

**Металлопрокат и трубы  
по стандартам**

**DIN, EN, ASTM**



**Поставляем металлопрокат  
по стандарту EN 10088-1**

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BS EN 10088-1:2014



BSI Standards Publication

# Stainless steels

Part 1: List of stainless steels

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**National foreword**

This British Standard is the UK implementation of EN 10088-1:2014. It supersedes BS EN 10088-1:2005 which is withdrawn.

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

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

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

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Date	Text affected
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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 9 August 2014.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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## Foreword

This document (EN 10088-1:2014) has been prepared by Technical Committee ECISS/TC 105 "Steels for heat treatment, alloy steels, free-cutting and stainless steels", 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of an identical text or by endorsement, at the latest by April 2015 and conflicting national standards shall be withdrawn at the latest by April 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 10088-1:2005.

This document mainly differs from the 2005 edition as follows:

- a) addition of austenitic grades 1.4615 (also part 3), 1.4618 (2), 1.4376 (2), 1.4640 (2), 1.4646 (2, 3), 1.4020 (3), 1.4378 (3), addition of austenitic-ferritic (duplex) grades 1.4162 (2, 3), 1.4662 (2, 3), 1.4658 (3), 1.4482 (2, 3), 1.4062 (2, 3), 1.4669 (3), addition of ferritic grades 1.4621 (2), 1.4600 (2), 1.4607 (2), 1.4611 (2, 3), 1.4613 (2, 3), 1.4630 (2), 1.4634 (2), addition of martensitic grade 1.4150 (3), addition of precipitation hardening grade 1.4612 (3);
- b) chemical composition was changed for following grades: austenitic grade 1.4371, 1.4597, austenitic-ferritic grade 1.4362.

Each of the tables for the chemical composition of steel grades now has a sub-section with grades designated as 'uncommon' (i.e. not produced in the past 10 years and which may be removed during the next revision).

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 B) [the present document];
- *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*;
- *Part 4: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for construction purposes*;
- *Part 5: Technical delivery conditions for bars, rods, wire, sections and bright products of corrosion resisting steels for construction purposes*.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

The European Organization for Standardization (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents applied to ten steel grades.

CEN takes no position concerning the evidence, validity and scope of these patent rights.

The holder of these patent rights has ensured CEN that they are willing to negotiate licences, under reasonable and non-discriminatory terms and conditions, with applicants throughout the world. In this respect, the statements of the holders of these patent rights are registered with CEN. Information may be obtained from:

Grade 1.4658  
Sandvik AB  
SE-81181 Sandviken, Sweden

Grade 1.4162, 14662  
Outokumpu Stainless AB  
SE-77480 Avesta, Sweden

Grade 1.4062, 1.4615, 1.4669  
Ugitech  
F-73403 Ugine Cedex, France

Grade 1.4062, 1.4669  
Industeel  
F-71200 Creusot, 56 Rue Clemenceau, France

Grade 1.4646, 1.4611, 1.4613  
Acciai Speciali Terni  
I-05100 Terni, Italy

## 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 10088-4		
EN 10088-5		
	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 E.1 to E.8.

NOTE 1 A matrix that shows which steels are included in which standard is given in Annex B.

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

EN 10079:2007, *Definition of steel products*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions for the product forms given in EN 10079:2007 and the following apply.

### 3.1

#### **stainless steels**

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

[SOURCE: EN 10020:2000, 3.2.2]

Note 1 to entry: Stainless steels are further subdivided in accordance with their main property into corrosion resisting steels, heat resisting steels and creep resisting steels.

Note 2 to entry: One type of steel in Table 7 and five types of steel in Table 9 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 austenitic corrosion resisting steels;
- in Table 3 for austenitic-ferritic corrosion resisting steels;
- in Table 4 for ferritic corrosion resisting steels;
- in Table 5 for martensitic and precipitation hardening corrosion resisting steels;
- in Table 6 for austenitic and austenitic-ferritic heat resisting steels;
- in Table 7 for ferritic heat resisting steels;
- in Table 8 for austenitic creep resisting steels;
- in Table 9 for martensitic creep resisting steels.

NOTE 1 The steel grades marked in Tables 2 to 9 as uncommon grades will be rechecked during the next revision and it will be decided whether to delete these steel grades or not.

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

Table 2 — Chemical composition (cast analysis) of austenitic corrosion resisting steels

Steel designation Name	Number	% by mass <sup>a</sup>											Cu <sup>e</sup>	Others	
		C	Si	Mn	P	S	Cr	Mo	Ni	N					
Austenitic steels															
X2CrNiN18-7	1.4318	0,030	1,00	2,00	0,045	0,015	16,5 to 18,5	-	6,0 to 8,0	0,10 to 0,20	-	-	-	-	
X10CrNi18-8	1.4310	0,05 to 0,15	2,00	2,00	0,045	0,015	16,0 to 19,0	0,80	6,0 to 9,5	0,10	-	-	-	-	
X2CrNi18-9	1.4307	0,030	1,00	2,00	0,045	0,015 <sup>b</sup>	17,5 to 19,5	-	8,0 to 10,5	0,10	-	-	-	-	
X9CrNi18-9	1.4325	0,03 to 0,15	1,00	2,00	0,045	0,030	17,0 to 19,0	-	8,0 to 10,0	-	-	-	-	-	
X8CrNiS18-9 <sup>e</sup>	1.4305 <sup>e</sup>	0,10	1,00	2,00	0,045	0,15 to 0,35	17,0 to 19,0	-	8,0 to 10,0	0,10	1,00	-	-	-	
X6CrNiCuS18-9-2 <sup>e</sup>	1.4570 <sup>e</sup>	0,08	1,00	2,00	0,045	0,15 to 0,35	17,0 to 19,0	0,60	8,0 to 10,0	0,10	1,40 to 1,80	-	-	-	
X3CrNiCu18-9-4	1.4567	0,04	1,00	2,00	0,045	0,015 <sup>b</sup>	17,0 to 19,0	-	8,5 to 10,5	0,10	3,0 to 4,0	-	-	-	
X5CrNiN19-9	1.4315	0,06	1,00	2,00	0,045	0,015	18,0 to 20,0	-	8,0 to 11,0	0,12 to 0,22	-	-	-	-	
X3CrNiCu19-9-2	1.4560	0,035	1,00	1,50 to 2,00	0,045	0,015	18,0 to 19,0	-	8,0 to 9,0	0,10	1,50 to 2,00	-	-	-	
X5CrNiCu19-6-2	1.4640	0,030 to 0,08	0,50	1,50 to 4,0	0,045	0,015	18,0 to 19,0	-	5,5 to 6,9	0,03 to 0,11	1,30 to 2,00	-	-	-	
X2CrNiN18-10	1.4311	0,030	1,00	2,00	0,045	0,015 <sup>b</sup>	17,5 to 19,5	-	8,5 to 11,5	0,12 to 0,22	-	-	-	-	
X5CrNi18-10	1.4301	0,07	1,00	2,00	0,045	0,015 <sup>b</sup>	17,5 to 19,5	-	8,0 to 10,5	0,10	-	-	-	-	
X6CrNiTi18-10	1.4541	0,08	1,00	2,00	0,045	0,015 <sup>b</sup>	17,0 to 19,0	-	9,0 to 12,0 <sup>d</sup>	-	-	-	Ti: 5xC to 0,70	-	
X6CrNiNb18-10	1.4550	0,08	1,00	2,00	0,045	0,015	17,0 to 19,0	-	9,0 to 12,0 <sup>d</sup>	-	-	-	Nb: 10xC to 1,00	-	
X2CrNiCu19-10	1.4650	0,030	1,00	2,00	0,045	0,015	18,5 to 20,0	-	9,0 to 10,0	0,08	1,00	-	-	-	
X2CrNi19-11	1.4306	0,030	1,00	2,00	0,045	0,015 <sup>b</sup>	18,0 to 20,0	-	10,0 to 12,0 <sup>d</sup>	0,10	-	-	-	-	
X4CrNi18-12	1.4303	0,06	1,00	2,00	0,045	0,015 <sup>b</sup>	17,0 to 19,0	-	11,0 to 13,0	0,10	-	-	-	-	
X1CrNiS18-15-4	1.4361	0,015	3,7 to 4,5	2,00	0,025	0,010	16,5 to 18,5	0,20	14,0 to 16,0	0,10	-	-	-	-	
X8CrMnCuN17-8-3	1.4597	0,10	2,00	6,5 to 9,0	0,040	0,030	15,0 to 18,0	1,00	3,00	0,10 to 0,30	2,00 to 3,5	-	-	-	
X8CrMnNi19-6-3	1.4376	0,10	1,00	5,0 to 8,0	0,045	0,015	17,0 to 20,5	-	2,00 to 4,5	0,30	-	-	-	-	
X3CrMnNiCu15-8-5-3 <sup>1)</sup>	1.4615 <sup>1)</sup>	0,030	1,00	7,0 to 9,0	0,040	0,010	14,0 to 16,0	0,80	4,5 to 6,0	0,02 to 0,06	2,0 to 4,0	-	-	-	
X12CrMnNiN17-7-5	1.4372	0,15 <sup>1)</sup>	1,00	5,5 to 7,5	0,045	0,015	16,0 to 18,0	-	3,5 to 5,5	0,05 to 0,25	-	-	-	-	

EN 10088-1:2014 (E)

Steel designation		% by mass <sup>a</sup>											Others
Name	Number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Cu <sup>e</sup>	Others	
X2CrMnNiN17-7-5	1.4371	0,030	1,00	6,0 to 8,0	0,045	0,015	16,0 to 17,5	-	3,5 to 5,5	0,15 to 0,25	1,00	-	
X9CrMnNiCu17-8-5-2	1.4618	0,10	1,00	5,5 to 9,5	0,070	0,010	16,5 to 18,5	-	4,5 to 5,5	0,15	1,00 to 2,50	-	
X12CrMnNiN18-9-5	1.4373	0,15	1,00	7,5 to 10,5	0,045	0,015	17,0 to 19,0	-	4,0 to 6,0	0,05 to 0,25	-	-	
X11CrNiMn19-8-6	1.4369	0,07 to 0,15	0,50 to 1,00	5,0 to 7,5	0,030	0,015	17,5 to 19,5	-	6,5 to 8,5	0,20 to 0,30	-	-	
X13CrMnNiN18-13-2	1.4020	0,15	1,00	11,0 to 14,0	0,045	0,030	16,5 to 19,0	-	0,5 to 2,5	0,20 to 0,45	-	-	
X6CrMnNiN18-13-3	1.4378	0,08	1,00	11,5 to 14,5	0,060	0,030	17,0 to 19,0	-	2,3 to 3,7	0,20 to 0,40	-	-	
X6CrMnNiCuN18-12-4-2 <sup>1)</sup>	1.4646 <sup>1)</sup>	0,02 to 0,10	1,00	10,5 to 12,5	0,050	0,015	17,0 to 19,0	0,50	3,5 to 4,5	0,20 to 0,30	1,50 to 3,00	-	
X1CrNi25-21	1.4335	0,020	0,25	2,00	0,025	0,010	24,0 to 26,0	0,20	20,0 to 22,0	0,10	-	-	
Austenitic steels with Mo													
X2CrNiMoCuS17-10-2 <sup>e</sup>	1.4598 <sup>e</sup>	0,030	1,00	2,00	0,045	0,10 to 0,20	16,5 to 18,5	2,00 to 2,50	10,0 to 13,0	0,10	1,30 to 1,80	-	
X3CrNiCuMo17-11-3-2	1.4578	0,04	1,00	2,00	0,045	0,015	16,5 to 17,5	2,00 to 2,50	10,0 to 11,0	0,10	3,0 to 3,5	-	
X2CrNiMoN17-11-2	1.4406	0,030	1,00	2,00	0,045	0,015 <sup>b</sup>	16,5 to 18,5	2,00 to 2,50	10,0 to 12,5 <sup>d</sup>	0,12 to 0,22	-	-	
X2CrNiMo17-12-2	1.4404	0,030	1,00	2,00	0,045	0,015 <sup>b</sup>	16,5 to 18,5	2,00 to 2,50	10,0 to 13,0 <sup>d</sup>	0,10	-	-	
X5CrNiMo17-12-2	1.4401	0,07	1,00	2,00	0,045	0,015 <sup>b</sup>	16,5 to 18,5	2,00 to 2,50	10,0 to 13,0	0,10	-	-	
X6CrNiMoTi17-12-2	1.4571	0,08	1,00	2,00	0,045	0,015 <sup>b</sup>	16,5 to 18,5	2,00 to 2,50	10,5 to 13,5 <sup>d</sup>	-	-	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	10,5 to 13,5	-	-	Nb: 10xC to 1,00	
X2CrNiMo17-12-3	1.4432	0,030	1,00	2,00	0,045	0,015 <sup>b</sup>	16,5 to 18,5	2,50 to 3,00	10,5 to 13,0	0,10	-	-	
X3CrNiMo18-12-3	1.4449	0,035	1,00	2,00	0,045	0,015	17,0 to 18,2	2,25 to 2,75	11,5 to 12,5	0,08	1,00	-	

Steel designation		% by mass <sup>a</sup>											Others
Name	Number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Cu <sup>e</sup>	Others	
X3CrNiMo17-13-3	1.4436	0,05	1,00	2,00	0,045	0,015 <sup>b</sup>	16,5 to 18,5	2,50 to 3,00	10,5 to 13,0 <sup>d</sup>	0,10	-	-	
X2CrNiMoN17-13-3	1.4429	0,030	1,00	2,00	0,045	0,015	16,5 to 18,5	2,50 to 3,00	11,0 to 14,0 <sup>d</sup>	0,12 to 0,22	-	-	
X2CrNiMoN18-12-4	1.4434	0,030	1,00	2,00	0,045	0,015	16,5 to 19,5	3,0 to 4,0	10,5 to 14,0 <sup>d</sup>	0,10 to 0,20	-	-	
X2CrNiMo18-14-3	1.4435	0,030	1,00	2,00	0,045	0,015 <sup>b</sup>	17,0 to 19,0	2,50 to 3,00	12,5 to 15,0	0,10	-	-	
X2CrNiMoN17-13-5	1.4439	0,030	1,00	2,00	0,045	0,015	16,5 to 18,5	4,0 to 5,0	12,5 to 14,5	0,12 to 0,22	-	-	
X2CrNiMo18-15-4	1.4438	0,030	1,00	2,00	0,045	0,015 <sup>b</sup>	17,5 to 19,5	3,0 to 4,0	13,0 to 16,0 <sup>d</sup>	0,10	-	-	
X1CrNiMoCuN20-18-7	1.4547	0,020	0,70	1,00	0,030	0,010	19,5 to 20,5	6,0 to 7,0	17,5 to 18,5	0,18 to 0,25	0,50 to 1,00	-	
X1CrNiMoN25-22-2	1.4466	0,020	0,70	2,00	0,025	0,010	24,0 to 26,0	2,00 to 2,50	21,0 to 23,0	0,10 to 0,16	-	-	
X1CrNiMoCuNW24-22-6	1.4659	0,020	0,70	2,00 to 4,0	0,030	0,010	23,0 to 25,0	5,5 to 6,5	21,0 to 23,0	0,35 to 0,50	1,00 to 2,00	W: 1,50 to 2,50	
X1CrNiMoCuN24-22-8	1.4652	0,020	0,50	2,00 to 4,0	0,030	0,005	23,0 to 25,0	7,0 to 8,0	21,0 to 23,0	0,45 to 0,55	0,30 to 0,60	-	
X2CrNiMnMoN25-18-6-5	1.4565	0,030	1,00	5,0 to 7,0	0,030	0,015	24,0 to 26,0	4,0 to 5,0	16,0 to 19,0	0,30 to 0,60	-	Nb: 0,15	
Austenitic steels with Ni as main alloying element													
X1NiCrMoCu25-20-5	1.4539	0,020	0,70	2,00	0,030	0,010	19,0 to 21,0	4,0 to 5,0	24,0 to 26,0	0,15	1,20 to 2,00	-	
X1NiCrMoCuN25-20-7	1.4529	0,020	0,50	1,00	0,030	0,010	19,0 to 21,0	6,0 to 7,0	24,0 to 26,0	0,15 to 0,25	0,50 to 1,50	-	
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	
X1NiCrMoCu31-27-4	1.4563	0,020	0,70	2,00	0,030	0,010	26,0 to 28,0	3,0 to 4,0	30,0 to 32,0	0,10	0,70 to 1,50	-	

# EN 10088-1:2014 (E)

Steel designation		% by mass <sup>a</sup>										
Name	Number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Cu <sup>e</sup>	Others
Uncommon austenitic steels												
X5CrNi17-7	1.4319	0,07	1,00	2,00	0,045	0,030	16,0 to 18,0	-	6,0 to 8,0	0,10	-	-
X8CrMnNi18-9-5	1.4374	0,05 to 0,10	0,30 to 0,60	9,0 to 10,0	0,035	0,030	17,5 to 18,5	0,50	5,0 to 6,0	0,25 to 0,32	0,40	-
X1CrNiMoCuN25-25-5	1.4537	0,020	0,70	2,00	0,030	0,010	24,0 to 26,0	4,7 to 5,7	24,0 to 27,0	0,17 to 0,25	1,00 to 2,00	-

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.

a Maximum values unless indicated otherwise.

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 sulfur content may provide improvement of particular properties. For machinability a controlled sulfur content of 0,015 % to 0,030 % is recommended and permitted. For weldability, a controlled sulfur content of 0,008 % to 0,030 % is recommended and permitted. For polishability, a controlled sulfur 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 sulfur free cutting austenitic steels may not comply with European Directive 94/27 regarding articles in contact with human skin.

f For pressure purposes a carbon limit of C ≤ 0,07 % is allowed.

\*) Patented steel grade.

Table 3 — Chemical composition (cast analysis) of austenitic-ferritic corrosion resisting steels

Steel designation		% by mass <sup>a</sup>										
Name	Number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Cu	Others
X2CrNiN22-2 <sup>a)</sup>	1.4062 <sup>a)</sup>	0,030	1,00	2,00	0,040	0,010	21,5 to 24,0	0,45	1,00 to 2,90	0,16 to 0,28	-	-
X2CrCuNiN23-2-2 <sup>a)</sup>	1.4669 <sup>a)</sup>	0,045	1,00	1,00 to 3,00	0,040	0,030	21,5 to 24,0	0,50	1,00 to 3,00	0,12 to 0,20	1,60 to 3,00	-
Austenitic-ferritic steels with Mo												
X2CrNiMoSi18-5-3	1.4424	0,030	1,40 to 2,00	1,20 to 2,00	0,035	0,015	18,0 to 19,0	2,50 to 3,0	4,5 to 5,2	0,05 to 0,10	-	-
X2CrNiN23-4	1.4362	0,030	1,00	2,00	0,035	0,015	22,0 to 24,5	0,10 to 0,60	3,5 to 5,5	0,05 to 0,20	0,10 to 0,60	-
X2CrMnNiN21-5-1 <sup>a)</sup>	1.4162 <sup>a)</sup>	0,04	1,00	4,0 to 6,0	0,040	0,015	21,0 to 22,0	0,10 to 0,80	1,35 to 1,90	0,20 to 0,25	0,10 to 0,80	-
X2CrMnNiMoN21-5-3	1.4482	0,030	1,00	4,0 to 6,0	0,035	0,030	19,5 to 21,5	0,10 to 0,60	1,50 to 3,50	0,05 to 0,20	1,00	-
X2CrNiMoN22-5-3 <sup>c</sup>	1.4462 <sup>c</sup>	0,030	1,00	2,00	0,035	0,015	21,0 to 23,0	2,50 to 3,5	4,5 to 6,5	0,10 to 0,22	-	-
X2CrNiMnMoCuN24-4-3-2 <sup>b)</sup>	1.4662 <sup>b)</sup>	0,030	0,70	2,50 to 4,0	0,035	0,005	23,0 to 25,0	1,00 to 2,00	3,0 to 4,5	0,20 to 0,30	0,10 to 0,80	-
X2CrNiMoCuN25-6-3	1.4507	0,030	0,70	2,00	0,035	0,015	24,0 to 26,0	3,0 to 4,0	6,0 to 8,0	0,20 to 0,30	1,00 to 2,50	-
X3CrNiMoN27-5-2	1.4460	0,05	1,00	2,00	0,035	0,015 <sup>b</sup>	25,0 to 28,0	1,30 to 2,00	4,5 to 6,5	0,05 to 0,20	-	-
X2CrNiMoN25-7-4	1.4410	0,030	1,00	2,00	0,035	0,015	24,0 to 26,0	3,0 to 4,5	6,0 to 8,0	0,24 to 0,35	-	-
X2CrNiMoCuWN25-7-4	1.4501	0,030	1,00	1,00	0,035	0,015	24,0 to 26,0	3,0 to 4,0	6,0 to 8,0	0,20 to 0,30	0,50 to 1,00	W: 0,50 to 1,00
X2CrNiMoN29-7-2	1.4477	0,030	0,50	0,80 to 1,50	0,030	0,015	28,0 to 30,0	1,50 to 2,60	5,8 to 7,5	0,30 to 0,40	0,80	-
X2CrNiMoCoN28-8-5-1 <sup>b)</sup>	1.4658 <sup>b)</sup>	0,030	0,50	1,50	0,035	0,010	26,0 to 29,0	4,0 to 5,0	5,5 to 9,5	0,30 to 0,50	1,00	Co: 0,50 to 2,00
Uncommon austenitic-ferritic steels												
X2CrNiCuN23-4	1.4655	0,030	1,00	2,00	0,035	0,015	22,0 to 24,0	0,10 to 0,60	3,5 to 5,5	0,05 to 0,20	1,00 to 3,00	-

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.

a) Maximum values unless indicated otherwise.  
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 sulfur content may provide improvement of particular properties. For machinability a controlled sulfur content of 0,015 % to 0,030 % is recommended and permitted. For weldability, a controlled sulfur content of 0,008 % to 0,030 % is recommended and permitted. For polishability, a controlled sulfur 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 D.1) greater than 34.  
\*) Patented steel grade.

Table 4 — Chemical composition (cast analysis) of ferritic corrosion resisting steels

Steel designation		% by mass <sup>a</sup>													Others
Name	Number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Nb	Ti			
X2CrNi12	1.4003	0,030	1,00	1,50	0,040	0,015 <sup>b</sup>	10,5 to 12,5	-	0,30 to 1,00	0,030	-	-	-	-	
X2CrTi12	1.4512	0,030	1,00	1,00	0,040	0,015	10,5 to 12,5	-	-	-	-	[6 × (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 <sup>b</sup>	12,0 to 14,0	-	-	-	-	-	-	-	
X6CrAl13	1.4002	0,08	1,00	1,00	0,040	0,015 <sup>b</sup>	12,0 to 14,0	-	-	-	-	-	-	Al: 0,10 to 0,30	
X2CrMnNiTi12	1.4600	0,030	1,00	1,00 to 2,50	0,040	0,015	11,0 to 13,0	-	0,30 to 1,00	0,025	-	6 x C to 0,35	-	-	
X2CrSiTi15	1.4630	0,030	0,20 to 1,50	1,00	0,050	0,050	13,0 to 16,0	0,50	0,50	-	0,50	[4 × (C+N) + 0,15] <sub>c</sub> to 0,80	-	Al: 1,50 Cu: 0,50	
X6Cr17	1.4016	0,08	1,00	1,00	0,040	0,015 <sup>b</sup>	16,0 to 18,0	-	-	-	-	-	-	-	
X2CrTi17	1.4520	0,025	0,50	0,50	0,040	0,015	16,0 to 18,0	-	-	0,015	-	[4 × (C+N) + 0,15] <sub>c</sub> to 0,80	-	-	
X3CrTi17	1.4510	0,05	1,00	1,00	0,040	0,015 <sup>b</sup>	16,0 to 18,0	-	-	-	-	[4 × (C+N) + 0,15] <sub>c</sub> to 0,80	-	-	
X3CrNb17	1.4511	0,05	1,00	1,00	0,040	0,015 <sup>b</sup>	16,0 to 18,0	-	-	-	12 x C to 1,00	-	-	-	
X6CrNi17-1	1.4017	0,08	1,00	1,00	0,040	0,015	16,0 to 18,0	-	1,20 to 1,60	-	-	-	-	-	
X2CrTiNb18	1.4509	0,030	1,00	1,00	0,040	0,015	17,5 to 18,5	-	-	-	[3 x C + 0,30] <sub>c</sub> to 1,00	0,10 to 0,60	-	-	
X2CrAlSiNb18	1.4634	0,030	0,20 to 1,50	1,00	0,050	0,050	17,5 to 18,5	0,50	0,50	-	[3 x C + 0,30] <sub>c</sub> to 1,00	-	-	Al: 0,20 to 1,50 Cu: 0,50	

Steel designation		% by mass <sup>a</sup>											Others
Name	Number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Nb	Ti	
X2CrNbTi20	1.4607	0,030	1,00	1,00	0,040	0,015	18,5 to 20,5	-	-	0,030	1,00	$[4 \times (C+N) + 0,15]_c$ to 0,80	-
X2CrTi21 <sup>7)</sup>	1.4611 <sup>7)</sup>	0,030	1,00	1,00	0,050	0,050	19,0 to 22,0	0,50	0,50	-	-	$[4 \times (C+N) + 0,20]_c$ to 1,00	Cu: 0,50, Al: 0,05
X2CrNbCu21	1.4621	0,030	1,00	1,00	0,040	0,015	20,0 to 21,5	-	-	0,030	0,20 to 1,00	-	Cu: 0,10 to 1,00
X2CrTi24 <sup>7)</sup>	1.4613 <sup>7)</sup>	0,030	1,00	1,00	0,050	0,050	22,0 to 25,0	0,50	0,50	-	-	$[4 \times (C+N) + 0,20]_c$ to 1,00	Cu: 0,50, Al:0,05
Ferritic steels with Mo													
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	-
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	-	-	-	-	-
X6CrMo17-1	1.4113	0,08	1,00	1,00	0,040	0,015 <sup>b</sup>	16,0 to 18,0	0,90 to 1,40	-	-	-	-	-
X2CrMoTi17-1	1.4513	0,025	1,00	1,00	0,040	0,015	16,0 to 18,0	0,80 to 1,40	-	0,020	-	$[4 \times (C+N) + 0,15]_c$ to 0,80	-
X6CrMoNb17-1	1.4526	0,08	1,00	1,00	0,040	0,015	16,0 to 18,0	0,80 to 1,40	-	0,040	$[7 \times (C+N) + 0,10]_c$ to 1,00	-	-
X2CrMoTi18-2	1.4521	0,025	1,00	1,00	0,040	0,015	17,0 to 20,0	1,80 to 2,50	-	0,030	-	$[4 \times (C+N) + 0,15]_c$ to 0,80	-
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	-	-	-	$[4 \times (C+N) + 0,15]_c$ to 0,80	(C+N) ≤ 0,040
X2CrMoTi29-4	1.4592	0,025	1,00	1,00	0,030	0,010	28,0 to 30,0	3,50 to 4,50	-	0,045	-	$[4 \times (C+N) + 0,15]_c$ to 0,80	-

Steel designation		% by mass <sup>a</sup>											Others
Name	Number	C	Si	Mn	P	S	Cr	Mo	Ni	N	Nb	Ti	Others
Uncommon ferritic steels													
X1CrNb15	1.4595	0,020	1,00	1,00	0,025	0,015	14,0 to 16,0	-	-	0,020	0,20 to 0,60	-	-
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

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.

a Maximum values unless indicated otherwise.  
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 sulfur content may provide improvement of particular properties. For machinability a controlled sulfur content of 0,015 % to 0,030 % is recommended and permitted. For weldability, a controlled sulfur content of 0,008 % to 0,030 % is recommended and permitted. For polishability, a controlled sulfur content of 0,015 % max. is recommended.  
c The stabilization may be made by use of Ti and/or Nb and/or Zr. According to the atomic mass of these elements and the content of Carbon and Nitrogen, the equivalence shall be the following:  
Nb (% by mass) ≡ Zr (% by mass) ≡ 7/4 Ti (% by mass).  
\*) Patented steel grade

Table 5 — Chemical composition (cast analysis) of martensitic and precipitation hardening corrosion resisting steels

Steel designation		% by mass <sup>a</sup>									
Name	Number	C <sup>c</sup>	Si	Mn	P	S	Cr	Mo	Ni	Cu	Others
Martensitic steels											
X12Cr13	1.4006	0,08 to 0,15	1,00	1,50	0,040	0,015 <sup>b</sup>	11,5 to 13,5	-	0,75	-	-
X12CrS13	1.4005	0,06 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 <sup>b</sup>	12,0 to 14,0	-	-	-	-
X20Cr13	1.4021	0,16 to 0,25	1,00	1,50	0,040	0,015 <sup>b</sup>	12,0 to 14,0	-	-	-	-
X30Cr13	1.4028	0,26 to 0,35	1,00	1,50	0,040	0,015 <sup>b</sup>	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 <sup>b</sup>	12,5 to 14,5	-	-	-	-
X46Cr13	1.4034	0,43 to 0,50	1,00	1,00	0,040	0,015 <sup>b</sup>	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	-	-	-	-
X17CrNi16-2	1.4057	0,12 to 0,22	1,00	1,50	0,040	0,015 <sup>b</sup>	15,0 to 17,0	-	1,50 to 2,50	-	-
Martensitic steels with Mo											
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 <sup>b</sup>	13,0 to 15,0	0,50 to 0,80	-	-	V: 0,15
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
X1CrNiMoCu12-5-2	1.4422	0,020	0,50	2,00	0,040	0,003	11,0 to 13,0	1,30 to 1,80	4,0 to 5,0	0,20 to 0,80	N: 0,020
X50CrMoV15	1.4116	0,45 to 0,55	1,00	1,00	0,040	0,015 <sup>b</sup>	14,0 to 15,0	0,50 to 0,80	-	-	V: 0,10 to 0,20 N: see e
X70CrMo15	1.4109	0,60 to 0,75	0,70	1,00	0,040	0,015 <sup>b</sup>	14,0 to 16,0	0,40 to 0,80	-	-	-
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
X1CrNiMoCu12-7-3	1.4423	0,020	0,50	2,00	0,040	0,003	11,0 to 13,0	2,30 to 2,80	6,0 to 7,0	0,20 to 0,80	N: 0,020
X53CrSiMoVN16-2	1.4150	0,45 to 0,60	1,30 to 1,70	0,80	0,030	0,010	15,0 to 16,5	0,20 to 0,40	0,40	-	V: 0,20 to 0,40 N: 0,05 to 0,20

Steel designation		% by mass <sup>a</sup>										
Name	Number	C <sup>c</sup>	Si	Mn	P	S	Cr	Mo	Ni	Cu	Others	
X4CrNiMo16-5-1	1.4418	0,06	0,70	1,50	0,040	0,015 <sup>b</sup>	15,0 to 17,0	0,80 to 1,50	4,0 to 6,0	-	N: ≥ 0,020	
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 <sup>b</sup>	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 <sup>b</sup>	16,0 to 18,0	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	
X90CrMoV18	1.4112	0,85 to 0,95	1,00	1,00	0,040	0,015 <sup>b</sup>	17,0 to 19,0	0,90 to 1,30	-	-	V: 0,07 to 0,12	
Precipitation hardening steels												
X5CrNiCuNb16-4	1.4542	0,07	0,70	1,50	0,040	0,015 <sup>b</sup>	15,0 to 17,0	0,60	3,0 to 5,0	3,0 to 5,0	Nb: 5xC to 0,45	
X7CrNiAl17-7	1.4568	0,09	0,70	1,00	0,040	0,015	16,0 to 18,0	-	6,5 to 7,8 <sup>d</sup>	-	Al: 0,70 to 1,50	
Precipitation hardening steels with Mo												
X5CrNiMoCuNb14-5	1.4594	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	1,20 to 2,00	Nb: 0,15 to 0,60	
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	
X1CrNiMoAlTi12-11-2	1.4612	0,015	0,10	0,10	0,010	0,005	11,0 to 12,5	1,75 to 2,25	10,2 to 11,3	-	Al: 1,35 to 1,75 Ti: 0,20 to 0,50 N: 0,010	

Steel designation		% by mass <sup>a</sup>									
Name	Number	C <sup>c</sup>	Si	Mn	P	S	Cr	Mo	Ni	Cu	Others
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

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.

a Maximum values unless indicated otherwise.  
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 sulfur content may provide improvement of particular properties. For machinability a controlled sulfur content of 0,015 % to 0,030 % is recommended and permitted. For weldability, a controlled sulfur content of 0,008 % to 0,030 % is recommended and permitted. For polishability, a controlled sulfur 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 %.  
e For increased mechanical properties, nitrogen may be added up to 0,15 %.

Table 6 — Chemical composition (cast analysis) of austenitic and austenitic-ferritic heat-resisting steels

Steel designation		% by mass <sup>a</sup>										
Name	Number	C	Si	Mn	P	S	Cr	Ni	N	Others		
X8CrNiTi18-10	1.4878	0,10	1,00	2,00	0,045	0,015	17,0 to 19,0	9,0 to 12,0	-	Ti: 5xC to 0,80		
X6CrNiSiN20-10	1.4818	0,04 to 0,08	1,00 to 2,00	1,00	0,045	0,015	18,0 to 20,0	9,0 to 11,0	0,12 to 0,20	Ce: 0,03 to 0,08		
X15CrNiSi20-12	1.4828	0,20	1,50 to 2,50	2,00	0,045	0,015	19,0 to 21,0	11,0 to 13,0	0,10	-		
X9CrNiSiN21-11-2	1.4835	0,05 to 0,12	1,40 to 2,50	1,00	0,045	0,015	20,0 to 22,0	10,0 to 12,0	0,12 to 0,20	Ce: 0,03 to 0,08		
X12CrNi23-13	1.4833	0,15	1,00	2,00	0,045	0,015	22,0 to 24,0	12,0 to 14,0	0,10	-		
X25CrMnNiN25-9-7	1.4872	0,20 to 0,30	1,00	8,0 to 10,0	0,045	0,015	24,0 to 26,0	6,0 to 8,0	0,20 to 0,40	-		
X8CrNi25-21	1.4845	0,10	1,50	2,00	0,045	0,015	24,0 to 26,0	19,0 to 22,0	0,10	-		
X15CrNiSi25-21	1.4841	0,20	1,50 to 2,50	2,00	0,045	0,015	24,0 to 26,0	19,0 to 22,0	0,10	-		
X10NiCrAlTi32-21	1.4876	0,12	1,00	2,00	0,030	0,015	19,0 to 23,0	30,0 to 34,0	-	Al: 0,15 to 0,60 Ti: 0,15 to 0,60		
X6NiCrSiN25-35-25	1.4854	0,04 to 0,08	1,20 to 2,00	2,00	0,040	0,015	24,0 to 26,0	34,0 to 36,0	0,12 to 0,20	Ce: 0,03 to 0,08		
X10NiCrSi35-19	1.4886	0,15	1,00 to 2,00	2,00	0,030	0,015	17,0 to 20,0	33,0 to 37,0	0,10	-		