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DEVELOPMENT OF RESOURCE-SAVING TECHNOLOGIES FOR THE PRODUCTION OF HIGH-QUALITY MAGNESIUM ALLOY CASTINGS FOR AIRCRAFT ENGINES

The creation of new and modernization of existing aircraft engines with increased characteristics and service life imposes high requirements on magnesium alloys, from which some of their parts are made. At the same time, a very important factor is the reduction in the cost of components, which is possible due to the use of resource-saving technologies in their production.

The technologies used today in the production of aviation magnesium casting involve the use of expensive charge materials of Russian production and carry the risk of instability in the operation of aviation enterprises. Today, there are no technological solutions for the use of domestic materials to obtain high-quality castings from magnesium alloys with an increased set of mechanical and special properties.

The solution to this problem is connected with the necessity of development of new resource-saving technologies of production of aviation casting using domestic charge materials, including wastes of metallurgical enterprises and foundry waste.

Based on the research of chemical composition and analysis of physicochemical properties of wastes of regional metallurgical enterprises, it was established the possibility of their use as charge materials for production of alloys based on magnesium. This allows not only to reduce import dependence in production of magnesium casting, but also to reduce the cost of finished products, to increase efficiency of its production.

The furnace technologies for the production of magnesium alloys using waste from metallurgical enterprises have been studied. Technologies for modifying

magnesium castings using carbonaceous waste and refining the melt using chloride waste have been developed and studied.

It has been established that the developed technologies do not require any additional changes in the technological process of smelting and obtaining a magnesium alloy, while environmental safety meets the established standards. Recommendations have been developed for the preparation and use of waste in the production of magnesium alloy castings. The use of metallurgical waste in the smelting of magnesium alloys allows to significantly reduce the costs of its production, improve the environment and reduce the costs of waste disposal.

The application of developed technologies in the production of castings from advanced magnesium alloys allowed to increase their tensile strength by 25%, and ductility by 30%.

The use of high-quality magnesium alloy castings with a high level of mechanical and operational properties will allow to increase the operational reliability and increase the service life of aviation units.