

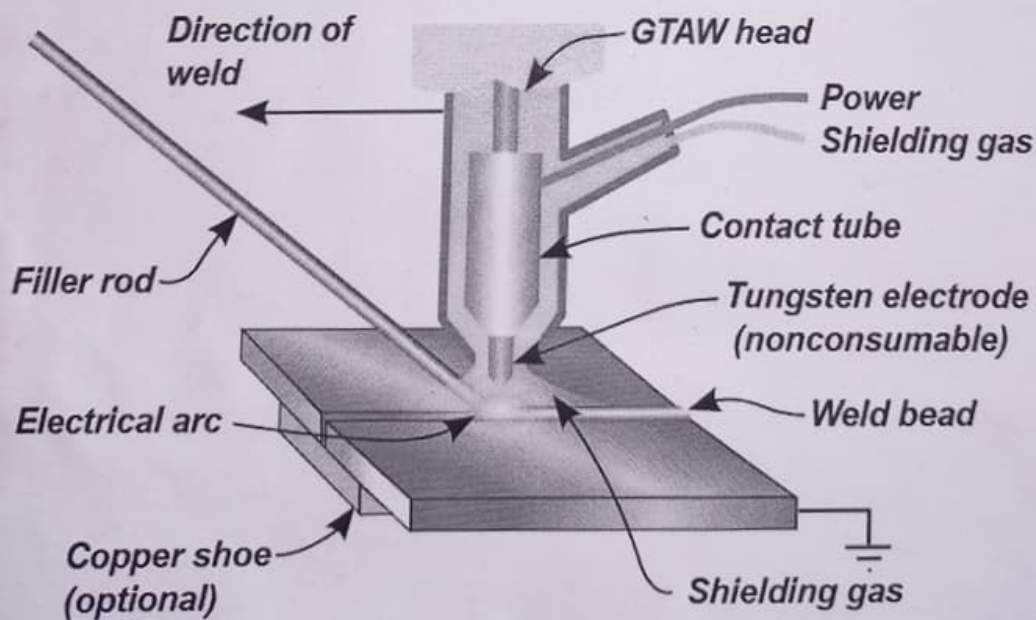
SHIELDED GAS ARC WELDING

① TUNGSTEN INERT GAS (TIG) / GAS TUNGSTEN ARC WELDING (GTAW)

- Arc is generated b/w w/p and non-consumable tungsten electrode [due to its High melting point 3300°C]
- For welding of $\geq 5\text{mm}$ thickness, filler material is supplied externally.
- for welding of $\leq 5\text{mm}$ thickness, no requirement of filler.
- Liquid metal in the weld pool can be protected by providing inert gas [Argon, Helium]
- DCSP used for all materials except Al, Mg and its alloys.
- For welding of Al, Mg & its alloys, AC power supply can be used in which first half of cycle due to straight polarity more heat will be generated on w/p & oxide layer produced. In next half of cycle due to reverse polarity oxide layer can be cleaned from the work surface. This is known as Cathodic cleaning.
- Mechanical efficiency is 90%.

Application:

- Used in Aerospace & Automobiles industry.
- Ferrous / Low Melting point use DCSP.
- Non-ferrous / High Melting point (Al, Mg) use AC.

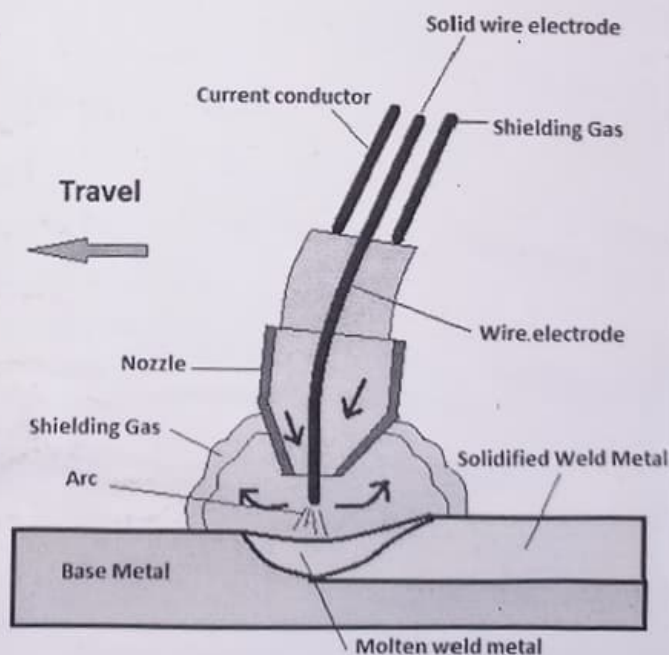
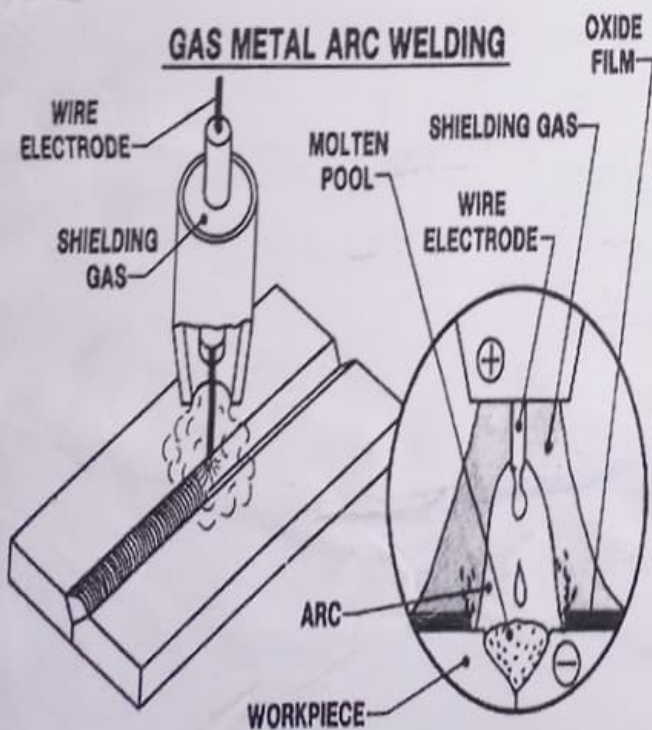


② METAL INERT GAS WELDING (MIG)/GAS METAL ARC WELDING

- Arc is generated b/w w/p + consumable electrode.
for manual - Steel, for Auto/Semi-Auto - Copper.
- Liquid metal in weld pool can be protected by providing inert gas (He , Ar and CO_2).
- Electrode is in the form of small dia. of wire.
- In general, metal can be transformed from electrode to the w/p in the form of spray at high rate of current.
- At low rate of current metal can be transformed in the form of droplets.
- For Al , Mg + its alloy - DCRP or AC.
For materials except Al, Mg - DCSP

Applications:

Metal fabrication industries, shipbuilding, automobiles, pressure vessel industries, Welding tool, Dies, Aerospace etc.



Metal Inert Gas

PLASMA ARC WELDING (PAW):

- Arc is generated b/w Non-consumable tungsten electrode & w/p.
- Through the ceramic nozzle high pressure plasma will be supplied. It will react with electric arc and produce plasma arc which is having high kinetic energy, and it will be focused on w/p at a given point.
- Heat Concentration on w/p will be very high. $[11000^{\circ}\text{C}]$
- Depth of penetration & speed of welding (200-1000 mm/min) is maximum in comparison to TIG & MIG.

Application:

- Welding plates upto 8mm thickness.
- Welding of carbon steels, stainless steels, nickel, copper, brass, monel, aluminium, titanium etc.

