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Air Leak Detection in Sintering Furnaces to Enhance Efficiency and Product Quality

Introduction

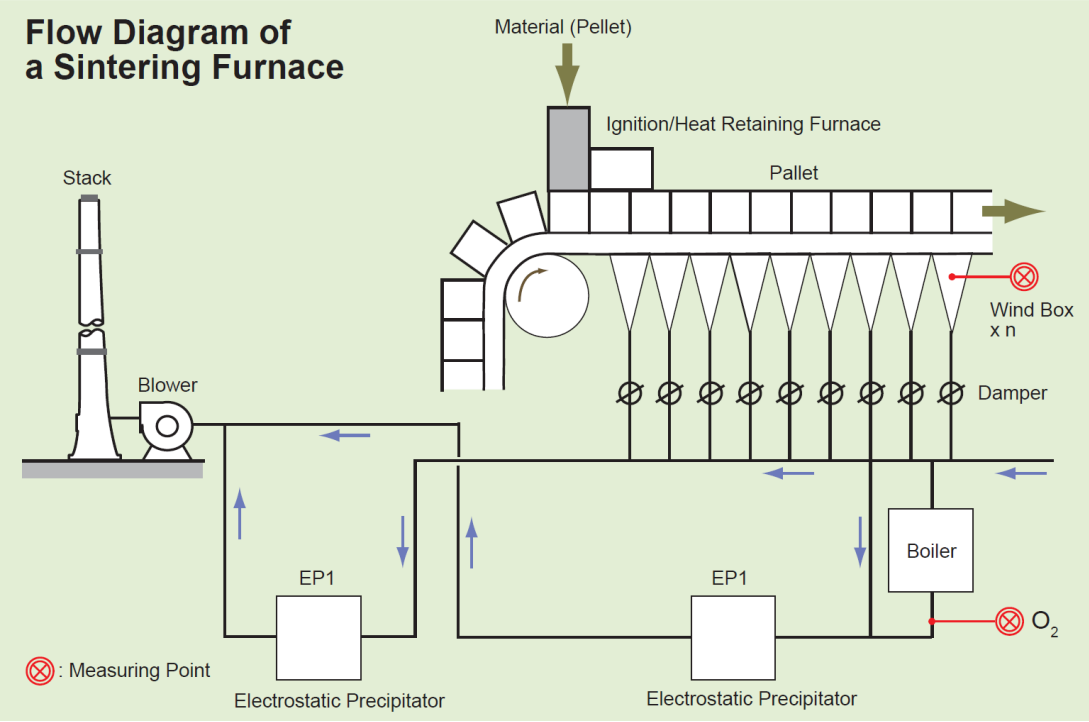
In sintering furnaces, periodic equipment maintenance has proven to be the most effective way to prevent air leaks. While cost reduction is a concern, energy loss from air leaks is also an issue. Air leak detection is performed so that equipment can be repaired in a timely manner or some other appropriate measure be taken. To detect air leaks, an oxygen analyzer is used. The ZR22G/ZR802G Zirconia Oxygen Analyzer has been well received due to its good response speed, stability, and maintainability. It has been confirmed that the ZR22G/ZR802G can be used in DL type sintering furnaces under harsh conditions that include large quantities of dust, high humidity, and a pressure of approximately –5 kPa.

Expected Benefits

- Saves energy and improves the efficiency of sintering furnaces, thereby maintaining high quality
- Ensures stable air leak detection
- Reduces operating costs

Process Overview

A sintering furnace mixes powdered ore with auxiliary materials such as powdered coke and sinters them to make lump ore, which is used as a raw material in blast furnaces. Since modern blast furnaces are large and require sophisticated and efficient operation, stringent control of the quality (lump size) of the sintered ore is essential. Air leakage detection is of paramount importance not only because it saves energy but also because it ensures the proper operation that produces high quality sintered ore through proper operation.



Solution Details

Process conditions

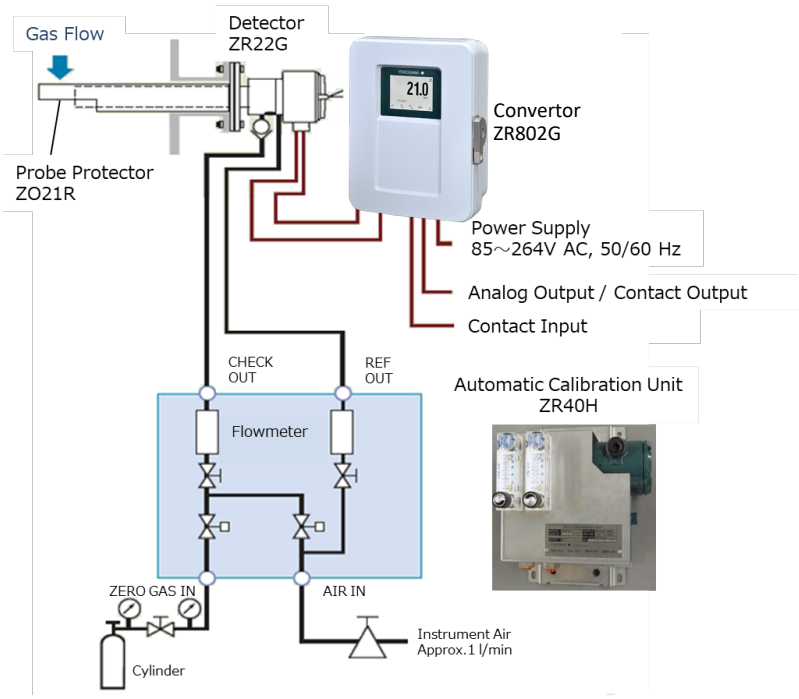
Measurement point: Wind box
Temperature: 200 ℃ or less
Pressure: -5 to 0 kPa
Composition: CO_2: approx. 10%;
CO: approx. 2%;
O_2: 8 to 16%;
N_2: approx. 76%,
SO_2: approx. 600 ppm
Humidity: 4 to 17% (with water droplets)
Dust: 1 to 5 g/Nm^3
(sintered powder/lumps:
approx. 30 mm in diameter)
Flow rate: Approx. 2 to 5 m/s

Utilities

Rated voltage: 100 to 240 V AC
Rated frequency: 50/60 Hz
Power consumption: 330 VA (Max. 800 VA)
Instrument air (reference gas):
pressure: 300 to 700 kPa
consumption: approx. 1 L/min

Measurement system

Detector: ZR22G-100-C-K-P-☐-☐-E-A /C/CV
Probe protector: ZO21R-L-100-J*B
Converter: ZR802G-☐-☐-N-N /☐
Automatic calibration unit: ZR40H-☐-☐-A
Zero gas cylinder: G7001ZC
Pressure regulator: G7013XF or G7014XF
Case for calibration gas cylinder: E7044KF
Note: the calibration gas cylinder must be purchased locally



Notes

- Since the sample gas contains large quantities of sintered powder, a probe protector should be used to protect the detector
- If the sample gas contains CO, compensation may be required. Contact Yokogawa.
- The detector should be installed so that the probe head does not point upstream into the gas flow. It is best to mount the detector vertically with the probe tip pointing downward. If necessary, it can be installed at any angle between 0° and 90° with respect to the vertical.

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[Ed:04, March 2021]
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