

# Verification of a Discrete Phase Model with Water-Particle Flow Experiments in a Tundish

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*Simulation of the melt flow, considered as a continuous phase, incorporating non-metallic inclusions and gas bubbles, represented as a discrete phase, is performed for the continuous casting tundish. A Discrete Phase Model (DPM) is employed in the Lagrangian frame of reference to track particles' motion whereas an Eulerian formulation is simultaneously used for the continuous phase. Different forces (viscous drag, lift force, buoyancy etc.) acting on the Lagrangian particles along their trajectories are taken into account as well as a stochastic behavior of the surrounding turbulent flow. The current study focuses on the verification of the numerical model and corresponding simulation results. Water modeling experiments were performed for a tundish flow with two different particle sizes. Being lighter than water, particles were captured at the framed top surface of the tundish and their measured distribution was used to verify the modeling results. The numerical simulations show good qualitative agreement with the experiments. The presented studies will help to improve the understanding of the transportation, separation and agglomeration mechanisms of non-metallic inclusions and gas bubbles in a turbulent melt flow. Their application in continuous casting will aim to increase inclusions removal and decrease defects formation in the final product.*

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