RWMA RECOMMENDED ELECTRODE MATERIALS FOR SPOT WELDING

Using Conventional Spot Welding Methods

TO WELD SIMILAR METALS

Ferrous	Tin Plate Steel		Terne Plate Steel		Galvanized Iron Zinc Plate		Cadmium Plate Steel		Chrome Plate Steel		Stainless Steel 18-8 Type		Scaly H.R. Steel		C.R. Steel H.R. Steel (Clean)	
Read Block Under Metal To Be Welded	B	I	A	I	A	I (II)	B	I	A	II	A	III (II)	B	I (II)	A	II
	I	3	I	3	I (II)	3	I	3	II	3	III (II)		I (II)	2	II	

Non-Ferrous	Aluminum		Aluminum Alloys Dura-luminum		Cupro Nickel		Nickel Silver		Nickel		Nickel Alloys Monel Nichome (High Res.)		Brass Yellow 25-40% Zinc		Phosphor Bronze Grade A, C & D		Silicon Bronze Everdur Olympic Duronze Herculoy	
	B	I (II)	B	I (II)	A	II	B	II	A	II	A	II	B	II	A[B]	II	A[B]	II
	I (II)	2	I (II)	2	II		II		II		II		II		II		II	

TO WELD DISSIMILAR METALS

Ferrous Alloys	Stainless Steel 18-8 Type		Chrome Plate Steel		Cadmium Plate Steel		Gal-vanized Iron		Terne Plate Steel		Tin Plate Steel	
Cold Rolled Steel Hot Rolled Steel, Clean	A	II (III)	A	II	B	II	B	I	A	I (II)	B	I
	III		II	3	II	3	II	3	II	3	II	3
Tin Plate Steel	B	II (III)	B	II	B	I (II)	B	I	B	I (II)		
	I		I	3	I	3	I	3	I	3		
Terne Plate Steel	B	II	B	II	B	I (II)	B	I				
	I	3	I	3	I	3	I	3				
Galvanized Iron Zinc Plate	B	II	B	II	B	I						
	I	3	I	3	I	3						
Cadmium Plate Steel	B	II	B	II								
	I	3	I	3								
Chrome Plate Steel	A	III (II)										
	II	3										

Non-Ferrous Alloys	Nickel Alloys		Nickel		Phosphor Bronze		Silicon Bronze		Yellow Brass		Nickel Silver	
Cupro Nickel	B	II	B	II	B	II	B	II	B	II	B	II
	II		II		II		II		II		II	
Silicon Bronze EverDur-Olympic Bronze-Herculoy	B	II	B	II	B	II	A	II	B	II		
	II		II		II		II		II			
Nickel Silver	B	II	B	II	B	II	B	II				
	II	1	II		II	1	II					
Nickel Alloys	A	II	B	II								
	II		II									
Stainless Steel 18-8 Type	B	II	B	II								
	III (II)	1	II (III)									

Non-Ferrous Alloys	Aluminum	
Aluminum Alloys Duraluminum	B	I (II)
	I (II)	2

LEGEND

BLOCK INTERPRETATION

Weld-ability	Electrodes Against ⬆
Electrodes ⬅ Against	Special Information

WELDABILITY
A-Excellent
B-Good

ELECTRODES, RWMA Specifications
I = Group A, Class 1 - TUFFALOY 88
II = Group A, Class 2 - TUFFALOY 77 & TUFFALOY Z
III = Group A, Class 3 - TUFFALOY 55
Materials indicated in circles are second choice, example (II)

SPECIAL INFORMATION
1 - Special conditions required
2 - Good practice recommends cleaning before welding
3 - If plating is heavy, weld strength is questionable.

Data based on Resistance Welding Equipment Standards, Bulletin 16, a publication of the Resistance Welder Manufacturers Association.

MINIMUM PHYSICAL PROPERTIES FOR RWMA ALLOYS

Published Standards of the Resistance Welder Manufacturer's Association

		Class	TUFFALOY Number	Proportional Limit Tension P. S. I.	Hardness Rockwell	Conductivity Percent I. A. C. S.	Ultimate Tensile Strength P. S. I.	Elongation Percent In 2′ or 4′ Diameter
GROUP A Copper Base Alloys	ROUND RODS Up to 1″ dia.	1	88	17,500	65-B	80	60,000	13
		2	77	35,000	75-B	75	65,000	13
		3	55	50,000	90-B	45	100,000	9
	1″ to 2″ dia.	1	88	15,000	60-B	80	55,000	14
		2	77	30,000	70-B	75	59,000	13
		3	55	50,000	90-B	45	100,000	9
	2″ to 3″ dia.	1	88	15,000	55-B	80	50,000	15
		2	77	25,000	65-8	75	55,000	13
		3	55	50,000	90-B	45	95,000	9
	BARS Square Rectangular Hexagon Up to 1″ thick	1	88	20,000	55-B	80	60,000	13
		2	77	35,000	70-B	75	65,000	13
		3	55	50,000	90-B	45	100,000	9
	Over 1″ thick	1	88	15,000	50-B	80	50,000	14
		2	77	25,000	65-8	75	55,000	13
		3	55	50,000	90-B	45	100,000	9
	FORGINGS Up to 1″	1	88	20,000	55-8	80	45,000	12
		2	77	22,000	65-B	75	55,000	13
		3	55	50,000	90-B	45	94,000	9
	1″ to 2″	1	88	15,000	50-B	80	40,000	13
		2	77	21,000	65-B	75	55,000	13
		3	55	50,000	90-B	45	94,000	9
	Over 2″	1	88	15,000	50-B	80	40,000	–
		2	77	20,000	65-B	75	55,000	12
		3	55	50,000	90-B	45	94,000	5
	All sizes	4	44	85,000	33-C	20	140,000	.5
	CASTINGS All sizes	2	77	20,000	55-8	70	45,000	12
		3	55	45,000	90-B	45	85,000	5
		4	44	60,000	33-C	18	90,000	.5
		5	66	12 to 16,000	65 to 85-B	10 to 15	65 to 75,000	2 to 10
GROUP B Refractory Metal Compositions	Rods, Bars & Inserts	10	1W		72-B	35	135,000	Ultimate Compression Strength P. S. I.
		11	10W		94-B	28	160,000	
		12	20W		98-B	27	170,000	
		13	100W		69-A	30	200,000	
		14	100M		85-B	30		