

SPOT WELDING DATA

Resistance Welding is the joining of metals by applying pressure and passing current for a length of time through the metal area which is to be joined, making it melt, holding it under pressure for proper cooling for it to form a solid weld nugget.

Advantages: This weld method is one of the fastest cost effective methods of welding. It is safe, easy to use and provides high production from easily repeatable equipment.

Uses: Spot Welding is used by all types of metal fabricators from sheet metal shops to appliance manufacturers, automobile, and aerospace companies to weld a wide variety of alloys and shapes. Almost all conductive alloys can be Resistance Welded. Examples are: Steels, Aluminum, Titanium, Brass, and Copper etc.

Theory of Operation: The resistance between two contacting parts is the highest where they touch, this is known as the interface resistance. As the current flows between the weld electrodes it causes the highest heat at this "interface" resistance. Thus it becomes red-hot melts and forms a molten pool held between the electrodes and the un-melted base metals. A timer stops Weld current just before the molten pool explodes the metal. The cooled electrodes quickly solidifies the red-hot metal to form a solid weld nugget.

Variables Are: Pressure – Heat – Time - & Electrodes.

Pressure - in pounds force

Heat – in amps or kamps

Time – in cycles (60 cycles = 1 Second)

Electrodes – alloys, shape, conductivity, and hardness etc.

Applications: To determine a beginning point for welding consult, a weld chart for recommended settings for the alloy, gauge size and other variables of the part to be welded. Approximate values of the above "variables" can be determined.

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Set-up: Preset as many variables as possible on the equipment prior to trying a weld. Usually the Pressure, Weld Time, Electrode material and size weld tip or projection weld die can be predetermined. The main last variable is "Current"; this should be started low and gradually increased to provide the desired results. (Safety dictates starting low)

If weld current meters are available they should be used to record the actual KAMP weld current being used. Today, weld checkers for on line inspection of current are available. Output can be to a warning light, buzzer or lockout circuit. Also RS-422 computer output data is available for quality control.

Spot Welding: Requires the use of proper diameter weld tips for the gauges being welded. Usually it is assumed welding equal thickness and thus the tips are same diameter. If a thick part is welded to a thin part, the larger tip dia. should be on the thick part.

Projection Welding: Projection welding requires one of the parts to have embossments punched into it to provide area of concentration for the "interface" resistance to help start the weld heat in the proper location. The Size, Height, Length, and location of the projections is very important. Projection Welding relies totally on the Size of the Projection to provide the proper weld size. Weld strength is a function of projection height and uniformity. Note the projection should always be placed in the "Thicker" material part. The weld will be no stronger than the thinnest material part.

Butt & Flash Welding: The most common butt-welding is for rods or bars end to end, or parts of equal cross section. Jaws grab the parts and force them together during a current flow. A higher force forges the parts together.

Seam Welding: Rotating wheels carry the current to an overlap joint and a series of spot welds are made close together to provide a continuous gas tight joint. Automobile gas tanks and heat exchangers are typical parts, which are seam welded.