PREHEATING COPPER AND COPPER ALLOYS

When welding copper based alloys using the gas tungsten arc or gas metal arc welding processes, preheating is normally unnecessary, provided the section thicknesses are not unusually heavy. When welding on copper, preheating and maintenance of interpass temperature to 1000°F (538°C) is often required, regardless of welding process. Preheating is suggested when using the shielded metal-arc process. The following recommendations are only suggestions and will often vary depending on section thicknesses, selected welding process and other variables.

PREHEAT INFORMATION

BASE METAL	PREHEAT TEMP.	
	°F	°C
Low carbon and mild steels up to 0.29 C Low alloy steels - same as low carbon and mild steel.	Not Required	Not Required
Medium carbon steels 0.30 C to 0.59 C	300-600	149-315
Gray cast iron (Slow Cool)	400-600	204-315
Nodular and malleable cast iron (post weld annealing is advisable.)	300-400	149-204
Cupro-nickel and silicon bronze (interpass temperature 200°F maximum)	Not Required	Not Required
Aluminum bronze - alloys up to 10% aluminum (interpass temperature 300°F maximum)	Not Required	Not Required
Manganese bronze - Inert Gas	300	149
Manganese bronze - Shielded metal-arc.	500	260
Copper	1000	538

RECOMMENDED WELDING AMPERAGE

Process	Diameter of Wire		Voltage (V)	Amperage (A)	Shielding Gas
	Inches	Millimeters			
MIG (GMAW) DCEP	0.035	0.9	20-26	100-200	100% Argon or 75% Argon/25% Helium
	0.045	1.2	22-28	100-250	
	1/16"	1.6	29-32	250-400	
	3/32"	2.4	32-34	350-500	
TIG (GTAW)2% Thoriated Tungsten			Amperes DCEN	Amperes ACHF	100% Argon (soft arc) 100% Helium (hot arc)
	1/16"	1.6	70-150	60-120	
	3/32"	2.4	150-250	100-180	
	1/8"	3.2	250-400	160-250	
	5/32"	4.0	400-500	200-300	