Equipment and accessories

Arc welding machines

A large variety of welding machines are available. They range from light-duty portable plants operating on household electrical supplies to the heavy-duty plants used for metal fabrication in the ship building, boilermaking and civil engineering construction work.
The welding plant is able to control the current output and two terminals are provided, one for the electrode cable and one for the work or return cable. A power supply cable connects to a suitable mains power outlet.

Power supply

Arc welding requires a continuous supply of electric current at a suitable safe voltage. This can be supplied by a self-contained generator set, which is a motor driven generator, or by a welding transformer, which, when connected to the mains electrical supply, reduces the voltage to a suitable welding level.

Both alternating current (AC) and direct current (DC) may be used for arc welding. The difference between AC and DC is that DC flows continuously in one direction through the welding circuit from negative (-) to positive (+) but in AC the current flows backwards and forward.

Electrodes

The electrode has two main functions:

• The metal core of the electrode conducts the current from the holder to form an arc, after making contact with the parent metal.

• The electrode deposits weld metal across the arc onto the parent metal.

The flux covering melts at a slower rate than the metal core forming a cup at the tip of the electrode which helps to direct the molten metal to the required spot

Types of electrodes

Manual metal arc welding electrodes consist of a core with an extruded flux coating. These coated electrodes are used extensively in the manual metal arc welding process in which covered electrodes are applied by the operator, without semi-automatic or automatic replacement of the electrode.

No protection, in the form of gas or gas mixture from separate source is applied to the arc or molten pool during welding, unlike GMAW.
The composition of the coating provides the flux, the protective shield around the arc and a protective slag which forms over the deposited weld metal during cooling.

There are four commonly used flux types used with MMAW electrodes:

- Rutile *(General purpose)*
- Cellulose *(Wood based)*
- Hydrogen control/Low hydrogen *(Must be stored at 100 degrees Celsius)*
- Iron powder *(High deposition rate)*