Wear Resistant Steel
XCHD 500

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PRODUCT

XCHD 500 wear resistant steel is a product with nominal hardness of 500HBW. The mechanical property is achieved by quenching or quenching and tempering process. It is suitable for applications with high demands on abrasions resistance. XCHD 500 also has good cold forming and welding performances.

APPLICATIONS

XCHD 500 is the structural steel for earth moving and loading machines, excavator, trucks, cutting edges, crushers, etc.

DIMENSIONS

XCHD 500 is available in the following range of size. Other dimensions can also be supplied according to customers requirements.

Thickness (mm)	Width (mm)
6 - 80	1500 - 3500

TECHNICAL CHARESTERITSTICS

Hardness guarantee at room temperature :

Thickness (mm)	Hardness,HBW min- max
6 - 40	470 - 530
(40) - 80	450 - 540

Brinell hardness on a milled surface 1-3 mm below surface.

The plates are through-hardened to a minimum of 90% of the guaranteed minimum surface hardness.

Mechanical Properties

Typical values for 20 mm plate thickness , not guaranteed	Yield strength (Re, MPa)	Rupture strength (Rm, MPa)	A50 (%)
	1250	1450	10 (transverse)

Impact Properties

	Test temperature (° C)	Charpy V impact energy (Joule)
Guaranteed	0	27 (longitudinal)
Typical values for 20mm plate thickness, not guaranteed	- 40	30 (longitudinal)

TESTING

Brinell hardness testing HBW according to EN ISO 6506-1 on a milled surface 1-3 mm below plate surface.Average of three indentations.

Charpy-v test according to EN 10045-1.

For thickness between 6-11.9 mm , subsize Charpy-v are used. The specified minimum value is proportional to full size specimen (10x10 mm).

Average of three tests. Single value minimum 70 % of average value.

Minimum one test unit per heat and 40 tons.

CHEMICAL COMPOSITION(heat analysis)

Depending on thickness, the following elements are used singly or in combination to reach a fully hardened structure.

Thickness	Chemical Composition (wt%)								
	C	Si	Mn	P	S	Cr	Ni	Mo	B
mm	Max	Max	Max	Max	Max	Max	Max	Max	Max
6-80	0.30	0.70	1.60	0.025	0.010	1.50	1.5	0.60	0.004

The steel is fully killed and fine-grained treated.

Max carbon equivalent

Thickness (mm)	6 - 20	(20) - 40	(40) - 80
CEV(CET),max	0.68(0.43)	0.71(0.46)	0.79(0.48)
CEV(CET),typical	0.60(0.41)	0.66(0.44)	0.74(0.46)

CEV=C+Mn/6+(Cr+Mo+V)/5+(Cu+Ni)/15
CET=C+(Mn+Mo)/10+(Cr+Cu)/20+Ni/40

DELIVERY CONDITION

XCHD 500 has obtained its mechanical properties by quenching and when necessary by means of subsequent low temperautre tempering. When XCHD 500 is heated above 250°C(480°F), the hardness will decrease. Therefore, the properties of the delivery condition can not be retained after exposure to service or preheating temperature in excess of 250°C(480°F).

TOLERANCES

Thickness: EN10029 class A

Width: EN10029

Length: EN10029

Flatness: EN10029 Class N

SURFACE CONDITION

According to EN10163-2 class A.

FABRICATION

The general information below cover some important points but for more additional information please contact our technical service department.

Thermal Cutting

Flame and plasma cutting could be made as for ordinary steels.

However it is necessary due to high hardness of the steel to prevent “notches” as they are a risk for the plate to crack.

Use of higher gas and oxygen pressure and lower cutting speed are therefore recommended.

Preheating is not necessary for thicknesses up to 40 mm if ambient temperature is above +5°C.

Slow cooling rate after cutting will reduce the risk for cut edge cracking.

Welding

XCHD 500 has very good weldability and conventional welding methods, manual or automatic, can be used.

It is recommended to do welding at temperature not lower than 5 °C and use slow cooling.

For plate thickness up to 12 mm , preheating is not necessary if heat input is 1.7 kJ/mm.

For plate thickness 12-40 mm , preheating of 125°C is recommended and for 40-80 mm 175°C.

Maximum recommended interpass temperature 225°C.

In general , weld consumable should be as low as the design of the construction allows.

Soft weld consumables are recommended to give low hydrogen weld deposit.

Preheating is not generally necessary for welding with austenitic filler metals.

Cold Forming

XCHD 500 is well suited for cold bending.

In general the formability of steel will decrease with increasing hardness and following facts must be taken into considerations:

Higher hardness:

-higher bending force

-more springback

-larger punch radius needed

Minimum recommended punch radius (r) and die opening width (w)

XCHD 500	Thickness mm	⊥ r/t	// r/t	⊥ w/t	// w/t	Springback °
	t< 8	4.0	5.0	10	12	12-20
	8≤t <20	5.0	6.0	12	14	12-20
	t> 20	7.0	8.0	16	18	12-20

Plate surface: Surface damage and rust will greatly reduce the bendability and therefore shot blasted and anti-corrosion painted plates are recommended.

Plate edge: Cut and sheared edges should be deburred and rounded with grinder.

Bending equipment – die opening: Use round rods and apply grease.

Machinability

XCHD 500 can be machined with HSS-drills and specially with HSS-Co-alloyed drills with good service life if a lower cutting speed is used.

Hot Forming

The steel should not be exposed to temperatures above 220 °C.

NOTES

For other information or requirements not listed in this document, please contact and discuss with us before ordering. This document will be updated according to the development of our products.