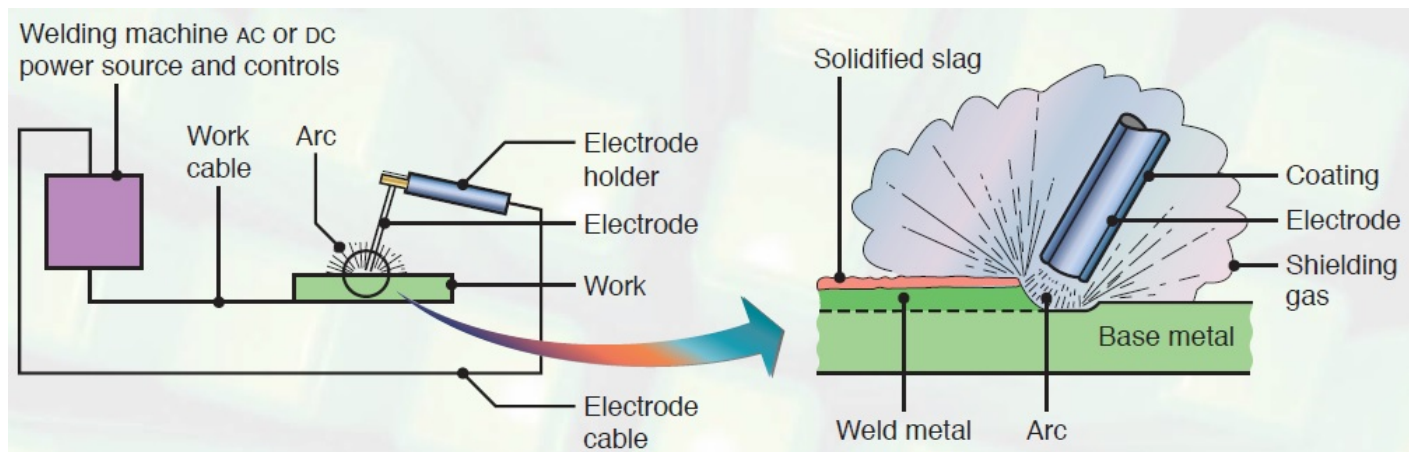


Shielded Metal-arc Welding (SMAW)

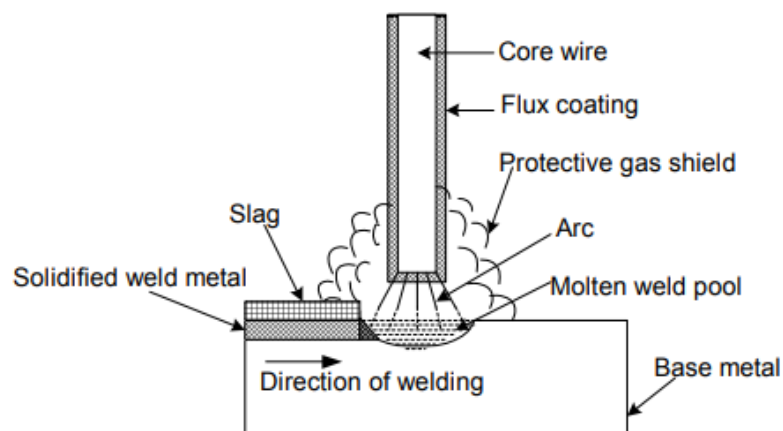
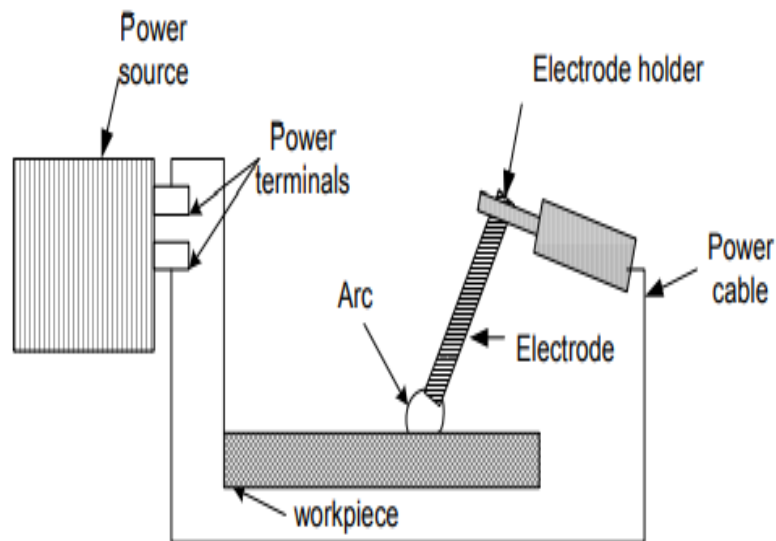
- ✓ **Shielded Metal-arc Welding (SMAW)** is the simplest and used for many joining processes.
- ✓ This is an arc welding process wherein **coalescence** is produced by heating the work piece with an electric arc setup between a flux-coated electrode and the work piece. The electrode is in a rod form coated with flux.
- ✓ More than 50% of industrial and maintenance welding currently is performed by this welding process.
- ✓ In this welding operation, an electric arc is generated by touching the tip of a coated electrode against the work piece and withdrawing it quickly to a distance sufficient to maintain the arc as shown in the picture below.



Shielded metal-arc welding process

- ✓ The electrodes are in the shapes of thin, long rods that are held manually.
- ✓ The heat generated melts a portion of the electrode tip, its coating and the base metal in the immediate arc area.
- ✓ The molten metal consists of a mixture of the base metal, the electrode metal, and substances from the coating on the electrode, this mixture forms the weld when it solidifies.

- ✓ The electrode coating de-oxidizes the weld area and provides a shielding gas to protect it from oxygen in the surroundings.
- ✓ A bare section at the end of the electrode is clamped to one terminal of the power source, while the other terminal is connected to the work piece being welded.
- ✓ The current may be either DC or AC usually in the range of 50 to 300 A.
- ✓ For sheet-metal welding, DC is suitable because of the steady arc it produces. Power requirement is generally less than 10 kW.



Application:

- This welding is used in marine and aerospace industries.
- It is used to weld pipes and tubes of stainless steel or titanium.
- It is mostly used in electronic industries.

- It is used to repair tools, die and mold.
- It is used to welding or coating on turbine blade.

Advantages and Disadvantages:

Advantages:

- Job of any thickness can be welded by shield metal arc welding
- This process is highly versatile and can be used extensively, for both simple as well as sophisticated job.
- Weld by this process can be made in any position.

Disadvantages:

- The main disadvantage if the shield metal arc welding process is slow welding speed.
- A lot of electrode material is waste in the form of unused end, slag and gas.
- There are more chances to slag inclusion in the bead.