HARDOX®
WEAR PLATE

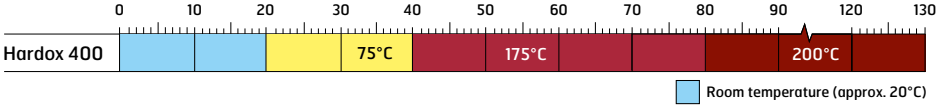
Workshop properties for Hardox® 400 Round Bars

The workshop properties of Hardox® 400 Round Bars are the same as for plate with a few exceptions. This leaflet highlights the recommendations for round bars in one place regarding welding, bending, drilling, sawing and turning. The information will be added in coming editions of the workshop recommendation brochures.

Welding

Comments compared to normal recommendations

- Diameter is equal a plate thickness.
- Increased pre heating temperature for 40–50 mm to 175°C.
- For other diameters same recommendations as plate.



WeldCalc for Hardox® 400 Round Bars

Diameter 40–50 mm use calculations for preheating temperature according to CET method. Do not use SSAB plate recommendations for 40–50 mm.

Diameter 50–100 mm all functions of WeldCalc can be used, meaning possible to use preheating if SSAB's recommendations is chosen. Other functions in WeldCalc can be used for all diameter of Hardox® 400 Round Bars.

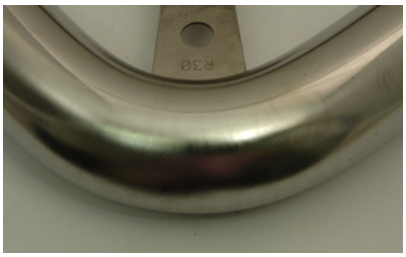
Bending

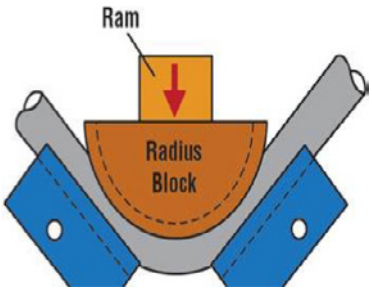
Comments compared to normal recommendations

- Bright bars (turned, peeled, ground) R/t 1,0.
- As rolled R/t 1,5.

R= radius, t= bar diameter

Minimum bending radius is smaller compared to plate recommendations due to shape and that you do not get plain strain (instead uni-axel strain path). Our experience is more from regular press brake tools.





The bending tools should always be as, or harder than the bar being bent, in order to avoid excessive damage on the tools. High contact pressure between tool and bar can cause damage on both tools and inner radius of the bar. To minimize high contact pressure the tools should be profiled to match the dimensions of the bar being bent.

SSAB

Drilling

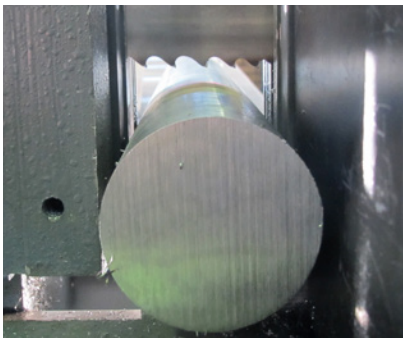
- Use only HSS drills when you have unstable machine conditions. HSS drills are only suitable up to 500 brinell. If the machine conditions are good you have several choices of solid cemented carbide drills with exchangeable heads or indexable insert drills. For more information, see the machining brochure.

Hardox® 400 Round Bars							
V_c (m/min)	Drill Ø	5	10	15	20	25	30
~ 9	Feed rate, f_n (mm/rev) and speed (rpm)	0.06/570	0.11/475	0.16/190	0.23/140	0.29/115	0.35/95

Sawing

Important to ask a supplier for suitable saw band to use in Hardox®.

- Choose blade.
- Use band speed values.
- Fine tune feed rate by studying the chips.

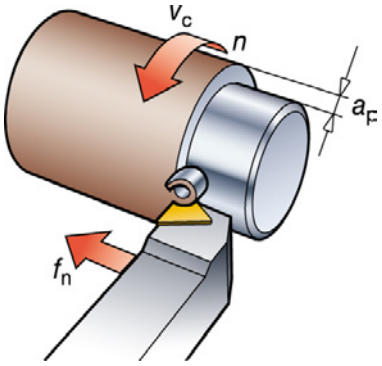


	Bandspeed (m/min)			
Material	Bi-metal		Carbide Tipped Blade	
Diameter >>	< 100 mm	100–400 mm	< 100 mm	100–400 mm
	30–35 m/min	20–25 m/min	50–60 m/min	40–50 m/min

Turning

- These cutting data should be seen as a starting values.
- It is up to each workshop to optimize cutting data for each machine.

Cuttingdata	Cemented Carbide	
	Roughing	Finishing
Cutting speed, V_c (m/min)	70–90	70–130
Feed per revolution, f_n (mm/r)	0.2–0.6	0.05–0.3
Cutting depth, a_p (mm)	2–4	0.5–2
Suitable grades	P20–P35* K20–K30*	K01–K20*



* If possible, use a CVD coated cemented carbide.

Formulas and definitions

$V_c = \pi \times d \times n / 1000$
$n = V_c \times 1000 / \pi \times d$
$v_f = n \times f_n$
$\pi = 3{,}14$

V_c = cutting speed (m/min)
n = speed (rpm)
f_n = feed rate (mm/rev)
v_f = feed rate (mm/min)

d = workpiece Ø
a_p = cutting depth (mm)

SSAB