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## **Electromagnetically rotating immersed object for stirring operation in a continuous glass melting tank furnace based on the Tesla “Columbus egg” demonstrator**

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Currently, to obtain high quality glass sheets in fuel-fired floating molten glass furnaces, the operation process has long retention time (5 to 10 hours) due to very weak flow circulation and mixing in the large continuous melt tank, where temperatures in the order of 1500°C are developed. This investigation provides a novel solution to reduce these processing times based on electromagnetic stirring (EMS) driven by one or several devices mounted externally and located below the refractory containing the melt moving stirring objects which are controlled by rotating magnetic fields. This idea is based on a device called Tesla “Columbus egg” [1] which has not been previously applied other than as demonstrator. A glass melt stirring force is generated to circulate flow with velocity in the range 1-10 cm/s. This new procedure will enable the glass melting process become faster, significantly reducing retention time [2] and thus increasing glass manufacturing productivity.

[1] N. Tesla, “System of Electrical Distribution”, U.S. Patent 0381970A. May 1, 1888.

[2] E. Salinas et al. “A continuous glass melting tank with an immersed stirring body”, Patent WO 202/178051 A1. September 10, 2020.

**Primary author(s) :** Dr SALINAS, Ener (Hitachi-ABB Powergrids)

**Presenter(s) :** Dr SALINAS, Ener (Hitachi-ABB Powergrids)

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