

AP23489348. Development and research of exogenous suspension casting technology for the production of alloyed castings using modifiers and foundry waste. sc.sp. – Isagulov A.Z.

Relevance: Modern production places high demands on the quality of cast parts. It is possible to ensure the quality of castings by forming a homogeneous dense structure of the casting. In turn, these indicators can be obtained by regulating the rate of solidification of the casting and the distribution of alloying elements inside it. One of the promising methods of controlling the structure of the casting is lost foam casting using inoculants. Using modifiers simultaneously with inoculants makes it possible to regulate the number of crystallization centers and the distribution of alloying elements. It is proposed to use foundry waste (scrap, defective products) as inoculants that which will have a positive effect on the sanitary and hygienic situation in the foundry shop and will make it possible to reduce the cost of casting.

Project objective: developing and implementing the technology of manufacturing castings by exogenous suspension casting using dispersed inoculants to improve the quality of castings typical for alloyed castings.

Expected and achieved results:

- analysis of improving the quality of casting in world practice and selection of basic process modes;
- literature review of process modes and casting methods for regulating the structure and properties of castings;
- literature analysis of the features and methods of suspension casting for regulating the properties of ingots.
- experiment planning, drawing up an experiment matrix, conducting basic experiments to develop the composition of the polystyrene model and fraction and the composition of the inoculants used.

The analysis of improving the quality of casting in the world practice and in the Republic of Kazakhstan was carried out. It was determined that one of the most common methods of obtaining high-quality castings is their manufacturing by the lost foam casting method. This method allows producing castings with a wide range for various industries: mining, construction, energy, etc. It was revealed that one of the promising methods of controlling the structure of castings was lost foam casting using inoculants that were used as foundry waste. The use of local microparticles for the foundry will make it possible to reduce rejects due to casting defects, to reduce the labor intensity of work to correct defects and the holding time of castings in the mold, to improve physical, mechanical and special properties which will lead to increasing the service life of cast parts.

List of publications

1. V.Yu. Kulikov, Sv.S. Kvon, A.Z. Issagulov, A.A. Kordasheva. Improving the quality of castings using exogenous suspension casting// Foundry production, 2024, No. 9. P. 15-18.

Research team

It includes 8 performers, of which 4 people are under 40 years old, 7 people have an academic degree.

The consultant is PhD, Associate Professor P.V. Kovalev (Peter the Great SPbPU, St. Petersburg, Russia).

Information for potential consumers

The obtained scientific results can be applied in the development of new productions and sections of metallurgical and foundry production.

Scope

This program can be used at foundry metallurgical and machine-building enterprises.

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