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Advanced fluid flow simulation for the RH process

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In the RH process, the continuous circulation of liquid steel between the vacuum chamber and the ladle significantly affects decarburization and degassing rates as well as the productivity. Several CFD (Computational Fluid Dynamics) models have been developed to simulate the transient multiphase flow of melt and injected inert gas in RH plants in order to investigate the effect of different process parameters such as ladle size, snorkel length, immersion depth of snorkel, inert gas flow rate and number of tuyeres. The numerical results are compared with published analytical calculations and used to determine the homogenization time for different process parameters. The simulations show, among others, specific melt flow phenomena such as intensive surface fluctuations but also local dead water regions. These results can help to improve currently implemented RH degassing processes.

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