MATERION

Product Brief

NRC® 76 (Ta2.5%W) Alloy

Mill Products for Anti-corrosion Applications

NRC 76 tantalum alloy, formerly part of the H.C. Starck product line, is now available from Materion. When compared with titanium, nickel, zirconium or steels, this alloy offers significant improvements in corrosion resistance in hydrochloric and sulfuric acid applications (HCl and H2SO4 acids) using higher temperatures and concentrations. To address the needs of challenging markets, NRC 76 alloy also provides longer equipment life, lower operating downtime and the ability to stand up to increased operating temperatures.

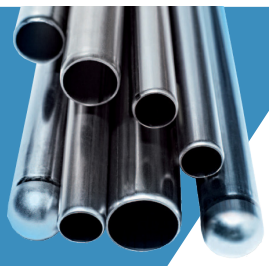
Outstanding Corrosion Resistance and Reliability

NRC 76 alloy is made in-house with our e-beam melting furnace, which provides multiple advantages:

- ***Highest purity*** - direct oversight ensures tight control of impurities for outstanding corrosion resistance
- ***Consistent chemical composition*** - reproducible anti-corrosion results
- ***Uniformity control*** - welded tubing allows for consistent wall thickness
- ***No weak spots*** - NRC 76 alloy provides reliable tubing collapse pressure calculations
- ***In-house R&D*** - novel alloys and performant technologies
- ***Customer support*** - expert service worldwide, including corrosion testing, failure analysis and alloy development
- ***Non-conflict materials*** - exclusive use of EICC certified materials only

Examples of Applications:

- ***Heat exchangers***
- ***Condensers and coils***
- ***Columns, vessels and reactors***
- ***Bayonet heaters***
- ***Furnace parts***



Forms Available:

- Welded tubing
- Plate, sheet and foil
- Rod and bar
- Glass vessels repair kits
- Crucibles
- Custom shapes and sizes

Comparison of Welded and Seamless Tantalum Tube

Property	Welded	Seamless	Implications for Users
Size	Long tubes, up to 12 m, can be manufactured in one piece, fully annealed.	Limited	User needs to ensure seamless tube is made from one piece.
Wall Thickness	Excellent wall thickness uniformity with superior concentricity. Tube can be produced to customer's specified wall thickness.	Seamless tubes exhibit wall thickness with high variability such as wavy tube surface. This has a negative effect on lifetime and mechanical strength of the tube.	Lifetime is difficult to guarantee with uncertain wall thickness. Thinner walls make the tube more prone to damage from handling, and collapse pressures cannot be guaranteed.
Concentricity	Very well-controlled, inherent to the manufacturing process.	Generally inferior to welded tubing because of the seamless manufacturing process. Especially poor for walls under 5 mm thick.	Concentricity and tolerances are important in ensuring leak-free, long-term and safe operation. Poor concentricity negatively impacts pressure calculations. Fabricators may find it difficult to assemble heat exchangers and other equipment using tubes of poor concentricity.
Burst and Collapse Pressure	Exceptional and reproducible compliance with tests for burst pressure.	Variable	Sub-par wall thickness control can lead to leaks, premature failures, stopped production, accidents, increased maintenance costs and more.
Testing	ASME requires more testing of welded tubes than seamless by ultrasonic leak testing each tube.	Less stringent than welded tubing.	Equipment received is thoroughly tested according to stringent norms.
Surface Quality	Clean surface with constant surface finish (Ra ≤ 0.8 µm), free of defects and contamination.	Exhibits scratches, pits, holes and contamination such as from lubricants and cleaning agents. Surface roughness variability can be encountered.	Under certain conditions, pits and holes can collect deposits. These deposits can lead to crevice-type corrosion.
Tubing Shapes (bending)	"U" bend tubes, coiled tubes and other shapes.	Limited	Fabricators and end users can have all their material needs met from one place.

Our global operations are in accordance with stringent purchasing guidelines and process only raw materials from conflict-free sources.

We have been certified by the EICC as a "Conflict-Free Smelter" of tantalum for our sustainable procurement process.

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