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Natural convection in aluminium ingots

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**Web of Science Id**[WOS:000080238900041](#)**Abstract**

We have designed an experiment to simulate natural convection in a direct-chill aluminium ingot. In this experiment we induce natural convection within a hemisphere filled with liquid-metal (mercury). The device consists of a copper hemispherical bowl closed by a copper plate. The top is maintained at superheat temperature while the boundary is cooled. While the temperature measurements were found using thermocouples, the velocities were obtained using an original technical procedure that relies on MHD properties. By applying a steady local magnetic field, we measure the velocity. The distribution of temperature and velocity can be separated into a thermally stratified core bounded by thermal wall jets. These wall jets greatly influence the degree of macrosegregation in ingots.

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