



Welding gases

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processes

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issues



An Introduction to MIG Welding

If you are looking for a versatile form of welding, MIG (Metal Inert Gas) could be a good choice:

- you can apply it to a wide range of metals and alloys
- it produces comparatively high welding speeds
- skill levels required for MIG are usually less demanding
- it is highly efficient, with 98% of filler wire weight converting into weld metal

Are you using the best shielding gas for your weld? Ask in-store for advice!



How does MIG work?

An arc is struck between the metal you are working on and a filler wire fed through a welding gun. This melts both the filler wire and the parent metal in the vicinity of the arc.

DC powers the arc, with your wire connected to the positive output and the workpiece connected to the negative terminal.

The wire is fed from a spool at a controlled speed and the entire arc area is covered by a shielding gas to prevent atmospheric contamination.



Different MIG methods

If you adjust the current, voltage or shielding gas composition you can get different methods of transferring metal from the wire to the weld pool:

- Dip transfer – operates at lower temperatures, suitable for joining thin sheets
- Globular transfer – droplets fall from the wire in an uncontrolled manner; can cause spatter
- Spray transfer – steady stream of smaller droplets are propelled across the arc in a controlled manner; high deposition rates
- Pulsed arc transfer – produces one single spray droplet per pulse; excellent arc stability

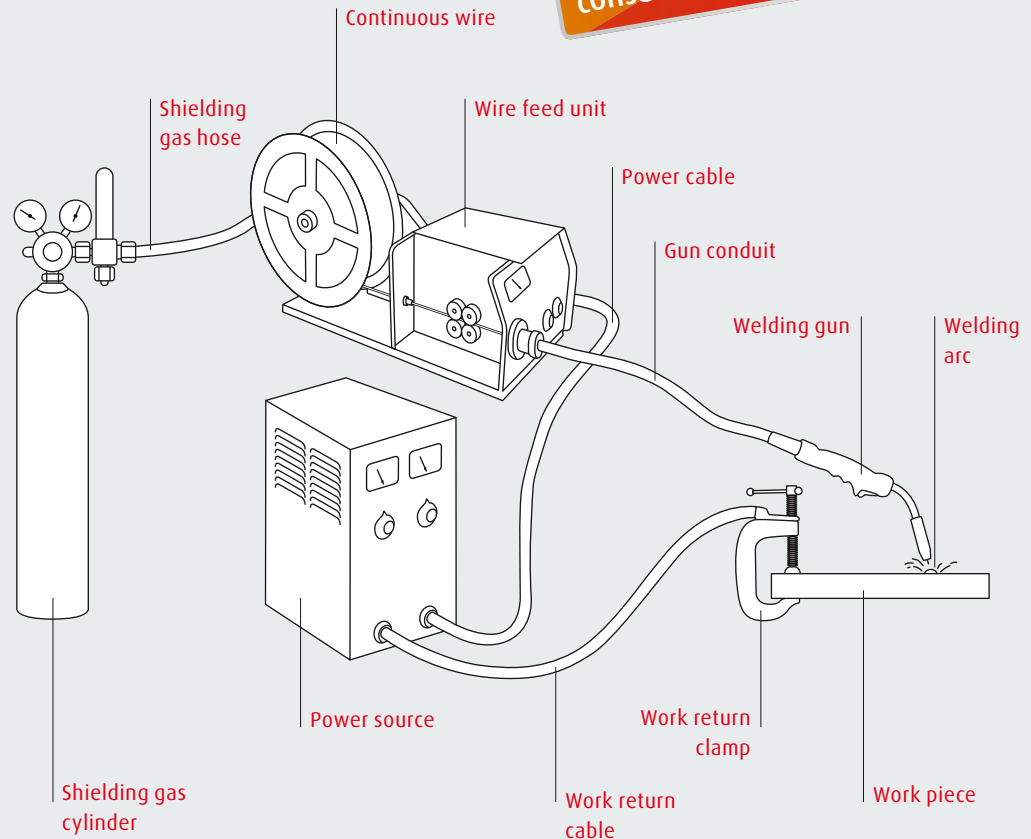


Equipment and consumables

- Power source – this must have sufficient duty cycle, constant voltage and current capacity for the type of work being completed
- Wire feed system – it's imperative this pushes both hard and soft filler wires to the welding gun smoothly and at a constant speed
- Welding gun – can be water or air cooled; some guns will pull the wire

- through in addition to the feed system's pushing action
- Filler wire – ensure you have the correct wire for the metal being welded; usually supplied on a spool or from a bulk pack
- Shielding gas – again, you need the right gas for the job you are doing. BOC has a range of shielding gas mixes specifically for MIG welding

Circuit diagram of MIG process parts





What to look out for

- Process control – you must match the rate of wire feed to how quickly it is melting in the weld pool
- Porosity – can be caused by grease or dirt on the surface being welded, or inadequate shielding gas flow rate
- Lack of fusion – enhanced technology and consumables have improved this, but welder technique is still important – especially when welding in dip transfer or on thicker plate



Stay safe!

Potential MIG welding hazards include:

- incorrect wiring and/or poor earthing
- particulate and gaseous fumes
- arc burns from UV and IR radiation
- skin burns from hot metal
- asphyxiation if working in a confined space

You need to consider all hazards individually and take appropriate action to minimise risks, for example using local fume extraction equipment. You must also ensure that the correct personal protective equipment is always worn whenever required.

This leaflet is part of the welder's toolkit: whether you need welding tips, gases advice or safety guidance, you'll find it in the toolkit!

For more welding advice, visit boconline.co.uk/welders-toolkit

From the welder's toolkit: you may also like...

- Shielding gas: the right gas working for you
- Shielding gases for carbon and low-alloy steels
- Shielding gases for stainless steel
- Shielding gases for non-ferrous materials