The welding process: MIG/MAG

The Process

The arc burns between a consumable electrode and the workpiece. The “endless” electrode functions both as an arc carrier and a filler material. The protective gas shield protects the arc from the ingress of atmospheric oxygen.

ISO 4063 131 (MIG) ISO 4063 135 (MAG)

Advantages

- High deposition rate
- High welding speed
- Deep penetration
- Constant wire diameter
- Complete mechanisation possible

Application areas

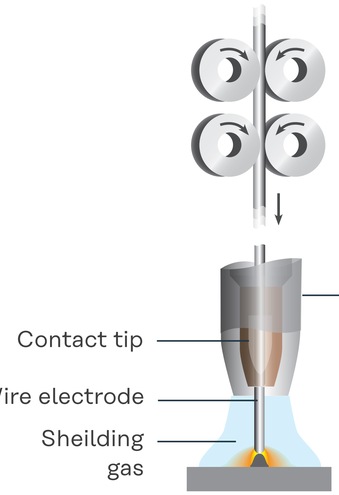
- Unalloyed and low-alloy steels (MAG)
- Increasing use with CrNi steels (MAG) and aluminium materials (MIG)
- In steel construction, shipbuilding, rail vehicle construction, container construction...

Metal inert gas welding

Inert shielding gases (reactionless gases): Argon, helium; used in particular with aluminium and copper alloys

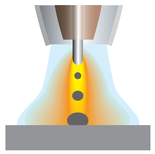
Metal active gas welding

Active shielding gases (reactive gases): CO_2, argon + oxygen and/or CO_2; used with steel, but also chrome-nickel steels

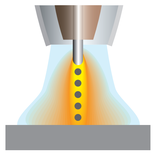


Arc types

Dip transfer arc
- For welding light-gauge sheets
- Very good for root passes
- Little spatter
- Very easy to control



Intermediate arc
- For medium-thickness sheets
- For position welding of thick sheets
- Very high spatter build-up
- Should be avoided



Pulsed arc
- Very little spatter
- Creates very flat fillet welds
- Can be used with larger wire diameters
- Universally applicable

Spray arc
- Only for thick sheets
- High amperages required
- Can create flat seams
- Barely any spatter

1 Welding torch

The welding torch forms the interface (incl. hosepack) to the power source and guides the filler metal and the arc. The gas nozzle focuses the stream of outflowing gas, ensuring clean shielding of the weld seam. Depending on the power range and duty cycle, gas-cooled or water-cooled torches are available.

2 Wirefeeder

The wirefeeder ensures constant, precise and smooth transport of the filler metal. It is either integrated into the power source housing or located externally in its own housing.

3 Gas pressure regulator

The gas pressure regulator regulates and stabilises the desired shielding gas flow rate.

4 Filler metal

Solid wires and flux core wires function as filler metals.

5 Cooling unit

The cooling unit ensures optimum cooling of the welding torch.

6 Power source

Transformation: High mains voltage is transformed into low welding voltage
Rectification: AC is converted into DC
Regulation: Welding parameters are adapted to suit the welding task at hand