

DUROXITE®

**THE LATEST
IN OVERLAY
TECHNOLOGY**



DUROXITE® FIGHTS WEAR, GUARANTEED

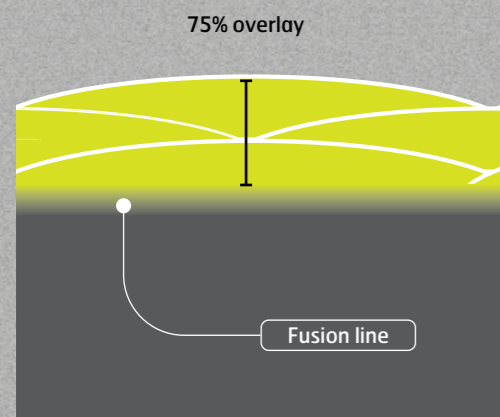
Duroxite® overlay products can add weeks, months, even years of trouble-free operations to your most extreme wear situations.

The Duroxite® product range is targeted at different types of wear, such as abrasion, impact, heat, metal-to-metal and erosion wear. Duroxite® is particularly well suited to fighting sliding wear from exceptionally hard particles such as minerals containing quartz.

By welding chromium or complex carbides, or other abrasion-resistant materials on top of mild or quenched and tempered steel, an extremely wear-resistant compound material is created.



GUARANTEED OVERLAY THICKNESS, GUARANTEED OVERLAY PROPERTIES



Duroxite® overlay plates and pipes are delivered with an overlay thickness guaranteed within $\pm 10\%$. This is consistent throughout the material and between individual plates and pipes.

The wear properties of Duroxite® are also guaranteed throughout the overlay down to 75% of the overlay thickness.

The remaining 25% of overlay is the transition layer necessary to maintain good bonding to the base material.

Duroxite® is delivered as plate, pipe, pin, wire and electrodes, ready for installation on your equipment or for fabrication, maintenance and repairs in your workshop or on site.

DUROXITE[®] EMPOWERS YOUR INDUSTRY

The performance of Duroxite[®] saves money and improves productivity in a wide range of applications through higher output and less maintenance.

Duroxite[®] overlay is the natural choice for industries active in quarries, mining, cement, energy, steel mills, recycling and many other areas where abrasive materials require extremely hard surfaces.

QUARRIES



AGRICULTURE



CEMENT



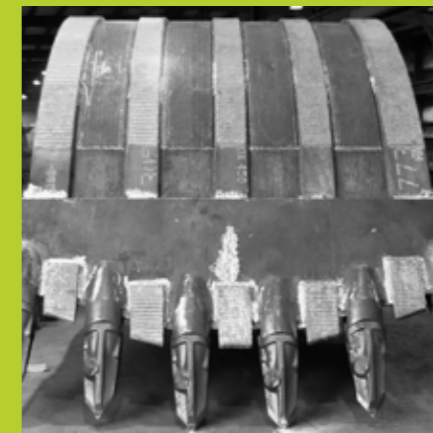
CONCRETE



CONSTRUCTION



MINING



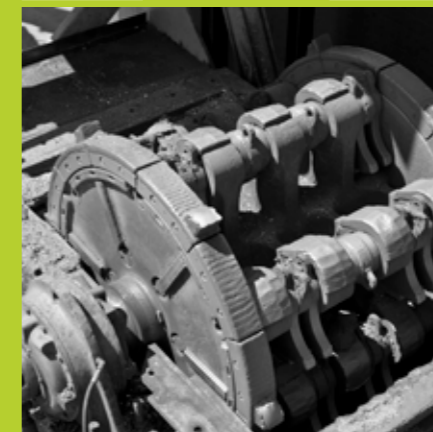
OIL SANDS



POWER



RECYCLING



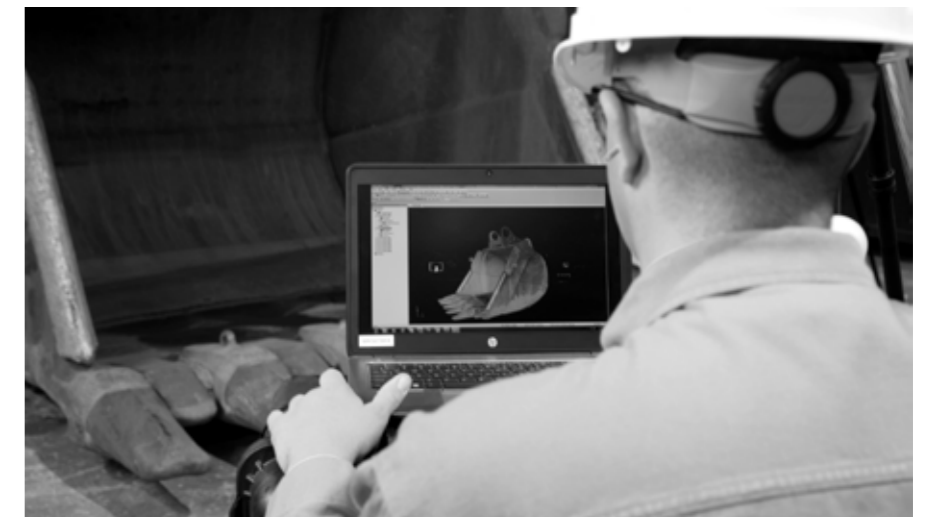
STEEL MAKING



OVERLAY EXCELLENCE

Duroxite® achieves its groundbreaking wear performance from a combination of SSAB's metal expertise, a solid knowledge from a wide range of applications, optimized overlay materials, and state-of-the-art production equipment.

The production techniques for Duroxite® are developed by SSAB and monitored at SSAB's state-of-the-art R&D testing facility, to ensure that wear resistance, welding, cutting, bending, impact, and other properties of all Duroxite® products meet your strictest requirements.



OVERLAY PLATE, PIPE AND PINS

HARDOX®
WEAR PLATE

Hardox® is the world's no.1 abrasion-resistant (AR) steel, providing a unique combination of hardness and toughness. When used as a base plate Hardox® increases the impact resistance of the overlay plate and gives a greater wear safety margin compared to using a mild steel base plate.



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PLATE			
SLIDING WEAR		SEVERE SLIDING WEAR	
DUROXITE® 100	DUROXITE® 101 HARDOX® BASE PLATE	DUROXITE® 200	DUROXITE® 201 HARDOX® BASE PLATE
PRODUCT DESCRIPTION A chromium-rich overlay deposited on a mild steel backing plate for sliding wear and moderate to low impact applications up to 350°C (660°F)	A chromium-rich overlay deposited on Hardox® 450 base plate.	A complex carbide overlay deposited on a mild steel backing plate for severe sliding wear and moderate impact applications up to 600°C (1100°F).	A complex carbide overlay deposited on Hardox® 450 base plate.
PROPERTIES Bulk hardness: Single pass 55-57 HRC, double pass 59-62 HRC, triple plus passes 60-64 HRC Carbide hardness: 1700 HK Volume fraction of primary carbides: 30-50% ASTM G65-Procedure A weight loss: 0.18 g max.	Bulk hardness: Single pass 55 to 57 HRC, double pass 56 to 59 HRC, triple pass 58 to 63 HRC Carbide hardness: 1700 HK Volume fraction of primary carbides: 30-50% ASTM G65-Procedure A weight loss: 0.18 g max.	Bulk hardness: 60-65 HRC Carbide hardness: 2500-3000 HK Volume fraction of primary carbides: 30-50% ASTM G65-Procedure A weight loss: 0.12 g max.	Bulk hardness: 60-65 HRC Carbide hardness: 2500-3000 HK Volume fraction of primary carbides: 30-50% ASTM G65-Procedure A weight loss: 0.12 g max.
TYPICAL APPLICATIONS Chutes/hoppers, liners for truck beds, dozer blades, shovel buckets, dragline buckets, excavators, separator guide vanes, discharge cones for clinker storage bins, chutes for sintering ore conveying, outlet ducts for clinker grinding mills, receiving hoppers, dredging pipes and pumps, suction pipelines, pump discharges, fan blade/housings, coke vibrating screen plates, coal handling chutes, coal feeder liners, crusher screen plates, classifier cones, journal liners, silo bunkers.	Slurry pumps, chutes, dredging pipes, cullet glass, air ducts, carbon injection pipes, suction lines, troughs.	Chutes, liner plates, conveyors sides, underground mine skips, cement furnace components, sinter plant parts, fan blades, mixer blades, crews, gyratory mantles, coal and cement pulverizer rolls, raw material crushing components, molding panels, ore sintering, crushing, riddling, blast furnace hoppers, throats, and ovens.	Buckets and teeth, railway ballast tampers, dredge buckets and lips, dragline buckets, coke hammers, rippers, sizing screens, crushing equipment, brick industry components, muller tyres, catalyst lift pipes, pump impellers, fan blades, rockwool rolls.

PLATE		PIPE	PIN
EXTREME SLIDING WEAR	HIGH IMPACT AND SLIDING WEAR	SLIDING WEAR	HEAT AND METAL-TO-METAL WEAR
DUROXITE® 300	DUROXITE® 500	DUROXITE® 100 PIPE	DUROXITE® 400 PIN
PRODUCT DESCRIPTION An ultra-fine complex borocarbide overlay deposited on a mild steel backing plate for extreme sliding wear applications up to 600°C (1100°F)	An ultra-fine complex borocarbide overlay deposited on a mild steel backing plate for a combination of wear and high impact applications up to 600°C (1100°F)	A chromium-rich overlay deposited on a mild steel pipe for sliding wear applications.	A tool steel overlay deposited on a Q&T bar for metal-to-metal applications up to 480°C (900°F)
PROPERTIES Bulk hardness: Single and double pass 67 to 70 HRC Volume fraction of borocarbides: 60-70% ASTM G65-Procedure A weight loss: 0.07 g max.	Bulk hardness: Single and double pass 67 to 70 HRC Volume fraction of borocarbides: 60-70% ASTM G65-Procedure A weight loss: 0.18 g max.	Bulk hardness: Double or multiple passes 59-62 HRC Carbide hardness: 1700 HK Volume fraction of primary carbides: 30-50% ASTM G65-Procedure A weight loss: 0.18 g max.	As-welded overlay hardness: 52-54 HRC Work hardening hardness: up to 58 HRC Maximum service temperature: 480°C (900°F)
TYPICAL APPLICATIONS Crusher rolls, skip liners, slurry pipes, slurry pumps, conveyor chains, excavator bucket liners, fan blades, deflector blades, cranks crushers, surge bins, feed chutes, slurry pipes, slurry pumps, ore chutes, screw augers, wear liner plates, ash handling equipment liners, grain shredding hammers, sugar mill knives, row crop sweeps, fracking blender pumps, snow plow shoes, demolition tools.	Earthmoving equipment, crushing equipment, mining equipment, shovel buckets, skip liners, slurry pumps, conveyor chains, feeder line plate, bucket lips, hardbanding, augers, scraper blades, muller tires, mixer tires, brick dies, tamper feet, tillage tools, chisel plows, surge bins, feed chutes, slurry pipes, slurry pumps, spoon section liner plates, ash handling equipment liners, cane knives and shredders.	Crusher hammers, gyratory crusher cones and mantles, dredging pumps, slurry pipes, dragline, bucket liners, coal pulverizer rolls, coke hammers, sand dredging parts, mining and earthmoving components, and sorting screens.	Dragline bucket components, dragline shovels, clam shell buckets, sheave pins, backhoe pins, crusher shafts.

OVERLAY WELDING CONSUMABLES



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WIRE

	DUROXITE® 100 WIRE	DUROXITE® 200 WIRE	DUROXITE® CR-ZERO WIRE	DUROXITE® AP WIRE
PRODUCT DESCRIPTION	A flux cored open-arc wire for hardfacing components subject to sliding wear applications.	A flux cored open-arc wire for hardfacing components subject to severe sliding wear applications.	A wire suitable for overlay welding situations where it is difficult to protect the welder from the emission of hexavalent chromium smoke.	A wire with properties that make it suitable for all-position (AP) welding, including flat, horizontal, vertical and overhead welding.
PROPERTIES	<p>Chemical composition (wt. %): 4.7 C, 0.2 Mn, 0.6 Si, 27.0 Cr, balance Fe</p> <p>Surface hardness: Two-layer deposit on mild steel: 58 to 65 HRC Three-layer deposit on mild steel: 60 to 65 HRC</p> <p>ASTM G65-Procedure A weight loss: 0.18 g max.</p>	<p>Chemical composition (wt. %): 5.3 C, 0.5 Mn, 0.2 Si, 22.0 Cr, 6.5 Nb, balance Fe</p> <p>Surface hardness: One-layer deposit on mild steel: 57 to 60 HRC Two-layer deposit on mild steel: 60 to 65 HRC</p> <p>ASTM G65-Procedure A weight loss: 0.12 g max.</p>	<p>Chemical composition (wt. %): 0.6 C, 2.3 Mn, 1.5 Si, 2.4 Ni, 4.0 B, balance Fe</p> <p>Surface hardness: Two-layer deposit on mild steel: 63 to 69 HRC Three-layer deposit on mild steel: 65 to 69 HRC</p> <p>ASTM G65-Procedure A weight loss: 0.18 max.</p>	<p>Chemical composition (wt. %): 0.5 C, 1.3 Mn, 0.6 Si, 7.0 Cr, 0.6 Mo, balance Fe</p> <p>Surface hardness: Two-layer deposit on mild steel: 55 to 59 HRC Three-layer deposit on mild steel: 56 to 60 HRC</p>
TYPICAL APPLICATIONS	Loader bucket liners, bucket lip and side shrouds, jaw shrouds, heel pads and dewatering conveyors, coal discharger chutes.	Screen plates, loader bucket liners, feeding systems for ball mills, loader bucket liners, bucket lip shrouds, bucket side shrouds, chutes, liner plates and skip liners, cement furnace components, sinter plant parts, fan blades, mixer blades, crews, gyratory mantles, coal and cement pulverizer rolls, raw material crushing components, molding panels, coal discharger chutes.	Mixer shafts, impellers, buckets, shovels, transport screws, and crushers for the concrete industry.	Bucket teeth, tillage tools, bucket lips, bucket sides, cutting edges, sand dredge equipment, dragline buckets, conveyor chutes, grizzly bars, screw flights, metal shredders, sliding metal parts, tire shredder knives, extruder screws, tamper feet, churn drills, muller tires. Especially applicable for all-position welding and re-instating of hardfacing sealing runs on clad wear plate fabrications.

ELECTRODE

DUROXITE® AP ELECTRODE

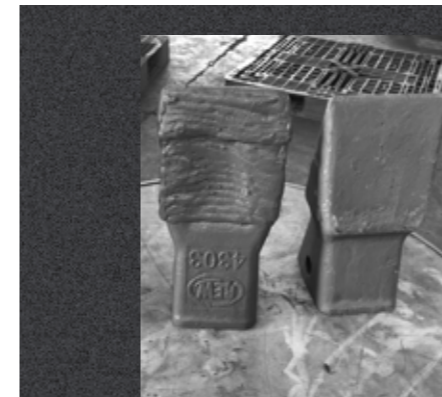
An electrode with properties that make it suitable for all-position (AP) welding, including flat, horizontal, vertical and overhead welding.

Chemical composition (wt. %)
0.5 C, 0.7 Mn, 0.6 Si, 5.5 Cr, 1.3 Mo, balance Fe

Surface hardness
Two-layer deposit on mild steel: 56-60 HRC

Three-layer deposit on mild steel: 56-60 HRC

Bucket teeth, tillage tools, bucket lips, bucket sides, cutting edges, sand dredge equipment, dragline buckets, conveyor chutes, grizzly bars, screw flights, metal shredders, sliding metal parts, tire shredder knives, extruder screws, tamper feet, churn drills, muller tires. Especially applicable for all-position welding and re-instating of hardfacing sealing runs on clad wear plate fabrications.



Wear part: Ground engaging teeth (GET) with **Duroxite® 200 Wire**

Industry: Mining – South Africa

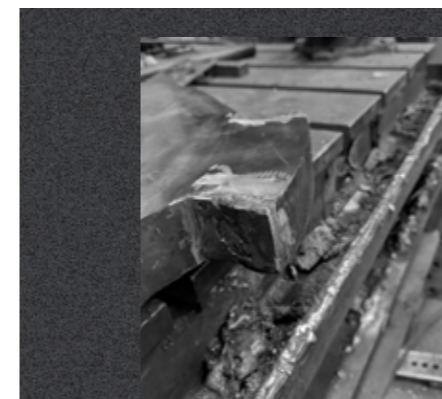
Application: **Excavator bucket teeth**
The original teeth (yellow) are made in CrMo steel. The other teeth received a hardfacing layer of Duroxite® 200 Wire

Service life: The teeth with Duroxite® 200 Wire had a 3 times longer service life

SLIDING WEAR

PRODUCT DESCRIPTION

PROPERTIES



Wear part: Cutter teeth with **Duroxite® 100 Wire**

Industry: Recycling – Canada

Application: **Cutting equipment for household recycling plant**
Teeth in heat treated 4140 steel were replaced by teeth hardfaced with Duroxite® 100 Wire on Hardox® 450

Service life: Increased from 3 to 14 months of operation, when the teeth with Duroxite® 100 Wire were still in good shape

SLIDING WEAR

TYPICAL APPLICATIONS

PROVEN PERFORMANCE

Duroxite® is tough on wear wherever it is applied. Here are a few examples where Duroxite® makes a difference.

If you want to know more about Duroxite® for your particular business, please visit www.duroxite.com to find the closest contact.



Wear part: Conveyor liner plate using **Duroxite® 300**

Industry: Steel foundry – Mexico

Application: **Conveyor**
The original conveyor liner made of casting Mn with tungsten carbide 38mm (1.5") worn out after three months. It's replaced by Duroxite 300 12 mm + 6 mm (1/4" on 1/2") welded on 20 mm (3/4") Hardox 600. After three months, this liner plate only showed 0.254 mm (0.01") wear

Service life: The service life of Duroxite® 300 plate is about 2 years

EXTREME SLIDING WEAR

SLIDING WEAR

Wear part: Drum mixer paddles of **Duroxite® 101**

Industry: Concrete – Canada

Application: **Drum mixer**
Replacing 1" polyurethane paddles with Duroxite® 101 6 mm on 10 mm (1/4" on 3/8")

Service life: 5 times longer service life



Wear part: Bail pin made of **Duroxite® 400 Pin**

Industry: Coal mine – USA

Application: **Dragline bucket**
The previously used induction hardened 4340 pin was replaced by a Duroxite® 400 overlay pin.

Service life: Increased service life from 800 to 3,500 hours

HEAT AND METAL-TO-METAL WEAR

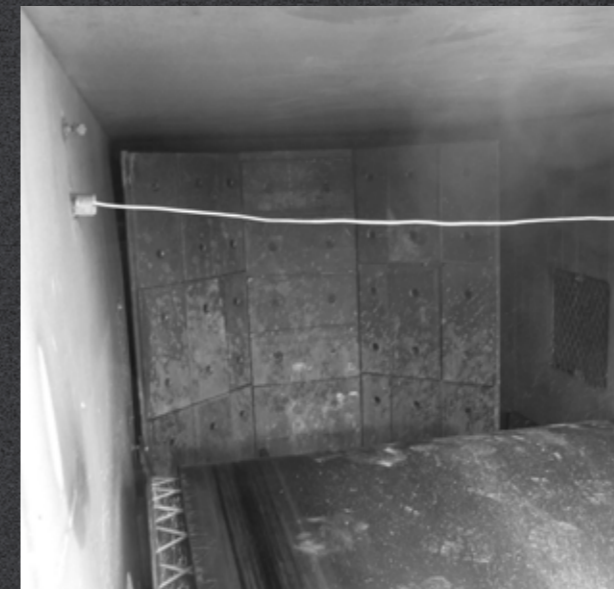
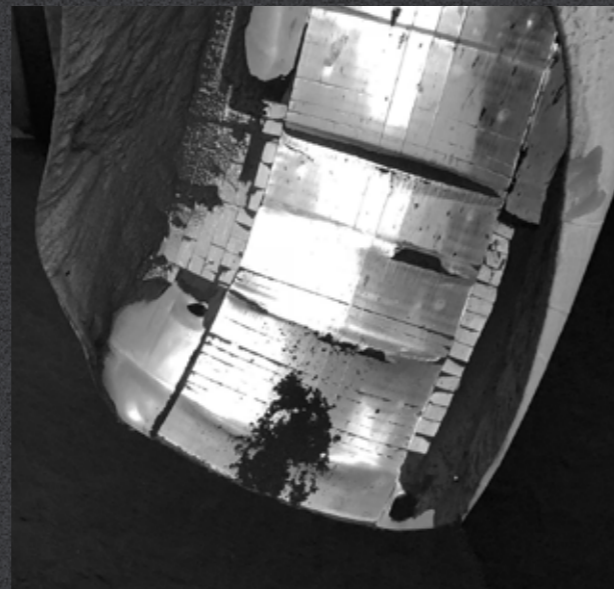
SEVERE SLIDING WEAR

Wear part: Liner plate made of **Duroxite® 200**

Industry: Coal terminal – Canada

Application: **Coal chute**
Replacing a competitor's CCO 6 mm on 6 mm (1/4" on 1/4") with Duroxite® 200 6mm + 6mm (1/4" on 1/4")

Service life: Increased service life from 6 to 30 months



Wear part: Liner plate made of **Duroxite® 500**

Industry: Copper mine – China

Application: **Belt machine**
Duroxite® 500 6 mm on 41 mm (1/4" on 1-5/8") replaced the ZG M13 cast liner plate (50 mm)

Service life: Increased from 15 to 45 days

HIGH IMPACT AND SLIDING WEAR

DUROXITE® IN FABRICATION

Duroxite® is designed to be hard, without giving you a hard time in the workshop.

Even the most worn-out equipment can be rebuilt and repaired to perform as new. With our broad product offering, including Hardox wear plate and Duroxite®, and top-of-the-line processing equipment, you are able to restore products of practically any condition, size and design.

INSTALLING DUROXITE®

No special equipment is needed to install Duroxite® products. Welding and bolting are the common methods for installing Duroxite® overlay plate or wear parts onto your equipment.

When joining base metal use 480 MPa (70 ksi) or 560 MPa (80 ksi) consumables. Any surface exposed to severe wear should be protected with hard-surfacing consumables. Cap welding a Duroxite® product with Duroxite® Wire ensures the weld will have the same wear resistance, resulting in a consistent service life for the entire overlay product.

SAFETY PRECAUTIONS

When welding or cutting Duroxite products, smoke is produced containing harmful fumes and gases that are chemically highly complex and difficult to easily classify. The major toxic component in the fumes and gases produced in the process is hexavalent chromium. The proper exhaust ventilation equipment and fume-extraction torches are recommended, as well as suitable protective clothing and respiratory protection for operators.

Duroxite® can be cut by plasma, laser, water jet, arc gouge, and abrasive saw cutting. It cannot be cut by oxy-fuel flame cutting. Duroxite® should be cut from the base metal side only to avoid carbon contamination. When beveling, Duroxite® overlay plate can be burned from the hard side. Cutting speeds need to be reduced when cutting carbides.



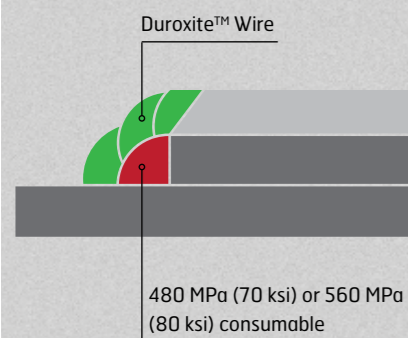
RECOMMENDED CUTTING SPEED AT DIFFERENT PLASMA CURRENTS AND THICKNESSES

Plate thickness	Duroxite® 100 plate				Carbon steel
	130 amps	200 amps	260 amps	400 amps	360 amps
6 mm on 3 mm 1/8" on 1/4"	1920 mm/min 75 inches/min	2655 mm/min 105 inches/min	3080 mm/min 120 inches/min	3540 mm/min 140 inches/min	4200 mm/min 165 inches/min
6 mm on 6 mm 1/4" on 1/4"	1920 mm/min 75 inches/min	2655 mm/min 105 inches/min	3080 mm/min 120 inches/min	3540 mm/min 140 inches/min	4200 mm/min 165 inches/min
10 mm on 10 mm 3/8" on 3/8"	1010 mm/min 40 inches/min	1265 mm/min 50 inches/min	1735 mm/min 65 inches/min	2440 mm/min 95 inches/min	4200 mm/min 165 inches/min
12 mm on 12 mm 1/2" on 1/2"	552 mm/min 20 inches/min	1225 mm/min 45 inches/min	1465 mm/min 55 inches/min	1800 mm/min 70 inches/min	4200 mm/min 165 inches/min

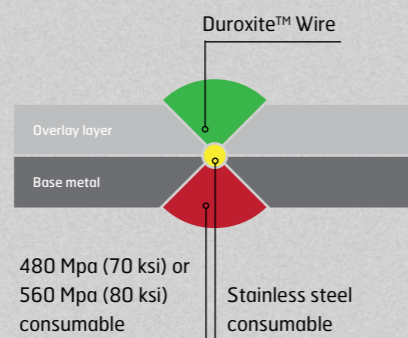
CUTTING

WELDING AND BOLTING DUROXITE® TO YOUR SUBSTRATE

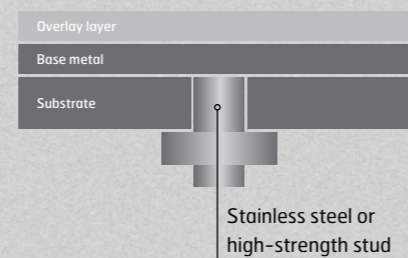
Joining Duroxite® plate on mild steel



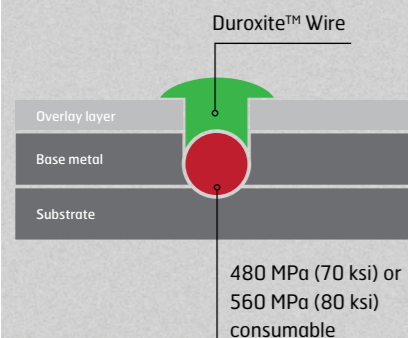
Joining Duroxite® plates end to end



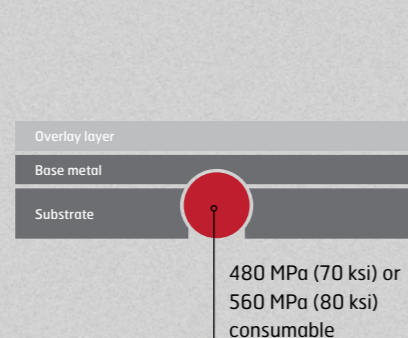
Stud welding of Duroxite® plate from base metal side



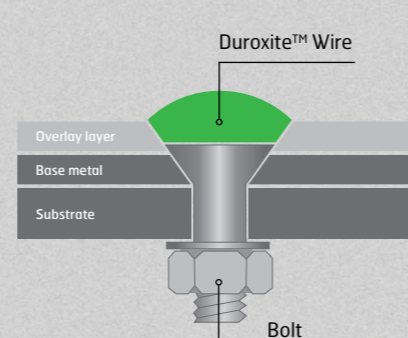
Plug welding of Duroxite® plate from overlay side



Plug welding of Duroxite® plate from base metal side



Bolting Duroxite® plate through countersunk hole



Duroxite® is typically formed with overlay to the inside but can be roll formed with overlay to the outside. Avoid bending plate parallel to the welding bead direction. The staggered cracking pattern on the overlay surface ensures good formability when bending. For bending radius recommendations, see chart on right.

The table covers bending radius recommendations for Duroxite® 100, 101, 200 and 201. Specific forming recommendations for Duroxite® 300 can be found on www.duroxite.com.

THICKNESS	MIN INSIDE RADIUS	MIN OUTSIDE RADIUS
	HARD LAYER FACE IN	HARD LAYER FACE OUT
3 mm on 6 mm 1/8" on 1/4"	200 mm 8"	900 mm 36"
3 mm on 10 mm 1/8" on 3/8"	300 mm 12"	900 mm 36"
6 mm on 6 mm 1/4" on 1/4"	300 mm 12"	1200 mm 48"
10 mm on 10 mm 3/8" on 3/8"	400 mm 15"	1500 mm 60"
13 mm on 13 mm 1/2" on 1/2"	500 mm 20"	1800 mm 72"

FORMING

Machining Duroxite® with conventional methods is not recommended. It can be finished by grinding. Countersunk holes can be precisely produced by EDM (Electrical Discharge Machining). Pre-machined mild steel inserts can be used if extra machining is required.



MACHINING

LEARN MORE AT www.duroxite.com

SSAB
SE-613 80 Oxelösund
Sweden

T +46 155 25 40 00
F +46 155 25 40 73
contact@ssab.com

www.duroxite.com

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