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WELDING-TECHNOLOGICAL PROPERTIES OF SLAG SYSTEMS OF FLUX-CORED WIRE

Mykola Kakhovskiy¹
Yurii Kakhovskiy²

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One of the way to increase the productivity of welding is using a mechanized flux-cored wire welding. The main difference between flux-cored wire and solid wire is the powder core, which includes alloying, stabilizing, gas- and slag-forming components.

Flux-cored wires have several advantages, such as high surfacing/welding speed, high productivity, the ability to weld in open areas with wind or even under water (for self-shielding wires), the ability to provide any type of alloying, additional desulfurization of the weld metal, etc. [1, p. 84; 2, p. 16].

The main factor, which provides the special properties of flux-cored wire, is a slag-forming system, which volume can reach up to 70% of the weight of the wire.

Adding of slag-forming and deoxidizing components into the flux-core of the wire makes it possible to deoxidize the weld metal pool, intensively treat it

¹ Paton Electric Welding Institute, Ukraine

² Paton Electric Welding Institute, Ukraine

with slag and reduce the content of gases and non-metallic inclusions in it and significantly increasing its mechanical characteristics [3, p. 843].

According to today's classification, cored wires divides into the following types [4, p. 54].

Rutile type includes wires with a slag system based on titanium oxide. Low basicity slags characterize them. These slag systems make possibility to achieve high welding-technological properties during welding, small drops of metal transfer, as well as regulation of slag hardening speed by using fluxing components, which makes it possible to obtain the most favorable properties for welding in various spatial positions.

Basic type includes wires with a slag system based on fluorite. Due to the high basicity, this type of system allows to provide a high refining slag ability, reduce the level of metal oxidation and provide higher mechanical characteristics. However, the welding and technological properties are lower in comparison with the rutile type and characterized by bigger drops of metal transfer, as well as low stability of arc burning, which can be partially compensated by using of pulsed welding sources.

The metal core wires contain powders of iron, ferroalloys and other alloying components with small additives of slag components that increase the stability of arc burning and improve the welding and technological properties of the wire. However, the amount of slag components is usually not more than 2.0% of wire weight. The welding and technological properties of such flux-cored wires are similar to solid wires, but provides higher stability of arc burning and welding productivity.

Using of mechanized and automatic flux-cored wire welding is one of the priority areas in world welding production, and the choice of flux-cored wire type is depends on the conditions under which the structure will be using, financial costs of manufacturing of welded structures, specificity of welding technology and provision of specified mechanical properties.

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