GOUGING TECHNIQUES FOR SPECIFIC MATERIALS

CARBON STEEL & LOW ALLOY STEEL, SUCH AS ASTM A514 & A517
Use DC electrodes with DCEP (electrode positive). AC electrodes with an AC transformer can be used, but for this application, AC is only half as efficient as DC.

STAINLESS STEEL
Use DC electrodes with DCEP (electrode positive). AC electrodes with an AC transformer can be used, but for this application, AC is only half as efficient as DC.

CAST IRON INCLUDING MALLEABLE AND DUCTILE IRON (NODULAR)
Use 1/2" (12.7 mm) or larger diameter CCDC electrodes at the highest rated amperage. Use an angle of 70° off the workpiece and the depth of gouge should not exceed 1/2" (12.7 mm) per pass.

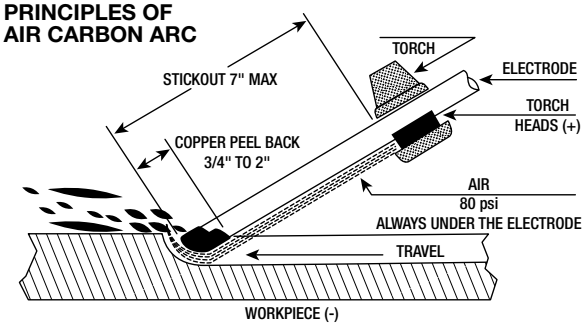
COPPER ALLOYS (COPPER CONTENT 60% AND UNDER)
Use CCDC electrodes with DCEN (electrode negative) at the electrode's highest amperage rating.

ALUMINUM BRONZE AND ALUMINUM NICKEL BRONZE (NAVAL PROPELLER ALLOY)
Use CCDC electrodes with DCEN (electrode negative) at the electrode's highest amperage rating.

NICKEL ALLOYS (NICKEL CONTENT OVER 80% OF MASS)
Use CCAC electrodes with AC current.

NICKEL ALLOYS (NICKEL CONTENT UNDER 80% OF MASS)
Use CCDC electrodes with DCEP (electrode positive) at the electrode's highest amperage rating.

PRINCIPLES OF AIR CARBON ARC



MAGNESIUM ALLOYS
Use CCDC electrodes with DCEP (electrode positive) and prior to welding, wire brush the groove.

ALUMINUM
Use CCDC electrodes with DCEP (electrode positive). You must brush with a stainless wire brush before welding. Electrode stick-out (length of electrode between torch and workpiece) should not exceed 3" (76.2 mm).

TITANIUM, ZIRCONIUM, HAFNIUM, AND THEIR ALLOYS
Do not cut or gouge to prepare for welding or remelting unless you mechanically remove the surface layer from the cut/gouge surface.

NOTE – If you preheat for welding, preheat for gouging

CURRENT REQUIREMENTS

Electrode Diameter	1/8" 3.2 mm	5/32" 4.0 mm	3/16" 4.8 mm	1/4" 6.4 mm	5/16" 7.9 mm	3/8" 9.5 mm	1/2" 13 mm	5/8" 16 mm	3/4" 19 mm	1" 25 mm	3/8" Flat 9.5 mm Flat	5/8" Flat 16 mm Flat
Minimum amps DC	60	90	200	300	350	450	800	1000	1250	1600	250	300
Maximum amps DC	90	150	250	400	450	600	1000	1250	1600	2200	450	500
Minimum amps AC	–	–	200	300	–	350	–	–	–	–	–	–
Maximum amps AC	–	–	250	400	–	450	–	–	–	–	–	–

GOUGING TORCH SELECTION GUIDE

Copperclad Electrodes	Amperage Range: 90 – 450	450 - 1000	1000 -1400	1400 – 2000	2000 - 2400	Recommended	Alternate
1/8" - 3/8" Round (3.2 mm - 9.5 mm) 3/8" & 5/8" Flats (9.5 mm & 15.9 mm)	■					K3000™	
5/32" – 1/2" Round (4.0 mm – 12.7 mm) 3/8" & 5/8" Flats (9.5 mm & 15.9 mm)	■	■				AirPro X4000®	K4000™
5/16" - 5/8" Round (7.9 mm - 15.9 mm)		■	■			K-5	Tri-Arc®, AirPro™ X4000, K4000®
5/16" – 1" Round (7.9 mm – 25.4 mm)		■	■	■	■	Tri-Arc®	

WHICH TORCH IS RIGHT FOR YOU?

Torch Model	Amperage (Maximum)	Swivel Cable	Swivel Cable Lengths (Ft)	Air-Cooled Water-Cooled	Handle Design	Body/ Upper Arm Construction	Application	Special Features
K3000™	600	360°	7 ft & 10 ft	Air-Cooled	Small & Ergonomic	Brass	Medium Duty	All brass torch parts with a copper head assembly having 4-hole design
K4000®	1000	360°	7 ft & 10 ft	Air-Cooled	Small & Ergonomic	Brass	Heavy Duty	All brass torch parts with a copper head assembly having 4-hole design
AirPro™ X4000	1000	360°	7 ft & 10 ft (2 m & 3 m)	Air-Cooled	Small & Ergonomic	Brass	Heavy Duty	All brass torch parts with a copper head assembly having 4-hole design, pneumatically operated upper arm
K-5	1250	340°	7 ft & 10 ft	Air-Cooled	Straight	Brass	Heavy Duty	All brass torch parts with a copper head assembly having 4-hole design
Tri-Arc®	2200	340°	7 ft & 10 ft	Air-Cooled & Water-Cooled	Straight	Copper	Heavy Duty	Versatility with three (3) different head assemblies to choose from to meet any metal removal application

Int'l Customer Care: 1-940-381-1212 / FAX 1-940-483-8178
esab.com