

Internationally Approved
EN 15267 Certified



Continuous Emissions Monitoring
and Process Control

Cement Industry

Continuous Emissions Monitoring and Process Control Cement Industry

Process control and emission monitoring in a cement plant can be a challenge. A large number of gaseous components need to be measured with high accuracy in a dusty and corrosive environment.

The monitoring system needs to be easy to maintain and fast to calibrate. To use an extractive system in this environment will demand a lot of maintenance.

The OPSIS system is different and provides the cement plant with an accurate analyser that will operate with high performance and a minimum of maintenance.

The OPSIS system is based on a non-contact DOAS/FTIR method, using an optical path that can operate across the duct. The optical light is transported in an optical fibre to the analyser and one analyser can operate several paths.

A single OPSIS system can measure all relevant gas components such as NO_x, SO₂, CO, CO₂, H₂O, HCl, HF, NH₃, CH₄, and Hg.

RETURN OF INVESTMENT

The cost of investing in an OPSIS system is small compared to the amount of money that is spent on maintaining old and complex extractive systems.

The OPSIS system has low cost of ownership based on few moving parts, long intervals between calibrations, easy operation and low energy consumption.

TEST AND APPROVALS

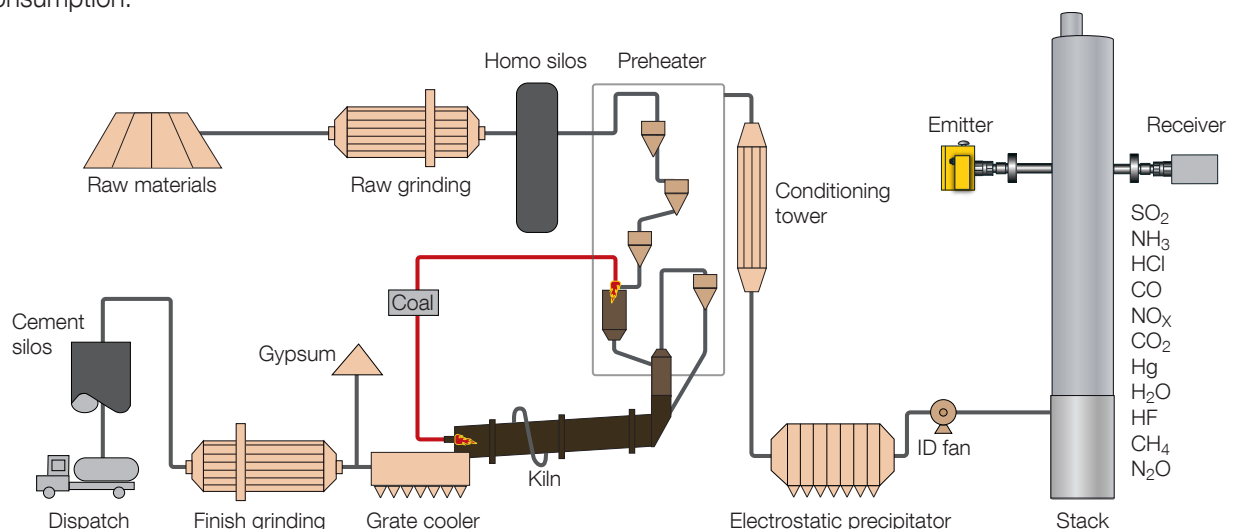
The OPSIS system has been tested and approved by a number of internationally recognized institutes and authorities. The system meets the European directive for waste and is approved by German TÜV and British MCERTS. Full details are available on request.

OPSIS PRODUCT PORTFOLIO

OPSIS has a full product portfolio for measurements of gases in a range of applications. It includes complete CEM systems including reporting, process analysers for raw gas measurements, TDL analysers for NH₃, HCl, and O₂, oxygen analysers, compact analysers based on dilution extractive, and Hg analysers.

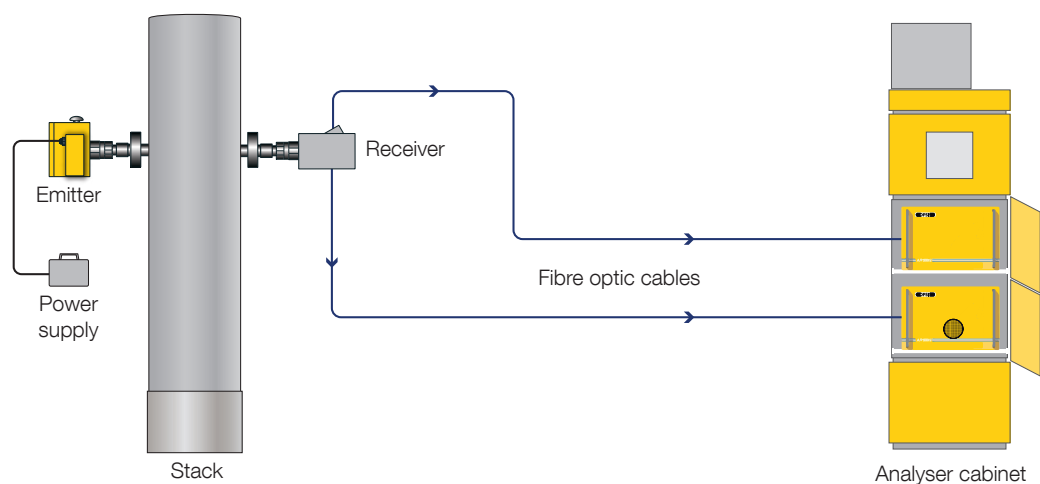
For further information, please visit www.opsis.se.

QAL 1 CERTIFICATION:
BEST PERFORMANCE
LONGEST CALIBRATION INTERVAL



SYSTEM OVERVIEW

An OPSIS DOAS system layout for a cement plant



PERFORMANCE DATA

(typical data which may vary depending on application)

Compound	Max. measurement range (1 m path) ⁽¹⁾	Lowest measurement range according to EN 15267	Min. detectable quantities (monitoring path 1 m, measurement time 30 sec.)
UV/FTIR DOAS Analyser Models AR600 / AR602Z / AR602Z/Hg / AR602Z/N / AR602Z/NHg / AR620			
NO ⁽²⁾	0–2000 mg/m ³	0–150 mg/m ³	0.5 mg/m ³
NO ₂	0–100% Vol.	0–20 mg/m ³	0.5 mg/m ³
SO ₂	0–100% Vol.	0–75 mg/m ³	0.5 mg/m ³
NH ₃ ⁽³⁾	0–1000 mg/m ³	0–10 mg/m ³	0.5 mg/m ³
Hg ⁽²⁾	0–1000 µg/m ³	0–45 µg/m ³	0.5 µg/m ³
THg	0–1000 µg/m ³	0–45 µg/m ³	0.5 µg/m ³
H ₂ O	0–100% Vol.	0–30% Vol.	0.1% Vol.
HCl	0–100% Vol.	0–1000 mg/m ³⁽⁶⁾	10 mg/m ³⁽⁴⁾
HF	0–100% Vol.	0–100 mg/m ³⁽⁶⁾	5 mg/m ³
CO ₂	0–100% Vol.	0–30% Vol. ⁽⁶⁾	0.5% Vol.
Benzene	0–1000 mg/m ³	0–20 mg/m ³⁽⁶⁾	1 mg/m ³
Formaldehyde	0–1000 mg/m ³	0–20 mg/m ³	1 mg/m ³
FTIR DOAS Analyser Models AR650 / AR650/N			
HCl	0–100% Vol.	0–15 mg/m ³	0.5 mg/m ³
CO	0–100% Vol.	0–75 mg/m ³	2 mg/m ³
H ₂ O	0–100% Vol.	0–30% Vol.	0.1% Vol.
HF	0–100% Vol.	0–1.5 mg/m ³	0.1 mg/m ³
NH ₃	0–100% Vol.	0–100 mg/m ³⁽⁶⁾	2 mg/m ³
N ₂ O	0–100% Vol.	0–500 mg/m ³	5 mg/m ³⁽⁵⁾
CH ₄	0–100% Vol.	0–20 mg/m ³	1 mg/m ³
CO ₂	0–100% Vol.	0–20% Vol.	0.1% Vol.
LD500 Laser Diode Gas Analyse			
HCl	0–100% Vol.	0–15 mg/m ³⁽⁶⁾	0.5 mg/m ³
CO	0–100% Vol.	0–5% Vol. ⁽⁶⁾	0.1% Vol.
H ₂ O	0–100% Vol.	0–30% Vol. ⁽⁶⁾	0.1% Vol.
HF	0–100% Vol.	0–1.5 mg/m ³⁽⁶⁾	0.1 mg/m ³
NH ₃	0–100% Vol.	0–10 mg/m ³⁽⁶⁾	0.5 mg/m ³
CO ₂	0–100 g/m ³	0–30% Vol. ⁽⁶⁾	0.1% Vol.
O ₂	0–21%	0–20% Vol. ⁽⁶⁾	0.1% Vol.
CH ₄	0–100% Vol.	0–20 mg/m ³⁽⁶⁾	0.5 mg/m ³
Temperature	0–1400°C	—	5°C

Accuracy

Better than 2% of measured value or equal to the detection limit (whichever is greater).

Span drift

Less than 2% per year.
Please, refer to QAL1 documents.

Zero drift

Less than 2% of measurement range per year.
Please, refer to QAL1 documents.

Linearity error

Less than 1% of measurement range.

⁽¹⁾ This data refers to a light path of 1 m. For longer paths the maximum range is proportionally smaller. Products are available to create shorter paths in very wide stacks.

⁽²⁾ Maximum SO₂ concentration: 5 g/m³ × m.

⁽³⁾ Maximum SO₂ concentration: 500 mg/m³ × m.

⁽⁴⁾ Monitoring path 5 m, measurement time 30 seconds.

⁽⁵⁾ Detection limit of 1 mg/m³ is optional with hardware upgrade.

⁽⁶⁾ Lowest measurement range.

- Recommended monitoring path length: 1 to 5 m.
- After wet scrubbers or when particulate concentration averaged over 1 m is higher than 5 g/m³, the monitoring path length may have to be reduced.
- Max. length of fibre optic cable: please refer to product sheets P9 and P16.

Continuous Emissions Monitoring and Process Control by OPSIS

Combines the benefits of UV/FTIR DOAS and TDL technology

Best performance according to QAL 1 certification

Longest calibration interval according to QAL 1 certification

Automatic QAL 3 check as option

No sampling required, non-contact measurement system

One system for all components including Hg

Operates with a minimum of maintenance

Low energy consumption

Gas calibration only once per year

Internationally approved

Thousands of systems installed worldwide

Serviced by highly skilled service network