

Tube & Pipe Alloy 3003

Technical Data

ALLOY DESCRIPTION ¹

One of the non-heat treatable manganese alloys. Typically used for condensers and heat exchangers in chemical equipment and pressure vessels. Good corrosion resistance, workability and weldability.

¹ Alloy subject to cast lot quantity restriction

TYPICAL MECHANICAL PROPERTIES

Temper	Tensile (.0625" Dia. Specimen)					Hardness Brinell 500kg 10 mm	Shear		Fatigue		Modulus	
	Ultimate		Yield		Elongation/4D %		Ultimate Shearing Strength		Endurance Limit - R.R. Moore Type		Modulus of Elasticity	
	KSI	MPa	KSI	MPa			KSI	MPa	KSI	MPa	KSI x 10 ³	Gpa
O	16	110	6	40	30	28	11	75	7	50	10	69
H14	22	152	21	145	16	40	14	96	9	62	10	69

COMPARATIVE CHARACTERISTICS

Temper	Corrosion Resistance		Cold Workability ³	Machinability ³	Anodize Response ³	Brazeability ⁴	Weldability ⁴		
	General ¹	Stress ²					Gas	Arc	Spot
O	A	A	A	E	A	A	A	A	B
H14	A	A	A	D	A	A	A	A	A

- Ratings A through E are relative ratings in decreasing order of merit, based on exposures to sodium chloride solution by intermittent spraying or immersion. Alloys with A and B ratings can be used in industrial and seacoast atmospheres without protection. Alloys with C, D and E ratings generally should be protected at least on faying surfaces.
- Stress-corrosion cracking ratings are based on service experience and laboratory tests of specimens exposed to the 3.5% sodium chloride alternate immersion test.
 - A= No known instance of failure in service or in laboratory tests.
 - B= No known instance of failure in service; limited failures in laboratory tests of short transverse specimens.
 - C= Service failures with sustained tension stress acting in short transverse direction relative to grain structure; limited failures in laboratory tests of long transverse specimens.
 - D= Limited service failures with sustained longitudinal or long transverse.
- Ratings A through D for Workability (cold), A through E for Machinability and A through C for Anodize Response, are relative ratings in decreasing order of merit.
- Ratings A through D for Weldability and Brazeability are relative ratings defined as follows:
 - A= Generally weldable by all commercial procedures and methods.
 - B= Weldable with special techniques or for specific applications that justify preliminary trials or testing to develop welding procedure and weld performance.
 - C= Limited weldability because of crack sensitivity or loss in resistance to corrosion and mechanical properties.
 - D= No commonly used welding methods have been developed.

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APPLICABLE SPECIFICATIONS

Cold Drawn	Extruded
ASTM B210 ASTM 234	ASTM B221
AMS 4067/AMS 4065	ASTM B241
AMS-WW-T-700/2	

CHEMICAL COMPOSITION LIMITS

Weight %	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Others	
										Each	Total
Maximum	..	..	0.05	1.0	..	..	..	..	..	..	..
Minimum	0.6	0.7	0.20	1.5	...	...	...	0.10	...	0.05	0.15

TYPICAL PHYSICAL PROPERTIES

Characteristic			English	Metric
Nominal Density (68 °F/20 °C) <i>English: lbs./in.³</i> <i>Metric: g/cm³</i>			0.099	2.73
Melting Range			1190 °F - 1210 °F	640 °C – 655 °C
Coefficient of Thermal Expansion <i>English: micro in./in.-°F</i> <i>Metric: micro m/m -°K</i>	Linear 68 °F-212 °F 20 °C-100 °C		12.9	23.2
Thermal Conductivity (68 °F/20 °C) <i>English: BTU-in/ft²hr°F</i> <i>Metric: W/m x K</i>	O Temper		1340	193
Electrical Conductivity (68 °F/20 °C) <i>English: %IACS @ 68°F</i> <i>Metric: MS/M @ 20°C</i>	Equal Volume	O Temper	50	29
	Equal Weight	O Temper	163	92