

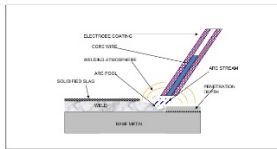
What is Electric Arc Welding:

The process of joining of metals with an electric arc at a temperature of about 10000 F melts the parent metal as well as filler metal together, producing a molten weld puddle that quickly solidifies to form the weld.

Types of electric arc welding

1. SMAW – Shielded Metal arc welding
2. GMAW – Gas Metal Arc welding.
3. GTAW – Gas Tungsten Arc welding
4. SAW – Submerged Arc welding

SMAW Welding Process



SMAW / MMAW/ Stick welding requires covered stick electrode. Metal rod of low carbon is coated with material called flux. An electrode holder is used to hold and supply current to the stick electrode to melt and deposit molten metal. As the electrode melts, the flux coating breaks down to perform the following functions:

1. Form gas shielding to protect the weld puddle from the air.
2. Keep the weld puddle clean from contamination.
3. Produces coating called slag.

Equipment & Tools

In stick welding the equipment and tools are required as below.

1. Power source welding machine complete with welding cable, electrode holder, Earth cable with earth clamp.
2. Chipping hammer or chisel and a wire brush to remove the slag.
3. Protective clothing including Helmet and gloves.

Techniques



To produce good quality weld it is important to practice the following stick welding techniques.

1. Make sure the work piece connected to ground clamp with the welding power source
2. Clean the work piece as much as possible. Remove rust, dirt, paint, grease oil from the surface by wire brush.
3. Do not use clean solvent may occur explosion or fire during welding.
4. Select the proper welding current based on the specification of the stick electrode recommended by electrode manufacturer. Then fine tune the setting so that electrode melts properly. It is better to do on test plate first to ensure the proper weld bead on the actual job.
5. To strike the arc bring tip of the stick nearest point of start point. Strike the electrode like a match stick on the job. Once the arc starts lift the electrode slightly above the work piece. Otherwise it will stick with the job.
6. The most important thing you want to do after initiation of arc is to maintain proper position of the electrode and arc. This involves three key factors.
 - A. Electrode angles
 - B. Arc length
 - C. Travel speed.

Electrode Angle

Electrode angles are the angles at which you should hold the stick electrode in relation to the work piece during welding. This angle varies depending on the type of weld you intend to make.

When you are doing lap joint or a T joint hold the electrode so that it points into the weld joint at an angle of 45 degree. When you start the welding angle it 10-15 degree in the direction of travel. When you stop the welding bring the electrode back to 90 degree and lift it to terminate the arc.

ARC Length

Maintaining the proper arc length is another key factor to produce good quality weld. The arc length is the distance from the tip of electrode to the surface of molten weld puddle. Be careful to watch the stick electrode as you weld because as it becomes shorter and shorter, you have to keep moving the electrode towards the weld point to maintain the proper arc length.

A good thumb rule the distance between tip of electrode and the job is equal to diameter of electrode .for eg

If you are welding with 4.0 mm electrode do maintain an arc length of 4.0 mm.

Longer arc length makes a coarse, uneven cracking sound that will often go out. You will also see an excessive amount of spatter and the weld will be too wide.

Shorter arc length makes a soft buzzing noise and produce a weld is too narrow. In some cases the stick electrode will stick to the work piece. If this occurs move the stick electrode side to side and pull it to free it from the work piece.

Travel speed

Travel speed is the rate at which you weld. A good travel speed produces a uniform weld that is slightly convex. However if the travel speed is too slow , the weld will pile up , wasting filler metal . If you go too fast the weld will be narrow and lack of proper penetration and fusion.