



SLOVENSKI STANDARD
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Nerjavna jekla - 1. del: Seznam nerjavnih jekel

Stainless steels - Part 1: List of stainless steels

Nichtrostende Stähle - Teil 1: Verzeichnis der nichtrostenden Stähle

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Aciers inoxydables - Partie 1: Liste des aciers inoxydables

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EUROPEAN STANDARD
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EN 10088-1

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English version

Stainless steels - Part 1: List of stainless steels

Aciers inoxydables - Partie 1: Liste des aciers inoxydables

Nichtrostende Stähle - Teil 1: Verzeichnis der
nichtrostenden Stähle

This European Standard was approved by CEN on 14 April 2005.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Foreword

This European Standard (EN 10088-1:2005) has been prepared by Technical Committee ECISS/TC 23 "Steels for heat treatment, alloy steels and free-cutting steels - Qualities and dimensions", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2005, and conflicting national standards shall be withdrawn at the latest by December 2005.

This document supersedes EN 10088-1:1995.

EN 10088, under the general title "Stainless steels", consists of the following parts:

- Part 1: List of stainless steels (including a table of European Standards, in which these stainless steels are further specified, see Annex D),
- Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes,
- Part 3: Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes.

The European Organisation for Standardisation (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents applied to five steels grades

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EN 10088-1:2005 (E)

1 Scope

This European Standard lists the chemical composition of stainless steels, which are subdivided in accordance with their main properties into corrosion resisting steels, heat resisting steels and creep resisting steels and specified in the European Standards given in Table 1.

Table 1 — Overview of material standards for stainless steels

Stainless steels		
Corrosion resisting steels	Heat resisting steels	Creep resisting steels
EN 10028-7		EN 10028-7
EN 10088-2		
EN 10088-3		
	EN 10095	
EN 10151		
EN 10216-5		EN 10216-5
EN 10217-7		
EN 10222-5		EN 10222-5
EN 10250-4		
EN 10263-5		
EN 10264-4	EN 10264-4	
EN 10269		EN 10269
EN 10270-3		
EN 10272		
EN 10296-2		
EN 10297-2		
		EN 10302
EN 10312		

Reference data on some physical properties are given in Tables A.1 to A.8.

- NOTE 1 A matrix that shows which steels are included in which standard is given in Annex D.
- NOTE 2 Valve steels are specified in EN 10090.
- NOTE 3 Steel castings are specified in various European Standards (see Bibliography).
- NOTE 4 Tool steels are specified in EN ISO 4957.
- NOTE 5 Welding consumables are specified in various European Standards (see Bibliography).

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.

EN 10079:1992, *Definition of steel products*

EN 10020:2000, *Definition and classification of grades of steel*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions for the product forms given in EN 10079:1992 and the following apply.

3.1

stainless steels

stainless steels are steels with at least 10,5 % of chromium and maximum 1,2 % of carbon

[see EN 10020:2000, definition 3.2.2]

They are further subdivided in accordance with their main property into corrosion resisting steels, heat resisting steels and creep resisting steels

NOTE One steel in Table 6 and five in Table 8 contain less Chromium than the minimum defined for stainless steels, but are included in the heat-resisting and creep-resisting steels standards respectively, because they form a part of these two families of steels.

4 Chemical composition

The chemical composition of stainless steels is given

- in Table 2 for ferritic corrosion resisting steels;
- in Table 3 for martensitic and precipitation hardening corrosion-resisting steels;
- in Table 4 for austenitic corrosion resisting steels;
- in Table 5 for austenitic-ferritic corrosion resisting steels;
- in Table 6 for ferritic heat resisting steels;
- in Table 7 for austenitic and austenitic-ferritic heat resisting steels;
- in Table 8 for martensitic creep resisting steels;
- in Table 9 for austenitic creep resisting steels.

NOTE The chemical composition of nickel and cobalt alloys listed in EN 10095, EN 10269 and EN 10302 is given in Tables E.1 and E.2.

Table 2 — Chemical composition (cast analysis) ^a of ferritic corrosion resisting steels

Steel designation		% by mass											
Name	Number	C max.	Si max.	Mn max.	P max.	S	N max.	Cr	Mo	Nb	Ni	Ti	Others
X2CrNi12	1.4003	0,030	1,00	1,50	0,040	≤ 0,015 ^b	0,030	10,5 to 12,5	-	-	0,30 to 1,00	-	-
X2CrTi12	1.4512	0,030	1,00	1,00	0,040	≤ 0,015	-	10,5 to 12,5	-	-	-	[6 x (C+N)] to 0,65	-
X6CrNiTi12	1.4516	0,08	0,70	1,50	0,040	≤ 0,015	-	10,5 to 12,5	-	-	0,50 to 1,50	0,05 to 0,35	-
X6Cr13	1.4000	0,08	1,00	1,00	0,040	≤ 0,015 ^b	-	12,0 to 14,0	-	-	-	-	-
X6CrAl13	1.4002	0,08	1,00	1,00	0,040	≤ 0,015 ^b	-	12,0 to 14,0	-	-	-	-	Al : 0,10 to 0,30
X2CrTi17	1.4520	0,025	0,50	0,50	0,040	≤ 0,015	0,015	16,0 to 18,0	-	-	-	0,30 to 0,60	-
X6Cr17	1.4016	0,08	1,00	1,00	0,040	≤ 0,015 ^b	-	16,0 to 18,0	-	-	-	-	-
X3CrTi17	1.4510	0,05	1,00	1,00	0,040	≤ 0,015 ^b	-	16,0 to 18,0	-	-	-	[4 x (C+N) + 0,15] to 0,80 ^c	-
X1CrNb15	1.4595	0,020	1,00	1,00	0,025	≤ 0,015	0,020	14,0 to 16,0	-	0,20 to 0,60	-	-	-
X3CrNb17	1.4511	0,05	1,00	1,00	0,040	≤ 0,015 ^b	-	16,0 to 18,0	-	12 x C to 1,00	-	-	-
X6CrMo17-1	1.4113	0,08	1,00	1,00	0,040	≤ 0,015 ^b	-	16,0 to 18,0	0,90 to 1,40	-	-	-	-
X6CrMoS17	1.4105	0,08	1,50	1,50	0,040	0,15 to 0,35	-	16,0 to 18,0	0,20 to 0,60	-	-	-	-
X2CrMoTi17-1	1.4513	0,025	1,00	1,00	0,040	≤ 0,015	0,020	16,0 to 18,0	0,80 to 1,40	-	-	0,30 to 0,60	-
X2CrMoTi18-2	1.4521	0,025	1,00	1,00	0,040	≤ 0,015	0,030	17,0 to 20,0	1,80 to 2,50	-	-	[4 x (C+N) + 0,15] to 0,80 ^c	-
X2CrMoTiS18-2	1.4523	0,030	1,00	0,50	0,040	0,15 to 0,35	-	17,5 to 19,0	2,00 to 2,50	-	-	0,30 to 0,80	(C+N) ≤ 0,040
X6CrNi17-1	1.4017	0,08	1,00	1,00	0,040	≤ 0,015	-	16,0 to 18,0	-	-	1,20 to 1,60	-	-
X5CrNiMoTi15-2	1.4589	0,08	1,00	1,00	0,040	≤ 0,015	-	13,5 to 15,5	0,20 to 1,20	-	1,00 to 2,50	0,30 to 0,50	-
X6CrMoNb17-1	1.4526	0,08	1,00	1,00	0,040	≤ 0,015	0,040	16,0 to 18,0	0,80 to 1,40	[7x(C+N)+0,10] to 1,00	-	-	-
X2CrNbZr17	1.4590	0,030	1,00	1,00	0,040	≤ 0,015	-	16,0 to 17,5	-	0,35 to 0,55	-	-	Zr ≥ 7x(C+N)+0,15
X2CrTiNb18	1.4509	0,030	1,00	1,00	0,040	≤ 0,015	-	17,5 to 18,5	-	[3 x C + 0,30] to 1,00	-	0,10 to 0,60	-
X2CrMoTi29-4	1.4592	0,025	1,00	1,00	0,030	≤ 0,010	0,045	28,0 to 30,0	3,50 to 4,50	-	-	[4 x (C+N) + 0,15] to 0,80 ^c	-

^a Elements not listed in this table shall not be intentionally added to the steel without the agreement of the purchaser except for finishing the cast. All appropriate precautions are to be taken to avoid the addition of such elements from scrap and other materials used in production which would impair mechanical properties and the suitability of the steel.

^b For bars, rods, wire, sections, bright products and the relevant semi-finished products, a maximum content of 0,030 % S applies. Particular ranges of sulphur content may provide improvement of particular properties. For machinability a controlled sulphur content of 0,015 % to 0,030 % is recommended and permitted. For weldability, a controlled sulphur content of 0,008 % to 0,030 % is recommended and permitted. For polishability, a controlled sulphur content of 0,015 % max. is recommended.

^c The stabilisation may be made by use of titanium or niobium or zirconium. According to the atomic mass of these elements and the content of carbon and nitrogen, the equivalence shall be the following:
 Nb (% by mass) \equiv Zr (% by mass) \equiv $7/4 Ti$ (% by mass).

Table 3 — Chemical composition (cast analysis)^a of martensitic and precipitation hardening corrosion resisting steels

Steel designation		% by mass										
Name	Number	C ^c	Si max.	Mn	P max.	S	Cr	Cu	Mo	Nb	Ni	Others
X12Cr13	1.4006	0,08 to 0,15	1,00	≤ 1,50	0,040	≤ 0,015 ^b	11,5 to 13,5	-	-	-	≤ 0,75	-
X12CrS13	1.4005	0,08 to 0,15	1,00	≤ 1,50	0,040	0,15 to 0,35	12,0 to 14,0	-	≤ 0,60	-	-	-
X15Cr13	1.4024	0,12 to 0,17	1,00	≤ 1,00	0,040	≤ 0,015 ^b	12,0 to 14,0	-	-	-	-	-
X20Cr13	1.4021	0,16 to 0,25	1,00	≤ 1,50	0,040	≤ 0,015 ^b	12,0 to 14,0	-	-	-	-	-
X30Cr13	1.4028	0,26 to 0,35	1,00	≤ 1,50	0,040	≤ 0,015 ^b	12,0 to 14,0	-	-	-	-	-
X29CrS13	1.4029	0,25 to 0,32	1,00	≤ 1,50	0,040	0,15 to 0,25	12,0 to 13,5	-	≤ 0,60	-	-	-
X39Cr13	1.4031	0,36 to 0,42	1,00	≤ 1,00	0,040	≤ 0,015 ^b	12,5 to 14,5	-	-	-	-	-
X46Cr13	1.4034	0,43 to 0,50	1,00	≤ 1,00	0,040	≤ 0,015 ^b	12,5 to 14,5	-	-	-	-	-
X46CrS13	1.4035	0,43 to 0,50	1,00	≤ 2,00	0,040	0,15 to 0,35	12,5 to 14,0	-	-	-	-	-
X38CrMo14	1.4419	0,36 to 0,42	1,00	≤ 1,00	0,040	≤ 0,015	13,0 to 14,5	-	0,60 to 1,00	-	-	-
X55CrMo14	1.4110	0,48 to 0,60	1,00	≤ 1,00	0,040	≤ 0,015 ^b	13,0 to 15,0	-	0,50 to 0,80	-	-	V: ≤ 0,15
X50CrMoV15	1.4116	0,45 to 0,55	1,00	≤ 1,00	0,040	≤ 0,015 ^b	14,0 to 15,0	-	0,50 to 0,80	-	-	V: 0,10 to 0,20
X70CrMo15	1.4109	0,60 to 0,75	0,70	≤ 1,00	0,040	≤ 0,015 ^b	14,0 to 16,0	-	0,40 to 0,80	-	-	-
X40CrMoVN16-2	1.4123	0,35 to 0,50	1,00	≤ 1,00	0,040	≤ 0,015	14,0 to 16,0	-	1,00 to 2,50	-	≤ 0,50	V ≤ 1,50 N: 0,10 to 0,30
X14CrMoS17	1.4104	0,10 to 0,17	1,00	≤ 1,50	0,040	0,15 to 0,35	15,5 to 17,5	-	0,20 to 0,60	-	-	-
X39CrMo17-1	1.4122	0,33 to 0,45	1,00	≤ 1,50	0,040	≤ 0,015 ^b	15,5 to 17,5	-	0,80 to 1,30	-	≤ 1,00	-
X105CrMo17	1.4125	0,95 to 1,20	1,00	≤ 1,00	0,040	≤ 0,015 ^b	16,0 to 18,0	-	0,40 to 0,80	-	-	-
X90CrMoV18	1.4112	0,85 to 0,95	1,00	≤ 1,00	0,040	≤ 0,015 ^b	17,0 to 19,0	-	0,90 to 1,30	-	-	V: 0,07 to 0,12
X17CrNi16-2	1.4057	0,12 to 0,22	1,00	≤ 1,50	0,040	≤ 0,015 ^b	15,0 to 17,0	-	-	-	1,50 to 2,50	-
X1CrNiMoCu12-5-2	1.4422	≤ 0,020	0,50	≤ 2,00	0,040	≤ 0,003	11,0 to 13,0	0,20 to 0,80	1,30 to 1,80	-	4,0 to 5,0	N: ≤ 0,020
X1CrNiMoCu12-7-3	1.4423	≤ 0,020	0,50	≤ 2,00	0,040	≤ 0,003	11,0 to 13,0	0,20 to 0,80	2,30 to 2,80	-	6,0 to 7,0	N: ≤ 0,020
X2CrNiMoV13-5-2	1.4415	≤ 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
X3CrNiMo13-4	1.4313	≤ 0,05	0,70	≤ 1,50	0,040	≤ 0,015	12,0 to 14,0	-	0,30 to 0,70	-	3,5 to 4,5	N: ≥ 0,020
X4CrNiMo16-5-1	1.4418	≤ 0,06	0,70	≤ 1,50	0,040	≤ 0,015 ^b	15,0 to 17,0	-	0,80 to 1,50	-	4,0 to 6,0	N: ≥ 0,020
X1CrNiMoAlTi12-9-2	1.4530	≤ 0,015	0,10	≤ 0,10	0,010	≤ 0,005	11,5 to 12,5	-	1,85 to 2,15	-	8,5 to 9,5	Al: 0,60 to 0,80 Ti: 0,28 to 0,37 N: ≤ 0,010
X1CrNiMoAlTi12-10-2	1.4596	≤ 0,015	0,10	≤ 0,10	0,010	≤ 0,005	11,5 to 12,5	-	1,85 to 2,15	-	9,2 to 10,2	Al: 0,80 to 1,10 Ti: 0,28 to 0,40 N: ≤ 0,020
X5CrNiCuNb16-4	1.4542	≤ 0,07	0,70	≤ 1,50	0,040	≤ 0,015 ^b	15,0 to 17,0	3,0 to 5,0	≤ 0,60	5xC to 0,45	3,0 to 5,0	-

Table 3 (concluded)

Steel designation		% by mass										
Name	Number	C ^c	Si max.	Mn	P max.	S	Cr	Cu	Mo	Nb	Ni	Others
X7CrNiAl17-7	1.4568	≤ 0,09	0,70	≤ 1,00	0,040	≤ 0,015	16,0 to 18,0	-	-	-	6,5 to 7,8 ^d	Al: 0,70 to 1,50
X5CrNiMoCuNb14-5	1.4594	≤ 0,07	0,70	≤ 1,00	0,040	≤ 0,015	13,0 to 15,0	1,20 to 2,00	1,20 to 2,00	0,15 to 0,60	5,0 to 6,0	-
X5NiCrTiMoVB25-15-2	1.4606	≤ 0,08	1,00	1,00 to 2,00	0,025	≤ 0,015	13,0 to 16,0	-	1,00 to 1,50	-	24,0 to 27,0	B: 0,001 0 to 0,010 Al: ≤ 0,35 Ti: 1,90 to 2,30 V: 0,10 to 0,50

^a Elements not quoted in this table shall not be intentionally added to the steel without the agreement of the purchaser except for finishing the cast. All appropriate precautions are to be taken to avoid the addition of such elements from scrap and other materials used in production which would impair mechanical properties and the suitability of the steel.

^b For bars, rods, wire, sections, bright products and the relevant semi-finished products, a maximum content of 0,030 % S applies. Particular ranges of sulphur content may provide improvement of particular properties. For machinability a controlled sulphur content of 0,015 % to 0,030 % is recommended and permitted. For weldability, a controlled sulphur content of 0,008 % to 0,030 % is recommended and permitted. For polishability, a controlled sulphur content of 0,015 % max. is recommended.

^c Tighter carbon ranges may be agreed at the time of enquiry and order.

^d For better cold deformability, the upper limit may be increased to 8,3 %.

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Table 4 — Chemical composition (cast analysis)^a of austenitic corrosion resisting steels

Steel designation		% by mass											
Name	Number	C	Si	Mn	P max.	S	N	Cr	Cu ^c	Mo	Nb	Ni	Others
X5CrNi17-7	1.4319	≤ 0,07	≤ 1,00	≤ 2,00	0,045	≤ 0,030	≤ 0,11	16,0 to 18,0	-	-	-	6,0 to 8,0	-
X10CrNi18-8	1.4310	0,05 to 0,15	≤ 2,00	≤ 2,00	0,045	≤ 0,015	≤ 0,11	16,0 to 19,0	-	≤ 0,80	-	6,0 to 9,5	-
X9CrNi18-9	1.4325	0,03 to 0,15	≤ 1,00	≤ 2,00	0,045	≤ 0,030	≤ 0,11	17,0 to 19,0	-	-	-	8,0 to 10,0	-
X2CrNi18-7	1.4318	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015	0,10 to 0,20	16,5 to 18,5	-	-	-	6,0 to 8,0	-
X2CrNi18-9	1.4307	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	17,5 to 19,5	-	-	-	8,0 to 10,5	-
X2CrNi19-11	1.4306	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	18,0 to 20,0	-	-	-	10,0 to 12,0 ^d	-
X5CrNi19-9	1.4315	≤ 0,06	≤ 1,00	≤ 2,00	0,045	≤ 0,015	0,12 to 0,22	18,0 to 20,0	-	-	-	8,0 to 11,0	-
X2CrNi18-10	1.4311	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	0,12 to 0,22	17,5 to 19,5	-	-	-	8,5 to 11,5	-
X5CrNi18-10	1.4301	≤ 0,07	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	17,5 to 19,5	-	-	-	8,0 to 10,5	-
X8CrNiS18-9 ^e	1.4305 ^e	≤ 0,10	≤ 1,00	≤ 2,00	0,045	0,15 to 0,35	≤ 0,11	17,0 to 19,0	≤ 1,00	-	-	8,0 to 10,0	-
X6CrNiTi18-10	1.4541	≤ 0,08	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	-	17,0 to 19,0	-	-	-	9,0 to 12,0 ^d	Ti:5xC to 0,70
X6CrNiNb18-10	1.4550	≤ 0,08	≤ 1,00	≤ 2,00	0,045	≤ 0,015	-	17,0 to 19,0	-	-	10xC to 1,00	9,0 to 12,0 ^d	-
X4CrNi18-12	1.4303	≤ 0,06	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	17,0 to 19,0	-	-	-	11,0 to 13,0	-
X1CrNi25-21	1.4335	≤ 0,020	≤ 0,25	≤ 2,00	0,025	≤ 0,010	≤ 0,11	24,0 to 26,0	-	≤ 0,20	-	20,0 to 22,0	-
X2CrNiMo17-12-2	1.4404	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	16,5 to 18,5	-	2,00 to 2,50	-	10,0 to 13,0 ^d	-
X2CrNiMo17-11-2	1.4406	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	0,12 to 0,22	16,5 to 18,5	-	2,00 to 2,50	-	10,0 to 12,5 ^d	-
X5CrNiMo17-12-2	1.4401	≤ 0,07	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	16,5 to 18,5	-	2,00 to 2,50	-	10,0 to 13,0	-
X1CrNiMoN25-22-2	1.4466	≤ 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	-
X6CrNiMoTi17-12-2	1.4571	≤ 0,08	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	-	16,5 to 18,5	-	2,00 to 2,50	-	10,5 to 13,5 ^d	Ti:5xC to 0,70
X6CrNiMoNb17-12-2	1.4580	≤ 0,08	≤ 1,00	≤ 2,00	0,045	≤ 0,015	-	16,5 to 18,5	-	2,00 to 2,50	10xC to 1,00	10,5 to 13,5	-
X2CrNiMo17-12-3	1.4432	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	16,5 to 18,5	-	2,50 to 3,00	-	10,5 to 13,0	-
X2CrNiMo17-13-3	1.4429	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015	0,12 to 0,22	16,5 to 18,5	-	2,50 to 3,00	-	11,0 to 14,0 ^d	-
X3CrNiMo17-13-3	1.4436	≤ 0,05	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	16,5 to 18,5	-	2,50 to 3,00	-	10,5 to 13,0 ^d	-
X3CrNiMo18-12-3	1.4449	≤ 0,035	≤ 1,00	≤ 2,00	0,045	≤ 0,015	≤ 0,08	17,0 to 18,2	≤ 1,00	2,25 to 2,75	-	11,5 to 12,5	-
X2CrNiMo18-14-3	1.4435	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	17,0 to 19,0	-	2,50 to 3,00	-	12,5 to 15,0	-
X2CrNiMo18-12-4	1.4434	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015	0,10 to 0,20	16,5 to 19,5	-	3,0 to 4,0	-	10,5 to 14,0 ^d	-
X2CrNiMo18-15-4	1.4438	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	17,5 to 19,5	-	3,0 to 4,0	-	13,0 to 16,0 ^d	-
X2CrNiMo17-13-5	1.4439	≤ 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	-
X1CrNiMoCuN24-22-8 ¹⁾	1.4652 ¹⁾	≤ 0,020	≤ 0,50	2,00 to 4,0	0,030	≤ 0,005	0,45 to 0,55	23,0 to 25,0	0,30 to 0,60	7,0 to 8,0	-	21,0 to 23,0	-
X1CrNiSi18-15-4	1.4361	≤ 0,015	3,7 to 4,5	≤ 2,00	0,025	≤ 0,010	≤ 0,11	16,5 to 18,5	-	≤ 0,20	-	14,0 to 16,0	-
X11CrNiMn19-8-6	1.4369	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	-
X12CrMnNi17-7-5	1.4372	≤ 0,15	≤ 1,00	5,5 to 7,5	0,045	≤ 0,015	0,05 to 0,25	16,0 to 18,0	-	-	-	3,5 to 5,5	-
X2CrMnNi17-7-5	1.4371	≤ 0,030	≤ 1,00	6,0 to 8,0	0,045	≤ 0,015	0,15 to 0,20	16,0 to 17,0	-	-	-	3,5 to 5,5	-
X12CrMnNi18-9-5	1.4373	≤ 0,15	≤ 1,00	7,5 to 10,5	0,045	≤ 0,015	0,05 to 0,25	17,0 to 19,0	-	-	-	4,0 to 6,0	-
X8CrMnNi18-9-5	1.4374	0,05 to 0,10	0,30 to 0,60	9,0 to 10,0	0,035	≤ 0,030	0,25 to 0,32	17,5 to 18,5	≤ 0,40	≤ 0,50	-	5,0 to 6,0	-
X8CrMnCuNB17-8-3	1.4597	≤ 0,10	≤ 2,00	6,5 to 8,5	0,040	≤ 0,030	0,15 to 0,30	16,0 to 18,0	2,00 to 3,5	≤ 1,00	-	≤ 2,00	B: 0,000 5 to 0,005 0
X3CrNiCu19-9-2	1.4560	≤ 0,035	≤ 1,00	1,50 to 2,00	0,045	≤ 0,015	≤ 0,11	18,0 to 19,0	1,50 to 2,00	-	-	8,0 to 9,0	-
X2CrNiCu19-10	1.4650	≤ 0,030	≤ 1,00	≤ 2,00	0,045	≤ 0,015	≤ 0,08	18,5 to 20,0	≤ 1,00	-	-	9,0 to 10,0	-
X6CrNiCuS18-9-2 ^e	1.4570 ^e	≤ 0,08	≤ 1,00	≤ 2,00	0,045	0,15 to 0,35	≤ 0,11	17,0 to 19,0	1,40 to 1,80	≤ 0,60	-	8,0 to 10,0	-

Table 4 (concluded)

Steel designation		% by mass											
Name	Number	C	Si	Mn	P max.	S	N	Cr	Cu ^c	Mo	Nb	Ni	Others
X3CrNiCu18-9-4	1.4567	≤ 0,04	≤ 1,00	≤ 2,00	0,045	≤ 0,015 ^b	≤ 0,11	17,0 to 19,0	3,0 to 4,0	-	-	8,5 to 10,5	-
X3CrNiCuMo17-11-3-2	1.4578	≤ 0,04	≤ 1,00	≤ 2,00	0,045	≤ 0,015	≤ 0,11	16,5 to 17,5	3,0 to 3,5	2,00 to 2,50	-	10,0 to 11,0	-
X1NiCrMoCu31-27-4	1.4563	≤ 0,020	≤ 0,70	≤ 2,00	0,030	≤ 0,010	≤ 0,11	26,0 to 28,0	0,70 to 1,50	3,0 to 4,0	-	30,0 to 32,0	-
X1NiCrMoCu25-20-5	1.4539	≤ 0,020	≤ 0,70	≤ 2,00	0,030	≤ 0,010	≤ 0,15	19,0 to 21,0	1,20 to 2,00	4,0 to 5,0	-	24,0 to 26,0	-
X1CrNiMoCuN25-25-5	1.4537	≤ 0,020	≤ 0,70	≤ 2,00	0,030	≤ 0,010	0,17 to 0,25	24,0 to 26,0	1,00 to 2,00	4,7 to 5,7	-	24,0 to 27,0	-
X1CrNiMoCuN20-18-7	1.4547	≤ 0,020	≤ 0,70	≤ 1,00	0,030	≤ 0,010	0,18 to 0,25	19,5 to 20,5	0,50 to 1,00	6,0 to 7,0	-	17,5 to 18,5	-
X2CrNiMoCuS17-10-2 ^e	1.4598 ^e	≤ 0,03	≤ 1,00	≤ 2,00	0,045	0,10 to 0,25	≤ 0,11	16,5 to 18,5	1,30 to 1,80	2,00 to 2,50	-	10,0 to 13,0	-
X1CrNiMoCuNW24-22-6	1.4659	≤ 0,020	≤ 0,70	2,00 to 4,0	0,030	≤ 0,010	0,35 to 0,50	23,0 to 25,0	1,00 to 2,00	5,5 to 6,5	-	21,0 to 23,0	W:1,50 to 2,50
X1NiCrMoCuN25-20-7	1.4529	≤ 0,020	≤ 0,50	≤ 1,00	0,030	≤ 0,010	0,15 to 0,25	19,0 to 21,0	0,50 to 1,50	6,0 to 7,0	-	24,0 to 26,0	-
X2NiCrAlTi32-20	1.4558	≤ 0,030	≤ 0,70	≤ 1,00	0,020	≤ 0,015	-	20,0 to 23,0	-	-	-	32,0 to 35,0	Al:0,15 to 0,45 Ti:[8x(C+N)] to 0,60
X2CrNiMnMoN25-18-6-5	1.4565	≤ 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	≤ 0,15	16,0 to 19,0	-

^a Elements not quoted in this table shall not be intentionally added to the steel without the agreement of the purchaser except for finishing the cast. All appropriate precautions are to be taken to avoid the addition of such elements from scrap and other materials used in production which would impair mechanical properties and the suitability of the steel.

^b For bars, rods, wire, sections, bright products and the relevant semi-finished products, a maximum content of 0,030 % S applies. Particular ranges of sulphur content may provide improvement of particular properties. For machinability a controlled sulphur content of 0,015 % to 0,030 % is recommended and permitted. For weldability, a controlled sulphur content of 0,008 % to 0,030 % is recommended and permitted. For polishability, a controlled sulphur content of 0,015 % max. is recommended.

^c For austenitic steel grades intended for cold heading and cold extruding, a Cu-content of max. 1,0 % is permitted.

^d Where for special reasons, e. g. hot workability for the fabrication of seamless tubes where it is necessary to minimize the deltaferrite content, or with the aim of low magnetic permeability, the maximum Ni content may be increased by the following amounts:
 0,50 % (m/m): 1.4571.
 1,00 % (m/m): 1.4306, 1.4406, 1.4429, 1.4434, 1.4436, 1.4438, 1.4541, 1.4550.
 1,50 % (m/m): 1.4404

^e Parts made of high sulphur free cutting austenitic steels may not comply with European Directive 94/27 regarding articles in contact with human skin.

^f) Patented steel grade.

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Table 5 — Chemical composition (cast analysis) ^a of austenitic-ferritic corrosion resisting steels

Steel designation		% by mass										
Name	Number	C max.	Si	Mn	P max.	S max.	N	Cr	Cu	Mo	Ni	W
X2CrNiN23-4 ¹⁾	1.4362 ¹⁾	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	0,10 to 0,60	3,5 to 5,5	-
X2CrNiCuN23-4	1.4655	0,030	≤ 1,00	≤ 2,00	0,035	0,015	0,05 to 0,20	22,0 to 24,0	1,00 to 3,00	0,10 to 0,60	3,5 to 5,5	-
X3CrNiMoN27-5-2	1.4460	0,05	≤ 1,00	≤ 2,00	0,035	0,015 ^b	0,05 to 0,20	25,0 to 28,0	-	1,30 to 2,00	4,5 to 6,5	-
X2CrNiMoN29-7-2 ¹⁾	1.4477 ¹⁾	0,030	≤ 0,50	0,80 to 1,50	0,030	0,015	0,30 to 0,40	28,0 to 30,0	≤ 0,80	1,50 to 2,60	5,8 to 7,5	-
X2CrNiMoN22-5-3 ^c	1.4462 ^c	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	-
X2CrNiMoCuN25-6-3	1.4507	0,030	≤ 0,70	≤ 2,00	0,035	0,015	0,20 to 0,30	24,0 to 26,0	1,00 to 2,50	3,0 to 4,0	6,0 to 8,0	-
X2CrNiMoN25-7-4 ¹⁾	1.4410 ¹⁾	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	-
X2CrNiMoCuWN25-7-4	1.4501	0,030	≤ 1,00	≤ 1,00	0,035	0,015	0,20 to 0,30	24,0 to 26,0	0,50 to 1,00	3,0 to 4,0	6,0 to 8,0	0,50 to 1,00
X2CrNiMoSi18-5-3	1.4424	0,030	1,40 to 2,00	1,20 to 2,00	0,035	0,015	0,05 to 0,10	18,0 to 19,0	-	2,50 to 3,0	4,5 to 5,2	-

^a Elements not listed in this table shall not be intentionally added to the steel without the agreement of the purchaser except for finishing the cast. All appropriate precautions are to be taken to avoid the addition of such elements from scrap and other materials used in production which would impair mechanical properties and the suitability of the steel.

^b For bars, rods, wire, sections, bright products and the relevant semi-finished products, a maximum content of 0,030 % S applies. Particular ranges of sulphur content may provide improvement of particular properties. For machinability a controlled sulphur content of 0,015 % to 0,030 % is recommended and permitted. For weldability, a controlled sulphur content of 0,008 % to 0,030 % is recommended and permitted. For polishability, a controlled sulphur content of 0,015 % max. is recommended.

^c By agreement, this grade can be delivered with a Pitting Resistance Equivalent Number (PRE = Cr + 3,3 Mo + 16 N, compare Table C.1) greater than 34.

¹⁾ Patented steel grade.