



DUROXITE™ 300

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General Product Description

Duroxite™ 300 is an iron-based steel alloy overlay deposited on a mild steel backing plate. It is designed for extremely severe sliding wear for both dry and wet (slurry) abrasive environments. It works well at ambient or elevated temperatures up to 1100°F (600°C). The product is available in single and double layers.

Duroxite™ 300 consists of specially formulated abrasive materials employing a uniform glass-forming melt chemistry that allows high undercooling to be achieved. The overlay contains a unique high volume of ultra-fine tungsten-niobium-molybdenum-rich complex borocarbides with a grain size refined down to 500 nm. The borocarbides are completely wetted in a ductile matrix preventing premature pull-out delamination, crack nucleation and bridging. This results in a product with significantly improved service life that maintains high toughness in severe sliding wear applications. Duroxite™ 300 is an excellent alternative to tungsten carbide overlay.

Key Benefits

- Extreme wear resistance in dry and wet abrasive environments with a high degree of toughness.
- Cost effective alternative to tungsten carbide with equivalent service life and better impact resistance.
- Overlay thickness is reduced compared to traditional overlays resulting in a lighter weight product while increasing service life.
- Absorbs 25% more impact energy than the traditional chromium overlay plate as measured by the continuous high impact lab test.
- Has uniform through-thickness hardness of 67 to 70 HRC for single and multiple-layer overlay. Maintains a high hardness of approximately 60 HRC after exposure to high temperatures up to 1100°F (600°C).
- Maintains a consistent wear resistance from surface down to 75% of the overlay.

Typical Applications

Duroxite™ 300 is suitable for use in the mining, cement, oil sands, steel production, power generation, agriculture, oil and gas and construction. Below are some typical applications:

Mining	Crusher rolls, Skip liners, Slurry pipes, Slurry pumps, Conveyor chains, Excavator bucket liners
Cement	Fan blades, Deflector blades, Cranker crushers
Oil sands	Surge bins, Feed chutes, Slurry pipes, Slurry pumps
Steel	Ore chutes
Power	Screw augers, Wear liner plates, Ash handling equipment liners
Agriculture	Grain shredding hammers, Sugar mill knives, Row crop sweeps
Oil and Gas	Fracking blender pumps
Construction	Snow plow shoes, Demolition tools

For more information on applications see the Duroxite™ Product brochure.

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Standard Dimensions

Standard overlay thicknesses				Standard plate sizes	
Single pass		Double passes			
Metric unit	Imperial unit	Metric unit	Imperial unit	Metric unit	Imperial unit
3 mm on 6 mm	1/8" on 1/4"	6 mm on 6 mm	1/4" on 1/4"	1.2 m x 2.4 m 1.5 m x 3.0 m 1.8 m x 3.0 m	4' x 8' 5' x 10' 6' x 10'
		6 mm on 8 mm	1/4" on 5/16"		
		6 mm on 10 mm	1/4" on 3/8"		
		6 mm on 12 mm	1/4" on 1/2"		

Custom thicknesses and other plate sizes are available upon request.

Mechanical Properties

Surface Hardness

Number of overlay passes	Typical surface bulk hardness ¹⁾
Single and double passes	67 to 70 HRC (925 to 1 075 HV)

¹⁾ Surface hardness is measured on machined flat surface just below overlay surface.

Wear Properties

Number of overlay passes	ASTM G65 – Procedure A weight loss ²⁾	
	Surface	75% depth of overlay ³⁾
Single pass	0.10 g	0.10 g
Double passes	0.07 g	0.07 g

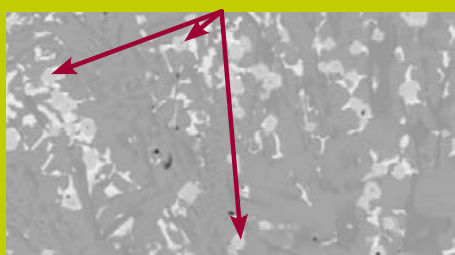
²⁾ ASTM G65 is a standard test measuring sliding abrasion resistance using a dry sand/rubber wheel apparatus. ASTM G65–Procedure A is the most severe test method.

³⁾ ASTM G65 wear test is conducted at 75 % depth of the overlay materials to ensure consistently good wear resistance from top surface through to the depth of 75 % of the overlay.

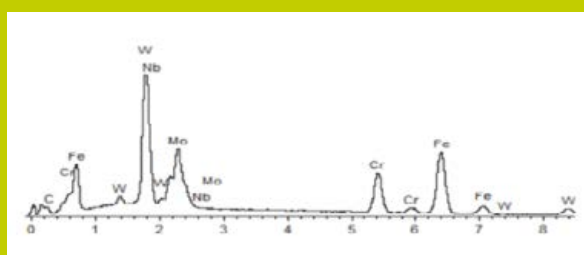
Microstructure

Duroxite™ 300 overlay contains an ultra-fine complex borocarbide phase down to approximately 500 nm in a ductile matrix. The typical volume fraction of borocarbides is maintained between 60 to 70% to form a uniform hard matrix. The SEM (Scanning Electron Microscopy) / EDS (Energy Dispersive Spectrometry) analysis of the Duroxite™ 300 overlay confirms that the refined borocarbides are tungsten-niobium-molybdenum-rich borocarbides, and chromium-rich borocarbides dispersed in an iron-based matrix. The ultra-fine borocarbides are approximately 200 times finer than the traditional chromium carbides.

Ultra-refined complex borocarbides in 500 nm



SEM / EDS spectrum showing W-Nb-Mo-rich borocarbides



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Tolerances

Thickness

Overall and overlay thickness tolerances can be guaranteed within $\pm 10\%$ of specified thickness.

Flatness

Plate flatness tolerance can be guaranteed within ± 3 mm ($\pm 1/8$ "") over 1.5 m (5') plate length for plate dimensions equal to or less than 1.5 m (5') x 3.0 m (10'). For plates greater than 1.5 m (5') wide by 3.0 m (10') long, the plate flatness tolerance can be guaranteed within ± 25 mm (± 1 "").

Delivery Conditions

Duroxite™ 300 is supplied in an as-welded condition.

Fabrication and Other Recommendations

Welding, cutting, forming and machining

Recommendations can be found in the Duroxite™ Product brochure, or consult your local technical support representative for more information.

