Alloy Selector Guide and Welding Procedures

Low, Medium, High Carbon Steels

Cronatron

Stick Electrodes

A	311	(78,000 PSI)	Low Hydrogen
A	311-1	(81,000 PSI)	Low Hydrogen
B	315	(86,500 PSI)	Low Hydrogen
A	321	(76,500 PSI)	Extra Penetration
A	324	(86,000 PSI)	High Deposition
A	338	(80,000 PSI)	Excellent at Vertical or Overhead
A	360P	(79,000 PSI)	Extra Penetration
C	375	(140,000 PSI)	

MIG Wires

A	311M-FC	(81,000 PSI)	
B	315M-MC	(86,500 PSI)	High Deposition
A	321M	(76,000 PSI)	
A	331M	(86,000 PSI)	
A	331M-FC	(90,600 PSI)	
A	331M-FCX	(84,100 PSI)	(No Gas)
A	331M-MC	(86,000 PSI)	High Deposition
B	375M	(90,000 PSI)	
C	375M-FC	(110,000 PSI)	
A	376M-FC	(76,000 PSI)	(No Gas) DCSP

TIG Wires

A	315T	(110,000 PSI)
A	321T	(76,000 PSI)

Gouging/Chamfering, Rods

1100

Certanium®

Stick Electrodes

A	701	(90,000 PSI)	Excellent at Vertical or Overhead
A	702	(81,000 PSI)	Excellent at Vertical or Overhead
B	704	(101,000 PSI)	Low Hydrogen
C	705	(130,000 PSI)	Low Hydrogen
A	747SP	(90,500 PSI)	Low Hydrogen
A	757	(76,000 PSI)	Low Hydrogen

MIG Wires

A	701FCG	(85,600 PSI)
A	702M	(79,000 PSI)
B	704FCG	(101,000 PSI)
C	705M	(107,000 PSI)

TIG Wires

A	701T	(70,000 PSI)

Gouging/Chamfering, Rods

100

T = TIG
M = MIG
FC = Flux Core
M-MC = Metal Core

Bead Profiles and Techniques

Desired Bead Profile	Fillet welds should be slightly concave with smooth transitions. Avoid excessive travel speed.
Technique	Multiple torch angles and weave techniques are acceptable.
Helpful Hints	Drag/Pull technique provides maximum penetration.
Preheat	Hold at stated preheat temperature for one hour per one inch thickness.
Base Metal ID	Carbon greatly affects the hardness of steel. Therefore, a low carbon steel can easily be filed while a high carbon steel would be difficult. All carbon steels are strongly magnetic as opposed to stainless steels.

Group	Description	Common Metal Grades
A	Low Carbon/Mild Steels (C = 0% to 0.2%)	A3-1>2, A27, A36, A53, A105, A106, A131, A134, A135-A>B, A139, A161, A178-A>C>D, A179, A181-60>70, A192, A204, A209, A210, A211, A214, A216, A226, A242, A250, A252, A266, A328, A414, A441, A537, A556, A557, A562, A570, A572, A573, A587, A660, A662, A694, A696, A737, A765, A841, A850, 1010, 1020
B	Medium Carbon Steels (C = 0.2% to 0.5%)	A3-3, A82, A184, A185, A333, A334, A335, A350, A356, A420, A533, A575, A588, A656, A660, A675, A678, A706, A727, A734, A735, A738, A739, A827, 1030, 1040, T-1 (Fillet Welds)
C	High Carbon/High Strength Steels (C = 0.5% to 1.2%)	A148, A225, A288, A372, A469, A470, A514, A517, A519, A521, A533, A649, A709, A724, A782, 1050, 1060, T-1 (Butt Welds)

Group	Thickness	Preheat °F	Postheat °F	Minimum Interpass °F	Maximum Interpass °F	Description
A – Low Carbon Steels	<1"	70	N/A	N/A	N/A	Excellent weldability. For thick sections, AWS (American Welding Society) recommends a stress relief PWHT (postweld heat treatment) of 1,150°F for an hour per inch of thickness.
	1" – 2"	100	N/A	N/A	N/A	
	>2"	150	N/A	N/A	N/A	
B – Medium Carbon Steels	<1"	200	N/A	200	N/A	Good weldability when proper preheat is used. Amount of proper preheat is also affected by alloying elements such as Mn; the higher the alloy percentage, the higher the preheat that is needed. A typical stress relief is 1,150°F held for one hour per one inch of base metal followed by a slow cool.
	1" – 2"	300	Stress Relief	300	N/A	
	>2"	400	Stress Relief	400	N/A	
C – High Carbon Steels	<1"	400	N/A	400	N/A	Poor weldability. Easily susceptible to cracking. Controlling hydrogen (use hotbox) and using proper preheat is critical to success. A typical stress relief is 1,150°F held for one hour per one inch of base metal followed by a slow cool.
	1" – 2"	500	Stress Relief	500	N/A	
	>2"	600	Stress Relief	600	N/A	

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