

Flow analysis in electric arc furnace using 3D computer simulations to study ways to reduce the production and release NO_x

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Abstract:

Measurement difficulties and physical complexities for mathematical modeling's caused to numerical simulation assumed as the most suitable way to study flow field and heat transfer in electric arc furnace. Harmful gas from NO_x family in electric arc furnace result to acidic rains and fog. Investigations show that NO_x production mainly extracted from Zeldowich and thermal mechanisms which formed in the period of slag removal from the furnace. The main reasons for such a phenomena are high temperature and presence of Oxygen and nitrogen in air penetrated to the furnace when the furnace door is opened .The present study includes a 3D modeling of the flow field and heat transfer to simulate electric arc furnace when the door is opened and in period of slag removal. The air flow is carefully studied In furnace and door type and Nox formation studied where door position and type are changed. Results show that door type is not so important in NO_x formation but the best location to reduce NO_x content is the place in opposite of outlet elbow for dedusting facility.

Keywords: Electric arc furnace, Pollution Control, NO_x ,CFD.