Technical Data

ROD & BAR ALLOY 6061

ALLOY DESCRIPTION

Generally selected where welding or brazing is required or for its high corrosion resistance in all tempers. Formability is excellent in O temper and good in the T4 temper. Machining is more difficult when compared to the other machining alloys. Corrosion resistance and appearance after anodizing are superior to all other screw machine alloys while strength is the lowest.

TYPICAL MECHANICAL PROPERTIES

Temper	Tensile (.500" Dia. Specimen)					Hardness	Shear		Fatigue*		Modulus	
	Ultimate		Yield		Elongation/4D	Brinell 500kg 10 mm	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
0	18	124	8	55	30	30	12	83	9	62	10.0	68.3
T4, T451	35	241	21	145	25	65	24	165	14	97	10.0	68.3
T6, T651	45	310	40	276	17	95	30	207	14	97	10.0	68.3

*5 x 10E8 cycles of reversed stress

COMPARATIVE CHARACTERISTICS

Temper	Corrosion Resistance		Cold Workability[3]	Machinability[3]	Anodize Response[3]	Brazeability[4]	Weldability[4]		
	General[1]	Stress[2]					Gas	Arc	Spot
0	B	A	A	D	A	A	A	A	B
T4, T451	B	B	B	C	A	A	A	A	A
T6, T651	B	A	C	C	A	A	A	A	A

1 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.

2 Stress-corrosion cracking ratings are based on service experience and on 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 areas.

3 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.

4 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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KAISER ALUMINUM

APPLICABLE SPECIFICATIONS

Cold Finished	Extruded
ASTM B211	ASTM B221
AMS-QQ-A-225/8	AMS-QQ-A-200/8
AMS 4115	AMS 4150
AMS 4116	AMS 4160
AMS 4117	AMS 4161
AMS 4128	AMS 4172
ASTM B316	AMS 4173

CHEMICAL COMPOSITION LIMITS

									Others	
Weight %	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Each	Total
Minimum	0.40		0.15		0.80	0.04				
Maximum	0.80	0.70	0.40	0.15	1.20	0.35	0.25	0.15	0.05	0.15

TYPICAL PHYSICAL PROPERTIES

Characteristic			English	Metric
Nominal Density (68 ºF / 20 ºC)			0.098 lbs./in.^{3}	2.70 Mg/m^3
Melting Range			1080 ºF - 1206 ºF	582 ºC - 652 ºC
Specific Heat (212 ºF / 100 ºC)			0.214 BTU/lb. - ºF	896 J/kg - ºK
Coefficient of Thermal Expansion	Linear 68 ºF - 212 ºF 20 ºC - 100 ºC		13.1 micro in./in. - ºF	23.6 micro m/m - ºK
	Volumetric 68 ºF / 20 ºC		3.93 x 10^{-5} in.^{3}/in.^{3} - ºF	71 x 10^{-6} m^3/m^3 - ºK
Thermal Conductivity (68 ºF / 20 ºC)	O Temper		104 BTU/ft. - hr. - ºF	180 W/m - ºK
	T4, T451		89 BTU/ft. - hr. - ºF	154 W/m - ºK
	T6, T651		97 BTU/ft. - hr. - ºF	167 W/m - ºK
Electrical Conductivity (68 ºF / 20 ºC)	Equal Volume	O Temper	47% IACS	
		T4, T451	40% IACS	
		T6, T651	43% IACS	
	Equal Weight	O Temper	155% IACS	
		T4, T451	132% IACS	
		T6, T651	142% IACS	