

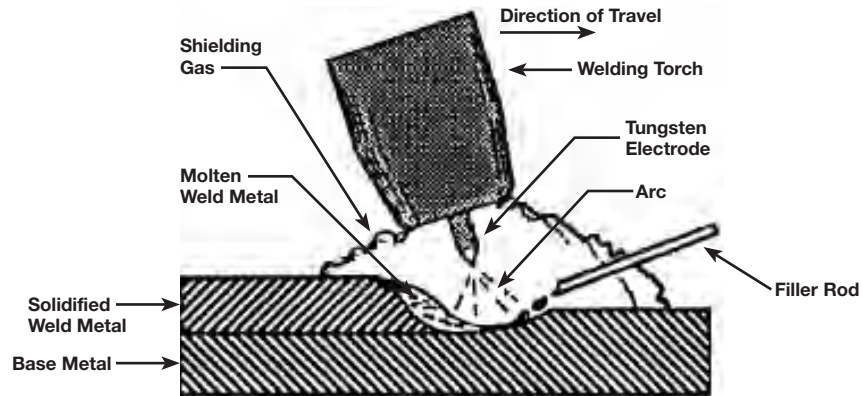
Product Information Report

TIG/Heli-Arc/Gas Tungsten Arc Welding



Overview

TIG welding is also known as GTAW (Gas Tungsten Arc Welding) or Heli-Arc welding. This process uses a non-consumable tungsten electrode to initiate an arc. The arc melts the base metal and the filler metal which is added to the molten weld pool. The inert gas shield protects the molten weld puddle from contamination.



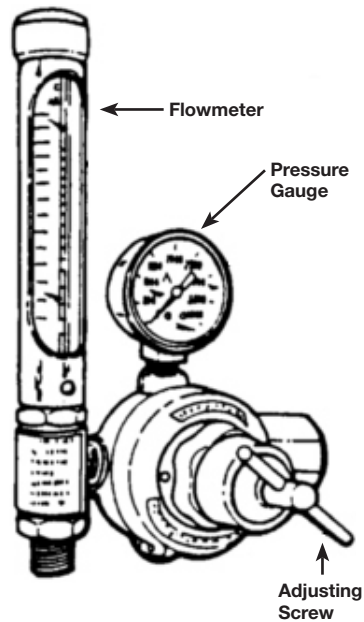
Advantages

- Excellent heat control allows joining of thin sections without burn-through
- The heat source and the addition of filler metal are separately controlled
- TIG can be used on almost all metals including aluminum, magnesium and titanium
- It is a very precise method and produces the best appearance of any process
- The weld is finished as-welded with no slag – typically, no cleanup is needed

Disadvantages

- It is the slowest welding process
- Exposure of the hot filler rod to the atmosphere can cause contamination
- Inert gas and tungsten electrode add to the cost
- Equipment costs are higher than other welding equipment

Gases



The flow rate of the gas is an important aspect of producing good TIG results. Flow rate, measured in CFH (cubic feet per hour), is a function of tungsten size and amperage and is normally set at 25 CFH on the regulator/flowmeter.

Argon, helium or a mix of the two are generally used as a shielding gas. (The term Heli-Arc is derived from the use of helium as the shielding gas.) Argon is generally preferred for the following reasons:

1. Easier arc starting
2. Better arc stability (smoother arc)
3. Better cleaning of metals when used in AC mode
4. Heavier than helium and therefore provides better coverage in drafty areas
5. Less expensive than helium

Exact gas selection depends on the type of work being done. Argon is the usual choice of maintenance welding shops. Argon is the best choice for aluminum, especially the 1100 grades. A mixture of 75% argon and 25% helium is best when welding heavy aluminum or austenitic stainless (308, 316, 304, etc.).

Polarity

DCRP Direct Current Straight Polarity (electrode negative) is used for TIG welding all metals except aluminum and magnesium.

ACHF Alternating Current High Frequency is used to weld aluminum and magnesium.

Tungsten Types

EWP Pure tungsten – Green tip color. Used for aluminum welding.

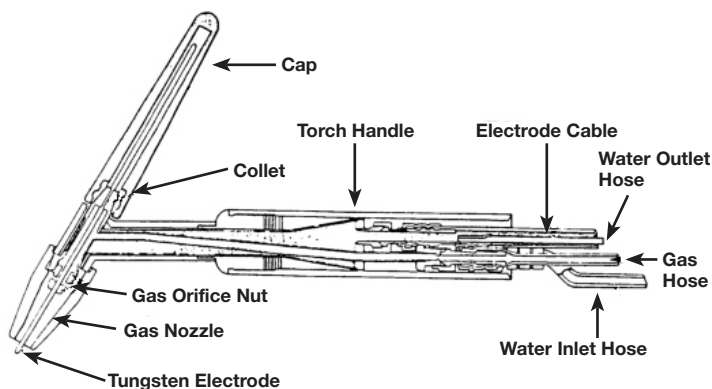
EWTh Thoriated tungsten – 1% yellow tip color, 2% red tip color.
Used for general welding.

EWZr Zirconium tungsten – Brown tip color. X-ray welds for stainless, titanium and pipe root passes.

EWCe Ceriated tungsten (rare earth) – Orange tip color. Holds up better to high heat and is more durable.

EWL Lanthanated (rare earth) – Black or light blue tip color. Best replacement for all other kinds of tungsten electrodes. Lasts longer and holds up better to high heat.

TIG Welding Torch Cutaway



Gas Tungsten Arc Welding System

