

**Continuous Emissions Monitoring System for the measurement of Total Reduced Sulfur (TRS) using field-proven, pulsed fluorescence technology.**

## Thermo Scientific Continuous Emissions Monitoring System for Total Reduced Sulfur



### Key Features

- Designed to meet U.S. EPA 40 CFR Part 60 requirements
- Dry-basis measurement
- Reliable pulsed-fluorescence technology
- Corrective oxygen measurement
- Designed specifically for the pulp and paper industry

The Thermo Scientific Continuous Emissions Monitoring System (CEMS) for the measurement of Total Reduced Sulfur (TRS) is designed to meet the needs of the pulp and paper industry in complying with the regulatory requirements of 40 CFR part 60 as set forth by the U.S. EPA.

In order to measure TRS in accordance with the federal regulations, the sample must be measured on a dry basis and be corrected to a fixed Oxygen ( $O_2$ ) content. This is accomplished by extracting the sample from the process using the Thermo Scientific PRO902C Low-Flow Dilution Probe.

First, the sample is passed through a water removal device to provide a dry sample. The oxygen content is measured

and the sample is diluted to an appropriate level, depending on the site conditions.

The diluted sample is sent through a sample line to the instrument cabinet and passes through a selective scrubber where Sulfur Dioxide ( $SO_2$ ) is removed and TRS is allowed to pass. Next, the sample is routed to a thermal oxidizer where the TRS compounds react with  $O_2$  under high temperature, and is then sent on to the Model 43i Pulsed Fluorescent  $SO_2$  analyzer.

The result of this process is that TRS compounds are converted to  $SO_2$  in a 1:1 ratio. This means the  $SO_2$  reading from the analyzer is a true representation of the amount of TRS in the sample.

## Product Specifications

To maintain optimal product performance, you need immediate access to experts worldwide, as well as priority status when your air quality equipment needs repair or replacement. We offer comprehensive, flexible support solutions for all phases of the product life cycle. Through predictable, fixed-cost pricing, our services help protect the return on investment and total cost of ownership of your Thermo Scientific air quality products.

### Thermo Scientific Total Reduced Sulfur Continuous Emissions Monitoring System

#### Thermo Scientific Model 43i SO<sub>2</sub> Analyzer

<b>Preset Ranges</b>	0-0.05, 0.1, 0.2, 0.5, 1, 2, 5, and 10 ppm
<b>Extended Ranges</b>	0-0.05, 1, 2, 5, 10, 20, 50 and 100 ppm
<b>Custom Ranges</b>	0-0.05 to 100 ppm,
<b>Zero Noise</b>	0.25 ppb RMS (300 second average)
<b>Lower Detectable Limit</b>	0.5 ppb (300 second average)
<b>Zero Drift (24 hour)</b>	Less than 1 ppb
<b>Span Drift (24 hour)</b>	+/-0.5%
<b>Response Time</b>	320 seconds (300 second average)
<b>Precision</b>	1% of reading or 1 ppb
<b>Linearity</b>	+/-1% full scale
<b>Sample Flow Rate</b>	0.5 liters/min.
<b>Temperature Range (Operating)</b>	15°C - 35°C range
<b>Outputs</b>	Selectable voltage, RS232/RS485, TCP/IP, 10 status relays, and power fail Indication (standard). 0-20 or 4-20 mA isolated current output (optional)
<b>Inputs</b>	16 digital inputs (standard), 8 0-10Vdc analog inputs (optional)

#### Thermo Scientific Thermal Oxidizer

<b>Maximum Flow Rate</b>	1000 cc/min
<b>Maximum Operating Temperature</b>	2000°F
<b>Maximum Pressure</b>	5 PSIG at maximum temp.
<b>Dimensions</b>	3.5"Hx17"Wx13"D
<b>Oxidation Media</b>	Quartz
<b>Heater</b>	Ceramic Fiber, 220 Watt
<b>Sensing Element</b>	Type K Thermocouple
<b>Temperature Controller</b>	Microprocessor Based, Programmable PID with Auto-Tuning
<b>Alarm Output</b>	Electromechanical, Form A, 0.5A @120/240VAC
<b>Temperature Stability</b>	+/- 0.2°F per °F rise in ambient

#### Thermo Scientific PRO902C

<b>Heated Filter</b>	0.1-micron glass fiber element, temperature controlled at 300°F
<b>Sample Orifice</b>	Quartz glass, temperature controlled at 300°F (149°C)
<b>Dilution Eductor</b>	Sample flow rate of 100 cc/min. dilution air-flow rate of 5 liters/minute, heated eductor temperature 300°F +/- 2°F, eductor vacuum greater than 15" Hg
<b>Calibration Line</b>	0.64 cm (1/4") OD Teflon
<b>Probe Assembly Weight</b>	73lbs. (33kg)
<b>Diluted Sample Dew Point</b>	-20° to 20°F (-28° to -6°C)
<b>Dilution Ratios</b>	Between 20:1 and 200:1
<b>Instrument Air Requirement</b>	Clean, dry air at -40°F (-40°C) dew point, 70 PSI minimum
<b>Operating Ambient Temp Range</b>	-4° to 122°F (-20° to 50°C)
<b>Maximum Process Temperature</b>	662°F (350°C)
<b>Modular Heat Exchanger</b>	Thermo electrically cooled 35° to 45°F (2° to 7°C)
<b>Modular TE O<sub>2</sub> Analysis System Enclosure</b>	Electrochemical oxygen sensor Fiberglass, NEMA 4 X (17" (H) x 19" (W) x 10.5" (D))
<b>Pressure Transducer</b>	Loop powered 0-15 PSIA w/316 SS diaphragm and housing

#### Thermo Scientific SO<sub>2</sub> Scrubber

<b>Air Requirements</b>	5 liters/minute, 30-45 psi, oil free, SO <sub>2</sub> -free, -20°F dewpoint
<b>Water Requirements</b>	Distilled, sulfur-free
<b>Ambient Temperature Range</b>	40-90°F
<b>Allowable Sample Flow Rate</b>	400-800 cc/minute
<b>Assembly size</b>	20" (50.8cm) H X 5" (12.2cm) W X 6" (15.2cm) D

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This product is manufactured in a plant whose quality management system is ISO 9001 certified.

**Air Quality Instruments**

27 Forge Parkway  
Franklin, MA 02038 USA

(866) 282-0430  
(508) 520-0430  
(508) 520-1460 fax

[www.thermoscientific.com/AQI](http://www.thermoscientific.com/AQI)

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