

HARDOX®

TechSupport

Information from
SSAB Oxelösund.

#39

HARDOX 550

HARDOX 550 is a new wear plate especially developed for users and producers of wear parts.

HARDOX 550 offers solid benefits for applications like hammers, shredders, cutters, bolt on cutting edges, shrouds, dump truck discharge ends, and various linings in the mining and quarry industry.

HARDOX 550 reduces the cost/performance ratio for companies that use 12% manganese steel, castings or 500 Brinell wear plates in their wear parts. It increases the wear life and improves the service economy.

SSAB Oxelösund is the only producer of HARDOX 550.

What is it?

HARDOX 550 is a wear resistant quenched and tempered martensitic steel with a typical hardness of 550 Brinell. It is intended for heavy abrasion applications.

HARDOX 550 is supplied in thicknesses of 10-50 mm (3/8"-2"), and in widths up to 2800 mm (110"). Like all HARDOX products, it is produced according to the AccuRollTech™ plate thickness guarantee (www.accurolltech.com).



The combination of properties makes HARDOX 550 unique. It combines excellent wear resistance, crack tolerance, and workshop performance. A fine tuned chemical composition and a high precision processing route gives a typical impact toughness of 30 J/-40°C, and a hardness accuracy guarantee of +/- 25 Brinell.

Where can you use it?

Typical applications are found in the recycling industry (e.g. hammers, shredders, cutters), and in the mining and quarry industry (e.g. bolt on cutting edges, shrouds, and various types of linings).

You can use HARDOX 550 in applications where you presently use ordinary 500 Brinell AR-steel. By substituting the 500 HBW plate with HARDOX 550 you typically gain an extra 60% of service life. The low scatter in plate hardness gives the component a consistent wear life, which enables more precise maintenance planning.

Figure 1: Mechanical properties of HARDOX 550

Hardness [HBW], guarantee	550 [+/- 25]
Impact toughness, typical 20 mm	30 J/-40C, 22 Ft-lb -40F
Yield strength, typical	1400 N/mm ² , 205 ksi
Tensile strength, typical	1700 N/mm ² , 250 ksi
Elongation [A5], typical	7 %
Carbon equivalents, typical	CEV= 0.72 / CET= 0.48

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

Figure 2: Chemical Max Composition of HARDOX 550

Chemical max composition HARDOX 550							
Plate Thickness	C Max%	Si Max%	Mn Max%	Cr Max%	Ni Max%	Mo Max%	B Max%
10-50 mm	0.37	0.50	1.30	1.14	1.40	0.60	0.004

Why HARDOX 550 beats 12% Manganese Steel in Wear Parts

Until now, wear parts made of wear plate were rarely an option to chromium rich castings and 12% Manganese steel. Few plates matched the wear life of manganese steels, particularly when it came to impact wear. Moreover, to be able to match 12% manganese steel you not only needed a wear plate harder than 500 brinell, the plate also had to allow easy profiling, welding and machining.

Now we have found a solution to these strict but fully justified demands. HARDOX 550 is a pioneer wear plate. It is hard, tough and workshop friendly. Therefore it is a genuine alternative to wear parts made of manganese steel.



Liner plates is a typical application for HARDOX 550

Longer lifetime

Users of manganese steel know that it rarely reaches 550 HBW. And if it does, it is only when exposed to extreme impact wear. For slide wear it mostly stays at a moderate 400-450 Brinell.

HARDOX 550 always performs at 550 HBW, no matter what type of wear, so your wear parts will indeed last longer.

Consistent components

Apart from *maximising* the service life, *predicting* it is vital. Due to the consistent hardness of HARDOX 550, you can forecast the wear life of your components with greater accuracy.

HARDOX 550 withstands the roughest wear without denting, expansion or distortion, owing to its superior form stability. This streamlines and optimizes your production, and leaves your wear part uncorrupted during service.

Simplified logistics

HARDOX 550 is easily available, so you get away from the trouble of delayed deliveries of castings from distant suppliers. Just get the plate from your local dealer, and then cut and machine your component for direct installation.

Customised components

A widely cherished advantage of HARDOX is that it gives you the remarkable opportunity of customising your wear parts. There are numerous ways of increasing the performance of any industrial process. Thanks to the workshop friendliness and availability of HARDOX 550, you can now customise your components. Do it yourself or use some local workshop.

Easy workshop handling

The shape of spare parts made of castings is limited by the mould shape, but the geometry of spare parts made of wear plate is as flexible as your workshop facilities permit. The workshop friendliness of HARDOX 550 is thus essential. In contrast to manganese steels, you can profile it, machine it, and weld it in standard machines and workshop set-ups.

HARDOX 550 also brings a healthier work environment, in comparison with manganese steel, since welding and cutting are performed without heavy fume emission.



HARDOX 550 is excellent in the workshop

Why HARDOX 550 Beats Standard 500 HBW plates in Wear Parts

When evaluating HARDOX 550, we knew that users of standard 500 Brinell plates would consider it only if they got the extra 50 HBW without losing any toughness or workability. Then they could benefit from the bonus wear resistance without having to change their designs and workshop routines.

In other words: *the extra 50 HBW had to be the only news*. All other qualities had to stay the same, or close enough.

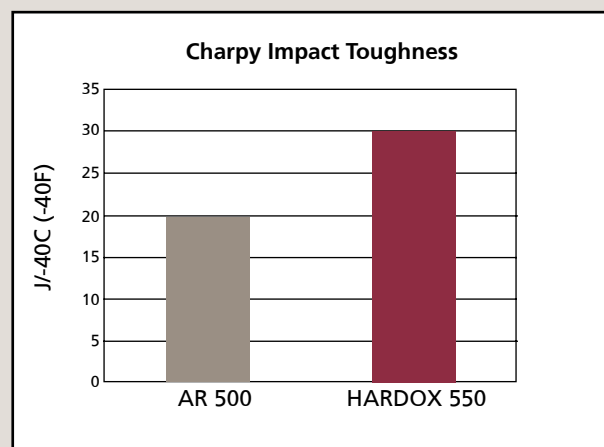
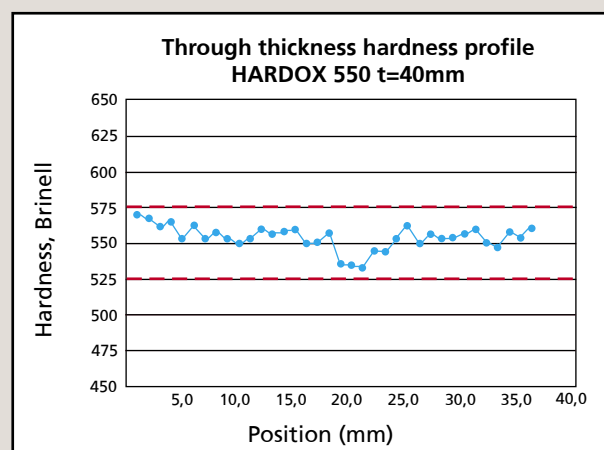
60% improved service life

Depending on your wear situation, the extra 50 HBW typically increases the service life of your wear parts by 60%.

The economic implications are obviously favourable since you then reduce the costs for material and maintenance. Fewer maintenance stops also upgrades your productivity.



A dumper body with HARDOX 550 liner plates



Crack Safety

The trial of several strategies led to a three step solution that gave HARDOX 550 its high toughness.

First, HARDOX 550 gets an extra grain refinement by additional plate processing. *Second*, improved plate handling routines secure an outstanding surface finish. This reduces the number of potential points of crack initiation. *Third*, a homogenous microstructure in combination with a low level of impurities, i.e. inclusions, residuals and segregations, boost the toughness.

First-class Workshop Performance

HARDOX 550 has equivalent workshop qualities as wear plates of 500 HBW. You can weld it and machine it with the same machines that you use for ordinary 500 HBW plates.

In addition, as a HARDOX user, you have complete access to our global and all-inclusive technical support.

Reasons to upgrade from HARDOX 500 to HARDOX 550

From the perspective of your day to day workshop activities, most things are the same for HARDOX 500 and HARDOX 550. You get the same technical support, local personal contact, logistics, toughness, and workshop friendliness.

All the good things remain, but there is one striking difference. You get an additional 50 HBW of hardness. It may not sound like much, but it makes a huge difference. Above all, you can expect an extra 60% of wear life for your applications.

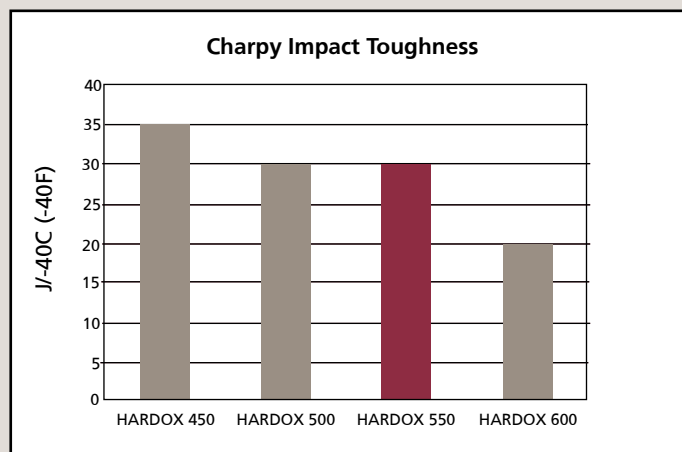
Identification	Vol. frac.
Granite	10
Obsidian	22
Quarzdonite	33
Rhyolite	20
Limestone	15

Mineral	HV	Vol. frac.
Limestone	150	100

Use WearCalc to plan the service life of your components



Technical support in 24 hours, via phone, mail or personal visits



HARDOX 500 and HARDOX 550 has equivalent impact toughness

Improved Service Economy

The ratio *extra performance per cost unit* was a major focus in the development of HARDOX 550.

As anyone could tell, the extra wear life would be of less worth if the plate price was correspondingly increased. Therefore we made sure that the additional 60% of service life far outnumbers the minor cost difference.

Optimized Operations Performance

Longer maintenance intervals optimize your production performance. Whether you can exploit all of the +60% life span depends on the operation you manage.

Our application engineers are as always at your disposal to evaluate your situation. Just give them a call to get instant access to their experience of cost/profit calculations.

More Accurate Prediction of Wear Life

HARDOX 500 has a hardness scatter of +/- 30 HBW. For HARDOX 550 we have tightened up the hardness scatter guarantee to +/-25 HBW.

This 17% improvement enables you to perform more accurate predictions of wear life and time intervals for maintenance.

The extra trimmed hardness scatter guarantee also points out that HARDOX 550 reaches even more uniform steel properties than HARDOX 500.

The Outstanding Workshop Performance of HARDOX 550

Machining

You can machine HARDOX 550 in ordinary stable machines. For drilling and milling, use cemented carbide tools (ISO class K20).

Welding

HARDOX 550 is weldable by all conventional welding methods, and to all other weldable steels.

By applying moderate preheating prior to welding, you can use low strength basic ferritic electrodes. By selecting austenitic consumables, you can weld in single plate thicknesses up to 20 mm without preheating.

Cutting

HARDOX 550 can be cut by all thermal or cold profiling methods available. Oxygen fuel cutting can be performed without preheating at full speed in plate thicknesses up to 20 mm. When cutting plates thicker than 20 mm, a preheat temperature of 100-150°C is recommended.

Bending

Our Technical Support will provide information on request.



You can weld HARDOX 550 with all conventional methods.

*You can find more workshop recommendations for HARDOX 550 in TechSupport #40 "HARDOX 550 in the workshop".
For more info about HARDOX 550, you're most welcome to consult our online technical support at www.ssabox.com/techsupport.*

HARDOX®
WEAR PLATE

HARDOX wear plate only from SSAB Oxelösund
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