Mould Powder Requirements for High-speed Casting

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Mould powders play an important role in the stability of the continuous casting process of steel. The main functions of mould slag (i.e. molten powder) are to provide sufficient lubrication and to control the heat transfer between the developing steel shell and the mould. Sufficient lubrication requires an undisturbed melting of mould powders and uniform infiltration of mould slag. Based on the casting practice in IJmuiden, it is found that these demands become even more important for the applied high casting speeds in thin slab casting at 5 to 6 m/min. At Corus RD&T, mould powders were characterised by X-ray diffraction and subsequent fully quantitative Rietveld analysis. Additionally, the melting of mould powders has been studied in-situ using high-temperature X-ray diffraction, to gain crucial knowledge about melting relations. Slag rims obtained from the thin slab caster mould were characterised using extended microscopic techniques in order to describe the mechanisms of rim formation and growth. Finally, slag films obtained after casting were characterised. As a result, not only the melting process of mould powder, but also the mechanism of formation and growth of slag rims is much better understood. This knowledge will be applied to define the demands on the composition and properties of mould powder for even higher casting speeds.

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