

论文

连铸中间包内三维湍流流动的数值模拟

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摘要: 连铸中间包的操作条件决定了其内流动现象的复杂性,为此,本文选择两种不同的湍流模型k-ε和LES(Largeeddy simulation),建立了描述连铸中间包内三维湍流流动的数学模型,并实施了数值计算和模型验证,对单流中间包内的流动现象进行了描述,考察了有、无流动控制情况下中间包内的流动特征和湍流模型的合理性.结果表明,合理的流动控制有利于中间包内非金属夹杂的上浮和吸附,用k-ε模型基本上能够描述中间包内的流动现象,LES则能描述用k-ε模型所不能很好描述的现象.

关键词: 连铸中间包 湍流流动 湍流模型 数值模拟

NUMERICAL SIMULATION OF THREE-DIMENSIONAL TURBULENT FLOW IN CONTINUOUS CASTING TUNDISHES

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Abstract: A Mathematical model to describe three-dimensional turbulent flow in continuous casting tundishes has been developed by choosing two different types of turbulent model as k-εand LES(Large eddy simulation). Numerical calculations have been performed to study the characteristics of flow in the tundish without/with now control,and the reasonability of the turbulent models has been discussed.The results show that the proper flow control is in favor of inclusions floating in the tundish;basically, the phenomena of flow in the tundish can be described by using traditional k-εmodel, however,the phenomena which could not be well calculated by k-εmodel can be described by using LES.

Keywords: continuous casting tundishes turbulent flow turbulent model numerical simulation

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