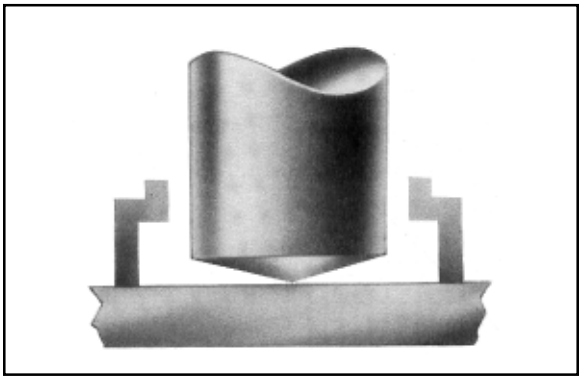
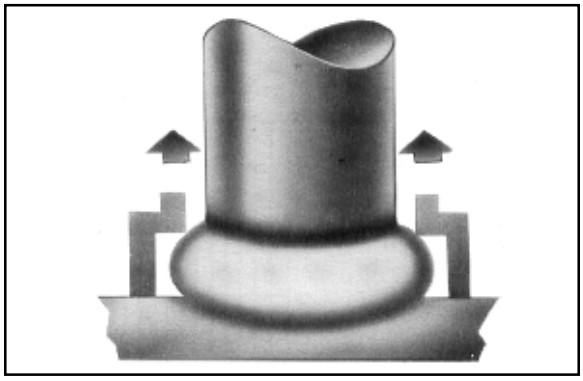
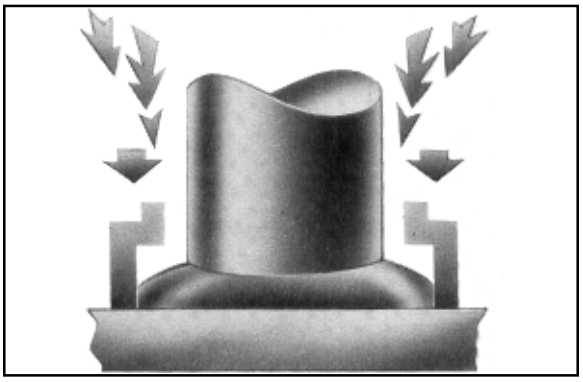
# THE ARC STUD WELDING PROCESS



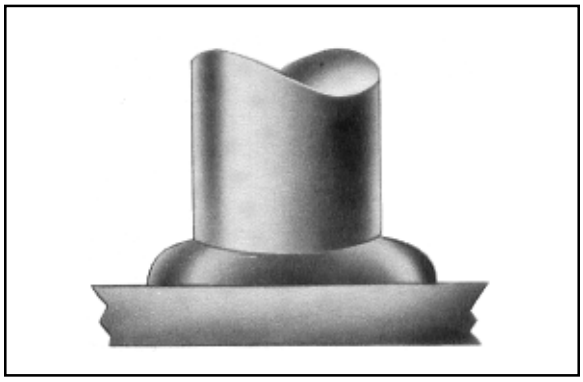
**1. STUD AND CERAMIC FERRULE AGAINST THE WORK PLATE.**



**2. STUD LIFTS AND ARC IS DRAWN.**



**3. CONTROL TIMES OUT AND STUD PLUNGES INTO MOLTEN STEEL.**



**4. METAL SOLIDIFIES AND WELD IS COMPLETED IN MILLISECONDS.**

ARC stud welding involves the same basic principles and metallurgical aspects as any other arc welding procedure. The weld gun lifts the stud a short distance from the base metal and initiates a controlled electric arc from the power source which melts the end of the stud and a portion of the base metal. The ceramic ferrule contains the molten metal into which the stud is thrust automatically and a high quality fusion weld is accomplished.

ARC stud welding is generally used to weld larger diameter studs to thick base metals. ARC studs may be almost any shape, however, they must have one end of the stud designed for ARC welding and must be made of weldable materials. Mild steel, stainless steel, and aluminum are applicable materials for ARC stud welding.

# Arc Studs - General Information

Basic engineering specifications of the studs listed in this publication are listed below.

## STUD DIMENSIONS

The length dimension (L) carried throughout these specifications is the overall length of the stud **Before Weld (BW)**. The "after weld" length will be shorter depending upon the size of the stud as shown in the following table:

| STUD DIAMETER | APPROXIMATE REDUCTION |
|---|---|
| 3/16" thru 1/2"<br>5/8" Thru 7/8"<br>1" and over | 1/8"<br>3/16"<br>1/4" |
| 1/8" wide rectangulars | 1/8" |

## MATERIALS

All studs shown in this catalog are available in mild or stainless steel. Mild steels conform to the following maximum chemical analysis:

| | | | |
|---|---|---|---|
| Carbon | 0.23% Maximum | Phosphorous | 0.040% Maximum |
| Manganese | 0.090% Maximum | Sulphur | 0.050% Maximum |

**STAINLESS STEELS:** Stainless steels most commonly used are grade 18/8.
**ALUMINUM:** In stud welding, aluminum alloy 5356 is most commonly used.
**SIZES:** Sizes not specified may be made to order upon request.

## THREADS

Threaded arc studs are rolled to UNC-2A standard. Other thread types are available upon request.

## FLUX

All studs 1/4" diameter and above are solid fluxed. Non-fluxed studs or fluxed studs with diameters below 1/4" are available upon request. See also "Capacitor Discharge Studs".
Note: rectangular shaped studs shown in this catalog are not fluxed.

## ANNEALING

Low carbon steel studs may be annealed to a Rockwell B maximum of 75 and Rockwell B maximum of 85 for stainless steel studs. Annealing is available as an option.

## MECHANICAL PROPERTIES (as cold drawn)

| STUD TYPE | MATERIAL | TENSILE (ULTIMATE) | REDUCTION IN AREA |
|---|---|---|---|
| PD, FT, FB, RB<br>TP, CL, SH, NT | C-1010/C-1020<br>ASTM-A108 | 61,000 psi Min | 50% Min. |
| R6, R7, R2 | 18-8 Stainless | 70,000 psi Min. | |
| | | | |
| HA, SC | C-1010/C-1020<br>18-8 Stainless | 65,000 psi Min.<br>70,000 psi Min. | 50% Min. |
| | AWSD1.1 & ASTM-A108 | | |
| | | | |
| DA | Low Carbon/ASTM-A496 | 80,000 psi Min. | |
| | | | |
| CD | C-1010/C01020<br>ASTM-A108<br>18-8 Stainless | 50,000 psi Min.<br><br>70,000 psi Min. | |