Product Specifications

Model 43C-TLE
Enhanced Trace Level SO_2 Analyzer
for Continuous Monitoring

Thermo Electron Corporation's Model 43C Enhanced Trace Level SO_2 Analyzer sets the standard for performance by sulfur dioxide detectors. The Model 43C-TLE extends the pulsed fluorescence technique and reflective optic design to measure SO_2 at ppt levels.

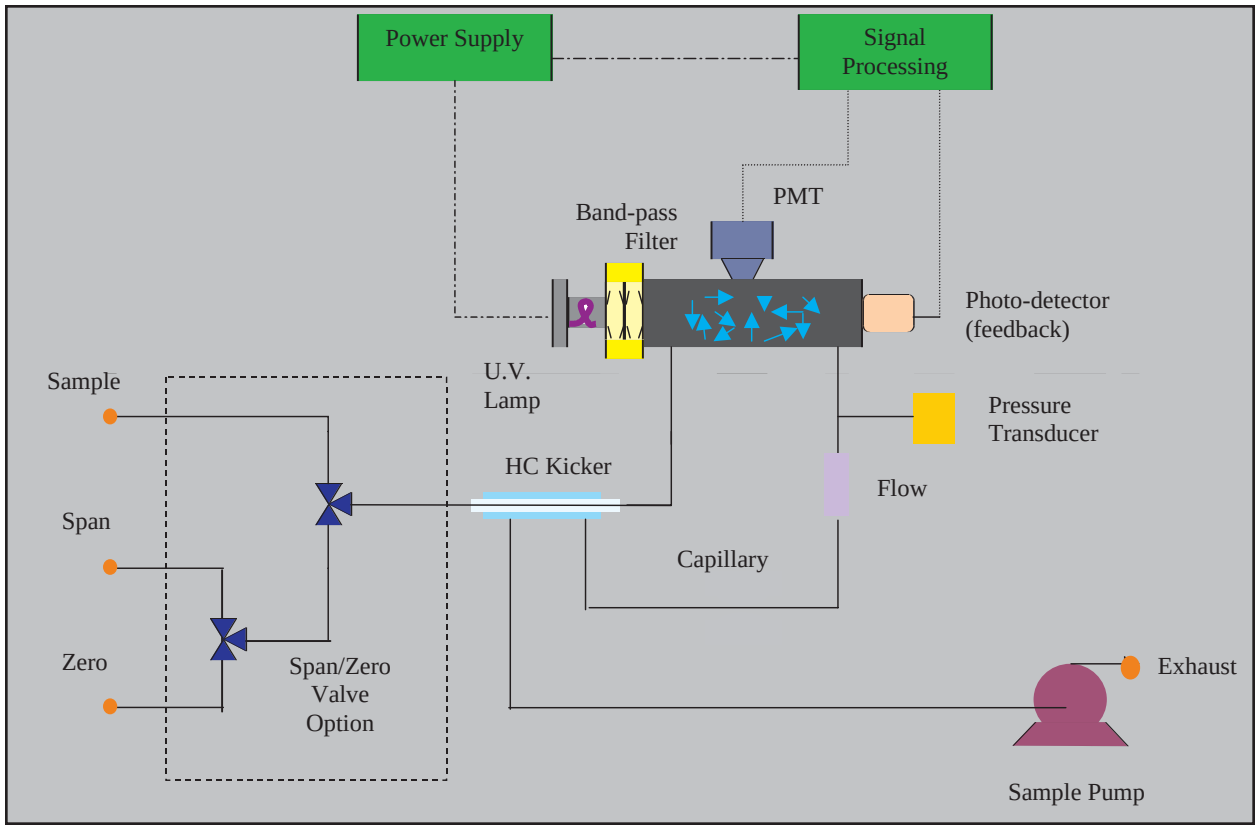
The Model 43C-TLE retains the simplicity and ease of operation inherent in Thermo Electron's instrumentation while meeting the requirements of ultimate detectability. Areas of application include acid deposition networks, modeling studies, university research, and aircraft measurements.

Key Features

- Long life - stable UV source - nominal life in excess of 3 years
- MBTF = two years (except for pump)
- Temperature stabilized reaction chamber
- Excitation intensity stabilization
- Low volume reaction chamber
- Modular electronic design
- No sample dryer
- Pulsed excitation of lamp
- Low noise
- UV lamp diagnostic
- Electronic test pulse diagnostic
- Maintenance Diagnostic
- RS-232/485 interface
- Remote actuation of zero/span solenoid valves (optional)

Ranges:	0-10, 20, 50, 100, 500, and 1000 ppb
Linearity:	+/- 1% of full scale
Zero Noise	0.1 ppb RMS (10 second average time) 0.05 ppb RMS (60 second average time) 0.025 ppb RMS (300 second average time)
Lower Detectable Limit (LDL)	0.2 ppb RMS (10 second average time) 0.10 ppb RMS (60 second average time) 0.05 ppb RMS (300 second average time)
Zero Drift (24 hour)	Less than 0.2 ppb per day
Span Drift (24 hour)	+/- 1% per week
Response Time (0-95%)	80 seconds (10 second average time) 110 seconds (60 second average time) 320 seconds (300 second average time)
Precision	1% of reading or 0.2 ppb
Sample Flow Rate	0.5 LPM (standard), 1 LPM (optional)
Interferences (EPA Levels)	Less than LDL except for the following: NO < 2.5 ppb, M-Xylene < 1 ppb and H_2O < 3% of reading
Temperature Dependence	+/- 0.05 ppb/°C (zero), +/- 0.1%/°C (span)
Power	90-110, 105-125, 210-250 VAC 100Watts
Size and Weight	16.75” (W) x 8.62’ (H) x 23” (D), 44 lbs.
Outputs	Voltage, current, RS-232/485

Model 43C-TLE Flow Diagram



Principal of Operation

The *Model 43C-TLE* is based on the principal that SO_2 molecules absorb ultraviolet (UV) light and become excited at one wavelength, then decay to a lower energy state emitting UV light at a different wavelength.

The sample is drawn into the *Model 43C-TLE* through the sample bulkhead, as shown above. The sample flows through a hydrocarbon "kicker", which removes aromatic hydrocarbons from the sample by forcing the molecules to permeate through the tube wall. The SO_2 molecules pass through the "kicker" unaffected.

The sample flows into the fluorescence chamber, where pulsating UV light excites the SO_2 molecules. The condensing lens focuses the pulsating UV light into the mirror assembly. The mirror contains eight mirrors that reflect only the wavelengths which excite SO_2 molecules.

As the excited SO_2 molecules decay to lower energy states they emit UV light that is proportional to the SO_2 concentration. The Bandpass filter allows only the wavelengths emitted by the excited molecules to reach the photomultiplier tube (PMT). The PMT detects the UV light emission from the decaying molecules. A photodetector, located at the back of the fluorescence chamber, continuously monitors the pulsating light source and is connected to a circuit that adjusts the power supply to keep the UV light source at a constant intensity.

The sample then flows through a flow sensor, a capillary and the shell side of the hydrocarbon "kicker". The *Model 43C-TLE* outputs the SO_2 concentration to the front panel display and to the analog outputs.

A serial output (RS232 or RS485) is also generated with the concentration, date and time stamp, and a wide range of diagnostic information. This can be accessed by simple commands with a PC in a terminal mode or with a custom program, TEI for Windows®, which is provided with each instrument.

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