SLOVENSKI STANDARD
SIST EN 10209:2013

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Hladno valjani ploščati izdelki iz maloogljičnih jekel za emajliranje - Tehnični dobavni pogoji

Cold rolled low carbon steel flat products for vitreous enamelling - Technical delivery conditions

Kaltgewalzte Flacherzeugnisse aus weichen Stählen zum Emaillieren - Technische Lieferbedingungen

Produits plats laminés à froid, en acier doux pour émaillage par vitrification - Conditions techniques de livraison

Ta slovenski standard je istoveten z: **EN 10209:2013**

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Cold rolled low carbon steel flat products for vitreous enamelling - Technical delivery conditions

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Foreword

This document (EN 10209:2013) has been prepared by Technical Committee ECISS/TC 109 “Flat products for cold working - Qualities, dimensions, tolerances and specific test”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.

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This document supersedes EN 10209:1996.

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1 Scope

This European Standard applies to cold rolled non-coated low carbon steel flat products in rolled widths equal to or over 600 mm and in thicknesses equal to or less than 3 mm, delivered in sheet, wide strip, slit wide strip or cut lengths obtained from slit wide strip or sheet.

It does not apply to cold rolled narrow strip (rolling width < 600 mm) nor to cold rolled flat products for which there is a specific standard, in particular the following:

— cold-rolled low carbon steel flat products for cold forming (EN 10130);

— cold-rolled non oriented electrical steel sheet and strip delivered in fully processed state (EN 10106);

— cold rolled electrical non-alloy and alloy steel sheet and strip delivered in the semi-processed state (EN 10341);

— cold reduced blackplate (EN 10205);

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

— cold-rolled uncoated non-alloy mild steel narrow strip for cold forming (EN 10139);

— cold-rolled structural steels for general purposes;

— cold-rolled flat products made of high yield strength for cold forming (EN 10268).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 10049, *Measurement of roughness average Ra and peak count RPc on metallic flat products*

EN 10079:2007, *Definition of steel products*

EN 10131, *Cold rolled uncoated and zinc or zinc-nickel electrolytically coated low carbon and high yield strength steel flat products for cold forming - Tolerances on dimensions and shape*

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

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

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

ISO 10113, *Metallic materials — Sheet and strip — Determination of plastic strain ratio*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 10079:2007.

4 Designation

4.1 Steel names are attributed in accordance with EN 10027-1; numerical designations are attributed in accordance with EN 10027-2.

All steels reported in Table 2 are non alloy and alloy quality steels.

4.2 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”);

b) number of this European Standard (EN 10209);

c) name or numerical designation of the steel, shown in Table 2;

d) where appropriate, the symbol relating to surface finish (see Table 1).

Examples of conventional designations:

Designation of a steel sheet with the symbolic designation DC01EK and the numerical designation 1.0390 with rough surface finish (*r*):

Sheet EN 10209 DC01EK *r* or

Sheet EN 10209 — 1.0390 *r*

Designation of a wide strip of steel with the symbolic designation DC06ED and the numerical designation 1.0872 with normal surface finish (*m*):

Wide strip EN 10209 — DC06ED *m* or

Wide strip EN 10209 — 1.0872 *m*.

5 Requirements

5.1 Steelmaking and manufacturing processes

Unless otherwise agreed at the time of ordering, the production methods shall be left to the discretion of the manufacturer.

The purchaser shall be informed of these processes if specified in the purchase order.

5.2 Method of deoxidation

See Table 2.

5.3 Chemical composition

The maximum values for the chemical compositions based on ladle analysis shall be as given in Table 2.

5.4 Suitability for vitreous enamelling

5.4.1 Qualities DCO1EK, DC04EK, DC05EK and DC06EK are suitable for one or two coats of conventional enamelling.

5.4.2 Qualities DC03ED, DC04ED and DC06ED are suitable for direct enamelling, as well as for the two coat – one fire process and for the special applications of two coat enamelling for sag resistance.

5.4.3 The following methods of test are defined in order to determine the suitability of the steel for enamelling:

— hydrogen permeation test (see Annex A) (alternatively, if agreed at the time of ordering, an enamelling test as described in A.2 may be specified).

NOTE These two tests enable the risk of fish scaling following enamelling to be assessed.

— iron loss test for qualities of steel for direct enamelling as described in 5.4.2 (see Annex B).

5.4.4 An enamel adherence test (see Annex C) is also defined (pretreatment and enamelling conditions shall be agreed at the time of ordering).

5.4.5 The application of the methods of test described in Annex A, Annex B and Annex C may be the subject of an agreement at the time of ordering.

5.5 Delivery condition

5.5.1 Products specified in this standard should be supplied in the skin-passed condition. If agreed at the time of ordering non-skin-passed products may be supplied.

5.5.2 The products are normally delivered oiled. In this case, both the surfaces are preserved by a layer of neutral non-drying oil, free of foreign bodies 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.

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 the ordering.

The layer of oils shall be capable of being removed by alkaline solutions or normal solvents.

The choice of protective oils may be the subject of special agreement.

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

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

5.6 Choice of properties

The products covered by this European Standard shall correspond to the requirements of Table 1 and Table 2.

Subject to agreement between the supplier and the purchaser, they may be supplied with particular 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 would not apply.

5.7 Mechanical properties

The mechanical properties given in Table 2 only apply to skin-passed products. These mechanical properties are valid for the period specified in Table 2 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 the mechanical properties.

5.8 Surface characteristics

5.8.1 General

The surface characteristics consist of the surface appearance and surface finish.

5.8.2 Surface appearance

The products are supplied with a surface appearance which does not adversely affect suitability for forming, the application of an enamel coating and the uniform appearance of the enamelled surface on the exposed surface.

When supplied as wide strip and slit strip, the percentage of surface defects may be higher than when supplied as sheet and cut lengths. This shall be taken into account by the purchaser and the permissible percentage of surface defects shall be set by special agreement at the time of ordering.

Unless otherwise agreed, a single surface of the product shall comply with the specified requirements. The other surface shall be such that during subsequent treatment it does not have a deleterious effect on the better surface.

5.8.3 Surface finish

The surface finish may be normal or rough.

In the absence of a requirement in the order, products shall be supplied with the normal surface finish.

The limiting figures for average surface roughness for the two types of finish are given in Table 1.

The measurements shall be made in accordance with EN 10049.

If specially agreed at the time of ordering, other ranges for surfaces are specified for specific end uses.

Table 1 — Surface finishes and standard roughness

Surface finish	Symbol	Roughness
Normal Rough	*m* *r*	0,6 μm < R_a ≤ 1,9 μm R_a > 1,6 μm

5.9 Stretcher strain marks

All the products are generally subjected to a light skin-pass after annealing at the manufacturer's works to avoid the formation of stretcher strain marks during subsequent forming. The tendency to form such marks may reappear a certain time after the skin-pass. It is therefore in the purchaser's interest to form the products as soon as possible.

Quality DC06EK and DC06ED products do not exhibit stretcher strain marks after deformation.

For the other qualities the absence of stretcher strain marks may be guaranteed for six months after the products are made available.

5.10 Weldability

The material is specified as suitable for normal welding procedures as long as the products are degreased beforehand. The welding procedure shall be specified at the time of ordering (see 10 h).

5.11 Tolerances on dimensions and shape

Tolerances on dimensions and shape are given in EN 10131.

6 Tests

6.1 General

6.1.1 The purchaser shall specify at the time of ordering his requirements for:

— type of inspection and testing: specific or non-specific, see EN 10021;

— type of inspection document, see EN 10204.

6.1.2 Specific inspection and testing shall be carried out in accordance with 6.2, 6.3, 6.4, 6.5 and 6.6.

6.1.3 Specific inspection and testing may not be specified either for the product analysis or the surface finish.

6.2 Inspection units

The inspection unit is 30 t or a fraction of 30 t products of the same grade and nominal thickness.

When a wide coil exceeds 30 t, it constitutes a single inspection unit, as do its products.

6.3 Number of tests

For each inspection unit a tensile test shall be carried out, and if required, a determination of *r* and of the suitability for enamelling shall be performed (see Table 2 and Annex A, Annex B and Annex C).

6.4 Sampling

The requirements of EN ISO 377 and EN 10021 are supplemented by the following specific requirements.

For sheet and cut lengths the selection of products to be tested and the position of the samples in the products is left to the discretion of the inspection representative.

In the case of wide strip and slit wide strip, the sample should preferably be taken from the outer end.

If the width of the product permits, the test pieces for the tensile test shall be taken perpendicular to the direction of rolling at a distance of at least 50 mm from the edge of the product.

6.5 Test methods

6.5.1 The products shall be tested in the as-delivered condition. The tests shall be carried out at ambient temperature.

6.5.2 The tensile test shall be carried out as specified in EN ISO 6892-1 using type 2 test pieces (initial gauge length L_o = 80 mm, width b = 20 mm).

6.5.3 Surface roughness shall be measured in accordance with EN 10049.

6.5.4 The determination of the plastic strain ratio *r* shall be carried out in accordance with ISO 10113.

6.5.5 The tests for suitability for enamelling (see 5.4.3) shall be carried out in accordance with

— Annex A for the fish scaling resistance test;

— Annex B for the mass loss due to pickling test;

— Annex C for the adherence test.

6.5.6 For the determination of the chemical composition the corresponding European Standards shall apply in cases of dispute.

6.6 Retests

The requirements of EN 10021 shall apply. For coils, in the event of the test results giving rise to dispute, the samples for retests shall be taken at intervals of at least one lap but also at a maximum distance of 20 m from the appropriate end.

6.7 Inspection documents

If agreed at the time of ordering, an inspection document chosen from those given in EN 10204 shall be supplied (see also 6.1.1).

7 Identification

All materials shall be identified with at least the following information:

— the conventional designation as described in Clause 4;

— the coil or bundle number;

— the supplier's mark.

Typically, the identification is applied by either a label or using an easily removable non-corrosive ink on the inspected surface. Other identification requirements shall be agreed at the time of ordering.

8 Packaging

The packaging requirements shall be agreed at the time of ordering.

9 Disputes

With regard to any claims and actions, EN 10021 shall apply.

10 Information to be supplied by the purchaser at the time of ordering

To permit the manufacturer to supply products conforming to this standard, the following information should be given in the order:

a) the full designation as given in Clause 4;

b) nominal dimensions and quantities;

c) if the products are to be supplied non skin-passed,

d) if the products are to be delivered with mill edges or sheared edges;

e) limits on mass and sizes of coils and individual bundles;

f) intended application for the products;

g) enamelling process used (see Annex D);