PROJECTION WELDING MADE EASY!

Projection Welding is a deluxe form of spot welding. Spot welding relies on the diameter of the weld tip to concentrate the weld current to make a weld. The alloy of the electrode and it's size are very important. Assuming proper settings of weld current, pressure and weld time, a quality spot weld can be made easy!

For projection welding, the weld size, penetration, pull strength and overall quality depends mostly on the projection in the parts to be welded. If the projections are not of a large enough size, or height, a poor weld will result. If the projections are the wrong shape, or in the wrong place, poor results will be assured.

Other problems found in projection welding are from projections being "too short". The next most common is too small a diameter. Projections should be formed in the parts and provide full material thickness at the protrusion. They should not be "coined out" as in a knock out box with sharp edges. If so, the dimple will weld to the mating part and low weld strength will result.

The thickness of the material to be welded and it's alloys should be studied and then the data for the correct projection size be located in the RWMA Handbook, or other tables showing the sizes which have been proven to work on these materials. Slight variations from charts are usable, but staying with proper height projection can not be stressed to much!

The weld pressures must be set close to the proper values. If the weld head slams down and pushes back the projections before current is applied, poor results can be expected.

The Weld electrodes or dies for projection welding must completely cover the part with about a 20% overlap. Remember the old saying of the.."pressure and current line must be aligned." This means that pressure over and under both parts must support the material to forge them together, during the weld and as it cools. Die alignment covering the projection is important, and the die faces must be parallel. A proper projection weld will have the parts in full contact with no air gap.

Multiple projection welding requires that all the dimples be as close as practical to the same size, height and shape. If one or more dimples are lower or not equal by more than about .005 or (3%) for gauges up to 12 gauge, a poor weld can result. Parts must be checked regularly to avoid welding improperly punched parts. Insufficient heating of the opposite material results when the projections are not correct.

Multiple projection values of current and pressure need to be determined carefully. The Weld Time is the same for multiple projection. But, weld force and current have to be increased. The use of up-slope current, quench and temper and pulsation, in some cases, can help projection welding, especially in thicker materials.

Projection welding results in lower electrode maintenance, welds can be placed closer together, and a larger number of welds can be made in heavier materials easily with less welding current than single spot welding. Properly applied, projection welding provides many advantages for metal joining.

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ITEMS YOU SHOULD HAVE IN YOUR SPOT WELDING DEPARTMENT

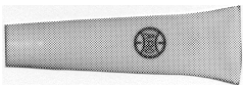
After visiting some facilities recently, I kept seeing the same problem. Many spot welding users are unaware of the equipment available for dressing electrodes. The electrode diameter is very important and the wrong tip diameter will cause uneven heating, ending in bad welds. I have compiled a list of the minimum amount of equipment that I feel a facility who spot welds should have to make good welds.

SUGGESTED REQUIRED EQUIPMENT

A. **NVHS-4500-NO4 "TIP DRESS LOCKOUT VALVE"**
ALL WELDERS SHOULD HAVE A "TIP DRESS VALVE"
This valve releases air pressure from the cylinder quickly (90 degree turn) lowering the electrodes for dressing. Dressing is accomplished easily using less time. This valve is also ideal for checking tip alignment. The valve also provide a lockout capability for maintenance or repairs.

B. **RATCHET TIP DRESSER, 601-0102**
With it's multi fluted cutter electrodes are dressed faster and with less effort. This dresser removes mushroomed portions and renews pointed and dome electrodes to their proper operating contour.

C. **2" RADIUS TIP FILE WITH HANDLE, 601-0120**
To use between regular dressings insuring correct tip diameter and shape. Each welder should have it's own tip file, preferably attached to the welder.



D. **CONDUCTIVE TIP LUBRICANT, 93790201**
Seals tapers and eliminates water leakage without reducing conductivity, also makes tips easier to remove, preventing galling of the electrode. (Do Not Use Teflon Tape!)

SUGGESTED ADDITIONAL EQUIPMENT

A. **SPOT WELDING EDUCATION KIT**
Kit contains RWMA pocket reference for spot welding. New 1994 CMW catalog of electrodes, holders and accessories. Data sheets for spot welding of CRS, Stainless Steels and Galvanized Steel. New welders installation guidelines.

B. **TIP FORCE GAUGE** 8020 0-2000 Lbs. with Red Pointer Hand and Hard Plastic Storage Case The three requirements for making spot welds are Pressure, Heat and Time. Know your tip pressure. Don't get caught without one. (available in ranges from 500-10,000 LBS)

C. **MM-315A HAND HELD WELD CHECKER**
Know your actual welder outputs! The MM-315 measures Cycle time and Kilo Amps of each weld, comes with battery charger, carrying case and 8 inch flexible pick up coil.

D. **MM-121B Weld Checker** is a precision monitor for resistance spot welders, measuring both weld current and cycles. These measured values, displayed digitally are compared against current and cycle parameters set by the user. 15 unique programmable schedules are available.

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