Chrome-Free*

PRAXAIR
SURFACE TECHNOLOGIES

SermaLoy™ J CF Diffusion Aluminide Coating

SermaLoy™ J CF (chrome-free*) diffusion aluminide coating is an environmentally-friendly slurry formulation free of toxic chromium VI compounds. SermaLoy J CF is comprised of a unique silicon- and chromium-enriched outer layer that offers equivalent performance to that of conventional SermaLoy J coating including excellent protection against hot corrosion and oxidation for superior protection of hot section components in marine and industrial gas turbines that suffer hot corrosion attack.

The Performance of Chrome … Without the Chrome

- REACH-compliant, environmentally-friendly, free of chromium VI compound
- Equivalent performance to that of SermaLoy J coating
- Excellent protection against both high- and low-temperature hot corrosion
- Excellent resistance to high-temperature oxidation and particulate erosion
- Compatible with austenitic stainless steel and nickel- and cobalt-based superalloys

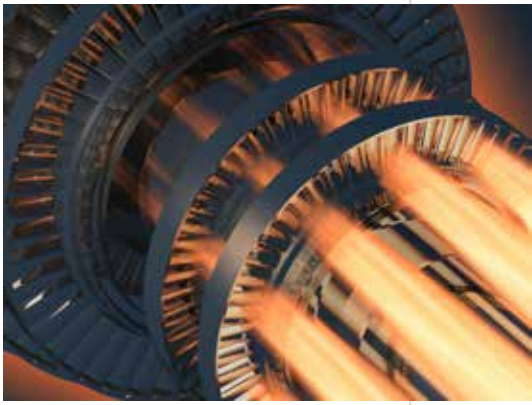
Tailored Application Process by Alloy and Component

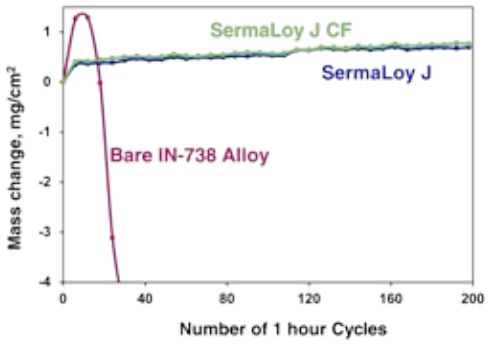
SermaLoy J CF coating is applied by spraying or brushing the coating onto the component surface to form a uniform layer of aluminum- and silicon-containing slurry. The coated component is then heated in a protective atmosphere in which the aluminide/silicon in the slurry diffuses into the substrate to form a silicon-modified aluminide coating. The outer portion of SermaLoy J CF coating comprises chromium silicide phase and aluminide phase. Chromium silicide is particularly resistant to acidic and basic hot corrosion while aluminide offers superior protection against high-temperature oxidation.

The slurry application process simplifies masking and allows for selective coating on the localized regions of turbine blades and vanes. Alternatively, the coating can be produced on all external surfaces of the components.

Diffusion treatment can be tailored to each alloy and application. The diffusion temperature can be as low as 1600°F (870°C) for nickel-based superalloys and 1800°F (980°C) for cobalt-based superalloys.

This relatively low diffusion temperature not only eliminates the post-coating heat treatment process, but also allows brazed components to be refurbished without risking damage to the brazed joints.





Cyclic oxidation resistance of uncoated and coated Inconel® 738 alloy at 2010°F (1100°C) in air showing equivalent protection of SermaLoy J and SermaLoy J CF on Inconel 738 against high-temperature oxidation attack.

	SermaLoy J	SermaLoy J CF
Properties:		
Coating Thickness	1-4 mils (25-100 µm)	
Diffusion Temperature	≥1600°F (870°C) for nickel-based alloys ≥1800°F (980°C) for cobalt-based alloys ≥1800°F (980°C) for austenitic steels	

	Uncoated IN738	SermaLoy J	SermaLoy J CF
Performance:			
Cyclic oxidation at 2010°F (1100°C), (mass change after 198 hours)	-23.7 mg/cm^2	+0.7 mg/cm^2	+0.7 mg/cm^2
Hot corrosion at 1650°F (900°C), (depth of corrosion penetration below sample surface after 500 hours)	11µm	7 µm	5 µm
Hot corrosion at 1290°F (700°C), (depth of corrosion penetration below sample surface after 500 hours)	68 µm	17 µm	19 µm

	Uncoated MarM002	SermaLoy J	SermaLoy J CF
Performance:			
Hot corrosion at 1650°F (900°C), (depth of corrosion penetration below sample surface after 500 hours)	500 µm	11 µm	5 µm
Hot corrosion at 1290°F (700°C), (depth of corrosion penetration below sample surface after 500 hours)	99 µm	26 µm	29 µm

* Free of hexavalent chromium

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Praxair Surface Technologies, Inc.
1500 Polco Street
Indianapolis, IN 46222

www.praxairsurfacetechnologies.com
psti-info@praxair.com

Telephone:
+1 317 240 2500

Fax:
+1 317 240 2255