

tion The danger is particularly great in hot weather when he is sweaty

He should develop the habit of keeping his body insulated from both the work and the metal electrode and holder He should never permit the bare metal part of an electrode, the electrode insulation, or any metal part of the electrode holder to touch either his bare skin or any wet covering on his body

Consistent use of well insulated electrode holders and cables, dry clothing on the hands and body, and insulation from ground will be helpful in preventing contact

Some specific precautions for prevention of electric shock are

- 1 In confined places, cover or arrange cables to prevent contact with falling sparks
- 2 Never change electrodes with bare hands or wet gloves, or when standing on wet floors or grounded surfaces
- 3 Ground the frames of welding units, portable or stationary, in accordance with the *National Electrical Code* With a small welding unit, a primary cable containing an extra conductor, one end of which is attached to the frame of the welding unit, can be used By means of the proper polarized plug, this ground connection can be carried back to the permanently grounded connection in the receptacle of the power supply
- 4 Arrange receptacles of power cables for portable welding units so that it is impossible to remove the plug without opening the power supply switch, or use plugs and receptacles which have been approved to break full load circuits of the unit
- 5 If a cable (either work lead or electrode lead) becomes worn, exposing bare conductors, cover the exposed portion with rubber, plastic, or friction tape equivalent to the cable covering
- 6 Keep welding cables dry and free of grease and oil to prevent premature breakdown of the insulation
- 7 Suspend cables on substantial overhead supports if the cables must be run some distance from the welding unit Protect cables that must be laid on the floor or

ground so that they will not interfere with safe passage or become damaged or entangled

- 8 Take special care to keep welding cables away from power supply cables or high-tension wires

Gas-shielded arc welding

Gas-shielded arc welding (Fig 31-8) is used for joining all types of metals and castings In gas-shielded methods, only one electrode is used A gas or gas mixture is introduced through the torch to surround the electrode and the welding point like a shield The gas cone protects the molten weld puddle from the atmosphere and stops oxidation of the base metal The electrode conducts either alternating or direct current to provide heat.

Tungsten arc In gas-shielded tungsten arc welding, the electrode does not melt and is not used for filler metal The electrode is tungsten, which is highly resistant to heat and non-consumable in the welding process

Metal arc. In gas-shielded metal arc welding, the electrode melts and provides the filler metal (the word "metal" used in the title of this type of welding signifies that the electrode is consumable as filler) The need for filler rods on light gauge metals is eliminated if the pieces to be joined are fitted up closely The pieces are generally cut in a die and held in place with clamps or are set up in jigs for maintenance of close contact The clamps also prevent distortion of the metal from heat Because the gas shields the weld area, flux is not necessary and the spattering of molten metal associated with other types of welding generally does not occur

Argon, helium, carbon dioxide, and mixtures of these gases are used to shield the welding zone from the atmosphere Argon, having greater density, does not mix with the surrounding air as rapidly and is more widely used than helium in the welding of light-gauge metals The greater penetration obtained with helium makes it useful on heavier metals and castings

When pieces are not fitted up closely or when heavier metal is being welded, a filler metal, an uncoated welding rod of the same metal as the base metal weld, may be needed