HARDOX®
WEAR PLATE

TECHSUPPORT #63
Properties and Processing

Mechanical Properties

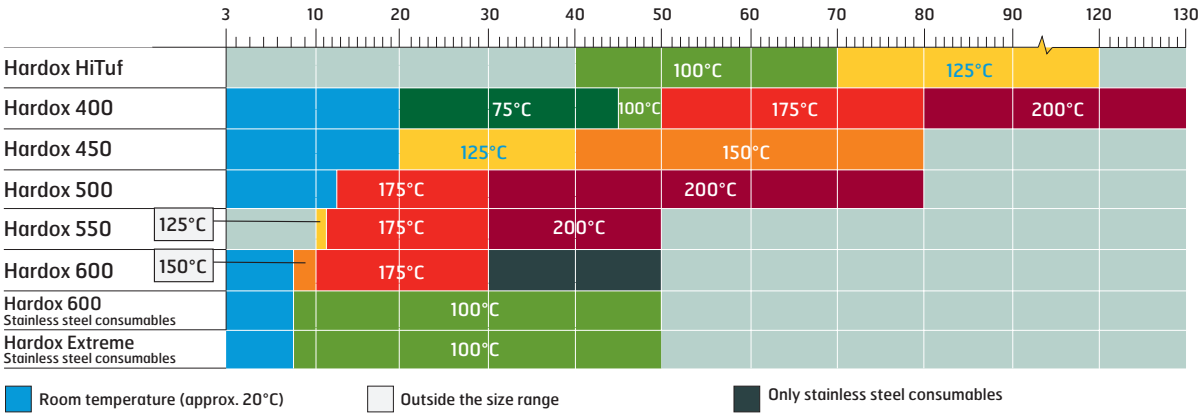
Name	Hardness* [HBW]	Toughness** KV, - 40°C [J]	Yield Strength** $R_{p0.2}$ [MPa]	Tensile strength** R_m [MPa]	Carbon equivalent**		Thickness range [mm]
					CEV [%]	CET [%]	
Hardox HiTuf* **	310–370	95	950	980	0.55	0.36	40–120
Hardox 400	370–430	45	1000	1250	0.37	0.27	4.0–130
Hardox 450	425–475	40	1200	1400	0.48	0.35	3.2–80
Hardox 500** **	470–530	30	1300	1550	0.62	0.41	4.0–80
Hardox 550	525–575	30	1400	1700	0.72	0.48	10–50
Hardox 600	570–640	20	1650	2000	0.73	0.55	8.0–50

* Guaranteed values. ** Typical values for 20 mm thick plates, except Hardox HiTuf. *** Typical values are for the thickness range 40–70 mm.
**** Guaranteed hardness values are for the thickness range 4–32 mm. For thicknesses 32.1–80 mm is guaranteed 450–540 HBW.

SSAB

Welding

MINIMUM RECOMMENDED PREHEAT AND INTERPASS TEMPERATURES FOR DIFFERENT SINGLE PLATE THICKNESSES [MM]



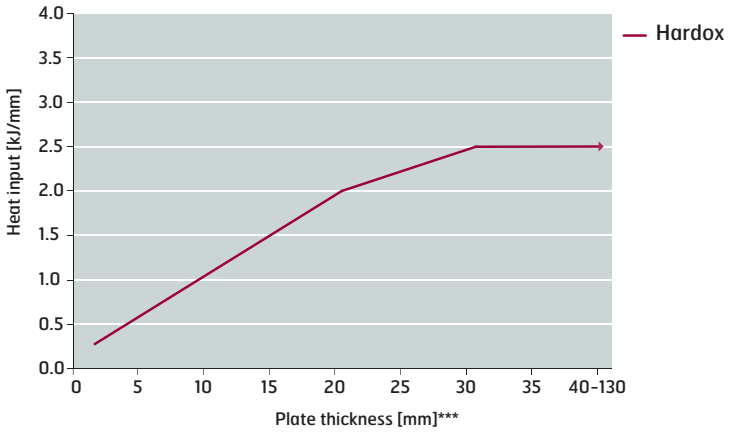
Note: The table is applicable to single plate thickness when welding with a heat input of 1.7 kJ / mm.
Further information on single plate thickness can be found in TechSupport #61 at www.ssab.com.

MAXIMUM RECOMMENDED INTERPASS TEMPERATURE

Hardox HiTuf**	300°C
Hardox 400	225°C
Hardox 450	225°C
Hardox 500	225°C
Hardox 550	225°C
Hardox 600	225°C
Hardox Extreme	100°C

** Interpass temperatures of up to approx. 400°C can be used in certain cases for Hardox HiTuf. In such cases, use WeldCalc.

RECOMMENDED MAXIMUM HEAT INPUT FOR HARDOX



***The thinest plate thickness in the joint.

Cutting

PREHEATING OF HARDOX PRIOR TO OXYFUEL CUTTING.

Grade	Plate thickness [mm]	Preheating temp. [° C]
Hardox HiTuf	≥ 90	100
Hardox 400	45–59.9 60–80 > 80	100 150 175
Hardox 450	40–49.9 50–69.9 70–80	100 150 175
Hardox 500	30–49.9 50–59.9 60–80	100 150 175
Hardox 550	20–50	150
Hardox 600	12–29.9 30–50	150 175

MAXIMUM CUTTING SPEED, MM/MIN, IF NO PREHEATING IS EMPLOYED IN OXYFUEL CUTTING

Plate thickness	Hardox 400	Hardox 450	Hardox 500	Hardox 550	Hardox 600
< 12 mm	x	x	x	x	x
< 15 mm	x	x	x	x	300
< 20 mm	x	x	x	x	200
< 25 mm	x	x	300	270	180
< 30 mm	x	x	250	230	150
< 35 mm	x	x	230	190	140
< 40 mm	x	230	200	160	130
< 45 mm	230	200	170	140	120
< 50 mm	210	180	150	130	110
< 60 mm	200	170	140	-	-
< 70 mm	190	160	135	-	-
< 80 mm	180	150	130	-	-

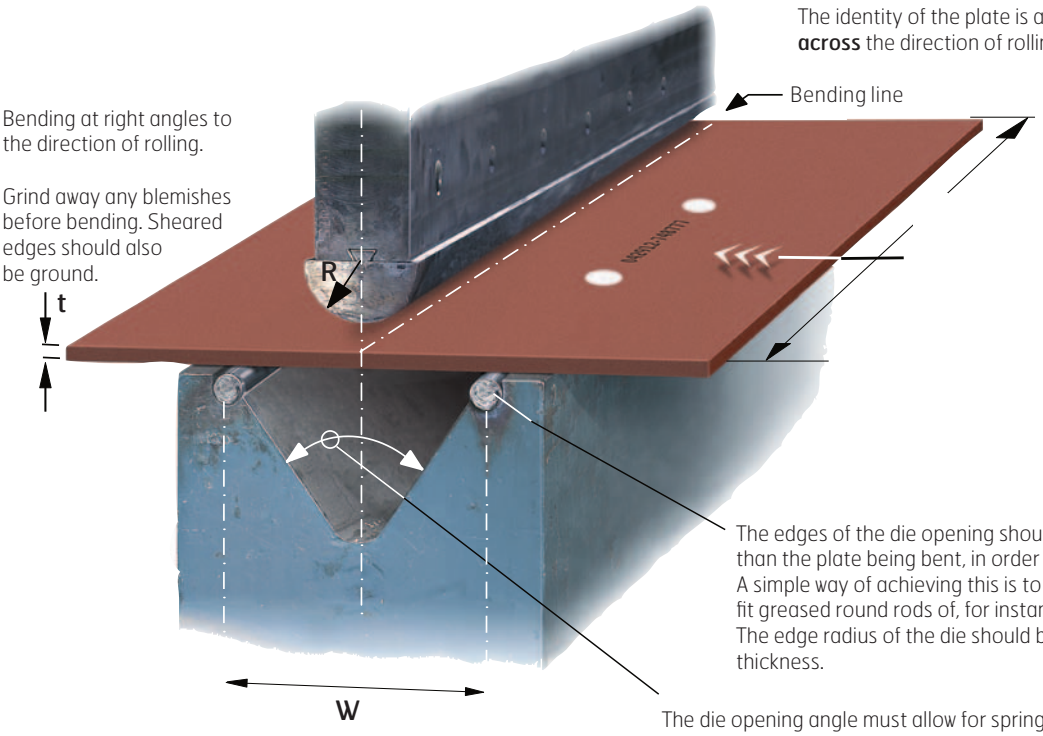
x = no restrictions

Bending

MINIMUM RECOMMENDED PUNCH RADIUS (R) AND DIE OPENING WIDTH (W) FOR PLATE THICKNESS (T) WHEN THE PLATE IS BEING BENT TO 90 ° ALONG THE DIRECTION OF ROLLING AND AT RIGHT ANGLES TO THE DIRECTION OF ROLLING – AND ALSO THE CORRESPONDING SPRINGBACK.

	Thickness [mm]	At right angles R/t	Along R/t	At right angles W/t	Along W/t	Springback [°]
S 355 acc to EN 10025		2.5	3.0	7.5	8.5	3–5
Hardox 400	t < 8 8 ≥ t < 20 t ≥ 20	2.5 3.0 4.5	3.0 4.0 5.0	8.5 10.0 12.0	10.0 10.0 12.0	9–13
Hardox 450	t < 8 8 ≥ t < 20 t ≥ 20	3.5 4.0 5.0	4.0 5.0 6.0	10.0 10.0 12.0	10.0 12.0 14.0	11–18
Hardox 500	t < 8 8 ≥ t < 20 t ≥ 20	4.0 5.0 7.0	5.0 6.0 8.0	10.0 12.0 16.0	12.0 14.0 18.0	12–20

Care should be taken during all bending – due to the high strength of the plate and the high bending force necessary. If the plate should crack, fragments of the material may fly off. During bending, the operator and other personnel must therefore not stand in front of the machine – they should move to the side.



SSAB is a global leader in value added, high strength steel. SSAB offers products developed in close cooperation with its customers to reach a stronger, lighter and more sustainable world.

SSAB employs over 8 700 people in over 45 countries around the world and operates production facilities in Sweden and the US. SSAB is listed on the NASDAQ OMX Nordic Exchange, Stockholm.

For more information, contact us or visit **www.ssab.com**

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