

CARPENTRY TRADE

LEVEL 4

LEVEL 4 CARPENTRY

MODULE NAME: CAPBW 401.PERFOM BASIC WELDING.

1 INTRODUCTION

Welding is the process of joining similar metals by the application of heat, with or without application of pressure or filler metal. In the beginning, welding was mainly used for repairing all kinds of worn or damaged parts. Now, it is extensively used in manufacturing industry, construction industry and maintenance work.

1. Electric arc welding,
2. Gas welding

However, only electric arc welding process is discussed in the subject point of view.

ELECTRIC ARC WELDING

Arc welding is the welding process, in which heat is generated by an electric arc struck between an electrode and the work piece.

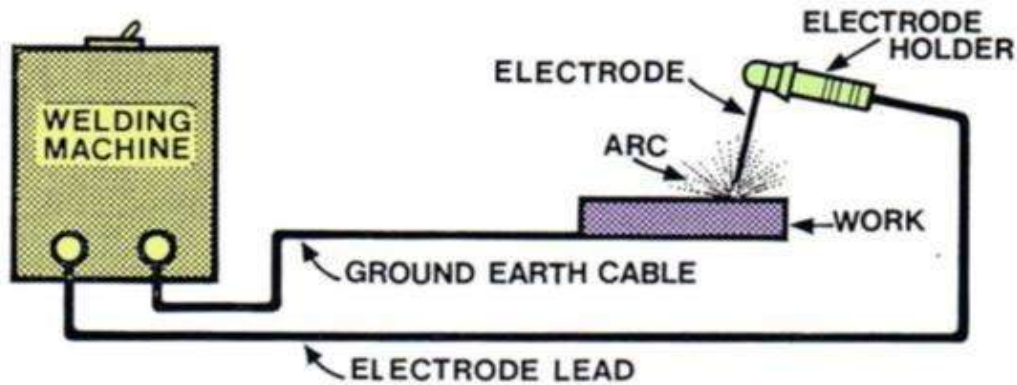


Figure 1.1: Arc welding set up.

Any arc welding method is based on an electric circuit consisting of the following parts:

- Power supply (AC or DC);
- Welding electrode;
- Work piece;
- Welding leads (electric cables) connecting the electrode and work piece to the power supply.

Transformers

The transformers type of welding machine produces A.C current and is considered to be the least expensive. It takes power directly from power supply line and transforms it to the voltage required for welding. Transformers are available in single phase and three phases in the market.

Motor generators

These are D.C generators sets, in which electric motor and alternator are mounted on the same shaft to produce D.C power as per the requirement for welding.

Rectifiers

These are essentially transformers, containing an electrical device which changes A.C into D.C by virtue of which the operator can use both types of power (A.C or D.C, but only one at a

time). In addition to the welding machine, certain accessories are needed for carrying out the welding work.

Welding cables

Two welding cables are required, one from machine to the electrode holder and the other, from the machine to the ground clamp. Flexible cables are usually preferred because of the ease of using and coiling the cables. Cables are specified by their current carrying capacity, say 300 A, 400 A, etc.

Electrodes

Filler rods used in arc welding are called electrodes. These are made of metallic wire called core wire, having approximately the same composition as the metal to be welded. These are coated uniformly with a protective coating called flux. While fluxing an electrode; about 20mm of length is left at one end for holding it with the electrode holder. It helps in transmitting full current from electrode holder to the front end of the electrode coating. Flux acts as an insulator of electricity. Figure.6.2 shows the various parts of an electrode.

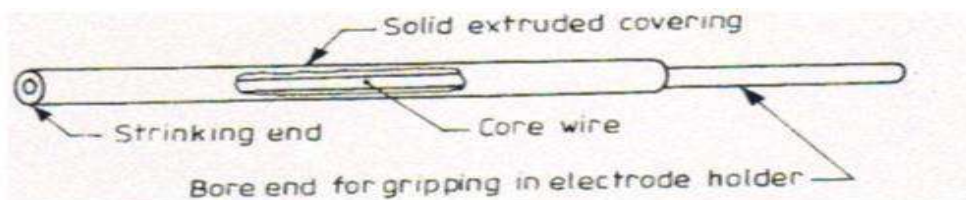


Figure 1.2: Parts of an electrode

In general, electrodes are classified into five main groups; mild steel, carbon steel, special alloy steel, cast iron and non-ferrous. The greatest range of arc welding is done with electrodes in the mild steel group.

While welding, the coating or flux vaporizes and provides a gaseous shield to prevent atmospheric attack.

WELDING TOOLS

Electrode holder

The electrode holder is connected to the end of the welding cable and holds the electrode. It should be light, strong and easy to handle and should not become hot while in operation.

Figure 6.3 shows one type of electrode holder. The jaws of the holder are insulated, offering protection from electric shock.



Electrode holder



Ground clamp

Ground clamp

It is connected to the end of the ground cable and is clamped to the work or welding table to complete the electric circuit. It should be strong and durable and give a low resistance connection.

Wire brush and chipping hammer

A wire brush is used for cleaning and preparing the work for welding. A chipping hammer is used for removing slag formation on welds. One end of the head is sharpened like a cold chisel and the other, to a blunt, round point.



Wire brush



Chipping hammer

Welding table

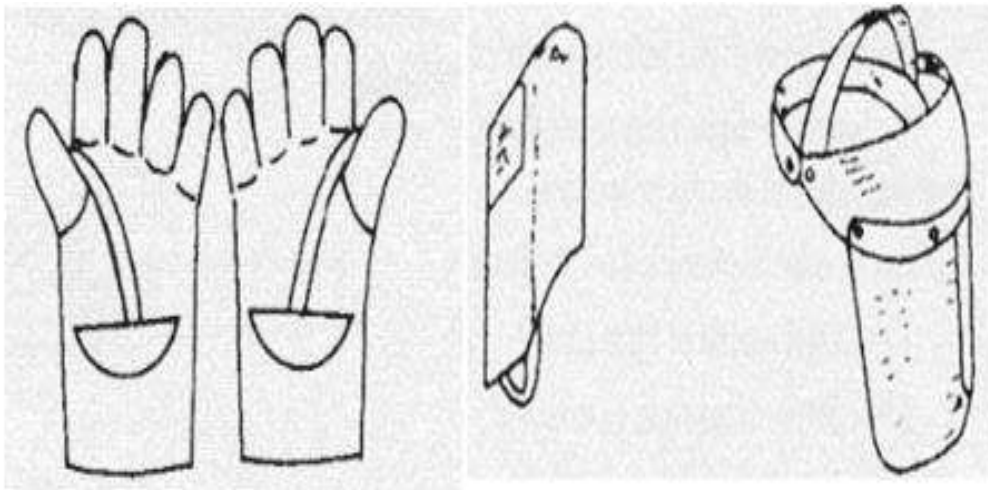
It is made of steel plate. It is used for positioning the parts to be welded properly.

Face shield

A face shield is used to protect the eyes and face from the rays of the arc and from spatter or flying particles of hot metal. It is available either in hand or helmet type. The hand type is convenient to use wherever the work can be done with one hand. The helmet type though not comfortable to wear, leaves both hands free for the work.

Hand gloves

These are used to protect the hands from electric shocks and hot spatters



Hand gloves

Face shield

TECHNIQUES OF WELDING

Preparation of work

Before welding, the work pieces must be thoroughly cleaned of rust, scale and other foreign material. The piece for metal generally welded without beveling the edges, however, thick work piece should be beveled to ensure adequate penetration and fusion of all parts of the weld. But, in either case, the parts to be welded must be separated slightly to allow better penetration of the weld.

Before starting the welding process, the following must be considered:

- a) Ensure that the welding cables are connected to proper power source.
- b) Set the electrode, as per the thickness of the plate to be welded.
- c) Set the welding current, as per the size of the electrode to be used.

FORMATIVE ASSESSMENT

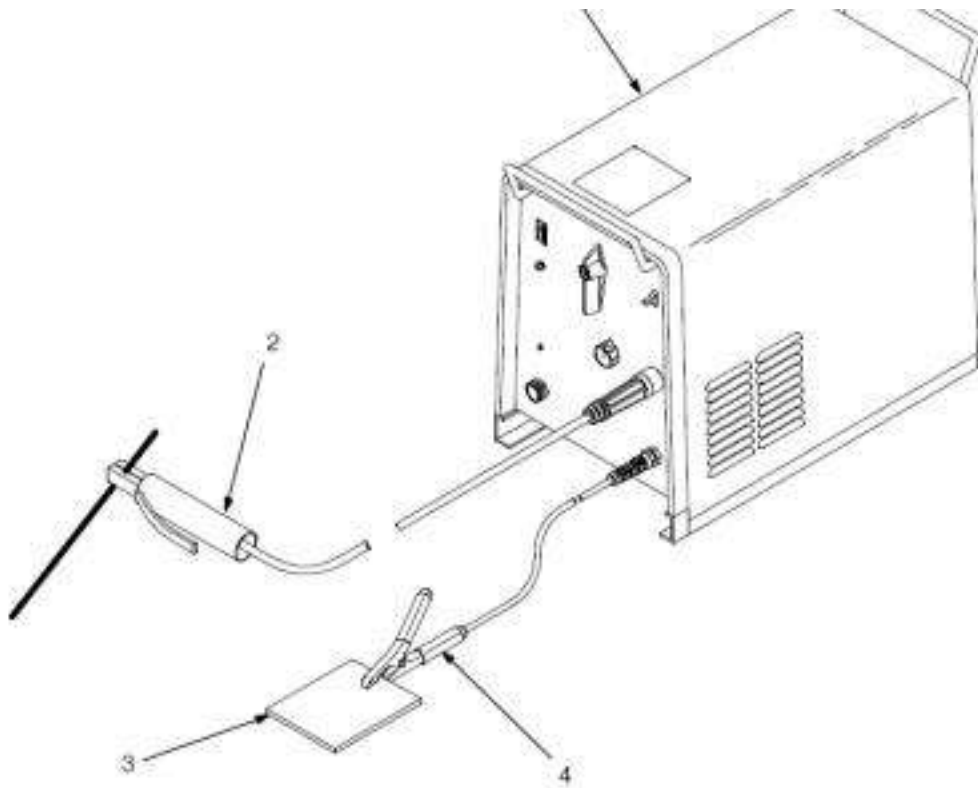
Date.....

MODULE NAME.....

LU 1 LO 1,2,3,4.

TRAINEE NAMES.....

1.Observe the Figure and name its parts.



2. Arc welding is the welding process, in which heat is not generated by an electric arc struck between an electrode and the work piece. TRUE or FALSE.

3. Welding is the process of joining similar metals by the application of heat ?
TRUE or FALSE.

4. Before starting the welding process, the following must be considered: TRUE or FALSE.

- a) Ensure that the welding cables are not connected to proper power source.....
- b) Set the electrode, as per the thickness of the plate to be welded.....
- c) Set the welding current, as per the size of the electrode to be used.....

5. One of the following materials is not welding material :

- a) Hand gloves
- b) Welding table
- c) Wire brush
- d) Claw hammer

COMPETENT

NOT YET COMPETENT