



# SLOVENSKI STANDARD SIST EN 10248-1:2023

01-maj-2023

---

## Vročje valjane jeklene zagatnice - 1. del: Tehnični dobavni pogoji

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

Warmgewalzte Spundbohlen aus Stahl - Teil 1: Technische Lieferbedingungen

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

Ta slovenski standard je istoveten z: EN 10248-1:2023

---

### ICS:

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

**SIST EN 10248-1:2023**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 10248-1**

March 2023

ICS 77.140.70

Supersedes EN 10248-1:1995

English Version

**Hot-rolled steel sheet piles - Part 1: Technical delivery conditions**

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

Warmgewalzte Spundbohlen aus Stahl - Teil 1:  
Technische Lieferbedingungen

This European Standard was approved by CEN on 17 January 2023.

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

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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

Document Preview

[SIST EN 10248-1:2023](https://standards.iteh.ai/SIST/EN/10248-1/2023)

<https://standards.iteh.ai/catalog/standards/sist/2ec481cb-b6db-45ba-ac8a-4051c4285dda/sist-en-10248-1-2023>



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

<b>Contents</b>	<b>Page</b>
European foreword .....	4
<b>1 Scope</b> .....	<b>5</b>
<b>2 Normative references</b> .....	<b>5</b>
<b>3 Terms and definitions</b> .....	<b>6</b>
<b>4 Classification and designation</b> .....	<b>6</b>
4.1 Classification.....	6
4.2 Designation .....	6
<b>5 Information to be supplied by the purchaser</b> .....	<b>6</b>
5.1 Mandatory information .....	6
5.2 Options.....	7
<b>6 Manufacturing process</b> .....	<b>7</b>
6.1 Steel making process .....	7
6.2 Delivery conditions .....	7
<b>7 Requirements</b> .....	<b>7</b>
7.1 General.....	7
7.2 Chemical composition .....	7
7.3 Mechanical properties .....	8
7.4 Technological properties .....	8
7.5 Surface properties .....	9
7.6 Internal soundness.....	9
7.7 Dimensions, tolerances on dimensions and shape.....	9
7.8 Load bearing capacity .....	10
<b>8 Inspection</b> .....	<b>10</b>
8.1 Type of inspection and inspection document.....	10
8.2 Content of inspection document.....	11
8.3 Tests to be carried out for specific inspection .....	11
<b>9 Frequency of testing and preparation of samples and test pieces</b> .....	<b>11</b>
9.1 Test unit .....	11
9.2 Frequency of testing .....	11
9.3 Preparation of samples and test pieces .....	12
9.4 Identification of samples and test pieces .....	13
<b>10 Test methods</b> .....	<b>13</b>
10.1 Chemical analysis.....	13
10.2 Mechanical tests .....	13
10.3 Retests.....	14
10.4 Load bearing capacity .....	14
<b>11 Marking, labelling, packaging</b> .....	<b>15</b>
<b>12 Complaints</b> .....	<b>15</b>
<b>13 Options</b> .....	<b>15</b>
<b>Annex A (normative) Location of samples and test pieces</b> .....	<b>19</b>
<b>Annex B (normative) Calculation of geometrical cross sectional properties</b> .....	<b>20</b>

<b>Annex C (normative) Interlock resistance of straight web sheet piles .....</b>	<b>21</b>
<b>Annex D (normative) Determination of the resistance of crimped points for U-shaped sheet piles .....</b>	<b>23</b>
<b>Annex E (normative) Interlock performance criteria .....</b>	<b>27</b>
<b>Bibliography .....</b>	<b>33</b>

**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

[SIST EN 10248-1:2023](#)

<https://standards.iteh.ai/catalog/standards/sist/2ec481cb-b6db-45ba-ac8a-4051c4285dda/sist-en-10248-1-2023>

**EN 10248-1:2023 (E)****European foreword**

This document (EN 10248-1:2023) has been prepared by Technical Committee CEN/TC 459/SC 3 “Structural steels other than reinforcements”, 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 September 2023, and conflicting national standards shall be withdrawn at the latest by September 2023.

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

This document supersedes EN 10248-1:1995.

In comparison with the previous edition, the following technical modifications have been made:

- a) Document was restructured;
- b) Normative references were updated;
- c) Grades S460 and S500 in quality GP were introduced;
- d) Modification concerning the maximum values for the chemical composition;
- e) Addition of 7.4.3 dedicated for hot-dip zinc-coating and 7.8 for load bearing capacity;
- f) New wording for Clauses 8, 9 and 10 for inspection and testing;
- g) Addition of Clause 12 on the complaints;
- h) Removal of the former Annexes B and C on Euronorms and equivalent designations;
- i) Addition of the Annexes B, C, D and E.

EN 10248 consists of the following parts, under the general title *Hot-rolled steel sheet piles*:

- *Part 1: Technical delivery conditions*
- *Part 2: Tolerances on shape and dimensions*

A further standard prEN 10375 with the title *Hot-rolled steel sheet piles – General (Characteristics, evaluation of conformity and marking)* is in preparation and can be used together with EN 10248 after publication.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

## 1 Scope

This document specifies the requirements for hot rolled steel sheet piles 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 document 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 document.

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

EN 1990:2002,<sup>1</sup> *Eurocode - Basis of structural design*

EN 1993-5:2007, *Eurocode 3 - Design of steel structures - Part 5: Piling*

EN 10020:2000, *Definition and classification of grades of steel*

EN 10021:2006, *General technical delivery conditions for steel products*

EN 10027-1, *Designation systems for steels - Part 1: Steel names*

EN 10027-2, *Designation systems for steels - Part 2: Numerical system*

EN 10079:2007, *Definition of steel products*

EN 10168, *Steel products - Inspection documents - List of information and description*

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

EN 10248-2, *Hot-rolled steel sheet piles - Part 2: Tolerances on shape and dimensions*

CEN/TR 10261, *Iron and steel - European standards for the determination of chemical composition*

EN ISO 148-1, *Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1)*

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

EN ISO 2566-1, *Steel - Conversion of elongation values - Part 1: Carbon and low-alloy steels (ISO 2566-1:2021, Corrected version 2022-06)*

EN ISO 6892-1, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1)*

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

---

<sup>1</sup> As impacted by EN 1990:2002/A1:2005.

**EN 10248-1:2023 (E)**

EN ISO 14713-2:2020, *Zinc coatings - Guidelines and recommendations for the protection against corrosion of iron and steel in structures - Part 2: Hot dip galvanizing (ISO 14713-2:2019)*

**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN 10020:2000, EN 10021:2006 and EN 10079:2007 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

**4 Classification and designation****4.1 Classification****4.1.1 Main quality classes**

The steel grades specified in this document shall be classified as non-alloy quality steels according to EN 10020.

**4.1.2 Grades and qualities**

This document specifies eight steel grades S240, S270, S320, S355, S390, S430, S460 and S500 on the basis of the minimum specified yield strength at room temperature.

The eight steel grades are supplied in quality GP.

**4.2 Designation**

**4.2.1** For the steel grades covered by this document in Table 1 the steel names shall be allocated in accordance with EN 10027-1; the steel numbers shall be allocated in accordance with EN 10027-2.

**4.2.2** The designation of the steel grade shall consist of: [48-1:2023](https://standards.iteh.ai/catalog/standards/sist/2ec481cb-b6db-45ba-ac8a-4051c4285dda/sist-en-10248-1-2023)

- the number of this document (EN 10248-1);
- the steel name or the steel number.

**EXAMPLE** Steel sheet piles in accordance with EN 10248-1 made of structural steels (S) with a specified minimum yield strength at room temperature of 430 MPa, followed by GP for steel sheet piles:

EN 10248-1 – S430GP

or

EN 10248-1 – 1.0523

**5 Information to be supplied by the purchaser****5.1 Mandatory information**

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

- a) quantity to be delivered;
- b) product name (including all necessary information);



- c) the name of the standard for tolerances on dimensions and shape (see 7.7);
- d) length and delivery form;
- e) steel designation (see 4.2.2);
- f) additional requirements of inspection and testing and all required options (see 5.2 and Clause 13);
- g) type of inspection document according to EN 10204 (see 8.1).

## 5.2 Options

A number of options are specified in Clause 13. In the event that the purchaser does not indicate his wish to implement any of these options, the supplier shall supply in accordance with the basic specification, see 5.1 a) to e) and g).

## 6 Manufacturing process

### 6.1 Steel making process

The steel making process is at the discretion of the manufacturer with the exclusion of the open hearth (Siemens-Martin) process.

See *Option 1*, Clause 13, (Details of manufacturing process).

### 6.2 Delivery conditions

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

See *Option 2*, Clause 13, (Delivery conditions).

## 7 Requirements

### 7.1 General

The requirements in 7.2 and 7.3 apply for sampling, preparation of test pieces and testing specified in Clauses 9 and 10.

### 7.2 Chemical composition

**7.2.1** The chemical composition determined by heat analysis shall comply with the specified values of Table 1.

For elements not specified in tables for the chemical composition for heat analysis, limit values of Table 1 of EN 10020:2000 shall apply as maximum values.

**7.2.2** The upper limits applicable for the product analysis are given in Table 2.

For elements not specified in tables for the chemical composition for product analysis, limit values of Table 1 of EN 10020:2000 shall apply as maximum values.

**7.2.3** The maximum carbon equivalent values for the grades based on the heat analysis given in Table 1 shall apply.

The maximum carbon equivalent values for the grades based on the product analysis given in Table 2 shall apply.

For determining the carbon equivalent value, the following IIW (International Institute of Welding) formula shall be used:

**EN 10248-1:2023 (E)**

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

**7.2.4** For all steel grades a copper-content between 0,20 % and 0,35 %, or between 0,35 % and 0,50 % on the heat analysis (for different corrosion protection levels) can be agreed upon at the time of enquiry and order. In both cases, the maximum carbon equivalent value of Table 1 shall be increased by 0,02.

See **Option 3**, Clause 13, (Cu alloyed).

**7.2.5** When products of grades S270 to S355 are supplied with a control on Si, e. g. for hot-dip zinc-coating, so that there could be a need to increase the content of other elements like C and Mn to achieve the required tensile properties, the maximum carbon equivalent values of Table 1 may be increased as follows:

- for Si ≤ 0,04 %, increase the value of the CEV by 0,02;
- for Si ≤ 0,25 %, increase the value of the CEV by 0,01.

**7.3 Mechanical properties****7.3.1 General**

Under the inspection and testing conditions as specified in Clauses 8, 9 and 10, the mechanical properties shall comply with the values given in Table 3.

**7.3.2 Impact properties**

The impact properties shall be verified by test at the temperature given in Table 3, unless otherwise agreed upon at the time of the order.

Using test pieces of width less than 10 mm, the minimum values given in Table 3 shall be reduced in direct proportion to the cross-sectional area of the test piece.

See **Option 4**, Clause 13, (Verification of impact energy).

**7.4 Technological properties**

<https://standards.iteh.ai/catalog/standards/sist/2ec481cb-b6db-45ba-ac8a-4051c4285dda/sist-en-10248-1-2023>

**7.4.1 Weldability**

General requirements for arc welding of the steels shall be as given in EN 1011-2. In general, steel sheet pile grades are suitable for arc welding.

**NOTE 1** With increasing product thickness and strength level, cold cracking can occur. Cold cracking is caused by the following factors in combination:

- the amount of diffusible hydrogen in the weld metal;
- a brittle structure of the heat affected zone;
- significant tensile stress concentrations in the welded joint.

**NOTE 2** Steels specified in this document 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.

**7.4.2 Flame straightening**

Recommendations regarding flame straightening are laid down in CEN/TR 10347.

### 7.4.3 Hot-dip zinc-coating

EN ISO 1461 should be used to specify coating requirements. EN ISO 14713-2 provides further guidance, including information on the influence of various factors, including steel chemical composition, on the coating formation.

Option 5, Clause 13, can be used to order steels with a chemical composition required for hot-dip zinc coating. When Option 5 is implemented, the purchaser and manufacturer shall agree to a steel composition (heat analysis) of silicon and phosphorous according to either:

- Category A (see also EN ISO 14713-2:2020, Table 1, Note 1); or
- Category B; or
- Category D (limited to  $0,25 \% < \text{Si} \leq 0,35 \%$ )

with required values as cited by the ranges given in EN ISO 14713-2:2020, Table 1, column 2.

NOTE EN ISO 14713-2:2020, Table 1, gives guidance on typical coating characteristics associated with certain steel compositions on the basis of the surface composition of silicon and phosphorous.

The maximum carbon equivalent shall be increased by 0,02 or by 0,01 (see 7.2.5).

In some cases, steels above S460 may be sensitive to cracking during galvanizing and therefore special care should be taken.

See **Option 5**, Clause 13, (Chemical composition for hot-dip zinc-coating).

### 7.5 Surface properties

EN 10163-1 and EN 10163-3 shall apply for the permissible surface discontinuities and for the repair of surface defects by grinding and/or welding. Class C, subclass 1 of EN 10163-3 shall apply, unless otherwise agreed upon at the time of the order.

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

See **Option 6**, Clause 13, (Other surface class).

### 7.6 Internal soundness

The internal soundness shall be in accordance with EN 10021.

### 7.7 Dimensions, tolerances on dimensions and shape, mass

Dimensions, tolerances on dimensions and shape shall be in accordance with the requirements given in the standard EN 10248-2.

The nominal mass shall be determined from the nominal dimensions using a volumetric mass of  $7\,850 \text{ kg/m}^3$ .