Alloy Selector Guide and Welding Procedures
Aluminum, Titanium

Cronatron

Stick Electrodes

B	510	(35,000 PSI)	Non heat-treatable

MIG Wires

B	510M	(35,000 PSI)	Non heat-treatable
A	556M	(45,000 PSI)	Heat-treatable

TIG Wires

B	510T	(35,000 PSI)	Non heat-treatable
A	556T	(45,000 PSI)	Heat-treatable

Titanium

C	59T	(60,000 PSI)	Titanium

Certanium®

Stick Electrodes

B	608	(34,000 PSI)

T = TIG
M = MIG

Group	Description	Common Metal Grades
A	Aluminum (Heat-treatable)	5XXX, 7XXX
B	Aluminum (Non heat-treatable)	1XXX, 2XXX, 3XXX, 4XXX, 6009, 6010, 6070
C	Titanium	Pure Ti – For Titanium Alloys, see notes below

Helpful Hints – Titanium: Cronatron's 59T can be used to weld pure Titanium and the following alloy grades as long as lower weld strength and increased ductility is acceptable.
Alloy grades – 0.15Pd, 5Al-2.5Sn, 8Al-1Mo-1V, 8Mn, 6Al-4V, 6Al-1V, 13V-11Cr-3Al, 6Al-2Cb-1Ta-1Mo, 15V-3Al-3Sn-3Cr, 11Mo-6Zr-4.5Sn, 15Mo-2.7Nb-3Al-0.2Si, 6Al-2Sn-4Zr-2Mo, 6Al-2.75Sn-4Zr-0.4Mo-0.45Si

Bead Profiles and Techniques

Desired Bead Profile	Fillet welds should be slightly concave with smooth transitions. Undercutting and even weld spatter can greatly affect the fatigue life of a weld.
Technique	Multiple torch angles and weave techniques are acceptable.
Helpful Hints	Cleanliness of base metal and filler metal is critical to success. All metals listed react strongly to the atmosphere and inert shielding is required.
Base Metal ID	Vinegar will not affect aluminum. Titanium is usually a dull gray color and when ground emits pure white sparks.

Group	Thickness	Preheat °F	Postheat °F	Minimum Interpass °F	Maximum Interpass °F	Description
A – Aluminum (Heat-Treatable 5XXX, 7XXX)	<1"	70°	Depends	N/A	N/A	These alloys in general are more susceptible to cracking, particularly crater cracks. Preheating, while sometimes necessary, can greatly reduce the weld strength. If preheat is necessary on large fabrications, preheat should be under 200°F. A full PWHT can restore base metal and weld metal properties. Use 75% Argon and 25% Helium for thick sections.
	1" – 2"	100°	Depends	N/A	N/A	
	>2"	150°	Depends	N/A	N/A	
B – Aluminum (Non Heat-Treatable 1XXX, 2XXX, 3XXX, 4XXX, 6XXX)	<1"	100°	N/A	N/A	N/A	A modest preheat is sometimes used to overcome the high thermal conductivity of aluminum. Use 75% Argon and 25% Helium for thick sections.
	1" – 2"	150°	N/A	N/A	N/A	
	>2"	200°	N/A	N/A	N/A	
C – Titanium	<1"	None	Depends	N/A	250°	Cleanliness is vital to sound welds. Must be TIG welded with an inert shielding gas. Keep gas coverage on weld until it cools to 300°F.
	1" – 2"	None	Depends	N/A	250°	
	>2"	None	Depends	N/A	250°	

For optimal operating parameters, refer to tech sheets or the Cronatron Maintenance Welding Guide (C555).