

Hardox 400 Plate

General Product Description

The all-around steel that resists wear and abrasion.

Hardox 400 is an abrasion-resistant steel with a nominal hardness of 400 HBW. Hardox 400 is an all-around wear resistant steel.

Thanks to its high toughness, good bendability and weldability, this steel can be used in structures with moderate wear.

Dimension Range

Hardox 400 is available in thicknesses of 4.0 – 130 mm. Hardox 400 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 ¹⁾ (HBW)	Typical yield strength (MPa), not guaranteed
4.0- 130.0	370- 430	900- 1100

¹⁾ 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 material thickness will not deviate more than ± 15 mm from that of the test specimen.

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

Impact Properties

Grade	Longitudinal test, typical impact energy, Charpy V 10 x10 mm test specimen.
Hardox 400 Plate ¹⁾	45 J /-40 °C

¹⁾ Impact toughness measured upon agreement. For thicknesses between 6- 11.9 mm, sub-size Charpy V-specimens are used. Impact testing according to ISO EN 148 per heat and thickness group. Average of three tests.

Chemical Composition (heat analysis)

C ¹⁾ (max %)	Si ¹⁾ (max %)	Mn ¹⁾ (max %)	P (max %)	S (max %)	Cr ¹⁾ (max %)	Ni ¹⁾ (max %)	Mo ¹⁾ (max %)	B ¹⁾ (max %)
0.32	0.70	1.60	0.025	0.010	2.50	1.50	0.60	0.004

The steel is grain refined. ¹⁾ Intentional alloying elements.

Carbon Equivalent CET(CEV)

Thickness (mm)	4.0 - 7.9	8.0 - 20.0	20.1 - 32.0	32.1 - 45.0	45.1 - 51.0	51.1 - 80.0	80.1 - 130.0
Max CET(CEV)	0.26 (0.41)	0.31 (0.47)	0.32 (0.52)	0.33 (0.60)	0.40 (0.59)	0.43 (0.82)	0.50 (0.82)
Typ CET(CEV)	0.24 (0.39)	0.28 (0.44)	0.29 (0.48)	0.31 (0.58)	0.38 (0.57)	0.41 (0.65)	0.48 (0.73)

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

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

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.

Thickness

Tolerances according to Hardox Thickness Guarantees. Hardox® Guarantees meet 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

For Hardox plate the tolerances are according to Hardox Bending Guarantees Class D.

Delivery Conditions

The delivery condition is Q or QT (Quenched or Quenched and Tempered). The plates are delivered with sheared or thermally cut edges. Thicknesses over 80 mm are delivered with mill edge as standard. Delivery requirements can be found in SSAB's brochure 41-General product information Strenx, Hardox, ArmoX and Toolox-UK or at www.ssab.com.

Fabrication and Other Recommendations

Welding, bending and machining.

Recommendations can be found in SSAB's brochures at www.hardox.com or consult Tech Support, techsupport@ssab.com.

Hardox 400 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