

SPOT WELDING DATA

OPTIMUM CONDITIONS

SCHEDULES FOR SPOT WELDING LOW CARBON STEEL—SAE 1010

Thickness of Thinnest Outside Piece (Inches)	Electrode Diameters and Shape*			Recommended Minimum Standard Electrode Size	Weld Force (Lbs.)	Weld Cycles (60 Cycles per Sec.)	Hold Time (Cycles) Min.	Welding Current (Amps.) (Approx.)	Weld Shear Strength (For Steels Having Ultimate Tensile Strength of 90,000 psi and below) Minimum Strength (Lbs/Weld)	Diameter of Fused Zone (Approx.) Dw (Inches)	Minimum Weld Spacing S (Inches)	Minimum Contacting Overlap L (Inches)
	Flat Face		Radius Face									
	Maximum d (Inches)	Min. D (Inches)	Radius R (Inches)									
0.010	0.125	1/2	2	4RW 1MT	160	4	5	4,000	130	0.113	1/4	3/8
0.021	0.187	1/2	2	4RW 1MT	244	6	8	6,500	300	0.139	3/8	7/16
0.031	0.187	1/2	2	4RW 1MT	326	8	10	8,000	530	0.161	1/2	7/16
0.040	0.250	5/8	3	5RW 2MT	412	10	12	8,800	812	0.181	3/4	1/2
0.050	0.250	5/8	3	5RW 2MT	554	14	16	9,600	1,195	0.210	7/8	9/16
0.062	0.250	5/8	3	5RW 2MT	670	18	20	10,600	1,717	0.231	1	5/8
0.078	0.312	5/8	3	5RW 2MT	903	25	30	11,800	2,365	0.268	1-1/8	11/16
0.094	0.312	5/8	4	7RW 3MT	1,160	34	35	13,000	3,054	0.304	1-1/4	3/4
0.109	0.375	7/8	4	7RW 3MT	1,440	45	40	14,200	3,672	0.338	1-5/16	13/16
0.125	0.375	7/8	4	7RW 3MT	1,760	60	45	15,600	4,300	0.375	1-1/2	7/8
0.156	0.500	7/8	6	Male or Female Threaded	2,500	93	50	18,000	6,500	0.446	1-3/4	1
0.187	0.625	1	6	Male or Female Threaded	3,340	130	55	20,500	9,000	0.516	2	1-1/2
0.250	0.750	1-1/4	6	Male or Female Threaded	5,560	230	60	26,000	18,000	0.660	4	1-1/2

PERMISSIBLE SCHEDULE VARIATIONS FOR SPOT WELDING LOW CARBON STEEL

Low Carbon Steel Spot Welding Data Chart—Single Impulse Welding

DATA COMMON TO ALL CLASSES OF SPOT WELDS					WELDING SET-UP FOR BEST QUALITY—CLASS A WELDS					WELDING SET-UP FOR MEDIUM QUALITY—CLASS B WELDS					WELDING SET-UP FOR GOOD QUALITY—CLASS C WELDS				
Thickness of Each of the Two Work Pieces (Inches)	Electrode Diam. & Shape		Min. Weld Spacing (Note 4) (Inches)	Min. Contacting Overlap (Note 6) (Inches)	Weld Time (Note 7) (Cycles)	Electrode Force (Pounds)	Welding Current (Amps.)	Diam. of Fused Zone (Inches)	Average Tensile Shear Strength ±14% (Pounds)	Weld Time (Note 7) (Cycles)	Electrode Force (Pounds)	Welding Current (Amps.)	Diam. of Fused Zone (Inches)	Average Tensile Shear Strength ±17% (Pounds)	Weld Time (Note 7) (Cycles)	Electrode Force (Pounds)	Welding Current (Amps.)	Diam. of Fused Zone (Inches)	Average Tensile Shear Strength ±20% (Pounds)
	Min. D (Inches)	Max. d (Inches)																	
.010	1/2	1/8	1/4	3/8	4	200	4000	.13	235	5	130	3700	.12	200	15	65	3000	.11	160
.021	1/2	3/16	3/8	7/16	6	300	6100	.17	530	10	200	5100	.16	460	22	100	3800	.14	390
.031	1/2	3/16	1/2	7/16	8	400	8000	.21	980	15	275	6300	.20	850	29	135	4700	.18	790
.040	5/8	1/4	3/4	1/2	10	500	9200	.23	1305	21	360	7500	.22	1230	38	180	5600	.21	1180
.050	5/8	1/4	7/8	9/16	12	650	10300	.25	1820	24	410	8000	.23	1700	42	205	6100	.22	1600
.062	5/8	1/4	1	5/8	14	800	11600	.27	2350	29	500	9000	.26	2150	48	250	6800	.25	2050
.078	5/8	5/16	1-1/8	11/16	21	1100	13300	.31	3225	36	650	10400	.30	3025	58	325	7900	.28	2900
.094	5/8	5/16	1-1/4	3/4	25	1300	14700	.34	4100	44	790	11400	.33	3900	66	390	8800	.31	3750
.109	7/8	3/8	1-5/16	13/16	29	1600	16100	.37	5300	50	960	12200	.36	5050	72	480	9500	.35	4850
.125	7/8	3/8	1-1/2	7/8	30	1800	17500	.40	6900	60	1140	12900	.39	6500	78	570	10000	.37	6150

NOTES:

- Low Carbon Steel as hot rolled, pickled, and slightly oiled with an ultimate strength of 42,000 to 45,000 PSI Similar to SAE 1005—SAE 1010.
- Electrode Material is CMW® 3.
- Surface of steel is lightly oiled but free from grease, scale or dirt.
- Minimum weld spacing is that distance for which no increase in welding current is necessary to compensate for the shunted current effect in adjacent welds.

- Radius Face electrodes may be used:
0.010 to 0.031 — 2" Radius
0.031 to 0.078 — 3" Radius
0.078 to 0.125 — 4" Radius



- Weld time is indicated in cycles of 60 cycle frequency.

- Tensile shear strength values are based on recommended test sample sizes:

Direction of Force	Thickness	Width	Length
	.000" to .029"	5/8"	3"
	.030" to .058"	1"	4"
	.059" to .115"	1-1/2"	5"
	.116" to .190"	2"	6"

- Tolerance for machining of electrode diameter "d" is ±.015" of specified dimension.
- Electrode force does not provide for force to press ill-fitting parts together.