

Internationally Approved  
EN 15267 Certified



Continuous Emissions Monitoring  
and Process Control

# Glass Manufacturing Industries

# Continuous Emissions Monitoring and Process Control Glass Manufacturing Industries

Process control and emissions monitoring in a glass manufacturing plant can be a challenge due to high temperature in the flue gas. To use an extractive system in this environment will demand a lot of maintenance.

The OPSIS DOAS system provides the glass industry with an accurate analyser that will operate with a minimum of maintenance. The OPSIS DOAS system is based on a non-contact method that uses an optical path to measure across the duct.

The light is transported in an optical fibre to the analyser, and one unit can operate several measurement paths.

A single OPSIS system will measure all relevant gas components such as NO<sub>x</sub>, SO<sub>2</sub>, CO, CO<sub>2</sub>, H<sub>2</sub>O, and O<sub>2</sub>.

## RETURN OF INVESTMENT

Many glass manufacturing plants will have to install monitoring systems to meet the environmental requirements.

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

## TEST AND APPROVALS

The OPSIS system has been tested and approved by a number of internationally recognized institutes and authorities. The system is approved by German TÜV and British MCERTS among others. Full details are available on request.

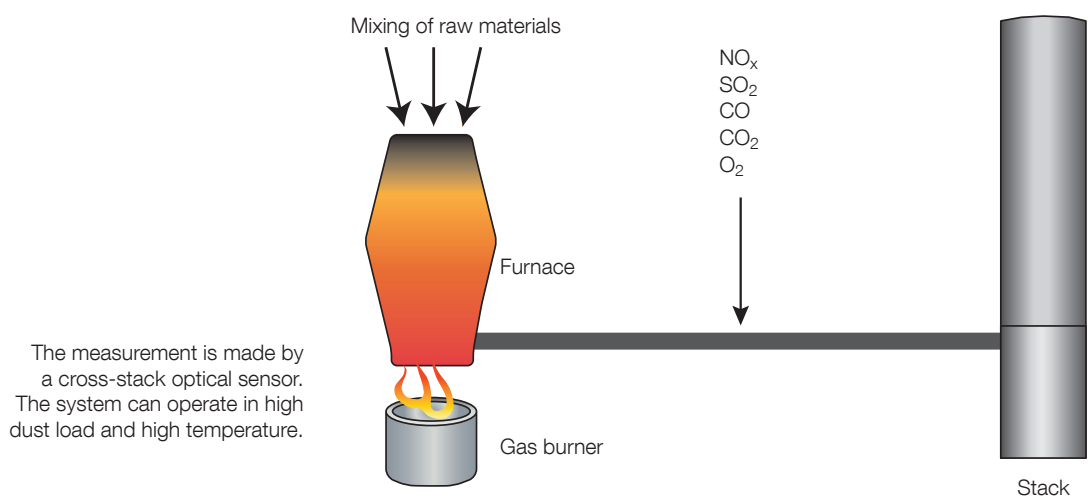
## OPSIS PRODUCT PORTFOLIO

OPSIS has a full product portfolio for measurement of gases. It includes complete CEM systems designed to meet the European directives, TDL systems, O<sub>2</sub> analysers, and Hg analysers.

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

### **QAL 1 CERTIFICATION:**

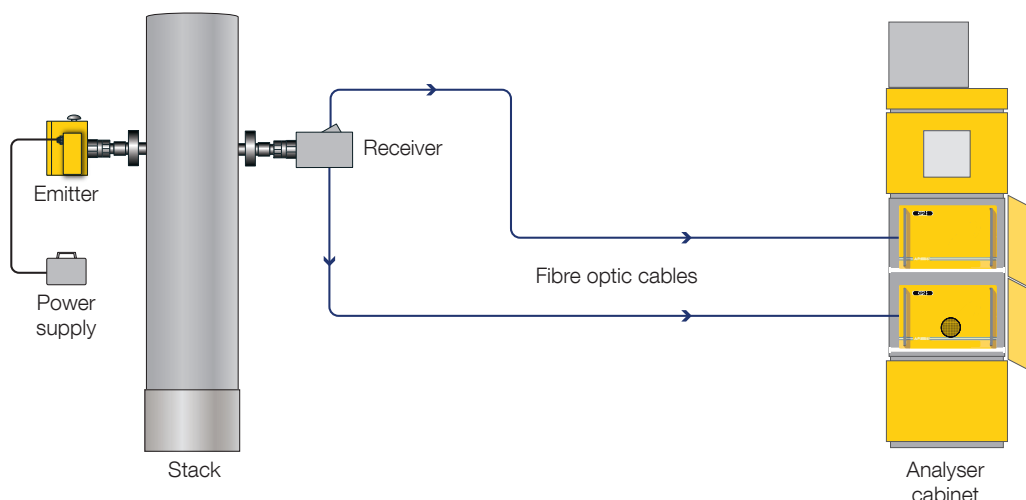
BEST PERFORMANCE  
LONGEST CALIBRATION INTERVAL





## SYSTEM OVERVIEW

An OPSIS system layout for emissions monitoring and process control in a glass manufacturing industry



## PERFORMANCE DATA

(typical data which may vary depending on application)

Compound	Max. measurement range (1 m path) <sup>(1)</sup>	Lowest measurement range according to EN 15267	Min. detectable quantities (monitoring path 1 m, measurement time 30 sec.)
<b>UV/IR 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>
H <sub>2</sub> O	0–100% Vol.	0–30% Vol.	0.1% Vol.
HCl	0–10000 mg/m <sup>3</sup>	0–1000 mg/m <sup>3(6)</sup>	10 mg/m <sup>3(4)</sup>
HF	0–1000 mg/m <sup>3</sup>	0–100 mg/m <sup>3(6)</sup>	5 mg/m <sup>3</sup>
CO <sub>2</sub>	0–100% Vol.	0–30% Vol.	0.5% Vol.
Benzene	0–1000 mg/m <sup>3</sup>	0–20 mg/m <sup>3(6)</sup>	0.5 mg/m <sup>3</sup>
Formaldehyde	0–2000 mg/m <sup>3</sup>	0–20 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>
<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(6)</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(5)</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.
<b>LD500 Laser Diode Gas Analyser</b>			
HCl	0–100% Vol.	0–15 mg/m <sup>3(6)</sup>	0.5 mg/m <sup>3</sup>
CO	0–100% Vol.	0–5% Vol. <sup>(6)</sup>	0.1% Vol.
H <sub>2</sub> O	0–100% Vol.	0–30% Vol. <sup>(6)</sup>	0.1% Vol.
HF	0–100% Vol.	0–1.5 mg/m <sup>3(6)</sup>	0.1 mg/m <sup>3</sup>
NH <sub>3</sub>	0–100% Vol.	0–10 mg/m <sup>3(6)</sup>	0.5 mg/m <sup>3</sup>
CO <sub>2</sub>	0–100% Vol.	0–30% Vol. <sup>(6)</sup>	0.1% Vol.
O <sub>2</sub>	0–21% Vol.	0–20% Vol. <sup>(6)</sup>	0.1% Vol.
CH <sub>4</sub>	0–100% Vol.	0–20 mg/m <sup>3(6)</sup>	0.5 mg/m <sup>3</sup>

### 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> x m.

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

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

<sup>(5)</sup> Detection limit of 1 mg/m<sup>3</sup> is optional with hardware upgrade.

<sup>(6)</sup> 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/m<sup>3</sup>, 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

Withstands high temperature in the flue gas  
Combines the benefits of UV/FTIR DOAS and TDL technology  
Best performance according to QAL1 certification  
Longest calibration interval according to QAL1 certification  
Automatic QAL 3 check as option  
No sampling required, non-contact measurement system  
Operates with a minimum of maintenance  
Low energy consumption  
Internationally approved  
Thousands of systems installed worldwide  
Serviced by highly skilled service network

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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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