

## Hardox® 400 Bar

### General Product Description

The all-round abrasion-resistant steel as round bar

Hardox® round bars are versatile, ready-to-use, abrasion-resistant steels that combine high toughness, good bendability and good weldability.

Hardox® round bars come in diameters between 40 and 100 mm and lengths up to 5000 mm, and feature the same guaranteed properties as the wear plate. Delivered quenched and tempered to high tensile strength and hardness levels, Hardox round bars represent entirely new possibilities for stronger and lighter product design. They also help optimize workshop procedures such as machining, welding and polishing.

### Dimension Range

Hardox® 400 Bar is available in diameters of 40 to 100 mm. Maximum available length depends upon product diameter.

### Mechanical Properties

Bar Diameter (mm)	Hardness <sup>1)</sup> (HBW)	Typical Yield strength (MPa)
40.0- 100.0	370- 430	1000- 1100

<sup>1)</sup> Bar hardness is measured on a milled surface, with indents positioned as impact test according to EN 10 083.

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	Longitudinal test, guaranteed impact energy, Charpy V 10x10 mm test specimen.
Hardox 400 Bar	45 J /-40 °C	Min. 27 J /-40 °C

### 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 %)
0.32	0.70	1.60	0.025	0.010	1.40	1.50	0.60	0.004

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

### Carbon Equivalent CET(CEV)

Bar diameter (mm)	40.0 - 100.0
Max CET(CEV)	0.39 (0.60)
Typ CET(CEV)	0.37 (0.58)

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

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

### Tolerances

More details are given in EN 10 060.

#### Bar Diameter and Length

Tolerances according to EN 10 060.

#### Bar Straightness

Straightness according to EN 10 060.

## Bar Surface

Black condition. Peeled surface available upon request.

## Delivery Conditions

The delivery condition is Q or QT (Quenched or Quenched and Tempered).

Delivery requirements can be found 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® 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](http://www.ssab.com/contact)