

## Basic Principles Of Spot Welding.

FFA # 33

The first basic welding was done by the blacksmith. He heated his metal in an open fire and pounded it together. Today we do the same thing, except we do it in a Resistance Spot Welder.

The heat is generated by the passage of current thru the metal where the copper electrodes contact. A force controlled is applied from an air cylinder (normally) to forge the heated metal together, just like the blacksmith.

Spot welding originally replaced riveting and some of the general mechanical principles also apply to spot welding.

1. Spacing of spot welds should be similar to riveting.
  - A. Not too close to the edge of a sheet.
  - B. Not too close together.
  - C. Electrodes need to be properly lined up.
  
2. The four main variables of the process are:
  - A. Current. (Current Density of weld area)
  - B. Time. (Length of Weld Current flow)
  - C. Force. (Force applied to weld area)
  - D. Tip dia. (Weld tip dia., Shape & Current Density Control)
  
3. The type of material being welded also is very important. As an example: Cold rolled steel, stainless, galvanized or aluminized, and similar ferrous metals can be resistance spot-welded very readily. On the other hand copper red brass, and other highly conductive materials are very difficult or impractical to weld. Aluminum alloys, which require 3-4 times the current of steel welding & special techniques can be welded on single-phase equipment, however almost always performed on expensive (3) phase resistance welders.

By understanding the way each variable, of current, force, weld time, tip dia, and material effects the weld the user is able to provide a proper weld for his specific part, to meet his quality and appearance requirements.

Spot welding is one of the fastest, safest and most economical methods of metal joining. We hope you will benefit from this information and help increase the use of spot welding thru the manufacture of better products properly spot-welded.

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