

## Recommendations of the 15th Congress of Foundry

### Anniversary BRICS International Foundry Forum November 9—12, 2021

1. **V.I. Nikitin, K.V. Nikitin, R.M. Biktimirov, S.A. Akishin, A.P. Novikov** Improving the quality of AK9ch alloy by gene engineering methods

An analysis of the literature data on the modification of the AK9ch alloy and the production of chill castings in the conditions of an aerospace enterprise is presented. The results of research on the production and use of microcrystalline modifiers are presented, and the high efficiency of gene modification of hypoeutectic silumin is shown.

**Keywords:** microcrystalline modifiers, silumin, TGI, structure, physical and mechanical properties.

2. **A.V. Zhernokleev, P.V. Vagaysky.** Inductotherm melting equipment.

Brief historical data of the Inductotherm Group Corporation and achievements in the production of crucible induction furnaces for melting ferrous and non-ferrous alloys. The advantages of the furnace design are given, which allow providing high performance indicators, efficiency while maintaining savings in electricity costs.

**Keywords:** Induction furnace, current frequency, charge, electric power.

3. **E.V. Sukhorukova, E.V. Velmezova, V.A. Kechin, V.N. Sharshin.** Influence of indium on the properties of tin alloys.

The results of studies on the influence of indium on the shape filling and strength characteristics of tin alloys used for artistic casting are presented. It is shown that the best combination of technological and operational characteristics is provided by tin alloys of the Sn—Sb—Cu—In system containing 4.0—6.0% indium.

**Keywords:** tin alloy, indium, fluidity, strength, hardness.

4. **T.R. Gilmanshina, I.E. Illarionov, E.N. Zhirkov, A.A. Kovaleva, S.I. Lytkina, S.A. Khudonogov, T.N. Stepanova, S.L. Nazarov.** Control of the structure of the surface layer of cast iron castings

The paper presents the methodology and results of the study of the dependence of the microstructure of the surface layer of cast iron castings on the composition of the graphite-bentonite coating of foundries. It is shown that coatings based on a mixture of natural and activated graphite allow controlling the microstructure of the metal base and graphite inclusions of the surface layer of the casting.

**Keywords:** casting mold, graphite-bentonite coating, metal base, graphite inclusions.

5. **M.A. Filippov, L.A. Moshechkova, S.O. Morozov, V.A. Sharapova, V.P. Shveikin.** Influence of high and low temperature treatment on the structure and abrasive wear resistance «Spanish».

Metallographic, micro-X-ray spectral, and X-ray diffraction analyses have shown that an increase in the heating temperature for quenching of hard chromium-nickel cast iron from 900 to 1150 °C leads to the preservation of its high abrasive wear resistance, despite a decrease in the initial hardness before the test from 60 to 35 HRC due to the fact that the phase composition of the metal base before the wear test changes during quenching from medium-carbon martensite with secondary cementite to a residual metastable austenite, which helps to increase

the crack resistance of cast iron. In the process of wear testing or operation, austenite on the working surface, as a result of the impact of abrasive particles, turns into dispersed friction martensite, which, together with a part of cementite, provides a high level of hardening and operability of the secondary microstructure of cast iron.

**Keywords:** abrasive wear resistance, quenching of cast iron, nihard, cold treatment.

6. **A. Popov.** Core-making technologies of Laempe by foundries worldwide in 2020.

The article describes the state of the modern foundry industry in the world, current development trends. Shown are new types of core-making equipment, which are actively used in foundries worldwide, and promising technologies such as 3D printing of cores.

**Keywords:** core-making machines and automatic lines, development trends, 3D printing of cores, foundry modernization

7. **V.I. Verbitsky.** Management of pre-compaction of the mixture on automatic molding machines.

Based on the experience of shaking-press molding control, it is recommended, first of all, to optimize the pneumo-impulse molding systems, which is possible only with the use of effective mathematical models. On existing molding machines, the control of the preliminary compaction of the mixture is simply realized only by changing the pressure of the compressed air in the receiver. It is assumed that the best result of preliminary compaction is not the highest density of the mixture, but the maximum uniformity of compaction of layers and volumes of the mixture in the entire mold.

**Keywords:** process control, compaction, mathematical model, air pulse, mixture density.