

1. **A.O. Demenok, S.P. Pavlinich, O.B. Demenok.** Mixture for producing rods for producing blades GTE from heat-resistant alloys.

A core sand mixture based on electrocorundum and fused quartz is proposed for the production of cores forming the internal cavity of a cooled working turbine blades (GTE) made of heat-resistant ZhS6U alloy with equiaxial structure. The dependence of the bend strength and deflection upon bending and thermal expansion, as well as other characteristics of the sand formulation, were studied in the temperature range 20—1200 °C. According to the results of the quality control of the blades, the use of cores from the developed material makes it possible, to eliminate defects on them almost completely by filling, clogging, and to reducing percentage of rejection of the blade wall thinning.

Keywords: ceramic core, cooled blade, core sand mixture, heat-resisting alloy, internal cavity.

2. **V.V. Bekov, I.V. Kostylev, A.A. Pavlov, V.A. Ivanova.** Design and technological solutions for production of pistons from cast iron with vermicular graphite for gas piston engines.

The design and technological solutions for the production of pistons from cast iron with vermicular graphite for gas piston engines are proposed. A reduction in the mass of a piston set (piston, pin) made of CWG is achieved in comparison with an aluminum-based alloy. A technology has been developed for producing a piston casting from CGI with a wall thickness of 4 mm by casting into sand molds using a sand rod.

Keywords: piston, engine, cast iron, vermicular graphite.

3. **D.A. Boldyrev, L.I. Popova, S.G. Prasolov, S.V. Davydov, A.A. Tokarev.** Electron microscopic examination composition of microinclusions of impurity phases of gray cast iron.

The content of uncontrolled impurity carbide-forming elements in zones of microstructure with interdritic distribution of graphite of types D, E of casting of pressure plate from gray pearlite iron of grade 25 was analyzed. It was found that these elements are contained in complex sulfide-phosphide and carbonitride phases. Element composition of impurity inclusions is qualitatively identified. The effect of carbide formers on the formation of zones with an interdritic distribution of graphite is concluded.

Keywords: electron-microscopic analysis, X-ray spectral microanalysis, carbide formers, interdritic distribution of graphite.

4. **I.A. Strelnikov, D.A. Pestryaev, Sh.V. Sadetdinov.** Influence of glyceroborate compounds on physical and mechanical properties of alumophosphate binder and mixtures.

The results of a study on the effect of the glyceroborate complex (GBC) of the general formula $(CH_2O)_3BH$, glyceroborate complex of oleic acid (GBCOC) of the general formula $C_{17}H_{33}COOXH(CH_2O)_2BH$ and glyceroborate complex of stearic acid (GBCC) of the general formula $C_{17}H_{35}COOXH(CH_2O)_2VON$ on the physical and mechanical properties of the aluminum phosphate binder and mixtures. The experimental data show that GBq, GBAK and GBXC are catalysts and speed up the process of hardening mixtures on alumophosphate binder, enhance its bonding properties and strength of composites, and reduce their fall, improve the formability, reduce the residual strength and work knockout. The developed compositions of alumophosphate binders and mixtures using glycerol borate compounds meet the requirements of practice in terms of technological characteristics and can be recommended for the manufacture of molding and rod mixtures in foundry production.

Keywords: aluminum phosphate binder, glyceroborate complex, oleic acid glyceroborate complex, stearic acid glyceroborate complex, binding properties, survivability, crumbling, formability, compressive strength, residual strength, knocking operation.

5. **A.I. Bezrukikh, V.V. Yanov, V.N. Baranov, P.O. Yuriev, N.A. Stepanenko.** Development of an automated physical model of a melting and casting complex for producing small-section ingots from experimental aluminum alloys.

The thesis describes the technical parameters and capabilities of the physical model of the smelting and foundry complex — an installation for semi-continuous casting of ingots from aluminum alloys, created at the Institute of Nonferrous Metals and Materials Science of the Siberian Federal University (Krasnoyarsk) with the assistance of RUSAL. The installation is a scaled 1:10 physical model of a cable casting machine for vertical continuous casting of flat ingots from standard and experimental aluminum alloys. The instrumental technological scheme and description of the facility's capabilities are presented, its main characteristics are presented. The design of the installation provides for the possibility of modernization in the shortest possible time for testing experimental foundry equipment (molds) and technological equipment of various designs. Foundry equipment is designed and manufactured to produce ingots of various sizes — 60 S 200, 80 S 180, \varnothing 195, \varnothing 70 mm. The automated control system (ACS) ensures the accuracy of regulation and recording of the main parameters of the installation in a wide range of values, which makes it possible to obtain the structure of cast billets under cooling conditions close to industrial ones. The versatility of the equipment layout allows the use of the complex for the production of ingots by the method of semi-continuous casting into a mold with or without heat packing from new or experimental aluminum alloys. The complex also provides ample opportunities for testing prototypes of technological equipment and various technical solutions in the field of foundry production of the aluminum industry.

Keywords: aluminum, aluminum alloys, semi-continuous casting, tooling, smelting and foundry complex, ingots.

6. **S.A. Kishkin.** Suggestions for solving problems in CAD — systems when developing 3D models and drawings for cast parts and castings.

The article discusses proposals for improving CAD — systems in the development of 3D models and drawings for cast parts and castings. These problems and suggestions are relevant not only for drawings and 3D models of cast parts and castings, but also for parts obtained by hot forging with subsequent mechanical processing.

Keywords: castings, cast parts, drawings, dimensions, allowances, fillets, slopes.

INFORMATION

What, where, when, who, to whom, how much, why?

1. About holding the XV Congress of Russian foundry workers and the BRICS International Foundry Forum.
2. «All-Russian Student Olympiad».
3. International Exhibition «LITMASH-2021».