

MATERIALS

Information



COMMON MATERIAL AMS SPECIFICATIONS

Material	Grade	Tubing		Sheet / Strip
		Seamless	Welded	
Aluminum	1100	-	-	4001
Nickel	201	-	-	5553
St. Steel	304	5560	5565	5513
St. Steel	304L	-	-	5511
St. Steel	316	5573	-	5524
St. Steel	316L	-	-	5507
St. Steel	321	5570	5576	5510
Alloy	C276	-	-	5530
Alloy	400	4574	-	4544
Alloy	600	5580	-	5540
Alloy	625	5581	5581	5599
Alloy	718	5590	-	5596
Alloy	X-750	5582	-	5598
Titanium	Grd 2	-	-	4902
Waspaloy		-	-	5544

HEAT TREATMENTS

SOLUTION HEAT TREAT / ANNEAL

- Stainless Steel (300 series): Anneal at 2000°F for 3 minutes
- Nickel: Anneal at 1325°F for 90 minutes
- Alloy X-750: Solution heat treat/anneal per AMS 5598 Section 3.4
- Alloy 718: Solution heat treat/anneal per AMS 5596 Section 3.4
- Other materials: Contact Applications Engineering

PRECIPITATION HARDEN / AGE

- Stainless Steel (300 Series): N/A
- Nickel: N/A
- Alloy X-750: Precipitation harden per AMS 5598 per Section 3.5.2
- Alloy 718: Precipitation harden per AMS 5596 Section 3.5.2
- Other materials: Contact Applications Engineering

SPECIAL HEAT TREATMENTS

- NACE: Temper per NACE MR0175 for control of stress corrosion cracking
- Custom 2-stage stainless steel anneal (316L VIMVAR stainless steel)
- Aluminum anneal (Alloys 6061 and 2024)

Contact Applications Engineering for more information.

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EnPro Industries companies

sales@techneticsgroup.com

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MATERIAL PROPERTIES

	Grade	UNS Description	Description	Density lb/in ³ (g/cm ³)	Tensile Strength ksi (Mpa)	Yield Strength at 0.2% offset ksi (MPa)	Elongation %	Hardness
Stainless Steels	304	S30400	Chromium-Nickel austenitic alloy. Used for a wide variety of home and commercial applications, this is one of the most familiar and most frequently used alloys in the stainless steel family.	0.285 (7.90)	75 (515)	30 (205)	30 (205)	92 Rb
	316	S31600	Molybdenum-bearing austenitic stainless steel which is more resistant to general corrosion and pitting/crevice corrosion than the conventional chromium-nickel austenitic stainless steels. This alloy offers higher creep, stress-to-rupture and tensile strength at elevated temperatures.	0.290 (8.03)	75 (515)	30 (205)	30 (205)	95 Rb
	321	S32100	A stabilized stainless steel which offers an excellent resistance to intergranular corrosion following exposure to temperature in the chromium carbide precipitation range from 800-1500°F (430-820°C).	0.286 (7.92)	75 (515)	30 (205)	30 (205)	95 Rb
Nickel Alloys	Alloy 276	N10276	A nickel-molybdenum-chromium-iron-tungsten alloy which is among the most corrosion resistant of alloys currently available. Alloy 276 alloy is widely used in the severest environments.	0.321 (8.89)	120 (825)	60 (415)	55	90 Rb
	Alloy 400	N04400	A ductile nickel-copper alloy with resistance to a variety of corrosive conditions.	0.318 (8.80)	80 (550)	40 (275)	40	70 Rb
	Alloy 600	N06600	A non-precipitation hardenable, high-strength nickel-chromium alloy. Service temperatures up to 1000°F.	0.306 (8.47)	95 (655)	45 (310)	40	80 Rb
	Alloy 625	N06625	An austenitic nickel-base superalloy possessing excellent resistance to oxidation and corrosion over a broad range of corrosive conditions. It has outstanding strength and toughness at temperatures ranging from cryogenic to high temperature.	0.305 (8.44)	135 (930)	70 (485)	45	95 Rb
	Alloy 718	N07718	A precipitation hardenable, high-temperature nickel alloy that combines excellent corrosion resistance, high-strength and weldability. Resistant to post-weld cracking. Service temperatures up to 1200°F.	0.297 (8.23)	195 (1345) (Heat Treated)	170 (1170) (Heat Treated)	17 (Heat Treated)	43 Rc (Heat Treated)
	Alloy X-750	N07750	A precipitation hardenable, high-strength and high-temperature nickel alloy. Service temperatures up to 1100°F.	0.299 (8.28)	175 (1207) (Heat Treated)	115 (793) (Heat Treated)	20 (Heat Treated)	35 Rc (Heat Treated)
	Waspaloy	N07001	A precipitation hardenable nickel alloy with excellent high-temperature strength. Service temperatures up to 1350°F.	0.296 (8.19)	80 (550)	40 (275)	40	70 Rb

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	Grade	UNS Description	Description	Density lb/in ³ (g/cm ³)	Tensile Strength ksi (Mpa)	Yield Strength at 0.2% offset ksi (MPa)	Elongation %	Hardness
Other Materials	Nickel 201	N02201	Commercially pure wrought Nickel with similar properties to Alloy 200 but with a lower carbon content to prevent embrittlement by intergranular carbon at elevated temperatures.	0.321 (8.89)	58.6 (403)	14.9 (103)	50	75-100 HB
	Aluminum (Alloy 1100)	A91100	Commercially pure aluminum that contains a minimum of 99.0% aluminum. It has good formability and high resistance to corrosion.	0.098 (2.71)	13 (89.6)	5 (34.5)	45	23 HB
	Silver (99.99 pure)		Commercially pure silver is very ductile, malleable, and capable of a high degree of polish.	0.379 (10.491)	20.3 (140)			25 HV
	Titanium	R50400	Commercially pure Titanium Grade 2 is the most commonly used and widely available grade of unalloyed titanium. The grade combines excellent corrosion resistance and weldability with good strength, ductility and formability.	0.163 (4.51)	50 (340) Min.	40 (280) Min.	22	80 Rb
	Tantalum		Superior resistance to all acids except hydrofluoric and hot sulfuric. Good for most aqueous salt solutions.	0.6 (16.6)	40 (276)	25 (172)	50	35 Rb
	Copper	C11000	Good to excellent corrosion resistance. Excellent hot and cold workability.	0.323 (8.94)	33 (227)	11 (76)	41	72 Rb

Typical room temperature mechanical properties.

The technical data contained herein is by way of example only and should not be relied on for any specific application.

APPLICATIONS DATA SHEET

Tel: 800-233-1722 Fax: 803-783-4279

E-Mail: sales@techneticsgroup.com



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COMPANY: _____	PHONE: _____
CONTACT: _____	FAX: _____
ADDRESS: _____	E-MAIL: _____
	DATE: _____

APPLICATION: (please attach customer drawing / sketch)

Brief Description: _____

Annual quantities: _____ RFQ Quantities: _____

Is This a New Design? Yes No Are Modifications Possible? Yes No

Drawing or Sketch Attached? Yes No What is the Seal Type? Shaped Circular

SERVICE CONDITIONS:

Media: _____	Life Expectancy: _____
Working Temperature: _____	Max/Proof Pressure: _____ @ Temp. = _____
Working Pressure: _____	Max Temperature: _____ @ Pressure = _____
Pressure Direction: <small>(Internal/External/Axial)</small> _____	Target Sealing Level: Helium: _____ Std.cc/sec
Pressure Cycles: _____	Flow Rate: _____ cc/minute
Temperature Cycles: _____	Other: _____

FLANGE DETAILS: (Please Provide Drawing)

Amount of Flange Movement in Service: (Inches) Radial: _____ Axial: _____ #Cycles: _____

Material: _____ Thickness: _____

Groove / Counter Bore: _____ Please list dimensions in Groove Details section

ANSI Raised Face Size: _____ # Rating: _____ Face Surface Finish: _____ (RMS)

Flange(s) with Clamping System: (ISO,KF, etc) Standard: _____ Size: _____

Other: _____ Description: _____ (Please Provide Drawing)

GROOVE DETAILS: (Please Provide Drawing)

Type (Rectangular, Dovetail, etc.): _____

Outer Diameter: _____	Tolerance: _____	Depth: _____	Tolerance: _____
Inner Diameter: _____	Tolerance: _____	Finish (RMS) _____	Type: _____

Finish Type: lathe (circular), endmill (multi-directional), other

BOLTING DETAILS: (Please Provide Drawing)

Size: _____	Type / Grade: _____
Number: _____ Bolt Circle _____	Tapped / Through: _____

OTHER:

Special coating / plating specification: _____

Special quality / inspection specifications: _____

Other: _____