

## PAIR ELECTRODE-FLUX

**Submerged Arc Welding (SAW)** is a common arc welding process. It requires a continuously fed consumable solid or tubular (flux cored) electrode. The molten weld and the arc zone are protected from atmospheric contamination by being "submerged" under a blanket of granular fusible flux. When molten, the flux becomes conductive, and provides a current path between the electrode and the work.

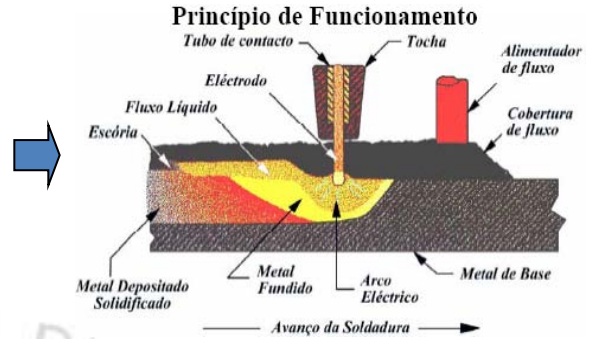


Fig.1-Submerged Arc Welding process

### Consumables

The consumables used on Submerged Arc Welding are the electrodes and fusible flux. Their combinations along with the base metal and the welding process determine the mechanical properties of the weld.

The electrodes are normally solid, continuously fed by a constant Voltage welding power supply. However Constant Current systems in combination with a voltage sensing wire-feeder are available, depending on the type and quantity of welding being performed.

The primary way to classify the solid electrodes is based on the amount of Mn present. The more Mn present, the bigger will the resistance of the deposited material be. It is necessary to select the electrode along with the flux, because this last one will also affect the amount of Mn present on the welding. Therefore when we select a consumable designation, we are referring to pair electrode flux.



Fig.2-Consumables (electrode and flux)

### Flux

The fluxes used on the Submerged Arc Welding may be classified by their chemical composition (Calcium silicate, Manganese silicate, etc), chemical characteristics (acid, basic, neutral) and relatively to the way they are made (Forged, multipass and multiuse).

Classificação de Fios e Fluxos para SAS  
Norma AWS A5.17-89 - Aços não Ligados

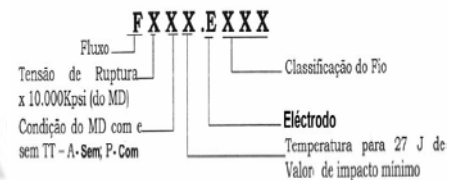


Fig.3-Electrodes and fluxes classification for Submerged Arc Welding

### Electrodes

The electrodes used may be solid or tubular (flux cored) wires, or solid or tubular tapes.

The flux cored wires require special attention when choosing the flux used, so that no incompatibilities are created between the flux and the electrode. DC or AC power can be utilized, and combinations of DC and AC are common on multiple electrode systems. These electrodes are normally used on structural and vessel applications.

The solid or tubular tapes are mainly used in coverings. They allow minor strains and higher rates of deposition and welding velocities.

### Pair Electrode-Flux

For an adjusted choice of the pair Electrode-Flux we must follow a few of basic rules, such as:

- The material deposited must be adequate to the welding being performed.
- Mechanical properties must be specified in the construction
- The contamination state of material to be weld.
- Depending on the thickness (welding current).
- If it is a multipass, mono pass or double pass joint.

### Código de Identificação Binário Fio/Fluxo - Aço não ligado/Grão Fino

EN 756 - S 46 3 AB S2

- **EN 756** - Norma aplicável ao Binário Fio-Fluxo para SAS
- **S** - Define que é um fio eléctrodo e/ou Binário Fio-Fluxo aplicável em SAS
- **46** - Código que define as propriedades mecânicas do metal depositado pelo material de adição (ver tabela)
- **3** - Código que define a temperatura à qual se obtém 47 Joules de energia de impacto (ver tabela)
- **AB** - Código que define o tipo de Fluxo com que se obteve a composição química do metal depositado (ver EN 760).
- **S2** - Código que identifica a composição química do fio Electrodo (ver tabela)

Fig.5-Identification code for the pair Electrode-Flux