TANTALINE® >>> EXERGY HEAT TRANSFER SOLUTIONS

Application Note: Tantaline® Treated Heat Exchangers

Description

When handling corrosive media like acids, chlorinated compounds, and vaporized fluids heat transfer can be a difficult task. Corrosion can cause loss of mechanical integrity and fouling. Fouling is the result of deposition of an undesired material on a surface. This can change the heat transfer coefficient of the surface and affect the performance of a heat exchanger. Special metal alloys such as C-276, titanium, Inconel®**, and tantalum have been used in critical process conditions to prevent corrosion and the resulting problems. Tantalum is recognized as the most corrosion resistant metal commercially available but its use for heat exchangers has been limited due to long lead-time and high cost. Deposition of a tantalum layer using the Tantaline® treatment process has been proven to have the same benefits of bulk tantalum with reduced lead-time and cost.

Availability

A wide range of styles and configurations are suitable for Tantaline® treatment.

STYLES
- ✓ Shell and Tube
- ✓ Sanitary Shell and Tube
- ✓ Tube in Tube
- ✓ Sanitary Shell and Tube
- ✓ Custom Heat Transfer Products

CONNECTIONS
- ✓ ANSI flanged
- ✓ Sanitary flanged
- ✓ Threaded
- ✓ Tube Stub

Benefits

The Chemical Vapor Deposition (CVD) process used by Tantaline produces a robust, uniform, tantalum layer that conforms to complex geometries and adheres to the base metal through diffusion bonding. Tantalum forms an inert oxide layer which prohibits corrosive attack by aggressive process fluids, even at elevated temperatures. This minimizes mechanical failure, cross contamination and fouling, which are critical issues for applications across a wide range of industries such as semiconductor and pharmaceutical manufacturing. Tantaline® treated heat exchangers have proven to be resistant to corrosion caused be many process fluids including HCl and H_2SO_4. Applying this unique surface treatment to Exergy's line of high quality, high performance heat exchangers provides a cost-effective solution for improved operational reliability.

SUPERIOR CORROSION RESISTANCE FOR AGGRESSIVE SERVICE CONDITIONS

- ✓ Hydrochloric acid
- ✓ Sulfuric acid
- ✓ Acetic acid
- ✓ Nitric acid
- ✓ Sour gas (H_2S)
- ✓ Chlorine
- ✓ Many other process fluids

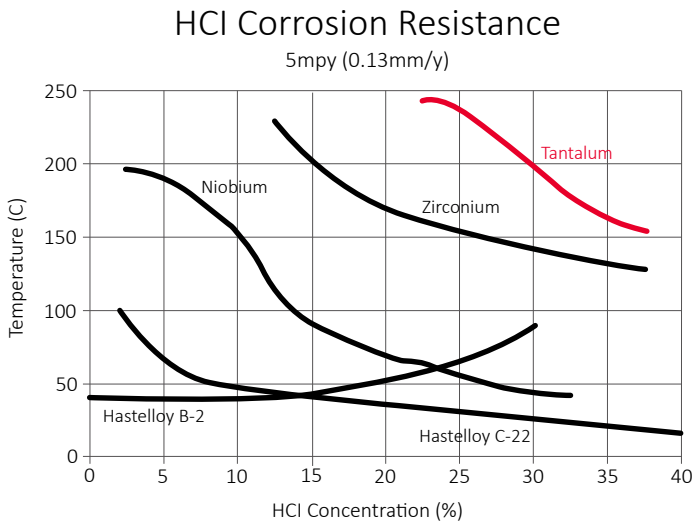
Use

MARKET	TYPICAL PROCESSES	TYPICAL USES
Chemical Processing	Pickling of chlorinated solvents, strong acids like HCl, H_2SO_4, HNO_3, hot corrosive waste fluids	✓ Pickling heat exchanger ✓ Reboilers ✓ Acid Evaporator ✓ Processing Equipment ✓ Condensers ✓ Regenerative heat transfer ✓ Digester heating ✓ Effluent cooling ✓ Waste Heat recovery ✓ Process fluid heating/cooling
Oil & Gas	Heated flue gases (CO_2, H_2S, SO_2), Amine gas treating	
Pharmaceutical	Volatile oxidizing compounds such as dichloromethane and methanol	
Semiconductor	Preparation of strong HCl etchants, processing byproducts of Silicon deposition	
General Industrial	Hot volatile chlorides, corrosive salts, sulfidation, methanation	

Key Technical Information

Hastelloy®*, Inconel®**, or Titanium, Stainless Steel heat exchangers are susceptible to Stress Corrosion Cracking (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 (H_2SO_4).***
- ✓Superior corrosion resistance against wet, dry chlorine atmospheres, and other chlorinated environments.



*Hastelloy® is a registered trademark of Haynes International.
**Inconel® is a trademark of Special Metals Wiggin Limited.
***FJ, H. (n.d.). Properties of Tantalum for Applications in the Chemical Process Industry.

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