



SLOVENSKI STANDARD
oSIST prEN 10248-1:2006
01-junij-2006

Vroče valjane zagate iz nelegiranih jekel - 1. del: Tehnični dobavni pogoji

Hot-rolled steel sheet piling - Part 1: Technical delivery conditions

Warmgewalzte Spundbohlen aus Stählen - Teil 1: Technische Lieferbedingungen

Palplanches en acier laminées a chaud - Partie 1 : Conditions techniques de livraison

Ta slovenski standard je istoveten z: prEN 10248-1

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ICS:

77.140.45	Nelegirana jekla	Non-alloyed steels
77.140.70	Jekleni profili	Steel profiles

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EUROPEAN STANDARD
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Hot-rolled steel sheet piling - Part 1: Technical delivery conditions

Palplanches en acier laminées à chaud - Partie 1 :
Conditions techniques de livraison

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ECISS/TC 10.

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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Foreword

This document (prEN 10248-1:2006) has been prepared by Technical Committee ECISS/TC 10 “Structural steels - Grades and qualities”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 10248-1:1995.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of the EU Construction Products Directive (89/106/EEC).

For relationship with EU Construction products Directive(89/106/EEC), see informative Annex ZA, which is an integral part of this document.

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1 Scope

This part of this European Standard specifies the requirements for hot rolled non alloy steel sheet piling in respect of its chemical composition, mechanical properties and conditions of delivery.

The products specified are for general, structural and civil engineering works.

The types of steel sheet piles covered by this standards are : Z-shaped, U-shaped, straight-web, H-shaped with their interlocking bars. The types of interlocks and the requirements in respect of tolerances on shape and dimensions are specified in Part 2 of this European Standard.

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.

EN 1011-2, *Welding – Recommendations for the welding of metallic materials – Part 2 : Arc welding of ferritic steels*

EN 1990, *EUROCODE 1 : Basis of design*

ENV 1993, *EUROCODE 3 : Design of steel structures*

EN 10002-1, *Metallic materials – Tensile testing – Part 1 : Method of test at ambient temperature.*

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

EN 10021, *General technical delivery requirements for steel and steel products.*

EN 10027-1, *Designation system for steel – Part 1 : Steel names*

EN 10027-2, *Designation system for steel – Part 2 : Steel numbers.*

EN 10045-1, *Metallic materials - Charpy impact test - Part 1: Test method.*

EN 10079, *Definition of steel products.*

EN 10168, *Iron and steel products – Inspection document – Contents*

EN 10204, *Metallic products - Types of inspection documents.*

prEN 10248-2, *Hot rolled steel sheet piling – Part 2 : Tolerances on shape and dimensions.*

CR 10261, *ECISS Information Circular 11 - Iron and steel - Review of available methods of chemical analysis.*

EN ISO 377, *Steel and steel products – Location and preparation of samples and test pieces for mechanical testing*

EN ISO 14284, *Steel and iron – Sampling and preparation of samples for the determination of chemical composition*

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3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 10020, EN 10021 and EN 10079 apply.

4 Information to be supplied by the purchaser

4.1 General

The following information shall be supplied by the purchaser, at the time of the enquiry and order:

- a) details of the product form, length, quantity and any further processing work that is required, e.g. surface treatment;
- b) the designation of the product (in accordance with 6.2);
- c) which type of inspection and which inspection document is required (see 8.1.1).

Where no specific choice is made by the purchaser concerning a) and b), the supplier shall refer back to the purchaser.

NOTE It is recommended that the manufacturer be informed by the purchaser at the time of the order, if the purchaser intends to carry out any surface treatment on the product after delivery.

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4.2 Options

A number of options are specified in clause 10. In the event that the purchaser does not indicate a requirement to implement any of these options, the product shall be supplied in accordance with the basic specification.

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5 Mass of steel

The calculated mass shall be determined using a conventional volumetric mass of 7,85 kg/dm³.

6 Classification and designation

6.1 Classification

This European Standard specifies seven steel grades which are classified as non-alloy quality steels according to EN 10020.

6.2 Designation

6.2.1 Steel names and Steel numbers

Steel names¹ are assigned to steel grades in Tables 1 and 2 in accordance with EN 10027-1. Steel numbers are allocated to steel grades in accordance with EN 10027-2.

¹ Former national designations (steel names) are listed in annex B

6.2.2 Other designation

The products covered by this European Standard shall be designated in the following sequence:

- a) the name of the product, i.e. "Sheet piling";
- b) the number of this European Standard, i.e. EN 10248;
- c) the steel name or number.

EXAMPLE Sheet piling EN10248-S320GP or Sheet piling EN 10248-1.0046,

indicating a sheet piling product in accordance with EN 10248 made of steel S320GP (steel number 1.0046).

7 Technical requirements

7.1 Steel manufacturing process

7.1.1 Manufacturing process

The steel manufacturing process shall be at the manufacturer's option. Where specified at the time of the enquiry and order, the steel manufacturing process shall be reported to the purchaser.

Option 1 : see 10.2

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7.1.2 Method of deoxidation

The method of deoxidation shall be at the option of the manufacturer, except that rimming steel shall not be permitted.

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7.2 Delivery condition

Unless otherwise agreed, sheet piles shall be delivered in the as rolled condition.

Option 2 : see 10.3

7.3 Chemical composition

7.3.1 Upper Limits

The upper limits applicable for both the ladle and the product analysis shall comply with the values given in Table 1.

The product analysis is only verified where specified at the time of the enquiry and order.

Option 3 : see 10.4

7.3.2 Carbon Equivalent Value

The maximum carbon equivalent values (CEV) for the grades S240GP, S270GP, S320GP, S355GP, S390GP, S430GP and S460GP, given in Table 1 shall apply.

The carbon equivalent value shall be determined according to the following formula :

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$$CEV = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15} \quad (1)$$

7.3.3 Copper Content

Where specified at the time of the enquiry and order, the copper content can be between 0,20 % and 0,35 % or 0,35 % and 0,50 %.

Option 4 : see 10.5

7.4 Mechanical properties**7.4.1 Yield Strength – Tensile Strength - Elongation**

Under the inspection and testing conditions as specified in clause 8 and in the delivery condition as specified in 7.2, the yield strength, the tensile strength and the elongation at fracture shall comply with the relevant requirements of Table 2.

7.4.2 Impact energy

The values of impact energy for the grades S240GP, S270GP, S320GP, S355GP, S390GP, S430GP and S460GP, given in Table 2 shall apply.

The impact properties are only verified when specified at the time of the order.

Option 5 : see 10.6

7.5 Technological properties

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7.5.1 Weldability

7.5.1.1 General requirements for the welding of steel sheet pile grades are given in EN 1011-2.

7.5.1.2 Steels specified in this European Standard do not have unlimited suitability for the various welding processes, since the behaviour of a steel during and after welding depends not only on the material, but also on the dimensions and shape and on the manufacturing and service conditions of the components.

7.5.2 Durability**7.5.2.1 General**

Durability is dependent on the chemical composition of the steel.

NOTE

Steels specified in this European Standard can be used in general, structural and civil engineering works without any specific corrosion protection. In this case, the durability of the sheet-piling wall can be ensured by a sacrificial thickness for corrosion allowance. The corrosion rates to be accounted for in order to calculate the sacrificial thickness depend on the environment where sheet-piling are exposed and on the service life of the sheet-piling structure. The sacrificial thickness for corrosion allowance can be determined according to the corrosion rates defined in Eurocode EN 1993-5. The durability of steel sheet-piling can also be enhanced by suitable corrosion protections like organic coatings, metallic coatings, or cathodic protection.

7.5.2.2 Suitability for hot-dip zinc coating

Where specified at the time of the enquiry and order, the suitability and the relevant product quality requirements for hot dip zinc coating may be agreed.

Option 6 : see 10.7

7.6 Load Bearing Capacity**7.6.1 General**

The design of steel sheet-piling structures requires on one hand determination of the actions on the structure, for example the earth pressure, the water pressure, the surface surcharge, etc, and on the other hand determination of the appropriate resistances. The actions will give rise to effects all over the structure, for instance internal forces and moments, stresses, strains and displacements. Additional local effects will also be produced for instance at points of load applications. The resistances of the sheet-piling to the effects of the loads shall be determined according to the calculation methods defined in Eurocode EN 1993-5.

In general, the section resistance can be expressed as the product of the material strength, depending on the steel grade, by a specified geometrical section property, depending on the nominal dimensions of the section. The rules for calculating the section properties from the sheet-piling nominal dimensions are given in the normative Annex C.

7.6.2 Interlock Resistance of Straight Web Sheet-piles

Where a manufacturer wishes to declare interlock resistance of straight web piles, the resistance shall be tested according to the normative Annex D.

The interlock resistance of straight web sheet-piles is verified only when specified at the time of order.

Option 7 : see 10.8

7.6.3 Resistance of Crimped Points of U-piles

Crimped points can be used to enhance the shear force transmission in the interlocks of U-piles.

Where a manufacturer wishes to declare the resistance of crimped points, the resistance shall be tested according to the normative Annex E.

The interlock resistance of crimped points of U-piles is verified only when specified at the time of order.

Option 8 : see 10.9

7.7 Tolerances on dimensions and shape

The tolerances on dimensions and shape defined in EN 10248-2 shall apply. The manufacturer shall declare the dimensional form of the sheet-piles.

7.8 Minimum interference on interlocking

The types of interlocks of the sheet-piles and their minimum interlocking interference shall comply with Table 15 of prEN 10248-2:2005.

prEN 10248-1:2006 (E)**7.9 Surface Condition****7.9.1 General Requirement**

The surface requirements and repair conditions of sheet piling apply to all surfaces excluding interlocks and radii at the connection between web and flange.

7.9.2 Surface imperfections

Sheet piling may have surface imperfections. Surface imperfections are surface discontinuities that are considered as being inherent to the manufacturing process and are permissible irrespective of their number, provided the limits of Table 3 are not exceeded.

7.9.3 Surface defects

Surface discontinuities with a depth exceeding the limits of Table 3 are considered as defects and must be repaired irrespective of their number. Repair by grinding and/or welding is permitted, provided that :

- a) after the elimination of the defect and before welding the thickness shall not be less than 80 % of the nominal thickness,
- b) the sum of the areas repaired by welding, with the exclusion of interlocks and radii at connection between web and flange, shall not be more than 15 % of the surface area of the sheet pile under inspection,
- c) the reinforcement of the groove weld shall be ground flush with the surface of the sheet pile,
- d) the dimensional tolerances specified in EN 10248-2 shall be complied with after repair.

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8 Inspection and testing

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8.1 General

8.1.1 The products shall be delivered either with specific or non-specific inspection and testing to indicate compliance with the order and this European standard.

Option 9 : see 10.10

8.1.2 If specific inspection and testing is requested , then it shall be carried out according to 8.2 to 8.9

8.1.3 Unless otherwise agreed at the time of the enquiry and order, inspection of surface conditions and dimensions shall be carried out by the manufacturer.

Option 10 : see 10.11**8.2 Specific inspection and testing**

Where specific inspection and testing is specified (see 4.1.c), the following tests shall be made :

- the ladle analysis (see.8.4)
- the tensile test (see 8.5).

At the time of the order, the following additional tests can be agreed:

- the product analysis, when the products are delivered by cast
Option 3 : see 10.4
- the impact test
Option 5 : see 10.6
- the interlock resistance of straight web sheet-piles (See annexe D)
Option 7 : see 10.8
- the resistance of crimped points of U-piles (See annexe E)
Option 8 : see 10.9

8.3 Inspection units

The inspection unit shall comprise products of the same section and the same steel grade as specified in Table 2, produced from the same cast or sequence of casts of the same steel grade and shall have a maximum mass of 125 tonnes.

8.4 Chemical composition

For the ladle analysis, the values given by the manufacturer are applicable.

Where the verification of the product analysis is specified, the preparation of samples shall be in accordance with EN ISO 14284.

The purchaser shall specify the number of samples and the elements to measure.

Option 3 :see 10.4

The chemical analysis shall be carried out on the basis of appropriate documents. The choice of a suitable physical or chemical analytical method shall be at the discretion of the manufacturer. The manufacturer shall declare the test method used if required.

NOTE The list of the available documents on chemical analysis is given in CR 10261.

8.5 Tensile testing

8.5.1 Number of samples

One sample shall be taken from each inspection unit. See 8.3.

8.5.2 Position and preparation of test pieces

Samples shall be taken from the product in accordance with Annex A and test pieces prepared in accordance with EN ISO 377.

8.5.3 Test pieces

Test pieces shall be cut in the longitudinal direction, i.e. parallel to the principal rolling direction, and comply with EN 10002-1.

Proportional test pieces having an initial gauge length $L_0 = 5,65 \sqrt{S_0}$ shall be used, where S_0 is the initial cross sectional area of the test piece.