

## Hardox® 500 Tuf

### General Product Description

Introducing the new generation Hardox wear plate

Hardox® 500 Tuf wear plate is the latest upgrade in the Hardox range. It delivers high strength, extreme hardness and guaranteed toughness in one and the same wear plate.

Hardox® 500 Tuf combines the best properties from Hardox® 450 and Hardox® 500. The result is a wear plate with no real competition on the market.

### Dimension Range

Hardox® 500 Tuf is available in thicknesses of 4.0 – 25.4 mm. Hardox® 500 Tuf is available in widths up to 3350 mm and lengths up to 14630 mm. More detailed information on dimensions is provided in the dimension program.

### Mechanical Properties

Thickness (mm)	Hardness <sup>1)</sup> (HBW)	Typical yield strength (MPa), not guaranteed
4.0- 25.4	475- 505	1250- 1400

<sup>1)</sup> Brinell hardness, HBW, according to EN ISO 6506-1, on a milled surface 0.5 – 3 mm below surface. At least one test specimen per heat and 40 tons. The nominal thickness of supplied plates will not deviate more than +/- 15 mm from the thickness of the test specimen used for hardness testing.

Hardox® 500 Tuf is through-hardened. Minimum core hardness is 90 % of the guaranteed minimum surface hardness.

### Impact Properties

Grade	Transverse test, guaranteed impact energy, Charpy V 10x10 mm test specimen.
Hardox® 500 Tuf <sup>1)</sup>	27 J/-20 °C

<sup>1)</sup> Impact toughness measured upon agreement. For thicknesses between 6- 11.9 mm, subsize Charpy V-specimens are used. The specified toughness is then proportional to the cross-sectional area of the test specimen, compared to a full-size specimen (10 x 10 mm). Impact testing according to ISO EN 148. Average of three tests.

### Chemical Composition (heat analysis)

C <sup>*)</sup> (max %)	Si <sup>*)</sup> (max %)	Mn <sup>*)</sup> (max %)	P (max %)	S (max %)	Cr <sup>*)</sup> (max %)	Ni <sup>*)</sup> (max %)	Mo <sup>*)</sup> (max %)	B <sup>*)</sup> (max %)
0.30	0.70	1.60	0.020	0.010	1.50	1.50	0.60	0.005

The steel is grain refined. <sup>\*)</sup> Intentional alloying elements.

### Carbon Equivalent CET(CEV)

Thickness	4.0 - 16.0	16.1 - 25.4
Max CET(CEV)	0.38 (0.54)	0.39 (0.55)
Typ CET(CEV)	0.36 (0.52)	0.37 (0.53)

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40}$$

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

## Tolerances

More details are given in SSAB's brochure 41-General Product Information Strenx, Hardox®, Armox and Toolox-UK and Hardox® Guarantees or at [www.ssab.com](http://www.ssab.com).

### Thickness

Tolerances according to Hardox® Thickness Guarantees. Hardox® Guarantees meets the requirements of EN 10 029 Class A.

### Length and Width

According to SSAB's dimension program. Tolerances according to SSAB's mill edge standards or tolerances that conform to EN 10 029.

### Shape

Tolerances according to EN 10 029.

### Flatness

Tolerances according to Hardox® Flatness Guarantees Class D, which are more restrictive than EN 10 029.

### Surface Properties

According to EN 10 163-2, Class A Subclass 1.

### Bending

Bendability according to Hardox® Bending Guarantees Class E.

## Delivery Conditions

The delivery condition is Q or QT (Quenched or Quenched and Tempered). The plates are delivered with sheared or thermally cut edges. Delivery requirements can be found in SSAB's brochure 41-General product information Strenx, Hardox®, Armox and Toolox-UK or at [www.ssab.com](http://www.ssab.com).

## Fabrication and Other Recommendations

### **Welding, bending and machining.**

Recommendations can be found in SSAB's brochures at [www.hardox.com](http://www.hardox.com) or consult Tech Support, [techsupport@ssab.com](mailto:techsupport@ssab.com).

Hardox® 500 Tuf is not intended for further heat treatment. It has obtained its mechanical properties by quenching and when necessary by means of subsequent tempering. The properties of the delivery condition cannot be retained after exposure to temperatures in excess of 250°C.

Appropriate health and safety precautions must be taken when welding, cutting, grinding or otherwise working on this product. Grinding, especially of primer coated plates, may produce dust with a high particle concentration.

## Contact Information

[www.ssab.com/contact](http://www.ssab.com/contact)