



TECHNOLOGY OF ALUMINUM MELTING IN AN ELECTROSLAG FURNACE

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Metal losses during aluminum smelting can be divided into chemical (oxidation, interaction with nitrogen, carbon, etc.) and physical (losses of aluminum metal with slag, attachments, etc.) [1].

Currently, the following advantages of the electroslag furnace have been established:

1. Uniformity of structure and chemical composition.
2. The ability to adjust the composition of the metal by using the appropriate flux.
3. Improved properties at elevated temperatures.
4. Providing a surface quality that eliminates the need for surface cleaning during hot working.
5. Excellent hot working performance.
6. Molten metal is protected from atmospheric oxidation.

This large number of advantages of the ESR process is a consequence of the large number of degrees of freedom inherent in this process. The importance of degrees of freedom in technology has become increasingly important as the requirements for modern products become more complex [2].

The electroslag process is essentially a chemical process, and to fully realize its potential, knowledge of the basic reactions occurring is essential. The data could be obtained in an industrial setup, but experiments in it are expensive and tedious. For remelting, single-phase alternating current from an oil-cooled transformer (250V, 0-60 W) is used. The voltage in the secondary winding is switched steplessly; it is possible to obtain a current of 1000A for at least 15 seconds required to start remelting. Under steady-state remelting conditions, a current of approximately 400 A is required. Energy losses are reduced by transmitting high current at low voltage through copper bars of sufficient cross-section and through braids. 60A fuses are used; other instruments are represented by an ammeter 0-1000A and a voltmeter 0-100V. There are flow meters and devices for regulating the water supply to the crystallizer and tray [3].

The slag melts down and fills the volume in the lower part of the electrical chamber. After the slag is melted, aluminum shavings enter the coke-slag bath, contacting the molten slag, it begins to melt and settles at the bottom of the furnace.

Literature

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