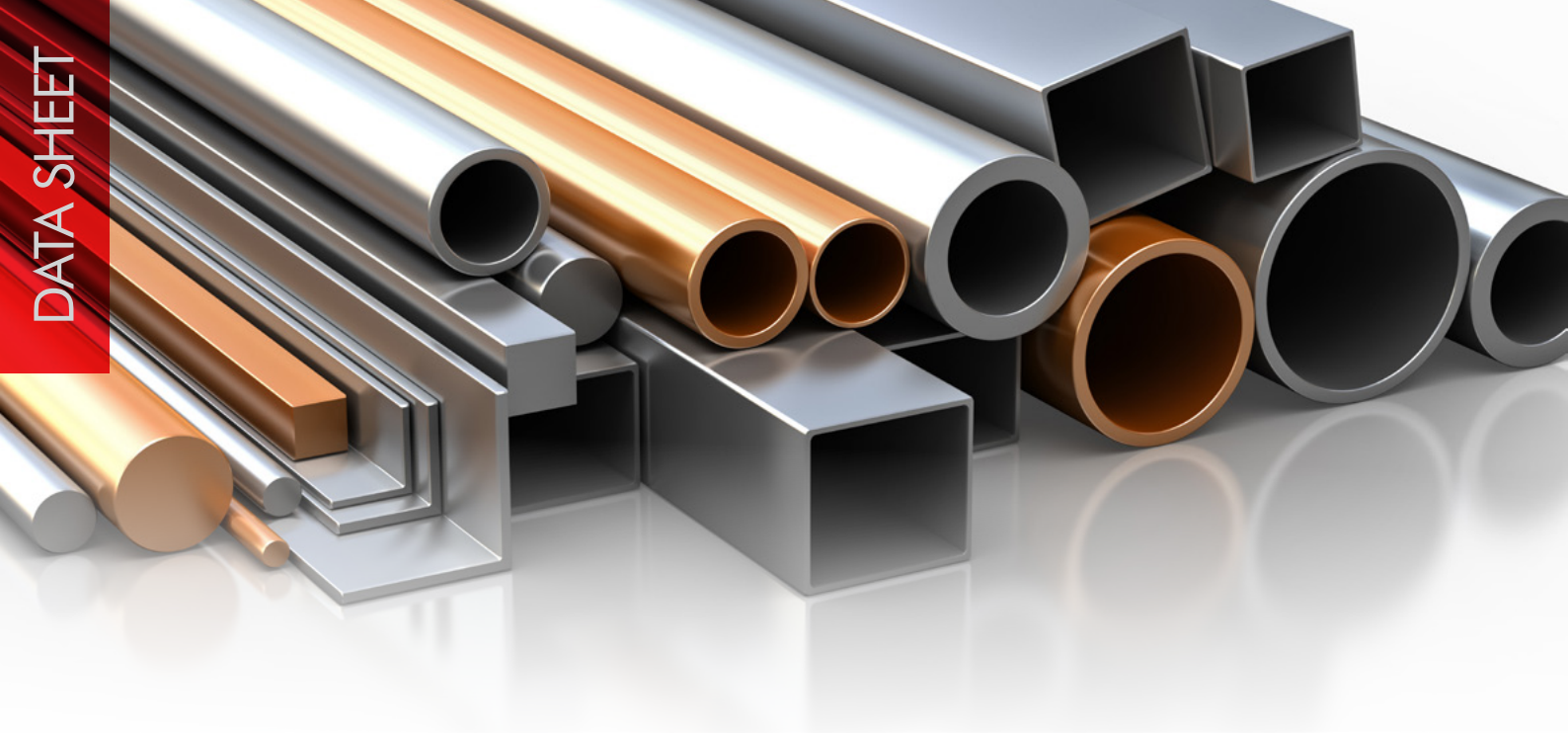
DATA SHEET



TITANIUM GRADE 2

UNS No - R50400

Titanium Grades 2 is one of the most important grade utilized for condenser tubing, Heat exchangers and offshore oil installation water pipe lines, bleaching plants in the paper industry. This grade can be utilized for the parts requiring strength up to 400°F as well as oxidation resistance to 600°F. Titanium Grade 2 is commercially pure which is slightly stronger than Grade 1 but equitably corrosion resistant against most applications.

Applications

- Orthopedic applications, such as implants and prosthesis
- Airframe and aircraft engine parts
- Marine chemical parts
- Condenser tubing
- Heat exchangers

Characteristics

- Moderate Strength Titanium
- Excellent Cold Formability
- Excellent Weldability
- Excellent Resistance to High Oxidation

SUNMACH™
shaping exotic metals

TITANIUM GRADE 2

Machining
As a family, titanium and its alloys have built a persona as a nightmare to machine. This is just not the situation. Experienced operators have compared its qualities to those found in 316 stainless steels. Recommended practice includes high coolant flow (to offset the material's low thermal conductivity), slow speeds and generally high feed rates. Tooling should be tungsten carbide designations C1-C4 or cobalt type high speed tools.

Forming
Forming might be hot or cold shaped by utilizing hydro press, power brake, stretch or drop hammer techniques. Forming is same in attributes to 300 series stainless steels.

Welding
Titanium Grade 2 may be welded by a wide assortment of standard fusion and solid-state processes, in spite of its chemical reactivity normally requires uncommon measures and process.

Forging
Roughing operations can begin at 899 C (1650 F), while finishing should be performed at 843 C (1550 F).

Hot Working
Both the spring back and required forming forces are reduced by hot forming and will increase the overall ductility of the material.

Cold Working
The cold work qualities of this material are same as that of a moderately tempered austenitic stainless steel. In numerous cold forming operations, intermediate stress relief is recommended to prevent tearing or other material damage. Post-work annealing is required to reattain optimum performance qualities.

Annealing
Heat to 704 C (1300 F) hold for 2 hours follow by air cooling. For intermediate stress relieving, heat to 482 F (900 C) and hold for 45 minutes.

Heat Treatment
Not hardenable by heat treatment.

Other Physical Props
Beta Transus (F +/- 25) 167.

Chemical Properties

N	C	H	Fe	O	Residuals***	Residuals ***	Ti
0.03 max	0.08 Max	0.015 Max	0.30	0.25 Max	0.1 Max	0.4 Max	Balance

*** Need not be reported.

*** A residual is an element present in a metal or an alloy in small quantities and is inherent to the manufacturing process but not added intentionally. In titanium these elements include aluminium, vanadium, tin, chromium, molybdenum, niobium, zirconium, hafnium, bismuth, ruthenium, palladium, yttrium, copper, silicon, cobalt, tantalum, nickel, boron, manganese, and tungsten.

TITANIUM GRADE 2

Mechanical Properties

Tensile Strength (ksi)	0.2% Yield Strength (ksi)	Elongation% in 2 inches
130	120	10

Physical Properties

Properties	Units	Temperature in °C
Density	4.51 g/cm^3	Room
Specific Heat	0.135 Kcal/kg.C	20°
Melting Point	1670 °C	-
Modulus of Elasticity	105 KN/mm^2	20°
Electrical Resistivity	312.7 µΩ.cm	20°
Coefficient of Expansion	8.6 µm/m °C	20-100°
Thermal Conductivity	16.4 W/m-°K	20°

ASTM Specifications

Pipe & Tube	Sheet / Plate	Bar	Forging
B 337, B 338	B 265	B 348	B 381

Availability

MANUFACTURING	RAW MATERIALS
Fasteners	Pipes
Custom Machining	Tubes
Custom Fabrication	Bars
Piping / Spools	Sheets
Stamped Parts	Plates
B/W Fittings	-
S/W Fittings	-
Flanges	-
Compression Fittings	-