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Measuring Technologies for DRI-fed Electric Arc Furnaces

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We present a design and the results of several trials of a Radar level probe. This probe measures the slag level during the EAF operation. The measured level can be compared to the model result of the slag foaming indication. The trend of the slag level indicates the end-of-batch by exactly identifying the rapid increase of the slag level. By accurately measuring the foaming level, batch to batch time and power consumption during melting can be reduced.

We also present a metallization degree sensor that can monitor the quality of the DRI or HBI which are fed into the EAF. The metallization degree is known to fluctuate, and a reduced value has an impact on the slag quality and on the amount of carbon required. The sensor can be used to check material periodically, or, on-line in a continuous feed. Tests show that the quantities of iron and carbide are both assessed with an accuracy better than 1%wt, and that both DRI pellets or HBI briquettes can be measured. Various factors such as the voidage, pellet or briquette shape, or slag composition only have a marginal impact on the sensor's accuracy.

The values of both sensors also help to operate a Hot Heel level model. The slag foaming behavior leads to knowledge about the slag amount. The exact slag level is known before and after steel tapping.

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