

RESISTANCE WELDING

Resistance Welding is a welding process, in which work pieces are welded due to a combination of a pressure applied to them and a localized heat generated by a high electric current flowing through the contact area of the weld.

No filler metal is needed.

Heat produced by the current is sufficient for local melting of the work piece at the contact point and formation of small weld pool ("nugget"). The molten metal is then solidifies under a pressure and joins the pieces.

AC electric current (3000 to 100 000 A) is supplied through copper electrodes connected to the secondary coil of a welding transformer.

The following metals may be welded by Resistance Welding:

Low carbon steels Medium carbon steels,

high carbon steels

Aluminum alloys

and Alloy steels (may be welded, but the weld is brittle)

Advantages of Resistance Welding -

- (i) Fast rate of production.
- (ii) No filler rod is needed.
- (iii) Semi automatic equipments.
- (iv) Less skilled workers can do the job.
- (v) Both similar and dissimilar metals can be welded.
- (vi) High reliability and reproducibility are obtained.
- (vii) More general elimination of warping or distortion of parts.

Disadvantages of Resistance Welding -

- (i) The initial cost of equipment is high.
- (ii) Skilled persons are needed for the maintenance of equipment and its controls.
- (iii) Bigger job thicknesses cannot be welded.

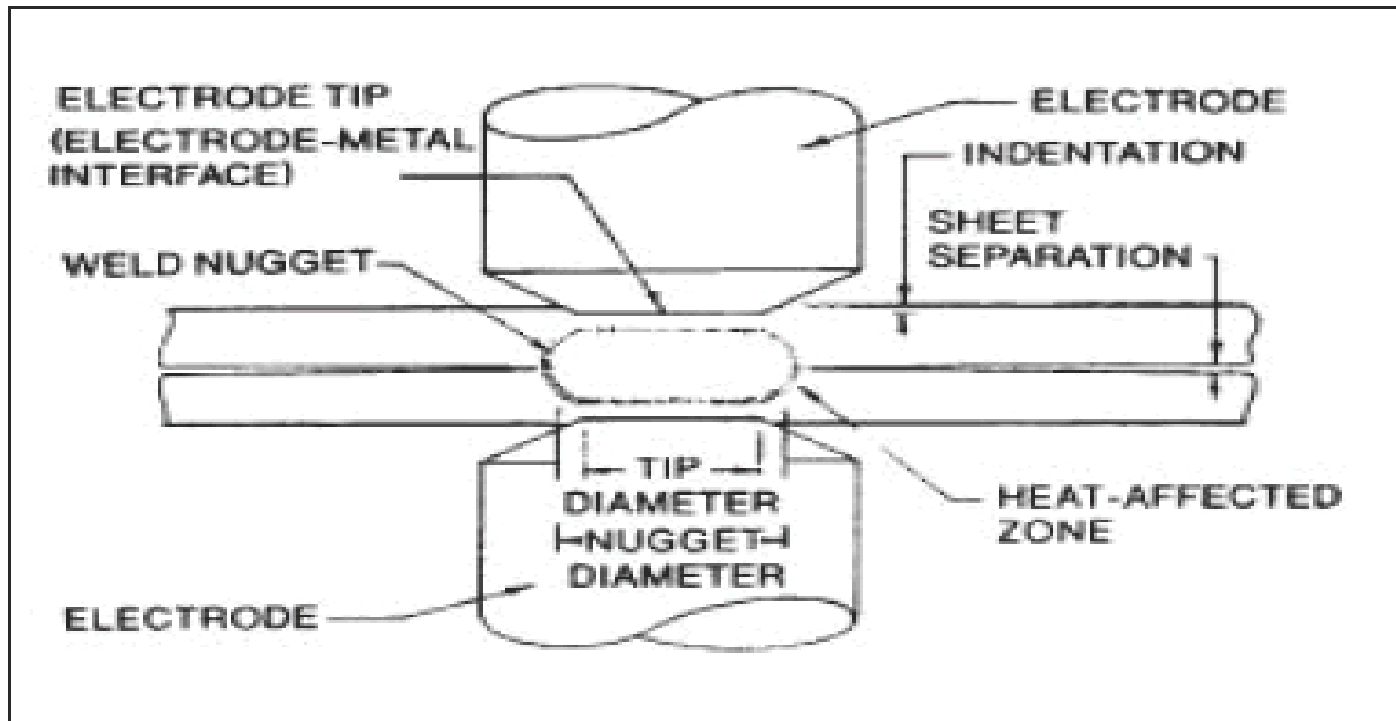
Applications of Resistance Welding

Resistance welding is used for

- (i) Joining sheets, bars, rods and tubes.
- (ii) Making tubes and metal furniture.
- (iii) Welding aircraft and automobile parts.
- (iv) Making cutting tools.
- (v) Making fuel tanks of cars, tractors etc.
- (vi) Making wire fabric, grids, grills, mash weld, containers etc.

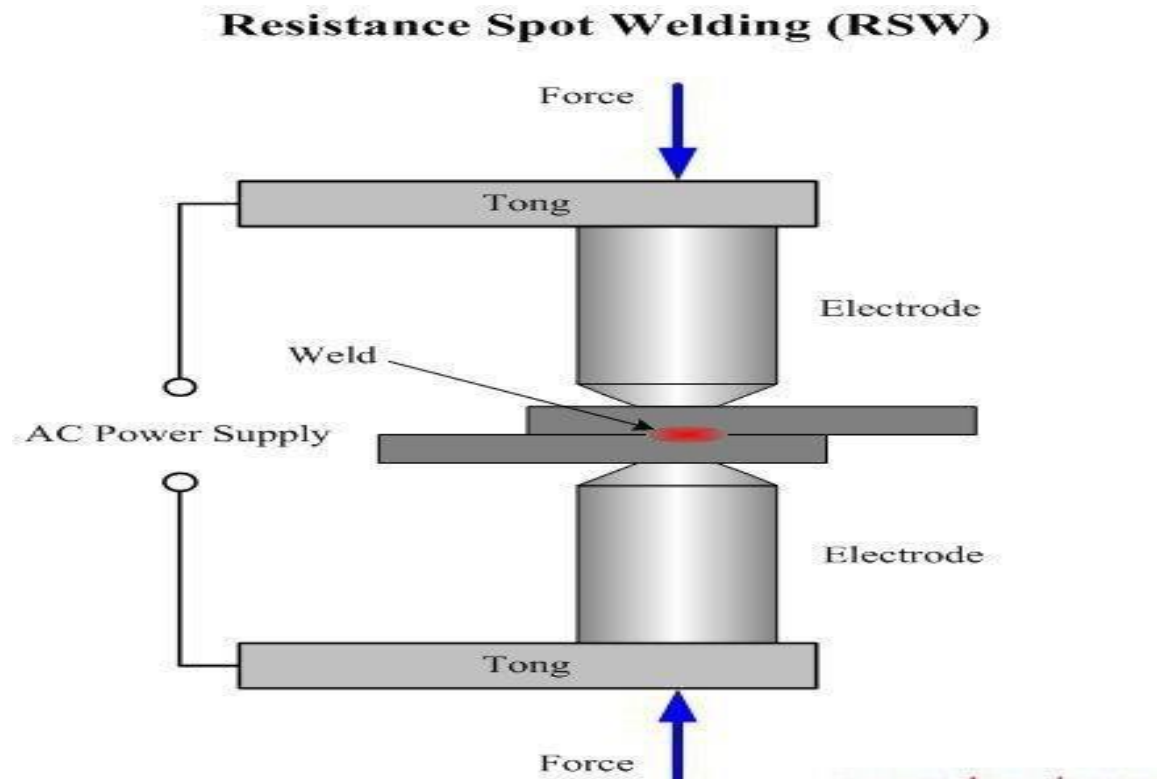
Types of Resistance Welding are:

- ❖ Spot Welding (RSW)
- ❖ Projection welding (PW)
- ❖ Seam Welding (RSEW)
- ❖ Flash Welding (FW)
- ❖ Resistance Butt Welding (UW)



Spot Welding (RSW)

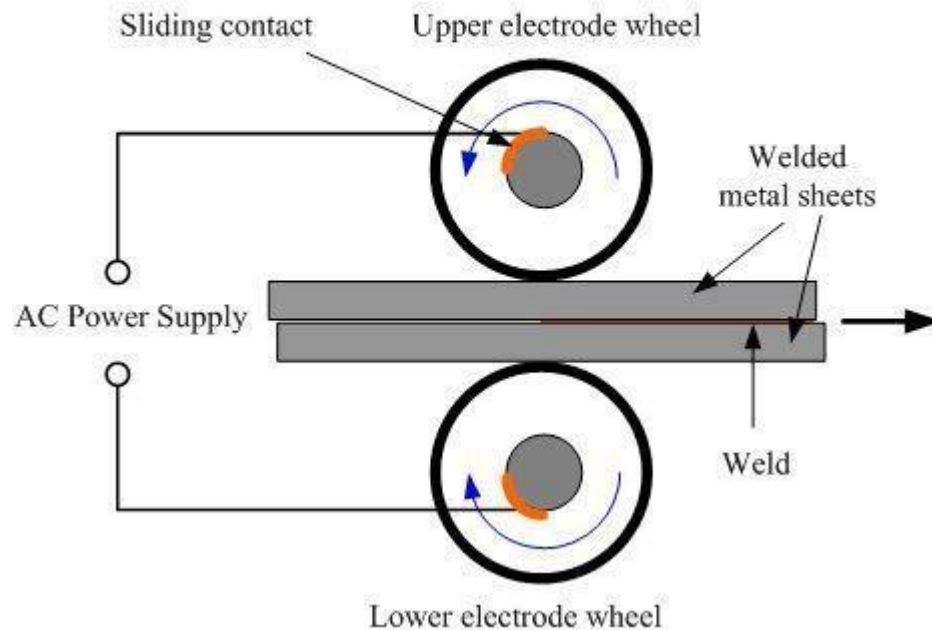
Spot welding is a resistance welding process in which overlapping sheets are joined by local fusion at one or more spots by the heat generated, by resistance to the flow of electric current through work pieces that are held together under force by two electrodes, one above and the other below the two overlapping sheets.



Seam Welding

It is the process of continuous joining of overlapping sheets by passing them between two rotating electrode wheels. Heat generated by the electric current flowing through the contact area and pressure provided by the wheels are sufficient to produce a leak-tight weld.

Seam Welding (RSEW)



Advantages

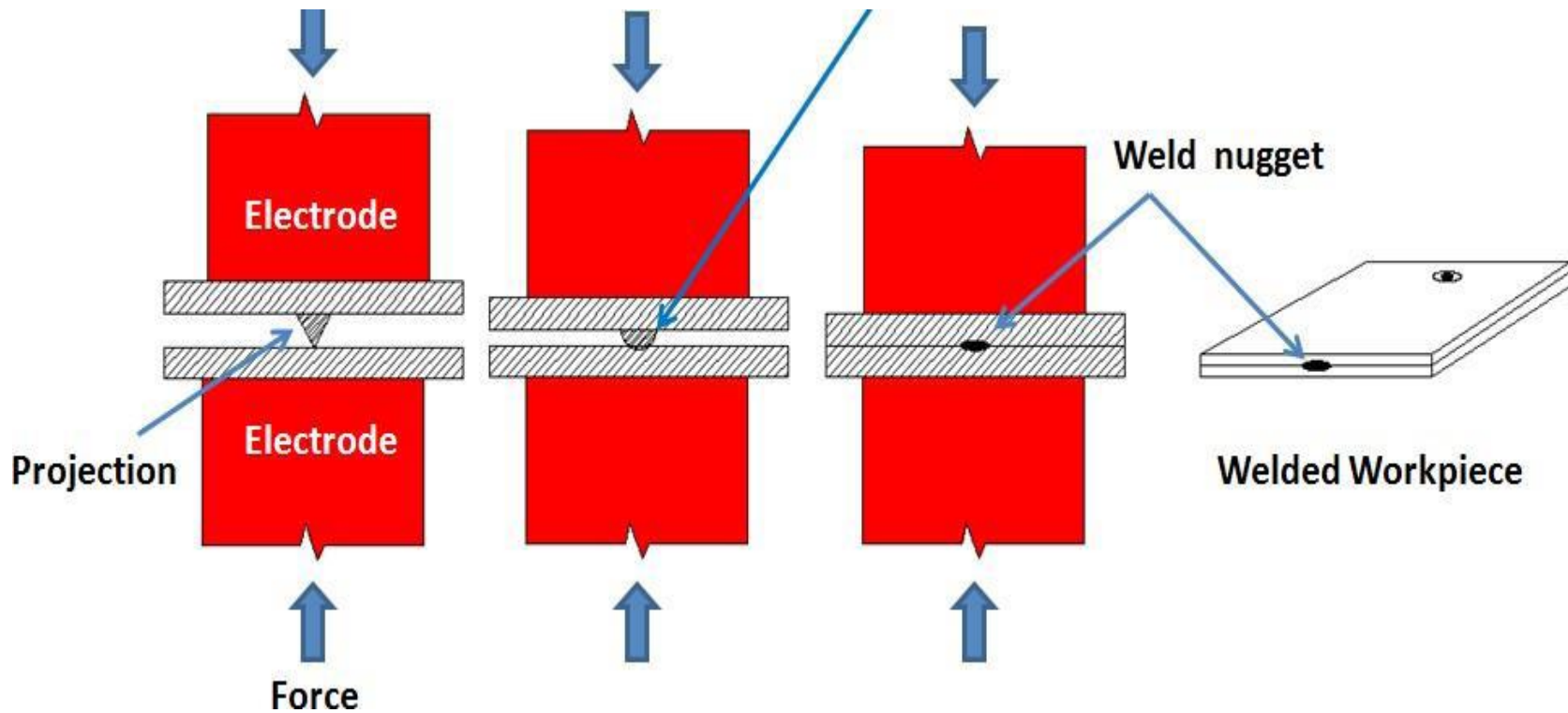
- ❑ Gas tight as well as liquid tight joints can be made.
- ❑ The Overlap is less than spot or projection welding.
- ❑ The production of single seam weld and parallel seams can be got simultaneously.

Disadvantages

- ❖ The welding process is restricted to a straight line or uniformly curved line.
- ❖ The metals sheets having thickness more than 3mm can cause problems while welding.
- ❖ The design of the electrodes may be needed to change to weld metal sheets having obstructions.

PROJECTION WELDING

In the projection welding, as per the name, different projections are formed for effective welding. Projection Welding is one of the types of resistance welding and its working principle is quite the same as the resistance welding. The only difference here is that projection or embossed joints are used for the welding purpose.



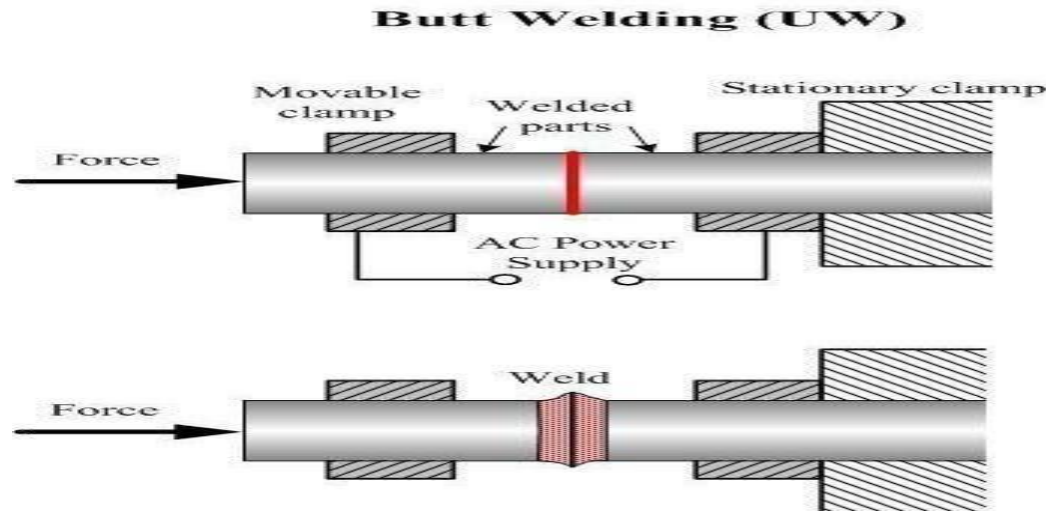
Butt Welding

Butt WELDING

Welding of two pieces of metal together with a butt weld can be carried out by different resistance welding processes. The butt weld consists of joining of two pieces of metal together either on face or on edge. It is of two types namely upset butt welding and flash butt welding.

Flash Welding (FW)

Flash Welding is a Resistance Welding (RW) process, in which ends of rods (tubes, sheets) are heated and fused by an arc struck between them and then forged (brought into a contact under a pressure) producing a weld



In this two electrode holders are used in which one is fixed and other is movable. Initially the current is supplied and movable clamp is forced against the fixed clamp due to contact of these two work pieces at high current, flash will be produced. When the interface surface comes into plastic form, the current is stopped and axial pressure is increased to make joint. In this process weld is formed due to plastic deformation.

Resistance Butt Welding (UW)

Resistance Butt Welding is a Resistance Welding (RW) process, in which ends of wires or rods are held under a pressure and heated by an electric current passing through the contact area and producing a weld. The process is similar to Flash Welding; however in Butt Welding pressure and electric current are applied simultaneously in contrast to Flash Welding where electric current is followed by forging pressure application. Butt welding is used for welding small parts. The process is highly productive and clean. In contrast to Flash Welding, Butt Welding provides joining with no loss of the welded materials.

