

# Case Study

## Analysis and monitoring of the content of sulfur compounds in the gaseous effluents of a paper mill

### Context & Challenges

The pulp and paper industry is widely recognized for odor nuisance generated during the manufacturing of paper pulp, cardboard, and wood-derived products. Kraft pulping processes, black liquor recovery systems, regeneration boilers, smelt dissolving tanks, and lime kilns are significant sources of sulfur-containing compounds responsible for odor emissions and atmospheric pollution.

In Europe, following the publication of the French ministerial decree dated September 10, 2020, paper manufacturers must comply with reinforced emission monitoring requirements for hazardous substances released into the atmosphere, particularly sulfur compounds from industrial installations classified for environmental protection. *More information:* [Extrait de l'arrêté ministériel du 10/09/2020 / NOR : TREP2013116A](#)

In the United States, the United States Environmental Protection Agency references the determination of Total Reduced Sulfur (TRS) emissions in its EPA Method 16B — [Determination of Total Reduced Sulfur Emissions from Stationary Sources](#) — This method is specifically applicable to recovery furnaces (boilers), lime kilns, and smelt dissolving tanks at kraft pulp mills, suggesting the analysis of the following compounds:

Analyte	CAS No.
Total reduced sulfur (TRS) including:	N/A
Dimethyl disulfide (DMDS), [(CH <sub>3</sub> ) <sub>2</sub> S <sub>2</sub> ]	62-49-20
Dimethyl sulfide (DMS), [(CH <sub>3</sub> ) <sub>2</sub> S]	75-18-3
Hydrogen sulfide (H <sub>2</sub> S)	7783-06-4
Methyl mercaptan (MeSH), [CH <sub>4</sub> S]	74-93-1
Reported as: Sulfur dioxide (SO <sub>2</sub> )	7449-09-5

Traditionally, EPA Method 16B relies on selective SO<sub>2</sub> removal using a citrate buffer solution, followed by thermal oxidation of TRS compounds into SO<sub>2</sub>. The traditional FPD detector is non-linear, sensitive to humidity, and carries a risk of flame extinction. Conventional measurement systems may also face issues such as:

- Interferences caused by SO<sub>2</sub> removal steps
- Catalyst or converter maintenance
- Filter clogging in lime kiln applications
- Operational complexity linked to auxiliary gases
- Inability to report individual sulfur species separately



## Chromatotec® solution

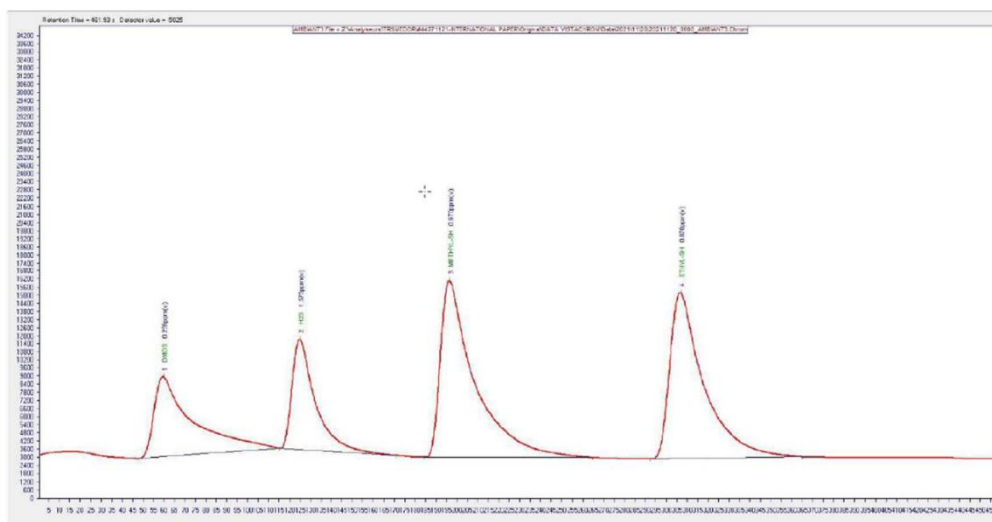
Chromatotec® has developed the trsMEDOR® analyzer for continuous online monitoring and speciated analysis of sulfur compounds in industrial gaseous emissions and odor monitoring applications. The solution can be deployed at several strategic locations on industrial sites, such as: recovery boiler outlets, lime kiln stacks, washing and bleaching processes, sulfur recovery systems and ambient air monitoring stations.

Unlike conventional EPA Method 16B configurations, the trsMEDOR® does not require citrate buffer solution, thermal converter, SO<sub>2</sub> filter or auxiliary carrier gas cylinders.

Our analyzer significantly reduces interferences and maintenance requirements while allowing direct and selective measurement of individual sulfur compounds. The analyzer provides speciated online quantification of: H<sub>2</sub>S, SO<sub>2</sub>, DMS, DMDS, mercaptans MM, EM, DES from low ppb levels up to % concentrations.

This chromatograph is equipped with an electrochemical detector specific to sulfur compounds, a nitrogen generator, and an internal calibration module with permeation tube offering a 100% autonomous and automated solution requiring only a power supply. Integrated into a thermoregulated box (in option), this turnkey solution has an industrial computer at eye level as well as an automatic calibration module allowing the device to be calibrated and/or validated in ppb and/or ppm offering a long-term stability verification. A two ways sampling system, with double automatic injection loop (dual concentration range) is available as an option in order to be able to analyze with the same device the input and the output of a filter for example.

The trsMEDOR® is also used on industrial sites such as wastewater treatment plants, recovery of organic matter or even food production sites, in the context of monitoring the levels of odorous compounds in the ambient air or channeled flows.



Chromatogram obtained with trsMEDOR® : Analysis of DMDS, H<sub>2</sub>S, Methyl and Ethyl Mercaptans.

## Ease of use

- No auxiliary gas required for operation or calibration
- Air supplied by integrated gas generator
- Low maintenance requirements
- Automatic internal calibration with permeation tubes
- Industrial turnkey solution
- Reliable and linear sulfur detection technology by ED detector



## Data acquisition and processing

All analytical data are automatically collected, processed, and stored using Chromatotec® VistaCHROM software. The system supports Modbus communication and 4–20 mA analog outputs for seamless integration into remote supervision and industrial control systems. Operators can easily visualize chromatograms, generate automatic reports, perform concentration averaging, and create customized environmental reporting functions directly from the embedded software platform. The integrated industrial touchscreen PC provides intuitive operation, real-time visualization, simplified data export, and comprehensive analyzer diagnostic capabilities

## Summary

- Continuous online TRS monitoring
- Speciation of sulfur compounds by online gas chromatography
- Direct measurement without citrate buffer solution
- No converter and no SO<sub>2</sub> filter required
- Reduced interferences compared with conventional EPA Method 16B systems
- Individual results for each sulfur compound
- Integrated permeation tube for calibration
- Stand-alone autonomous solution
- No auxiliary gas cylinders required
- Dual-range analysis capability (ppb to %)
- Robust industrial design with low maintenance
- Ideal for kraft pulp mills, lime kilns, recovery boilers, and odor monitoring applications

