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# AN ANALYSIS OF IMPROVEMENT METHODS FOR INTERNALSS OF NON-RUSTING STEELS, WHICH GET AT ELECTRO-SLAG REMELTING

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There are considered and analyzed various methods of improving for the quality of stainless steels at electro-slag remelting. There are shown the main shortcomings of technologies for the production of mentioned steels, the ways for optimization of these processes are aimed.
Keywords: stainless steel, electro-slag remelting, technological process, methods for improving the steel, the optimal composition of the flux

Metallurgical industry of Ukraine is one of leading in a country. On production volumes of steel Ukraine occupies an eighth place in the world and third - in Europe. In this connection the decisions of problem of improvement of steel quality, a decline of energy consumption at its making, introduction of the newest metallurgical technologies is a near-term task for development of metallurgy in a country [1].

An important place among the existent methods of making of high-quality steel is occupied electrometallurgy, in particular method of electro-slag remelting (ESR) [2]. At the use of the noted method a making of high-quality alloy non-rusting steel is possible.

With use of ESR method steel, what alloyed by chrome, are more frequent smelt. Noted steels are most economic in relation to alloying that is why they are applied in different industries of technique as heat-resistant material.

Taking into account the presence of non-rusting steels actual there is implementation of analysis of modern methods for their making with the purpose of exposure of ways for improvement of technological process.

The followings technologies for improvement of quality of steel, which is got the method of ESR are applied now: the uses of electrodes, which revolve, and also optimization of high-quality and quantitative composition for fluxes.

The method of improvement of quality and increase of thermal efficiency for electro-slag remelting by the action of electrode rotation speed, which spends [3], on the processes of melting, transporting and crystallization of metal take to the first group.

The lack of such technologies is relatively rapid to come off-line details of holder of electrode, which is revolved.

The method of improvement of quality of non-rusting steels application of fluorine fluxes and optimizations of them behaves high-quality and quantitative composition takes to the second group.

Most distribution was got by an electro-slag remelting with the purpose of the deep desulphurization, affinage of metal from nonmetallic inclusions and making of the dense casted structure. For its achievement the row of fluxes is worked out on the base of the systems of calcium fluoride with the thermodynamics strong calcium,

aluminum and magnesium oxides. Such fluxes are characterized by considerable refining ability and have a complex of physical and physical and chemical properties which provide the resistant mode of remelting [4].

Flux ANF-6, that consists 30 % aluminum oxide and 70 % calcium fluoride, apply at the remelting of steel of many marks. However at the remelting of non-rusting steels under the noted flux on account of high content in its there is substantial renewal of the noted metal which results in creation in the re-fused metal of row of defects («since», «slate fracture» and other) the aluminum oxide.

At the production of welding fluxes as components use the calcium and magnesium oxides, and also magnesite powder and derbyshire spar [5].

Also a flux, which consists of aluminum oxide (35-65 %), magnesium oxide (10-20 %) and calcium fluoride (25-55 %) use [6]. Such flux is applied for the remelting of steel and alloys with considerable content of active elements, for example to the aluminum, to titan and other.

At remelting from the use of such flux arrive at satisfactory technique-economy factors. To its advantages it follows to take privation from valuable technologies of preparation each of flux components, and also exception of necessity for charges, related to conditioning of transporting and storage of its the separately prepared components. However there is noticeable renewal of aluminum which in a number of cases causes the decline of metal quality. Except for that, necessary quality of surface of bars is not provided and process accompanied by considerable electro-charges.

It should be noted that in some cases a necessity can appear for very careful control of content of separate elements, which existent methods do not allow high-quality to provide. It is therefore necessary to perfect existent technologies of making the high-quality non-rusting steels by method of ESR.

In our view, development of technology of improvement of mechanical properties of non-rusting steels is perspective with the use of alkaline-earth metals [7]. Such methods scalene influence on quality of noted steels, namely on mechanical properties, especially in transversal in relation to a fiber direction which assists the substantial decline of anisotropy of properties. Due to these methods of improvement of stainless steel in ESR it was educed, that the noted steel has closeness more than in steel that smelt in an ordinary arc furnace. A surface of bar after application of ESR is absolutely even and does not need tooling before forging.

*Conclusions.* At the analysis of existent methods of improvement of quality of non-rusting steels, got the method of electro-slag remelting, it is set:

1. The known methods of improvement of quality of steels have a row of substantial defects, in particular relatively rapid to come off-line equipment for holders of electrodes which are revolved; and also absence of careful checking of content of separate elements of fluxes feature.

2. The above-mentioned methods, to our opinion, need further research, adjustment and modernization. It was suggested to investigate adjustment of content of constituents of this flux by addition of alkaline-earth metals and supervision of treasons in the technological process of electro-slag remelting toward the improvement of this mark of steel.

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