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Stainless steels — Chemical composition

Aciers inoxydables — Composition chimique

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 15510 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 4, *Heat treatable and alloy steels*.

This first edition cancels and replaces ISO/TS 15510:2003, which has been technically revised.

Stainless steels — Chemical composition

1 Scope

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

2 Normative references

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

ISO 6929:1987, *Steel products — Definitions and classification*

3 Terms and definitions

For the purposes of this document, the terms and definition given in ISO 6929:1987 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 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

The steel designation according to this International Standard is 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 ISO designation 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 designation.

— The first subgroup contains 4 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 3 digits and refers, in most cases, to the 3 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 2 digits. In most cases, similar principles to those used in the UNS have been adopted. Care should be taken because some differences may exist between 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 4 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 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 second column. In Table A.3, the sequence is given in the order of the first column.

Table B.1 gives a list where the steel grades of Table 3 are to be found in other International Standards.

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

NOTE 2 The line number in the steel designation is an internal reference to ease the reading of the document. It is by no means a designation and it is not for commercial purposes or as a technical reference. The number in brackets behind gives the old line number as mentioned in ISO/TS 15510:2003.

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

Steel designation			% (mass fraction)[a]									
ISO number	ISO name	Line (old)	C	Si	Mn	P	S	N	Cr	Mo	Ni	Others
a) Austenitic steel												
4318-301-53-I	X2CrNiN18-7	A25A (04)	0,030	1,00	2,00	0,045	0,015	0,10 to 0,20	16,0 to 18,5	—	6,0 to 8,0	—
4319-301-00-I	X5CrNi17-7	A24H (05)	0,07	1,00	2,00	0,045	0,030[b]	0,10	16,0 to 18,0	—	6,0 to 8,0	—
4310-301-00-I	X10CrNi18-8	A26L (11)	0,05 to 0,15	2,00	2,00	0,045	0,030[b]	0,10	16,0 to 19,0	0,80	6,0 to 9,5	—
4325-302-00-E	X9CrNi18-9	A27N	0,030 to 0,15	1,00	2,00	0,045	0,030	0,10	17,0 to 19,0	—	8,0 to 10,0	—
4326-302-15-I	X12CrNiSi18-9-3	A27P (46)	0,15	2,00 to 3,00	2,00	0,045	0,030	—	17,0 to 19,0	—	8,0 to 10,0	—
4307-304-03-I	X2CrNi18-9	A27B (01)	0,030	1,00	2,00	0,045	0,030[b]	0,10	17,5 to 19,5	—	8,0 to 10,5[c]	—
4306-304-03-I	X2CrNi19-11	A30A (02)	0,030	1,00	2,00	0,045	0,030[b]	0,10	18,0 to 20,0	—	10,0 to 12,0[c]	—
4311-304-53-I	X2CrNiN18-9	A27A (03)	0,030	1,00	2,00	0,045	0,030[b]	0,12 to 0,22	17,5 to 19,5	—	8,0 to 11,0	—
4301-304-00-I	X5CrNi18-10	A28E (06)	0,07	1,00	2,00	0,045	0,030[b]	0,10	17,5 to 19,5	—	8,0 to 10,5[c]	—
4315-304-51-I	X5CrNiN19-9	A28F (10)	0,08	1,00	2,50	0,045	0,030	0,10 to 0,25	18,0 to 20,0	—	7,5 to 10,5	—
4948-304-09-I	X7CrNi18-9	A27L (07)	0,04 to 0,10	1,00	2,00	0,045	0,030[b]	0,10	17,5 to 19,5	—	8,0 to 11,0	—
4818-304-15-E	X6CrNiSiNCe19-10	A29J	0,04 to 0,08	1,00 to 2,00	1,00	0,045	0,015[b]	0,12 to 0,20	18,0 to 20,0	—	9,0 to 11,0	Ce: 0,03 to 0,08
4650-304-75-E	X2CrNiCu19-10	A29A	0,030	1,00	2,00	0,045	0,015	0,08	18,5 to 20,0	—	9,0 to 10,0	Cu: 1,00
4649-304-76-J	X6CrNiCu19-9-1	A28I	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
4305-303-00-I	X10CrNiS18-9	A27M (14)	0,12	1,00	2,00	0,060	⩾ 0,15	0,10	17,0 to 19,0	—	8,0 to 10,0	Cu[d]
4625-303-23-X	X12CrNiSe18-9	A27O	0,15	1,00	2,00	0,20	0,060	—	17,0 to 19,0	—	8,0 to 10,0	Se: ⩾ 0,15
4570-303-31-I	X6CrNiCuS18-9-2	A27I (44)	0,08	1,00	2,00	0,045	⩾ 0,15	0,10	17,0 to 19,0	0,60	8,0 to 10,0	Cu: 1,40 to 1,80
4667-303-76-J	X12CrNiCuS18-9-3	A27Q	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
4615-201-75-E	X3CrMnNiCu15-8-5-3[e]	A28C	0,030	1,00	7,0 to 9,0	0,040	0,010	0,02 to 0,06	14,0 to 16,0	0,80	4,5 to 6,0	Cu: 2,0 to 4,0
4541-321-00-I	X6CrNiTi18-10	A28G (16)	0,08	1,00	2,00	0,045	0,030[b]	—	17,0 to 19,0	—	9,0 to 12,0[c]	Ti: 5xC to 0,70
4940-321-09-I	X7CrNiTi18-10	A28O (17)	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: 5xC to 0,80
4941-321-09-I	X6CrNiTiB18-10	A28J (18)	0,04 to 0,08	1,00	2,00	0,035	0,015	—	17,0 to 19,0	—	9,0 to 12,0	Ti: 5xC to 0,70 B: 0,001 5 to 0,005 0
4550-347-00-I	X6CrNiNb18-10	A28H (19)	0,08	1,00	2,00	0,045	0,030[b]	—	17,0 to 19,0	—	9,0 to 12,0[c]	Nb: 10xC to 1,00
4912-347-09-I	X7CrNiNb18-10	A28K (20)	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: 10xC to 1,00
4961-347-77-E	X8CrNiNb16-13	A29L	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: 10xC to 1,20

Table 1 (*continued*)

Steel designation			% (mass fraction)[a]									
ISO number	**ISO name**	**Line** (old)	**C**	**Si**	**Mn**	**P**	**S**	**N**	**Cr**	**Mo**	**Ni**	**Others**
a) Austenitic steel												
4567-304-30-I	X3CrNiCu18-9-4	A27F (15)	0,04	1,00	2,00	0,045	0,030[b]	0,10	17,0 to 19,0	—	8,0 to 10,5	Cu: 3,0 to 4,0
4567-304-76-I	X6CrNiCu17-8-2	A25J (45)	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
4567-304-98-X	X6CrNiCu18-9-2	A27J	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
4660-315-77-I	X6CrNiCuSiMo19-10-3-2	A30J	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
4867-316-77-J	X40CrNiWSi15-14-3-2	A29P	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
4303-305-00-I	X6CrNi18-12	A30I (08)	0,08	1,00	2,00	0,045	0,030[b]	0,10	17,0 to 19,0	—	10,5 to 13,0	—
4828-305-09-I	X15CrNiSi20-12	A32R	0,20	1,50 to 2,50	2,00	0,045	0,030	0,10	19,0 to 21,0	—	11,0 to 13,0	—
4835-308-15-U	X7CrNiSiNCe21-11	A32N	0,05 to 0,10	1,40 to 2,00	0,80	0,040	0,030	0,14 to 0,20	20,0 to 22,0	—	10,0 to 12,0	Ce: 0,03 to 0,08
4884-305-00-X	X6CrNiSi18-13-4	A31H	0,08	3,0 to 5,0	2,00	0,045	0,030	—	15,0 to 20,0	—	11,5 to 15,0	—
4389-384-00-I	X3NiCr18-16	A34F (09)	0,04	1,00	2,00	0,045	0,030[b]	0,10	15,0 to 17,0	—	17,0 to 19,0	—
4371-201-53-I	X2CrMnNiN17-7-5	A29B	0,030	1,00	6,0 to 8,0	0,045	0,015	0,15 to 0,25	16,0 to 17,5	—	3,5 to 5,5	Cu: 1,00
4372-201-00-I	X12CrMnNiN17-7-5	A29O (13)	0,15	1,00	5,5 to 7,5	0,045	0,030[b]	0,05 to 0,25	16,0 to 18,0	—	3,5 to 5,5	—
4597-204-76-I	X8CrMnCuN17-8-3	A25L (40)	0,10	2,00	6,5 to 8,5	0,040	0,030	0,15 to 0,30	16,0 to 18,0	1,00	2,00	Cu: 2,00 to 3,5
4617-201-76-J	X6CrNiMnCu17-8-4-2	A29I	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
4618-201-76-E	X9CrMnNiCu17-8-5-2	A30L	0,10	1,00	5,5 to 9,5	0,070	0,010	0,15	16,5 to 18,5	—	4,5 to 5,5	Cu: 1,00 to 2,50
4373-202-00-I	X12CrMnNiN18-9-5	A32O	0,15	1,00	7,5 to 10,0	0,060	0,030	0,15 to 0,30	17,0 to 19,0	—	4,0 to 6,0	—
4982-215-00-E	X10CrNiMoMnNbVB 15-10-1	A32P	0,06 to 0,15	0,20 to 1,00	5,50 to 7,0	0,035	0,015	0,10	14,0 to 16,0	0,80 to 1,20	9,0 to 11,0	V: 0,15 to 0,40 Nb: 0,75 to 1,25 B: 0,003 to 0,009
4369-202-91-I	X11CrNiMnN19-8-6	A33L (43)	0,07 to 0,15	0,50 to 1,00	5,0 to 7,5	0,030	0,015	0,20 to 0,30	17,5 to 19,5	—	6,5 to 8,5	—
4890-202-09-X	X53CrMnNiN21-9-4	A34V	0,48 to 0,58	0,35	8,0 to 10,0	0,040	0,030	0,35 to 0,50	20,0 to 22,0	—	3,25 to 4,5	—
4648-315-77-I	X6CrNiSiCuMo19-13-3-3-1	A33I	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
4404-316-03-I	X2CrNiMo17-12-2	A31A (21)	0,030	1,00	2,00	0,045	0,030[b]	0,10	16,5 to18,5	2,00 to 3,00	10,0 to 13,0[c]	—
4432-316-03-I	X2CrNiMo17-12-3	A32A (22)	0,030	1,00	2,00	0,045	0,030[b]	0,10	16,5 to18,5	2,50 to 3,00	10,5 to 13,0[c]	—
4435-316-91-I	X2CrNiMo18-14-3	A35A (23)	0,030	1,00	2,00	0,045	0,030	0,10	17,0 to 19,0	2,50 to 3,00	12,5 to 15,0	—
4406-316-53-I	X2CrNiMoN17-11-2	A30B (25)	0,030	1,00	2,00	0,045	0,030[b]	0,12 to 0,22	16,5 to 18,5	2,00 to 3,00	10,0 to 12,5[c]	—

Table 1 (*continued*)

Steel designation			% (mass fraction)[a]									
ISO number	**ISO name**	**Line** (old)	**C**	**Si**	**Mn**	**P**	**S**	**N**	**Cr**	**Mo**	**Ni**	**Others**
a) Austenitic steel												
4665-316-76-J	X6CrNiMoCu18-12-2-2	A32I	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
4647-316-75-X	X2CrNiMoCu18-14-2-2	A34A	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
4578-316-76-E	X3CrNiCuMo17-11-3-2	A30F	0,04	1,00	2,00	0,045	0,015	0,10	16,5 to17,5	2,00 to 2,50	10,0 to 11,0	Cu: 3,0 to 3,5
4429-316-53-I	X2CrNiMoN17-12-3	A32B (26)	0,030	1,00	2,00	0,045	0,030[b]	0,12 to 0,22	16,5 to 18,5	2,50 to 3,00	10,5 to 13,0[c]	—
4401-316-00-I	X5CrNiMo17-12-2	A31I (30)	0,08	1,00	2,00	0,045	0,030[b]	0,10	16,0 to 18,0	2,00 to 3,00	10,0 to 13,0	—
4436-316-00-I	X3CrNiMo17-12-3	A32F (31)	0,05	1,00	2,00	0,045	0,030[b]	0,10	16,5 to 18,5	2,50 to 3,00	10,5 to 13,0[c]	—
4449-316-76-E	X3CrNiMo18-12-3	A33F	0,035	1,00	2,00	0,045	0,015	0,08	17,0 to 18,2	2,25 to 2,75	11,5 to 12,5	Cu: 1,00
4910-316-77-E	X3CrNiMoBN17-13-3	A33G	0,04	0,75	2,00	0,035	0,015	0,10 to 0,18	16,0 to 18,0	2,00 to 3,0	12,0 to 14,0	B: 0,001 5 to 0,005 0
4494-316-74-J	X6CrNiMoS17-12-3	A32K	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	—
4495-316-51-J	X6CrNiMoN17-12-3	A32H	0,08	1,00	2,00	0,045	0,030	0,10 to 0,22	16,0 to 18,0	2,00 to 3,0	10,0 to 14,0	—
4571-316-35-I	X6CrNiMoTi17-12-2	A31F (32)	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: 5xC to 0,70
4580-316-40-I	X6CrNiMoNb17-12-2	A31G (33)	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: 10xC to 1,00
4879-317-77-J	X30CrNiMoPB20-11-2	A33R	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
4438-317-03-I	X2CrNiMo19-14-4	A37A (24)	0,030	1,00	2,00	0,045	0,030[b]	0,10	17,5 to 20,0	3,0 to 4,0	12,0 to 15,0	—
4439-317-26-E	X2CrNiMoN17-13-5	A35B	0,030	1,00	2,00	0,045	0,015	0,12 to 0,22	16,5 to 18,5	4,0 to 5,0	12,5 to 14,5	—
4483-317-26-I	X2CrNiMoN18-15-5	A38A (28)	0,030	1,00	2,00	0,045	0,030	0,10 to 0,20	17,0 to 20,0	4,0 to 5,0	13,5 to 17,5	—
4434-317-53-I	X2CrNiMoN18-12-4	A34B (27)	0,030	1,00	2,00	0,045	0,030[b]	0,10 to 0,20	17,5 to 20,0	3,00 to 4,0	11,0 to 14,0[c]	—
4445-317-00-U	X6CrNiMo19-13-4	A36I	0,08	1,00	2,00	0,045	0,030	0,10	18,0 to 20,0	3,0 to 4,0	11,0 to 15,0	—
4476-317-92-X	X3CrNiMo18-16-5	A39F	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	—
4824-308-09-J	X20CrNiN22-11	A33Q	0,15 to 0,25	1,00	1,00 to 1,60	0,040	0,030	0,15 to 0,30	20,5 to 22,5	—	10,0 to 12,0	—
4950-309-08-E	X6CrNi23-13	A36J	0,04 to 0,08	0,70	2,00	0,035	0,015	0,10	22,0 to 24,0	—	12,0 to 15,0	—
4833-309-08-I	X18CrNi23-13	A36R	0,20	1,00	2,00	0,045	0,030	0,10	22,0 to 24,0	—	12,0 to 15,0	—
4496-309-51-J	X4CrNiMoN25-14-1	A40F	0,06	1,50	2,00	0,045	0,030	0,25 to 0,40	23,0 to 26,0	0,50 to 1,20	12,0 to 16,0	—
4335-310-02-I	X1CrNi25-21	A46A (12)	0,020	0,25	2,00	0,025	0,010	0,10	24,0 to 26,0	0,20	20,0 to 22,0	—
4951-310-08-I	X6CrNi25-20	A45L	0,04 to 0,10	0,70	2,00	0,035	0,015	0,10	24,0 to 26,0	—	19,0 to 22,0	—
4845-310-08-E	X8CrNi25-21	A46L	0,10	1,50	2,00	0,045	0,030	0,10	24,0 to 26,0	—	19,0 to 22,0	—

Table 1 (*continued*)

Steel designation			% (mass fraction)[a]									
ISO number	**ISO name**	**Line** (old)	**C**	**Si**	**Mn**	**P**	**S**	**N**	**Cr**	**Mo**	**Ni**	**Others**
a) Austenitic steel												
4845-310-09-X	X23CrNi25-21	A46O	0,25	1,50	2,00	0,040	0,030	—	24,0 to 26,0	—	19,0 to 22,0	—
4841-314-00-E	X15CrNiSi25-21	A46R	0,20	1,50 to 2,50	2,00	0,045	0,015	0,10	24,0 to 26,0	—	19,0 to 22,0	—
4466-310-50-E	X1CrNiMoN25-22-2	A49A (29)	0,020	0,70	2,00	0,025	0,010	0,10 to 0,16	24,0 to 26,0	2,00 to 2,50	21,0 to 23,0	—
4547-312-54-I	X1CrNiMoCuN20-18-7	A45A (34)	0,020	0,70	1,00	0,035	0,015	0,18 to 0,25	19,5 to 20,5	6,0 to 7,0	17,5 to 18,5	Cu: 0,50 to 1,00
4659-312-66-I	X1CrNiMoCuNW24-22-6	A52B (41)	0,020	0,70	2,0 to 4,0	0,030	0,010	0,35 to 0,50	23,0 to 25,0	5,5 to 6,5	21,0 to 23,0	Cu: 1,00 to 2,00 W: 1,50 to 2,50
4652-326-54-I	X1CrNiMoCuN24-22-8	A54A (38)	0,020	0,50	2,0 to 4,0	0,030	0,005	0,45 to 0,55	23,0 to 25,0	7,0 to 8,0	21,0 to 23,0	Cu: 0,30 to 0,60
4565-345-65-I	X2CrNiMnMoN25-18-6-5	A54B (42)	0,030	1,00	5,0 to 7,0	0,030	0,015	0,30 to 0,60	24,0 to 26,0	4,0 to 5,0	16,0 to 19,0	Nb: 0,15
4971-314-79-I	X12CrNiCoMoWMnNNb21-20-20-3-3-2	A64R	0,08 to 0,16	1,00	1,00 to 2,00	0,035	0,015	0,10 to 0,20	20,0 to 22,5	2,50 to 3,5	19,0 to 21,0	Co:18,5 to 21,0 W: 2,00 to 3,0 Nb: 0,75 to 1,25
4537-310-92-E	X1CrNiMoCuN25-25-5	A55A	0,020	0,70	2,00	0,030	0,010	0,17 to 0,25	24,0 to 26,0	4,7 to 5,7	24,0 to 27,0	Cu: 1,00 to 2,00
4656-089-04-I	X1NiCrMoCu22-20-5-2	A47A	0,020	1,00	2,00	0,040	0,030	0,10	19,0 to 21,0	4,0 to 5,0	21,0 to 23,0	Cu: 1,00 to 2,00
4539-089-04-I	X1NiCrMoCu25-20-5	A50A (35)	0,020	0,75	2,00	0,035	0,015	0,15	19,0 to 22,0	4,0 to 5,0	23,5 to 26,0	Cu: 1,00 to 2,00
4529-089-26-I	X1NiCrMoCuN25-20-7	A52A (37)	0,020	0,75	2,00	0,035	0,015	0,15 to 0,25	19,0 to 21,0	6,0 to 7,0	24,0 to 26,0	Cu: 0,50 to 1,50
4478-083-67-U	X2NiCrMoN25-21-7	A53A	0,030	1,00	2,00	0,040	0,030	0,18 to 0,25	20,0 to 22,0	6,0 to 7,0	23,5 to 25,5	Cu: 0,75
4958-088-77-E	X5NiCrAlTi31-20	A51J	0,03 to 0,08	0,70	1,50	0,015	0,010	0,030	19,0 to 22,0	—	30,0 to 32,5	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
4563-080-28-I	X1NiCrMoCu31-27-4	A62A (36)	0,020	0,70	2,00	0,030	0,010	0,10	26,0 to 28,0	3,0 to 4,0	30,0 to 32,0	Cu: 0,70 to 1,50
4876-088-00-I	X8NiCrAlTi32-21	A53L (54)	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
4959-088-77-E	X8NiCrAlTi32-20	A52L	0,05 to 0,10	0,70	1,50	0,015	0,010	0,030	19,0 to 22,0	—	30,0 to 34,0	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

Table 1 (*continued*)

Steel designation			% (mass fraction)[a]									
ISO number	**ISO name**	**Line** (old)	**C**	**Si**	**Mn**	**P**	**S**	**N**	**Cr**	**Mo**	**Ni**	**Others**
a) Austenitic steel												
4959-088-10-U	X7NiCrAlTi33-21	A54L	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
4959-088-11-U	X8NiCrAlTi33-21	A54M	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
4864-083-77-X	X13NiCr35-16	A51O	0,15	1,50	2,00	0,040	0,030	—	14,0 to 17,0	—	33,0 to 37,0	—
4657-080-20-U	X4NiCrCuMo35-20-4-3	A58F	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: (8xC) to 1,00
4854-353-15-E	X6NiCrSiNCe35-25	A60J	0,04 to 0,08	1,20 to 2,00	2,00	0,040	0,015	0,12 to 0,20	24,0 to 26,0	—	34,0 to 36,0	Ce: 0,03 to 0,08
4479-089-36-U	X1NiCrMoMnN34-27-6-5[e]	A72A	0,020	0,50	4,0 to 6,0	0,025	0,010	0,30 to 0,50	26,0 to 28,0	5,0 to 6,0	33,0 to 35,0	Cu: 0,50
b) Austenitic-ferritic (duplex) steels												
4062-322-02-U	X2CrNiN22-2[e]	D24A	0,030	1,00	2,00	0,040	0,010	0,18 to 0,26	21,5 to 24,0	0,45	1,00 to 2,80	—
4162-321-01-E	X2CrMnNiN21-5-1[e]	D27F	0,040	1,00	4,0 to 6,0	0,040	0,015	0,20 to 0,25	21,0 to 22,0	0,10 to 0,80	1,35 to 1,70	Cu: 0,10 to 0,80
4362-323-04-I	X2CrNiN23-4	D27B (51)	0,030	1,00	2,00	0,035	0,015	0,05 to 0,20	22,0 to 24,0	0,10 to 0,60	3,5 to 5,5	Cu: 0,10 to 0,60
4424-315-00-I	X2CrNiMoSiMnN19-5-3-2-2	D29A	0,030	1,40 to 2,00	1,20 to 2,00	0,035	0,030	0,05 to 0,10	18,0 to 19,0	2,50 to 3,0	4,3 to 5,2	—
4462-318-03-I	X2CrNiMoN22-5-3[f]	D30A (52)	0,030	1,00	2,00	0,035	0,015	0,10 to 0,22	21,0 to 23,0	2,50 to 3,5	4,5 to 6,5	—
4481-312-60-J	X2CrNiMoN25-7-3	D35A	0,030	1,00	1,50	0,040	0,030	0,08 to 0,30	24,0 to 26,0	2,50 to 3,5	5,5 to 7,5	—
4507-325-20-I	X2CrNiMoCuN25-6-3	D34A (53)	0,030	0,70	2,00	0,035	0,015	0,20 to 0,30	24,0 to 26,0	3,0 to 4,0	6,0 to 8,0	Cu: 1,00 to 2,50
4507-325-50-X	X3CrNiMoCuN26-6-3-2	D35F	0,04	1,00	1,50	0,040	0,030	0,10 to 0,25	24,0 to 27,0	2,9 to 3,9	4,5 to 6,5	Cu: 1,50 to 2,50
4410-327-50-E	X2CrNiMoN25-7-4	D36A (54)	0,030	1,00	2,00	0,035	0,015	0,24 to 0,35	24,0 to 26,0	3,0 to 4,5	6,0 to 8,0	—
4501-327-60-I	X2CrNiMoCuWN25-7-4	D36B (56)	0,030	1,00	1,00	0,030	0,010	0,20 to 0,30	24,0 to 26,0	3,0 to 4,0	6,0 to 8,0	Cu: 0,50 to 1,00 W: 0,50 to 1,00
4460-312-00-I	X3CrNiMoN27-5-2	D34F (55)	0,050	1,00	2,00	0,035	0,030[b]	0,05 to 0,20	25,0 to 28,0	1,30 to 2,00	4,5 to 6,5	—
4480-329-00-U	X6CrNiMo26-4-2	D32F	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	—
4477-329-06-E	X2CrNiMoN29-7-2[e]	D38A	0,030	0,80	0,80 to 1,50	0,030	0,030	0,30 to 0,40	28,0 to 30,0	1,50 to 2,60	5,8 to 7,5	Cu: 0,80

Table 1 (*continued*)

Steel designation			% (mass fraction)[a]									
ISO number	**ISO name**	**Line** (old)	**C**	**Si**	**Mn**	**P**	**S**	**N**	**Cr**	**Mo**	**Ni**	**Others**
b) Austenitic-ferritic (duplex) steels												
4658-327-07-U	X2CrNiMoCoN28-8-5-1[e]	D42A	0,030	0,50	1,50	0,035	0,010	0,30 to 0,50	26,0 to 29,0	4,0 to 5,0	5,5 to 9,5	Cu: 1,00 Co: 0,50 to 2,00
4485-332-07-U	X2CrNiMoN31-8-4	D43A	0,030	0,80	1,50	0,035	0,010	0,40 to 0,60	29,0 to 33,0	3,0 to 5,0	6,0 to 9,0	Cu: 1,00
c) Ferritic steels												
4030-410-90-X	X2Cr12	F12A	0,030	1,00	1,00	0,040	0,030	—	11,0 to 13,5	—	—	—
4003-410-77-I	X2CrNi12	F12C (61)	0,030	1,00	2,00	0,040	0,015	0,030	10,5 to 12,5	—	0,30 to 1,10	—
4720-409-00-I	X2CrTi12[j]	F12B (62)	0,030	1,00	1,00	0,040	0,030[b]	0,030	10,5 to 12,5	—	0,50	Ti: 6x(C+N) to 0,65
4516-409-75-I	X6CrNiTi12	F13F (64)	0,08	1,00	2,00	0,040	0,015	0,030	10,5 to 12,5	—	0,50 to 1,50	Ti: 0,05 to 0,35
4000-410-08-I	X6Cr13	F13G (65)	0,08	1,00	1,00	0,040	0,030[b]	—	11,5 to 14,0	—	0,75	—
4002-405-00-I	X6CrAl13	F13H (66)	0,08	1,00	1,00	0,040	0,030[b]	—	11,5 to 14,0	—	—	Al: 0,10 to 0,30
4724-405-77-I	X10CrAlSi13	F13L	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
4012-429-00-X	X10Cr15	F15L	0,12	1,00	1,00	0,040	0,030	—	14,0 to 16,0	—	—	—
4595-429-71-I	X1CrNb15	F15A	0,020	1,00	1,00	0,035	0,015	0,020	14,0 to 16,0	—	—	Nb: 0,20 to 0,60
4589-429-70-E	X5CrNiMoTi15-2	F17H	0,08	1,00	1,00	0,040	0,015	—	13,5 to 15,5	0,2 to 1,2	1,00 to 2,50	Ti: 0,30 to 0,50
4016-430-00-I	X6Cr17	F17I (67)	0,08[g]	1,00	1,00	0,040	0,030[b]	—	16,0 to 18,0	—	—	—
4004-430-20-I	X7CrS17	F17L (68)	0,09	1,50	1,50	0,040	⩾ 0,15	—	16,0 to 18,0	0,60	—	—
4520-430-70-I	X2CrTi17	F17A	0,025	0,50	0,50	0,040	0,015	0,015	16,0 to 18,0	—	—	Ti: 8x(C+N) to 0,60[h]
4664-430-75-J	X2CrCuTi18	F18A	0,025	1,00	1,00	0,040	0,030	0,025	16,0 to 20,0	—	—	Ti: 8x(C+N) to 0,80[h] Cu: 0,30 to 0,80
4509-439-40-X	X2CrTiNb18	F18B	0,030	1,00	1,00	0,040	0,015	—	17,5 to 18,5	—	—	Ti: 0,10 to 0,60 Nb: 0,30 + 3xC to 1,00
4510-430-35-I	X3CrTi17	F17F (70)	0,05	1,00	1,00	0,040	0,030[b]	0,030	16,0 to 19,0	—	—	Ti: 0,15 to 0,75[h]
4511-430-71-I	X3CrNb17	F17G (73)	0,05	1,00	1,00	0,040	0,015	0,030	16,0 to 18,0	—	—	Nb: 12xC to 1,00
4742-430-77-I	X10CrAlSi18	F18N	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
4017-430-91-E	X6CrNi17-1	F18H	0,08	1,00	1,00	0,040	0,015	—	16,0 to 18,0	—	1,20 to 1,60	—

Table 1 (*continued*)

Steel designation			% (mass fraction)[a]									
ISO number	**ISO name**	**Line** (old)	**C**	**Si**	**Mn**	**P**	**S**	**N**	**Cr**	**Mo**	**Ni**	**Others**
c) Ferritic steels												
4113-434-00-I	X6CrMo17-1	F18I (69)	0,08	1,00	1,00	0,040	0,030[b]	—	16,0 to 18,0	0,75 to 1,40	—	—
4513-436-00-J	X2CrMoNbTi18-1	F19A	0,025	1,00	1,00	0,040	0,030	0,025	16,0 to 19,0	0,75 to 1,50	—	Ti+Nb+Zr: 8x(C+N) to 0,80
4609-436-77-J	X2CrMo19	F19B	0,025	1,00	1,00	0,040	0,030	0,025	17,0 to 20,0	0,40 to 0,80	—	Ti+Nb+Zr: 8x(C+N) to 0,80
4526-436-00-I	X6CrMoNb17-1	F18J (71)	0,08	1,00	1,00	0,040	0,015	0,040	16,0 to 18,0	0,80 to 1,40	—	Nb: 5xC to 1,00
4521-444-00-I	X2CrMoTi18-2	F20A (72)	0,025	1,00	1,00	0,040	0,015	0,030	17,0 to 20,0	1,75 to 2,50	—	Ti: $\geqslant$ 4x(C+N) and $0{,}15 \leqslant Ti \leqslant 0{,}75$[h]
4523-182-35-I	X2CrMoTiS18-2	F20B (74)	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) $\leqslant$ 0,040
4621-445-00-E	X2CrNbCu21	F21A	0,030	1,00	1,00	0,040	0,015	0,030	20, 0 to 21,5	—	—	Nb: 0,20 to 1,00 Cu: 0,10 to 1,00
4764-442-72-J	X8CrAl19-3	F19N	0,10	1,50	1,00	0,040	0,030	—	17,0 to 21,0	—	—	Al: 2,00 to 4,0
4128-445-92-J	X2CrMo23-1	F24A	0,025	1,00	1,00	0,040	0,030	0,025	21,0 to 24, 0	0,70 to 1,50	—	—
4129-445-92-J	X2CrMo23-2	F25A	0,025	1,00	1,00	0,040	0,030	0,025	21,0 to 24,0	1,50 to 2,50	—	—
4762-445-72-I	X10CrAlSi25	F25N	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
4749-446-00-I	X15CrN26	F26R	0,20	1,00	1,00	0,040	0,030	0,15 to 0,25	24,0 to 28,0	—	1,00	—
4131-446-92-C	X1CrMo26-1	F27A	0,010	0,40	0,40	0,030	0,020	0,015	25,0 to 27,5	0,75 to 1,50	—	—
4750-446-60-U	X2CrMoNi27-4-2	F33A	0,030	1,00	1,00	0,040	0,030	0,040	25,0 to 28,0	3,0 to 4,0	1,00 to 3,5	(Ti + Nb): 0,20 + 6 x (C+N) to 1,00
4135-447-92-C	X1CrMo30-2	F32A	0,010	0,40	0,40	0,030	0,020	0,015	28,5 to 32,0	1,50 to 2,50	—	—
d) Martensitic steels												
4006-410-00-I	X12Cr13	M13B (82)	0,08 to 0,15	1,00	1,50	0,040	0,030[b]	—	11,5 to 13,5	—	0,75	—
4024-410-09-E	X15Cr13	M13F	0,12 to 0,17	1,00	1,00	0,040	0,015	—	12,0 to 14,0	—	—	—
4119-410-92-C	X13CrMo13	M13G	0,08 to 0,18	0,60	1,00	0,040	0,030	—	11,5 to 14,0	0,30 to 0,60	—	—

Table 1 (*continued*)

Steel designation			% (mass fraction)[a]									
ISO number	**ISO name**	**Line** (old)	**C**	**Si**	**Mn**	**P**	**S**	**N**	**Cr**	**Mo**	**Ni**	**Others**
d) Martensitic steels												
4642-416-72-J	X13CrPb13	M13A	0,15	1,00	1,00	0,040	0,030	—	11,5 to 13,5	—	—	Pb: 0,05 to 0,30
4005-416-00-I	X12CrS13	M13C (83)	0,08 to 0,15	1,00	1,50	0,040	⩾ 0,15	—	12,0 to 14,0	0,60	—	—
4021-420-00-I	X20Cr13	M13I (84)	0,16 to 0,25	1,00	1,50	0,040	0,030[b]	—	12,0 to 14,0	—	—	—
4916-600-77-J	X18CrMnMoNbVN12	M12G	0,15 to 0,20	0,50	0,50 to1,00	0,040	0,030	0,05 to 0,10	10,0 to 13,0	0,30 to 0,90	0,60	Nb: 0,20 to 0,60 V: 0,10 to 0,40
4929-422-00-I	X23CrMoWMnNiV12-1-1	M13J	0,20 to 0,25	0,50	0,50 to1,00	0,040	0,025	—	11,0 to12,5	0,75 to 1,25	0,50 to1,00	V: 0,20 to 0,30 W: 0,75 to 1,25
4923-422-77-E	X22CrMoV12-1	M13H	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
4028-420-00-I	X30Cr13	M13M (85)	0,26 to 0,35	1,00	1,50	0,040	0,030[b]	—	12,0 to 14,0	—	—	—
4029-420-20-I	X33CrS13	M13N	0,25 to 0,40	1,00	1,50	0,060	⩾ 0,15	—	12,0 to 14,0	0,60	0,60	—
4643-420-72-J	X33CrPb13	M13O	0,26 to 0,40	1,00	1,00	0,040	0,030	—	12,0 to 14,0	—	—	Pb: 0,05 to 0,30
4031-420-00-I	X39Cr13	M13P (86)	0,36 to 0,42	1,00	1,00	0,040	0,030[b]	—	12,5 to 14,5	—	—	—
4419-420-97-E	X38CrMo14	M14P	0,36 to 0,42	1,00	1,00	0,040	0,015	—	13,0 to 14,5	0,60 to 1,00	—	—
4123-431-77-E	X40CrMoVN16-2	M18T	0,35 to 0,50	1,00	1,00	0,040	0,015	0,10 to 0,30	14,0 to 16,0	1,00 to 2,50	0,50	V: 1,50
4034-420-00-I	X46Cr13	M13Q (87)	0,43 to 0,50	1,00	1,00	0,040	0,030[b]	—	12,5 to 14,5	—	—	—
4035-420-74-E	X46CrS13	M13R	0,43 to 0,50	1,00	2,00	0,040	0,15 to 0,35	—	12,5 to 14,0	—	—	—
4038-420-00-I	X52Cr13	M13U (88)	0,48 to 0,55	1,00	1,00	0,040	0,030[b]	—	12,5 to 14,5	—	—	—
4110-420-69-E	X55CrMo14	M14U	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
4039-420-09-I	X60Cr13	M13V (89)	0,56 to 0,65	1,00	1,00	0,040	0,030[b]	—	12,5 to 14,5	—	—	—
4313-415-00-I	X3CrNiMo13-4	M17A (81)	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	—
4415-415-92-E	X2CrNiMoV13-5-2	M20A	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
4116-420-77-E	X50CrMoV15	M15U	0,45 to 0,55	1,00	1,00	0,040	0,015	—	14,0 to 15,0	0,50 to 0,80	—	V: 0,10 to 0,20
4057-431-00-X	X17CrNi16-2	M18G (91)	0,12 to 0,22	1,00	1,50	0,040	0,030	—	15,0 to 17,0	—	1,50 to 2,50	—
4058-429-99-J	X33Cr16	M16O	0,25 to 0,40	1,00	1,00	0,040	0,030	—	15,0 to 17,0	—	—	—
4418-431-77-E	X4CrNiMo16-5-1	M22A	0,06	0,70	1,50	0,040	0,015	⩾ 0,020	15,0 to 17,0	0,80 to 1,50	4,0 to 6,0	—

Table 1 (*continued*)

Steel designation			% (mass fraction)[a]									
ISO number	**ISO name**	**Line** (old)	**C**	**Si**	**Mn**	**P**	**S**	**N**	**Cr**	**Mo**	**Ni**	**Others**
d) Martensitic steels												
4019-430-20-I	X14CrS17	M17F (90)	0,10 to 0,17	1,00	1,50	0,040	⩾ 0,15	—	16,0 to 18,0	0,60	—	—
4122-434-09-I	X39CrMo17-1	M18R (92)	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	—
4040-440-02-X	X68Cr17	M17U	0,60 to 0,75	1,00	1,00	0,040	0,030	—	16,0 to 18,0	0,75	0,60	—
4041-440-03-X	X85Cr17	M17V	0,75 to 0,95	1,00	1,00	0,040	0,030	—	16,0 to 18,0	0,75	0,60	—
4023-440-04-I	X110Cr17	M17W	0,95 to 1,20	1,00	1,00	0,040	0,030	—	16,0 to 18,0	0,75	0,60	—
4025-440-74-X	X110CrS17	M17Z	0,95 to 1,20	1,00	1,25	0,060	⩾ 0,15	—	16,0 to 18,0	0,75	0,60	—
4766-440-77-X	X80CrSiNi20-2	M20U	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	—
e) Precipitation-hardening steels												
4594-155-92-E	X5CrNiMoCuNb14-5	P19I	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
4542-174-00-I	X5CrNiCuNb16-4	P20I (101)	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
4568-177-00-I	X7CrNiAl17-7	P24L (102)	0,09	1,00	1,00	0,040	0,015	—	16,0 to 18,0	—	6,5 to 7,8[i]	Al: 0,70 to 1,50
4530-455-77-E	X1CrNiMoAlTi12-9-2	P23A	0,015	0,10	0,10	0,010	0,005	0,01	11,5 to 12,5	1,85 to 2,15	8,5 to 9,5	Ti: 0,28 to 0,37 Al: 0,60 to 0,80
4596-455-77-E	X1CrNiMoAlTi12-10-2	P24A	0,015	0,10	0,10	0,010	0,005	0,02	11,5 to 12,5	1,85 to 2,15	9,2 to 10,2	Ti: 0,28 to 0,40 Al: 0,80 to 1,10
4532-157-00-I	X8CrNiMoAl15-7-2	P24M (103)	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
4534-138-00-X	X3CrNiMoAl13-8-3	P24H	0,05	0,10	0,20	0,010	0,008	0,010	12,3 to 13,2	2,00 to 3,00	7,5 to 8,5	Al: 0,90 to 1,35
4645-469-10-U	X2CrNiMoCuAlTi12-9-4-3[e]	P25A	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
4457-350-00-X	X9CrNiMoN17-5-3	P25M	0,07 to 0,11	0,50	0,50 to 1,25	0,040	0,030	0,07 to 0,13	16,0 to 17,0	2,5 to 3,2	4,0 to 5,0	—
4980-662-86-X	X6NiCrTiMoVB25-15-2	P42J	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
4644-662-20-U	X4NiCrMoTiMnSiB26-14-3-2	P43J	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 number	**ISO name**	**Line** (old)	**C**	**Si**	**Mn**	**P**	**S**	**N**	**Cr**	**Mo**	**Ni**	**Others**

a Maximum values unless indicated otherwise.

b Particular ranges of sulfur mass fraction may 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 % may 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 mass fraction, the maximum nickel mass fraction may be increased by the following amounts:
— by 0,50 % for steels in lines (old) 01, 06 and 32;
— by 1,00 % for steels in lines (old) 02, 16, 17, 19, 20, 25, 26, 27 and 31;
— by 1,50 % for steels in lines (old) 21 and 22.

d Copper may 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.

e Patented grade.

f For special applications, the lower limits of N, Cr and Mo can be limited to 0,14 %, 22,0 % and 3,0 %.

g For certain applications, e.g. weldability or high-strength wire, a maximum of 0,12 % C may be agreed upon.

h Stabilization may be obtained by the use of titanium or niobium or zirconium. The equivalence shall be the following: Nb [% (mass fraction)] = Zr [% (mass fraction)] = 7/4 Ti [% (mass fraction)].

i By special agreement, the steel, when intended for cold deformation, may also be ordered with 7,00 % to 8,30 % Ni.

j S40900 (4720-409-00) has been replaced by S40971, S40978 and S40979. Unless otherwise specified in the ordering information, an order specifying S40900 shall be satisfied by any one of S40971 [with Ti: 6x(C+N) to 0,50, Nb: $\leqslant$ 0,17], S40978 [with 8x(C+N) $\leqslant$ Ti, Ti: 0,15 to 0,50 and Nb: $\leqslant$ 0,10] or S40979 [with 0,08 + 8x(C+N) $\leqslant$ (Nb +Ti) $\leqslant$ 0,75 and 0,05 $\leqslant$ Ti] at the option of the seller. Material meeting the requirements of S40971, S40978 and S40979 may, at the option of the manufacturer, be certified as S40900.

Table 2 — Principles used for allocation of the last two digits of the ISO steel designation according to this International Standard

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
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 designation 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 designations according to this International Standard

ISO designation	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 Table A.3: standardized compositions that are close matches also exist in the JIS standard (grade SUS304L) and in 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 Table 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 Table 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 Table 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 20 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; — 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 (old)	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										
4318-301-53-I	X2CrNiN18-7	A25A (04)	S30153	W	1.4318	N	SUS301L	W	S30153	W
4319-301-00-I	X5CrNi17-7	A24H (05)	S30100	W	1.4319	I	SUS301	W	S30110	W
4310-301-00-I	X10CrNi18-8	A26L (11)	S30100	W	1.4310	N	—	—	S30110	W
4325-302-00-E	X9CrNi18-9	A27N	S30200	W	1.4325	I	SUS302	W	S30210	W
4326-302-15-I	X12CrNiSi18-9-3	A27P (46)	S30215	W	(1.4326)	I	SUS302B	I	S30240	N
4307-304-03-I	X2CrNi18-9	A27B (01)	S30403	W	1.4307	N	SUS304L	W	S30403	W
4306-304-03-I	X2CrNi19-11	A30A (02)	S30403	W	1.4306	N	SUS304L	W	S30403	N
4311-304-53-I	X2CrNiN18-9	A27A (03)	S30453	W	1.4311	N	SUS304LN	W	S30453	W
4301-304-00-I	X5CrNi18-10	A28E (06)	S30400	W	1.4301	I	SUS304	W	S30408	W
4315-304-51-I	X5CrNiN19-9	A28F (10)	S30451	N	1.4315	W	SUS304N1	W	S30458	W
4948-304-09-I	X7CrNi18-9	A27L (07)	S30409	W	1.4948	W	SUS304H	W	S30409	W
4818-304-15-E	X6CrNiSiNCe19-10	A29J	S30415	W	1.4818	I	—	—	S30450	N
4650-304-75-E	X2CrNiCu19-10	A29A	—	—	1.4650	I	SUS304L	W	S30403	W
4649-304-76-J	X6CrNiCu19-9-1	A28I	—	—	(1.4649)	I	SUS304Cu	I	S30488	W
4305-303-00-I	X10CrNiS18-9	A27M (14)	S30300	W	1.4305	W	SUS303	W	S30317	W
4625-303-23-X	X12CrNiSe18-9	A27O	S30323	I	(1.4625)	I	SUS303Se	I	S30327	I
4570-303-31-I	X6CrNiCuS18-9-2	A27I (44)	S30331	I	1.4570	N	—	—	—	—
4667-303-76-J	X12CrNiCuS18-9-3	A27Q	—	—	(1.4667)	I	SUS303Cu	I	—	—
4615-201-75-E	X3CrMnNiCu15-8-5-3	A28C	—	—	1.4615	I	—	—	—	—
4541-321-00-I	X6CrNiTi18-10	A28G (16)	S32100	W	1.4541	I	SUS321	W	S32168	W
4940-321-09-I	X7CrNiTi18-10	A28O (17)	S32109	W	1.4940	N	SUS321H	W	S32169	N
4941-321-09-I	X6CrNiTiB18-10	A28J (18)	S32109	W	1.4941	W	—	—	S32169	W
4550-347-00-I	X6CrNiNb18-10	A28H (19)	S34700	I	1.4550	N	SUS347	W	S34778	N
4912-347-09-I	X7CrNiNb18-10	A28K (20)	S34709	W	1.4912	N	SUS347H	W	S34779	W
4961-347-77-E	X8CrNiNb16-13	A29L	—	—	1.4961	I	—	—	—	—
4567-304-30-I	X3CrNiCu18-9-4	A27F (15)	S30430	W	1.4567	N	SUSXM7	W	S30488	W
4567-304-76-I	X6CrNiCu17-8-2	A25J (45)	—	—	1.4567	W	SUS304J1	I	S30480	W
4567-304-98-X	X6CrNiCu18-9-2	A27J	—	—	1.4567	W	SUS304J3	I	S30480	I
4660-315-77-I	X6CrNiCuSiMo19-10-3-2	A30J	—	—	(1.4660)	I	SUS315J1	N	—	—

Table A.1 (*continued*)

Steel designations according to[a]										
ISO number	ISO name	Line (old)	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										
4867-316-77-J	X40CrNiWSi15-14-3-2	A29P	—	—	(1.4867)	I	SUH31	I	—	—
4303-305-00-I	X6CrNi18-12	A30I (08)	S30500	W	1.4303	N	SUS305	W	S30510	W
4828-305-09-I	X15CrNiSi20-12	A32R	—	—	1.4828	N	—	—	—	—
4835-308-15-U	X7CrNiSiNCe21-11	A32N	S30815	I	1.4835	N	—	—	—	—
4884-305-00-X	X6CrNiSi18-13-4	A31H	S30500	W	(1.4884)	I	SUSXM15J1	I	S38148	I
4389-384-00-I	X3NiCr18-16	A34F (09)	S38400	W	(1.4389)	I	SUS384	W	S38408	W
4371-201-53-I	X2CrMnNiN17-7-5	A29B	S20153	N	1.4371	N	—	—	—	—
4372-201-00-I	X12CrMnNiN17-7-5	A29O (13)	S20100	N	1.4372	N	SUS201	W	S35350	N
4597-204-76-I	X8CrMnCuN17-8-3	A25L (40)	—	—	1.4597	N	—	—	—	—
4617-201-76-J	X6CrNiMnCu17-8-4-2	A29I	—	—	(1.4617)	I	SUS304J2	I	—	—
4618-201-76-E	X9CrMnNiCu17-8-5-2	A30L	—	—	1.4618	I	—	—	—	—
4373-202-00-I	X12CrMnNiN18-9-5	A32O	S20200	W	1.4373	N	SUS202	W	S35450	N
4982-215-00-E	X10CrNiMoMnNbVB 15-10-1	A32P	S21500	N	1.4982	I	—	—	—	—
4369-202-91-I	X11CrNiMnN19-8-6	A33L (43)	—	—	1.4369	I	—	—	—	—
4890-202-09-X	X53CrMnNiN21-9-4	A34V	—	—	(1.4890)	I	SUH35	I	S35650	I
4648-315-77-I	X6CrNiSiCuMo19-13-3-3-1	A33I	—	—	(1.4648)	I	SUS315J2	W	—	—
4404-316-03-I	X2CrNiMo17-12-2	A31A (21)	S31603	W	1.4404	N	SUS316L	W	S31603	N
4432-316-03-I	X2CrNiMo17-12-3	A32A (22)	S31603	W	1.4432	I	SUS316L	W	S31603	W
4435-316-91-I	X2CrNiMo18-14-3	A35A (23)	—	—	1.4435	N	SUS316L	W	S31603	W
4406-316-53-I	X2CrNiMoN17-11-2	A30B (25)	S31653	W	1.4406	N	SUS316LN	W	S31653	N
4665-316-76-J	X6CrNiMoCu18-12-2-2	A32I	—	—	(1.4665)	I	SUS316J1	I	—	—
4647-316-75-X	X2CrNiMoCu18-14-2-2	A34A	—	—	(1.4647)	I	SUS316J1L	I	S31683	I
4578-316-76-E	X3CrNiCuMo17-11-3-2	A30F	—	—	1.4578	I	—	—	—	—
4429-316-53-I	X2CrNiMoN17-12-3	A32B (26)	S31653	W	1.4429	N	SUS316LN	W	S31653	N
4401-316-00-I	X5CrNiMo17-12-2	A31I (30)	S31600	W	1.4401	N	SUS316	W	S31608	N
4436-316-00-I	X3CrNiMo17-12-3	A32F (31)	S31600	W	1.4436	I	SUS316	W	S31608	W
4449-316-76-E	X3CrNiMo18-12-3	A33F	—	—	1.4449	I	—	—	—	—
4910-316-77-E	X3CrNiMoBN17-13-3	A33G	—	—	1.4910	I	—	—	—	—
4494-316-74-J	X6CrNiMoS17-12-3	A32K	—	—	(1.4494)	I	SUS316F	I	—	—
4495-316-51-J	X6CrNiMoN17-12-3	A32H	S31651	N	(1.4495)	I	SUS316N	I	S31658	N
4571-316-35-I	X6CrNiMoTi17-12-2	A31F (32)	S31635	W	1.4571	N	SUS316Ti	W	S31668	W
4580-316-40-I	X6CrNiMoNb17-12-2	A31G (33)	S31640	W	1.4580	N	—	—	S31678	W
4879-317-77-J	X30CrNiMoPB20-11-2	A33R	—	—	(1.4879)	I	SUH38	I	—	—
4438-317-03-I	X2CrNiMo19-14-4	A37A (24)	S31703	W	1.4438	W	SUS317L	W	S31703	W
4439-317-26-E	X2CrNiMoN17-13-5	A35B	S31726	N	1.4439	I	—	—	S31723	W
4483-317-26-I	X2CrNiMoN18-15-5	A38A (28)	S31726	W	(1.4483)	I	—	—	S31723	N
4434-317-53-I	X2CrNiMoN18-12-4	A34B (27)	S31753	W	1.4434	N	SUS317LN	W	S31753	W
4445-317-00-U	X6CrNiMo19-13-4	A36I	S31700	I	(1.4445)	I	SUS317	W	S31708	N
4476-317-92-X	X3CrNiMo18-16-5	A39F	—	—	(1.4476)	I	SUS317J1	I	S31794	I

Table A.1 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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										
4824-308-09-J	X20CrNiN22-11	A33Q	—	—	(1.4824)	I	SUH37	I	S30850	W
4950-309-08-E	X6CrNi23-13	A36J	S30908	W	1.4950	I	SUS309S	W	S30908	W
4833-309-08-I	X18CrNi23-13	A36R	S30908	W	1.4833	N	SUH309	W	S30908	W
4496-309-51-J	X4CrNiMoN25-14-1	A40F	—	—	(1.4496)	I	SUS317J2	I	—	—
4335-310-02-I	X1CrNi25-21	A46A (12)	S31002	W	1.4335	I	—	—	—	—
4951-310-08-I	X6CrNi25-20	A45L	S31008	W	1.4951	N	SUS310S	W	S31008	W
4845-310-08-E	X8CrNi25-21	A46L	S31008	W	1.4845	I	SUS310S	W	S31008	N
4845-310-09-X	X23CrNi25-21	A46O	S31008	W	1.4845	N	SUH310	I	S31020	I
4841-314-00-E	X15CrNiSi25-21	A46R	S31400	N	1.4841	I	—	—	—	—
4466-310-50-E	X1CrNiMoN25-22-2	A49A (29)	S31050	W	1.4466	I	—	—	S31053	W
4547-312-54-I	X1CrNiMoCuN20-18-7	A45A (34)	S31254	W	1.4547	N	SUS312L	W	S31252	N
4659-312-66-I	X1CrNiMoCuNW24-22-6	A52B (41)	S31266	W	1.4659	I	—	—	—	—
4652-326-54-I	X1CrNiMoCuN24-22-8	A54A (38)	S32654	N	1.4652	I	—	—	S32652	N
4565-345-65-I	X2CrNiMnMoN25-18-6-5	A54B (42)	S34565	W	1.4565	I	—	—	S34553	N
4971-314-79-I	X12CrNiCoMoWMnNNb21-20-20-3-3-2	A64R	—	—	1.4971	N	SUH661	W	—	—
4537-310-92-E	X1CrNiMoCuN25-25-5	A55A	—	—	1.4537	I	—	—	—	—
4656-089-04-I	X1NiCrMoCu22-20-5-2	A47A	N08904	N	(1.4656)	I	—	—	S39042	N
4539-089-04-I	X1NiCrMoCu25-20-5	A50A (35)	N08904	W	1.4539	N	SUS890L	W	S39042	N
4529-089-26-I	X1NiCrMoCuN25-20-7	A52A (37)	N08926	W	1.4529	N	—	—	—	—
4478-083-67-U	X2NiCrMoN25-21-7	A53A	N08367	I	(1.4478)	I	SUS836L	W	—	—
4958-088-77-E	X5NiCrAlTi31-20	A51J	—	—	1.4958	I	—	—	—	—
4563-080-28-I	X1NiCrMoCu31-27-4	A62A (36)	N08028	W	1.4563	I	—	—	—	—
4876-088-00-I	X8NiCrAlTi32-21	A53L	N08800	W	1.4876	N	NCF800	W	—	—
4959-088-77-E	X8NiCrAlTi32-20	A52L	—	—	1.4959	I	—	—	—	—
4959-088-10-U	X7NiCrAlTi33-21	A54L	N08810	I	1.4959	N	NCF800H	N	—	—
4959-088-11-U	X8NiCrAlTi33-21	A54M	N08811	I	1.4959	W	—	—	—	—
4864-083-77-X	X13NiCr35-16	A51O	—	—	1.4864	N	SUH 330	I	S33010	I
4657-080-20-U	X4NiCrCuMo35-20-4-3	A58F	N08020	I	(1.4657)	I	—	—	—	—
4854-353-15-E	X6NiCrSiNCe35-25	A60J	S35315	N	1.4854	I	—	—	—	—
4479-089-36-U	X1NiCrMoMnN34-27-6-5	A72A	N08936	I	(1.4479)	I	—	—	—	—
b) Austenitic-ferritic (duplex) steels										
4062-322-02-U	X2CrNiN22-2	D24A	S32202	I	1.4062	N	—	—	—	—
4162-321-01-E	X2CrMnNiN21-5-1	D27F	S32101	N	1.4162	I	—	—	—	—
4362-323-04-I	X2CrNiN23-4	D27B (51)	S32304	W	1.4362	I	—	—	S23043	W
4424-315-00-I	X2CrNiMoSiMnN19-5-3-2-2	D29A	S31500	N	1.4424	N	—	—	—	—
4462-318-03-I	X2CrNiMoN22-5-3	D30A (52)	S32205	N	1.4462	I	SUS329J3L	W	S22053	N
4481-312-60-J	X2CrNiMoN25-7-3	D35A	S31260	W	(1.4481)	I	SUS329J4L	I	S22583	W
4507-325-20-I	X2CrNiMoCuN25-6-3	D34A (53)	S32550	W	1.4507	I	—	—	S25554	—
4507-325-50-X	X3CrNiMoCuN26-6-3-2	D35F	S32550	I	1.4507	W	—	—	S25554	I

Table A.1 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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]
b) Austenitic-ferritic (duplex) steels										
4410-327-50-E	X2CrNiMoN25-7-4	D36A (54)	S32750	W	1.4410	I	—	—	S25073	W
4501-327-60-I	X2CrNiMoCuWN25-7-4	D36B (56)	S32760	I	1.4501	N	—	—	S27603	N
4460-312-00-I	X3CrNiMoN27-5-2	D34F (55)	S31200	W	1.4460	I	—	—	S22553	W
4480-329-00-U	X6CrNiMo26-4-2	D32F	S32900	I	(1.4480)	I	SUS329J1	W	—	—
4477-329-06-E	X2CrNiMoN29-7-2	D38A	S32906	N	1.4477	I	—	—	—	—
4658-327-07-U	X2CrNiMoCoN28-8-5-1	D42A	S32707	I	(1.4658)	I	—	—	—	—
4485-332-07-U	X2CrNiMoN31-8-4	D43A	S33207	U	(1.4485)	I	—	—	—	—
c) Ferritic steels										
4030-410-90-X	X2Cr12	F12A	—	—	(1.4030)	I	SUS410L	I	S11203	I
4003-410-77-I	X2CrNi12	F12C (61)	S41003	N	1.4003	N	—	—	S11213	N
4720-409-00-I	X2CrTi12	F12B (62)	S40900	W	1.4720	N	SUH409L	W	S11163	—
4516-409-75-I	X6CrNiTi12	F13F (64)	S40975	W	1.4516	N	—	—	—	—
4000-410-08-I	X6Cr13	F13G (65)	S41008	W	1.4000	N	SUS410S	N	S41008	N
4002-405-00-I	X6CrAl13	F13H (66)	S40500	W	1.4002	N	SUS405	W	S11348	N
4724-405-77-I	X10CrAlSi13	F13L	—	—	1.4724	N	—	—	—	—
4012-429-00-X	X10Cr15	F15L	S42900	I	(1.4012)	I	SUS429	I	S11510	I
4595-429-71-I	X1CrNb15	F15A	—	—	1.4595	N	—	—	—	—
4589-429-70-E	X5CrNiMoTi15-2	F17H	—	—	1.4589	I	—	—	—	—
4016-430-00-I	X6Cr17	F17I (67)	S43000	W	1.4016	I	SUS430	W	S11710	W
4004-430-20-I	X7CrS17	F17L (68)	S43020	W	(1.4004)	I	SUS430F	W	S11717	W
4520-430-70-I	X2CrTi17	F17A	—	—	1.4520	N	SUS430LX	W	—	—
4664-430-75-J	X2CrCuTi18	F18A	—	—	(1.4664)	I	SUS430J1L	I	—	—
4509-439-40-X	X2CrTiNb18	F18B	S43940	I	1.4509	N	SUS430LX	W	S11873	I
4510-430-35-I	X3CrTi17	F17F (70)	S43035	W	1.4510	N	SUS430LX	W	S11863	W
4511-430-71-I	X3CrNb17	F17G (73)	—	—	1.4511	N	SUS430LX	W	—	—
4742-430-77-I	X10CrAlSi18	F18N	—	—	1.4742	N	—	—	—	—
4017-430-91-E	X6CrNi17-1	F18H	—	—	1.4017	I	—	—	—	—
4113-434-00-I	X6CrMo17-1	F18I (69)	S43400	W	1.4113	N	SUS434	W	S11790	W
4513-436-00-J	X2CrMoNbTi18-1	F19A	S43600	W	(1.4513)	N	SUS436L	I	S11862	W
4609-436-77-J	X2CrMo19	F19B	—	—	(1.4609)	I	SUS436J1L	I	—	—
4526-436-00-I	X6CrMoNb17-1	F18J (71)	S43600	W	1.4526	N	—	—	S11770	W
4521-444-00-I	X2CrMoTi18-2	F20A (72)	S44400	W	1.4521	N	SUS444	W	S11972	W
4523-182-35-I	X2CrMoTiS18-2	F20B (74)	S18235	W	1.4523	I	—	—	—	—
4621-445-00-E	X2CrNbCu21	F21A	S44500	W	1.4621	I	—	—	—	—
4764-442-72-J	X8CrAl19-3	F19N	—	—	(1.4764)	I	SUH21	I	—	—
4128-445-92-J	X2CrMo23-1	F24A	—	—	(1.4128)	I	SUS445J1	I	—	—
4129-445-92-J	X2CrMo23-2	F25A	—	—	(1.4129)	I	SUS445J2	I	—	—
4762-445-72-I	X10CrAlSi25	F25N	—	—	1.4762	N	—	—	—	—

Table A.1 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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]
c) Ferritic steels										
4749-446-00-I	X15CrN26	F26R	S44600	W	1.4749	W	SUH446	W	S12550	W
4131-446-92-C	X1CrMo26-1	F27A	S44627	W	(1.4131)	I	SUSXM27	N	S12791	I
4750-446-60-U	X2CrMoNi27-4-2	F33A	S44660	I	(1.4750)	I	—	—	—	—
4135-447-92-C	X1CrMo30-2	F32A	S44700	N	(1.4135)	I	SUS447J1	N	S13091	I
d) Martensitic steels										
4006-410-00-I	X12Cr13	M13B (82)	S41000	W	1.4006	I	SUS410	W	S41010	W
4024-410-09-E	X15Cr13	M13F	—	—	1.4024	I	SUS410	W	—	—
4119-410-92-C	X13CrMo13	M13G	—	—	(1.4119)	I	SUS410J1	N	S45710	I
4642-416-72-J	X13CrPb13	M13A	—	—	(1.4642)	I	SUS410F2	I	—	—
4005-416-00-I	X12CrS13	M13C (83)	S41600	W	1.4005	N	SUS416	W	S41617	N
4021-420-00-I	X20Cr13	M13I (84)	S42000	W	1.4021	I	SUS420J1	N	S42020	N
4916-600-77-J	X18CrMnMoNbVN12	M12G	—	—	(1.4916)	I	SUH 600	I	S46250	N
4929-422-00-I	X23CrMoWMnNiV12-1-1	M13J	S42200	W	(1.4929)	I	SUH 616	N	S47220	N
4923-422-77-E	X30Cr13	M13H	—	—	1.4923	I	—	—	—	—
4028-420-00-I	X30Cr13	M13M (85)	S42000	W	1.4028	I	SUS420J2	W	S42030	N
4029-420-20-I	X33CrS13	M13N	S42020	W	1.4029	N	SUS420F	N	S42037	N
4643-420-72-J	X33CrPb13	M13O	—	—	(1.4643)	I	SUS420F2	I	—	—
4031-420-00-I	X39Cr13	M13P (86)	S42000	W	1.4031	I	—	—	S42040	W
4419-420-97-E	X38CrMo14	M14P	—	—	1.4419	I	—	—	S45830	W
4123-431-77-E	X40CrMoVN16-2	M18T	—	—	1.4123	I	—	—	—	—
4034-420-00-I	X46Cr13	M13Q (87)	S42000	W	1.4034	I	—	—	S42040	W
4035-420-74-E	X46CrS13	M13R	—	—	1.4035	I	—	—	—	—
4038-420-00-I	X52Cr13	M13U (88)	S42000	W	(1.4038)	I	—	—	—	—
4110-420-69-E	X55CrMo14	M14U	—	—	1.4110	I	—	—	—	—
4039-420-09-I	X60Cr13	M13V (89)	—	—	(1.4039)	I	—	—	—	—
4313-415-00-I	X3CrNiMo13-4	M17A (81)	S41500	W	1.4313	N	SUSF6NM	W	S41595	W
4415-415-92-E	X2CrNiMoV13-5-2	M20A	—	—	1.4415	I	—	—	—	—
4116-420-77-E	X50CrMoV15	M15U	—	—	1.4116	I	—	—	—	—
4057-431-00-X	X17CrNi16-2	M18G (91)	S43100	W	1.4057	I	SUS431	W	S43120	I
4058-429-99-J	X33Cr16	M16O	—	—	(1.4058)	I	SUS429J1	I	—	—
4418-431-77-E	X4CrNiMo16-5-1	M22A	—	—	1.4418	I	—	—	—	—
4019-430-20-I	X14CrS17	M17F (90)	S43020	W	1.4019	I	—	—	S11717	W
4122-434-09-I	X39CrMo17-1	M18R (92)	—	—	1.4122	I	—	—	—	—
4040-440-02-X	X68Cr17	M17U	S44002	W	(1.4040)	I	SUS440A	I	S44070	I
4041-440-03-X	X85Cr17	M17V	S44003	W	(1.4041)	I	SUS440B	I	S44080	I
4023-440-04-I	X110Cr17	M17W	S44004	W	(1.4023)	I	SUS440C	N	S44096	N
4025-440-74-X	X110CrS17	M17Z	—	—	(1.4025)	I	SUS440F	I	S44097	I
4766-440-77-X	X80CrSiNi20-2	M20U	—	—	(1.4766)	I	SUH4	I	S48380	I

Table A.1 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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]
e) Precipitation-hardening steels										
4594-155-92-E	X5CrNiMoCuNb14-5	P19I	—	—	1.4594	I	—	—	—	—
4542-174-00-I	X5CrNiCuNb16-4	P20I (101)	S17400	W	1.4542	N	SUS630	W	S51740	W
4568-177-00-I	X7CrNiAl17-7	P24L (102)	S17700	N	1.4568	N	SUS631	W	S51770	N
4530-455-77-E	X1CrNiMoAlTi12-9-2	P23A	—	—	1.4530	I	—	—	—	—
4596-455-77-E	X1CrNiMoAlTi12-10-2	P24A	—	—	1.4596	I	—	—	—	—
4532-157-00-I	X8CrNiMoAl15-7-2	P24M (103)	S15700	N	1.4532	N	—	—	S51570	N
4534-138-00-X	X3CrNiMoAl13-8-3	P24H	S13800	I	1.4534	N	—	—	S51380	I
4645-469-10-U	X2CrNiMoCu AlTi12-9-4-3	P25A	(S46910)	I	(1.4645)	I	—	—	—	—
4457-350-00-X	X9CrNiMoN17-5-3	P25M	(S35000)	I	(1.4457)	W	—	—	S51750	I
4980-662-86-X	X6NiCrTiMoVB25-15-2	P42J	(S66286)	I	1.4980	N	SUH660	I	S51525	W
4644-662-20-U	X4NiCrMoTiMnSiB26-14-3-2	P43J	(S66220)	I	(1.4644)	I	—	—	—	—

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 AISI numbers

Steel designations according to[a]										
ISO number	ISO name	Line (old)	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										
4657-080-20-U	X4NiCrCuMo35-20-4-3	A58F	N08020	I	(1.4657)	I	—	—	—	—
4563-080-28-I	X1NiCrMoCu31-27-4	A62A (36)	N08028	W	1.4563	I	—	—	—	—
4478-083-67-U	X2NiCrMoN25-21-7	A53A	N08367	I	(1.4478)	I	SUS836L	W	—	—
4864-083-77-X	X13NiCr35-16	A51O	—	—	1.4864	N	SUH 330	I	S33010	I
4876-088-00-I	X8NiCrAlTi32-21	A53L	N08800	W	1.4876	N	NCF800	W	—	—
4959-088-10-U	X7NiCrAlTi33-21	A54L	N08810	I	1.4959	N	NCF800H	N	—	—
4959-088-11-U	X8NiCrAlTi33-21	A54M	N08811	I	1.4959	W	—	—	—	—
4958-088-77-E	X5NiCrAlTi31-20	A51J	—	—	1.4958	I	—	—	—	—
4959-088-77-E	X8NiCrAlTi32-20	A52L	—	—	1.4959	I	—	—	—	—
4656-089-04-I	X1NiCrMoCu22-20-5-2	A47A	N08904	N	(1.4656)	I	—	—	S39042	N
4539-089-04-I	X1NiCrMoCu25-20-5	A50A (35)	N08904	W	1.4539	N	SUS890L	W	S39042	N
4529-089-26-I	X1NiCrMoCuN25-20-7	A52A (37)	N08926	W	1.4529	N	—	—	—	—
4479-089-36-U	X1NiCrMoMnN34-27-6-5	A72A	N08936	I	(1.4479)	I	—	—	—	—
4372-201-00-I	X12CrMnNiN17-7-5	A29O (13)	S20100	N	1.4372	N	SUS201	W	S35350	N
4371-201-53-I	X2CrMnNiN17-7-5	A29B	S20153	N	1.4371	N	—	—	—	—
4615-201-75-E	X3CrMnNiCu15-8-5-3	A28C	—	—	1.4615	I	—	—	—	—
4618-201-76-E	X9CrMnNiCu17-8-5-2	A30L	—	—	1.4618	I	—	—	—	—
4617-201-76-J	X6CrNiMnCu17-8-4-2	A29I	—	—	(1.4617)	I	SUS304J2	I	—	—
4373-202-00-I	X12CrMnNiN18-9-5	A32O	S20200	W	1.4373	N	SUS202	W	S35450	N
4890-202-09-X	X53CrMnNiN21-9-4	A34V	—	—	(1.4890)	I	SUH35	I	S35650	I
4369-202-91-I	X11CrNiMnN19-8-6	A33L (43)	—	—	1.4369	I	—	—	—	—
4597-204-76-I	X8CrMnCuN17-8-3	A25L (40)	—	—	1.4597	N	—	—	—	—
4982-215-00-E	X10CrNiMoMnNbVB 15-10-1	A32P	S21500	N	1.4982	I	—	—	—	—
4319-301-00-I	X5CrNi17-7	A24H (05)	S30100	W	1.4319	I	SUS301	W	S30110	W
4310-301-00-I	X10CrNi18-8	A26L (11)	S30100	W	1.4310	N	—	—	S30110	W
4318-301-53-I	X2CrNiN18-7	A25A (04)	S30153	W	1.4318	N	SUS301L	W	S30153	W
4325-302-00-E	X9CrNi18-9	A27N	S30200	W	1.4325	I	SUS302	W	S30210	W
4326-302-15-I	X12CrNiSi18-9-3	A27P (46)	S30215	W	(1.4326)	I	SUS302B	I	S30240	N
4305-303-00-I	X10CrNiS18-9	A27M (14)	S30300	W	1.4305	W	SUS303	W	S30317	W
4625-303-23-X	X12CrNiSe18-9	A27O	S30323	I	(1.4625)	I	SUS303Se	I	S30327	I
4667-303-76-J	X12CrNiCuS18-9-3	A27Q	—	—	(1.4667)	I	SUS303Cu	I	—	—
4570-303-31-I	X6CrNiCuS18-9-2	A27I (44)	S30331	I	1.4570	N	—	—	—	—
4301-304-00-I	X5CrNi18-10	A28E (06)	S30400	W	1.4301	I	SUS304	W	S30408	W
4307-304-03-I	X2CrNi18-9	A27B (01)	S30403	W	1.4307	N	SUS304L	W	S30403	W
4306-304-03-I	X2CrNi19-11	A30A (02)	S30403	W	1.4306	N	SUS304L	W	S30403	N
4948-304-09-I	X7CrNi18-9	A27L (07)	S30409	W	1.4948	W	SUS304H	W	S30409	W
4818-304-15-E	X6CrNiSiNCe19-10	A29J	S30415	W	1.4818	I	—	—	S30450	N
4567-304-30-I	X3CrNiCu18-9-4	A27F (15)	S30430	W	1.4567	N	SUSXM7	W	S30488	W

Table A.2 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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										
4315-304-51-I	X5CrNiN19-9	A28F (10)	S30451	N	1.4315	W	SUS304N1	W	S30458	W
4311-304-53-I	X2CrNiN18-9	A27A (03)	S30453	W	1.4311	N	SUS304LN	W	S30453	W
4650-304-75-E	X2CrNiCu19-10	A29A	—	—	1.4650	I	SUS304L	W	S30403	W
4567-304-76-I	X6CrNiCu17-8-2	A25J (45)	—	—	1.4567	W	SUS304J1	I	S30480	W
4649-304-76-J	X6CrNiCu19-9-1	A28I	—	—	(1.4649)	I	SUS304Cu	I	S30488	W
4567-304-98-X	X6CrNiCu18-9-2	A27J	—	—	1.4567	W	SUS304J3	I	S30480	I
4303-305-00-I	X6CrNi18-12	A30I (08)	S30500	W	1.4303	N	SUS305	W	S30510	W
4884-305-00-X	X6CrNiSi18-13-4	A31H	S30500	W	(1.4884)	I	SUSXM15J1	I	S38148	I
4828-305-09-I	X15CrNiSi20-12	A32R	—	—	1.4828	N	—	—	—	—
4824-308-09-J	X20CrNiN22-11	A33Q	—	—	(1.4824)	I	SUH37	I	S30850	W
4835-308-15-U	X7CrNiSiNCe21-11	A32N	S30815	I	1.4835	N	—	—	—	—
4950-309-08-E	X6CrNi23-13	A36J	S30908	W	1.4950	I	SUS309S	W	S30908	W
4833-309-08-I	X18CrNi23-13	A36R	S30908	W	1.4833	N	SUH309	W	S30908	W
4496-309-51-J	X4CrNiMoN25-14-1	A40F	—	—	(1.4496)	I	SUS317J2	I	—	—
4335-310-02-I	X1CrNi25-21	A46A (12)	S31002	W	1.4335	I	—	—	—	—
4845-310-08-E	X8CrNi25-21	A46L	S31008	W	1.4845	I	SUS310S	W	S31008	N
4951-310-08-I	X6CrNi25-20	A45L	S31008	W	1.4951	N	SUS310S	W	S31008	W
4845-310-09-X	X23CrNi25-21	A46O	S31008	W	1.4845	N	SUH310	I	S31020	I
4466-310-50-E	X1CrNiMoN25-22-2	A49A (29)	S31050	W	1.4466	I	—	—	S31053	W
4537-310-92-E	X1CrNiMoCuN25-25-5	A55A	—	—	1.4537	I	—	—	—	—
4547-312-54-I	X1CrNiMoCuN20-18-7	A45A (34)	S31254	W	1.4547	N	SUS312L	W	S31252	N
4659-312-66-I	X1CrNiMoCuNW24-22-6	A52B (41)	S31266	W	1.4659	I	—	—	—	—
4841-314-00-E	X15CrNiSi25-21	A46R	S31400	N	1.4841	I	—	—	—	—
4971-314-79-I	X12CrNiCoMoWMnNNb21-20-20-3-3-2	A64R	—	—	1.4971	N	SUH661	W	—	—
4660-315-77-I	X6CrNiCuSiMo19-10-3-2	A30J	—	—	(1.4660)	I	SUS315J1	N	—	—
4648-315-77-I	X6CrNiSiCuMo19-13-3-3-1	A33I	—	—	(1.4648)	I	SUS315J2	W	—	—
4401-316-00-I	X5CrNiMo17-12-2	A31I (30)	S31600	W	1.4401	N	SUS316	W	S31608	N
4436-316-00-I	X3CrNiMo17-12-3	A32F (31)	S31600	W	1.4436	I	SUS316	W	S31608	W
4404-316-03-I	X2CrNiMo17-12-2	A31A (21)	S31603	W	1.4404	N	SUS316L	W	S31603	N
4432-316-03-I	X2CrNiMo17-12-3	A32A (22)	S31603	W	1.4432	I	SUS316L	W	S31603	W
4571-316-35-I	X6CrNiMoTi17-12-2	A31F (32)	S31635	W	1.4571	N	SUS316Ti	W	S31668	W
4580-316-40-I	X6CrNiMoNb17-12-2	A31G (33)	S31640	W	1.4580	N	—	—	S31678	W
4495-316-51-J	X6CrNiMoN17-12-3	A32H	S31651	N	(1.4495)	I	SUS316N	I	S31658	N
4406-316-53-I	X2CrNiMoN17-11-2	A30B (25)	S31653	W	1.4406	N	SUS316LN	W	S31653	N
4429-316-53-I	X2CrNiMoN17-12-3	A32B (26)	S31653	W	1.4429	N	SUS316LN	W	S31653	N
4494-316-74-J	X6CrNiMoS17-12-3	A32K	—	—	(1.4494)	I	SUS316F	I	—	—
4647-316-75-X	X2CrNiMoCu18-14-2-2	A34A	—	—	(1.4647)	I	SUS316J1L	I	S31683	I
4578-316-76-E	X3CrNiCuMo17-11-3-2	A30F	—	—	1.4578	I	—	—	—	—
4449-316-76-E	X3CrNiMo18-12-3	A33F	—	—	1.4449	I	—	—	—	—

Table A.2 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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										
4665-316-76-J	X6CrNiMoCu18-12-2-2	A32I	—	—	(1.4665)	I	SUS316J1	I	—	—
4910-316-77-E	X3CrNiMoBN17-13-3	A33G	—	—	1.4910	I	—	—	—	—
4867-316-77-J	X40CrNiWSi15-14-3-2	A29P	—	—	(1.4867)	I	SUH31	I	—	—
4435-316-91-I	X2CrNiMo18-14-3	A35A (23)	—	—	1.4435	N	SUS316L	W	S31603	W
4445-317-00-U	X6CrNiMo19-13-4	A36I	S31700	I	(1.4445)	I	SUS317	W	S31708	N
4438-317-03-I	X2CrNiMo19-14-4	A37A (24)	S31703	W	1.4438	W	SUS317L	W	S31703	W
4439-317-26-E	X2CrNiMoN17-13-5	A35B	S31726	N	1.4439	I	—	—	S31723	W
4483-317-26-I	X2CrNiMoN18-15-5	A38A (28)	S31726	W	(1.4483)	I	—	—	S31723	N
4434-317-53-I	X2CrNiMoN18-12-4	A34B (27)	S31753	W	1.4434	N	SUS317LN	W	S31753	W
4879-317-77-J	X30CrNiMoPB20-11-2	A33R	—	—	(1.4879)	I	SUH38	I	—	—
4476-317-92-X	X3CrNiMo18-16-5	A39F	—	—	(1.4476)	I	SUS317J1	I	S31794	I
4541-321-00-I	X6CrNiTi18-10	A28G (16)	S32100	W	1.4541	I	SUS321	W	S32168	W
4940-321-09-I	X7CrNiTi18-10	A28O (17)	S32109	W	1.4940	N	SUS321H	W	S32169	N
4941-321-09-I	X6CrNiTiB18-10	A28J (18)	S32109	W	1.4941	W	—	—	S32169	W
4652-326-54-I	X1CrNiMoCuN24-22-8	A54A (38)	S32654	N	1.4652	I	—	—	S32652	N
4565-345-65-I	X2CrNiMnMoN25-18-6-5	A54B (42)	S34565	W	1.4565	I	—	—	S34553	N
4550-347-00-I	X6CrNiNb18-10	A28H (19)	S34700	I	1.4550	N	SUS347	W	S34778	N
4912-347-09-I	X7CrNiNb18-10	A28K (20)	S34709	W	1.4912	N	SUS347H	W	S34779	W
4961-347-77-E	X8CrNiNb16-13	A29L	—	—	1.4961	I	—	—	—	—
4854-353-15-E	X6NiCrSiNCe35-25	A60J	S35315	N	1.4854	I	—	—	—	—
4389-384-00-I	X3NiCr18-16	A34F (09)	S38400	W	(1.4389)	I	SUS384	W	S38408	W
b) Austenitic-ferritic (duplex) steels										
4460-312-00-I	X3CrNiMoN27-5-2	D34F (55)	S31200	W	1.4460	I	—	—	S22553	W
4481-312-60-J	X2CrNiMoN25-7-3	D35A	S31260	W	(1.4481)	I	SUS329J4L	I	S22583	W
4424-315-00-I	X2CrNiMoSiMnN19-5-3-2-2	D29A	S31500	N	1.4424	N	—	—	—	—
4462-318-03-I	X2CrNiMoN22-5-3	D30A (52)	S32205	N	1.4462	I	SUS329J3L	W	S22053	N
4162-321-01-E	X2CrMnNiN21-5-1	D27F	S32101	N	1.4162	I	—	—	—	—
4062-322-02-U	X2CrNiN22-2	D24A	S32202	I	1.4062	N	—	—	—	—
4362-323-04-I	X2CrNiN23-4	D27B (51)	S32304	W	1.4362	I	—	—	S23043	W
4507-325-20-I	X2CrNiMoCuN25-6-3	D34A (53)	S32550	W	1.4507	I	—	—	S25554	—
4507-325-50-X	X3CrNiMoCuN26-6-3-2	D35F	S32550	I	1.4507	W	—	—	S25554	I
4658-327-07-U	X2CrNiMoCoN28-8-5-1	D42A	S32707	I	(1.4658)	I	—	—	—	—
4410-327-50-E	X2CrNiMoN25-7-4	D36A (54)	S32750	W	1.4410	I	—	—	S25073	W
4501-327-60-I	X2CrNiMoCuWN25-7-4	D36B (56)	S32760	I	1.4501	N	—	—	S27603	N
4480-329-00-U	X6CrNiMo26-4-2	D32F	S32900	I	(1.4480)	I	SUS329J1	W	—	—
4477-329-06-E	X2CrNiMoN29-7-2	D38A	S32906	N	1.4477	I	—	—	—	—
4485-332-07-U	X2CrNiMoN31-8-4	D43A	S33207	U	(1.4485)	I	—	—	—	—

Table A.2 (*continued*)

Steel designations according to[a]										
ISO number	ISO name	Line (old)	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]
c) Ferritic steels										
4523-182-35-I	X2CrMoTiS18-2	F20B (74)	S18235	W	1.4523	I	—	—	—	—
4002-405-00-I	X6CrAl13	F13H (66)	S40500	W	1.4002	N	SUS405	W	S11348	N
4724-405-77-I	X10CrAlSi13	F13L	—	—	1.4724	N	—	—	—	—
4720-409-00-I	X2CrTi12	F12B (62)	S40900	W	1.4720	N	SUH409L	W	S11163	—
4516-409-75-I	X6CrNiTi12	F13F (64)	S40975	W	1.4516	N	—	—	—	—
4003-410-77-I	X2CrNi12	F12C (61)	S41003	N	1.4003	N	—	—	S11213	N
4000-410-08-I	X6Cr13	F13G (65)	S41008	W	1.4000	N	SUS410S	N	S41008	N
4030-410-90-X	X2Cr12	F12A	—	—	(1.4030)	I	SUS410L	I	S11203	I
4012-429-00-X	X10Cr15	F15L	S42900	I	(1.4012)	I	SUS429	I	S11510	I
4589-429-70-E	X5CrNiMoTi15-2	F17H	—	—	1.4589	I	—	—	—	—
4595-429-71-I	X1CrNb15	F15A	—	—	1.4595	N	—	—	—	—
4016-430-00-I	X6Cr17	F17I (67)	S43000	W	1.4016	I	SUS430	W	S11710	W
4004-430-20-I	X7CrS17	F17L (68)	S43020	W	(1.4004)	I	SUS430F	W	S11717	W
4510-430-35-I	X3CrTi17	F17F (70)	S43035	W	1.4510	N	SUS430LX	W	S11863	W
4520-430-70-I	X2CrTi17	F17A	—	—	1.4520	N	SUS430LX	W	—	—
4511-430-71-I	X3CrNb17	F17G (73)	—	—	1.4511	N	SUS430LX	W	—	—
4664-430-75-J	X2CrCuTi18	F18A	—	—	(1.4664)	I	SUS430J1L	I	—	—
4742-430-77-I	X10CrAlSi18	F18N	—	—	1.4742	N	—	—	—	—
4017-430-91-E	X6CrNi17-1	F18H	—	—	1.4017	I	—	—	—	—
4113-434-00-I	X6CrMo17-1	F18I (69)	S43400	W	1.4113	N	SUS434	W	S11790	W
4526-436-00-I	X6CrMoNb17-1	F18J (71)	S43600	W	1.4526	N	—	—	S11770	W
4513-436-00-J	X2CrMoNbTi18-1	F19A	S43600	W	(1.4513)	N	SUS436L	I	S11862	W
4609-436-77-J	X2CrMo19	F19B	—	—	(1.4609)	N	SUS436J1L	I	—	—
4509-439-40-X	X2CrTiNb18	F18B	S43940	I	1.4509	N	SUS430LX	W	S11873	I
4764-442-72-J	X8CrAl19-3	F19N	—	—	(1.4764)	I	SUH21	I	—	—
4521-444-00-I	X2CrMoTi18-2	F20A (72)	S44400	W	1.4521	N	SUS444	W	S11972	W
4621-445-00-E	X2CrNbCu21	F21A	S44500	W	1.4621	I	—	—	—	—
4762-445-72-I	X10CrAlSi25	F25N	—	—	1.4762	N	—	—	—	—
4128-445-92-J	X2CrMo23-1	F24A	—	—	(1.4128)	I	SUS445J1	I	—	—
4129-445-92-J	X2CrMo23-2	F25A	—	—	(1.4129)	I	SUS445J2	I	—	—
4749-446-00-I	X15CrN26	F26R	S44600	W	1.4749	W	SUH446	W	S12550	W
4750-446-60-U	X2CrMoNi27-4-2	F33A	S44660	I	(1.4750)	I	—	—	—	—
4131-446-92-C	X1CrMo26-1	F27A	S44627	W	(1.4131)	I	SUSXM27	N	S12791	I
4135-447-92-C	X1CrMo30-2	F32A	S44700	N	(1.4135)	I	SUS447J1	N	S13091	I

Table A.2 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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) Martensitic steels										
4006-410-00-I	X12Cr13	M13B (82)	S41000	W	1.4006	I	SUS410	W	S41010	W
4024-410-09-E	X15Cr13	M13F	—	—	1.4024	I	SUS410	W	—	—
4119-410-92-C	X13CrMo13	M13G	—	—	(1.4119)	I	SUS410J1	N	S45710	I
4313-415-00-I	X3CrNiMo13-4	M17A (81)	S41500	W	1.4313	N	SUSF6NM	W	S41595	W
4415-415-92-E	X2CrNiMoV13-5-2	M20A	—	—	1.4415	I	—	—	—	—
4005-416-00-I	X12CrS13	M13C (83)	S41600	W	1.4005	N	SUS416	W	S41617	N
4642-416-72-J	X13CrPb13	M13A	—	—	(1.4642)	I	SUS410F2	I	—	—
4021-420-00-I	X20Cr13	M13I (84)	S42000	W	1.4021	I	SUS420J1	N	S42020	N
4028-420-00-I	X30Cr13	M13M (85)	S42000	W	1.4028	I	SUS420J2	W	S42030	N
4031-420-00-I	X39Cr13	M13P (86)	S42000	W	1.4031	I	—	—	S42040	W
4034-420-00-I	X46Cr13	M13Q (87)	S42000	W	1.4034	I	—	—	S42040	W
4038-420-00-I	X52Cr13	M13U (88)	S42000	W	(1.4038)	I	—	—	—	—
4039-420-09-I	X60Cr13	M13V (89)	—	—	(1.4039)	I	—	—	—	—
4029-420-20-I	X33CrS13	M13N	S42020	W	1.4029	N	SUS420F	N	S42037	N
4110-420-69-E	X55CrMo14	M14U	—	—	1.4110	I	—	—	—	—
4643-420-72-J	X33CrPb13	M13O	—	—	(1.4643)	I	SUS420F2	I	—	—
4035-420-74-E	X46CrS13	M13R	—	—	1.4035	I	—	—	—	—
4116-420-77-E	X50CrMoV15	M15U	—	—	1.4116	I	—	—	—	—
4419-420-97-E	X38CrMo14	M14P	—	—	1.4419	I	—	—	S45830	W
4929-422-00-I	X23CrMoWMnNiV12-1-1	M13J	S42200	W	(1.4929)	I	SUH 616	N	S47220	N
4923-422-77-E	X30Cr13	M13H	—	—	1.4923	I	—	—	—	—
4058-429-99-J	X33Cr16	M16O	—	—	(1.4058)	I	SUS429J1	I	—	—
4019-430-20-I	X14CrS17	M17F (90)	S43020	W	1.4019	I	—	—	S11717	W
4057-431-00-X	X17CrNi16-2	M18G (91)	S43100	W	1.4057	I	SUS431	W	S43120	I
4123-431-77-E	X40CrMoVN16-2	M18T	—	—	1.4123	I	—	—	—	—
4418-431-77-E	X4CrNiMo16-5-1	M22A	—	—	1.4418	I	—	—	—	—
4122-434-09-I	X39CrMo17-1	M18R (92)	—	—	1.4122	I	—	—	—	—
4040-440-02-X	X68Cr17	M17U	S44002	W	(1.4040)	I	SUS440A	I	S44070	I
4041-440-03-X	X85Cr17	M17V	S44003	W	(1.4041)	I	SUS440B	I	S44080	I
4023-440-04-I	X110Cr17	M17W	S44004	W	(1.4023)	I	SUS440C	N	S44096	N
4025-440-74-X	X110CrS17	M17Z	—	—	(1.4025)	I	SUS440F	I	S44097	I
4766-440-77-X	X80CrSiNi20-2	M20U	—	—	(1.4766)	I	SUH4	I	S48380	I
4916-600-77-J	X18CrMnMoNbVN12	M12G	—	—	(1.4916)	I	SUH 600	I	S46250	N

Table A.2 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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]
e) Precipitation-hardening steels										
4534-138-00-X	X3CrNiMoAl13-8-3	P24H	S13800	I	1.4534	N	—	—	S51380	I
4594-155-92-E	X5CrNiMoCuNb14-5	P19I	—	—	1.4594	I	—	—	—	—
4532-157-00-I	X8CrNiMoAl15-7-2	P24M (103)	S15700	N	1.4532	N	—	—	S51570	N
4542-174-00-I	X5CrNiCuNb16-4	P20I (101)	S17400	W	1.4542	N	SUS630	W	S51740	W
4568-177-00-I	X7CrNiAl17-7	P24L (102)	S17700	N	1.4568	N	SUS631	W	S51770	N
4457-350-00-X	X9CrNiMoN17-5-3	P25M	(S35000)	I	(1.4457)	W	—	—	S51750	I
4530-455-77-E	X1CrNiMoAlTi12-9-2	P23A	—	—	1.4530	I	—	—	—	—
4596-455-77-E	X1CrNiMoAlTi12-10-2	P24A	—	—	1.4596	I	—	—	—	—
4645-469-10-U	X2CrNiMoCu AlTi12-9-4-3	P25A	(S46910)	I	(1.4645)	I	—	—	—	—
4644-662-20-U	X4NiCrMoTiMnSiB26-14-3-2	P43J	(S66220)	I	(1.4644)	I	—	—	—	—
4980-662-86-X	X6NiCrTiMoVB25-15-2	P42J	(S66286)	I	1.4980	N	SUH660	I	S51525	W

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.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 (old)	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										
4301-304-00-I	X5CrNi18-10	A28E (06)	S30400	W	1.4301	I	SUS304	W	S30408	W
4303-305-00-I	X6CrNi18-12	A30I (08)	S30500	W	1.4303	N	SUS305	W	S30510	W
4305-303-00-I	X10CrNiS18-9	A27M (14)	S30300	W	1.4305	W	SUS303	W	S30317	W
4306-304-03-I	X2CrNi19-11	A30A (02)	S30403	W	1.4306	N	SUS304L	W	S30403	N
4307-304-03-I	X2CrNi18-9	A27B (01)	S30403	W	1.4307	N	SUS304L	W	S30403	W
4310-301-00-I	X10CrNi18-8	A26L (11)	S30100	W	1.4310	N	—	—	S30110	W
4311-304-53-I	X2CrNiN18-9	A27A (03)	S30453	W	1.4311	N	SUS304LN	W	S30453	W
4315-304-51-I	X5CrNiN19-9	A28F (10)	S30451	N	1.4315	W	SUS304N1	W	S30458	W
4318-301-53-I	X2CrNiN18-7	A25A (04)	S30153	W	1.4318	N	SUS301L	W	S30153	W
4319-301-00-I	X5CrNi17-7	A24H (05)	S30100	W	1.4319	I	SUS301	W	S30110	W
4325-302-00-E	X9CrNi18-9	A27N	S30200	W	1.4325	I	SUS302	W	S30210	W
4326-302-15-I	X12CrNiSi18-9-3	A27P (46)	S30215	W	(1.4326)	I	SUS302B	I	S30240	N
4335-310-02-I	X1CrNi25-21	A46A (12)	S31002	W	1.4335	I	—	—	—	—
4369-202-91-I	X11CrNiMnN19-8-6	A33L (43)	—	—	1.4369	I	—	—	—	—
4371-201-53-I	X2CrMnNiN17-7-5	A29B	S20153	N	1.4371	N	—	—	—	—
4372-201-00-I	X12CrMnNiN17-7-5	A29O (13)	S20100	N	1.4372	N	SUS201	W	S35350	N
4373-202-00-I	X12CrMnNiN18-9-5	A32O	S20200	W	1.4373	N	SUS202	W	S35450	N
4389-384-00-I	X3NiCr18-16	A34F (09)	S38400	W	(1.4389)	I	SUS384	W	S38408	W
4401-316-00-I	X5CrNiMo17-12-2	A31I (30)	S31600	W	1.4401	N	SUS316	W	S31608	N
4404-316-03-I	X2CrNiMo17-12-2	A31A (21)	S31603	W	1.4404	N	SUS316L	W	S31603	N
4406-316-53-I	X2CrNiMoN17-11-2	A30B (25)	S31653	W	1.4406	N	SUS316LN	W	S31653	N
4429-316-53-I	X2CrNiMoN17-12-3	A32B (26)	S31653	W	1.4429	N	SUS316LN	W	S31653	N
4432-316-03-I	X2CrNiMo17-12-3	A32A (22)	S31603	W	1.4432	I	SUS316L	W	S31603	W
4434-317-53-I	X2CrNiMoN18-12-4	A34B (27)	S31753	W	1.4434	N	SUS317LN	W	S31753	W
4435-316-91-I	X2CrNiMo18-14-3	A35A (23)	—	—	1.4435	N	SUS316L	W	S31603	W
4436-316-00-I	X3CrNiMo17-12-3	A32F (31)	S31600	W	1.4436	I	SUS316	W	S31608	W
4438-317-03-I	X2CrNiMo19-14-4	A37A (24)	S31703	W	1.4438	W	SUS317L	W	S31703	W
4439-317-26-E	X2CrNiMoN17-13-5	A35B	S31726	N	1.4439	I	—	—	S31723	W
4445-317-00-U	X6CrNiMo19-13-4	A36I	S31700	I	(1.4445)	I	SUS317	W	S31708	N
4449-316-76-E	X3CrNiMo18-12-3	A33F	—	—	1.4449	I	—	—	—	—
4466-310-50-E	X1CrNiMoN25-22-2	A49A (29)	S31050	W	1.4466	I	—	—	S31053	W
4476-317-92-X	X3CrNiMo18-16-5	A39F	—	—	(1.4476)	I	SUS317J1	I	S31794	I
4478-083-67-U	X2NiCrMoN25-21-7	A53A	N08367	I	(1.4478)	I	SUS836L	W	—	—
4479-089-36-U	X1NiCrMoMnN34-27-6-5	A72A	N08936	I	(1.4479)	I	—	—	—	—
4483-317-26-I	X2CrNiMoN18-15-5	A38A (28)	S31726	W	(1.4483)	I	—	—	S31723	N
4494-316-74-J	X6CrNiMoS17-12-3	A32K	—	—	(1.4494)	I	SUS316F	I	—	—
4495-316-51-J	X6CrNiMoN17-12-3	A32H	S31651	N	(1.4495)	I	SUS316N	I	S31658	N
4496-309-51-J	X4CrNiMoN25-14-1	A40F	—	—	(1.4496)	I	SUS317J2	I	—	—

Table A.3 (*continued*)

Steel designations according to[a]										
ISO number	ISO name	Line (old)	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										
4529-089-26-I	X1NiCrMoCuN25-20-7	A52A (37)	N08926	W	1.4529	N	—	—	—	—
4537-310-92-E	X1CrNiMoCuN25-25-5	A55A	—	—	1.4537	I	—	—	—	—
4539-089-04-I	X1NiCrMoCu25-20-5	A50A (35)	N08904	W	1.4539	N	SUS890L	W	S39042	N
4541-321-00-I	X6CrNiTi18-10	A28G (16)	S32100	W	1.4541	I	SUS321	W	S32168	W
4547-312-54-I	X1CrNiMoCuN20-18-7	A45A (34)	S31254	W	1.4547	N	SUS312L	W	S31252	N
4550-347-00-I	X6CrNiNb18-10	A28H (19)	S34700	I	1.4550	N	SUS347	W	S34778	N
4563-080-28-I	X1NiCrMoCu31-27-4	A62A (36)	N08028	W	1.4563	I	—	—	—	—
4565-345-65-I	X2CrNiMnMoN25-18-6-5	A54B (42)	S34565	W	1.4565	I	—	—	S34553	N
4567-304-30-I	X3CrNiCu18-9-4	A27F (15)	S30430	W	1.4567	N	SUSXM7	W	S30488	W
4567-304-76-I	X6CrNiCu17-8-2	A25J (45)	—	—	1.4567	W	SUS304J1	I	S30480	W
4567-304-98-X	X6CrNiCu18-9-2	A27J	—	—	1.4567	W	SUS304J3	I	S30480	I
4570-303-31-I	X6CrNiCuS18-9-2	A27I (44)	S30331	I	1.4570	N	—	—	—	—
4571-316-35-I	X6CrNiMoTi17-12-2	A31F (32)	S31635	W	1.4571	N	SUS316Ti	W	S31668	W
4578-316-76-E	X3CrNiCuMo17-11-3-2	A30F	—	—	1.4578	I	—	—	—	—
4580-316-40-I	X6CrNiMoNb17-12-2	A31G (33)	S31640	W	1.4580	N	—	—	S31678	W
4597-204-76-I	X8CrMnCuN17-8-3	A25L (40)	—	—	1.4597	N	—	—	—	—
4615-201-75-E	X3CrMnNiCu15-8-5-3	A28C	—	—	1.4615	I	—	—	—	—
4617-201-76-J	X6CrNiMnCu17-8-4-2	A29I	—	—	(1.4617)	I	SUS304J2	I	—	—
4618-201-76-E	X9CrMnNiCu17-8-5-2	A30L	—	—	1.4618	I	—	—	—	—
4625-303-23-X	X12CrNiSe18-9	A27O	S30323	I	(1.4625)	I	SUS303Se	I	S30327	I
4647-316-75-X	X2CrNiMoCu18-14-2-2	A34A	—	—	(1.4647)	I	SUS316J1L	I	S31683	I
4648-315-77-I	X6CrNiSiCuMo19-13-3-3-1	A33I	—	—	(1.4648)	I	SUS315J2	W	—	—
4649-304-76-J	X6CrNiCu19-9-1	A28I	—	—	(1.4649)	I	SUS304Cu	I	S30488	W
4650-304-75-E	X2CrNiCu19-10	A29A	—	—	1.4650	I	SUS304L	W	S30403	W
4652-326-54-I	X1CrNiMoCuN24-22-8	A54A (38)	S32654	N	1.4652	I	—	—	S32652	N
4656-089-04-I	X1NiCrMoCu22-20-5-2	A47A	N08904	N	(1.4656)	I	—	—	S39042	N
4657-080-20-U	X4NiCrCuMo35-20-4-3	A58F	N08020	I	(1.4657)	I	—	—	—	—
4659-312-66-I	X1CrNiMoCuNW24-22-6	A52B (41)	S31266	W	1.4659	I	—	—	—	—
4660-315-77-I	X6CrNiCuSiMo19-10-3-2	A30J	—	—	(1.4660)	I	SUS315J1	N	—	—
4665-316-76-J	X6CrNiMoCu18-12-2-2	A32I	—	—	(1.4665)	I	SUS316J1	I	—	—
4667-303-76-J	X12CrNiCuS18-9-3	A27Q	—	—	(1.4667)	I	SUS303Cu	I	—	—
4818-304-15-E	X6CrNiSiNCe19-10	A29J	S30415	W	1.4818	I	—	—	S30450	N
4824-308-09-J	X20CrNiN22-11	A33Q	—	—	(1.4824)	I	SUH37	I	S30850	W
4828-305-09-I	X15CrNiSi20-12	A32R	—	—	1.4828	N	—	—	—	—
4833-309-08-I	X18CrNi23-13	A36R	S30908	W	1.4833	N	SUH309	W	S30908	W
4835-308-15-U	X7CrNiSiNCe21-11	A32N	S30815	I	1.4835	N	—	—	—	—
4841-314-00-E	X15CrNiSi25-21	A46R	S31400	N	1.4841	I	—	—	—	—
4845-310-08-E	X8CrNi25-21	A46L	S31008	W	1.4845	I	SUS310S	W	S31008	N
4845-310-09-X	X23CrNi25-21	A46O	S31008	W	1.4845	N	SUH310	I	S31020	I

Table A.3 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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										
4854-353-15-E	X6NiCrSiNCe35-25	A60J	S35315	N	1.4854	I	—	—	—	—
4864-083-77-X	X13NiCr35-16	A51O	—	—	1.4864	N	SUH 330	I	S33010	I
4867-316-77-J	X40CrNiWSi15-14-3-2	A29P	—	—	(1.4867)	I	SUH31	I	—	—
4876-088-00-I	X8NiCrAlTi32-21	A53L	N08800	W	1.4876	N	NCF800	W	—	—
4879-317-77-J	X30CrNiMoPB20-11-2	A33R	—	—	(1.4879)	I	SUH38	I	—	—
4884-305-00-X	X6CrNiSi18-13-4	A31H	S30500	W	(1.4884	I	SUSXM15J1	I	S38148	I
4890-202-09-X	X53CrMnNiN21-9-4	A34V	—	—	(1.4890)	I	SUH35	I	S35650	I
4910-316-77-E	X3CrNiMoBN17-13-3	A33G	—	—	1.4910	I	—	—	—	—
4912-347-09-I	X7CrNiNb18-10	A28K (20)	S34709	W	1.4912	N	SUS347H	W	S34779	W
4940-321-09-I	X7CrNiTi18-10	A28O (17)	S32109	W	1.4940	N	SUS321H	W	S32169	N
4941-321-09-I	X6CrNiTiB18-10	A28J (18)	S32109	W	1.4941	W	—	—	S32169	W
4948-304-09-I	X7CrNi18-9	A27L (07)	S30409	W	1.4948	W	SUS304H	W	S30409	W
4950-309-08-E	X6CrNi23-13	A36J	S30908	W	1.4950	I	SUS309S	W	S30908	W
4951-310-08-I	X6CrNi25-20	A45L	S31008	W	1.4951	N	SUS310S	W	S31008	W
4958-088-77-E	X5NiCrAlTi31-20	A51J	—	—	1.4958	I	—	—	—	—
4959-088-10-U	X7NiCrAlTi33-21	A54L	N08810	I	1.4959	N	NCF800H	N	—	—
4959-088-11-U	X8NiCrAlTi33-21	A54M	N08811	I	1.4959	W	—	—	—	—
4959-088-77-E	X8NiCrAlTi32-20	A52L	—	—	1.4959	I	—	—	—	—
4961-347-77-E	X8CrNiNb16-13	A29L	—	—	1.4961	I	—	—	—	—
4971-314-79-I	X12CrNiCoMoWMnNNb21-20-20-3-3-2	A64R	—	—	1.4971	N	SUH661	W	—	—
4982-215-00-E	X10CrNiMoMnNbVB 15-10-1	A32P	S21500	N	1.4982	I	—	—	—	—
b) Austenitic-ferritic (duplex) steels										
4062-322-02-U	X2CrNiN22-2	D24A	S32202	I	1.4062	N	—	—	—	—
4162-321-01-E	X2CrMnNiN21-5-1	D27F	S32101	N	1.4162	I	—	—	—	—
4362-323-04-I	X2CrNiN23-4	D27B (51)	S32304	W	1.4362	I	—	—	S23043	W
4410-327-50-E	X2CrNiMoN25-7-4	D36A (54)	S32750	W	1.4410	I	—	—	S25073	W
4424-315-00-I	X2CrNiMoSiMnN19-5-3-2-2	D29A	S31500	N	1.4424	N	—	—	—	—
4460-312-00-I	X3CrNiMoN27-5-2	D34F (55)	S31200	W	1.4460	I	—	—	S22553	W
4462-318-03-I	X2CrNiMoN22-5-3	D30A (52)	S32205	N	1.4462	I	SUS329J3L	W	S22053	N
4477-329-06-E	X2CrNiMoN29-7-2	D38A	S32906	N	1.4477	I	—	—	—	—
4480-329-00-U	X6CrNiMo26-4-2	D32F	S32900	I	(1.4480)	I	SUS329J1	W	—	—
4481-312-60-J	X2CrNiMoN25-7-3	D35A	S31260	W	(1.4481)	I	SUS329J4L	I	S22583	W
4485-332-07-U	X2CrNiMoN31-8-4	D43A	S33207	U	(1.4485)	I	—	—	—	—
4501-327-60-I	X2CrNiMoCuWN25-7-4	D36B (56)	S32760	I	1.4501	N	—	—	S27603	N
4507-325-20-I	X2CrNiMoCuN25-6-3	D34A (53)	S32550	W	1.4507	I	—	—	S25554	—
4507-325-50-X	X3CrNiMoCuN26-6-3-2	D35F	S32550	I	1.4507	W	—	—	S25554	I
4658-327-07-U	X2CrNiMoCoN28-8-5-1	D42A	S32707	I	(1.4658)	I	—	—	—	—

Table A.3 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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]
c) Ferritic steels										
4000-410-08-I	X6Cr13	F13G (65)	S41008	W	1.4000	N	SUS410S	N	S41008	N
4002-405-00-I	X6CrAl13	F13H (66)	S40500	W	1.4002	N	SUS405	W	S11348	N
4003-410-77-I	X2CrNi12	F12C (61)	S41003	N	1.4003	N	—	—	S11213	N
4004-430-20-I	X7CrS17	F17L (68)	S43020	W	(1.4004)	I	SUS430F	W	S11717	W
4012-429-00-X	X10Cr15	F15L	S42900	I	(1.4012)	I	SUS429	I	S11510	I
4016-430-00-I	X6Cr17	F17I (67)	S43000	W	1.4016	I	SUS430	W	S11710	W
4017-430-91-E	X6CrNi17-1	F18H	—	—	1.4017	I	—	—	—	—
4030-410-90-X	X2Cr12	F12A	—	—	(1.4030)	I	SUS410L	I	S11203	I
4113-434-00-I	X6CrMo17-1	F18I (69)	S43400	W	1.4113	N	SUS434	W	S11790	W
4128-445-92-J	X2CrMo23-1	F24A	—	—	(1.4128)	I	SUS445J1	I	—	—
4129-445-92-J	X2CrMo23-2	F25A	—	—	(1.4129)	I	SUS445J2	I	—	—
4131-446-92-C	X1CrMo26-1	F27A	S44627	W	(1.4131)	I	SUSXM27	N	S12791	I
4135-447-92-C	X1CrMo30-2	F32A	S44700	N	(1.4135)	I	SUS447J1	N	S13091	I
4509-439-40-X	X2CrTiNb18	F18B	S43940	I	1.4509	N	SUS430LX	W	S11873	I
4510-430-35-I	X3CrTi17	F17F (70)	S43035	W	1.4510	N	SUS430LX	W	S11863	W
4511-430-71-I	X3CrNb17	F17G (73)	—	—	1.4511	N	SUS430LX	W	—	—
4513-436-00-J	X2CrMoNbTi18-1	F19A	S43600	W	(1.4513)	N	SUS436L	I	S11862	W
4516-409-75-I	X6CrNiTi12	F13F (64)	S40975	W	1.4516	N	—	—	—	—
4520-430-70-I	X2CrTi17	F17A	—	—	1.4520	N	SUS430LX	W	—	—
4521-444-00-I	X2CrMoTi18-2	F20A (72)	S44400	W	1.4521	N	SUS444	W	S11972	W
4523-182-35-I	X2CrMoTiS18-2	F20B (74)	S18235	W	1.4523	I	—	—	—	—
4526-436-00-I	X6CrMoNb17-1	F18J (71)	S43600	W	1.4526	N	—	—	S11770	W
4589-429-70-E	X5CrNiMoTi15-2	F17H	—	—	1.4589	I	—	—	—	—
4595-429-71-I	X1CrNb15	F15A	—	—	1.4595	N	—	—	—	—
4609-436-77-J	X2CrMo19	F19B	—	—	(1.4609)	I	SUS436J1L	I	—	—
4621-445-00-E	X2CrNbCu21	F21A	S44500	W	1.4621	I	—	—	—	—
4664-430-75-J	X2CrCuTi18	F18A	—	—	(1.4664)	I	SUS430J1L	I	—	—
4720-409-00-I	X2CrTi12	F12B (62)	S40900	W	1.4720	N	SUH409L	W	S11163	—
4724-405-77-I	X10CrAlSi13	F13L	—	—	1.4724	N	—	—	—	—
4742-430-77-I	X10CrAlSi18	F18N	—	—	1.4742	N	—	—	—	—
4749-446-00-I	X15CrN26	F26R	S44600	W	1.4749	W	SUH446	W	S12550	W
4750-446-60-U	X2CrMoNi27-4-2	F33A	S44660	I	(1.4750)	I	—	—	—	—
4762-445-72-I	X10CrAlSi25	F25N	—	—	1.4762	N	—	—	—	—
4764-442-72-J	X8CrAl19-3	F19N	—	—	(1.4764)	I	SUH21	I	—	—

Table A.3 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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) Martensitic steels										
4005-416-00-I	X12CrS13	M13C (83)	S41600	W	1.4005	N	SUS416	W	S41617	N
4006-410-00-I	X12Cr13	M13B (82)	S41000	W	1.4006	I	SUS410	W	S41010	W
4019-430-20-I	X14CrS17	M17F (90)	S43020	W	1.4019	I	—	—	S11717	W
4021-420-00-I	X20Cr13	M13I (84)	S42000	W	1.4021	I	SUS420J1	N	S42020	N
4023-440-04-I	X110Cr17	M17W	S44004	W	(1.4023)	I	SUS440C	N	S44096	N
4024-410-09-E	X15Cr13	M13F	—	—	1.4024	I	SUS410	W	—	—
4025-440-74-X	X110CrS17	M17Z	—	—	(1.4025)	I	SUS440F	I	S44097	I
4028-420-00-I	X30Cr13	M13M (85)	S42000	W	1.4028	I	SUS420J2	W	S42030	N
4029-420-20-I	X33CrS13	M13N	S42020	W	1.4029	N	SUS420F	N	S42037	N
4031-420-00-I	X39Cr13	M13P (86)	S42000	W	1.4031	I	—	—	S42040	W
4034-420-00-I	X46Cr13	M13Q (87)	S42000	W	1.4034	I	—	—	S42040	W
4035-420-74-E	X46CrS13	M13R	—	—	1.4035	I	—	—	—	—
4038-420-00-I	X52Cr13	M13U (88)	S42000	W	(1.4038)	I	—	—	—	—
4039-420-09-I	X60Cr13	M13V (89)	—	—	(1.4039)	I	—	—	—	—
4040-440-02-X	X68Cr17	M17U	S44002	W	(1.4040)	I	SUS440A	I	S44070	I
4041-440-03-X	X85Cr17	M17V	S44003	W	(1.4041)	I	SUS440B	I	S44080	I
4057-431-00-X	X17CrNi16-2	M18G (91)	S43100	W	1.4057	I	SUS431	W	S43120	I
4058-429-99-J	X33Cr16	M16O	—	—	(1.4058)	I	SUS429J1	I	—	—
4110-420-69-E	X55CrMo14	M14U	—	—	1.4110	I	—	—	—	—
4116-420-77-E	X50CrMoV15	M15U	—	—	1.4116	I	—	—	—	—
4119-410-92-C	X13CrMo13	M13G	—	—	(1.4119)	I	SUS410J1	N	S45710	I
4122-434-09-I	X39CrMo17-1	M18R (92)	—	—	1.4122	I	—	—	—	—
4123-431-77-E	X40CrMoVN16-2	M18T	—	—	1.4123	I	—	—	—	—
4313-415-00-I	X3CrNiMo13-4	M17A (81)	S41500	W	1.4313	N	SUSF6NM	W	S41595	W
4415-415-92-E	X2CrNiMoV13-5-2	M20A	—	—	1.4415	I	—	—	—	—
4418-431-77-E	X4CrNiMo16-5-1	M22A	—	—	1.4418	I	—	—	—	—
4419-420-97-E	X38CrMo14	M14P	—	—	1.4419	I	—	—	S45830	W
4642-416-72-J	X13CrPb13	M13A	—	—	(1.4642)	I	SUS410F2	I	—	—
4643-420-72-J	X33CrPb13	M13O	—	—	(1.4643)	I	SUS420F2	I	—	—
4766-440-77-X	X80CrSiNi20-2	M20U	—	—	(1.4766)	I	SUH4	I	S48380	I
4916-600-77-J	X18CrMnMoNbVN12	M12G	—	—	(1.4916)	I	SUH 600	I	S46250	N
4923-422-77-E	X30Cr13	M13H	—	—	1.4923	I	—	—	—	—
4929-422-00-I	X23CrMoWMnNiV12-1-1	M13J	S42200	W	(1.4929)	I	SUH 616	N	S47220	N

Table A.3 (*continued*)

Steel designations according to[a]										
ISO number	**ISO name**	**Line** (old)	**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]
e) Precipitation-hardening steels										
4457-350-00-X	X9CrNiMoN17-5-3	P25M	(S35000)	I	(1.4457)	W	—	—	S51750	I
4530-455-77-E	X1CrNiMoAlTi12-9-2	P23A	—	—	1.4530	I	—	—	—	—
4532-157-00-I	X8CrNiMoAl15-7-2	P24M (103)	S15700	N	1.4532	N	—	—	S51570	N
4534-138-00-X	X3CrNiMoAl13-8-3	P24H	S13800	I	1.4534	N	—	—	S51380	I
4542-174-00-I	X5CrNiCuNb16-4	P20I (101)	S17400	W	1.4542	N	SUS630	W	S51740	W
4568-177-00-I	X7CrNiAl17-7	P24L (102)	S17700	N	1.4568	N	SUS631	W	S51770	N
4594-155-92-E	X5CrNiMoCuNb14-5	P19I	—	—	1.4594	I	—	—	—	—
4596-455-77-E	X1CrNiMoAlTi12-10-2	P24A	—	—	1.4596	I	—	—	—	—
4644-662-20-U	X4NiCrMoTiMnSiB26-14-3-2	P43J	(S66220)	I	(1.4644)	I	—	—	—	—
4645-469-10-U	X2CrNiMoCu AlTi12-9-4-3	P25A	(S46910)	I	(1.4645)	I	—	—	—	—
4980-662-86-X	X6NiCrTiMoVB25-15-2	P42J	(S66286)	I	1.4980	N	SUH660	I	S51525	W

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.

Annex B
(informative)

Steels given in Table 1 and of comparable grades covered in various International Standards

Table B.1 — Steels given in Table 1 and of comparable grades covered in various International Standards

ISO number	ISO name	Line (old)	Steel designations according to[a,b] ISO 4954:1993	ISO 4955:2005	ISO 6931-1:1994	ISO 6931-2:2005	ISO 9327-5:1999	ISO 9328-7:2004	ISO 16143-1:2004	ISO 16143-2:2004	ISO 16143-3:2005
a) Austenitic steels											
4318-301-53-I	X2CrNiN18-7	A25A (04)	—	—	—	—	—	X	—	—	—
4319-301-00-I	X5CrNi17-7	A24H (05)	—	—	—	—	—	—	—	—	—
4310-301-00-I	X10CrNi18-8	A26L (11)	X10CrNi18 9 E	—	X9CrNi18-8	X	—	—	X	X	X
4325-302-00-E	X9CrNi18-9	A27N	—	—	—	—	—	—	X	—	—
4326-302-15-I	X12CrNiSi18-9-3	A27P (46)	—	—	—	—	—	—	X	—	—
4307-304-03-I	X2CrNi18-9	A27B (01)	X2CrNi18 10E	—	—	—	X2CrNi18-10	X	X	X	x
4306-304-03-I	X2CrNi19-11	A30A (02)	—	—	—	—	—	X	X	X	X
4311-304-53-I	X2CrNiN18-9	A27A (03)	—	—	—	—	X2CrNiN18-10	X2CrNiN18-10	X	X	—
4301-304-00-I	X5CrNi18-10	A28E (06)	X5CrNi18 9E	—	—	X	X5CrNi18-9	X	X	X	X
4315-304-51-I	X5CrNiN19-9	A28F (10)	—	—	—	—	—	—	—	X	X
4948-304-09-I	X7CrNi18-9	A27L (07)	—	X	—	—	X	X6CrNi18-10	—	—	x
4818-304-15-E	X6CrNiSiNCe19-10	A29J	—	X	—	—	—	—	—	—	—
4650-304-75-E	X2CrNiCu19-10	A29A	—	—	—	—	—	—	—	—	—
4649-304-76-J	X6CrNiCu19-9-1	A28I	—	—	—	—	—	—	—	—	—
4305-303-00-I	X10CrNiS18-9	A27M (14)	—	—	—	—	—	—	—	X	X
4625-303-23-X	X12CrNiSe18-9	A27O	—	—	—	—	—	—	—	—	—
4570-303-31-I	X6CrNiCuS18-9-2	A27I (44)	—	—	—	—	—	—	—	X	X
4667-303-76-J	X12CrNiCuS18-9-3	A27Q	—	—	—	—	—	—	—	—	—
4615-201-75-E	X3CrMnNiCu15-8-5-3	A28C	—	—	—	—	—	—	—	—	—
4541-321-00-I	X6CrNiTi18-10	A28G (16)	X6CrNiTi 18 10E	—	—	—	X	X	X	X	X
4940-321-09-I	X7CrNiTi18-10	A28O (17)	—	X	—	—	X	—	—	—	—
4941-321-09-I	X6CrNiTiB18-10	A28J (18)	—	—	—	—	—	X	—	—	—
4550-347-00-I	X6CrNiNb18-10	A28H (19)	—	X	—	—	X	X	X	X	—
4912-347-09-I	X7CrNiNb18-10	A28K (20)	—	—	—	—	X	—	—	—	—
4961-347-77-E	X8CrNiNb16-13	A29L	—	—	—	—	—	X	—	—	—

Table B.1 (*continued*)

ISO number	ISO name	Line (old)	Steel designations according to[a,b] ISO 4954:1993	ISO 4955:2005	ISO 6931-1:1994	ISO 6931-2:2005	ISO 9327-5:1999	ISO 9328-7:2004	ISO 16143-1:2004	ISO 16143-2:2004	ISO 16143-3:2005
a) Austenitic steels											
4567-304-30-I	X3CrNiCu18-9-4	A27F (15)	X3CrNiCu 18 9 3E	—	—	—	—	—	—	X	—
4567-304-76-I	X6CrNiCu17-8-2	A25J (45)	—	—	—	—	—	—	X	—	—
4567-304-98-X	X6CrNiCu18-9-2	A27J	—	—	—	—	—	—	—	—	—
4660-315-77-I	X6CrNiCuSiMo19-10-3-2	A30J	—	—	—	—	—	—	—	—	—
4867-316-77-J	X40CrNiWSi15-14-3-2	A29P	—	—	—	—	—	—	—	—	—
4303-305-00-I	X6CrNi18-12	A30I (08)	X5CrNi18 12E	—	—	—	—	—	—	X	X
4828-305-09-I	X15CrNiSi20-12	A32R	—	X	—	—	—	—	—	—	—
4835-308-15-U	X7CrNiSiNCe21-11	A32N	—	X	—	—	—	—	—	—	X
4884-305-00-X	X6CrNiSi18-13-4	A31H	—	—	—	—	—	—	—	—	—
4389-384-00-I	X3NiCr18-16	A34F (09)	—	—	—	—	—	—	—	—	—
4371-201-53-I	X2CrMnNiN17-7-5	A29B	—	—	—	—	—	—	—	—	—
4372-201-00-I	X12CrMnNiN17-7-5	A29O (13)	—	—	—	X	—	—	X	—	—
4597-204-76-I	X8CrMnCuN17-8-3	A25L (40)	—	—	—	—	—	—	X	X	X
4617-201-76-J	X6CrNiMnCu17-8-4-2	A29I	—	—	—	—	—	—	—	—	—
4618-201-76-E	X9CrMnNiCu17-8-5-2	A30L	—	—	—	—	—	—	—	—	—
4373-202-00-I	X12CrMnNiN18-9-5	A32O	—	—	—	—	—	—	—	—	—
4982-215-00-E	X10CrNiMoMnNbVB 15-10-1	A32P	—	—	—	—	—	—	—	—	—
4369-202-91-I	X11CrNiMnN19-8-6	A33L (43)	—	—	—	—	—	—	X	X	x
4890-202-09-X	X53CrMnNiN21-9-4	A34V	—	—	—	—	—	—	—	—	—
4648-315-77-I	X6CrNiSiCuMo19-13-3-3-1	A33I	—	—	—	—	—	—	—	—	—
4404-316-03-I	X2CrNiMo17-12-2	A31A (21)	—	—	—	—	X	X	X	X	X
4432-316-03-I	X2CrNiMo17-12-3	A32A (22)	X2CrNiMo 17 13 3E	—	—	—	—	X	X	X	X
4435-316-91-I	X2CrNiMo18-14-3	A35A (23)	—	—	—	—	—	X	X	X	X
4406-316-53-I	X2CrNiMoN17-11-2	A30B (25)	—	—	—	—	—	X	—	—	—
4665-316-76-J	X6CrNiMoCu18-12-2-2	A32I	—	—	—	—	—	—	—	—	—

Table B.1 (*continued*)

Steel designations according to[a,b]											
ISO number	**ISO name**	**Line** (old)	**ISO 4954:1993**	**ISO 4955:2005**	**ISO 6931-1:1994**	**ISO 6931-2:2005**	**ISO 9327-5:1999**	**ISO 9328-7:2004**	**ISO 16143-1:2004**	**ISO 16143-2:2004**	**ISO 16143-3:2005**
a) Austenitic steels											
4647-316-75-X	X2CrNiMoCu18-14-2-2	A34A	—	—	—	—	—	—	—	—	—
4578-316-76-E	X3CrNiCuMo17-11-3-2	A30F	—	—	—	—	—	—	—	—	—
4429-316-53-I	X2CrNiMoN17-12-3	A32B (26)	X2CrNiMoN 17 13 3E	—	—	—	—	X2CrNiMoN 17-13-3	X	X	—
4401-316-00-I	X5CrNiMo17-12-2	A31I (30)	X5CrNiMo 17 12 2E	—	X5CrNiMo 17-12-2	X	X5CrNiMo 17-12	X	X	X	X
4436-316-00-I	X3CrNiMo17-12-3	A32F (31)	—	—	—	—	—	X	X	X	X
4449-316-76-E	X3CrNiMo18-12-3	A33F	—	—	—	—	—	—	—	—	—
4910-316-77-E	X3CrNiMoBN17-13-3	A33G	—	—	—	—	—	X	—	—	—
4494-316-74-J	X6CrNiMoS17-12-3	A32K	—	—	—	—	—	—	—	—	—
4495-316-51-J	X6CrNiMoN17-12-3	A32H	—	—	—	—	—	—	—	—	—
4571-316-35-I	X6CrNiMoTi17-12-2	A31F (32)	X6CrNiMoTi 17 12 2E	—	—	—	X6CrNiMoTi 17-12	X	X	X	X
4580-316-40-I	X6CrNiMoNb17-12-2	A31G (33)	—	—	—	—	—	X	—	—	—
4879-317-77-J	X30CrNiMoPB20-11-2	A33R	—	—	—	—	—	—	—	—	—
4438-317-03-I	X2CrNiMo19-14-4	A37A (24)	—	—	—	—	—	—	—	—	—
4439-317-26-E	X2CrNiMoN17-13-5	A35B	—	—	—	—	—	X	—	—	—
4483-317-26-I	X2CrNiMoN18-15-5	A38A (28)	—	—	—	—	—	—	—	—	—
4434-317-53-I	X2CrNiMoN18-12-4	A34B (27)	—	—	—	—	—	X	—	X	X
4445-317-00-U	X6CrNiMo19-13-4	A36I	—	—	—	—	—	—	—	—	—
4476-317-92-X	X3CrNiMo18-16-5	A39F	—	—	—	—	—	—	—	—	—
4824-308-09-J	X20CrNiN22-11	A33Q	—	—	—	—	—	—	—	—	—
4950-309-08-E	X6CrNi23-13	A36J	—	—	—	—	—	X	—	—	—
4833-309-08-I	X18CrNi23-13	A36R	—	X	—	—	—	—	—	—	X
4496-309-51-J	X4CrNiMoN25-14-1	A40F	—	—	—	—	—	—	—	—	—
4335-310-02-I	X1CrNi25-21	A46A (12)	—	—	—	—	—	X	—	X	X
4951-310-08-I	X6CrNi25-20	A45L	—	—	—	—	—	X	X	—	—
4845-310-08-E	X8CrNi25-21	A46L	—	X	—	—	X6CrNi25-21	—	—	—	—

Table B.1 (*continued*)

ISO number	ISO name	Line (old)	Steel designations according to[a,b] ISO 4954:1993	ISO 4955:2005	ISO 6931-1:1994	ISO 6931-2:2005	ISO 9327-5:1999	ISO 9328-7:2004	ISO 16143-1:2004	ISO 16143-2:2004	ISO 16143-3:2005
a) Austenitic steels											
4845-310-09-X	X23CrNi25-21	A46O	—	—	—	—	—	—	—	—	—
4841-314-00-E	X15CrNiSi25-21	A46R	—	—	—	—	—	—	—	—	—
4466-310-50-E	X1CrNiMoN25-22-2	A49A (29)	—	—	—	—	—	X	X	X	X
4547-312-54-I	X1CrNiMoCuN20-18-7	A45A (34)	—	—	—	—	—	X	—	X	X
4659-312-66-I	X1CrNiMoCuNW24-22-6	A52B (41)	—	—	—	—	—	—	X	X	—
4652-326-54-I	X1CrNiMoCuN24-22-8	A54A (38)	—	—	—	—	—	—	X	—	—
4565-345-65-I	X2CrNiMnMoN25-18-6-5	A54B (42)	—	—	—	—	—	—	X	X	—
4971-314-79-I	X12CrNiCoMoWMnNNb21-20-20-3-3-2	A64R	—	—	—	—	—	—	—	—	—
4537-310-92-E	X1CrNiMoCuN25-25-5	A55A	—	—	—	—	—	X	—	—	—
4656-089-04-I	X1NiCrMoCu22-20-5-2	A47A	—	—	—	—	—	—	—	—	—
4539-089-04-I	X1NiCrMoCu25-20-5	A50A (35)	—	—	—	—	X2NiCrMoCu 25-20-5	X	X	X	X
4529-089-26-I	X1NiCrMoCuN25-20-7	A52A (37)	—	—	—	—	—	X	—	X	X
4478-083-67-U	X2NiCrMoN25-21-7	A53A	—	—	—	—	—	—	—	—	—
4958-088-77-E	X5NiCrAlTi31-20	A51J	—	—	—	—	—	X	—	—	—
4563-080-28-I	X1NiCrMoCu31-27-4	A62A (36)	—	—	—	—	—	X	X	X	X
4876-088-00-I	X8NiCrAlTi32-21	A53L	—	X	—	—	—	X	—	—	X
4959-088-77-E	X8NiCrAlTi32-20	A52L	—	—	—	—	—	X	—	—	—
4959-088-10-U	X7NiCrAlTi33-21	A54L	—	—	—	—	—	—	—	—	—
4959-088-11-U	X8NiCrAlTi33-21	A54M	—	—	—	—	—	—	—	—	—
4864-083-77-X	X13NiCr35-16	A51O	—	—	—	—	—	—	—	—	—
4657-080-20-U	X4NiCrCuMo35-20-4-3	A58F	—	—	—	—	—	—	—	—	—
4854-353-15-E	X6NiCrSiNCe35-25	A60J	—	X	—	—	—	—	—	—	—
4479-089-36-U	X1NiCrMoMnN34-27-6-5	A72A	—	—	—	—	—	—	—	—	—

Table B.1 (*continued*)

ISO number	ISO name	Line (old)	Steel designations according to[a,b] ISO 4954:1993	ISO 4955:2005	ISO 6931-1:1994	ISO 6931-2:2005	ISO 9327-5:1999	ISO 9328-7:2004	ISO 16143-1:2004	ISO 16143-2:2004	ISO 16143-3:2005
b) Austenitic-ferritic (duplex) steels											
4062-322-02-U	X2CrNiN22-2	D24A	—	—	—	—	—	—	—	—	—
4162-321-01-E	X2CrMnNiN21-5-1	D27F	—	—	—	—	—	—	—	—	—
4362-323-04-I	X2CrNiN23-4	D27B (51)	—	—	—	—	—	—	X	X	X
4424-315-00-I	X2CrNiMoSiMnN19-5-3-2-2	D29A	—	—	—	—	—	—	—	—	—
4462-318-03-I	X2CrNiMoN22-5-3	D30A (52)	—	—	—	—	—	—	X	X	X
4481-312-60-J	X2CrNiMoN25-7-3	D35A	—	—	—	—	—	—	—	X	—
4507-325-20-I	X2CrNiMoCuN25-6-3	D34A (53)	—	—	—	—	—	—	X	—	—
4507-325-50-X	X3CrNiMoCuN26-6-3-2	D35F	—	—	—	—	—	—	—	—	—
4410-327-50-E	X2CrNiMoN25-7-4	D36A (54)	—	—	—	—	—	—	X	X	X
4501-327-60-I	X2CrNiMoCuWN25-7-4	D36B (56)	—	—	—	—	—	—	X	X	—
4460-312-00-I	X3CrNiMoN27-5-2	D34F (55)	—	—	—	—	—	—	—	X	—
4480-329-00-U	X6CrNiMo26-4-2	D32F	—	—	—	—	—	—	—	—	—
4477-329-06-E	X2CrNiMoN29-7-2	D38A	—	—	—	—	—	—	—	—	—
4658-327-07-U	X2CrNiMoCoN28-8-5-1	D42A	—	—	—	—	—	—	—	—	—
4485-332-07-U	X2CrNiMoN31-8-4	D43A	—	—	—	—	—	—	—	—	—
c) Ferritic steels											
4030-410-90-X	X2Cr12	F12A	—	—	—	—	—	—	—	—	—
4003-410-77-I	X2CrNi12	F12C (61)	—	—	—	—	—	X	X	—	—
4720-409-00-I	X2CrTi12	F12B (62)	—	X	—	—	—	—	X	—	—
4516-409-75-I	X6CrNiTi12	F13F (64)	—	—	—	—	—	X	—	—	—
4000-410-08-I	X6Cr13	F13G (65)	—	X	—	—	—	—	—	—	—
4002-405-00-I	X6CrAl13	F13H (66)	—	—	—	—	—	—	—	—	—
4724-405-77-I	X10CrAlSi13	F13L	—	X	—	—	—	—	—	—	—
4012-429-00-X	X10Cr15	F15L	—	—	—	—	—	—	—	—	—
4595-429-71-I	X1CrNb15	F15A	—	—	—	—	—	—	—	—	—
4589-429-70-E	X5CrNiMoTi15-2	F17H	—	—	—	—	—	—	—	—	—

Table B.1 (*continued*)

ISO number	ISO name	Line (old)	Steel designations according to[a,b] ISO 4954:1993	ISO 4955:2005	ISO 6931-1:1994	ISO 6931-2:2005	ISO 9327-5:1999	ISO 9328-7:2004	ISO 16143-1:2004	ISO 16143-2:2004	ISO 16143-3:2005
c) Ferritic steels											
4016-430-00-I	X6Cr17	F17I (67)	X6Cr17E	X	—	X	—	—	X	X	X
4004-430-20-I	X7CrS17	F17L (68)	—	—	—	—	—	—	—	—	—
4520-430-70-I	X2CrTi17	F17A	—	—	—	—	—	X	—	—	—
4664-430-75-J	X2CrCuTi18	F18A	—	—	—	—	—	—	—	—	—
4509-439-40-X	X2CrTiNb18	F18B	—	X	—	—	—	X	—	—	—
4510-430-35-I	X3CrTi17	F17F (70)	—	X	—	—	—	X	X	—	—
4511-430-71-I	X3CrNb17	F17G (73)	—	—	—	—	—	—	X	X	X
4742-430-77-I	X10CrAlSi18	F18N	—	X	—	—	—	—	—	—	—
4017-430-91-E	X6CrNi17-1	F18H	—	—	—	—	—	—	—	—	—
4113-434-00-I	X6CrMo17-1	F18I (69)	X6CrMo17 1E	—	—	—	—	—	—	X	X
4513-436-00-J	X2CrMoNbTi18-1	F19A	—	—	—	—	—	—	—	—	—
4609-436-77-J	X2CrMo19	F19B	—	—	—	—	—	—	—	—	—
4526-436-00-I	X6CrMoNb17-1	F18J (71)	—	—	—	—	—	—	—	—	—
4521-444-00-I	X2CrMoTi18-2	F20A (72)	—	—	—	—	—	X	—	—	—
4523-182-35-I	X2CrMoTiS18-2	F20B (74)	—	—	—	—	—	—	—	—	X
4621-445-00-E	X2CrNbCu21	F21A	—	—	—	—	—	—	—	—	—
4764-442-72-J	X8CrAl19-3	F19N	—	—	—	—	—	—	—	—	—
4128-445-92-J	X2CrMo23-1	F24A	—	—	—	—	—	—	—	—	—
4129-445-92-J	X2CrMo23-2	F25A	—	—	—	—	—	—	—	—	—
4762-445-72-I	X10CrAlSi25	F25N	—	X	—	—	—	—	—	—	—
4749-446-00-I	X15CrN26	F26R	—	X	—	—	—	—	—	—	X
4131-446-92-C	X1CrMo26-1	F27A	—	—	—	—	—	—	—	—	—
4750-446-60-U	X2CrMoNi27-4-2	F33A	—	—	—	—	—	—	—	—	—
4135-447-92-C	X1CrMo30-2	F32A	—	—	—	—	—	—	—	—	—

Table B.1 (*continued*)

ISO number	ISO name	Line (old)	Steel designations according to[a,b] ISO 4954:1993	ISO 4955:2005	ISO 6931-1:1994	ISO 6931-2:2005	ISO 9327-5:1999	ISO 9328-7:2004	ISO 16143-1:2004	ISO 16143-2:2004	ISO 16143-3:2005
d) Martensitic steels											
4006-410-00-I	X12Cr13	M13B (82)	X12Cr13E	—	—	—	—	—	X	X	X
4024-410-09-E	X15Cr13	M13F	—	—	—	—	—	—	—	—	—
4119-410-92-C	X13CrMo13	M13G	—	—	—	—	—	—	—	—	—
4642-416-72-J	X13CrPb13	M13A	—	—	—	—	—	—	—	—	—
4005-416-00-I	X12CrS13	M13C (83)	—	—	—	—	—	—	—	X	X
4021-420-00-I	X20Cr13	M13I (84)	—	—	—	X	—	—	X	X	X
4916-600-77-J	X18CrMnMoNbVN12	M12G	—	—	—	—	—	—	—	—	—
4929-422-00-I	X23CrMoWMnNiV12-1-1	M13J	—	—	—	—	—	—	—	—	—
4923-422-77-E	X30Cr13	M13H	—	—	—	—	—	—	—	—	—
4028-420-00-I	X30Cr13	M13M (85)	—	—	—	X	—	—	X	X	X
4029-420-20-I	X33CrS13	M13N	—	—	—	—	—	—	—	—	—
4643-420-72-J	X33CrPb13	M13O	—	—	—	—	—	—	—	—	—
4031-420-00-I	X39Cr13	M13P (86)	—	—	—	X	—	—		—	—
4419-420-97-E	X38CrMo14	M14P	—	—	—	—	—	—	—	—	—
4123-431-77-E	X40CrMoVN16-2	M18T	—	—	—	—	—	—	—	—	—
4034-420-00-I	X46Cr13	M13Q (87)	—	—	—	—	—	—	—	—	—
4035-420-74-E	X46CrS13	M13R	—	—	—	—	—	—	—	—	—
4038-420-00-I	X52Cr13	M13U (88)	—	—	—	—	—	—	—	—	—
4110-420-69-E	X55CrMo14	M14U	—	—	—	—	—	—	—	—	—
4039-420-09-I	X60Cr13	M13V (89)	—	—	—	—	—	—	—	—	—
4313-415-00-I	X3CrNiMo13-4	M17A (81)	—	—	—	—	—	X	—	X	—
4415-415-92-E	X2CrNiMoV13-5-2	M20A	—	—	—	—	—	—	—	—	—
4116-420-77-E	X50CrMoV15	M15U	—	—	—	—	—	—	—	—	—
4057-431-00-X	X17CrNi16-2	M18G (91)	X19CrNi16 2E	—	—	—	—	—	—	—	X
4058-429-99-J	X33Cr16	M16O	—	—	—	—	—	—	—	X	—
4418-431-77-E	X4CrNiMo16-5-1	M22A	—	—	—	—	—	X	—	—	—

Table B.1 (*continued*)

ISO number	ISO name	Line (old)	Steel designations according to[a,b] ISO 4954:1993	ISO 4955:2005	ISO 6931-1:1994	ISO 6931-2:2005	ISO 9327-5:1999	ISO 9328-7:2004	ISO 16143-1:2004	ISO 16143-2:2004	ISO 16143-3:2005
d) Martensitic steels											
4019-430-20-I	X14CrS17	M17F (90)	—	—	—	—	—	—	—	X	X
4122-434-09-I	X39CrMo17-1	M18R (92)	—	—	—	—	—	—	—	X	—
4040-440-02-X	X68Cr17	M17U	—	—	—	—	—	—	—	—	—
4041-440-03-X	X85Cr17	M17V	—	—	—	—	—	—	—	—	—
4023-440-04-I	X110Cr17	M17W	—	—	—	—	—	—	—	—	—
4025-440-74-X	X110CrS17	M17Z	—	—	—	—	—	—	—	—	—
4766-440-77-X	X80CrSiNi20-2	M20U	—	—	—	—	—	—	—	—	—
e) Precipitation-hardening steels											
4594-155-92-E	X5CrNiMoCuNb14-5	P19I	—	—	—	—	—	—	—	—	—
4542-174-00-I	X5CrNiCuNb16-4	P20I (101)	—	—	—	—	—	—	—	X	—
4568-177-00-I	X7CrNiAl17-7	P24L (102)	—	—	X7CrNiAl17-7	X	—	—	X	X	X
4530-455-77-E	X1CrNiMoAlTi12-9-2	P23A	—	—	—	—	—	—	—	—	—
4596-455-77-E	X1CrNiMoAlTi12-10-2	P24A	—	—	—	—	—	—	—	—	—
4532-157-00-I	X8CrNiMoAl15-7-2	P24M (103)	—	—	—	—	—	—	—	—	—
4534-138-00-X	X3CrNiMoAl13-8-3	P24H	—	—	—	—	—	—	—	—	—
4645-469-10-U	X2CrNiMoCuAlTi12-9-4-3	P25A	—	—	—	—	—	—	—	—	—
4457-350-00-X	X9CrNiMoN17-5-3	P25M	—	—	—	—	—	—	—	—	—
4980-662-86-X	X6NiCrTiMoVB25-15-2	P42J	—	—	—	—	—	—	—	—	—
4644-662-20-U	X4NiCrMoTiMnSiB26-14-3-2	P43J	—	—	—	—	—	—	—	—	—

NOTE The grades given in this table are comparable to those given in Table 1. However, it should be noted that their chemical compositions may 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 may 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 may 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 may 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 ($S \geqslant 0{,}15$ %), 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 ($\leqslant 0{,}030$ %), 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 may 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		Line	Density kg/dm^3
a) Austenitic steels			
4318-301-53-I	X2CrNiN18-7	A25A (04)	7,9
4319-301-00-I	X5CrNi17-7	A24H (05)	7,9
4310-301-00-I	X10CrNi18-8	A26L (11)	7,9
4325-302-00-E	X9CrNi18-9	A27N	7,9
4326-302-15-I	X12CrNiSi18-9-3	A27P (46)	—
4307-304-03-I	X2CrNi18-9	A27B (01)	7,9
4306-304-03-I	X2CrNi19-11	A30A (02)	7,9
4311-304-53-I	X2CrNiN18-9	A27A (03)	7,9
4301-304-00-I	X5CrNi18-10	A28E (06)	7,9
4315-304-51-I	X5CrNiN19-9	A28F (10)	7,9
4948-304-09-I	X7CrNi18-9	A27L (07)	7,9
4818-304-15-E	X6CrNiSiNCe19-10	A29J	7,8
4650-304-75-E	X2CrNiCu19-10	A29A	—
4649-304-76-J	X6CrNiCu19-9-1	A28I	—
4305-303-00-I	X10CrNiS18-9	A27M (14)	7,9
4625-303-23-X	X12CrNiSe18-9	A27O	7,9
4570-303-31-I	X6CrNiCuS18-9-2	A27I (44)	7,9
4667-303-76-J	X12CrNiCuS18-9-3	A27Q	7,9
4615-201-75-E	X3CrMnNiCu15-8-5-3	A28C	—
4541-321-00-I	X6CrNiTi18-10	A28G (16)	7,9
4940-321-09-I	X7CrNiTi18-10	A28O (17)	7,9
4941-321-09-I	X6CrNiTiB18-10	A28J (18)	7,9
4550-347-00-I	X6CrNiNb18-10	A28H (19)	7,9
4912-347-09-I	X7CrNiNb18-10	A28K (20)	7,9
4961-347-77-E	X8CrNiNb16-13	A29L	7,9
4567-304-30-I	X3CrNiCu18-9-4	A27F (15)	7,9
4567-304-76-I	X6CrNiCu17-8-2	A25J (45)	7,9
4567-304-98-X	X6CrNiCu18-9-2	A27J	7,9
4660-315-77-I	X6CrNiCuSiMo19-10-3-2	A30J	7,9
4867-316-77-J	X40CrNiWSi15-14-3-2	A29P	—
4303-305-00-I	X6CrNi18-12	A30I (08)	7,9

Table D.1 (*continued*)

Steel designation		Line	Density kg/dm^3
a) Austenitic steels			
4828-305-09-I	X15CrNiSi20-12	A32R	7,9
4835-308-15-U	X7CrNiSiNCe21-11	A32N	7,8
4884-305-00-X	X6CrNiSi18-13-4	A31H	—
4389-384-00-I	X3NiCr18-16	A34F (09)	—
4371-201-53-I	X2CrMnNiN17-7-5	A29B	7,8
4372-201-00-I	X12CrMnNiN17-7-5	A29O (13)	7,8
4597-204-76-I	X8CrMnCuN17-8-3	A25L (40)	7,8
4617-201-76-J	X6CrNiMnCu17-8-4-2	A29I	7,9
4618-201-76-E	X9CrMnNiCu17-8-5-2	A30L	7,7
4373-202-00-I	X12CrMnNiN18-9-5	A32O	7,8
4982-215-00-E	X10CrNiMoMnNbVB 15-10-1	A32P	8,0
4369-202-91-I	X11CrNiMnN19-8-6	A33L (43)	7,9
4890-202-09-X	X53CrMnNiN21-9-4	A34V	7,8
4648-315-77-I	X6CrNiSiCuMo19-13-3-3-1	A33I	—
4404-316-03-I	X2CrNiMo17-12-2	A31A (21)	8,0
4432-316-03-I	X2CrNiMo17-12-3	A32A (22)	8,0
4435-316-91-I	X2CrNiMo18-14-3	A35A (23)	8,0
4406-316-53-I	X2CrNiMoN17-11-2	A30B (25)	8,0
4665-316-76-J	X6CrNiMoCu18-12-2-2	A32I	—
4647-316-75-X	X2CrNiMoCu18-14-2-2	A34A	—
4578-316-76-E	X3CrNiCuMo17-11-3-2	A30F	8,0
4429-316-53-I	X2CrNiMoN17-12-3	A32B (26)	8,0
4401-316-00-I	X5CrNiMo17-12-2	A31I (30)	8,0
4436-316-00-I	X3CrNiMo17-12-3	A32F (31)	8,0
4449-316-76-E	X3CrNiMo18-12-3	A33F	8,0
4910-316-77-E	X3CrNiMoBN17-13-3	A33G	8,0
4494-316-76-J	X6CrNiMoS17-12-3	A32K	8,0
4495-316-51-J	X6CrNiMoN17-12-3	A32H	8,0
4571-316-35-I	X6CrNiMoTi17-12-2	A31F (32)	8,0
4580-316-40-I	X6CrNiMoNb17-12-2	A31G (33)	8,0
4879-317-77-J	X30CrNiMoPB20-11-2	A33R	—
4438-317-03-I	X2CrNiMo19-14-4	A37A (24)	8,0
4439-317-26-E	X2CrNiMoN17-13-5	A35B	8,0
4483-317-26-I	X2CrNiMoN18-15-5	A38A (28)	8,0
4434-317-53-I	X2CrNiMoN18-12-4	A34B (27)	8,0
4445-317-00-U	X6CrNiMo19-13-4	A36I	—
4476-317-92-X	X3CrNiMo18-16-5	A39F	—
4824-308-09-J	X20CrNiN22-11	A33Q	—

Table D.1 (*continued*)

Steel designation		Line	Density kg/dm³
a) Austenitic steels			
4950-309-08-E	X6CrNi23-13	A36J	7,9
4833-309-08-I	X18CrNi23-13	A36R	7,9
4496-309-51-J	X4CrNiMoN25-14-1	A40F	—
4335-310-02-I	X1CrNi25-21	A46A (12)	7,9
4951-310-08-I	X6CrNi25-20	A45L	7,9
4845-310-08-E	X8CrNi25-21	A46L	7,9
4845-310-09-X	X23CrNi25-21	A46O	7,9
4841-314-00-E	X15CrNiSi25-21	A46R	7,9
4466-310-50-E	X1CrNiMoN25-22-2	A49A (29)	8,0
4547-312-54-I	X1CrNiMoCuN20-18-7	A45A (34)	8,0
4659-312-66-I	X1CrNiMoCuNW24-22-6	A52B (41)	8,2
4652-326-54-I	X1CrNiMoCuN24-22-8	A54A (38)	8,0
4565-345-65-I	X2CrNiMnMoN25-18-6-5	A54B (42)	8,0
4971-314-79-I	X12CrNiCoMoWMnNNb21-20-20-3-3-2	A64R	8,3
4537-310-92-E	X1CrNiMoCuN25-25-5	A55A	8,1
4656-089-04-I	X1NiCrMoCu22-20-5-2	A47A	—
4539-089-04-I	X1NiCrMoCu25-20-5	A50A (35)	8,0
4529-089-26-I	X1NiCrMoCuN25-20-7	A52A (37)	8,1
4478-083-67-U	X2NiCrMoN25-21-7	A53A	—
4958-088-77-E	X5NiCrAlTi31-20	A51J	8,0
4563-080-28-I	X1NiCrMoCu31-27-4	A62A (36)	8,0
4876-088-00-I	X8NiCrAlTi32-21	A53L	8,0
4959-088-77-E	X8NiCrAlTi32-20	A52L	8,0
4959-088-10-U	X7NiCrAlTi33-21	A54L	8,0
4959-088-11-U	X8NiCrAlTi33-21	A54M	8,0
4864-083-77-X	X13NiCr35-16	A51O	—
4657-080-20-U	X4NiCrCuMo35-20-4-3	A58F	—
4854-353-15-E	X6NiCrSiNCe35-25	A60J	7,9
4479-089-36-U	X1NiCrMoMnN34-27-6-5	A72A	—
b) Austenitic-ferritic steels			
4062-322-02-U	X2CrNiN22-2	D24A	—
4162-321-01-E	X2CrMnNiN21-5-1	D27F	—
4362-323-04-I	X2CrNiN23-4	D27B (51)	7,8
4424-315-00-I	X2CrNiMoSiMnN19-5-3-2-2	D29A	7,8
4462-318-03-I	X2CrNiMoN22-5-3	D30A (52)	7,8
4481-312-60-J	X2CrNiMoN25-7-3	D35A	7,8
4507-325-20-I	X2CrNiMoCuN25-6-3	D34A (53)	7,8
4507-325-50-X	X3CrNiMoCuN26-6-3-2	D35F	7,8

Table D.1 (*continued*)

Steel designation		Line	Density kg/dm^3
b) Austenitic-ferritic steels			
4410-327-50-E	X2CrNiMoN25-7-4	D36A (54)	7,8
4501-327-60-I	X2CrNiMoCuWN25-7-4	D36B (56)	7,8
4460-312-00-I	X3CrNiMoN27-5-2	D34F (55)	7,8
4480-329-00-U	X6CrNiMo26-4-2	D32F	—
4477-329-06-E	X2CrNiMoN29-7-2	D38A	7,7
4658-327-07-U	X2CrNiMoCoN28-8-5-1	D42A	—
4485-332-07-U	X2CrNiMoN31-8-4	D43A	—
c) Ferritic steels			
4030-410-90-X	X2Cr12	F12A	7,7
4003-410-77-I	X2CrNi12	F12C (61)	7,7
4720-409-00-I	X2CrTi12	F12B (62)	7,7
4516-409-75-I	X6CrNiTi12	F13F (64)	7,7
4000-410-08-I	X6Cr13	F13G (65)	7,7
4002-405-00-I	X6CrAl13	F13H (66)	7,7
4724-405-77-I	X10CrAlSi13	F13L	7,7
4012-429-00-X	X10Cr15	F15L	—
4595-429-71-I	X1CrNb15	F15A	7,7
4589-429-70-E	X5CrNiMoTi15-2	F17H	7,7
4016-430-00-I	X6Cr17	F17I (67)	7,7
4004-430-20-I	X7CrS17	F17L (68)	7,7
4520-430-70-I	X2CrTi17	F17A	7,7
4664-430-75-J	X2CrCuTi18	F18A	—
4509-439-40-X	X2CrTiNb18	F18B	7,7
4510-430-35-I	X3CrTi17	F17F (70)	7,7
4511-430-71-I	X3CrNb17	F17G (73)	7,7
4742-430-77-I	X10CrAlSi18	F18N	7,7
4017-430-91-E	X6CrNi17-1	F18H	7,7
4113-434-00-I	X6CrMo17-1	F18I (69)	7,7
4513-436-00-J	X2CrMoNbTi18-1	F19A	7,7
4609-436-77-J	X2CrMo19	F19B	7,7
4526-436-00-I	X6CrMoNb17-1	F18J (71)	7,7
4521-444-00-I	X2CrMoTi18-2	F20A (72)	7,7
4523-182-35-I	X2CrMoTiS18-2	F20B (74)	7,7
4621-445-00-E	X2CrNbCu21	F21A	7,7
4764-442-72-J	X8CrAl19-3	F19N	—
4128-445-92-J	X2CrMo23-1	F24A	—
4129-445-92-J	X2CrMo23-2	F25A	—
4762-445-72-I	X10CrAlSi25	F25N	7,7
4749-446-00-I	X15CrN26	F26R	7,7
4131-446-92-C	X1CrMo26-1	F27A	—
4750-446-60-U	X2CrMoNi27-4-2	F33A	—
4135-447-92-C	X1CrMo30-2	F32A	—

Table D.1 (*continued*)

Steel designation		Line	Density kg/dm³
d) Martensitic steels			
4006-410-00-I	X12Cr13	M13B (82)	7,7
4024-410-09-E	X15Cr13	M13F	7,7
4119-410-92-C	X13CrMo13	M13G	—
4642-416-72-J	X13CrPb13	M13A	—
4005-416-00-I	X12CrS13	M13C (83)	7,7
4021-420-00-I	X20Cr13	M13I (84)	7,7
4916-600-77-J	X18CrMnMoNbVN12	M12G	—
4929-422-00-I	X23CrMoWMnNiV12-1-1	M13J	—
4923-422-77-E	X30Cr13	M13H	—
4028-420-00-I	X30Cr13	M13M (85)	7,7
4029-420-20-I	X33CrS13	M13N	7,7
4643-420-72-J	X33CrPb13	M13O	—
4031-420-00-I	X39Cr13	M13P (86)	7,7
4419-420-97-E	X38CrMo14	M14P	—
4123-431-77-E	X40CrMoVN16-2	M18T	—
4034-420-00-I	X46Cr13	M13Q (87)	7,7
4035-420-74-E	X46CrS13	M13R	7,7
4038-420-00-I	X52Cr13	M13U (88)	7,7
4110-420-69-E	X55CrMo14	M14U	7,7
4039-420-09-I	X60Cr13	M13V (89)	7,7
4313-415-00-I	X3CrNiMo13-4	M17A (81)	7,7
4415-415-92-E	X2CrNiMoV13-5-2	M20A	7,8
4116-420-77-E	X50CrMoV15	M15U	7,7
4057-431-00-X	X17CrNi16-2	M18G (91)	7,7
4058-429-99-J	X33Cr16	M16O	—
4418-431-77-E	X4CrNiMo16-5-1	M22A	7,7
4019-430-20-I	X14CrS17	M17F (90)	7,7
4122-434-09-I	X39CrMo17-1	M18R (92)	7,7
4040-440-02-X	X68Cr17	M17U	—
4041-440-03-X	X85Cr17	M17V	—
4023-440-04-I	X110Cr17	M17W	7,7
4025-440-74-X	X110CrS17	M17Z	7,7
4766-440-77-X	X80CrSiNi20-2	M20U	—

Table D.1 (*continued*)

Steel designation		Line	Density kg/dm^3
e) Precipitation-hardening steels			
4594-155-92-E	X5CrNiMoCuNb14-5	P19I	7,8
4542-174-00-I	X5CrNiCuNb16-4	P20I (101)	7,8
4568-177-00-I	X7CrNiAl17-7	P24L (102)	7,8
4530-455-77-E	X1CrNiMoAlTi12-9-2	P23A	—
4596-455-77-E	X1CrNiMoAlTi12-10-2	P24A	—
4532-157-00-I	X8CrNiMoAl15-7-2	P24M (103)	7,8
4534-138-00-X	X3CrNiMoAl13-8-3	P24H	—
4645-469-10-U	X2CrNiMoCu AlTi12-9-4-3	P25A	—
4457-350-00-X	X9CrNiMoN17-5-3	P25M	—
4980-662-86-X	X6NiCrTiMoVB25-15-2	P42J	—
4644-662-20-U	X4NiCrMoTiMnSiB26-14-3-2	P43J	—

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