



SLOVENSKI STANDARD
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Technical delivery conditions for steel castings for pressure purposes - Part 4: Austenitic and austenitic-ferritic steel grades

Technische Lieferbedingungen für Stahlguß für Druckbehälter - Teil 4: Austenitische und austenitisch-ferritische Stahlsorten

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Conditions techniques de livraison de pieces moulées en acier pour service sous pression - Partie 4: Nuances d'aciers austénitiques et austéno-ferritiques

[SIST EN 10213-4:1997](https://standards.iteh.ai/catalog/standards/sist/4d893498-1a53-492a-8762-cc50d16c514/sist-en-10213-4-1997)

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77.140.10 Jekla za toplotno obdelavo Heat-treatable steels
77.140.30 Jekla za uporabo pod tlakom Steels for pressure purposes

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en

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English version

**Technical delivery conditions for steel castings for
pressure purposes - Part 4: Austenitic and
austenitic-ferritic steel grades**

Conditions techniques de livraison des pièces
moulées en acier pour service sous pression -
Partie 4: Nuances d'aciers austénitiques et
austéno-ferritiques

Technische Lieferbedingungen für Stahlguß für
Druckbehälter - Teil 4: Austenitische und
austentisch-ferritische Stahlsorten

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard was prepared by the Technical Committee ECISS/TC 31 "Steel castings" the secretariat of which is held by AFNOR.

This European Standard EN 10213 "Technical delivery conditions for steel castings for pressure purposes" consists of 4 parts :

- Part 1 General
- Part 2 Steel grades for use at room temperature and elevated temperatures
- Part 3 Steel grades for use at low temperatures
- Part 4 Austenitic and austenitic-ferritic steel grades

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 June 1996, and conflicting national standards shall be withdrawn at the latest by June 1996.

According to the Internal Regulations of the CEN/CENELEC, the following countries are bound to implement this European Standard : Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

According to the general delivery conditions of EN 10213-1 this standard specifies the chemical and mechanical requirements to be met under specific inspection of austenitic and austenitic-ferritic grades.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

prEN 10213-1 Technical delivery conditions for steel castings for pressure purposes - Part 1 : General

3 Requirements

3.1 Chemical composition

The cast analysis shall comply with table 1 (see 7.1 of EN 10213-1 for permissible deviations and for unspecified elements). For chemical analysis on castings see 8.4.1 of EN 10213-1.

3.2 Heat treatment

Heat treatment shall comply with table 2 (see 6.2 of EN 10213-1).

3.3 Mechanical properties

3.3.1 The mechanical properties at room, low and elevated temperatures shall comply with table 2. For the conditions of verification on test block see 7.2.1 of EN 10213-1, and on castings see 7.2.2 and 8.4.2 of EN 10213-1.

3.3.2 Mechanical properties at elevated temperatures are specified in table 2 but their verification is performed only by agreement (see 7.2.3 of EN 10213-1), and on castings (see 7.2.2 and 8.4.2 of EN 10213-1).

NOTE : Creep resistance mean values are given, for some grades in Annex A table A.1 only for information.

Table 1 : Chemical composition (cast analysis)
[(% (m/m))]

Designation		Number	C max.	Si max.	Mn max.	P max.	S max.	Cr	Mo	Ni	Cu	Others
Name												
GX2CrNi19-11 1)		1.4309 1)	0,030	1,50	2,00	0,035	0,025	18,00 to 20,00		9,00 to 12,00		N : 0,20 max.
GX5CrNi19-10 1)		1.4308 1)	0,07	1,50	1,50	0,040	0,030	18,00 to 20,00		8,00 to 11,00		
GX5CrNiNb19-11 1)		1.4552 1)	0,07	1,50	1,50	0,040	0,030	18,00 to 20,00		9,00 to 12,00		Nb:8 x C, max : 1,00
GX2CrNiMo19-11-2 1)		1.4409 1)	0,030	1,50	2,00	0,035	0,025	18,00 to 20,00	2,00 to 2,50	9,00 to 12,00		N : 0,20 max.
GX5CrNiMo 19-11-2 1)		1.4408 1)	0,07	1,50	1,50	0,040	0,030	18,00 to 20,00	2,00 to 2,50	9,00 to 12,00		
GX5CrNiMoNb19-11-2 1)		1.4581 1)	0,07	1,50	1,50	0,040	0,030	18,00 to 20,00	2,00 to 2,50	9,00 to 12,00		Nb:8 x C, max : 1,00
GX2NiCrMo28-20-2 1)		1.4458 1)	0,030	1,00	2,00	0,035	0,025	19,00 to 22,00	2,00 to 2,50	26,00 to 30,00	2,00 max.	N : 0,20 max.
GX2CrNiMoN22-5-3		1.4470	0,030	1,00	2,00	0,035	0,025	21,00 to 23,00	2,50 to 3,50	4,50 to 6,50		N : 0,12 to 0,20
GX2CrNiMoCuN25-6-3-3		1.4517	0,030	1,00	1,50	0,035	0,025	24,50 to 26,50	2,50 to 3,50	5,00 to 7,00	2,75 to 3,50	N : 0,12 to 0,22
GX2CrNiMoN26-7-4 2)		1.4469 2)	0,030	1,00	1,00	0,035	0,025	25,00 to 27,00	3,00 to 5,00	6,00 to 8,00	1,30 max.	N : 0,12 to 0,22

1) It should be pointed out that the suggested chemical composition ranges of these high alloyed corrosion resistant steel grades are rather large. According to the final destination (high temperature/low temperature, etc...), it may be advisable for the founder to aim for narrower ranges for different elements in order to achieve the most suitable structures.

2) For this steel grade a minimum value of the "pitting index" may be required as $PI = Cr + 3,3 Mo + 16 N \geq 40$.

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Table 2 : Mechanical properties

Designation	Heat treatment ¹⁾ + AT 1)	Thick- ness	Tensile test at room temperature		Impact test		Tensile test at elevated temperature										
			Name	Number	R _p 1,0 ⁵⁾ MPa*)	R _m MPa*)	A %	KV °C 8)	J min.	R _p 1,0 ⁵⁾ MPa*) min.							
										at °C							500
					min.						100	200	300	350	400	500	550
GX2CrNi19-11	1050 to 1150	max.			210	440 to 640	30	80/)	min.		165	130	110	100	-	-	-
GX5CrNi19-10	1050 to 1150	150			200	440 to 640	30	60/)		160	125	110	-	-	-	-	-
GX5CrNiNb19-11	1050 to 1150	150			200	440 to 640	25	40		165	145	130	-	120	110	100	-
GX2CrNiMo19-11-2	1080 to 1150	150			220	440 to 640	30	80/)		175	145	115	-	105	-	-	-
GX5CrNiMo19-11-2	1080 to 1150	150			210	440 to 640	30	60/)		170	135	115	-	105	-	-	-
GX5CrNiMoNb19-11-2	1080 to 1150	150			210	440 to 640	25	40		185	160	145	-	130	120	115	-
GX2NiCrMo28-20-2	1100 to 1180	150			190	430 to 630	30	60/)		165	135	120	-	110	-	-	-
GX2CrNiMoN22-5-3	1120 to 1150 2) 3)	150			420 6)	600 to 800	20	30		330 6)	280 6)	4)	-	-	-	-	-
GX3CrNiMoCuN25-6-3-3	1120 to 1150 2) 3)	150			480 6)	650 to 850	22	50/)		390 6)	330 6)	4)	-	-	-	-	-
GX2CrNiMoN26-7-4	1140 to 1180 2) 3)	150			480 6)	650 to 850	22	50/)		390 6)	330 6)	4)	-	-	-	-	-

1) The heat treatment for all the steel grades is + AT + QW (solution annealing + water quenching).

2) After solution annealing at high temperature, castings may be cooled down to 1040 °C to 1010 °C prior to water quenching in order to improve corrosion resistance and prevent cracks in complex shapes.

3) As far as steel castings for pressure vessels are concerned the austenitic-ferritic steels are not considered in their age hardened condition.

4) For similar reasons as those concerning note 3) the austenitic-ferritic steels have not to be used for temperatures higher than 250 °C in pressure vessel applications.

5) R_{p0,2} may be estimated by lowering R_{p1,0} by 25 MPa.

6) R_{p0,2}.

7) For use at low temperatures impact properties may be agreed and the following applies :

Steel number	KV	at	J	°C
			min.	
1.4517, 1.4469	35	-	70	
1.4308, 1.4408, 1.4458	60	-	196	
1.4309, 1.4409	70	-	196	

8) RT = room temperature.

*) 1 MPa = 1N/mm².