



SLOVENSKI STANDARD
oSIST prEN 10251:2023

01-marec-2023

**Magnetni materiali - Metode za ugotavljanje geometrijskih lastnosti
elektropločevin in trakov**

Magnetic materials - Methods of determination of the geometrical characteristics of
electrical steel sheet and strip

Magnetische Werkstoffe - Verfahren zur Bestimmung der geometrischen Kenngrößen
von Elektroblech und -band

Matériaux magnétiques - Méthodes de détermination des caractéristiques géométrique
des bandes et tôles en acier électrique

<https://standards.iteh.ai/catalog/standards/sist/16a47814-b801-45d3-b469-522d8d9f986/osist-pr-en-10251-2023>

Ta slovenski standard je istoveten z: prEN 10251

ICS:

29.030	Magnetni materiali	Magnetic materials
77.140.50	Ploščati jekleni izdelki in polizdelki	Flat steel products and semi- products

oSIST prEN 10251:2023

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 10251

January 2023

ICS 29.030; 77.140.50

Will supersede EN 10251:2015

English Version

Magnetic materials - Methods of determination of the geometrical characteristics of electrical steel sheet and strip

Matériaux magnétiques - Méthodes de détermination des caractéristiques géométriques des bandes et tôles en acier électrique

Magnetische Werkstoffe - Verfahren zur Bestimmung der geometrischen Kenngrößen von Elektroblech und -band

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 459/SC 8.

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.

This draft European Standard was established by CEN 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.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

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

Contents	Page
European foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Test Methods	5
4.1 Edge wave	5
4.1.1 Test specimen	5
4.1.2 Measuring procedure	5
4.2 Residual curvature	6
4.2.1 General	6
4.2.2 Horizontal method	7
4.2.3 Vertical method	7
4.3 Edge camber	8
4.3.1 Test specimen	8
4.3.2 Measuring procedure	8
4.4 Deviation from the shearing line due to internal stresses	9
4.4.1 Test specimen	9
4.4.2 Measuring procedure	9
4.5 Burr height	10
4.5.1 Test specimen	10
4.5.2 Measuring procedure	10
5 Test report	12
Annex A (informative) Examples of clamping systems	13
Bibliography	15

European foreword

This document (prEN 10251:2023) has been prepared by Technical Committee CEN/TC 459/SC 8 “Steel sheet and strip for electrical applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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 will supersede EN 10251:2015.

The main changes compared to the previous edition are as follows:

- the definitions have been updated, in particular replacement of “flatness” with “edge wave”;
- the test methods have been amended as follows:
 - Edge wave: the requirements for the test specimen and the measuring procedure have been updated;
 - Residual curvature: the horizontal method has been added (the residual curvature can be made with both a vertical and a horizontal method);
 - Edge camber: the requirements for the test specimen and the measuring procedure have been updated;
 - Deviation from the shearing line due to internal stresses: the requirements for the test specimen and the measuring procedure have been updated;
 - Burr height: the requirements for the test specimen and the measuring procedure have been updated, and the measuring procedure using a hand-held micrometre for the thickness has been added;
- the test report has updated.

The author thanks the International Electrotechnical Commission (IEC) for permission to reproduce Information from its International Standards. All such extracts are copyright of IEC, Geneva, Switzerland. All rights reserved. Further information on the IEC is available from www.iec.ch. IEC has no responsibility for the placement and context in which the extracts and contents are reproduced by the author, nor is IEC in any way responsible for the other content or accuracy therein.

prEN 10251:2023 (E)**1 Scope**

This document is intended to define the test methods used for the determination of the following geometrical characteristics of electrical steel sheet and strip:

- edge wave;
- residual curvature;
- edge camber;
- deviation from the shearing line due to internal stresses;
- burr height of cut edges.

This document applies to electrical steel sheet and strip intended for the construction of magnetic circuits and corresponding to Clauses B2, C21 and C22 of EN 60404-1:2017.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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>

3.1**edge wave
wave factor**

variation of flatness of a length of strip or sheet taking a form of waves at the cut edge of the product; characterised by the wave factor, i.e. by the relation of the height of the wave to its length

Note 1 to entry: For examples of waves, see Figure 1.

3.2**residual curvature**

variations of flatness of a length of unwound strip or a sheet taking a permanent curvature in the direction of rolling of the product

3.3**edge camber**

greatest distance between a longitudinal edge of a length of strip or a sheet and the line joining the two extremities of the measured length of this edge

Note 1 to entry: See Figure 5.

[SOURCE: IEC 60404-9:2018, definition 3.3]

3.4

deviation from the shearing line

greatest distance between corresponding points on the two cut edges of a length of strip or a sheet sheared in the middle of the width, in parallel to the rolling direction of the product, which may characterise the internal stress of the materials

Note 1 to entry: See Figure 6.

3.5

burr height

difference between the thicknesses of a length of strip or a sheet measured respectively at the cut edge of the sheet and at a distance of 10 mm from this edge

Note 1 to entry: See Figure 7.

4 Test Methods

4.1 Edge wave

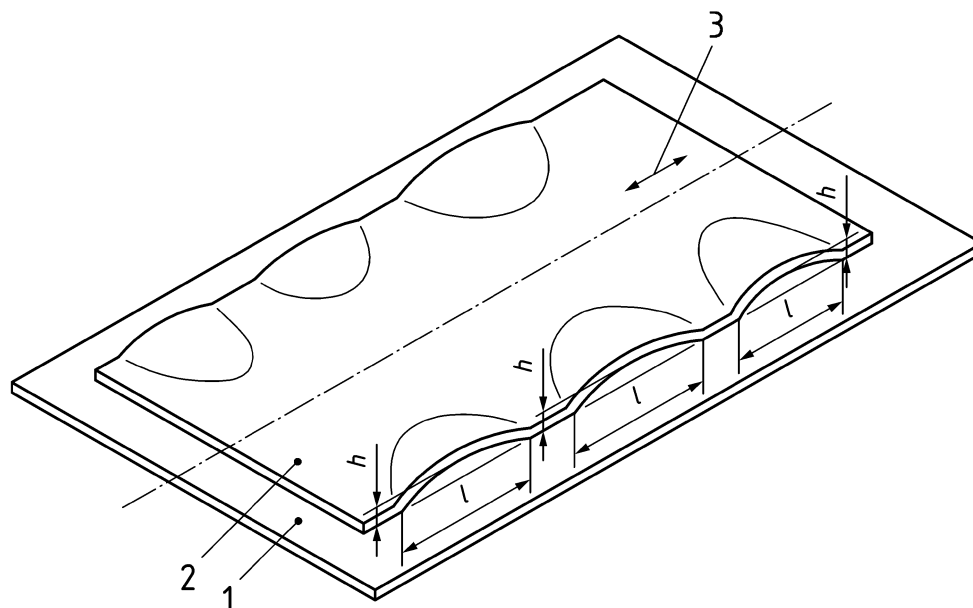
4.1.1 Test specimen

The test specimen shall consist of a sheet or a length of strip, the size of which is defined in the product standard. If it is not defined in the product standard, the length shall be 1 m. Its width shall be equal to the delivered width of the product. The axis of the specimen shall be parallel to the rolling direction.

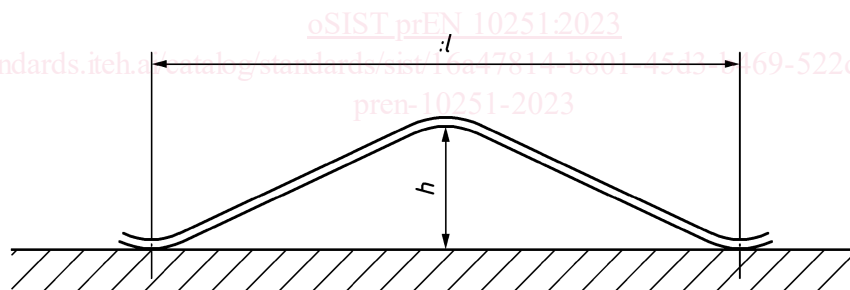
4.1.2 Measuring procedure

The test specimen shall be placed on a flat surface (e.g. a granite, marble, table) which is sufficiently large so that the test specimen does not overhang the edges (see Figure 1). It shall then be lifted up on one edge and allowed to fall back. The height of the maximum wave (h) shall be measured by means of an instrument having a resolution of 0,1 mm or better. The length of the wave (l) shall be measured by means of an instrument having a resolution of 1 mm or better (see Figure 2). Only complete waves are taken into account.

The wave factor shall be determined as the ratio of the height of the wave (h) to its length (l), expressed as a percentage (see Figure 2).

**Key**

- 1 flat surface
- 2 sheet
- 3 rolling direction
- h height of wave (mm)
- l length of wave (mm)

Figure 1 — Example of wave**Figure 2 — Wave factor****4.2 Residual curvature****4.2.1 General**

Two methods for the determination of the residual curvature in the rolling direction of the product are described in this document: a horizontal method and a vertical method.

NOTE 1 The vertical method is adopted in EN 10106:2015, FprEN 10107:2022 and EN 10303:2015. The horizontal method is an option that can be relevant for thin products. (adopted in IEC 60404-8-5:2020 need to add in next revision of EN 10265 and consistent with ISO 16162:2012.)

For the horizontal method, the maximum distance (d) between the test specimen and a flat surface, on which the test specimen is placed, shall be measured. For the vertical method, the maximum distance (a) between the bottom edge of the test specimen and a supporting plate shall be measured.

NOTE 2 Both the horizontal and vertical methods are applicable to test specimens obtained from electrical steel strips and sheets of any grade. These two methods give different values.

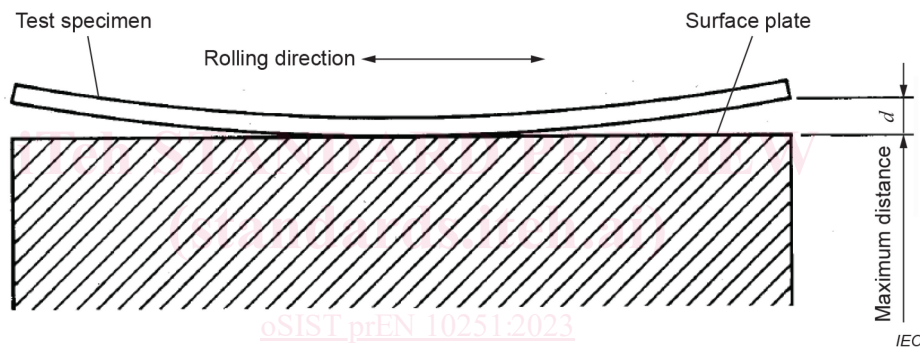
4.2.2 Horizontal method

4.2.2.1 Test specimen

The test specimen shall consist of a length of strip or a sheet, the length of which is defined in the product standard. If it is not defined in the product standard, the length shall be 1 m. Its width shall be equal to the delivered width of the product. The test specimen for the determination of edge wave (wave factor) may be used.

4.2.2.2 Measuring procedure

The test shall consist of placing the test specimen lying under its weight on a flat surface sufficiently large so that the test specimen does not overhang the edges (see Figure 1). The convex surface of the test specimen shall be in contact with the surface plate. The maximum distance (d) between the lower surface of the test specimen and the surface plate shall be measured by means of an instrument having a resolution of 1 mm or better (see Figure 3).



<https://standards.iteh.ai/catalog/standards/sist/16a47814-b801-45d3-b469-522d8d9f986/osist-10251-2023>

Figure 3 — Verification of the residual curvature (horizontal method) ¹⁾

4.2.3 Vertical method

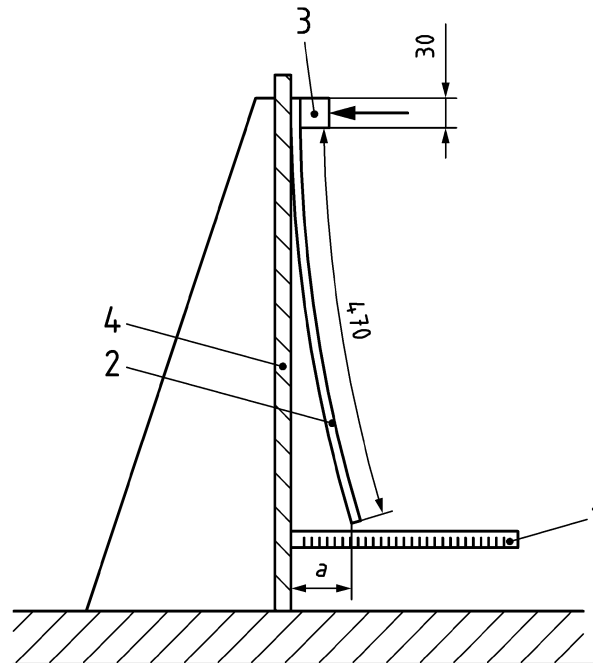
4.2.3.1 Test specimen

The test specimen shall consist of a length of strip or a sheet, the length of which is defined in the product standard. If it is not defined in the product standard, the length shall be 500 mm. Its width shall be equal to the delivered width of the product. The axis of the test specimen shall be parallel to the direction of rolling of the product.

4.2.3.2 Measuring procedure

The test shall consist of placing the test specimen vertically against a supporting plate. The top of the test specimen shall be held against the supporting plate over a clamping length of 30 mm with its convex surface facing the supporting plate. The maximum distance (a) between the bottom edge of the test specimen and the supporting plate shall then be measured at the axis of the test specimen by means of a graduated rule having a resolution of 1 mm or better (see Figure 4). The clamping force shall be sufficient to allow the full width of the test specimen to be in contact with the support (see in Figures A.1 and A.2 examples of clamping systems).

¹⁾ IEC 60404-9 ed.2.0 “Copyright © 2018 IEC Geneva, Switzerland. www.iec.ch”

**Key**

- 1 graduated rule
- 2 test specimen
- 3 clamping device
- 4 supporting plate

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN 10251:2023
Figure 4 — Measuring device

<https://standards.iteh.ai/catalog/standards/sist/10a47814-8001-45d3-b469-522d8d19f986/osist-pren-10251-2023>

4.3 Edge camber**4.3.1 Test specimen**

The test specimen shall consist of a length of strip or a sheet, the length of which is defined in the product standard. If it is not defined in the product standard, the length shall be 1 m. Its width shall be equal to the delivered width of the product. The test specimen for the determination of edge wave (wave factor) may be used.

4.3.2 Measuring procedure

The test specimen shall be placed on a flat surface (see Figure 1). A rule shall be placed in contact with the extremities of the concave side (see Figure 5). The maximum distance (e) between the edge and the rule shall be measured by means of an instrument having a resolution of 0,1 mm or better.