



**SLOVENSKI STANDARD**  
**oSIST prEN 10250-4:2018**

**01-november-2018**

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**Prosto kovani jekleni izkovki za splošno tehnično uporabo - 4. del: Nerjavna jekla**

Open die steel forgings for general engineering purposes - Part 4: Stainless steels

Freiformschmiedestücke aus Stahl für allgemeine Verwendung - Teil 4: Nichtrostende Stähle

Pièces forgées en acier pour usage général - Partie 4: Aciers inoxydables

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**Ta slovenski standard je istoveten z: prEN 10250-4:2018**

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**ICS:**

77.140.20	Visokokakovostna jekla	Stainless steels
77.140.85	Železni in jekleni kovani izdelki	Iron and steel forgings

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EUROPEAN STANDARD  
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**DRAFT**  
**prEN 10250-4**

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ICS 77.140.20; 77.140.85

Will supersede EN 10250-4:1999

English Version

## Open die steel forgings for general engineering purposes - Part 4: Stainless steels

Pièces forgées en acier pour usage général - Partie 4:  
Aciers inoxydables

Freiformschmiedestücke aus Stahl für allgemeine  
Verwendung - Teil 4: Nichtrostende Stähle

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ECISS/TC 111.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## European foreword

This document (prEN 10250-4:2018) has been prepared by Technical Committee ECISS/TC 111 “Steel castings and forgings”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 10250-4:1999.

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## prEN 10250-4:2018 (E)

### 1 Scope

This document specifies the technical delivery requirements for open die forgings, forged bars and products pre-forged and finished in ring rolling mills, manufactured from stainless steels with ferritic, martensitic, austenitic and austenitic-ferritic structures.

NOTE The majority of steels listed in this part of EN 10250 are identical to steels specified EN 10088-3 and more extensive information on properties is given in that European Standard.

General information on technical delivery conditions is given in EN 10021.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 10250-1:1999, *Open die steel forgings for general engineering purposes - Part 1: General requirements*

### 3 Chemical Composition

#### 3.1 Cast Analysis

The chemical composition of the steel shall be determined by cast analysis and shall conform to the analysis given in Tables 1, 2 and 3. (see A.7, A.8, and A.11 of EN 10250-1:1999).

Elements not quoted in Tables 1, 2, and 3 shall not be added intentionally to the steel without the agreement of the purchaser, except for the purpose of finishing the heat. All reasonable measures should also be taken to prevent the addition from the scrap, or other material used in the manufacture of the steel, of such elements which affect the corrosion resistance, mechanical properties and applicability of the steel.

#### 3.2 Product Analysis

The product analysis shall not deviate from the specified cast analysis (see Tables 1, 2 and 3) by more than the values specified in Table 4 (see 9.2 to EN 10250-1:1999).

Table 1 — Steel grades and chemical composition - ferritic and martensitic grades

Steel designation		C %	Si max %	Mn max %	P max %	S max %	Cr %	Mo %	Ni %	Others %
Name	Number									
X6CrAl13	1.4002	≤ 0,08	1,00	1,00	0,040	0,030 <sup>1)</sup>	12,00 to 14,00	-	-	Al 0,10 to 0,30
X6Cr17	1.4016	≤ 0,08	1,00	1,00	0,040	0,030 <sup>1)</sup>	16,00 to 18,00	-	-	-
X12Cr13	1.4006	0,08 to 0,15	1,00	1,50	0,040	0,030 <sup>1)</sup>	11,50 to 13,50	-	≤ 0,75	-
X20Cr13	1.4021	0,16 to 0,25	1,00	1,50	0,040	0,030 <sup>1)</sup>	12,00 to 14,00	-	-	-
X30Cr13	1.4028	0,26 to 0,35	1,00	1,50	0,040	0,030 <sup>1)</sup>	12,00 to 14,00	-	-	-
X17CrNi16-2	1.4057	0,12 to 0,22	1,00	1,50	0,040	0,030 <sup>1)</sup>	15,00 to 17,00	-	1,50 to 2,50	-
X3CrNiMo13-4	1.4313	≤ 0,05	0,70	1,50	0,040	0,015	12,00 to 14,00	0,30 to 0,70	3,50 to 4,50	N ≥ 0,020
X4CrNiMo16-5-1	1.4418	≤ 0,06	0,70	1,50	0,040	0,030 <sup>1)</sup>	15,00 to 17,00	0,80 to 1,50	4,00 to 6,00	N ≥ 0,020
X5CrNiCuNb16-4	1.4542	≤ 0,07	0,70	1,50	0,040	0,030 <sup>1)</sup>	15,00 to 17,00	≤ 0,60	3,00 to 5,00	Nb = 5xC to 0,45 Cu = 3,00 to 5,00

<sup>1)</sup>For products to be machined a controlled sulfur content of 0,015 to 0,030 % is recommended.

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Table 2 — Steel grades and chemical composition - austenitic grades

Steel designation		C max %	Si max %	Mn max %	P max %	S max %	N %	Cr %	Mo %	Ni %	Nb %	Ti %	Others %
Name	Number												
X2CrNi18-9	1.4307	0,030	1,00	2,00	0,045	≤ 0,030 1)	≤ 0,11	17,50 to 19,50	-	8,00 to 10,00	-	-	-
X2CrNi19-11	1.4306	0,030	1,00	2,00	0,045	0,030 <sup>1)</sup>	≤ 0,11	18,00 to 20,00	-	10,00 to 12,00 <sup>2)</sup>	-	-	-
X2CrNi18-10	1.4311	0,030	1,00	2,00	0,045	0,030 <sup>1)</sup>	0,12 to 0,22	17,00 to 19,50	-	8,50 to 11,50	-	-	-
X5CrNi18-10	1.4301	0,07	1,00	2,00	0,045	0,030 <sup>1)</sup>	≤ 0,11	17,00 to 19,50	-	8,00 to 10,50	-	-	-
X6CrNiTi18-10	1.4541	0,08	1,00	2,00	0,045	0,030 <sup>1)</sup>	-	17,00 to 19,00	-	9,00 to 12,00 <sup>2)</sup>	-	5xC to 0,70	-
X2CrNiMo17-12-2	1.4404	0,030	1,00	2,00	0,045	0,030 <sup>1)</sup>	≤ 0,11	16,50 to 18,50	2,00 to 2,50	10,00 to 13,00 <sup>2)</sup>	-	-	-
X2CrNiMoN17-11-2	1.4406	0,030	1,00	2,00	0,045	0,030 <sup>1)</sup>	0,12 to 0,22	16,50 to 18,50	2,00 to 2,50	10,00 to 12,00	-	-	-
X5CrNiMo17-12-2	1.4401	0,07	1,00	2,00	0,045	0,030 <sup>1)</sup>	≤ 0,11	16,50 to 18,50	2,00 to 2,50	10,00 to 13,00	-	-	-
X6CrNiMoTi17-12-2	1.4571	0,08	1,00	2,00	0,045	0,030 <sup>1)</sup>	-	16,50 to 18,50	2,00 to 2,50	10,50 to 13,50 <sup>2)</sup>	-	5xC to 0,70	-
X2CrNiMoN17-13-3	1.4429	0,030	1,00	2,00	0,045	0,015	0,12 to 0,22	16,50 to 18,50	2,50 to 3,00	11,00 to 14,00 <sup>2)</sup>	-	-	-
X3CrNiMo17-13-3	1.4436	0,05	1,00	2,00	0,045	0,030 <sup>1)</sup>	≤ 0,11	16,50 to 18,50	2,50 to 3,00	10,50 to 13,00 <sup>2)</sup>	-	-	-
X2CrNiMo18-14-3	1.4435	0,030	1,00	2,00	0,045	0,030 <sup>1)</sup>	≤ 0,11	17,00 to 19,00	2,50 to 3,00	12,50 to 15,00	-	-	-



X1NiCrMoCu25-20-5	1.4539	0,020	0,70	2,00	0,030	0,010	≤ 0,15	19,00 to 21,00	4,00 to 5,00	24,00 to 26,00	-	-	Cu 1,20 to 2,00
X6CrNiNb18-10	1.4550	0,08	1,00	2,00	0,045	0,015	-	17,00 to 19,00	-	9,00 to 12,00 <sup>2)</sup>	10xC to 1,00	-	-
X1NiCrMoCu31-27-4	1.4563	0,020	0,70	2,00	0,030	≤ 0,010	- ≤ 0,11	26,00 to 28,00	3,00 to 4,00	30,00 to 32,00	-	-	Cu 0,70 to 1,50
X1CrNiMoCuN20-18-7 <sup>3)</sup>	1.4547 <sup>3)</sup>	0,020	0,70	1,00	0,030	0,010	0,18 to 0,25	19,50 to 20,50	6,00 to 7,00	17,500 to 18,50	-	-	Cu 0,50 to 1,00
X1NiMoCuN25-20-7	1.4529	0,020	0,50	1,00	0,030	0,010	0,15 to 0,25	19,00 to 21,00	6,00 to 7,00	24,00 to 26,00	-	-	-

1) For products to be machined a controlled sulfur content of 0,015 to 0,030 % is recommended.

2) Where for special reasons, e.g. hot workability for fabrication where it is necessary to minimize the delta ferrite content, or with the aim of low permeability, the maximum Ni content may be increased by the following amounts:

- 0,50 %: 1.4571

- 1,00 %: 1.4306, 1.4429, 1.4436, 1.4541, 1.4550

- 1,50 %: 1.4404

3) Patented steel

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Table 3 — Steel grades and chemical composition - austenitic-ferritic grades

Steel designation		C max	Si max	Mn max	P max	S max	N	Cr	Mo	Ni	Others
Name	Number	%	%	%	%	%	%	%	%	%	%
X2CrNiN23-4 <sup>2)</sup>	1.4362 <sup>2)</sup>	0,030	1,00	2,00	0,035	0,015	0,05 to 0,20	22,00 to 24,00	0,10 to 0,60	3,50 to 5,50	Cu 0,10 to 0,60
X3CrNiMoN27-5-2	1.4460	0,05	1,00	2,00	0,035	0,030 <sup>1)</sup>	0,05 to 0,20	25,00 to 28,00	1,30 to 2,00	4,50 to 6,50	–
X2CrNiMoN22-5-3	1.4462	0,030	1,00	2,00	0,035	0,015	0,10 to 0,22	21,00 to 23,00	2,50 to 3,50	4,50 to 6,50	–
X2CrNiMoCuN25-6-3	1.4507	0,030	0,70	2,00	0,035	0,015	0,15 to 0,30	24,00 to 26,00	2,70 to 4,00	5,50 to 7,50	Cu 1,00 to 2,50
X2CrNiMoN25-7-4 <sup>2)</sup>	1.4410 <sup>2)</sup>	0,030	1,00	2,00	0,035	0,015	0,20 to 0,35	24,00 to 26,00	3,00 to 4,50	6,00 to 8,00	–
X2CrNiMoCuWN25-7-4	1.4501	0,030	1,00	1,00	0,035	0,015	0,20 to 0,30	24,00 to 26,00	3,00 to 4,00	6,00 to 8,00	W 0,50 to 1,00 Cu 0,50 to 1,00

1) For products to be machined a controlled sulfur content of 0,015 to 0,030 % is recommended.

2) Patented steel

**Table 4 — Permissible deviations between the product analysis and the limiting values given in Tables 1, 2 and 3 for the cast analysis**

Element	Permissible maximum content in the cast analysis %	Permissible deviation %
Carbon	$\leq 0,030$	+ 0,005
	> 0,030 $\leq 0,20$	$\pm 0,01$
	> 0,20 $\leq 0,35$	$\pm 0,02$
Silicon	$\leq 1,00$	+ 0,05
Manganese	$\leq 1,0$	+ 0,03
	> 1,0 $\leq 2,0$	$\pm 0,04$
Phosphorus	$\leq 0,045$	+ 0,005
Sulfur	$\leq 0,015$	+ 0,003
	> 0,015 $\leq 0,030$	+ 0,005
Nitrogen	$\leq 0,35$	$\pm 0,01$
Aluminium	> 0,10 $\leq 0,30$	$\pm 0,05$
Chromium	> 11,50 $\leq 15,00$	$\pm 0,15$
	> 15,00 $\leq 20,00$	$\pm 0,20$
	> 20,00 $\leq 28,00$	$\pm 0,25$
Copper	$\leq 1,00$	$\pm 0,07$
	> 1,00 $\leq 5,00$	$\pm 0,10$
Molybdenum	$\leq 0,60$	$\pm 0,03$
	> 0,60 $\leq 1,75$	$\pm 0,05$
	> 1,75 $\leq 7,00$	$\pm 0,10$
Nickel	$\leq 1,00$	+ 0,03
	> 1,00 $\leq 5,00$	$\pm 0,07$
	> 5,00 $\leq 10,00$	$\pm 0,10$
	> 10,00 $\leq 20,00$	$\pm 0,15$
	> 20,00 $\leq 32,00$	$\pm 0,20$
Titanium	$\leq 0,70$	$\pm 0,05$
Niobium	$\leq 1,00$	$\pm 0,05$
Tungsten	$\leq 1,00$	$\pm 0,05$

## 4 Heat treatment

Heat treatment conditions are given in Tables A.1, A.2 and A.3 for guidance.

The grain size of the forgings shall be left to the discretion of the manufacturer.

If any straightening operation is carried out after the final heat treatment, the procedure shall be such that the forgings would be free from harmful residual stress. If with the agreement of the purchaser, this procedure includes a thermal stress relief this treatment shall also be applied to the test specimens either when still attached to the forging or after removal.

## 5 Mechanical properties

### 5.1 Room temperature properties

The mechanical properties determined on test pieces selected, prepared and tested in accordance with Clauses 11 and 12 of EN 10250-1:1999 shall conform to the property requirements given in Tables 5, 6, 7.