
Ploščati jekleni izdelki za tlačne posode - 4. del: Jekla, legirana z nikljem, s specificiranimi lastnostmi pri nizkih temperaturah

Flat products made of steels for pressure purposes - Part 4: Nickel alloy steels with specified low temperature properties

Flacherzeugnisse aus Druckbehälterstählen - Teil 4: Nickellegierte kaltzähe Stähle

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Produits plats en aciers pour appareils a pression - Partie 4: Aciers alliés au nickel avec propriétés spécifiées a basse température

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77.140.20	Visokokakovostna jekla	Stainless steels
77.140.30	Jekla za uporabo pod tlakom	Steels for pressure purposes
77.140.50	Ploščati jekleni izdelki in polizdelki	Flat steel products and semi-products

SIST EN 10028-4:1997**en**

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EUROPEAN STANDARD

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NORME EUROPÉENNE

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Descriptors: Iron and steel products, metal plates, steel strips, steel, alloy steels, nickel steels, pressure equipment, low temperature steels, delivery condition, chemical composition, mechanical properties, heat treatment, tables (data)

English version

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CEN

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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NOTE:

The clauses marked with two points (••) contain information relating to agreements that may be made at the time of ordering.



FOREWORD

This European Standard has been prepared by ECISS/TC 22 "Steels for pressure purposes - Qualities", the Secretariat of which is held by Normenausschuß Eisen und Stahl (FES) im DIN..

Within the framework of ECISS (European Committee for Iron and Steel Standardization) programme of work, TC 22 was allocated the task of revising EURONORM 28-85 "Steel plate, sheet and strip with elevated temperature properties - Technical delivery conditions" and (where relevant to pressure vessel fabrication) EURONORM 113-72 "Weldable fine-grain structural steels" and replacing them with a European Standard. At its meeting from 10 to 12 July 1990, TC 22 decided also to include EURONORM 129-76 "Nickel alloy steel plate and strip for application at low temperature; quality requirements" in this work. At its meeting on 17 and 18 January 1991, TC 22 then agreed to use ISO/DIS 9328-3: 1990 "Steel plates and strips for pressure purposes - Technical delivery condition - Part 3: Nickel alloyed steels with specified low temperature properties" as a basis for the European Standard and initially to publish it as prEN 10028-4.

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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 March 1995, and conflicting national standards shall be withdrawn at the latest by March 1995.

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According to the CEN/CENELEC Internal Regulations, 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, United Kingdom.

1 Scope

1.1 This Part 4 of EN 10 028 specifies requirements for flat products for pressure purposes made of nickel alloy steels with specified low temperature properties as given in table 1.

1.2 The requirements of EN 10028-1 also apply.

2 Normative references

This European Standard incorporates by dated or undated references 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.

EN 10 020 Definition and classification of grades of steel

EN 10 028-1 Flat products made of steels for pressure purposes - Part 1: General requirements

3 Definitions

See EN 10 028-1.

4 Dimensions and tolerances on dimensions

See EN 10 028-1.

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5 Calculation of mass

See EN 10 028-1.

6 Designation and ordering

See EN 10 028-1.

7 Classification into grades

This European Standard covers the steel grades given in table 1. These are alloy special steels in accordance with EN 10 020.

8 Requirements

8.1 Steelmaking process

See EN 10 028-1.

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8.2 Delivery condition

8.2.1 •• Unless otherwise agreed at the time of ordering, the products specified in this European Standard shall be supplied in the usual conditions given in table 3.

8.2.2 In the case of steel grades 11 MnNi 5-3 and 13 MnNi 6-3, normalizing may be replaced by normalizing rolling. This means that the requirements shall be met again even after subsequent normalizing.

8.2.3 •• If specially agreed, the products may be supplied in the untreated condition.

In these cases, the test shall be carried out on test pieces in the usual delivery condition as given in table 3.

NOTE:

This test on test pieces in the simulated heat treated condition does not free the processor from the obligation of providing proof of the specified properties in the finished product.

8.3 Chemical composition

8.3.1 The information in table 1 applies for the chemical composition according to the cast analysis.

8.3.2 The product analysis may deviate from the specified values of the cast analysis as specified in table 1 by the values given in table 2.

8.4 Mechanical properties

The values given in tables 3 and 4 shall apply (see also EN 10 028-1).

8.5 Surface condition

See EN 10 028-1.

8.6 Internal soundness

See EN 10 028-1.

9 Testing

See EN 10 028-1.

9.1 Type and content of inspection documents

See EN 10 028-1.

9.2 Tests to be carried out

See EN 10 028-1.

9.3 Number of tests

See EN 10 028-1.

9.4 Sampling and sample preparation

See EN 10 028-1.

9.5 Test procedure

9.5.1 See 10 028-1.

9.5.2 Verification of the impact values shall be obtained at the lowest test temperature given in table 4 for the relevant steel grade.

•• Unless otherwise agreed, verification shall be obtained on transverse test pieces.

9.6 Re-tests

See EN 10 028-1.

10 •• Marking

See EN 10 028-1.

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Table 1. Chemical composition (cast analysis)

Steel grade		% by mass ¹⁾										
Name	Steel Number	C	S	Mn	P	S	Al _{hot}	Mo	Nb	Ni	V	
		max.	max.		max.	max.	min.	max.	max.		max.	
11MnNi5-3	1.6212	0,14	0,50	0,70 to 1,50	0,025	0,015	0,020	-	0,05	0,30 ²⁾ to 0,80	0,05	
13MnNi6-3	1.6217	0,16	0,50	0,85 to 1,70	0,025	0,015	0,020	-	0,05	0,30 ²⁾ to 0,85	0,05	
15NiMn6	1.6228	0,18	0,35	0,80 to 1,50	0,025	0,015	-	-	-	1,30 to 1,70	0,05	
12Ni14	1.5637	0,15	0,35	0,30 to 0,80	0,020	0,010	-	-	-	3,25 to 3,75	0,05	
12Ni19	1.5680	0,15	0,35	0,30 to 0,80	0,020	0,010	-	-	-	4,75 to 5,25	0,05	
X8Ni9	1.5662	0,10	0,35	0,30 to 0,80	0,020	0,010	-	0,10	-	8,50 to 10,00	0,05	
X7Ni9	1.5663	0,10	0,35	0,30 to 0,80	0,015	0,005	-	0,10	-	8,50 to 10,00	0,01	

¹⁾ Elements not listed in this table shall not be intentionally added to the steel without the approval of the purchaser except for finishing the cast. All appropriate measures shall be taken to prevent the addition from scrap or other materials used in steelmaking of these elements which may adversely affect the mechanical properties and usability. The content of Cr + Cu + Mo shall not exceed 0,50 %.

²⁾ For thicknesses ≤ 25 mm, a minimum nickel content of 0,15 % is permitted.