



CASE STUDY HRGMWH2024

Hardchrome Replacement

Providing a safe and long-lasting alternative to chrome plating.

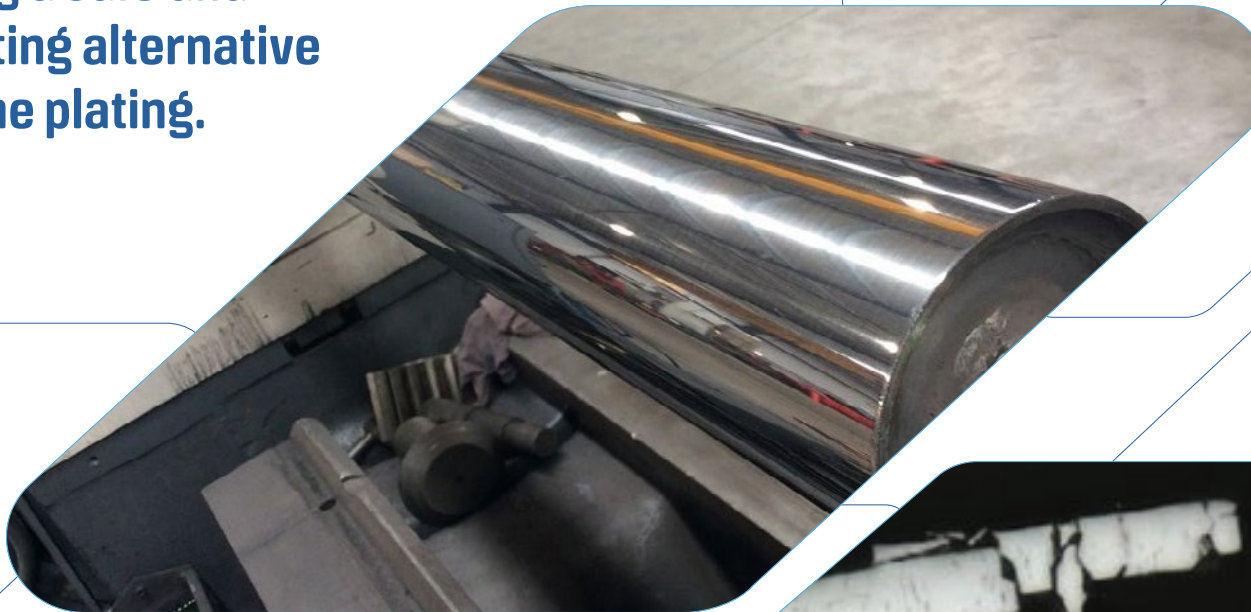


Figure 1: shaft coated with Laserbond Hardchrome alternative



Figure 2: microscopic image of a failed Hardchrome coating after short service in an underground mine. Corrosive media penetrated through micro-cracks causing bi-metallic corrosion.

The Problem

Hardchrome plating is an industrial coating process for the application of wear and corrosion resistant coatings. Through electrolytic Hardchrome plating (also known as electroplating) a layer of chrome is applied onto a metallic substrate. The main attribute affecting corrosion resistance of Hardchrome coatings are micro-cracks.

Hexavalent chromium oxide, also known as Cr(VI) is commonly used in Hardchrome plating. Cr(VI) compounds are proven to be hazardous to human health and the environment. Due to significant health and environmental concerns associated with hexavalent chromium, regulatory agencies have restricted its use. Hardchrome plating is now heavily restricted in Europe and China as well as several industries. More countries and industries are likely to follow suit in coming years. With regulations being enforced the need to find alternative solutions is at an all-time high.

The Solution | An Alternative To Hardchrome Plating

At Laserbond we have spent over 30 years developing our technology and we were the first to operate a Laser Cladding system in Australia. We are supported by our industry leading Research & Development team who continue to develop leading edge surface engineering solutions. We can work with you to find the perfect solution for Hardchrome replacement.

We offer many types of alternatives to Hardchrome plating, that are superior to Hardchrome. All Laserbond Hardchrome replacement products are tailored to the specific conditions the part is experiencing in service.

With our extensive experience in thermal spraying and laser cladding we can ensure dense coatings that provide a barrier for corrosive media. All our materials have been proven in lab and field tests for their wear and corrosion resistance. A selection of Laserbond Hardchrome alternatives are listed in the table on the next page.

High-Velocity-Oxy/Air-fuel Spraying (HVOF/HVAF)

HVOF/HVAF is a high-velocity thermal spray process for the application of dense, wear and corrosion resistant coatings. Melted particles of the coating material hit the substrate material with a velocity of up to 800 m/s, achieving very high coating bond strength of up to 100 MPa.

HVOF was the first surface engineering process qualified as a Hardchrome alternative in the late 90's in the aerospace industry for coating of landing gears. Since then, it has made its way into several specifications as a surface engineering process, replacing Hardchrome.

Laser Cladding

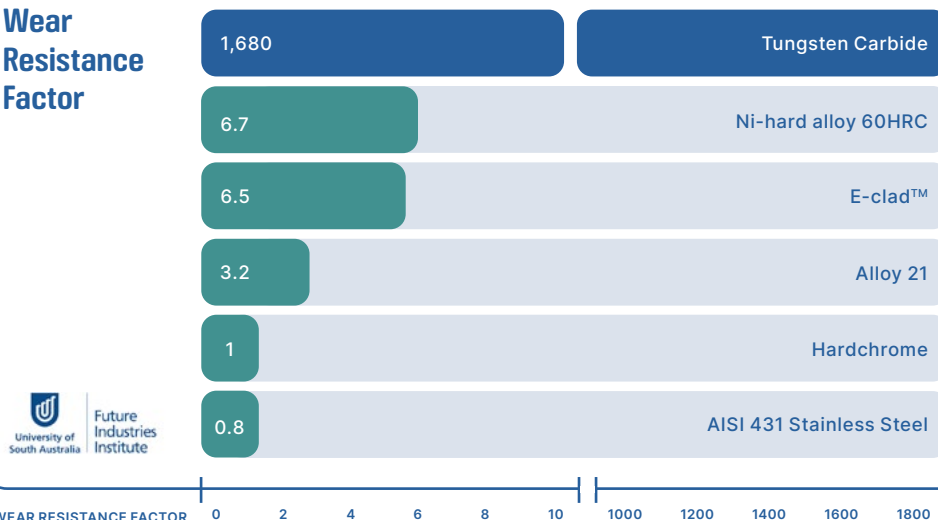
Laser Cladding is in principle a deposition welding process using a laser as a heat source. Due to the extremely precise heat input Laser Cladding achieves metallurgical bonding of the coating with the following.

- Small heat affected zone (HAZ)
- Low dilution
- No distortion
- No change of microstructure in substrate material

Our coatings are also safe on people and the environment. Some types of Hardchrome alternatives we offer include:

Surfacing Process	Material	Laserbond Products	Wear Resistance	Corrosion Resistance
HVOF/ HVAF	Tungsten carbide (e.g. WC-CoCr)	PT3150, PT3160	++++	++/++++
	Chrome carbide (e.g. Cr3C2-NiCr)	PT3020	+++	+++
	Nickel hard alloys (e.g. NiCrBSi)	PT1452, PT1461	++	++
	Nickel superalloys	PT1410, PT1470	++	++++
Laser Cladding	Cobalt based materials (e.g. Stellite)	PL1500, PL1516	+++	++++
	E-clad™	E-clad™	+++	++
	Martensitic steels e.g. AISI 431)	431	++	+
	Nickel superalloys	PL1410, PL1470	++	++++
Hardchrome	Chrome	-	++	-/+

Wear Resistance Factor



About Laserbond

We are a specialist surface engineering company, founded in 1992, that focuses on the development and application of materials, technologies and methodologies to increase operating performance and wear life of capital intensive machinery components. Our surface engineering technology has applications across many industries, such as resources and energy, agriculture, advanced manufacturing, defence and infrastructure construction.



Laserbond

info@laserbond.com.au
laserbond.com

Sydney
2/57 Anderson Road
Smeaton Grange NSW 2567
+61 2 4631 4500

Brisbane
74 High Road
Bethania QLD 4205
+61 7 3200 9733

Adelaide
112 Levels Road
Cavan SA 5094
+61 8 8262 2289

Melbourne
26-32 Aberdeen Road
Altona VIC 3018
+61 3 9398 5925