ELECTRODE MAINTENANCE

This Chart graphically shows the importance of Electrode maintenance. This is not only important from the quality of the weld, which is of the first importance, but also the extra load added to the welding machine and equipment. Read the data on the chart, you can then draw your own conclusions.

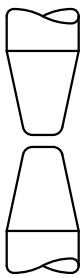
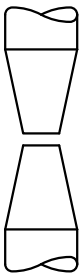
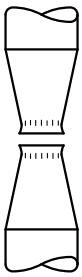
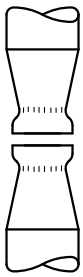
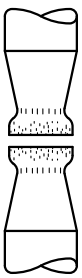
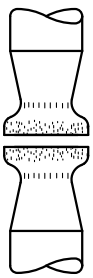
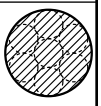
YOU CAN'T AFFORD TO NEGLECT YOUR ELECTRODES!

We can supply you with Tip Files, hand operated Tip Dressers or Pneumatic Power Driven Dressers. Design or type will depend on your production requirements.

A TIP DRESSER WILL PAY DIVIDENDS!

Keep your Electrodes dressed for maximum production and quality welds.

RESISTANCE WELDING

400% TOO SMALL **(A)**	PROPER NEW TIPS **(B)**	56% TOO LARGE **(C)**	125% TOO LARGE **(D)**	300% TOO LARGE **(E)**	525% TOO LARGE **(F)**	800% TOO LARGE **(G)**
						
Approx. ⅛ th sq. in. at ⅛" Dia. 	Approx. 1/20 th sq. in. at ¼" Dia.	Approx. 1/13 th sq. in. at 5/16" Dia. 	Approx. 1/9 th sq. in. at ⅜" Dia. 	Approx. ⅕ th sq. in. at ½" Dia. 	Approx. ⅓ rd sq. in. at ⅝" Dia. 	Approx. ½ sq. in. at ¾" Dia. 
2,460 Amperes only would be required (†)	9,823 Amperes only would be required (†)	15,337 Amperes only would be required (†)	22,100 Amperes only would be required (†)	39,300 Amperes only would be required (†)	61,350 Amperes only would be required (†)	88,500 Amperes only would be required (†)
127,640 lbs. sq. in. Pressure (*)	31,960 lbs. sq. in. Pressure (*)	20,470 lbs. sq. in. Pressure (*)	14,200 lbs. sq. in. Pressure (*)	7,990 lbs. sq. in. Pressure (*)	5,120 lbs. sq. in. Pressure (*)	3,500 lbs. sq. in.. Pressure (*)
RESULT: Four times too much pressure & current. Very severe indentation and splitting from high current density. **CORRECTION:** Cut pressure to ¼ Cut current to ¼	**RESULT:** Correct pressure, current & tips. Excellent weld. This is the size tip (new) for which the pressure time and current are adjusted.	**RESULT:** Only 60% of proper pressure & current. Borderline weld. Lower strength. Last diameter size tolerated unless current & pressure were set between the ¼ and 5/16 size tips.	**RESULT:** Only 45% of the required pressure and current. Welds would be unacceptable. If the current or time were increased with tips in this condition a large weak weld would result.	**RESULT:** Only 25% of the required pressure and current. No weld would be made if tips were left in this condition.	**RESULT:** Only 16% of the required pressure and current. This is a very serious condition and the only cure is to dress the tips back to (B) condition.	**RESULT:** Only 11% of the required pressure and current. This is an absurd (though often seen) condition that only heats a spot.

(†) Current density required for this gauge to be 200,000 amps. per square inch. Setting is 9,900 amps. for condition (B).
(*) Five inch diameter air cylinder A, 80 Lbs. air pressure - 1,570 Lbs. on ram.

Proper Maintenance of Spot and Projection Welding Electrodes

ELECTRODES FOR PROJECTION WELDING

To insure accurate alignment for good contact and quality welds, electrodes for projection welding should be located directly on the center-line of pressure application. In addition to producing faulty welds, misaligned electrodes can result in damage to the electrode face (Figure 1).

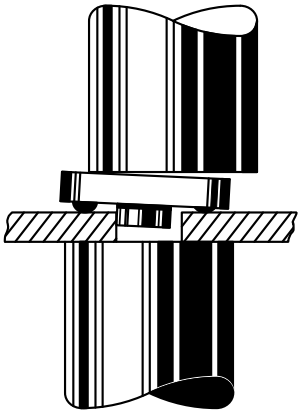


Fig. 1

Misaligned electrodes cause unbalanced pressure which results in a poor weld.

Another major contributor to a bad weld is non-parallel electrode faces. They cause unbalanced pressure on electrodes which results in expulsion of weld metal during weld cycle. This damages threads and can burn electrode insulation when welding screws through the parent metal. In addition, non-parallel faces cause weld nuts to skid against parent metal during weld, resulting in a burned pilot with distorted threads and possible misalignment with mating parts (Figure 2).

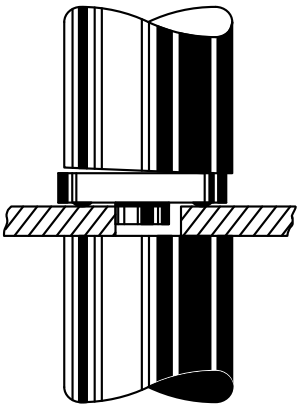


Fig. 2

Non-parallel electrodes cause skidding of the part which results in burned pilot with distorted threads.

MAINTENANCE TIPS

DO ... maintain a standby supply of electrodes at the welder to minimize downtime due to electrode change.

... dress the face of electrodes on a lathe.

... use an RWMA, Group A, Class 3 copper on the sheet side.

DON'T ... use a file to dress electrodes (uneven face will result in either a limited weld or expulsion of weld metal).

... store electrodes where face damage can result.

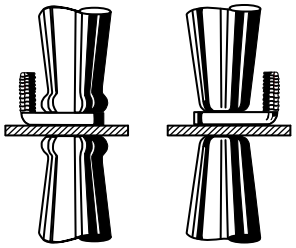
... use a pipe wrench to remove the electrodes.

ELECTRODES FOR SPOT WELDING

In spot welding, the heat concentration depends on the size and shape of the electrode tips. The weld is made by passing current through the entire area under the electrode tip. The smaller spotweld electrode tip diameters erode or mushroom much faster than projection weld electrodes; consequently, they must be dressed regularly to maintain proper contact (See Figure 3).

Fig. 3

Mushroomed tips produce poor, weak welds.



Electrodes properly dressed to insure uniform contact and sound welds.

MAINTENANCE TIPS

DO ... maintain a standby supply of electrodes at the welder.

... dress electrodes periodically with an approved spotweld tip dresser.

... change tip diameters to adjust to each thickness of metal to be welded.

DON'T ... use a file to dress electrodes (distorted face will lead to faulty weld).

... store electrodes where face damage can result.

... use a pipe wrench to remove the electrodes.

GENERAL TIPS

- To assure perfect alignment, both the faces and the axis of the electrodes must be parallel. This can be checked by inserting between the electrodes a piece of carbon and a piece of plain white paper and applying pressure. The resulting impression on the plain paper will indicate the extent and uniformity of the surface contact between the two faces.
- Utilize a water jacket when necessary and locate it as close to the welding surface as possible.
- Keep material to be welded free of oil, film, dirt and other foreign matter
- Follow the correct weld schedule.

RWC RESISTANCE WELDING ELECTRODES AND HOLDERS

DO'S	DON'TS
1. Use the proper electrode material for the job you are doing.	1. Never use unidentified electrodes or electrode material.
2. Use standard electrodes whenever possible.	2. Avoid special, offset or irregular tips when the job can be done with a standard straight tip.
3. Use the most suitable tip diameter for the thickness of stock being welded.	3. Don't use small tips on heavy gauge welding jobs or large tips on small work.
4. Use open sight drains to observe more readily the water flow through the holders.	4. Don't forget to turn on the cooling water full force before starting to weld.
5. Connect the water inlet hose to the proper holder inlet so that the water flows through the center cooling tube first.	5. Never use water hose that will not fit the holder water connection nipples snugly.
6. Internally cool the spot welding tips with cool water flowing at a rate of at least 1½ gallons per minute through each tip.	6. Do not allow water connections to become leaky, clogged or broken.
7. Be sure the internal water cooling tube of the holder projects into the tip water hole to within ¼" of the tip hole bottom.	7. Avoid using holders with leaking or deformed tapers.
8. Adjust the internal water cooling tube of the holder to the proper height when changing to a different length tip.	8. Never use electrode holders that do not have an adjustable internal water cooling tube.
9. Be sure top end of adjustable water cooling tube in holders is cut at an angle so as to avoid jamming tip down and shutting water off.	9. Do not permit adjustable water tube to be "frozen" by accumulation of deposits. A few drops of oil periodically will keep the tube free.
10. Place a thin film of Koperkote® grease on the tip taper prior to inserting in the holder, to make it easier to remove.	10. Do not allow electrodes to remain idle in tapered holder seats for extended periods.
11. Use ejector type holders for easy removal of tips and to avoid damage to tip walls.	11. Don't use pipe wrenches or similar tools to remove electrodes.
12. Keep the tip taper and holder taper clean, smooth and free of foreign deposits.	12. Avoid using white lead or similar compounds to seal a leaking taper.
13. Dress spot welding electrodes frequently enough to maintain the weld quality.	13. Never permit a spot welding tip to mushroom enough to make dressing difficult.
14. Dress electrodes in a lathe to their original contour whenever possible.	14. Never use a coarse file to dress electrodes.
15. Use a rawhide or rubber mallet for striking holder or tips in aligning operations.	15. Don't pound on the holder or tip with a steel hammer in aligning the welder arms.
16. Provide flood cooling on both sides of the seam welding wheel.	16. Avoid the use of seam welder wheels too thin to stand the heat or pressure of the job.
17. Use properly designed knurling wheels to maintain proper seam welding wheel shape.	17. Do not permit seam welding wheel to run off the corners of the work being welded.