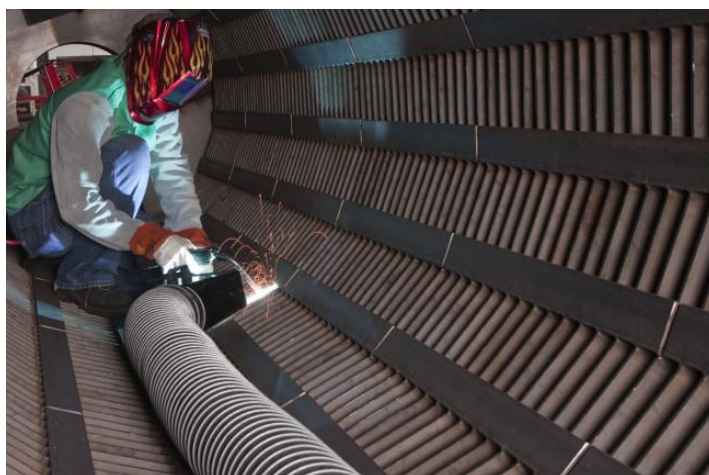




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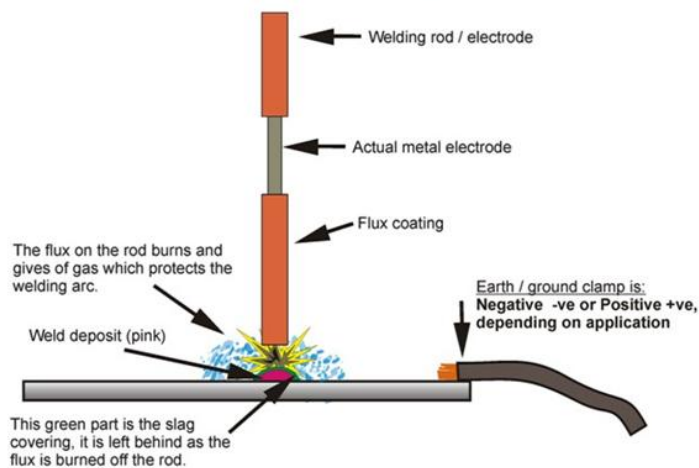
Email: sales@agstech.net, Web: <http://www.agstech.net>

WELDING PROCESSES:



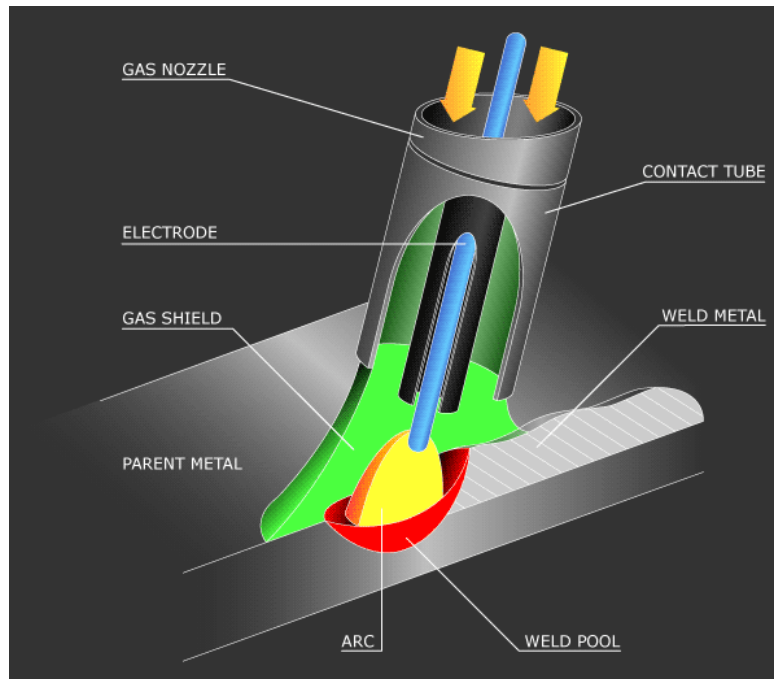
Shielded Metal Arc Welding (SMAW) / Stick Welding

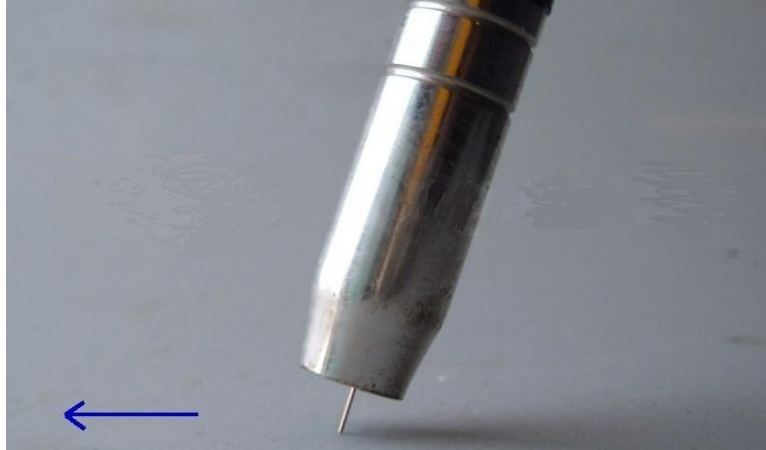
Arc / Stick Welding



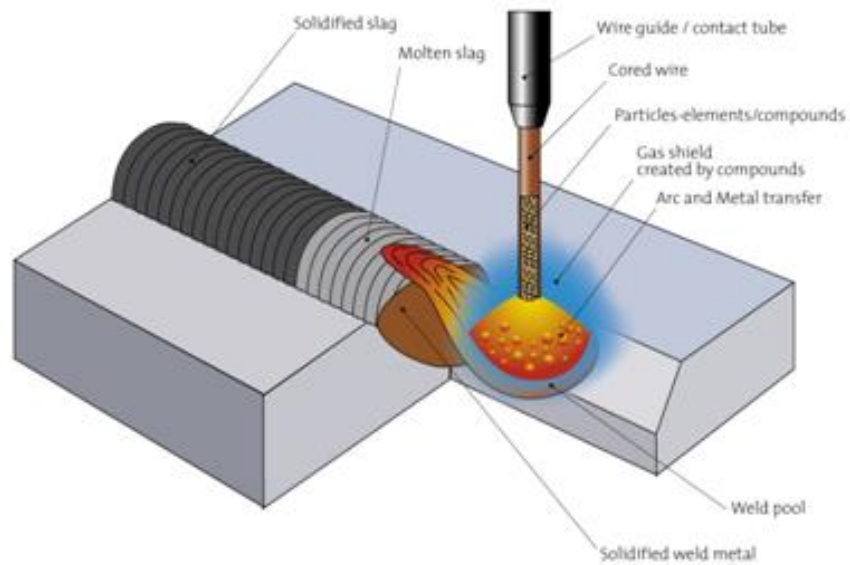


Gas Metal Arc Welding (GMAW) / Metal-Inert Gas Welding (MIG)





Flux-Cored Arc Welding (FCAW)



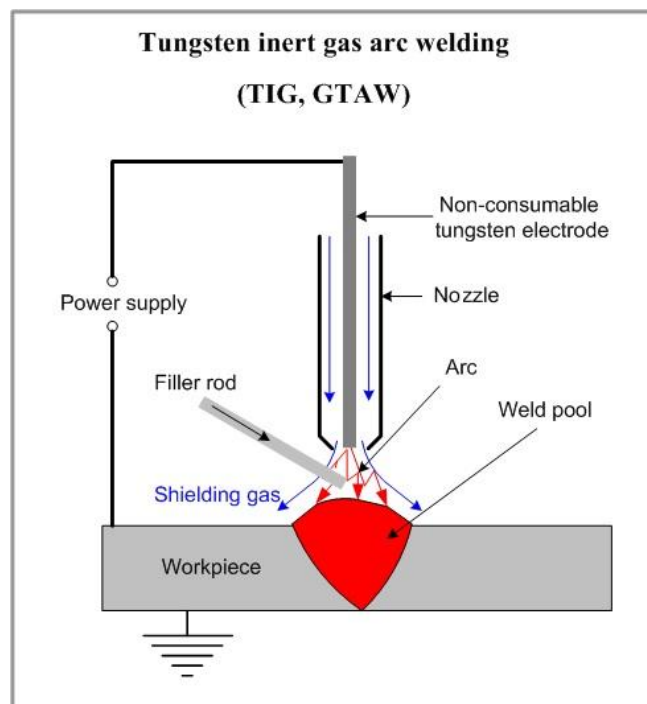


Flux Material



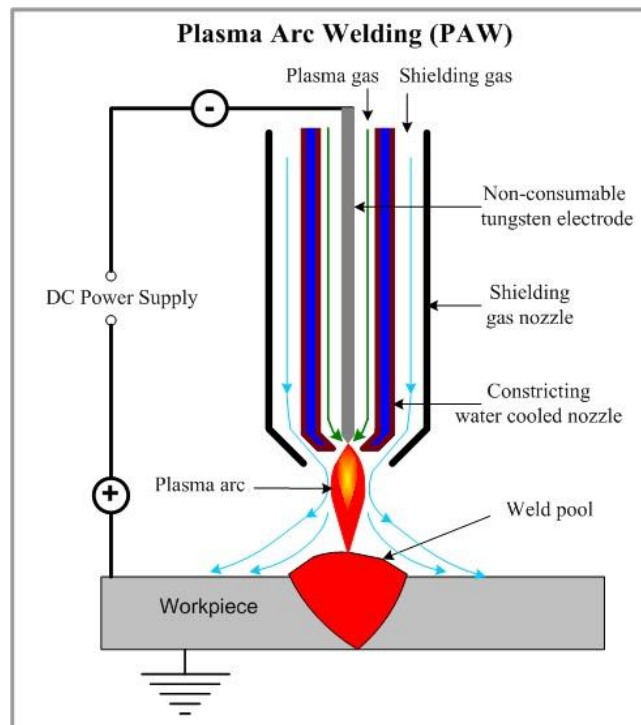
Automated submerged arc welding

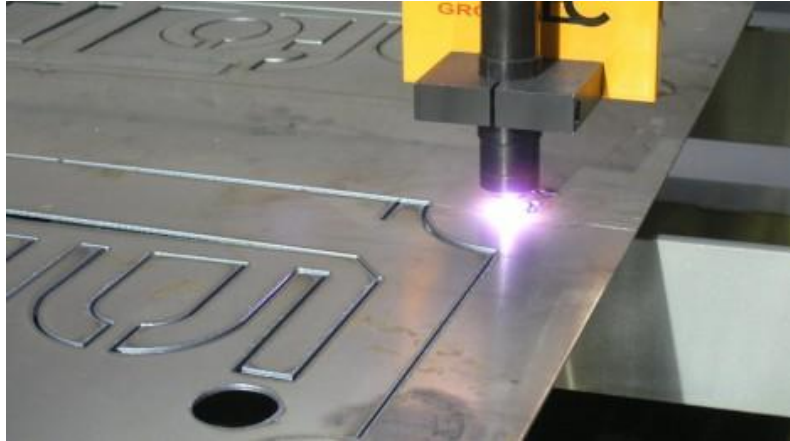
Gas Tungsten Arc Welding (GTAW) / Tungsten-Inert Gas Welding (TIG)



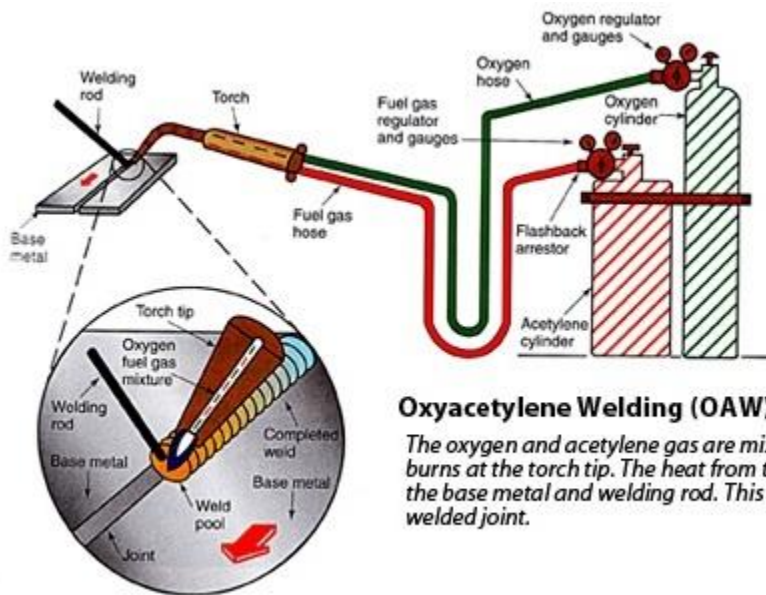


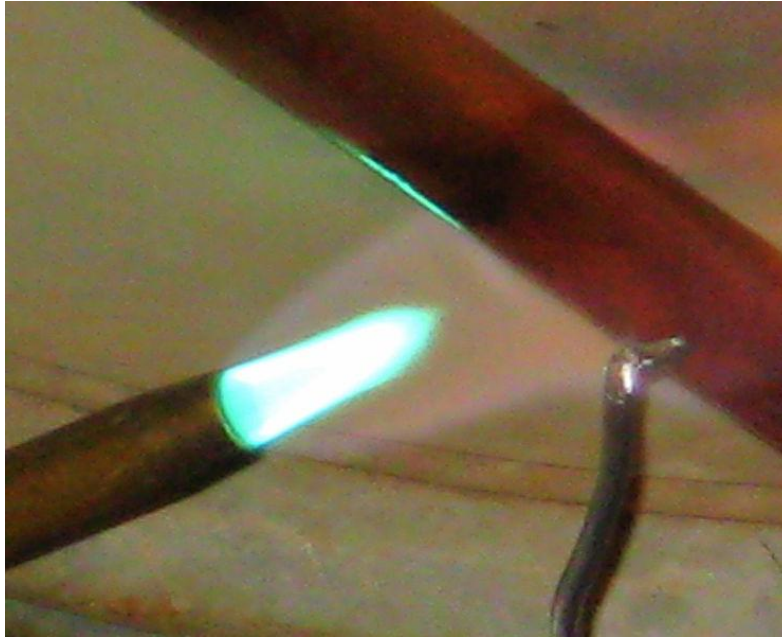
Plasma Arc Welding





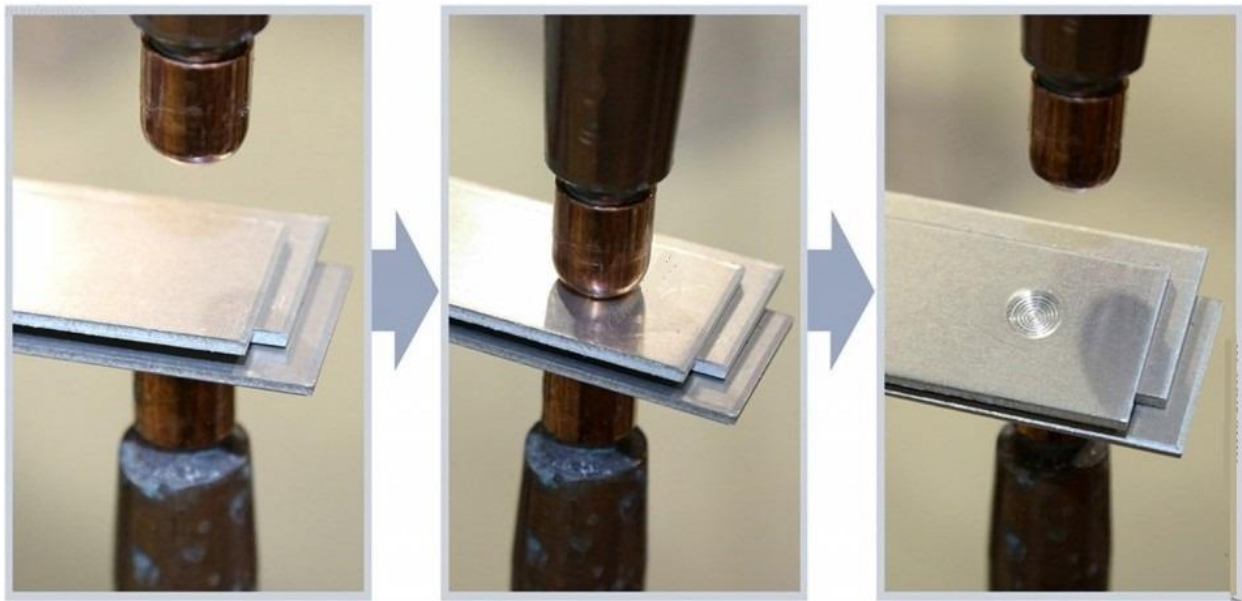
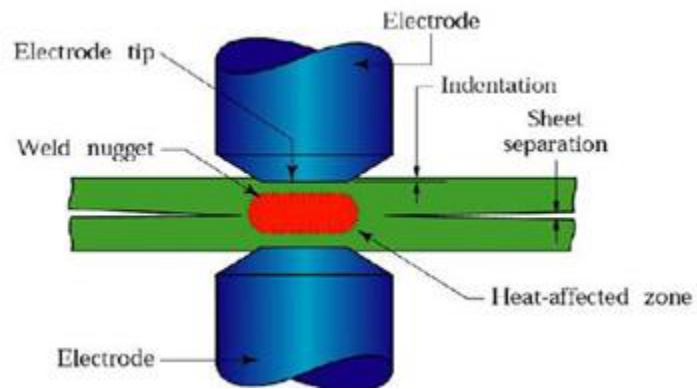
Oxyfuel / Oxyacetylene Welding



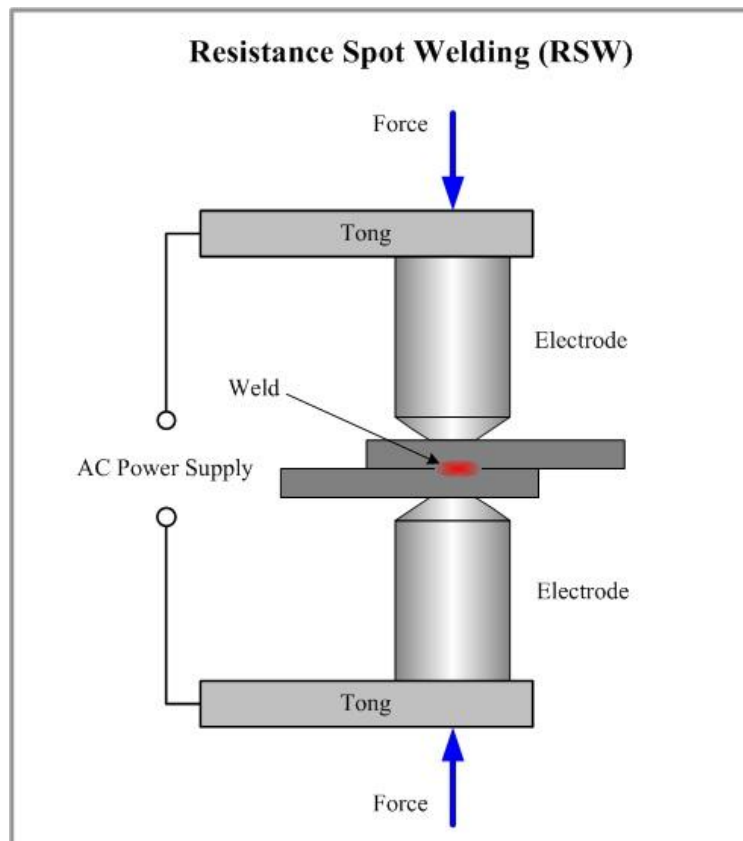


Resistance Welding Processes

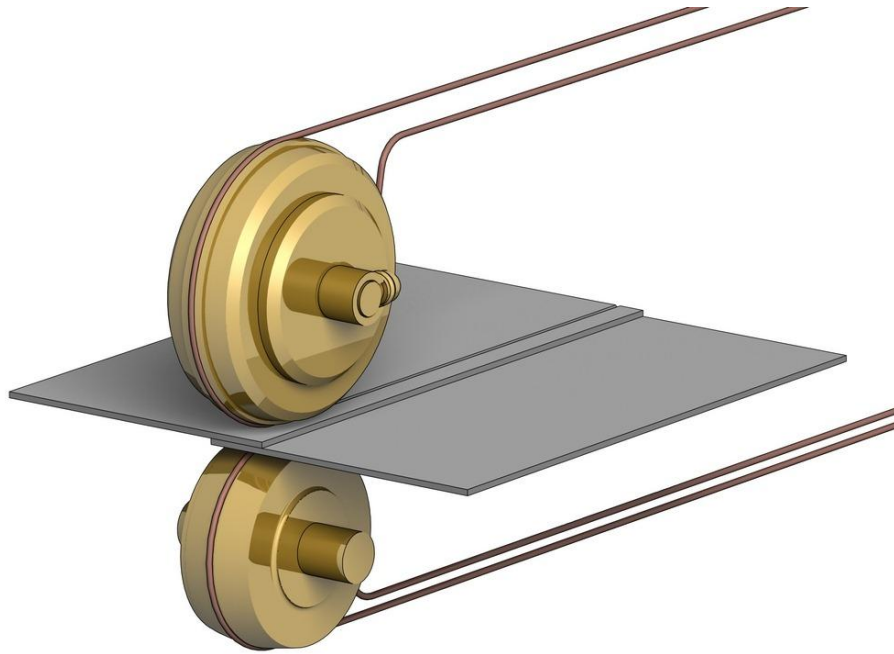
Spot Welding





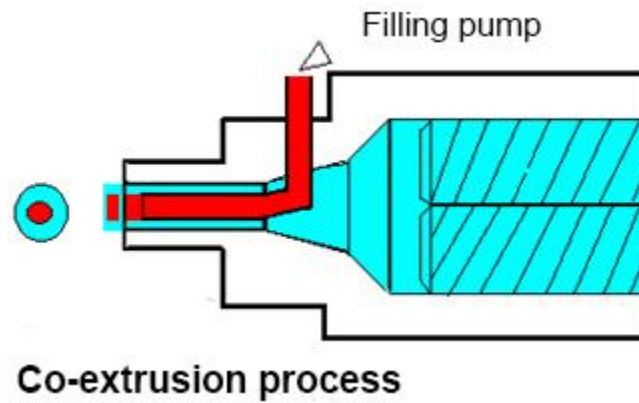


Seam Welding



Solid State Welding Processes

Coextrusion Welding



Cold Pressure Welding

- Pressure is applied to the workpieces through dies or rolls
- Preferably both work pieces should be ductile
- The work pieces should be cleaned thoroughly
- Can not join dissimilar metals

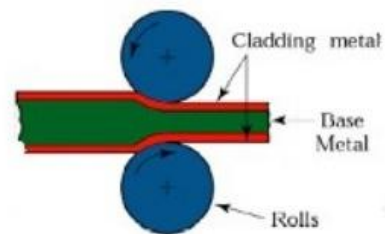
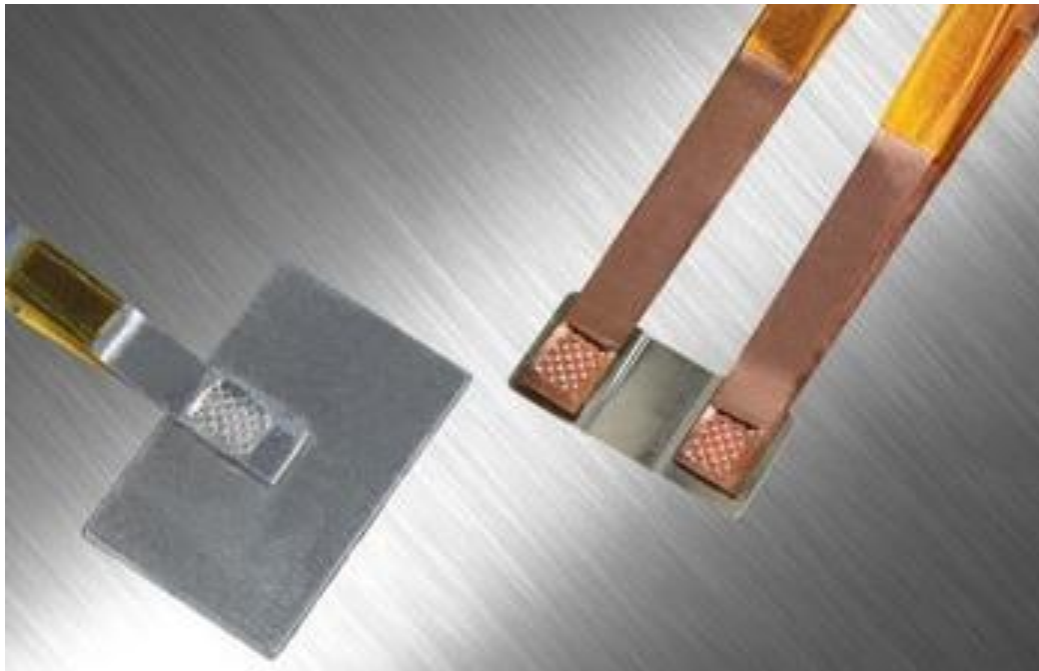


Fig: The roll bonding or cladding process





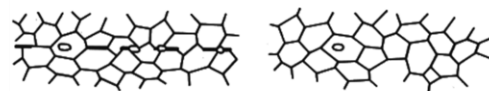
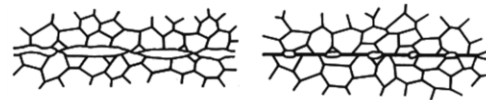
Cold pressure welding machine for copper wire

Diffusion Welding

Diffusion Welding Working Principles

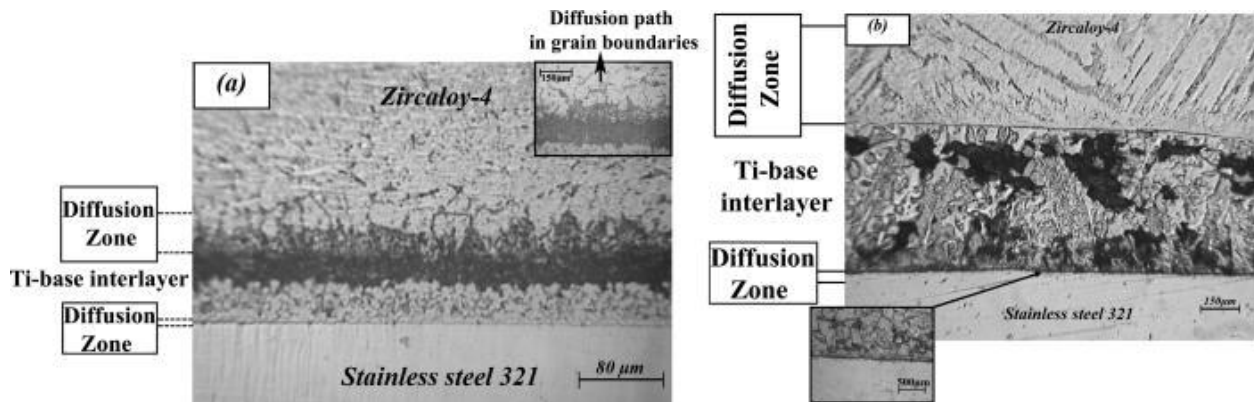
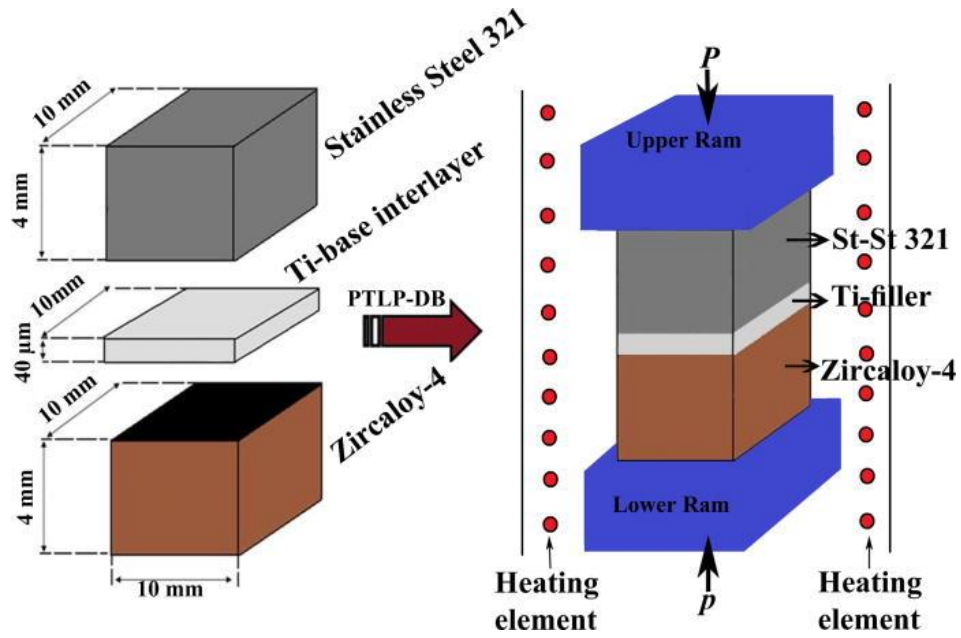
- 1st stage
 - deformation forming interfacial boundary.
- 2nd stage
 - Grain boundary migration and pore elimination.
- 3rd stage
 - Volume diffusion and pore elimination.

asperities come into contact.



2nd stage grain boundary migration and pore elimination

3rd stage volume diffusion pore elimination

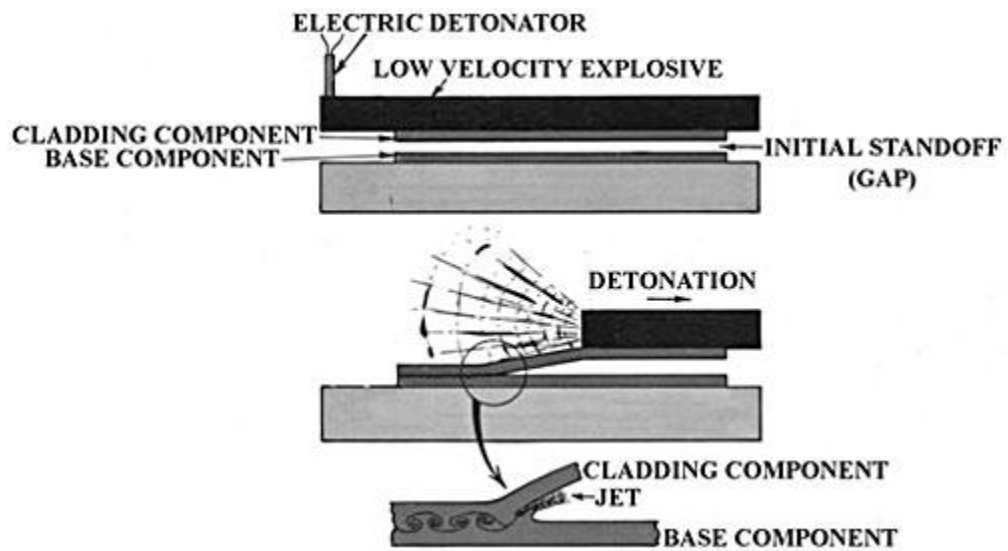


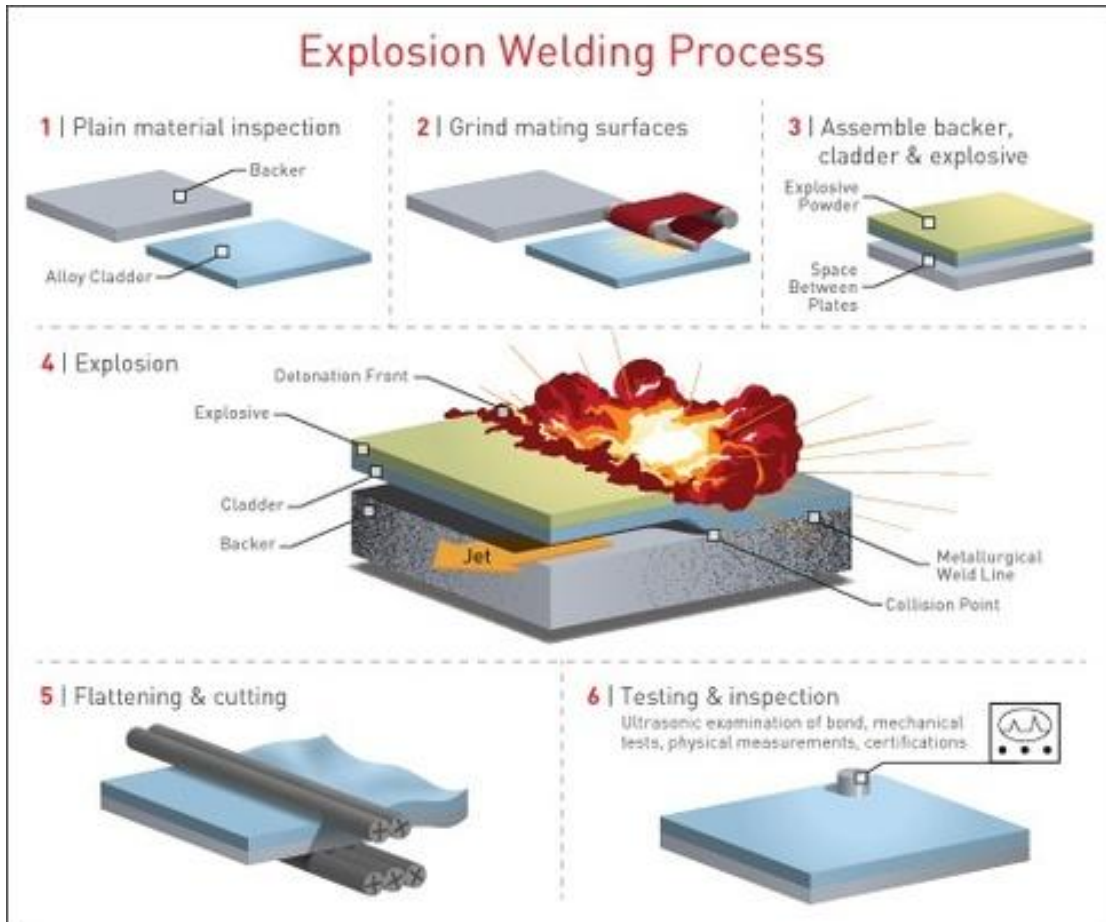
An example of Diffusion Bonding

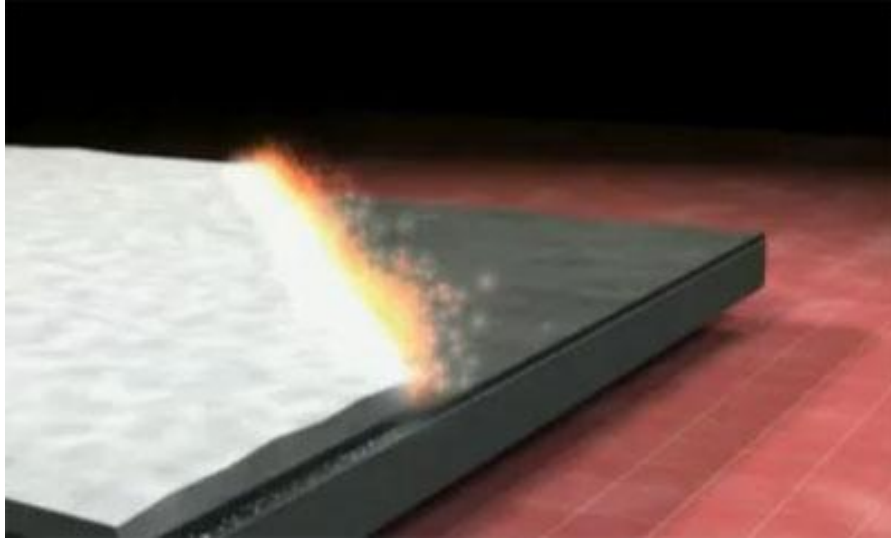


Diffusion welded products

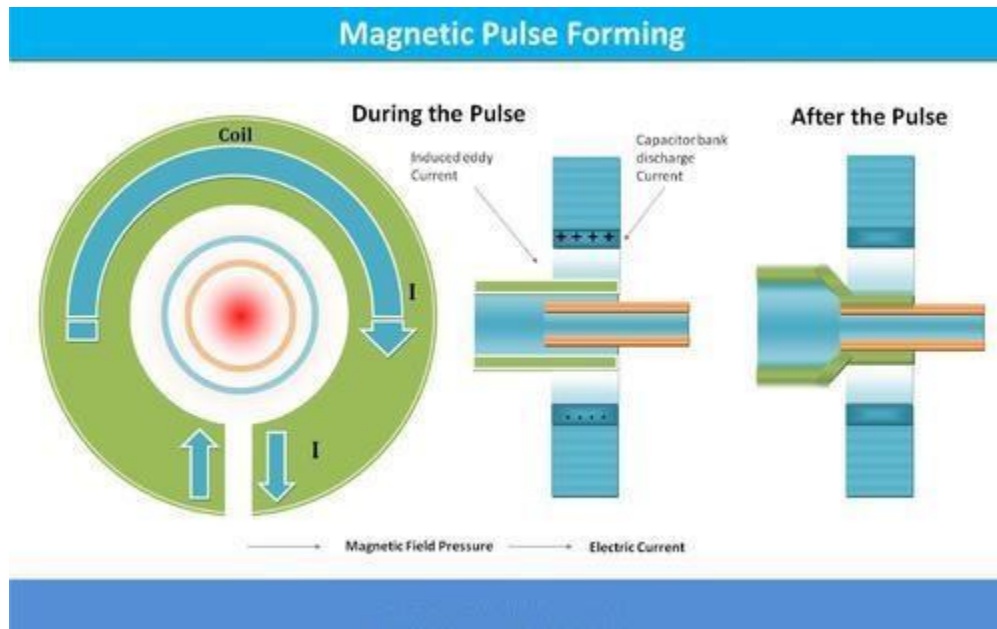
Explosion Welding

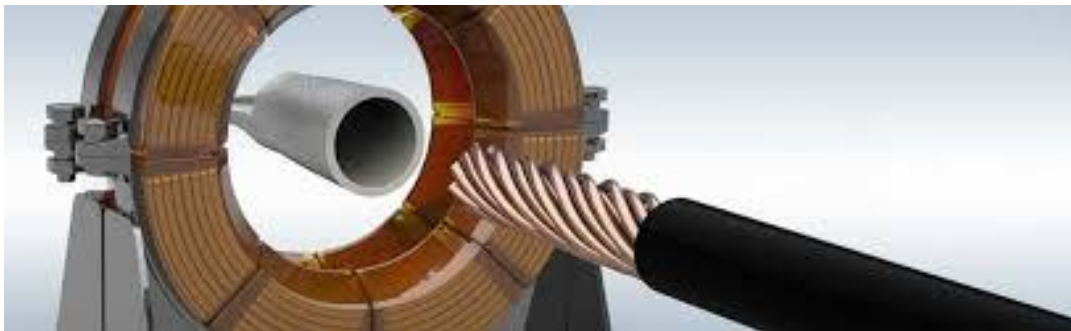
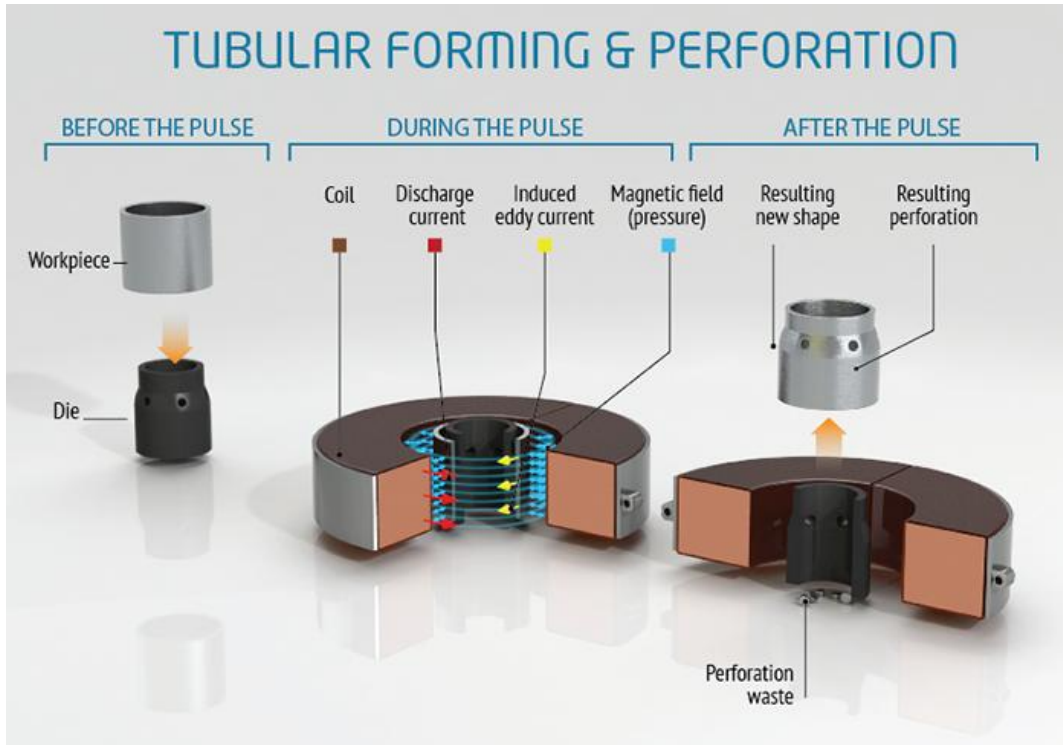






Electromagnetic Pulse Welding





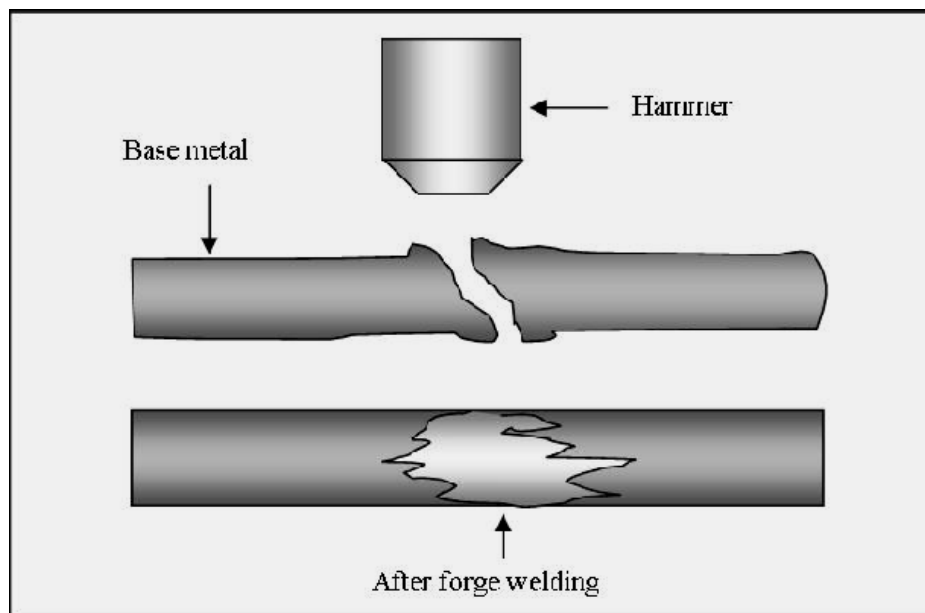
Competitive advantages of MPW

- Allows designs previously not possible
- High-speed (a typical pulse lasts from 10 to 100 μ s, so the only time limitation is loading and unloading)
- High repeatability
- Reliable and well suited to high-volume production (MTBF typically 1-5 million welds)
- Many welding combinations using dissimilar metals are possible
- Cold weld with no heat-affected zone (parts can be handled immediately after the process)

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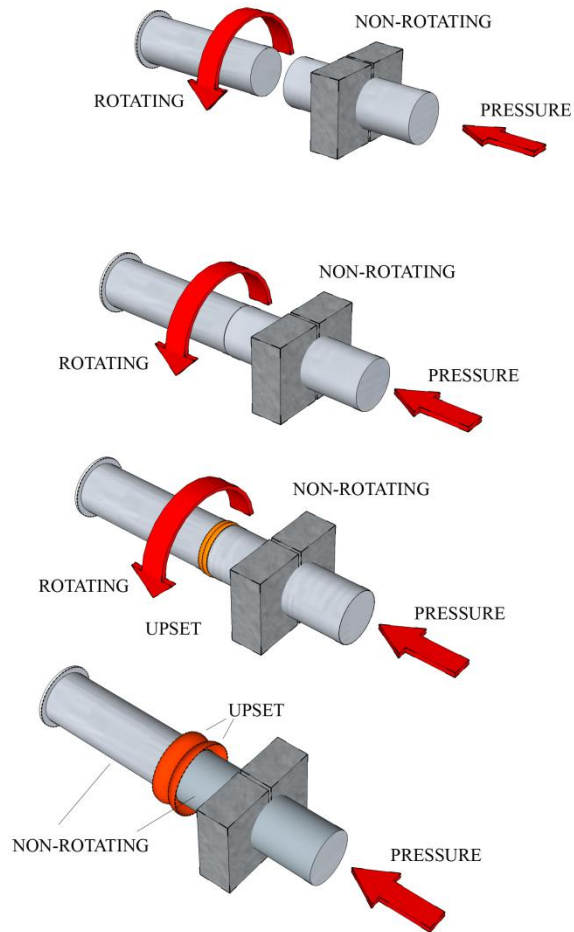
- No need for filler materials
- Green process (no heat, no sparks, no smoke, no radiation)
- Clean process (no pre- or post-weld cleaning)
- High quality, very aesthetic and cleaner interface
- Maintains mechanical strength (typical joints are stronger than the parent material)
- High precision (single micron precision obtainable by adjustment of magnetic field)
- No distortion
- No corrosion development in the welding area
- All these advantages translate into significantly lower costs and much higher quality and productivity

Forge Welding

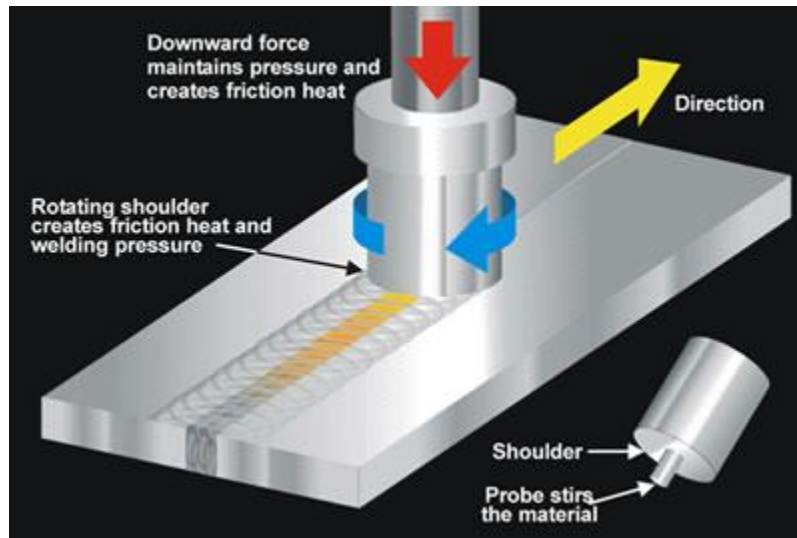




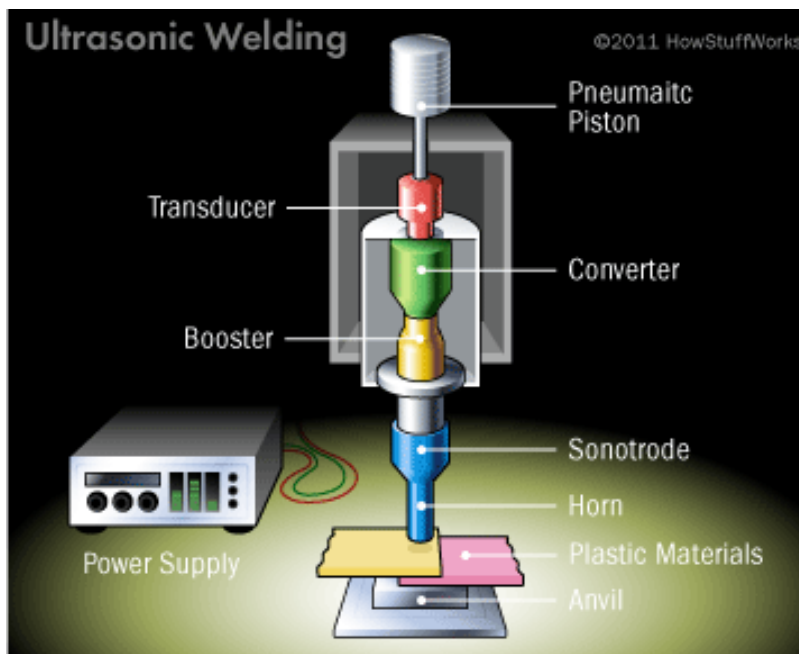
Friction Welding



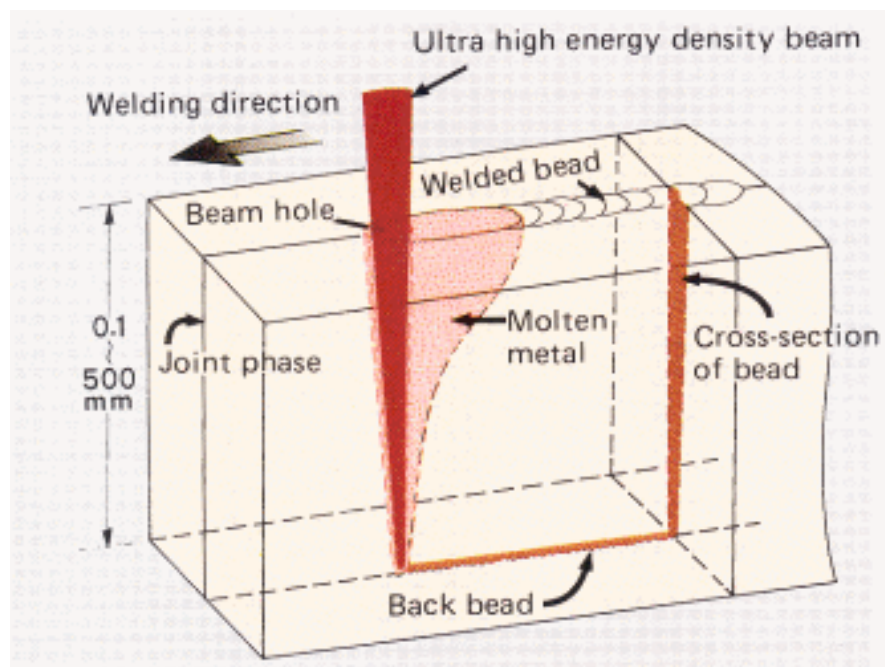
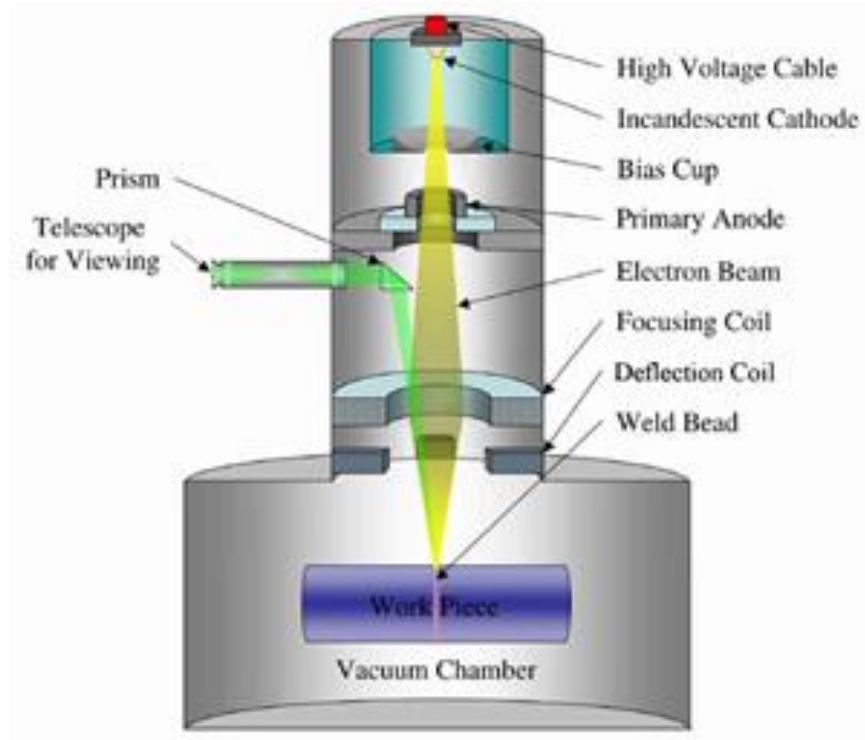
Friction Stir Welding



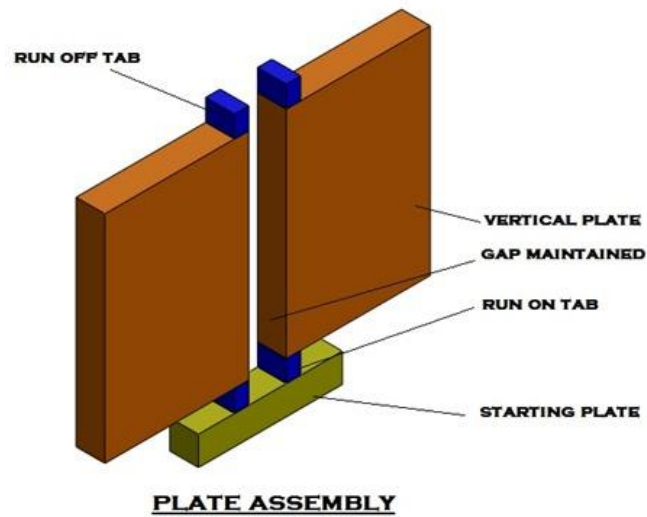
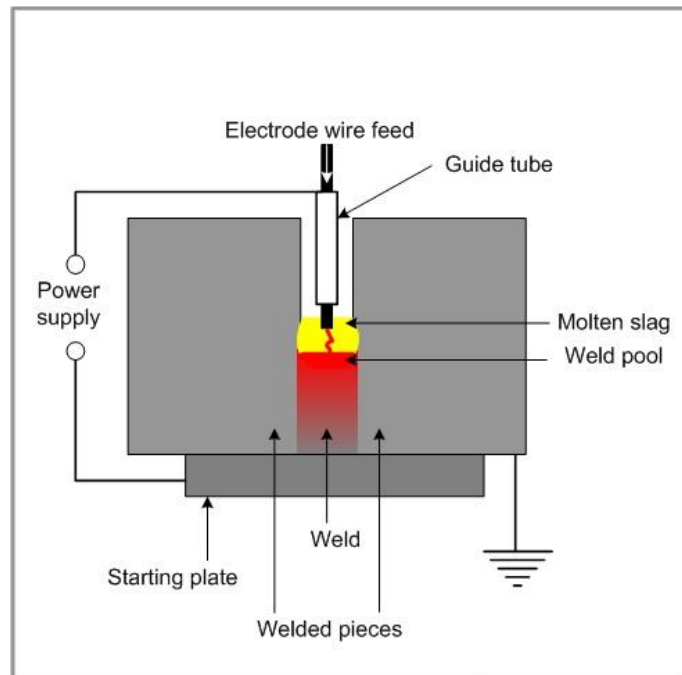
Ultrasonic Welding

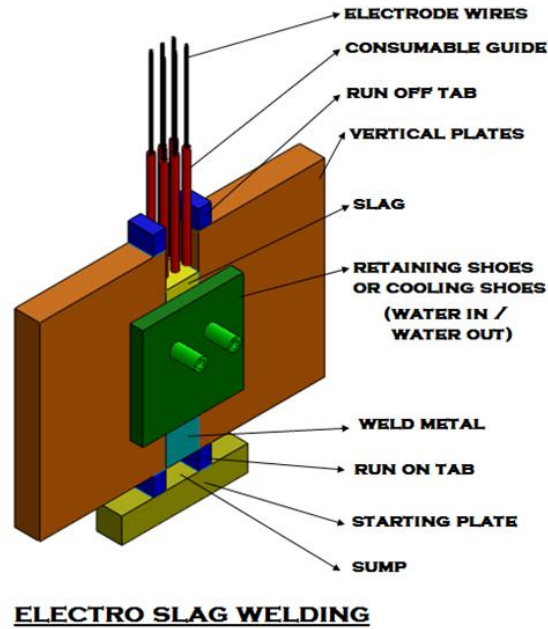
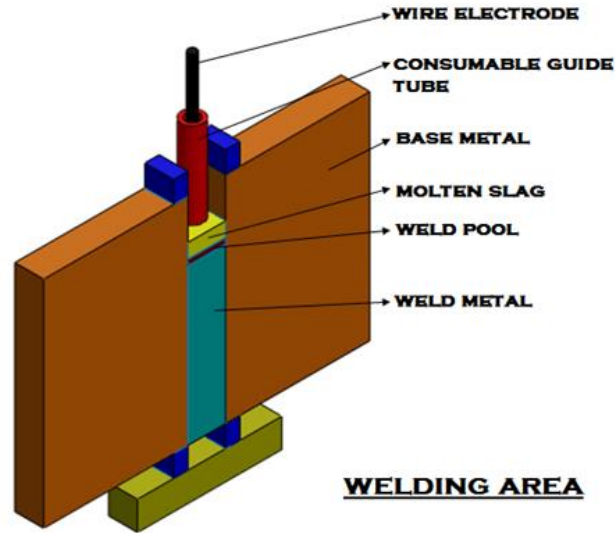


Electron Beam Welding



Electroslag Welding (ESW)



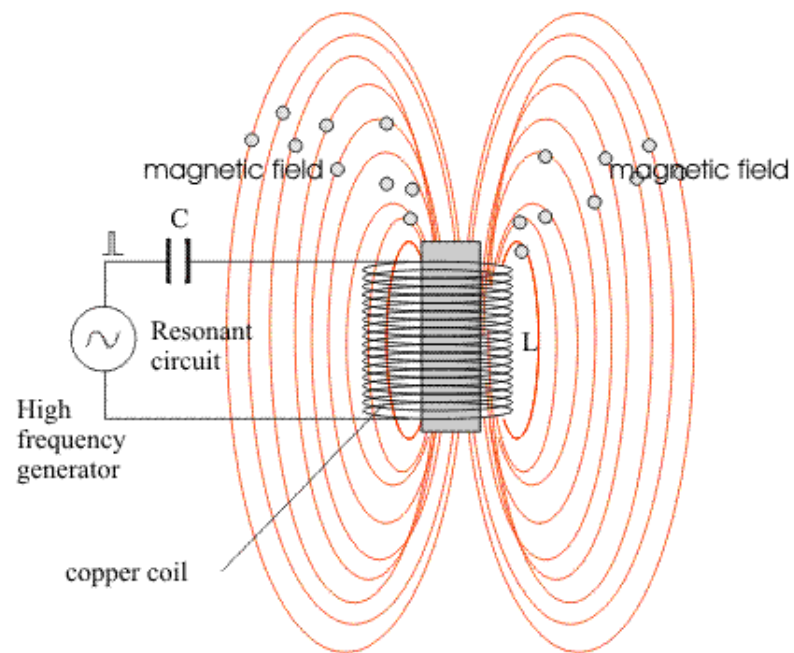


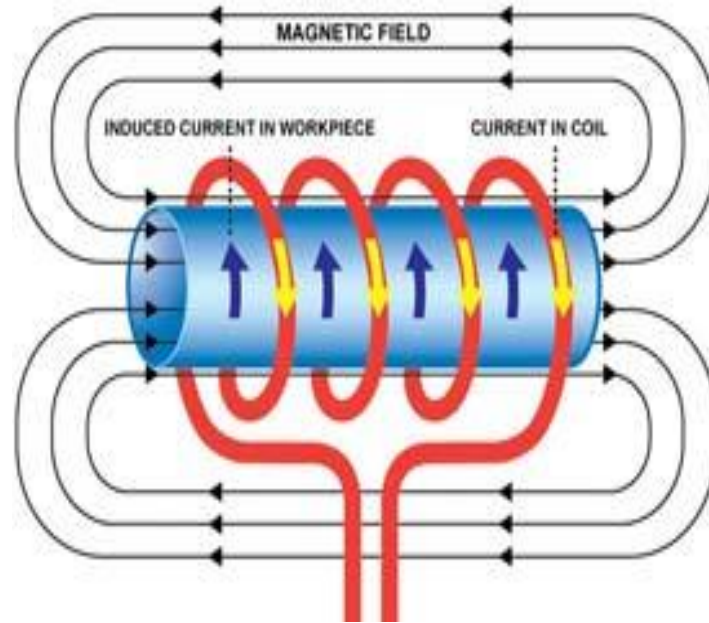


Induction Welding

Induction Heating

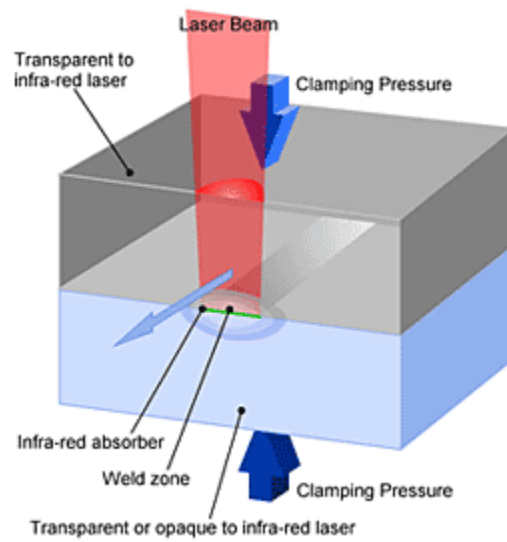
Metallic bar placed in the copper coil is rapidly heated to high temperatures by induced currents from the highly concentrated magnetic field.



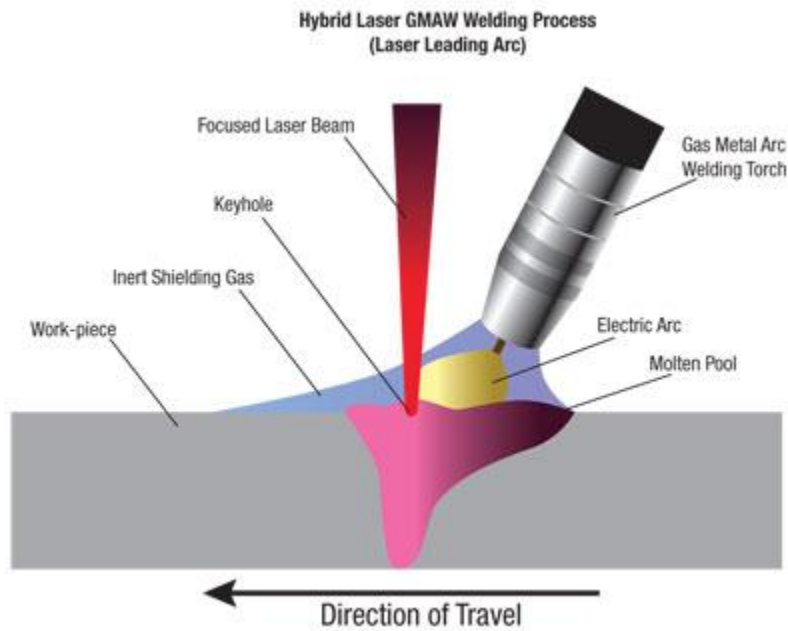




Laer Welding



Laser Hybrid Welding



Percussion Welding



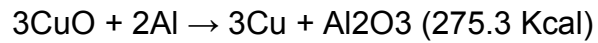
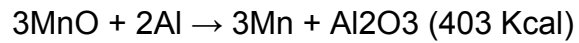
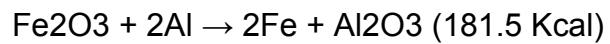
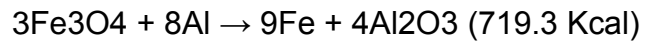


Thermit Welding

Thermit welding is a chemically reaction welding process. The weld joint is produced by pouring of superheated molten metal around the joint to be welded, applying with or without of pressure. Thermit welding basically called a mixture of finely divided metal oxide and a metal reducing agent as aluminium. The necessary heat for joining metal of thermit welding is obtained from chemical reaction of metal oxide and metal reducing agent. Usually iron oxide is used as a metal oxide and aluminium or magnesium is used as metal reducing agent. The strong chemical attraction of aluminium for oxygen is the basis for thermit process. First the thermit mixture is ignited by a burning magnesium ribbon. The ignited temperature of thermit is about 12000C. When ignited in one spot of mixture, the heat reaction spreads through the mass. The aluminium merging with the oxygen of metal oxide and setting free the iron, which is deposited on joint portion into the mold as a highly superheated liquid metal. If theoretical temperature is about 30000C of thermit, due to chilling effect of crucible the temperature is reduced about 25000C. So it is sufficient for welding temperature.

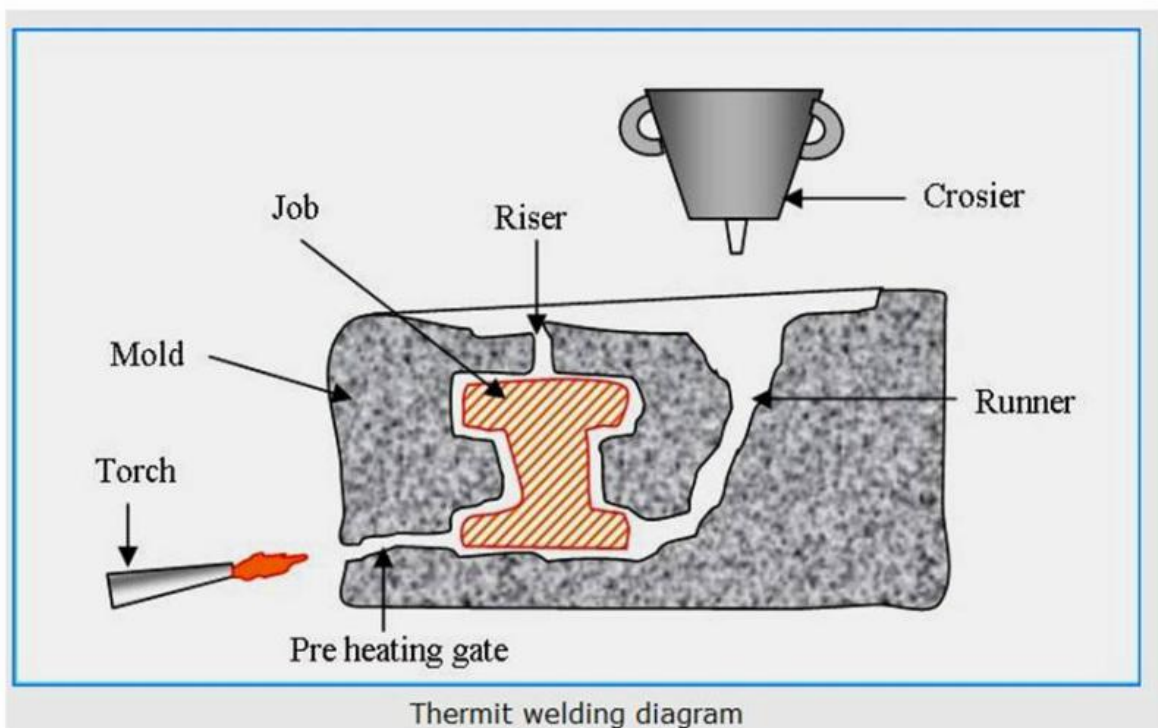
The thermit reaction is required about thirty second to ignite and it is non-explosive process.

Some chemical reactions:



Applications:

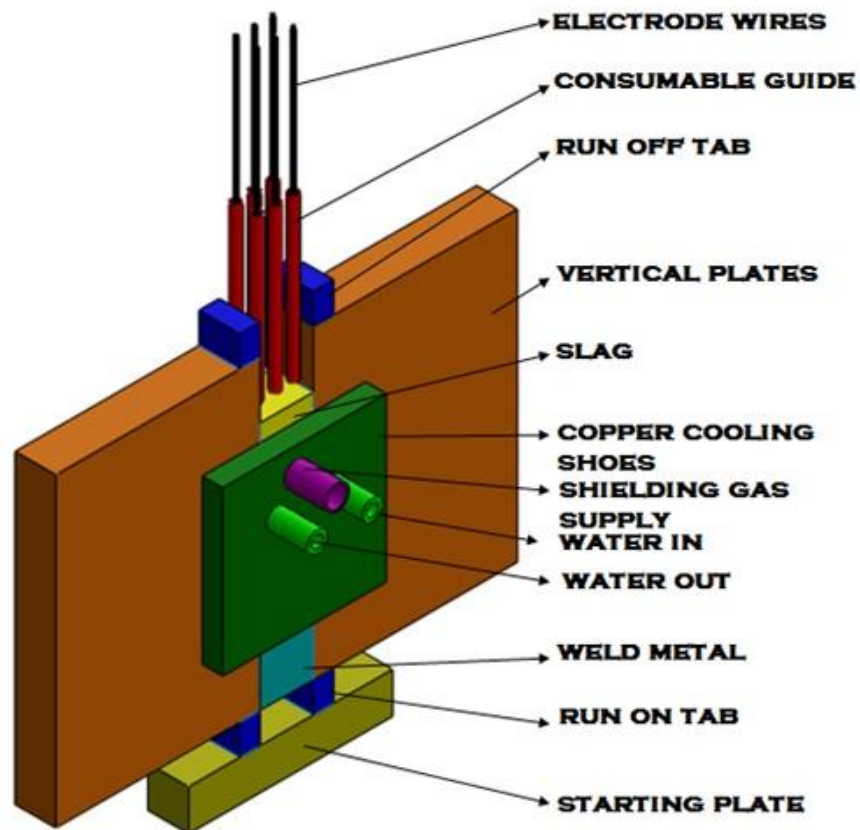
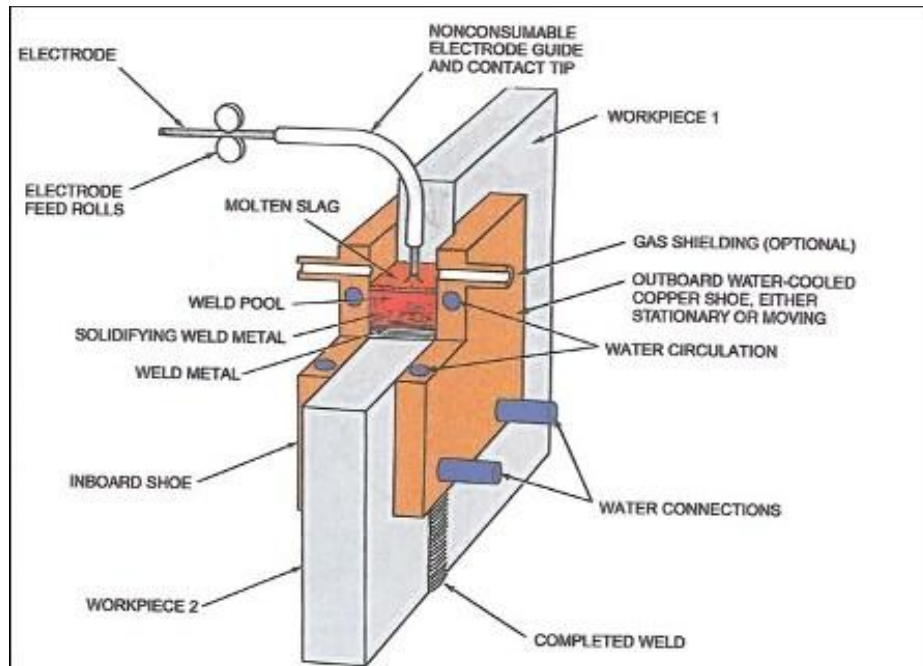
1. It has large application in railway track repairing on the spot.
2. It is used in large frame like locomotive frame welding.
3. Thermit welding is used in crank shaft welding.





Photos of Thermit Welding Process

Electrogas Welding





All Time EGW used for tank erection



Inside the EGW frame

Stud Arc Welding

