INTERNATIONAL STANDARD

ISO 9446

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Hot-rolled stainless steel narrow strip — Tolerances on dimensions and form

Feuillards en acier inoxydable laminés à chaud — Tolérances sur dimensions et forme

Reference number
ISO 9446:1990(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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Hot-rolled stainless steel narrow strip — Tolerances on dimensions and form

1 Scope

1.1 This International Standard specifies the tolerances on dimensions and form for hot-rolled stainless steel[1)] narrow strip, in thicknesses from 2,0 mm to 8,0 mm and in rolling widths of less than 600 mm.

1.2 This International Standard also applies to cut lengths taken from the strip described in 1.1.

1.3 However, narrow strip and cut lengths with widths less than 600 mm, which are manufactured from wide strip by longitudinal slitting, are covered in ISO 9444.

1.4 For hot-rolled flat products of stainless steels in rolling widths of 600 mm and over, ISO 9444 applies.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 683-13:1986, *Heat-treatable steels, alloy steels and free-cutting steels — Part 13: Wrought stainless steels.*

ISO 683-16:1976, *Heat-treated steels, alloy steels and free-cutting steels — Part 16: Precipitation hardening stainless steels.*

ISO 4955:1983, *Heat-resisting steels and alloys.*

ISO/TR 4956:1984, *Wrought steels for use at elevated temperatures in engines.*

ISO 6929:1987, *Steel products — Definitions and classification.*

ISO 9444:1990, *Hot-rolled stainless steel wide strip and sheet — Tolerances on dimensions and form.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 stainless steels: Steels with a carbon content of up to and including 1,2 % and a chromium content of 10,5 % and over.

NOTE 1 This definition covers the ferritic, martensitic and austenitic steels of ISO 683-13 and ISO 683-16, the heat-resisting steels of ISO 4955, and some of the creep-resisting steels of ISO/TR 4956.

3.2 product forms

The definitions given in ISO 6929 apply.

4 Designation on ordering

For complete designation in the order the following should be stated in the sequence given:

— the denomination (strip or cut length);

— the number of this International Standard;

— the thickness in millimetres (if necessary accurate to two decimal places);

— the width in millimetres;

1) See 3.1.

— the condition of the edges (M = mill edges, T = trimmed edges);

— for strip, the condition of the ends [R = mill (rolled) ends, C = cropped ends];

— for cut lengths, the length in millimetres.

EXAMPLE 1

Strip ISO 9446 - 2,20 × 500 MC

EXAMPLE 2

Sheet ISO 9446 - 2,00 × 400 T × 2 000

5 Type of delivery

5.1 Hot-rolled flat products according to this International Standard can be supplied as

a) narrow strip (coils with a width less than 600 mm);

b) cut lengths of strip according to item a).

5.2 Narrow strip in the hot-rolled and not mechanically or chemically descaled condition (conditions F1 and F3 in ISO 683-13) shall be delivered, according to the agreements at the time of enquiry and order,

— either with mill ends (symbol R),

— or with cropped ends (symbol C),

and

— either with mill edges (symbol M),

— or with trimmed edges (symbol T).

Hot-rolled descaled narrow strip (conditions F4 and F5 of ISO 683-13) and all other products covered in this International Standard [see 5.1 b)] shall be delivered with cropped ends and

— either with mill edges (symbol M),

— or with trimmed edges (symbol T).

6 Tolerances on dimensions and form

6.1 Thickness

The tolerances on thickness are given in table 1. See also 7.1.

Table 1 — Thickness tolerances

Values in millimetres

Specified widths		Thickness tolerance[1) 2)] for specified thicknesses			
equal to and over	less than	from 2,0 to 4,0	over 4,0 up to and including 5,0	over 5,0 up to and including 6,0	over 6,0 up to and including 8,0
10	100	± 0,20	± 0,21	± 0,22	± 0,25
100	600	± 0,22	± 0,23	± 0,24	± 0,25

1) The tolerance values specified do not apply to the uncropped ends of a mill-edge coil within 7 m inclusive of both ends.

2) See 7.1.

6.2 Width

6.2.1 The tolerances on width for strip and cut lengths with mill edges are given in table 2.

6.2.2 The tolerances on width for strip and cut lengths with trimmed edges are given in table 3.

Table 2 — Width tolerances for strip and cut lengths with mill edges

Values in millimetres

Specified widths		Tolerance[1) 2)]
over	up to and including	
	50	± 1,0
50	100	± 1,5
100	200	± 2,0
200	400	± 2,5
400	600 (exclusive)	± 3,0

1) The values specified do not apply to the uncropped ends of a mill-edge coil within 7 m of both ends.

2) By agreement, material can be ordered with only plus tolerances. In this case the value in the table is doubled.

Table 3 — Width tolerances for strip and cut lengths with trimmed edges

Values in millimetres

Specified widths		Tolerance[1]	
		Specified thicknesses	
over	up to and including	up to and including 3	over 3
	100	± 0,3	± 0,4
100	200	± 0,5	± 0,6
200	400	± 0,7	± 0,8
400	600 (exclusive)	± 0,9	± 1,0

1) By agreement, material can be ordered with only plus tolerances. In this case the value in the table is doubled.

6.3 Length (in the case of cut lengths)

When ordering nominal lengths for cut lengths, the oversizes given in table 4 apply.

Table 4 — Length tolerances for cut lengths of width up to 600 mm (exclusive)

Values in millimetres

Specified lengths		Tolerance[1]
over	up to and including	
	1 500	$^{+25}_{0}$
1 500	3 000	$^{+30}_{0}$
3 000	6 000	$^{+40}_{0}$
6 000	9 000	$^{+65}_{0}$
9 000	12 000	$^{+85}_{0}$
12 000		$^{+100}_{0}$

1) Closer tolerances may be agreed upon at the time of enquiry and order.

6.4 Edger camber tolerances

The edge camber tolerances are given in table 5 (see also 7.2).

Table 5 — Edge camber tolerances for cut lengths and coils

Values in millimetres

Form	Edge camber tolerance[1] [2]
Coils	20 in any 2 000 length
Cut lengths	10 in any 2 000 length

1) In those cases where it is not practical to measure the tolerance given in the table, the following formula may be used:

$$\text{New tolerance} = \frac{(\text{non-standard } l)^2}{(\text{standard } l)^2} \times \text{tolerance in this table.}$$

2) The values specified do not apply to the uncropped ends of a mill-edge coil within 7 m of both ends.

6.5 Flatness

The flatness tolerance for cut lengths, measured on a length of 2 000 mm, shall be 15 mm (see also 7.3).

7 Measurement of dimensions

7.1 Thickness

The thickness is measured at any point on the strip not less than 20 mm from a side edge for mill-edge strip and not less than 10 mm from a side edge for edge-trimmed strip. Measurement shall not be made on top of the shear burr.

7.2 Edge camber

Edge camber is the greatest deviation of a side edge from a straight line, the measurement being taken on the concave side with a straight-edge (see figure 1).

7.3 Flatness

Flatness tolerances can be measured in the following ways.

a) Maximum deviation from a flat horizontal surface. With the sheet lying under its own mass on a flat surface, the maximum deviation from flatness is the maximum distance between the lower surface of the sheet and the flat horizontal surface.

b) To measure the flatness, the product shall be laid on an approximately flat surface. Deviation with respect to flatness shall be taken as the greatest distance between the product and a straight-edge placed upon it. The straight-edge should be

2 000 mm. It may be placed on the product at any position and in any direction. Only the position of the points of contact of plate and straight-edge shall be taken into account.

Unless otherwise agreed, the choice of measurement is left to the manufacturer.

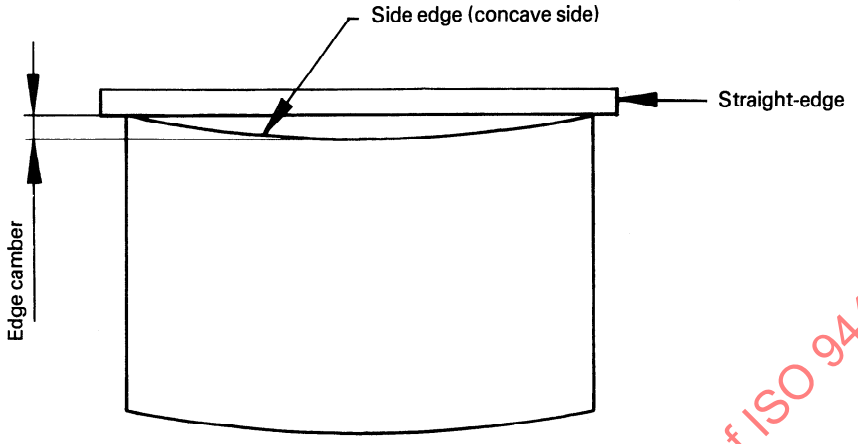

Figure 1 — Measurement of edge camber