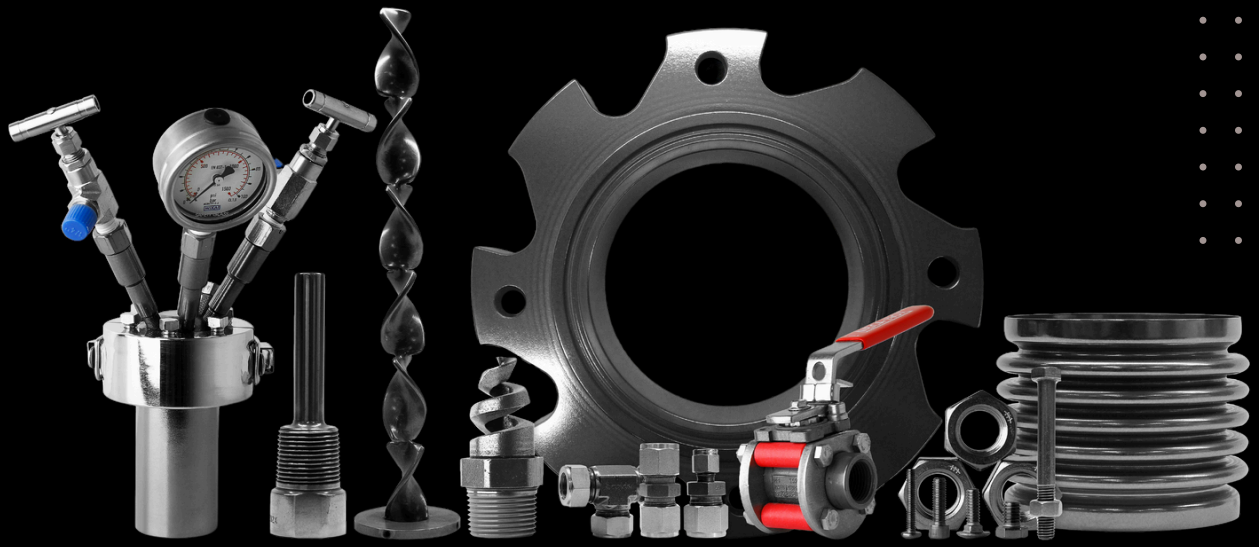
TANTALINE®



WE SOLVE CORROSION PROBLEMS WITH OUR TANTALUM TREATMENT

www.tantaline.com

- Who we are
- What is Tantaline® ?
- Technical details

TABLE OF CONTENT

WHO WE ARE AND WHAT WE DO

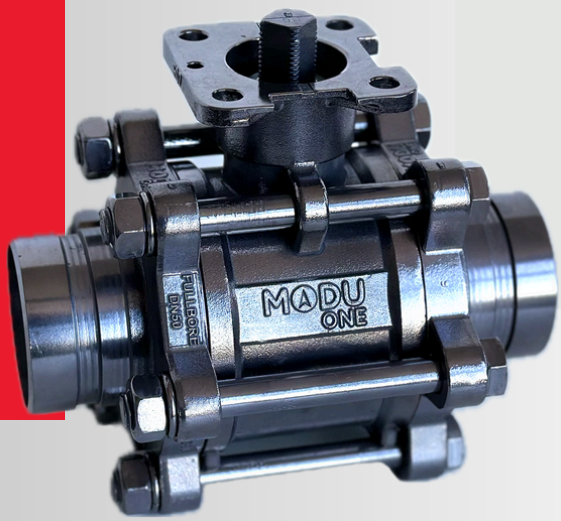
We are an innovative Danish company, established in 2006, specializing in advanced corrosion protection.

Our Tantalum-based treatment, called Tantaline®, allows your components to work in extremely aggressive environments such as hot acids, sour gas and sea water, for extended periods of time.

TANTALINE
CONQUER CORROSION

WHO OUR CUSTOMERS ARE

- Companies facing corrosion challenges in their production processes, leading to losses and frequent part replacements
- Businesses looking to extend the range of applications for their products
- Developers of high-performance and efficient process equipment
- Innovators experimenting with new materials or technologies who believe Tantaline can enhance their performance



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WHAT YOU GET

- Components will function in highly aggressive environments for extended periods
- Reduced costs of spare parts and service works
- Reduced risk of contamination
- Reduced risk of downtime and accidents
- Access to new markets

HOW WE DO IT

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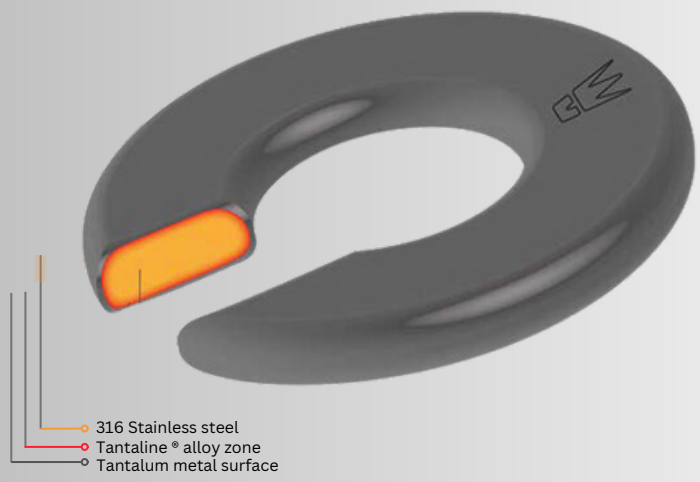
OUR TECHNOLOGY

Tantaline utilizes a patented **Chemical Vapor Deposition (CVD) process** to apply a **50µm** layer of tantalum onto the surface of materials. This process involves the thermal decomposition of precursor gases to form a pure tantalum surface. As a result, **tantalum atoms diffuse into the substrate creating an inseparable nanoscale surface alloy**. Competing tantalum coatings (sprayed or dipped) use different methods and cannot guarantee such a high damage resistance, as theTantaline® treatment.

Materials we treat with Tantaline®:

- Stainless steel 316, 304
- Alloy 20
- Oxygen free copper
- Graphite
- Carbon fiber
- Reinforced carbon
- Titanium
- Your material is not in the list? - contact us

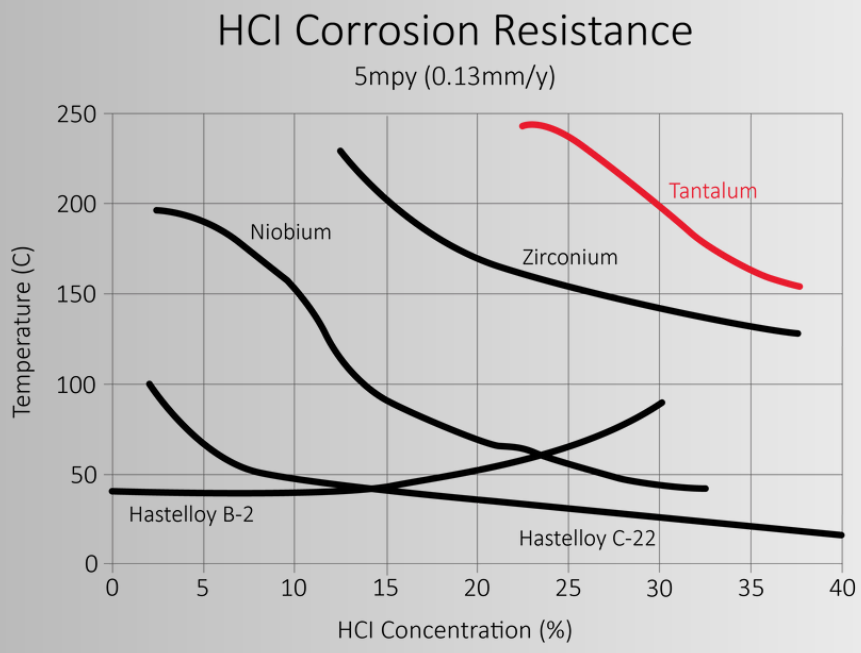


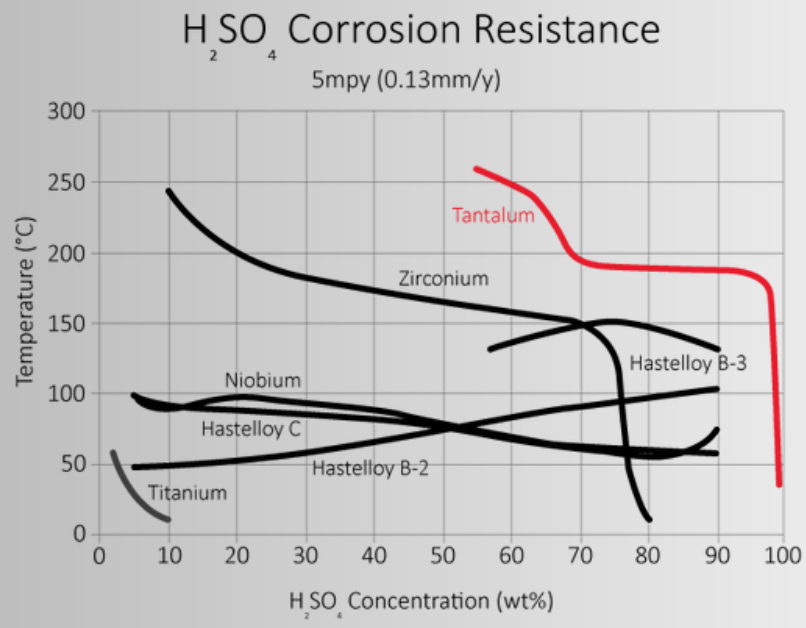
TANTALINE PROTECTS

TANTALINE
CONQUER CORROSION

CORROSION CHARTS :

inform us how quickly (in mm or inches) a material will corrode annually under certain conditions. In our chart it is 0,13 mm (0,005") per year .





TANTALINE PROTECTS

Tantaline® is resistant to the most aggressive media :

- Hydrochloric acid HCL
- Sulfuric acid H_2SO_4
- Hydrogen sulfite H_2S (sour gas)
- Carbon dioxide CO_2 (acid gas)
- Formic acid HCOOH
- Acetic or ethanoic acid CH_3COOH
- Bromine

If you have a mix of chemicals or just want to make sure Tantaline will work for you, just order Tantaline samples, using the contact information at the end of this brochure:

TANTALINE RESISTS

Tantaline® performance for Sulfuric Acid H_2SO_4 compared to other materials:

50°C	10%	20%	30%	40%	50%	60%	70%	80%	90%
Tantalum	E	E	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E	E	E
Niobium	E	E	E	E	E	E	E	G	G
Zirconium	E	E	E	E	E	E	E	P	P
Hastelloy® C	E	E	E	E	E	E	E	G	G
Hastelloy® B	P	P	G	G	E	E	E	E	E

100°C	10%	20%	30%	40%	50%	60%	70%	80%	90%
Tantalum	E	E	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E	E	E
Niobium	P	P	P	P	P	P	P	P	P
Zirconium	E	E	E	E	E	E	E	P	P
Hastelloy® C	P	P	P	P	P	P	P	P	P
Hastelloy® B	P	P	P	P	P	P	P	P	P

150°C	10%	20%	30%	40%	50%	60%	70%	80%	90%
Tantalum	E	E	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E	E	E
Niobium	P	P	P	P	P	P	P	P	P
Zirconium	E	E	E	E	E	G	G	P	P
Hastelloy® C	P	P	P	P	P	P	P	P	P
Hastelloy® B	P	P	P	P	P	P	P	P	P

TANTALINE RESISTS

Tantaline® performance for Hydrochloric Acid HCL compared to other materials:

50°C	5%	10%	15%	20%	25%	30%	35%
Tantalum	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E
Niobium	E	E	E	E	G	P	P
Zirconium	E	E	E	E	E	E	E
Hastelloy® C	E	G	P	P	P	P	P
Hastelloy® B	P	P	P	G	E	E	E

100°C	5%	10%	15%	20%	25%	30%	35%
Tantalum	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E
Niobium	E	G	P	P	P	P	P
Zirconium	E	E	E	E	E	E	E
Hastelloy® C	P	P	P	P	P	P	P
Hastelloy® B	P	P	P	P	P	P	P

150°C	5%	10%	15%	20%	25%	30%	35%
Tantalum	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E
Niobium	E	G	P	P	P	P	P
Zirconium	E	E	E	E	G	P	P
Hastelloy® C	P	P	P	P	P	P	P
Hastelloy® B	P	P	P	P	P	P	P

200°C	5%	10%	15%	20%	25%	30%	35%
Tantalum	E	E	E	E	E	G	P
Tantaline®	E	E	E	E	E	P	P
Niobium	P	P	P	P	P	P	P
Zirconium	E	E	G	P	P	P	P
Hastelloy® C	P	P	P	P	P	P	P
Hastelloy® B	P	P	P	P	P	P	P

Excellent
Good
Poor

COMPARE THE RESULTS

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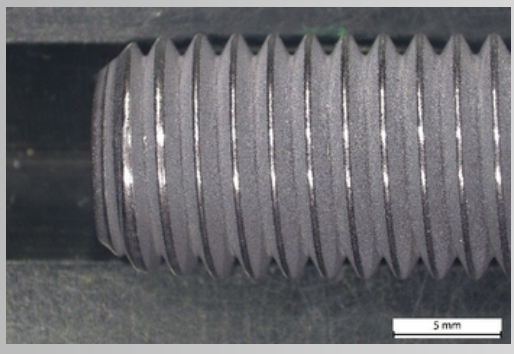
Ball valves in 316 stainless steel

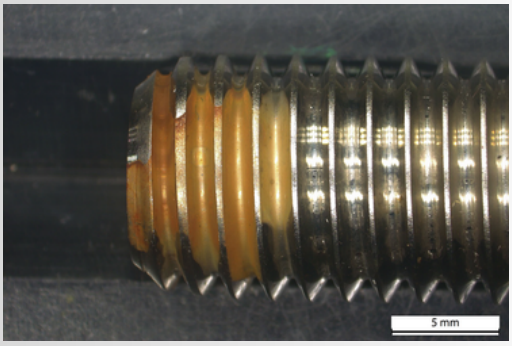
Treated with Tantaline® after 48 hours in hot acid

Untreated after 10 hours in hot acid

Bolts in 316 stainless steel



Treated with Tantaline® after 2000 hours in salt spray



Untreated after 2000 hours in salt spray

TECHNICAL DETAILS

TANTALINE
CONQUER CORROSION

Tantaline is NOT resistant to:

Hydrofluoric acid HF ands its compounds

Some alkalis in high concentrations

Materials which cannot be treated with Tantaline:

Metals and alloys with low melting point (aluminium, lead, zinc, etc)

Nickel and high nickel alloys (nickel more than 35%) - Hastelloy B, C, G, Alloy S, Inconel, Monel

Stainless steel 303

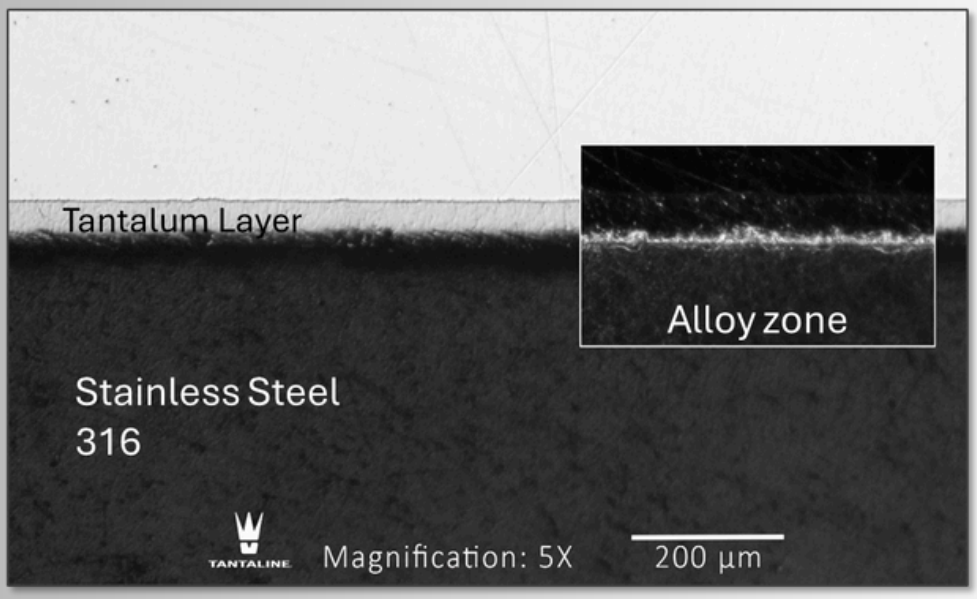
Zirconium 702, Zirconia ZrO2

Some copper and copper alloys (brass, bronze, Cu-Be, etc)
Note: We can treat oxygen free copper

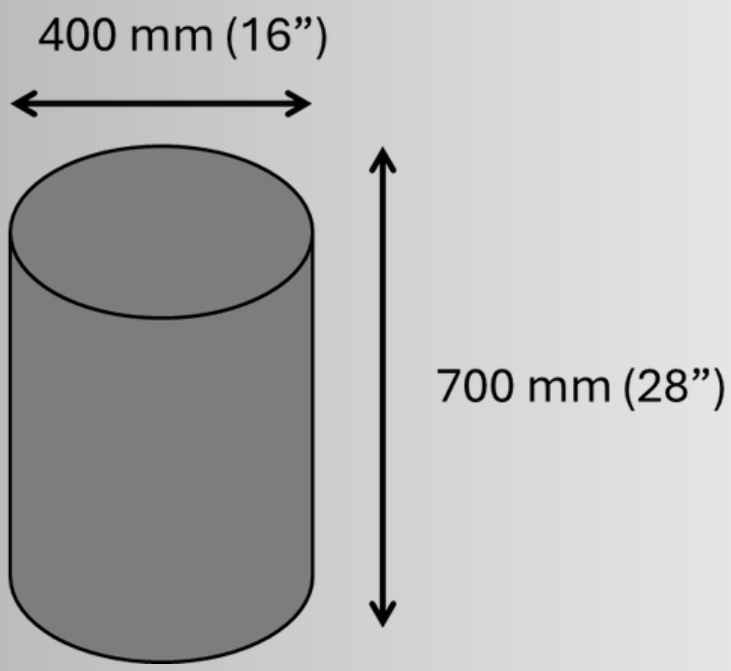
TECHNICAL DETAILS

Thickness of the treatment

50µm (0.002”) dense Ta layer



What is the maximum size of the part we can treat?



TECHNICAL DETAILS

Can a part with complicated design be treated?

The CVD technology makes it **possible** to provide a uniform coating on items with complicated designs (with a few restrictions).

Can a part with welds be treated?

Parts with **full penetration welds** can be treated

Can parts with threads be treated?

Yes, **threads can be treated**. They must be pre-machined before the treatment. We can provide this service or send you instructions.

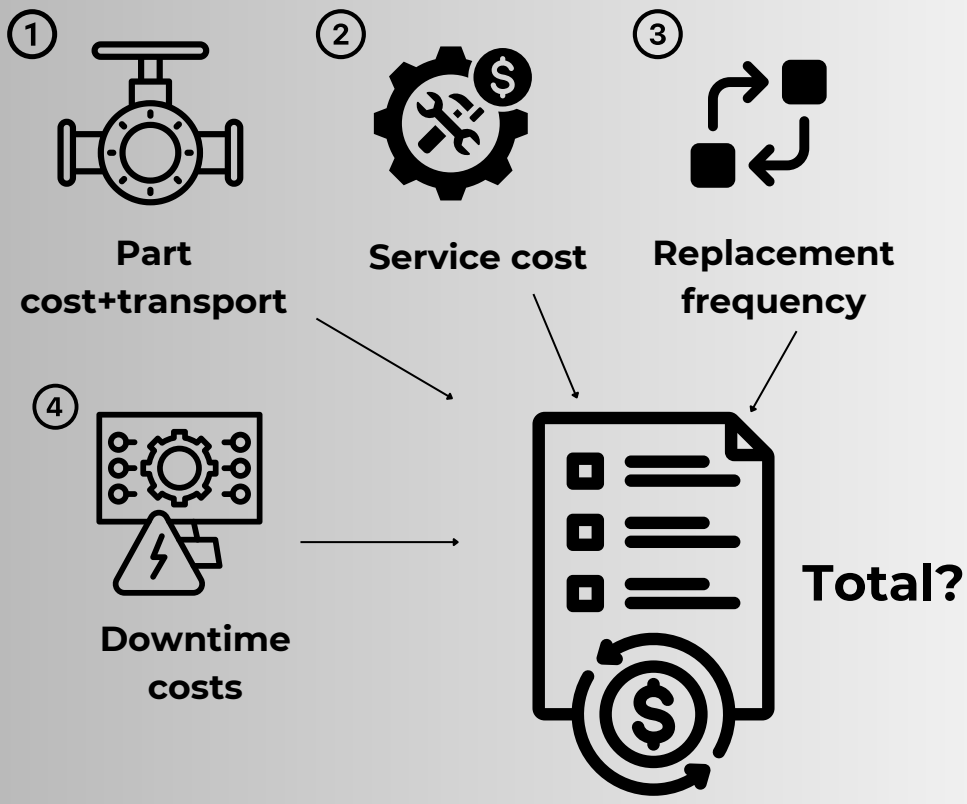
How do we check the quality of our treatment?

Each part is tested by **immersion in hot acid for 48 hours** and inspected prior to final shipment.

Lead time

Typically **4 to 6 weeks** from the acceptance of parts at our factory.

HOW TO CALCULATE TANTALINE VALUE?



How to calculate replacement frequency of the Tantaline treated part?

1. Collect all the information about aggressive media: its concentration, temperature, pressure
2. Use corrosion charts
3. Ask Tantaline

SEND US YOUR REQUEST

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What information do we need to send you a quote?

- **Technical drawing** of the part with dimensions, base material, weld type, thread type/s and size/s
- **Aggressive media** the part will be exposed to (its name, concentration, temperature, exposure time and evt. pressure)
- **Any information** you think is important to mention

When can I expect a response?

We typically answer during **1-2 working days**

How to contact us?

- Send your e-mail to **sales@tantaline.com**
- Send your request through the **RFQ form** on our website
- Write us a message on **LinkedIn**
- Or let´s have a talk **+45 7020 0679**
- Have a specific question and want to save time? Book an online meeting with our technical team using any channel above

TANTALINE®

Solutions for Conquering Corrosion.

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