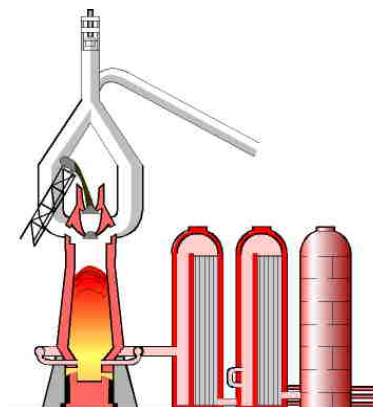


Blast Furnace Stove Dome and Hot Blast Main Temperature Measurement



The quality and composition of blast furnace iron is related to the hearth temperature which, in turn, is dependent on the temperature of the hot-blast delivered from the blast furnace stoves. Preheating the air also intensifies and accelerates the burning of the coke.

In order to maximise efficiency the stoves are operated at high temperatures, close to the working limit of the refractories. Therefore, the temperatures of the stoves have to be carefully monitored.

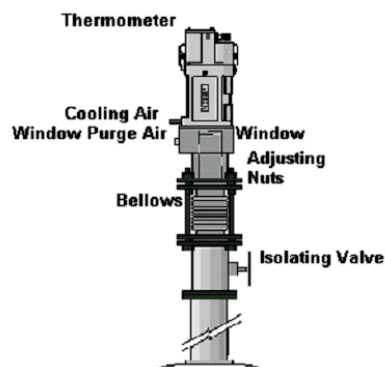
Continuous monitoring of the hot blast main provides data necessary to maximise the efficiency of the blast furnace operation.

The Problem

Traditionally, immersion thermocouples have been used for this measurement. The harsh environment reduces the lifetime of these thermocouples through erosion, thermal cycling, contamination and mechanical damage. Thermocouples inserted into the ceramic packing are liable to mechanical damage due to expansion and contraction of the ceramics during the heating cycle. Maintenance of these thermocouples is both time consuming and expensive. Many installations have relied upon multiple thermocouples to counter the high loss rate. Also, it is difficult to replace damaged thermocouples during operation due to the high pressures encountered within the process.

The Solution

Use a non contact temperature measurement utilising an infrared thermometer. An infrared thermometer correctly installed will provide accurate temperature measurement, maintenance free for many years in operation. Should the need arise for checking or cleaning of the thermometer, an isolation valve facilitates removal without problems. A specialised mounting arrangement provides alignment, isolation and protection from the high pressures.



Recommended Instrumentation

A short wavelength thermometer is required so that errors caused by products of combustion are minimised. Depending on the mounting position certain specialised components may be required. For example, if alignment is critical it may be necessary to utilise bellows or alternative methods to provide sealing and to permit sighting adjustments.

A gas purged window assembly is essential to provide optical sighting for the thermometer and protection from the high stove pressures.

An isolation valve must also be fitted to allow access to the system components. Certain customers have requested specialised systems with automatic (electrical or pneumatic) shut off valves. Land Instruments International will provide specialist solutions to such customers. The photos below illustrate some examples of specialist systems supplied.



Auto Shut-off Valve Actuator



Twin System for Harsh Environments

Thermometer Type

The selection of the correct thermometer type and mountings to suit the particular application is extremely important. The thermometer choice should take into account the position and environmental conditions through consultation with suitably qualified engineers. Land Instruments International will provide this service.

Application Dedicated Systems

Land Instruments International have produced many specialist systems and a custom solution can be offered that is both affordable and available on short delivery times.

Installation

Correct installation of the thermometers is critical to ensure accurate operation and long-term reliability. Land Instruments International can advise the installation and commissioning engineers of the necessary requirements. Basic system requirements include: a stable power supply, clean air supply to the air purge and sighting/mounting assembly to maintain the protection window and lens clean, and possible heating/cooling for the thermometer enclosure in severe environmental operating conditions.



Infrared Temperature Measurement

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