

# OpreX™ Analyzers Measurement and Monitoring of O<sub>2</sub> Concentrations in Steel Mill Reheating Furnaces

Application Note

## Introduction

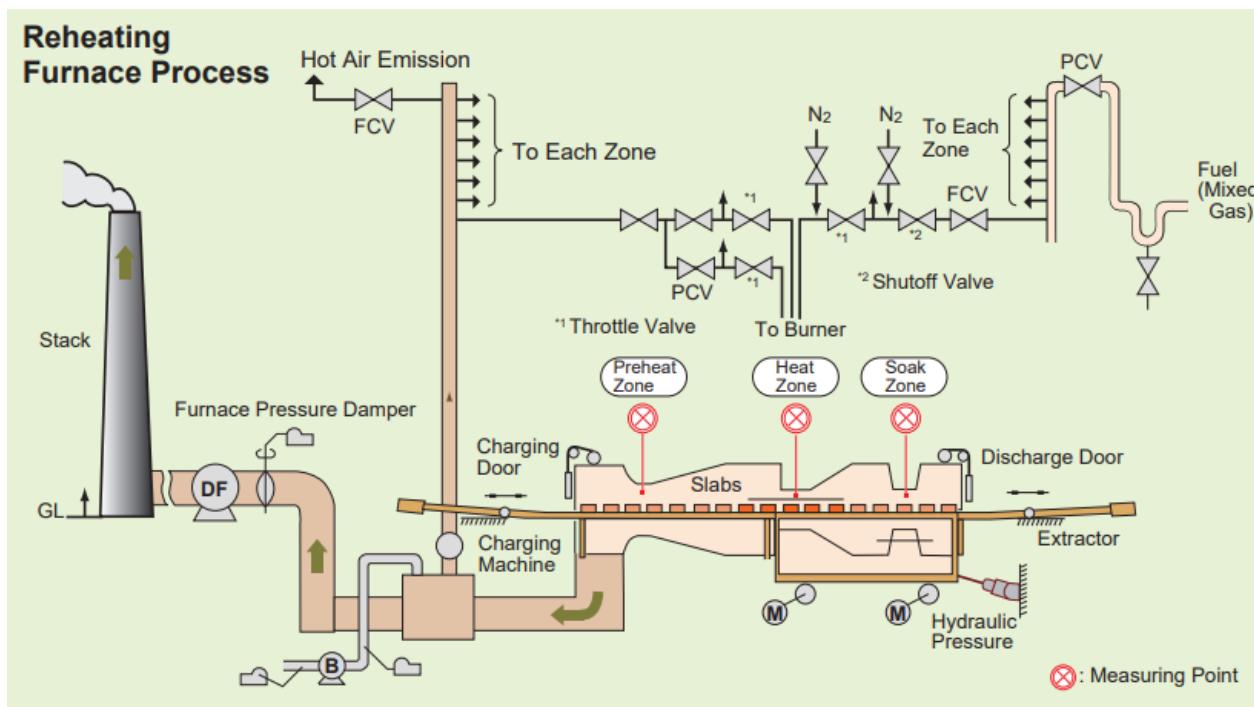
A furnace for heating slabs needs to be operated under low oxygen conditions at high temperatures of 1000°C and above to prevent oxidation of the steel. The measurement of oxygen concentrations in the furnace is essential in this process. The ZR22G/ZR802G Zirconia Oxygen Analyzer requires no sampling system and utilizes a long-life sensor, and is therefore ideally suited for measurement of oxygen concentrations in a high-temperature environment. The ZR22G detector with the ZO21P high temperature probe adapter can be used in gas furnaces at temperatures up to 1400°C.

## Expected Benefits

- Maintains high product quality by monitoring oxygen concentrations in steel mill reheating furnaces
- Ensures stable, continuous measurement of oxygen concentrations
- Reduces operating costs

## Process Overview

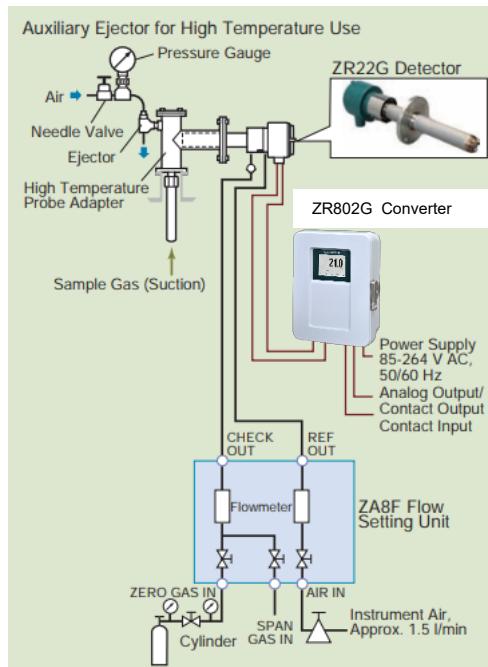
Slabs are loaded on a conveyor and fed to a reheating furnace, which is heated to between 900 and 1400°C by burners that use fuels such as by-product gas. In order to keep the oxygen concentration between 1 and 2%, it is monitored in the preheat, heat , and soak zones. The slabs are heated uniformly without being oxidized, and then sent to the next processing stage.



## Solution Details

Field Data	
Process conditions	
<b>Measurement point:</b>	furnace reheat, heat, and soak zones
<b>Temperature:</b>	900°C to 1400°C
<b>Pressure:</b>	30 to 50 kPa
<b>Dust:</b>	Trace
<b>Fuel:</b>	Gas

## Measurement system

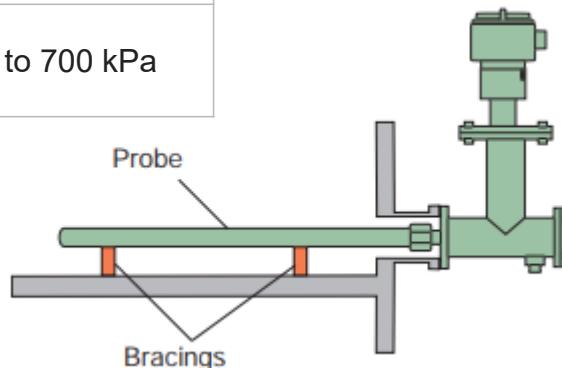


<b>Detector:</b>	ZR22G-015-S-Q-□-□-□-E-A/CV
<b>High temperature probe adapter:</b>	ZO21P-H-□-□□□-□*B
<b>Auxiliary ejector for high temperature use:</b>	E7046E□
<b>Converter:</b>	ZR802G-□-□-N-N/□
<b>Flow setting unit:</b>	ZA8F-□*C
<b>Calibration gas unit</b>	
<b>Pressure regulator for gas cylinder:</b>	G7013XF (inlet W22, outlet Rc1/4) or G7014XF (inlet W22, outlet 1/4NPT)
<b>Case assembly for calibration gas cylinder:</b>	E7044KF

Note: the calibration gas cylinder must be purchased locally.

## Probe Adapter

Utilities	
<b>Power supply:</b>	85 to 264 V AC, 50/60 Hz
<b>Instrument air (reference gas):</b>	pressure, 300 to 700 kPa



## Notes

The material selected for the high temperature probe adapter depends on the temperature of the sample gas. Follow instructions carefully when installing the probe.

<b>SUS:</b>	Sample gas temperature ≤ 750°C
<b>Probe orientation:</b>	vertical or horizontal
<b>Inconel:</b>	750°C < sample gas temperature ≤ 900°C Probe orientation: vertical or horizontal
<b>SiC:</b>	900°C < sample gas temperature ≤ 1400°C Probe orientation: vertical

Note:

When the probe is installed horizontally, bracings must be provided for mechanical support

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**YOKOGAWA ELECTRIC CORPORATION**  
World Headquarters  
9-32, Nakacho 2-chome, Musashino-shi, Tokyo 180-8750, JAPAN

<http://www.yokogawa.com/an/>



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