



NATIONAL METALLURGICAL ACADEMY OF UKRAINE

TECHNOLOGY OF IRON-CARBON MELT TREATMENT FOR THE PURPOSE OF REFINING AND MODIFICATION BY THE IMMERSION OF ELECTRIC ARC IN LADLE FURNACE

Purposes and implication

The technology is used for refining and modification of iron-carbon melt by active reagents that are reduced in the melt due to the heat of electric arc. It significantly reduces the manufacturing cost of the final product as there is no need to use expensive materials that contain magnesium metal or calcium. The developed technology can serve national industries that possess metallurgical plants and systems to perform casting operations with liquid metal melt.

Key characteristics of the developed technology

The main advantages of the technology of iron-carbon melt treatment for the purpose of refining and modification by the immersion of electric arc in ladle furnace include low resource and power consumption, replacement of expensive materials needed for refining, modification, and alloying processes.

Intellectual property rights protection

Three patents for the utility model registered in Ukraine.

Specifications

Maximum degree of cast iron desulphurization is 97,2% with 98,14% magnesium consumption. Alloy heating speed is 10 – 14 °C/m, with 75 – 80% heat efficiency.

Market demand

The developed technology can be introduced in national metallurgical plants that employ ladle furnace without significant capital investment. Moreover, it can be used in any foundry works and metallurgical plant, with certain re-equipment.

Research development

There has been developed the design procedure of the parameters of treating iron-carbon melt by immersed electric arc that allow to control sulphur content as well as balance heat losses per treatment period. Magnesium treatment of cast iron (with magnesium reduced from oxide in the area where electric arc is immersed in metal) has been conducted in semi-industrial conditions.



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