Automatic Slag Detection in Steelmaking

Non-contact slag detection with infrared thermography

- Clear visual monitoring of tapping and deslag processes through excellent image resolution
- Precise distinction between steel and slag
- Optional automatic detection of the tapping end
- Adjustable data recording on system PC or data server
- Different interfaces for the integration into process control system

Slag detection system with long wave IR Camera for the highest detection reliability

Steel and slag have different features with regard to radiation physics in the infrared spectral range. Thus, by means of a thermographic camera, it is possible to determine contact-free and in real time which of both materials is the current main constituent of the tapping, respectively the deslag stream coming out of the converter or an electric furnace.

For this purpose, the relevant process is constantly monitored with a thermographic camera whose sensitivity range involves a long-wave infrared range of (8 ... 12) µm. In this wavelength range appears the highest contrast between steel and slag resulting in the best possible selectivity on material detection.

SlagDetect – suitable for manual as well as automatic plant operation

Independent of extended opportunities of an integrated automatic image evaluation, slag proportions in the VIS image will be highlighted in a different colour than the rest of the infrared image (such as steel and image background). Thus, in case of manual operation, the smelter may detect slag parts due to the tapping’s green colouring and is able to react according to technological specifications.

Moreover, integrated evaluation algorithms provide an extended opportunity on an operator-independent reaction on automatically detected slag occurrence. In order to stop tapping immediately or at a specific delay time, a slag stopper, respectively the converter tilting backwards can be ensured via a direct signal to the process control system.
SlagDetect – applicable for BOF tapping operation as well as EAF and Deslagging

Apart from its main application for BOF operation, using SlagDetect can be very useful and advisable under other technological conditions of steelmaking. Thus, in many cases, it is possible to control the tapping at EAF systems (depending on their construction) with the help of thermographic camera technology. In the same way, SlagDetect has proved successful at numerous installations on tasks to be carried out in a reversed manner, the detection of steel during deslagging, and contributes to optimum material utilisation and high operational safety by avoiding the overstraining of the ladle’s material.

Being equipped with high-performance thermographic camera technology adapted to harsh operating conditions in industry, SlagDetect represents a reliable instrument ensuring product quality while making full use of the converter’s capacity in the best possible way. Its flexible system configuration allows the integration into installations with different degrees of automation – starting from manual operation displaying the ongoing process in real time up to a fully automatic control of the converter’s tilt angle during tapping.

A short video of a typical BOF slag detection can be send onto request!

Do you know LHSD – ladle hot spot detection?

The Ladle Hot Spot Detection (LHSD) system uses the latest infrared technology to monitor the temperature of the ladle steel structure. Up to five thermographic cameras observe the ladles while the crane is moving past the inspection site. The temperature measurements are completely automatic and require no manual interaction. If the ladles have been provided with a suitable marking, each ladle can be identified and matched with its data. LHSD automatically releases the alarm if a preset temperature threshold is transcended. This reliably prevents dangerous and loss-making ladle breakage.