

HOT-ROLLED STEEL SHEETS, PLATES AND COILS

Prefabrications, Precision cut lengths and precision cut plates with bevelled edge

Precision cut lengths and precision cut plates with a bevelled edge are components that can be delivered directly to the installation site, which saves time and reduces transport and storage costs. The dimensionally accurate groove ensures uninterrupted automated welding and fitting.

Applications

- Silos
- Steel and equipment manufacture
- Masts of wind power plants
- Debarking drums
- Components in serial manufacture
- Bevelled components of equipment

● **Product description**

Precision cut lengths and precision cut plates with bevelled edge are manufactured from heavy plates and they are delivered with welding bevels according to the customers' needs. Beveling can be made to shop primed, bent and/or cut shape plates. Precision cutting and beveling are carried out by flame cutting, mechanical cutting or machining. The selection of steel grades covers the production programme and dimensions of plate products.

Precision cut plates, that is the so-called small plates, exceed the dimensional range of cut lengths either by their length and/or width. They are manufactured to the agreed dimensions by mechanically cutting larger plates. The steel geometry, clearance and cutting order are carefully selected in compliance with the properties of the steel, which provides these strip products with good dimensional accuracy, flatness and high-quality cut surface. Precision cut plates can also be delivered prefabricated: pickled, shot blasted and shop primed. Priming is always preceded by shot-blasting with steel shot to commercial standard Sa 2 ½ in compliance with SFS-ISO 8501-1. The material range covers the grades in the strip products production programme.

● **Dimensions and tolerances**

The wide range of lengths and widths of precision cut lengths is presented in table 1. The accuracy of dimensions and shapes of precision cut lengths corresponds to the tolerances required in the plate work in workshops, table 2. The dimensions of pickled precision cut lengths depend on the strength level of the relevant steel grade.

Table 1.
Precision Cut Lengths. Dimensions

Thickness mm	Maximum length mm	Maximum width mm
2 – 12	3000	1800

Minimum width and length are 21 x plate thickness or 75 mm.

Table 2.
Tolerances

Thickness mm	Length tolerance mm	Width tolerance mm	Cross-measure difference	Flatness mm/m
2 – 8	± 1,5	± 1,5	2.5	3
(8) – 12	± 2,0	± 2,0	2.5	3

The dimensions and tolerances of precision cut plates with bevelled edge are presented in tables 3 and 4.

Table 3.
Precision Cut Plates with Bevelled Edge. Dimensions

Bevel type	Type of joint preparation		Mechanical cutting		Machining (with a milling machine)			Thickness mm ¹⁾
	Flame cutting		Bevel angle °	Thickness mm	Bevel dimensions	r mm	c mm	
	Bevel angle °	Thickness mm	Bevel angle °	Thickness mm	Bevel angle °			
Square groove	0	5 – 150	–	–	0	–	–	6 – 55
Single V	15 – 45	16 – 100	25, 30, 45	5 – 7	15, 20, 22.5, 25, 30, 3, 40, 45	–	–	6 – 30
Y groove	15 – 45	16 – 100	25 – 55	5 – 50	15, 20, 22.5, 25, 30, 35, 40, 45	–	–	6 – 30 ²⁾
Double V	15 – 45	16 – 100	25 – 55	10 – 50	15, 20, 22.5, 25, 30, 35, 40, 45	–	–	6 – 30 ²⁾
Single J	–	–	–	–	10 20	8 5	2 – 10 2 – 10	6 – 40 6 – 40
Double J	–	–	–	–	10 20	8 5	2 – 10 2 – 10	6 – 70 ²⁾ 6 – 70 ²⁾
J + V groove	–	–	–	–	J: 10 J: 20 V: 15, 20, 22.5, 25	8 5 –	2 – 10 2 – 10 –	6 – 70 ²⁾ 6 – 70 ²⁾ 6 – 70 ²⁾

r = Groove bottom radius of curvature, cf. Drawing example on table 5.

c = Depth of root face (scaling by even millimetres), cf. Drawing example on table 5.

¹⁾ Thickness ranges for plates to be bevelled by machining are not mandatory.

²⁾ The bevel depth on each side is ≤ 30 mm and plate thickness ≤ 70 mm.

The thickness range for plates for machining is 1200 – 3250 mm and the length range 4200 – 16000 mm.

The width range for plates for flame cutting and mechanical cutting is 800 – 3250 mm and the length range 2000 – 19500 mm.

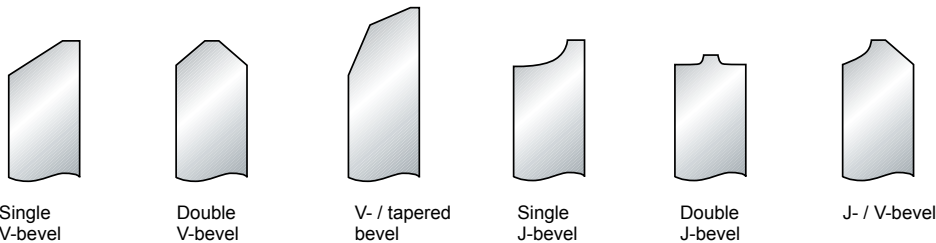


Table 4.
Tolerances

Measure unit	Permissible deviation from the nominal dimension	
	Flame cutting, Mechanical cutting	Machining
Thickness	1)	1)
Width	$\pm 1.5 \text{ mm}^2)$	$\pm 1.0 \text{ mm}$
Length	$\pm 2.0 \text{ mm}^2)$	$\pm 1.5 \text{ mm}$
Length over 10 m	$\pm 0.02 \%$	$\pm 0.015 \%$
Cross-measure difference	$\leq 4 \text{ mm}$	$\leq 3 \text{ mm}$
Bevel angle	$\pm 2.5^\circ$	$\pm 1.5^\circ$
Depth of root face	$\pm 1.5 \text{ mm}$	$\pm 1.0 \text{ mm}$
Root face position	$\pm 1.5 \text{ mm}$	$\pm 1.0 \text{ mm}$
Edge straightness of the bevel	—	$\pm 0.5 \text{ mm}/16 \text{ m}$
Linearity of the bevelled edges	—	$\pm 1.0 \text{ mm}/16 \text{ m}$
Surface quality of the bevelled surface	3)	4)

1) Thickness tolerance in accordance with Standard EN 10029 Class A, or as agreed.

2) For plates > 80 mm thickness, the tolerance is $\pm 5 \text{ mm}$.

3) The surface quality of flame cut bevels is in accordance with Standard EN ISO 9013 (2003).

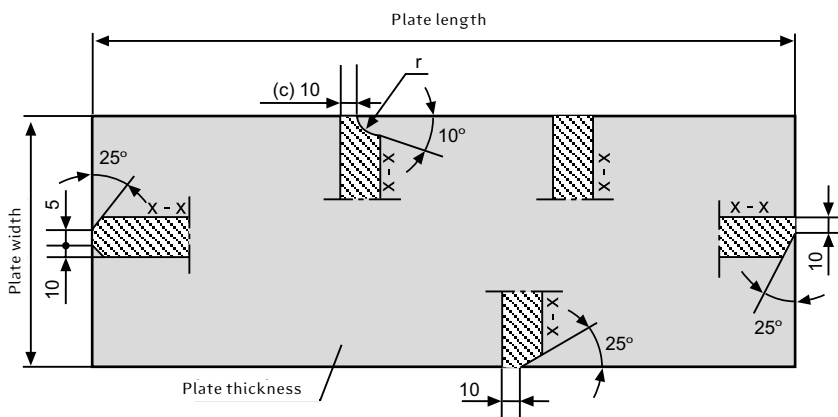
There is no standard for the surface quality of mechanically cut bevels.

4) There is no standard for the surface quality of machined bevels.

● **Ordering information**

The nominal plate dimensions and measurements of edge bevels are to be stated at the time of ordering, for example, in accordance with the drawing in picture 1. The drawing must show the nominal plate dimensions, shape of bevel and groove, bevel measurements and angles, and the bevel opening side on the plate. The marking side i.e. the side of the plate to be marked, is indicated by the marking x - x on the drawing example. The minimum weight of precision cut plates with bevelled edges is 2000 - 5000 kg depending on plate thickness. The minimum delivery batch is one hot-rolled coil (about 10 tonnes) of one steel grade and thickness.

Picture 1.
Drawing example



c = Depth of root face (scaling by even millimetres), mm.

r = Groove bottom radius of curvature, mm.

Marking example: Steel plate, precision cut 20 x 2960 x 8760 Multisteel EN 10204-3.1.

Note! The upper i.e. top side of the plate (x - x) must be stated unambiguously in the order and drawing because this side of the plate will be hard stamped and marked.

- **Delivery time**

Precision cutting and bevelling add from 1 to 2 weeks to the delivery time. The possible additional treatments of precision cut lengths, such as pickling, shot-blasting and shop priming affect the delivery time as well. The exact delivery time is determined in accordance with the requirements stated in accordance with the order.

- **Packing and marking**

Precision cut plates with bevelled edges are marked with the plate number data by hard stamping and with other data agreed upon order by paint marking. Bevelled plate products are packed as agreed in the order, and the steel ordered can be delivered to the correct work point in the workshop without unpacking or other unnecessary work phases.

- **Further information**

The following data sheets are related to the subject: Plate products Production programme, Coil products Production programme, Dimensional and Shape Tolerances, Markings and Packing.

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