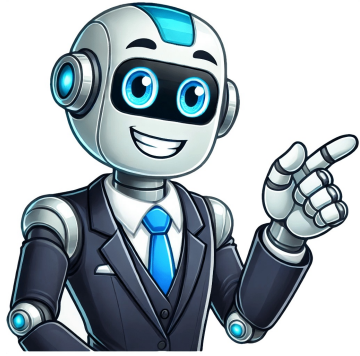


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while utilizing the strength and economy of the low-alloy steels for the wall thickness. A strip electrode feeder is required and special flux is normally used. When the width of the strip is over 2 in. (51 mm), a magnetic arc oscillating device is used to provide for even burn-off of the strip and uniform penetration.Other OptionsAnother way of increasing the deposition rate of submerged arc welding is to add iron base ingredients to the joint under the flux. The iron in this material will melt in the heat of the arc and will become part of the deposited weld metal. This increases deposition rates without decreasing weld metal properties. Metal additives can also be used for special surfacing applications. This variation can be used with single-wire or multi-wire installations.Another variation is the use of an electrically cold filler wire fed into the arc area. The cold filler rod can be solid or flux-cored to add special alloys to the weld metal. By regulating the addition of the proper material, the properties of the deposited weld metal can be improved. It is possible to utilize a flux-cored wire for the electrode, or for one of the multiple electrodes to introduce special alloys into the weld metal deposit. Each of these variations requires special engineering to ensure that the proper material is added to provide the desired deposit properties.

Typical ApplicationsThe submerged arc welding process is widely used in the manufacture of most heavy steel products. These include pressure vessels, boilers, tanks, nuclear reactors, chemical vessels, etc. Another use is in the fabrication of trusses and beams. It is used for welding flanges to the web. The heavy equipment industry is a major user of submerged arc welding.

Materials UsedTwo materials are used in submerged arc welding: the welding flux and the consumable electrode wire.Submerged arc welding flux shields the arc and the molten weld metal from the harmful effects of atmospheric oxygen and nitrogen. The flux contains deoxidizers and scavengers which help to remove impurities from the molten weld metal. Flux also provides a means of introducing alloys into the weld metal. As this molten flux cools to a glassy slag, it forms a covering that protects the surface of the weld. The unmelted portion of the flux does not change its form and its properties are not affected, so it can be recovered and reused. The flux that does melt and forms the slag covering must be removed from the weld bead. This is easily done after the weld has cooled. In many cases, the slag will actually peel without requiring special effort for removal. In groove welds, the solidified slag may have to be removed by a welders chipping hammer.

Fluxes are designed for specific applications and for specific types of weld deposits. Submerged arc fluxes come in different particle sizes. Many fluxes are not marked for size of particles because the size is designed and produced for the intended application.

There is no specification for submerged arc fluxes in use in North America. A method of classifying fluxes, however, is by means of the deposited weld metal produced by various combinations of electrodes and proprietary submerged arc fluxes. This is covered by the American Welding Society Standard. Bare carbon steel electrodes and fluxes for submerged arc welding. In this way, fluxes can be designated to be used with different electrodes to provide the deposited weld metal analysis that is desired.

References for SAWSubmerged Arc Welding Process

Submerged welding process. Submerged arc welding pipe. Submerged arc welding stainless steel. Submerged-arc welding.