

Welding and its Classification

Welding

Welding is a materials joining process which produces coalescence of materials by heating them to suitable temperatures with or without the application of pressure or by the application of pressure alone, and with or without the use of filler material.

Welding is used for making permanent joints.

It is used in the manufacture of automobile bodies, aircraft frames, railway wagons, machine frames, structural works, tanks, furniture, boilers, general repair work and ship building.

Classification of welding processes

(i) Arc welding

- Carbon arc
- Metal arc
- Metal inert gas
- Tungsten inert gas
- Plasma arc
- Submerged arc
- Electro-slag

(ii) Gas Welding

- Oxy-acetylene
- Air-acetylene
- Oxy-hydrogen

iii) Resistance Welding

- Butt
- Spot
- Seam
- Projection
- Percussion

(iv) Thermit Welding

(v) Solid State Welding

Friction
Ultrasonic
Diffusion
Explosive

(vi) Newer Welding

Electron-beam
Laser

(vii) Related Process

Oxy-acetylene cutting
Arc cutting
Hard facing
Brazing
Soldering

Welding practice & equipment

STEPS :

- Prepare the edges to be joined and maintain the proper position
- Open the acetylene valve and ignite the gas at tip of the torch
- Hold the torch at about 45deg to the work piece plane
- Inner flame near the work piece and filler rod at about 30 – 40 deg
- Touch filler rod at the joint and control the movement according to the flow of the material

Two Basic Types of AW Electrodes

- Consumable – consumed during welding process
 - Source of filler metal in arc welding
- Nonconsumable – not consumed during welding process
 - Filler metal must be added separately

Consumable Electrodes

Forms of consumable electrodes

- Welding rods (a.k.a. sticks) are 9 to 18 inches and 3/8 inch or less in diameter and must be changed frequently
- Weld wire can be continuously fed from spools with long lengths of wire, avoiding frequent interruptions

In both rod and wire forms, electrode is consumed by arc and added to weld joint as filler metal.

Nonconsumable Electrodes

- Made of tungsten which resists melting
- Gradually depleted during welding (vaporization is principal mechanism)
- Any filler metal must be supplied by a separate wire fed into weld pool