I	7,7
X6Cr13	4000-410-08-I	7,7
X6CrAl13	4002-405-00-I	7,7
X10CrAlSi13	4724-405-77-I	7,7
X10Cr15	4012-429-00-X	7,7
X1CrNb15	4595-429-71-I	7,7
X6Cr17	4016-430-00-I	7,7
X7CrS17	4004-430-20-I	7,7
X2CrTi17	4520-430-70-I	7,7
X2CrNb17	4510-430-36-X	7,7
X3CrTi17	4510-430-35-I	7,7
X3CrNb17	4511-430-71-I	7,7
X6CrNi17-1	4017-430-91-E	7,7
X2CrCuTi18	4664-430-75-J	7,7
X2CrTiNb18	4509-439-40-X	7,7

Table D.1 *(continued)*

Steel designation		Density kg/dm^3
X10CrAlSi18	4742-430-77-I	7,7
X8CrAl19-3	4764-442-72-J	—
X2CrNbTi20	4607-445-00-E	7,7
X2CrTi21	4611-445-70-E	7,7
X2CrNbCu21	4621-445-00-E	7,7
X2CrTiCu22	4621-443-30-J	7,7
X2CrTi24	4613-446-70-E	7,7
X10CrAlSi25	4762-445-72-I	7,7
X15CrN26	4749-446-00-I	7,7
g) Ferritic steels with Mo		
X5CrNiMoTi15-2	4589-429-70-E	7,7
X6CrMoS17	4105-430-20-X	7,7
X6CrMo17-1	4113-434-00-I	7,7
X6CrMoNb17-1	4526-436-00-I	7,7
X2CrMo19	4609-436-77-J	7,7
X2CrMoNbTi18-1	4513-436-00-J	7,7
X2CrMoTi18-2	4521-444-00-I	7,7
X2CrMoTiS18-2	4523-182-35-I	7,7
X2CrMo23-1	4128-445-92-J	7,7
X2CrMo23-2	4129-445-92-J	7,7
X1CrMo26-1	4131-446-92-C	7,7
X2CrMoNi27-4-2	4750-446-60-U	7,7
X1CrMo30-2	4135-447-92-C	7,7
h) Martensitic steels		
X12Cr13	4006-410-00-I	7,7
X12CrS13	4005-416-00-I	7,7
X13CrPb13	4642-416-72-J	7,7
X15Cr13	4024-410-09-E	7,7
X20Cr13	4021-420-00-I	7,7
X30Cr13	4028-420-00-I	7,7
X33CrS13	4029-420-20-I	7,7
X33CrPb13	4643-420-72-J	7,7
X39Cr13	4031-420-00-I	7,7
X46Cr13	4034-420-00-I	7,7
X46CrS13	4035-420-74-E	7,7
X52Cr13	4038-420-00-I	7,7
X60Cr13	4039-420-09-I	7,7
X17CrNi16-2	4057-431-00-X	7,7
X33Cr16	4058-429-99-J	7,7
X14CrS17	4019-430-20-I	7,7

Table D.1 *(continued)*

Steel designation		Density kg/dm^3
X68Cr17	4040-440-02-X	7,7
X85Cr17	4041-440-03-X	7,7
X110Cr17	4023-440-04-I	7,7
X110CrS17	4025-440-74-X	7,7
X80CrSiNi20-2	4766-440- 77-X	—
i) Martensitic steels with Mo		
X18CrMnMoNbVN12	4916-600-77-J	—
X23CrMoWMnNiV12-1-1	4929-422-00-I	7,7
X22CrMoV12-1	4923-422-77-E	7,7
X13CrMo13	4119-410-92-C	7,7
X38CrMo14	4419-420-97-E	7,7
X55CrMo14	4110-420-69-E	7,7
X3CrNiMo13-4	4313-415-00-I	7,7
X50CrMoV15	4116-420-77-E	7,7
X2CrNiMoV13-5-2	4415-415-92-E	7,8
X4CrNiMo16-5-1	4418-431-77-E	7,7
X39CrMo17-1	4122-434-09-I	7,7
X40CrMoVN16-2	4123-431-77-E	—
j) Precipitation-hardening steels		
X5CrNiCuNb16-4	4542-174-00-I	7,8
X7CrNiAl17-7	4568-177-00-I	7,8
k) Precipitation-hardening steels with Mo		
X5CrNiMoCuNb14-5	4594-155-92-E	7,8
X1CrNiMoAlTi12-9-2	4530-455-77-E	7,8
X1CrNiMoAlTi12-10-2	4596-455-77-E	7,8
X8CrNiMoAl15-7-2	4532-157-00-I	7,8
X3CrNiMoAl13-8-3	4534-138-00-X	7,8
X9CrNiMoN17-5-3	4457-350-00-X	—
X2CrNiMoCuAlTi12-9-4-3	4645-469-10-U	7,9
X6NiCrTiMoVB25-15-2	4980-662-86-X	7,9
X4NiCrMoTiMnSiB26-14-3-2	4644-662-20-U	—

Bibliography

[1] ISO 4954:1993, *Steels for cold heading and cold extruding*

[2] ISO 4955:2005, *Heat-resistant steels*

[3] ISO 6931-1:1994, *Stainless steels for springs — Part 1: Wire*

[4] ISO 6931-2:2005, *Stainless steels for springs — Part 2: Narrow strip*

[5] ISO 9327-5:1999, *Steel forgings and rolled or forged bars for pressure purposes — Technical delivery conditions — Part 5: Stainless steels*

[6] ISO 9328-7:2004, *Steel flat products for pressure purposes — Technical delivery conditions — Part 7: Stainless steels*

[7] ISO 16143-1, 2014, *Stainless steels for general purposes — Part 1: Corrosion-resistant flat products*

[8] ISO 16143-2:2014, *Stainless steels for general purposes — Part 2: Corrosion-resistant semi-finished products, bars, rods and sections*

[9] ISO 16143-3:2014, *Stainless steels for general purposes —Part 3: Wire*

[10] EN 10088-1:2005, *Stainless steels — Part 1: List of stainless steels*

[11] *Stahl-Eisen-Liste*, Published by Verlag Stahleisen GmbH, Düsseldorf

[12] ASTM E527, *Standard Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS), Joint publication of the Society of Automotive Engineers and the American Society for Testing and Materials*

[13] ASTM A959, *Standard Guide for Specifying Harmonized Standard Grade Compositions for Wrought Stainless Steels, ASTM Annual Book of Standards*

[14] GB/T20878/2007, *Stainless and heat-resisting steels — Designation and chemical composition*

[15] JIS G4304, *Hot rolled stainless steel plate, sheet and strip*

[16] JIS G4305, *Cold-rolled stainless steel plate, sheet and strip*

ICS 77.140.20

Price based on 61 pages

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

All the data, software and documentation set out in all British Standards and other BSI publications are the property of and copyrighted by BSI, or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI. Details and advice can be obtained from the Copyright & Licensing Department.

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

bsi.

...making excellence a habit.™

--`,,```,,,,````-`-`,,`,,`,`,,`---