



TANTALINE®

Application Note: Tantaline® Treated Heat Exchangers

Description

Acids used in all kinds of industrial processes are most aggressive when they are heated. Heat exchangers, the main product used to heat these acids, have long been a sore point within the industry. When handling corrosive media like hot acids, heat transfer can be a difficult task. Fouling triggers corrosion and is a result of deposition of any undesired material on heat transfer surfaces. This significantly impacts the thermal and mechanical performance of heat exchangers. Tantalum is recognized as the most corrosion resistant metal commercially available. Tantalum can be applied by proprietary Tantaline® treatment to produce a robust and cost-effective option for shell and tube heat exchangers. This has shown to extend the service life and reduce maintenance cost in chemical processing, pharmaceutical, pulp & paper industries etc.

Benefits

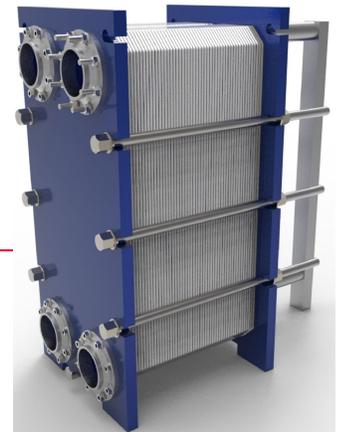
The Chemical Vapor Deposition (CVD) process used by Tantaline® produces a thin, uniform, tantalum layer that conforms to complex geometries and adheres to the base metal through diffusion bonding. Tantaline® treatment provides superior corrosion resistance in hot acids and chlorinated compounds. Tantalum due to its inertness to most aggressive chemistries resist fouling even at high temperatures and prevents cross contamination of process fluids, the characteristic most required by pharmaceutical industries. Tantaline's heat exchangers have the same chemical properties and corrosion resistance as pure tantalum units, offering significantly higher corrosion performance compared to Hastelloy B, C grades, titanium and zirconium devices with economical pricing and shorter lead times.

Availability

The following range of styles and configurations are suitable for Tantaline® treatment:

- ✓ Plate and frame
- ✓ Tube in tube

Important note: there are certain limitations that may prevent the application of Tantaline in some cases. For further details, please don't hesitate to reach out to us.



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SUPERIOR CORROSION RESISTANCE FOR AGGRESSIVE SERVICE CONDITIONS

- ✓ Hydrochloric acid
- ✓ Sulfuric acid
- ✓ Acetic acid
- ✓ Nitric acid
- ✓ Sour gas (H₂S)
- ✓ Chlorine
- ✓ Many other process fluids

Use

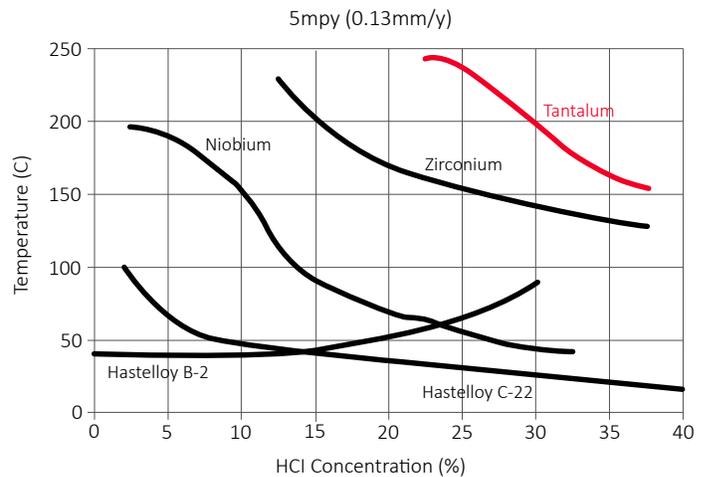
MARKET	TYPICAL PROCESSES	TYPICAL USES
Chemical Processing	Hot acids, wet and dry chlorine, sulfur compounds, sour gases containing hydrogen sulfide (H ₂ S) compounds	<ul style="list-style-type: none"> ✓ Processing Equipment ✓ Condensing and Evaporation ✓ Regenerative heat transfer ✓ Digester heating ✓ Effluent cooling ✓ Waste Heat recovery ✓ Process fluid heating/cooling
Oil & Gas	Acid gases (CO ₂ , H ₂ S, SO ₂) in vapor phase, ammonia (NH ₃), hydrogen cyanide (HCN), and amine derivatives	
Pharmaceutical	Oxidizing agents including hydrogen peroxide (H ₂ O ₂), bromine (Br), chlorine (Cl) and various cleaning chemistries	
Semiconductor	Strong HCl etchants, corrosive Nital (alcohol + nitric acid), byproducts of Silicon deposition process	
Power Generation	Hot corrosion by salt contamination	

Key Technical Information

Hastelloy[®]*, Inconel[®]**, or Titanium, Stainless Steel heat exchangers are susceptible to SCC and pitting especially in hot acids like HCl. Tantaline[®] treatment offers the following beneficial characteristics:

- ✓ Chemically resistant to SCC and pitting in many aggressive media and environments.
- ✓ Tantalum layer remains passivated and inert to corrosion under high temperature (>200° C) acidic conditions including concentrated hydrochloric acid (HCl) and sulfuric acid (H₂SO₄).***
- ✓ Superior corrosion resistance against wet, dry chlorine atmospheres, and other chlorinated environments.

HCl Corrosion Resistance



*Hastelloy[®] is a registered trademark of Haynes International.

**Inconel[®] is a trademark of Special Metals Wiggins Limited.

***FJ, H. (n.d.). Properties of Tantalum for Applications in the Chemical Process Industry.



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