



## SSAB LASER 460MC PLUS

### General Product Description

The hot-rolled cold-forming steel ideal for laser cutting at 460 MPa

SSAB Laser® 460MC Plus is the optimal high-strength low-alloy (HSLA) steel for laser cutting and cold forming, with guaranteed flatness after laser cutting.

Part of the SSAB Laser Plus range of steels, SSAB Laser 460MC Plus is produced with a well-balanced and consistent chemical composition, accurate hot rolling process, and optimized temperature control to create a uniform and smooth microscale surface. This microscale surface, together with dead-flat technology, makes SSAB Laser 460MC Plus the ideal choice to achieve faster laser cutting speed and cost-efficient use of material when nesting components together.

SSAB guarantees a flatness tolerance of  $\leq 3$  mm/m after laser cutting.

The excellent laser-cutting properties of SSAB Laser 460MC Plus are combined with an increased toughness, guaranteed at -60°C, which pushes the limits even more for how you can use this steel. Thanks to its toughness, it can be used in arctic climates even when very tight forming operations are needed, making it suitable for any kind of fabricated component or structure where additional toughness is required.

SSAB Laser 460MC Plus sheet meets or exceeds the requirements of S460MC in EN 10149-2. Upon agreement, it can be delivered as double certified. This double certification will enable producers of steel structures, in accordance with EN 1090, to use SSAB Laser 460MC Plus in their CE-marked final component or structure.

Sheets are delivered with Laser Plus tolerances, exceeding the requirements of EN 10051. Plates are delivered with SSAB Laser Plus tolerances, exceeding the requirements of EN 10029.

### Dimension Range

SSAB Laser 460MC Plus is available in thickness of 2.00- 25.00 mm and widths up to 1860 mm as cut to length or 3300 mm as plate. Length up to 16 meters as cut to length and 15 meters as plate.

### Mechanical Properties

Delivery form	Thickness (mm)	Yield strength $R_{eh}$ (min MPa)	Tensile strength $R_m$ (MPa)	Elongation (min %)
Cut Length	2- 10	460	520- 670	19 <sup>1)</sup>
Heavy Plate	10- 25	460 <sup>2)</sup>	520- 650 <sup>2)</sup>	19 <sup>2)</sup>

<sup>1)</sup> Elongation is guaranteed as  $A80 \geq 14\%$  for thicknesses  $< 3$  mm.

<sup>2)</sup> As an exception to EN 10149-2, the tensile test of heavy plates is carried out transverse to the rolling direction.

The mechanical properties are tested longitudinal to the direction of rolling.

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## Impact Properties

Delivery form	Test temperature	Longitudinal Test Impact Energy
Cut lengths	-60 °C	40 J
Heavy plates	-20 °C	40 J <sup>1)</sup>

<sup>1)</sup>Alternatively, ≥27J at -40°C according to EN 10149-2.

Impact strength is tested by the Charpy V test in accordance with EN ISO148-1:2010. Impact energy value 40J is guaranteed for test piece size 10 x 10 mm. When testing thickness <10 mm, the width of the test pieces correspond with the plate thickness. The values decrease in direct relation to the surface area of the test piece. No impact tests are carried out for thicknesses < 6 mm.

## Chemical Composition (Ladle analysis)

Delivery form	C (max %)	Si (max %)	Mn (max %)	P (max %)	S (max %)
Cut Length	0.12	0.03	1.6	0.020	0.015
Heavy Plate	0.13	0.03	1.6	0.020	0.015

All SSAB Laser Plus steels are aluminum-killed (Al ≥ 0.015%) and grain-refined. Additionally, niobium (Nb), vanadium (V), titanium (Ti) and/or boron (B) may be used as single alloying element or in any combination.

## Carbon Equivalent Values

Thickness (mm)	Cut lengths 2 - 10	Heavy plates 10 - 25
CEV max	0.30	0.39

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

## Tolerances

SSAB Laser Plus is delivered with SSAB Laser Plus tolerances, with improved guarantees compared to corresponding EN standards. More details are available at SSAB.com

### Thickness

**Cut to length:** SSAB Laser Plus thickness tolerances correspond to 2/3 of EN 10051:2010 as default value. Tighter tolerances are available on request.

**Plate:** SSAB Laser Plus is delivered with tolerances that correspond to ¾ of EN 10 029:2011 as default value.

### Length and Width

**Cut to length:** SSAB Laser Plus tolerances for width and length are according to SSAB standard and offer narrower width and length tolerances compared to EN 10051:2010.

For sheet with mill edge, the width tolerances are corresponding to -0/+20 mm.

For sheet with cut edge, the width tolerances are corresponding to -0/+2 mm.

After special agreement, tighter tolerances can be delivered for certain products and dimensions.

Length tolerances only apply for cut to length sheets.

**Plate:** Width tolerances are -0/+4-10mm depending on the thickness. Length tolerances are -0/+15-25mm depending on length.

### Shape

**Cut to length:** SSAB Laser Plus is delivered with shape tolerances according to EN 10051:2010. Tighter tolerances are available on

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request.

**Plate:** According to EN 10 029:2011.

## Flatness

**Cut to length:** SSAB Laser Plus tolerances can thanks to dead-flat technology be delivered with a guarantee of flatness tolerance of  $\leq 3$  mm/m after laser cutting, in addition to  $\leq 3$  mm/m when delivered. SSAB Laser Plus tolerances always exceed EN 10051:2010 in flatness requirements.

Flatness guarantees only apply for cut to length sheets.

**Plate:** : SSAB Laser Plus tolerances guarantee a maximum flatness deviation of 3 mm/m after laser cutting.

## Surface Properties

According to EN 10 163-2 Class A, Subclass 3.

## Delivery Conditions

SSAB Laser 460MC Plus according to EN 10149-2 is delivered in thermo-mechanically rolled condition.

Surface and edge condition

SSAB Laser 460MC Plus is available as non-pickled or pickled surface with mill or cut edge.

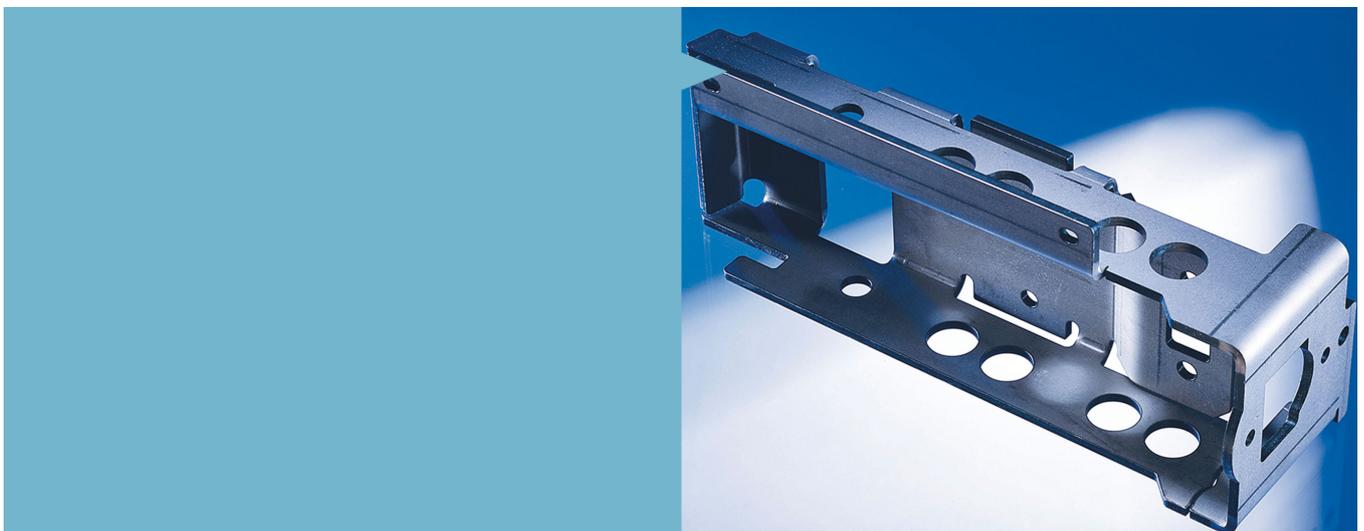
## Fabrication and Other Recommendations

SSAB Laser 460MC Plus has ideal laser cutting, cold forming and welding performance.

SSAB Laser 460MC Plus is a cold forming steel not suited for heat treatments at temperatures above 580°C, since the material then may lose its guaranteed properties.

For information concerning fabrication, see SSAB's brochures on [www.ssab.com](http://www.ssab.com) or consult Tech Support, [techsupport@ssab.com](mailto:techsupport@ssab.com).

Appropriate health and safety precautions must be taken when bending, welding, cutting, grinding or otherwise working on the product.



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