# Numerical Simulation of the Possibility to Use Magnetodielectric Composite to Maintain Work Efficiency of Electromagnetic Stirrer

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## Abstract

Electromagnetic stirring technology occupies an important place in metallurgy, it's successfully applied in doping and thermostating processes intensification. Growth of requirements for energy efficiency leads to need the modernize stirrer units, one of its directions is to compensate for a large non-magnetic gap. Previously, study of using a high-temperature magnetodielectric (HMD) composite inserts to compensate for a large non-magnetic gap between stirrer induction and molten metal was conducted [1]. In this article considers the possibility to use HMD composite inserts, to maintain the stirring efficiency with increasing melt volume. Time of temperature gradient equalization in the melt was used as estimation parameter. For its calculation, a three-dimensional numerical simulation of a laboratory stirrer was carried out. It included three parts: electromagnetic, hydrodynamic and heat transfer. Effect of the shape and position of inserts on character and efficiency of stirring for different volumes of melt was considered. Obtained results may be used to development of a universal electromagnetic stirrer with HMD composite inserts, for metallurgical aggregates with different volume of melt.

## References

1. K. Bolotin and I. Smolyanov and E. Shvidkiy and V. Frizen and S. Bychkov. Numerical Simulation of Electromagnetic Stirrer Modernized by Using a Magnetodielectric Composite. Magnetohydrodynamics, vol. 53, no. 4.