



**TANTALINE®**

## Application Note: Tantaline® Treated Lab Reactors

### Description

Reactors are designed to carry out chemical reactions to yield a product that is chemically pure. Reactors can be exposed to extremely aggressive solutions resulting in materials degradation issues due to corrosion leading to increased costs, maintenance and downtime. Even the more expensive alloys like duplex stainless steels, Hastelloy, titanium, zirconium are challenged to provide a cost-effective and a reliable solution. The corrosion resistance, durability, and heat transfer properties of tantalum makes it an ideal material for challenging applications. Tantalum's rapidly self-reforming surface oxide layer resists corrosion thereby minimizing downtime and stoppages in equipment and parts.

### Benefits

Tantaline® treatment is a cost-effective approach providing customers with an alternative to exotic materials and bulk tantalum units which are highly expensive. Tantaline® uses Chemical Vapor Deposition technique to deposit a thin tantalum surface layer onto the base material that provides superior performance in hot concentrated acids. Tantaline treatment being geometry independent process, there is no limitation while treating small bore parts, internal radii and crevices. The chemical compatibility of Tantaline treatment is similar to glass lining without having any geometry limitations. The Tantaline treated reactors remain passivated and inert to corrosion preventing fouling and cross contamination of process fluids, the characteristic most required by pharmaceutical industries.

Tantaline® treatment can be effectively applied to a wide range of products including piping systems, valve assemblies, mechanical seals, ancillary equipment, agitators etc.



### Availability

Baffle Assays	Orifice Ring & Cones
Reactor Housings	Couplings
Valve Bodies	Collars
Gauge & Adapter Extensions	Bottom Caps
Plugs, Rings, Needles	Sampling Tubes
Stir Shafts	Impellers

### SUPERIOR CORROSION RESISTANCE FOR AGGRESSIVE SERVICE CONDITIONS

- ✓ Hydrochloric acid
- ✓ Sulfuric acid
- ✓ Acetic acid
- ✓ Nitric acid
- ✓ Sour gas (H<sub>2</sub>S)
- ✓ Chlorine
- ✓ Many other process fluids

MARKET	TYPICAL PROCESSES	TYPICAL USES
<b>Chemical Processing</b>	Halogen salts and acids, chlorinated compounds, hot sulfuric, nitric acid	<ul style="list-style-type: none"> <li>✓ Bottom Drain Valves</li> <li>✓ Stirrers &amp; Agitators</li> <li>✓ Pressure Relief Valves</li> <li>✓ Reactor Jackets</li> <li>✓ Ancillary Equipment</li> <li>✓ Interconnecting Piping and Fittings</li> <li>✓ Instrumentation</li> <li>✓ Sampling Systems</li> <li>✓ Mechanical Seals</li> <li>✓ Reactor Lids and Covers</li> <li>✓ Steam Jet Ejectors</li> </ul>
<b>Pharmaceutical</b>	Amination, Esterification, Catalysis using strong oxidizing agents like hydrogen peroxide, bromine, chlorine, etc.	
<b>Semiconductor</b>	Trichloro silane and, wet and dry chlorinated compounds, strong acid etchants	
<b>Water Treatment</b>	Polyaluminum Chloride, strong HCl reaction environment	

## Key Technical Information

Hastelloy®\*, Inconel®\*\*, Zirconium, Titanium, and Stainless Steel valve components 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<sub>2</sub>SO<sub>4</sub>).\*\*\*

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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