

NRC[®] ELECTRON BEAM MELTED TANTALUM (ETA) (UNS R05200)

Applications

NRC[®] ETA TANTALUM metal products are used where purity and or ductility of the tantalum metal is more important than strength or grain size. Consequently, their primary applications are in sputtering, nickel based superalloys, explosion bonding of liners for corrosion resistance, medical, and ordnance applications. All grades meet ASTM requirements.

Forms Available

Sheet: 0.020 to 0.1875" thick by widths up to 40" wide.
Plate: 0.1875 to 1" thick in common widths, with sheared or water jet cut edges.
Also, tube, rod, wire, bar in customer specified specialty sizes.

Typical Purity

Purity refers to 100% minus total metallic content only, gases are omitted from the calculation. Metallic impurities are measured by GDMS, gases by Leco. Custom purities are available upon request.

Chemical Characteristics¹⁾

(Mass fraction in % [cg/g]; ppm [μ g/g])

| Element ppm max. | 3N5 99.95% Min. | 4N 99.99% Min. | 4N5 99.995% Min. | 5N 99.999% Min. | Element ppm max. | 3N5 99.95% Min. | 4N 99.99% Min. | 4N5 99.995% Min. | 5N 99.999% Min. |
|---------------------|-----------------------|----------------------|------------------------|-----------------------|------------------------------|-----------------------|----------------------|------------------------|-----------------------|
| C | 40 | 40 | 40 | 40 | Mn | 5 | 1 | 1 | 1 |
| O | 100 | 100 | 100 | 100 | Mo | 50 | 30 | 15 | 10 |
| N | 40 | 40 | 40 | 40 | Na | 1 | 1 | 1 | 1 |
| H | 10 | 10 | 10 | 10 | Nb | 400 | 80 | 40 | 10 |
| S | 1 | 1 | 1 | 1 | Ni | 5 | 1 | 1 | 1 |
| Al | 5 | 1 | 1 | 1 | Pb | 5 | 1 | 1 | 1 |
| Ca | 5 | 1 | 1 | 1 | Si | 5 | 1 | 1 | 1 |
| Cd | 5 | 1 | 1 | 1 | Sn | 5 | 1 | 1 | 1 |
| Cl | 5 | 1 | 1 | 1 | Ti | 5 | 1 | 1 | 1 |
| Co | 5 | 1 | 1 | 1 | Th | 0.005 | 0.005 | 0.005 | 0.005 |
| Cr | 5 | 1 | 1 | 1 | V | 5 | 1 | 1 | 1 |
| Cu | 5 | 1 | 1 | 1 | W | 150 | 80 | 30 | 10 |
| Fe | 5 | 1 | 1 | 1 | Zn | 5 | 1 | 1 | 1 |
| Hf | 5 | 1 | 1 | 1 | Zr | 5 | 1 | 1 | 1 |
| K | 1 | 1 | 1 | 1 | Y | 5 | 1 | 1 | 1 |
| Li | 1 | 1 | 1 | 1 | U | 0.005 | 0.005 | 0.005 | 0.005 |
| Mg | 5 | 1 | 1 | 1 | Others (each) | 5 | 1 | 1 | 1 |
| | | | | | Total Metallic Content | 500 | 100 | 50 | 10 |

Metallurgical Characteristics

Material is single-phase tantalum. Stress relieve at 1500°F, recrystallize at 1900°F - 2100°F.

1) Information on testing methods on request.

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Physical Properties

| | | | |
|---|------------|------------------------|---------------------|
| Atomic Number | | 73 | |
| Atomic Weight | | 180.95 | |
| Density | | 16.6 | gms/cm ³ |
| Melting Point | | 2996 | ° C |
| Coefficient of Expansion (20° - 500° C) | | 3.6 X 10 ⁻⁶ | °F ⁻¹ |
| Specific Heat (at 100° C) | | 0.0336 | BTU/Lb°F |
| Thermal Conductivity (20° – 100°) | | 32 | BTU/Hr-Ft °F |
| Electrical Resistivity (0° – 100°) | | 14.7 | Microhm-cm |
| Thermal Neutron Absorption Cross Section | | 21.3 | Barns/Atom |
| Typical Ultimate Tensile Strength at 20 C | | 35 - 45 | KPSI |
| Typical Yield Strength at 20° C | | 20 - 30 | KPSI |
| Modulus of Elasticity | | 27 X 10 ⁶ | PSI |
| Hardness as Annealed (Typical) | Vickers | 80 - 120 | |
| | Rockwell B | 25 - 65 | |

Main Products

- Sputtering targets**
- Ballistic penetrators**
- Vessel liners for corrosion resistance**
- Stents**
- Substrates for bone regrowth**
- Additive for Nickel based superalloys**
- Medical grade wire for pacemakers and defibrillators**

Hazards identification in advertising (Directive 67/548/EEC Article 26 and Directive 1999/45/EC Article 13)
Metal powder, flammable, n.o.s.

H.C. Starck Inc.
45 Industrial Place
Newton, MA 02461-1951 / USA
Phone +1 (617) 630-5800, Fax +1 (617) 630-5879