SLOVENSKI STANDARD
SIST EN 10111:2008

01-junij-2008

Nadomeģ a:
SIST EN 10111:1998

Kontinuirno vroļ e valjane ploļ evine in trakovi iz maloogljiļ nega jekla za preoblikovanje v hladnem - Tehniļ ni dobavni pogoji

Continuously hot rolled low carbon steel sheet and strip for cold forming - Technical delivery conditions

Kontinuierlich warmgewalztes Band und Blech aus weichen Stählen zum Kaltumformen - Technische Lieferbindungen

Bandes et tôles laminées a chaud en continu, en acier doux pour emboutissage ou pliage a froid - Conditions techniques de livraison

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Ta slovenski standard je istoveten z: **EN 10111:2008**

ICS:

77.140.50	Ploģļ ati jekleni izdelki in polizdelki	Flat steel products and semi-products

SIST EN 10111:2008 **en,de**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 10111

April 2008

ICS 77.140.50

Supersedes EN 10111:1998

English Version

Continuously hot rolled low carbon steel sheet and strip for cold forming - Technical delivery conditions

Tôles et bandes en acier doux laminées à chaud en continu pour formage à froid - Conditions techniques de livraison

Kontinuierlich warmgewalztes Band und Blech aus weichen Stählen zum Kaltumformen - Technische Lieferbindungen

This European Standard was approved by CEN on 29 February 2008.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 10111:2008) has been prepared by Technical Committee ECISS/TC 13 “Flat products for cold working - Qualities, dimensions, tolerances and specific tests”, the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by October 2008, and conflicting national standards shall be withdrawn at the latest by October 2008.

This document supersedes EN 10111:1998.

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1 Scope

This European Standard specifies the grades of continuously hot rolled low carbon steel sheet and strip (in coils) for cold forming.

Depending on its actual width, strip is classified as:

— hot rolled wide strip if its width is greater than or equal to 600 mm;

— hot rolled slit wide strip if its width is less than 600 mm.

For each grade, it specifies the chemical composition and the mechanical properties.

This European Standard is applicable to products of thickness not less than 1,0 mm and not exceeding 11 mm.

This European Standard is not applicable to products covered by other standards, such as:

— hot rolled products of non-alloy structural steels for general use (see EN 10025 all parts);

— steel sheet for pressure purposes (see EN 10028 all parts);

— steel sheet for welded gas cylinders (see EN 10120);

— quenched and tempered steels (see EN 10083-1 and EN 10083-2).

2 Normative references

SIST Preview
(Standard Preview)

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.

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

EN 10021, *General technical delivery requirements 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 10079, *Definition of steel products*

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

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 European Standard, the terms and definitions of hot rolled flat products are those given in EN 10079.

4 Classification and designation

4.1 Classification

The choice of steel grade and product type is left to the purchaser. For this choice, the purchaser may be advised by the manufacturer, but without any liability on the part of the latter, unless agreed at the time of enquiry and order.

Hot rolled products are classified into four grades DD11, DD12, DD13 and DD14 defined by chemical composition, mechanical and forming characteristics (see Table 1).

4.2 Designation

4.2.1 The steel names are in compliance with EN 10027-1; the steel numbers, with EN 10027-2.

4.2.2 Products conforming to this European Standard shall be designated, in order, in the following way:

a) product designation (e.g. “strip”, “sheet” or “slit strip cut longitudinally”) in line with EN 10079;

b) number of this European Standard (EN 10111);

c) symbolic or numerical designation of the steel (see Table 1).

EXAMPLE Strip EN 10111 – DD13

or

Strip EN 10111 – 1.0335

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5 Requirements

5.1 Steelmaking and manufacturing processes

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Unless otherwise agreed at the time of enquiry and order, the steelmaking and manufacturing processes are left to the discretion of the manufacturer.

The purchaser shall be informed of these processes if he specifies it.

5.2 Deoxidation

For grade DD11 the method of deoxidation shall be at the manufacturer’s discretion. Grades DD12, DD13 and DD14 shall be fully killed.

5.3 Chemical composition

Table 1 gives the permissible chemical composition limits in the cast.

5.4 Delivery conditions

5.4.1 The products shall usually be delivered with their surface as rolled. By agreement at the time of enquiry and order, the products may be delivered with descaled surface. When they are delivered as rolled, they are covered with a thin layer of scale of variable coloration.

The products may be supplied with a light skin-pass, either at the manufacturer’s discretion or by agreement at the time of enquiry and order.

5.4.2 The descaled products are usually delivered oiled. In this case, both surfaces are preserved by a layer of neutral non-drying oil, free of impurities, and uniformly spread in such a way that under normal conditions of packaging, transportation, handling and storage the products will show no corrosion for up to three months from the date on which the products are made available. The date of availability shall be notified to the purchaser with reasonable prior notice compatible with the validity of corrosion resistance.

The layer of oil shall be capable of being removed by alkaline solutions or usual solvents.

The choice of protective oils may be subject to special agreement at the time of enquiry and order.

If the conditions of transportation or storage are such that special protection against corrosion is required, the purchaser shall inform the manufacturer at the time of enquiry and order.

If the purchaser does not require the surfaces to be oiled, this shall be clearly indicated at the time of enquiry and order.

NOTE If the order is for unoiled products, the manufacturer is not responsible for the risk of corrosion. The purchaser is also advised that there is a greater risk of the appearance of light scratches during handling, transportation and putting into application.

5.4.3 Descaled products may be supplied with trimmed edges upon agreement at the time of enquiry and order (designation GK following EN 10051).

5.5 Mechanical properties

Table 1 gives the basic mechanical properties valid for the four grades.

They correspond to the increasing formability in the order DD11 to DD14.

The characteristics indicated in Table 1 are valid for the period specified in the same Table 1, from the date on which the products are made available.

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The date of availability shall be notified to the purchaser with reasonable prior notice compatible with the validity of the mechanical properties.

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Subject to special agreement, the products may be supplied with special suitability for the production of a specific part. In this case, a maximum rejection percentage may be set by mutual agreement and acceptance on the basis of mechanical properties does not apply.

5.6 Surface characteristics

The sheets shall be free of slivers, blow holes, seams, cracks or scratches which would adversely affect their use.

Pores, small pits, small marks, small scratches, kinks from pay-off reels and a slight coloration are permitted.

The defects shall not be of such an extent that they might run the risk of causing failure or damage to tooling or welding difficulties when in use.

The surface quality of the unwound coil is assessed as for sheets. However, the percentage of surface defects is generally greater than when supplied in sheets. The maximum percentage of permissible rejections shall be fixed by special agreement at the time of enquiry and order.

5.7 Suitability for surface coating

The products may be intended for metallic coating by the hot dipping or electrodeposition and/or organic or other coatings. When such a coating is required, it shall be specified at the time of enquiry and order.

5.8 Weldability

The products are suitable for standard welding processes. However, the welding process and possible specific requirements of the resulting welded component should be specified at the time of enquiry and order, e.g. gas welding, structural safety requirements.

For non-descaled products, the welding process shall take into account the presence of a layer of scale.

5.9 Tolerances on dimensions and shape

The tolerances on dimensions and shape are given in EN 10051

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Table 1 — Characteristics [a]

Steel name	Steel number	Method of deoxidation	Ladle analysis chemical composition [b]				Mechanical properties [c]							Validity
							R_{eL} [d]		R_m	Minimum elongation after fracture				
										$L_0 = 80$ mm			$L_0 = 5{,}65\sqrt{S_0}$	
			C	Mn	P	S	1,0 mm ≤ e e < 2 mm	2 mm ≤ e e ≤ 11 mm		1,0 mm ≤ e e < 1,5 mm	1,5 mm ≤ e e < 2 mm	2 mm ≤ e e < 3 mm	3 mm ≤ e e ≤ 11 mm	
			max. %	max. %	max. %	max. %	MPa	MPa	max. MPa	%	%	%	%	months
DD11	1.0332	At the discretion of the manufacturer	0,12	0,60	0,045	0,045	170 to 360	170 to 340	440	22	23	24	28	–
DD12	1.0398	Fully killed	0,10	0,45	0,035	0,035	170 to 340	170 to 320	420	24	25	26	30	6
DD13	1.0335	Fully killed	0,08	0,40	0,030	0,030	170 to 330	170 to 310	400	27	28	29	33	6
DD14	1.0389	Fully killed	0,08	0,35	0,025	0,025	170 to 310	170 to 290	380	30	31	32	36	6

NOTE 1 MPa = 1 N/mm^2.

a The mechanical characteristics relate only to hot rolled non-descaled or chemically descaled and oiled products, skin-passed or not.

b Unless otherwise agreed at the time of enquiry and order, nitrogen-fixing elements such as titanium and boron may be added at the discretion of the manufacturer.

c As long as the width of the product permits, the test pieces for the tensile tests shall be taken transverse to the direction of rolling.

d $R_{p0,2}$ shall be used instead of R_{eL} if the product does not exhibit any yield phenomenon.

e It is recommended that products in grade DD11 should be formed within 6 weeks from the time of their availability.

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