

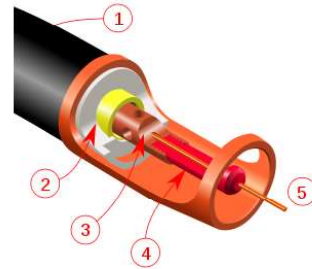
# Types & Applications of Welding – Overview

## Fact Sheet

### **GMAW** is Gas Metal Arc Welding; a.k.a. MIG (Metal Inert Gas) or wire-feed welding

This is the most common form of welding. This welding process uses a wire consumable electrode that matches the base metal and a shielding gas to protect the arc. There are several types of wire and several types of shielding gas which are selected based on a variety of factors. There are four common modes of GMAW transfer: short circuit, globular, spray, and pulse. These processes are used in industry based on the application. GMAW is found in most welding shops, especially for production and fabrication applications. It is also commonly found in custom welding shops, maintenance departments, and sometimes construction.

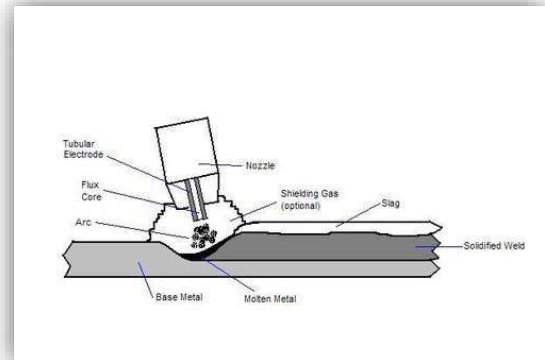
Shielding of the arc and the molten weld pool is often obtained by using inert gases such as argon and helium, and this is why GMAW is also called the metal-inert gas (MIG) welding process. Since non-inert gases, particularly CO<sub>2</sub>, are also used, GMAW seems a more appropriate name. This is the most widely used arc welding process for aluminum alloys.



GMAW torch nozzle cutaway image. (1) Torch handle, (2) Molded phenolic dielectric (shown in white) and threaded metal nut insert (yellow), (3) Shielding gas diffuser, (4) Contact tip, (5) Nozzle output face

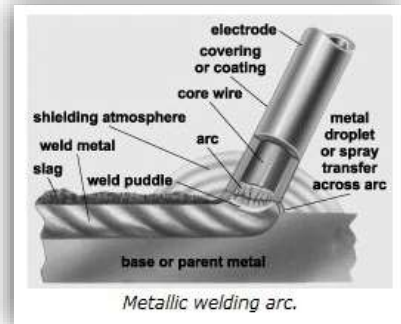
### **FCAW** is Flux Core Arc Welding

This is a wire-feed process that uses flux core wire, a hollow consumable wire with flux on the inside that helps to shield the arc and add properties to the weld. There are two main categories of flux core wire: FCAW-S and FCAW-G. FCAW-S is a self-shielding wire, meaning that it does not require shielding gas. This type of wire is beneficial for welding outdoors and is commonly used in construction because it provides the efficiency of GMAW without having to worry about wind blowing away shielding gas and causing weld defects. FCAW-G wire is often referred to as dual shield because it requires an external shielding gas along with the flux on the inside. This type of wire is commonly used in structural welding that is done in a shop and is beneficial because it provides the strength of FCAW with a better appearance than FCAW-S.



## SMAW is Shielded Metal Arc Welding; a.k.a. arc or stick welding

This welding process uses an electrode, a.k.a. welding rod, which consists of a metal core wire that is covered with flux. There are several types of SMAW electrodes that are used for different applications depending on the specific properties of the electrode. SMAW is commonly used in construction and maintenance because it requires minimal equipment and can be used outdoors. SMAW is also common in pipe welding because of the portability and the ability of the electrodes to penetrate better than other welding processes.



## GTAW is Gas Tungsten Arc Welding; a.k.a. TIG (Tungsten Inert Gas)

This welding process uses a non-consumable electrode made of tungsten to create an arc and an inert shielding gas, typically argon, to protect the arc. The welder often uses a filler wire that matches the base metal and is added to the molten weld puddle to add size and strength to the weld. This type of welding is commonly used to weld light gauge stainless steel, aluminum and magnesium. It is commonly used in the food industry and for thin stainless steel pipe. It is also used for welding on bicycles, motorcycles, boats, ships, etc.

