HARDOX®
WEAR PLATE

Hardox® HiAce

General Product Description

Hardox® HiAce for wear, corrosion and high temperatures

Hardox® HiAce is a wear-resistant steel designed for demanding applications where corrosive or elevated-temperature conditions accelerate wear. Typical uses include garbage trucks, containers and recycling facilities, pulp and paper processing, sawmills, waste-to-energy plants and biomass plants, as well as mining and other process industries. It is also suitable for high-temperature equipment in industries like asphalt production, steelmaking, power generation and foundries. With a nominal hardness of 450 HBW, Hardox® HiAce provides the same excellent performance as Hardox® 450 while delivering reliable wear resistance in these environments.

Dimension Range

Hardox® HiAce plate is available in thicknesses of 4.0 - 100.0 mm and in widths up to 3350 mm and lengths up to 14630 mm. Hardox® HiAce sheet is available in thicknesses of 3.0 - 6.0 mm, with widths up to 1600 mm and lengths up to 16000 mm. More detailed information on dimensions is provided in the dimension program.

Mechanical Properties

Product	Thickness (mm)	Hardness [1] (HBW)	Typical yield strength (MPa), not guaranteed
Hardox® HiAce sheet	3.0 - 6.0	425 - 475	1250
Hardox® HiAce plate	4.0 - 100.0	425 - 475	1250

[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 thickness of supplied plates will not deviate more than +/- 15 mm from the thickness of the test specimen used for hardness testing. For sheet the Brinell hardness test is according to EN ISO 6506-1 on each heat treatment individual/coil. Hardness is measured on a milled surface 0.3 - 2 mm below surface.

Hardox® wear plate is through-hardened. Minimum core hardness is 90 % of the guaranteed minimum hardness.

Impact Properties

Thickness (mm)	Transverse test, guaranteed impact energy, Charpy V 10x10 mm test specimen [1]
3.0 - 39.9	27 J / -20 °C [2]

[1] Impact testing is performed on thicknesses ≥ 6 mm for plate and ≥ 3 mm for sheet. For thicknesses between 3 and 11.9 mm, sub-size Charpy V-specimens are used. The specified minimum value is 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 per heat and thickness group. Average of three tests.

[2] Single value minimum 70% of specified average.

Chemical Composition (heat analysis)

Product type	C *) (max %)	Si *) (max %)	Mn*) (max %)	P (max %)	S (max %)	Cr*) (max %)	Ni*) (max %)	Mo*) (max %)	B*) (max %)
Sheet	0.18	0.40	0.50	0.025	0.004	4.30	0.20	0.20	0.002
Plate	0.26	0.70	1.60	0.025	0.010	5.10	1.50	0.60	0.005

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

Carbon Equivalent CET(CEV)

Product type	Sheet	Plate
Thickness (mm)	3.0 - 6.0	4.0 - 100.0
Max CET(CEV)	0.41 (1.03)	0.42 (1.08)
Typ CET(CEV)	0.38 (0.99)	0.39 (1.01)

$$CET = C + \frac{Mn + Mo}{10} + \frac{Cr + Cu}{20} + \frac{Ni}{40} \qquad CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

SSAB

Tolerances

More details are given in SSAB's brochure Hardox® Guarantees or at www.ssab.com.

Thickness

Tolerances according to Hardox® Thickness Guarantee.
Hardox® Guarantees meet the requirements of EN 10029 Class A for plate, but offer more narrow tolerances. For sheets the guarantees meets the requirements of 1/2 EN 10051.

Length and Width

According to SSAB's dimension program. For plate, the tolerances are according to SSAB´s mill edge standard or tolerances that conform to EN 10029. For sheet the tolerances conform to EN 10051, tighter tolerances available on request.

Shape

Tolerances according to EN 10029 for plate and according to EN 10051 for sheet.

Flatness

For plate the tolerances are according to Hardox® Flatness Guarantees Class C, which are more restrictive than EN 10029 Class N. For sheets the tolerances are according to Hardox® flatness guarantees Class A, which are more restrictive than EN 10051.

Surface Properties

According to EN 10163-2 Class A, Subclass 1.

Delivery Conditions

The delivery condition is Quenched or Quenched and Tempered. Plates are delivered with sheared or thermally cut edges and thicknesses over 80 mm are delivered with mill edge as standard. Sheets are delivered with an as-rolled surface and mill edge as standard.

Delivery requirements can be found in SSAB's brochure Hardox® Guarantees or www.ssab.com.

Fabrication and Other Recommendations

Welding, bending and machining

Recommendations can be found in SSABs brochures at www.hardox.com or consult Tech Support.

Bendability for plate are according to Hardox® Bending Guarantees Class E. For sheet, the bendability are according to Hardox® Bending Guarantees Class A.

Hardox® HiAce often retains ≥90% of the guaranteed minimum hardness when exposed to temperatures up to 400 °C. Please note that exposure to elevated temperatures at and below this limit may still degrade the mechanical properties over time, retention of the delivery condition is not guaranteed.
Contact SSAB for further discussion.

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

The English version of this document shall prevail in case of discrepancy. Minor changes and updates to the document may occur, please download the latest version of this document at www.ssab.com

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