Alloy Selector Guide and Welding Procedures

Tool Steels

Cronatron

Stick Electrodes

B	344	Rc 60–64
C	345	Rc 52–58
D	346	Rc 56–62
F	349	Rc 33–36

MIG Wires

C	345M	Rc 60–64

TIG Wires

B	344T	Rc 60–64
C	345T	Rc 52–58
D	346T	Rc 56–62
F	349T	Rc 33–36

T = TIG
M = MIG

Bead Profiles and Techniques

Desired Bead Profile	Uniform tight stringer beads with adequate penetration.
Technique	Stringer beads should be used, with careful attention paid to eliminating notches and areas of stress concentration.
Helpful Hints	It is best to position the workpiece in the flat position with slight incline, welding up the incline. Peen between passes.
Preheat	Hold at stated preheat temperature for one hour per one inch thickness followed by a slow cool.
Base Metal ID	If unsure about the type of tool steel, it is safer to weld with 345 and use a higher than normal preheat.

Group	Description	Common Metal Grades
B	D/M-Series Tool Steels (High-Speed)	D2, M2, (Preheat 900°F to 950°F)
C	H-Series Tool Steels (Hot Work) S-Series Tool Steels (Shock Resistant) O-Series Tool Steels (Oil Hardening)	H11, H12, H13 (Preheat 700°F to 1,000°F) S1, S5, S7 (Preheat 500°F to 600°F) O1, O6 (Preheat 300°F to 400°F)
D	A-Series Tool Steels (Air Hardening)	A2, A4, A6 (Preheat 300°F to 400°F)
F	Chrome-Moly and Mold Steels	A217, 4130, 4140, 4340 (Preheat 450°F to 550°F)

Group	Thickness	Preheat °F	Postheat °F	Minimum Interpass °F	Maximum Interpass °F	Description
B – D/M Series Tool Steels	<1"	900	900	Preheat Temp.	1,000	Tool steels have good weldability as long as proper preheat and welding procedures are followed. Tightly control interpass temperatures to prevent tempering base material. Refer to Cronatron's Tool Steel Chart for more details on temperatures and procedures.
	1" – 2"	950	950	Preheat Temp.	1,000	
	>2"	950	950	Preheat Temp.	1,000	
C – H Series Tool Steels	<1"	800	800	Preheat Temp.	1,000	
	1" – 2"	900	900	Preheat Temp.	1,000	
	>2"	1,000	1,000	Preheat Temp.	1,000	
C – S Series Tool Steels	<1"	500	500	Preheat Temp.	600	
	1" – 2"	550	550	Preheat Temp.	600	
	>2"	600	600	Preheat Temp.	600	
C – O Series Tool Steels	<1"	300	300	Preheat Temp.	400	
	1" – 2"	350	350	Preheat Temp.	400	
	>2"	400	400	Preheat Temp.	400	
D – A Series Tool Steels	<1"	300	300	Preheat Temp.	500	
	1" – 2"	400	400	Preheat Temp.	500	
	>2"	500	500	Preheat Temp.	500	
F – Chrome-moly and Mold Steels	<1"	400	400	Preheat Temp.	500	
	1" – 2"	450	450	Preheat Temp.	500	
	>2"	500	500	Preheat Temp.	500	

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