

Internationally Approved  
EN 15267 Certified



Continuous Emissions Monitoring  
and Process Control

# Chemical Industries

# Continuous Emissions Monitoring and Process Control Chemical Industries

Process control and emissions monitoring in a chemical plant can be a challenge due to corrosive gases, high dust load, and high temperatures. To use an extractive system in this environment will demand a lot of maintenance.

The OPSIS DOAS system is different and provides chemical plants with an accurate analyser that will operate with a minimum of maintenance. The OPSIS DOAS system is based on a non-contact method using an optical measurement 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 monitor several compounds. As well as monitoring standard gases such as nitric oxide (NO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon dioxide (CO<sub>2</sub>) and water vapour (H<sub>2</sub>O), systems are available to meet the specific needs of particular users:

- Hydrocarbons (benzene, toluene, xylenes, ethylbenzene, styrene, methylbenzene, methane, etc.) in refineries, petrochemical plants and steel industry,
- Chlorine (Cl<sub>2</sub>), carbon disulfide (CS<sub>2</sub>), ozone (O<sub>3</sub>) chlorine dioxide (ClO<sub>2</sub>) in textile industries, pulp and paper mills and colour pigment production,
- Mercury (Hg) in power plants, waste incinerators, crematoria, etc.,
- Ammonia (NH<sub>3</sub>) to control DeNO<sub>x</sub> scrubbers, fertilizer producers, mineral wool, fibre board producers, etc.,
- Phenol in mineral wool plants and fibre board production,
- Formaldehyde in mineral wool plants and fibre board production,
- Process (H<sub>2</sub>S) monitoring in refineries and steel plants,
- HF in aluminium and alumina plants, waste incinerators, fertilizers, refineries, etc., and
- HCl in waste incinerators, etc.

In addition, OPSIS offers dilution extractive and heated extractive systems and instruments for oxygen and mercury monitoring.

## 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

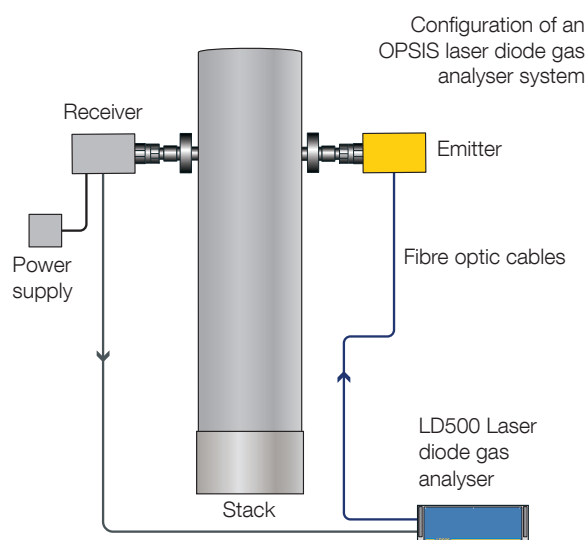
The OPSIS system has been tested and approved by a number of internationally recognized institutes and authorities. The system meets the European directive for power plants and is certified according to EN 15267. The OPSIS system meets the requirements given by U.S. EPA and China EPA.

## OPSIS PRODUCT PORTFOLIO

OPSIS has a full product portfolio for measurements of gases in a range of applications. We offer complete CEM systems including reporting, process analysers for raw gas measurements, TDL analysers for NH<sub>3</sub>, HCl, and O<sub>2</sub>, compact analysers based on dilution extraction, and Hg analysers.

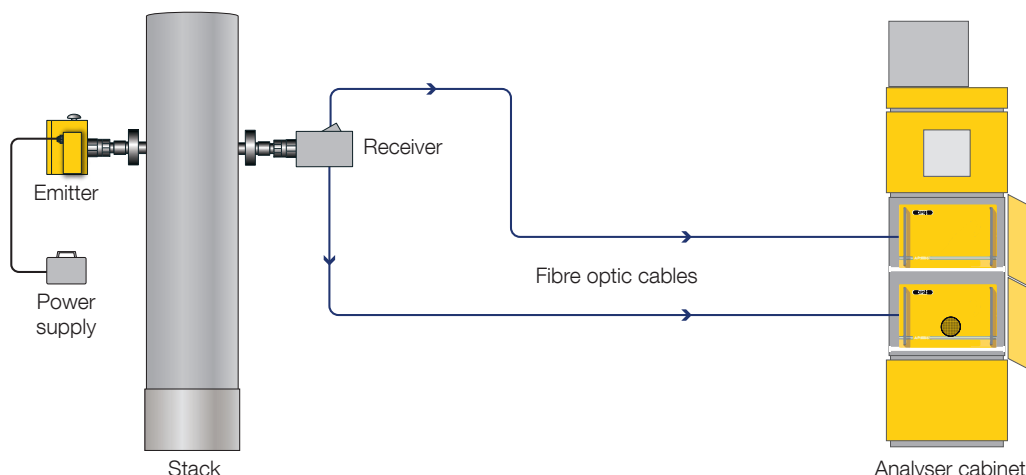
For further information, please visit [www.opsis.se](http://www.opsis.se).

**QAL 1 CERTIFICATION:**  
BEST PERFORMANCE  
LONGEST CALIBRATION INTERVAL



# SYSTEM OVERVIEW

An OPSIS system layout for a chemical plant



## PERFORMANCE DATA

(typical data which may vary depending on application)

Compound	Max. measurement range (1 m path) <sup>(1)</sup>	Lowest TÜV approved measurement range	Min. detectable quantities (monitoring path 1 m, measurement time 30 sec.)
<b>UV/FTIR DOAS Analyser Models AR600 / AR602Z / AR602Z/Hg / AR602Z/N / AR602Z/NHg / AR620</b>			
NO <sup>(2)</sup>	0–2000 mg/m <sup>3</sup>	0–150 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
NO <sub>2</sub>	0–100% Vol.	0–20 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
SO <sub>2</sub>	0–100% Vol.	0–75 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
NH <sub>3</sub> <sup>(3)</sup>	0–1000 mg/m <sup>3</sup>	0–10 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
Hg <sup>0</sup>	0–1000 µg/m <sup>3</sup>	0–45 µg/m <sup>3</sup>	0.5 µg/m <sup>3</sup>
THg	0–1000 µg/m <sup>3</sup>	0–45 µg/m <sup>3</sup>	0.5 µg/m <sup>3</sup>
Phenol	0–1000 mg/m <sup>3</sup>	0–20 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
Formaldehyde	0–1000 mg/m <sup>3</sup>	0–20 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>
H <sub>2</sub> O	0–100% Vol.	0–30% Vol.	0.1% Vol.
Benzene	0–1000 mg/m <sup>3</sup>	0–20 mg/m <sup>3(7)</sup>	0.5 mg/m <sup>3</sup>
Toluene	0–1000 mg/m <sup>3</sup>	0–50 mg/m <sup>3(7)</sup>	0.5 mg/m <sup>3</sup>
m-, p-Xylene	0–1000 mg/m <sup>3</sup>	0–50 mg/m <sup>3(7)</sup>	1 mg/m <sup>3</sup>
o-Xylene	0–1000 mg/m <sup>3</sup>	0–100 mg/m <sup>3(7)</sup>	2 mg/m <sup>3</sup>
Styrene	0–10000 mg/m <sup>3</sup>	0–50 mg/m <sup>3(7)</sup>	1 mg/m <sup>3</sup>
Cl <sub>2</sub> <sup>(5)</sup>	0–1000 mg/m <sup>3</sup>	0–500 mg/m <sup>3(7)</sup>	10 mg/m <sup>3</sup>
ClO <sub>2</sub>	0–1000 mg/m <sup>3</sup>	0–50 mg/m <sup>3(7)</sup>	1 mg/m <sup>3</sup>
O <sub>3</sub>	0–1000 mg/m <sup>3</sup>	0–50 mg/m <sup>3(7)</sup>	1 mg/m <sup>3</sup>
CS <sub>2</sub>	0–1000 mg/m <sup>3</sup>	0–100 mg/m <sup>3(7)</sup>	5 mg/m <sup>3</sup>
HCl	0–10000 mg/m <sup>3</sup>	0–1000 mg/m <sup>3(7)</sup>	10 mg/m <sup>3(4)</sup>
HF	0–1000 mg/m <sup>3</sup>	0–100 mg/m <sup>3(7)</sup>	5 mg/m <sup>3</sup>
CO <sub>2</sub>	0–100% Vol.	0–30% Vol.	0.5% Vol.
<b>FTIR DOAS Analyser Models AR650 / AR650/N</b>			
HCl	0–100% Vol.	0–15 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
CO	0–100% Vol.	0–75 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>
H <sub>2</sub> O	0–100% Vol.	0–30% Vol.	0.1% Vol.
HF	0–100% Vol.	0–1.5 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>
NH <sub>3</sub>	0–100% Vol.	0–100 mg/m <sup>3(7)</sup>	2 mg/m <sup>3</sup>
N <sub>2</sub> O	0–100% Vol.	0–500 mg/m <sup>3</sup>	5 mg/m <sup>3(6)</sup>
CH <sub>4</sub>	0–100% Vol.	0–20 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
CO <sub>2</sub>	0–100% Vol.	0–20% Vol.	0.1% Vol.
HCN	0–100% Vol.	0–100 mg/m <sup>3(7)</sup>	3 mg/m <sup>3</sup>
<b>LD500 Laser Diode Gas Analyser</b>			
CO	0–100% Vol.	0–5% Vol. <sup>(7)</sup>	0.1% Vol.
CO <sub>2</sub>	0–100% Vol.	0–30% Vol. <sup>(7)</sup>	0.1% Vol.
CH <sub>4</sub>	0–100% Vol.	0–20 mg/m <sup>3(7)</sup>	0.5 mg/m <sup>3</sup>
H <sub>2</sub> O	0–100% Vol.	0–30% Vol. <sup>(7)</sup>	0.1% Vol.
HCl	0–5000 mg/m <sup>3</sup>	0–15 mg/m <sup>3(7)</sup>	0.5 mg/m <sup>3</sup>
HF	0–5000 mg/m <sup>3</sup>	0–1.5 mg/m <sup>3(7)</sup>	0.1 mg/m <sup>3</sup>
H <sub>2</sub> S	0–100% Vol.	0–2% Vol.	0.1% Vol.
NH <sub>3</sub>	0–5000 mg/m <sup>3</sup>	0–10 mg/m <sup>3(7)</sup>	0.5 mg/m <sup>3</sup>
O <sub>2</sub>	0–21%	0–20% Vol. <sup>(7)</sup>	0.1% Vol.
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.

<sup>(1)</sup> 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.

<sup>(2)</sup> Maximum SO<sub>2</sub> concentration 5 g/m<sup>3</sup> × m.

<sup>(3)</sup> Maximum SO<sub>2</sub> concentration 500 mg/m<sup>3</sup> × m.

<sup>(4)</sup> Monitoring path 5 m, measurement time 30 sec.

<sup>(5)</sup> May require automatic zero function. Consult OPSIS.

<sup>(6)</sup> Detection limit of 1 mg/m<sup>3</sup> is optional with hardware upgrade.

<sup>(7)</sup> Lowest measurement range.

- Recommended monitoring path length: 1 to 5 m.
- After wet scrubbers or when the particulate concentration is high, the monitoring path length may have to be reduced.
- Max. length of fibre optic cable: please refer to product sheets P9 and P16. Besides the compounds above, the OPSIS system monitors the following gases: sulphur trioxide (SO<sub>3</sub>), hydrogen bromide (HBr), bromine (Br<sub>2</sub>), iodine (I<sub>2</sub>), hydrogen cyanide (HCN), hydrogen sulphide (H<sub>2</sub>S), phosgene (COCl<sub>2</sub>), and others.

# Continuous Emissions Monitoring and Process Control by OPSIS

- Can be installed in explosive areas
- 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
- 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

## UK & Ireland Distributor



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Please contact your OPSIS supplier to discuss your particular system requirements, including the compounds you wish to monitor. Separate product and other industrial application sheets are available. Specifications subject to change without notice.

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