



# SLOVENSKI STANDARD SIST EN 10120:2008

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Steel sheet and strip for welded gas cylinders

Stahlblech und -band für geschweißte Gasflaschen

Tôles et bandes pour bouteilles à gaz soudées en acier

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**ICS:**

77.140.50 Ú[[ z æå\|^} å å^|\ åå Flat steel products and semi-products  
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**SIST EN 10120:2008**

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EUROPEAN STANDARD

EN 10120

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

## Steel sheet and strip for welded gas cylinders

Tôles et bandes pour bouteilles à gaz soudées en acier

Stahlblech und -band für geschweißte Gasflaschen

This European Standard was approved by CEN on 1 August 2008.

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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 Management Centre has the same status as the official versions.

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## Foreword

This document (EN 10120:2008) has been prepared by Technical Committee ECISS/TC 22 “Steels for pressure purposes - Qualities”, 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of an identical text or by endorsement, at the latest by March 2009, and conflicting national standards shall be withdrawn at the latest by March 2009.

This document supersedes EN 10120:1996.

NOTE The clauses marked with a point (●) contain information relating to agreements which are to be made at the time of enquiry and order. The clauses marked by two points (●●) contain information relating to agreements that may be made at the time of enquiry and order.

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

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**EN 10120:2008 (E)****1 Scope**

This European Standard specifies requirements for hot-rolled sheet and strip up to 5 mm thickness of steels listed in Table 1 and intended for the manufacture of welded gas cylinders.

The general technical delivery conditions in EN 10021 also apply to products supplied in accordance with this European Standard.

**2 Normative references**

The following referenced documents are indispensable for the application 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 10002-1:2001, *Metallic materials — Tensile testing — Part 1: Method of test at ambient temperature*

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

EN 10021, *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 10051, *Continuously hot rolled uncoated plate, sheet and strip of non-alloy and alloy steels — Tolerances on dimensions and shape*

EN 10052:1993, *Vocabulary of heat treatment terms for ferrous products*

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*

CEN/TR 10261, *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 (ISO 377:1997)*

EN ISO 2566-1, *Steel — Conversion of elongation values — Part 1: Carbon and low alloy steels (ISO 2566-1:1984)*

EN ISO 14284, *Steel and iron — Sampling and preparation of samples for the determination of chemical composition (ISO 14284:1996)*

**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN 10020:2000, EN 10052:1993 (but see 3.1), EN 10079:2007 and the following apply.

**3.1**

**normalizing rolling** [deviating from EN 10052:1993]

rolling process in which the final deformation process is carried out in a certain temperature range leading to a material condition equivalent to that obtained after normalizing so that the specified values of the mechanical properties are retained even after normalizing

NOTE The symbol for this delivery condition is N.

**4 Classification and designation****4.1 Classification**

The steels specified in this European Standard are non-alloy quality steels in accordance with EN 10020.

**4.2 Designation**

The steel grades are designated with steel names in accordance with EN 10027-1. The corresponding steel numbers have been allocated in accordance with EN 10027-2.

**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 enquiry and order:

- a) quantity required;
- b) type of flat products (sheet or strip);
- c) nominal dimensions of the product (length<sup>1</sup>, width, thickness);
- d) number of this European Standard;
- e) steel name or number (see Table 1 or 3);
- f) delivery condition (see 6.2 and 7.5);
- g) inspection document to be delivered (see 8.1.1).

**5.2 Options**

A number of options are specified in this European Standard and listed below. If the purchaser does not indicate his wish to implement any of these options the products shall be supplied in accordance with the basic specification (see 5.1).

- 1) Information on the melting and deoxidation process (see 6.1.1 and 6.1.2)
- 2) Product analysis (see 7.1.2 and Table 4)
- 3) Sampling conditions for the product analysis (see 9.2.2)

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1) For sheet only

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4) Special marking conditions (see Clause 11)

**5.3 Example of ordering**

10 t sheets with nominal dimensions of thickness = 4,0 mm, width = 600 mm, length = 1 200 mm, made of the steel grade P265NB (1.0423) as specified in EN 10120, delivered normalized, descaled and oiled, inspection certificate 3.1 in accordance with EN 10204:

10 t sheet – 600x1200x4,0 – EN 10120 – P265NB– normalized and oiled – EN 10204-3.1

or

10 t sheet – 600x1200x4,0 – EN 10120 – 1.0423– normalized and oiled – EN 10204-3.1

**6 Manufacturing process****6.1 Steelmaking process**

**6.1.1** ●● The melting and deoxidation process shall be at the discretion of the manufacturer with the limitations to 6.1.2 and 6.1.3 and Table 1, unless otherwise agreed at the time of enquiry and order.

**6.1.2** ●● The steel shall be manufactured using the electric arc process or an oxygen process. Other melting processes may be used by agreement at the time of enquiry and order. On request, the purchaser shall be informed of the process used.

**6.1.3** The used type of deoxidation shall ensure that the steel has an acceptable degree of resistance to ageing (see Table 1, footnote b).

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**6.2 Delivery condition**

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● The delivery condition shall be specified at the time of enquiry and order. Usual delivery conditions are:

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a) hot rolled and normalized (N)<sup>2)</sup> ;

b) hot rolled (AR).

NOTE The delivery condition "hot rolled and normalized<sup>2)</sup>" is generally used for gas cylinders which are only stress relieved after welding. The "hot rolled" delivery condition is only intended for gas cylinders which are normalized after welding.

**7 Requirements****7.1 Chemical composition****7.1.1 Cast analysis**

The cast analysis reported by the steel producer shall apply and comply with the requirements of Table 1.

**7.1.2 Product analysis**

The product analysis shall not deviate from the limiting values for the cast analysis as specified in Table 1 by more than the values given in Table 2.

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2) This includes the normalizing rolled condition.



**Table 1 — Chemical composition of the cast analysis, in %<sup>a</sup>**

| Steel grade |              | C    | Si   | Mn   | P     | S     | Al <sub>total</sub> <sup>b</sup> | N <sup>c</sup> | Nb    | Ti   |
|-------------|--------------|------|------|------|-------|-------|----------------------------------|----------------|-------|------|
| Steel name  | Steel number | max. | max. | min. | max.  | max.  | min.                             | max.           | max.  | max. |
| P245NB      | 1.0111       | 0,16 | 0,25 | 0,30 | 0,025 | 0,015 | 0,020                            | 0,009          | 0,050 | 0,03 |
| P265NB      | 1.0423       | 0,19 | 0,25 | 0,40 | 0,025 | 0,015 | 0,020                            | 0,009          | 0,050 | 0,03 |
| P310NB      | 1.0437       | 0,20 | 0,50 | 0,70 | 0,025 | 0,015 | 0,020                            | 0,009          | 0,050 | 0,03 |
| P355NB      | 1.0557       | 0,20 | 0,50 | 0,70 | 0,025 | 0,015 | 0,020                            | 0,009          | 0,050 | 0,03 |

<sup>a</sup> Elements not listed in this table may not be intentionally added to the steel without the agreement 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.

<sup>b</sup> The aluminium content may partly be replaced by  $\leq 0,050$  % Nb and/or  $\leq 0,03$  % Ti (see 6.1.3). In such cases the content of these elements is to be reported in the inspection document.

<sup>c</sup> If the ratio of  $\frac{Al_{total}}{N} \geq 2,2$  or if Nb and/or Ti additions are applied, the nitrogen content may be  $\leq 0,012$  %.

**Table 2 – Permissible product analysis tolerances on the limiting values given in Table 1 for the cast analysis**

| Element             | Limiting value of the cast analysis | Permissible deviation of the product analysis |
|---------------------|-------------------------------------|---|
| C                   | $\leq 0,20$                         | + 0,02  |
| Si                  | $\leq 0,50$                         | + 0,05  |
| Mn                  | $\geq 0,30$                         | - 0,05  |
| P                   | $\leq 0,025$                        | + 0,005                                       |
| S                   | $\leq 0,015$                        | + 0,003                                       |
| Al <sub>total</sub> | $\geq 0,020$                        | - 0,005                                       |
| N                   | $\leq 0,009$                        | + 0,002                                       |
| Nb                  | $\leq 0,050$                        | + 0,010                                       |
| Ti                  | $\leq 0,03$                         | + 0,01  |

## 7.2 Mechanical properties

The mechanical properties shall comply with the values in Table 3 which are applicable to samples in the normalized or normalizing rolled condition.