



ME-METALS &
t e c h n o l o g i e s

TANTALINE®



Tantaline® is a special surface treatment, through which stainless steel parts are given the extensive corrosion-resistant properties of tantalum.

Special rare metals such as nickel alloys, titanium, zirconium, niobium and even tantalum can be replaced by Tantaline®.

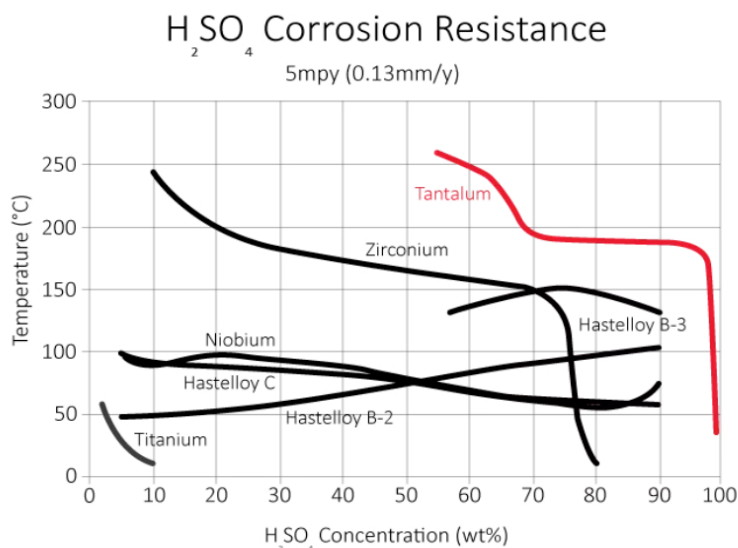


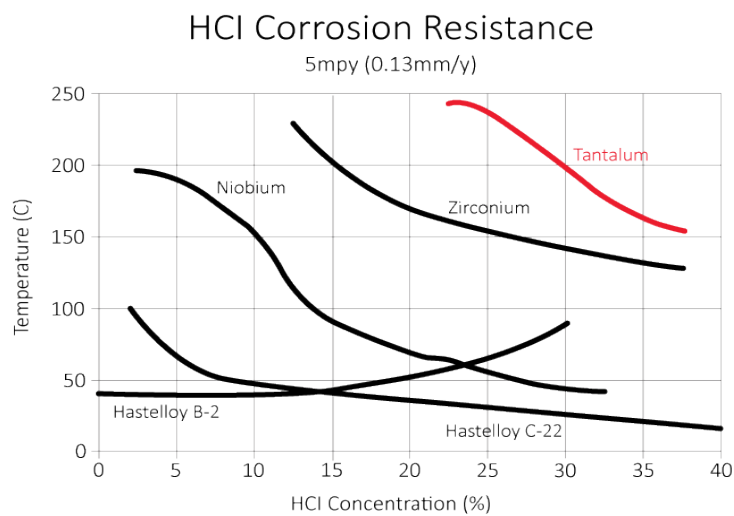
Tantaline® Technologie

Tantaline® treatment is a diffusion bonded protective layer of tantalum, formed by chemical vapor deposition (CVD) on the surface of common materials.

The resulting surface has the same properties of pure tantalum. Due to its very dense surface oxide layer, tantalum is the most corrosion-resistant inert material on earth. Compatibility with concentrated high temperature acidic environments has been well established in industrial applications.

The proprietary process creates a dense tantalum surface with all of the beneficial properties of pure tantalum metal. The Tantaline® process is conducted in a sealed reaction chamber under highly controlled conditions.



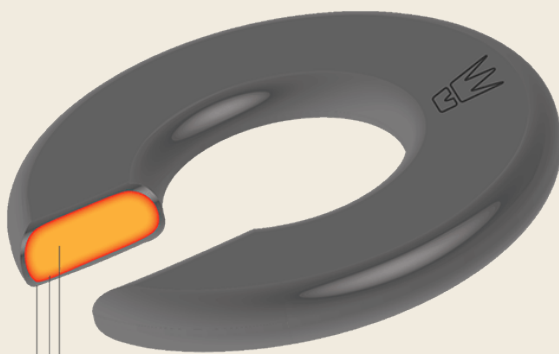


Applications

Typical parts treated by Tantaline® are valves, fittings, autoclaves, process chambers, flow reactors, bellows, fasteners, flowmeters, mixers, custom parts and medical devices, among many other items. Please contact us with your request.

Properties of Tantaline® Surface Alloy

- Diffusion bonded and inseparable to the substrate.
- Thickness of tantalum layer is 50 µm
- Dimension D 460mm * L 840 mm
- Geometrie independent
- 100% dense



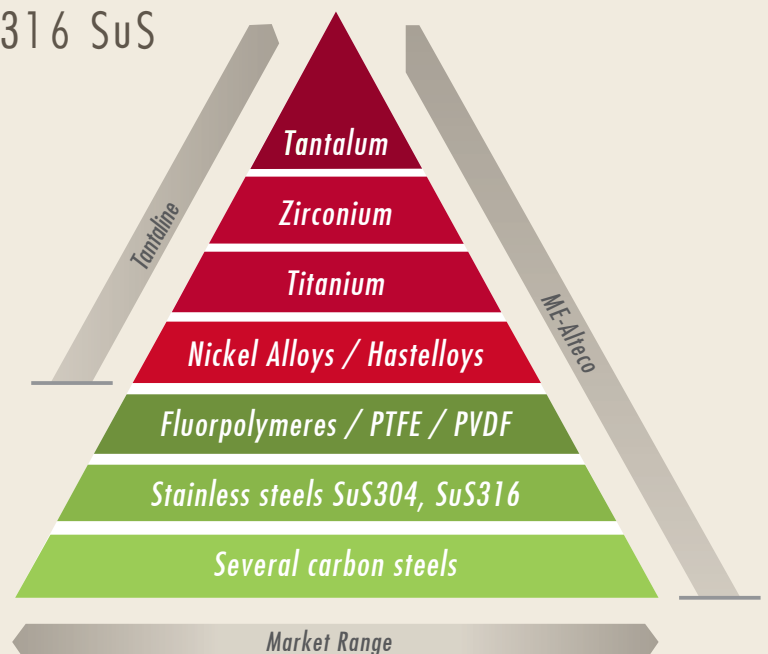
- 316 Stainless Steel
- Tantaline® Alloy Zone
- Tantalum Metal Surface

Thermal Shock Resistance

- Samples were water quenched from 300 C
- 48h corrosion test 32% HCl at 75 C after 10 – 30 – 60 – 100 cycles
- No cracks, delamination or other defects observed after 100 cycles
- No corrosion observed

Hardness

- Tantaline has a hardness similar to 316 SuS
- Brinell @3000kg: 193 – 240
- Measured 200 – 250 Vickers
- Rockwell C: 11- 23
- Rockwell B: 92- 100
- Rockwell A: 56 -62



Corrosion table

Tantaline® is resistant against corrosion in the following media up to 150 degrees Celsius, unless stated otherwise.

Acetic acid	Ethyl sulfate	Phosphorus, <700 C (1290 F)
Acetic anhydride	Ferric chloride	Phosphorus chlorides
Acetone	Ferric sulfate	Phosphorus oxychloride
Air, <300 C (570 F)	Ferrous sulfate	Pickling acids, except HNO3-HF
Aldehydes	Formaldehyde	Potassium bromide
Aluminum chloride	Formic acid	Potassium chloride
Aluminum nitrate	Glycerine	Potassium dichromate
Aluminum sulfate	Hydroiodic acid	Potassium ferricyanide
Amines	Hydrobromic acid	Potassium iodine-iodine
Ammonium bicarbonate	Hydrocarbons	Potassium nitrate
Ammonium carbonate	Hydrochloric acid	Potassium permanganate
Ammonium chloride	Hydrogen bromide, <400 C	Potassium sulfate
Ammonium nitrate	Hydrogen chloride, <350 C	Propionic acid
Ammonium phosphate	Hydrogen iodide	Silver nitrate
Ammonium sulfate	Hydrogen peroxide	Sodium acetate
Amyl acetate or chloride	Hydrogen sulfide	Sodium aluminate
Aniline hydrochloride	Hydroxyacetic acid	Sodium bisulfate, solution
Barium carbonate	Hypochlorous acid	Sodium bromide
Barium chloride	Iodine, <300 C (570 F)	Sodium chlorate
Barium hydroxide	Ketones	Sodium chloride
Barium nitrate	Lactic acid	Sodium citrate
Benzoic acid	Magnesium chloride	Sodium cyanide
Boric acid	Magnesium hydroxide	Sodium dichromate
Bromine, dry, <300 C (570 F)	Magnesium sulfate	Sodium hypochlorite
Bromine, wet	Manganous chloride	Sodium nitrate
Butyric acid	Methyl alcohol	Sodium nitrite
Calcium bicarbonate	Methylsulfuric acid	Sodium phosphate
Calcium bisulfates	Mineral oils	Sodium silicate
Calcium bisulfites	Mixed acids (sulfuric-nitric)	Sodium sulfate
Calcium carbonate	Motor fuels	Sodium sulfide
Calcium chloride	Nickel salts	Sodium sulfite
Calcium hydroxide	Nitric acid	Sodium thiosulfate
Calcium hypochlorite	Nitric acid, fuming	Stearic acid
Carbolic acid	Nitric oxides	Succinic acid
Carbon dioxide	Nitrogen, <300 C (570 F)	Sulfamic acid
Chloric acid	Nitrous acid	Sulfur, <500 C (930 F)
Chlorinated brine	Nitrosyl chloride	Sulfur chlorides
Chlorine, dry, <250 C (480 F)	Organic chlorides	Sulfur dioxide
Chlorine, wet, <350 C (662 F)	Organic acids	Sulfuric acid, to 175 C (350 F)
Chlorine oxides	Organic esters	Sulfurous acid
Chloroacetic acid	Organic salts	Sulfuryl chloride
Chromic acid	Oxalic acid	Tannic acid
Citric acid	Oxygen, <300 C (570 F)	Tartaric acid
Copper salts	Pechloric acid	Thionyl chloride
Dichloroacetic acid	Petroleum products	Tin salts
Dimethylformaldehyde	Phenol	Zinc chloride
Ethylene dibromide	Phosphoric acid, <4ppmp, <180 C	Zinc sulphate

Corrosive Acids:

H2SO4

HI

Nitric Acid

HBr

Acetic Acid

H2S

Phosphoric Acid

HCl

Tantaline offers limited corrosion resistance in the following media.

Air, >300 C (570 F)	Oleum (fuming sulfuric acid)	Sodium carbonate
Ammonia	Potassium carbonate	Sodium hydroxide, dilute
Ammonium hydroxide	Potassium hydroxide, dilute	Sodium hydroxide, conc.
Fluoride salt	Potassium hydroxide, conc.	Sodium pyrosulfate, molten
Hydrofluoric acid	Potassium pyrosulfate, molten	Sulfur trioxide
Hydrogen, <300 C (570 F)	Sodium bisulfate, molten	Sulfuric acid, >175 C (350 F)
Hydrogen fluoride		

This is a 316 stainless steel washer that has been treated in the Tantaline® process. As a result, this washer has a pure tantalum metal surface and all of the corrosion resistant properties of pure tantalum.



We offer test coupons to test in your corrosive medium.
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