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Weld Schedule Guide

RECOMMENDED ELECTRODE MATERIALS

The process of resistance welding makes it possible to join most metals, similar or dissimilar. Bonds of adequate strength are obtainable for an extremely wide range of applications. Selecting electrodes of the proper alloy is a most important consideration in producing good welds at the required speed. The chart below is a valuable guide to this selection.

The weldability of two materials as expressed in the following chart has been derived after careful laboratory study and field survey of many factors which influence the welding or resultant weld of the metals. The factors include:

1. Thermal and electrical conductivity
2. Metallurgical properties
3. Nature of resultant weld or alloy
4. Weld strength
5. Relative accuracy in control of welding conditions necessary

The weldability of metals as shown in the chart applies only when conventional spot welding methods are used on similar thicknesses of material. However, many metal combinations which are listed as having a "poor weldability" may be satisfactorily joined by using a special setup or procedure.

There is a CMW® Alloy for each specific welding application. Experienced CMW engineers will provide assistance with special problems.

Electrode Materials For SPOT WELDING Similar and Dissimilar Metals

	Tungsten Molybdenum	Magnesium	Nickel Alloys	Nickel	Stainless Steel	Chrome Steel	Cadmium Plate	Galvanized Steel Zn. Plate	Terne Plate	Tin Plate	Scaly Steel	C. R. Steel	Phosphor Bronze	Silicon Bronze	Nickel Silver	Cupro Nickel	Brass Yellow	Brass Red	Copper	Aluminum Alloys	Aluminum	C. P. Titanium
Commercially Pure Titanium																						A II (III) / II (III) 1
Aluminum 2S-3S			C I 1 5	E II 2 5	E II 2 3	H I 2 3 4	H II 3 8	E I 3 4 9	D I 3 4 9	D I 3 4 9	D I 3 4 9	E II 3 4	D II 2 5	D II 2 5			D II 5	E II 2	H V 2	C I 1	C I 1	
Aluminum Alloys Duralumin 52S-17S-24S			C I 1 5	E II 2	E II 2 3	H I 2 3 4	H II 3 8	E I (6) 3 4 9	D I 3 4 9	D I 3 4 9	D I 3 4 9	E II 3 4	D II 2 5	D II 2 5			D II 6	E II 2	E V 2	D I 1		
Copper—Pure	H II V 3	H V 5	E II V	E II V 3 6	H I V 2 3 4	H II V 3 4	H (6) V 3 9	H I V 3 4 9	H I V 3 4 9	H I V 3 4 9		H II V 3 4	D II V 5 6	D II V 5 6	D II V 5 6	D II D 5 6	D II V 6	E II V 6	K V 2			
Brass—Red 5-25% Zinc		H II 5	I V 6	D II V 6	D II V 6	H II V	H (6) V	H I V 6	H I V 6	H (6) V 6		H II 3 4	D II V 6	D II V 6	D II V 6	D II V	D II	E II 5 6				
Brass—Yellow 25-40% Zinc		E II 5	I IV 6	D II 6	D II IV	H II IV	H II IV 6	E (6) IV 6	E I IV 6	E (6) IV 6		E II 3 4	C II IV 1	C II IV 1	C II IV 1	C II IV 1	C II II 1					
Cupro-Nickel		D I II 2 5	C II II	C VI II	E (1) II 2	E II II 2 8	E (6) II 2	E I II 2	E (6) II 2	E I II 2	H (6) II 7	E II II 3	C II II 1	C II II 1	C II II	B II II 1						
Nickel Silver		D I II 2 5	C II II	C VI II	E (1) II 2	E II II 2 8	E (6) II 2	E I II 2	E (6) II 2	E I II 2	H (6) II 7	E II II 3	C II II 1	C II II 1	B II II 1							
Silicon Bronze		D I II 2 5	C II II	D II II	E (1) II	E II II 8	E (6) II	E I II	E (6) II	E I II	H (6) II 7	D II II 3	C II II 1	B II II 1								
Phosphor Bronze Grades A, C, & D		E I II 2 5	D II II	D II II	E (1) II	E II II 8	E (6) II	E I II	E (6) II	E I II	H (6) II 7	D II II 3	B II II 1									
C. R. Steel H. R. Steel—Clean	D II II 3			D II II 3	D II II 3	B II III	B II II 8	C II II	C I II	B (1) II 6	C I II	E (6) II 7	A II 1									
Scaly H. R. Steel	H II (6) 3 7					D II (1) 7	D II (1) 7 8	D II (II) 7	D I (6) 6 7	D I (II) 6 7	D I (1) 6 7	E I (6) 7										
Tin Plate	E II I 9	E I 5 9	D I I 3 9	D II I 9	C (1) I	C II I 8	D (6) I 9	C I I 6 9	D I I 6 9	D (6) I 6 9												
Terne Plate	E II (6) 9	E I 5 9	D I I 3	D II I 9	C II I	C II I 8	C (6) I	C I I 6	C I I 6													
Galvanized Steel Zinc Plate	E II I 9	E I (6) 5 9	D I (II) 3	D II II 9	C II I	C II I 8 9	C I I 9	C (1) I 9														
Cadmium Plate	E II I 9	E I 5	D I I 3	D II I 9	C II I	C II I 8	C I I 9															
Chrome Plate	D I I 8			D II II 8	D II II 8	B III II 8	(6) B II 8															
Stainless Steel 18-8 Type	D I I 2 5			D II II	D III II	A III (II) 1																
Nickel Grade A	D II II 2 5			C II II 1	B II II 1																	
Nickel Alloys Monel Nichrome (High Res.)	D II II 2 5			B II II 1																		
Magnesium Alloys		D I I 1 5																				
Molybdenum Tungsten	D II II 2 5																					

WELDABILITY

As a basis for comparison cold rolled (mild) steel has been chosen and its weldability designated as "excellent."

A - Excellent
B - Very Good
C - Good
D - Fair
E - Poor
H - Very Poor
K - Impractical

ELECTRODES

I - RWMA CLASS 1
II - RWMA CLASS 2
III - RWMA CLASS 3
IV - RWMA CLASS 11 - 10W
V - RWMA CLASS 14 - 100M*
VI - RWMA CLASS 10 - 1W △

*100W may be substituted.
△ RWMA CLASS 11 may be interchanged.
○Electrode materials in circles are second choice.

BLOCK INTERPRETATION

WELD-ABILITY	ELECTRODE AGAINST
ELECTRODE AGAINST	SPECIAL INFORMA-TION

ELECTRODES

I - RWMA CLASS 1
II - RWMA CLASS 2
III - RWMA CLASS 3
IV - RWMA CLASS 11 - 10W
V - RWMA CLASS 14 - 100M*
VI - RWMA CLASS 10 - 1W △

*100W may be substituted.
△ RWMA CLASS 11 may be interchanged.
○Electrode materials in circles are second choice.

SPECIAL INFORMATION

1. Good weld strength.
2. May be welded under special conditions.
3. Low weld strength.
4. No actual weld nugget occurs, a "stick" is obtained.
5. Welding conditions must be accurately controlled.
6. Keep electrode clean to prevent sticking to the work.
7. Good practice recommends cleaning steel before welding.
8. Use one flat tip to minimize distortion or discoloration.
9. Coating may dissolve in other metals or burn away.