

AQE

AIR QUALITY & EMISSIONS
12TH & 13TH OCTOBER 2022
TELFORD, UNITED KINGDOM

New Solutions for Low Measuring Ranges

Advanced analytics made into a commodity

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Emissions

Where?

Table of Contents

Summary zoom

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New Solutions for Low Measuring Ranges

Advanced analytics made into a commodity

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Emission Limit Values Development

Page 5 | Unrestricted | © Siemens 2022 | Clemens Barth | DI PA MI PRM | October 2022



New Solutions Sensitive and stable monitoring

Page 9 | Unrestricted | © Siemens 2022 | Clemens Barth | DI PA MI PRM | October 2022



Finally

Page 16 | Unrestricted | © Siemens 2022 | Clemens Barth | DI PA MI PRM | October 2022





Emission Limit Values

Development

Emission Limit Values Development – IED

Industrial Emission Directive 2010/75/EU

Set into force January 6, 2011,
mandatory for member states January 7, 2013

Revision April 5, 2022

Pillars of IED

- Integrated approach – consider entire frame of installation
- Integrated tightening by BAT conclusions/BREF as reference for permit conditions
- Flexibility – in limited cases for competent authorities
- Regular environmental inspections
- Public participation

Source: [Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions \(integrated pollution prevention and control\) \(europa.eu\)](#)



Emission Limit Values

Evolution of ELV in LCB

Example: 13. BImSchV – Daily average

| Solid fuel | 2013 | 2021 | Trend |
|------------------------------------|-----------------------|-----------------------|-------|
| CO | 200 mg/m ³ | 200 mg/m ³ | → |
| NO _x as NO ₂ | 150 mg/m ³ | 125 mg/m ³ | ↘ |
| SO ₂ | 150 mg/m ³ | 110 mg/m ³ | ↘ |

| Natural gas | 2013 | 2021 | Trend |
|------------------------------------|-----------------------|----------------------|-------|
| CO | 50 mg/m ³ | 50 mg/m ³ | → |
| NO _x as NO ₂ | 100 mg/m ³ | 85 mg/m ³ | ↘ |
| SO ₂ ¹ | 35 mg/m ³ | 35 mg/m ³ | → |

¹ As "other gas" – no dedicated "natural gas" definition



Emission Limit Values

Impact on analyzers

Some physics/principles come close to the edge

Increased effort in acceptance testing

Relative impact of environment needs to be considered closer

Close look to analyzer health can increase warning period in case – predictive maintenance





New Solutions

Sensitive and stable monitoring

Changes in Setup Set CEM CERT

Continuous emission
monitoring systems

Control environment

Central operation

Use options digitalization
enables



New Solutions

Properties of analyzers

Mandatory

→ Comply with regulations

Important

→ Price, robustness and simplicity

Because legal frames require ...

- Availability of 95% (O₂ 98%)
- Behavior in varying conditions (environment, gas composition)
- Emission Limit Values (ELV) define measuring range

ELVs only know one direction



New Solutions

Analyzers as technology carriers

NDIR

Non-Dispersive Infrared Spectroscopy

Single beam optics

for measurement of **CO**, **NO**, **SO₂** (higher ranges), **CH₄** ...

UV-Photometer

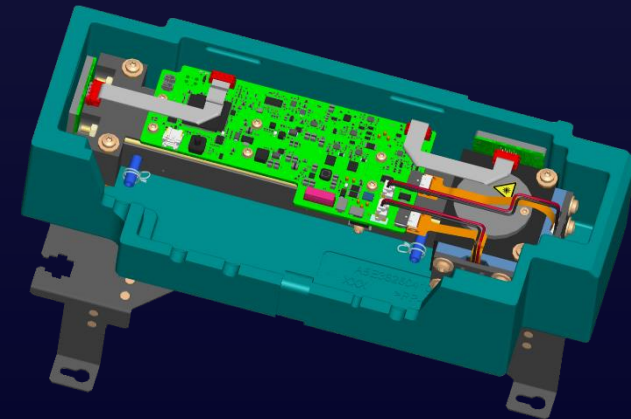
for measurement of **SO₂** and **NO₂**

Paramagnetic

for measurement of **oxygen**

Electrochemical detectors

to measure **O₂** and **H₂S**



Digitalization as Core Element to Contribute to Realize Sustainability

High availability and reliability as core requirement for analytical measurements

Example: Analyzer system for emission monitoring

- 01** Legal emission requirements require high availability of the measurement.
- 02** Penalties will be initiated if the availability requirements are violated.
- 03** Other analytical measurements within processes
e.g., for quality control for hydrogen require high availability of measurement as well.



How can **digitalization** help?

Example: **SITRANS AID IQ**

AID IQ is a solution that uses the internal diagnostic data of Siemens Analyzer to predict future health status and developments.

Whenever an anomaly is discovered, AID IQ informs the user, identifies the cause of the problem, and suggests a solution to the user.

AID IQ monitors the typical problems and causes of failure and monitors key device components, thereby identifying early on if there are any negative developments.

In addition to AID IQ, remote connection is built up to monitor and maintain the analyzer in case of need.

➤ **Maximize value of an analyzer for sustainable process by highest availability**

Digitalization as Core Element to Contribute to Realize Sustainability

Realize highest performance by combining reliable analyzer with remote connectivity and predictive maintenance software



What is the **value-add**?

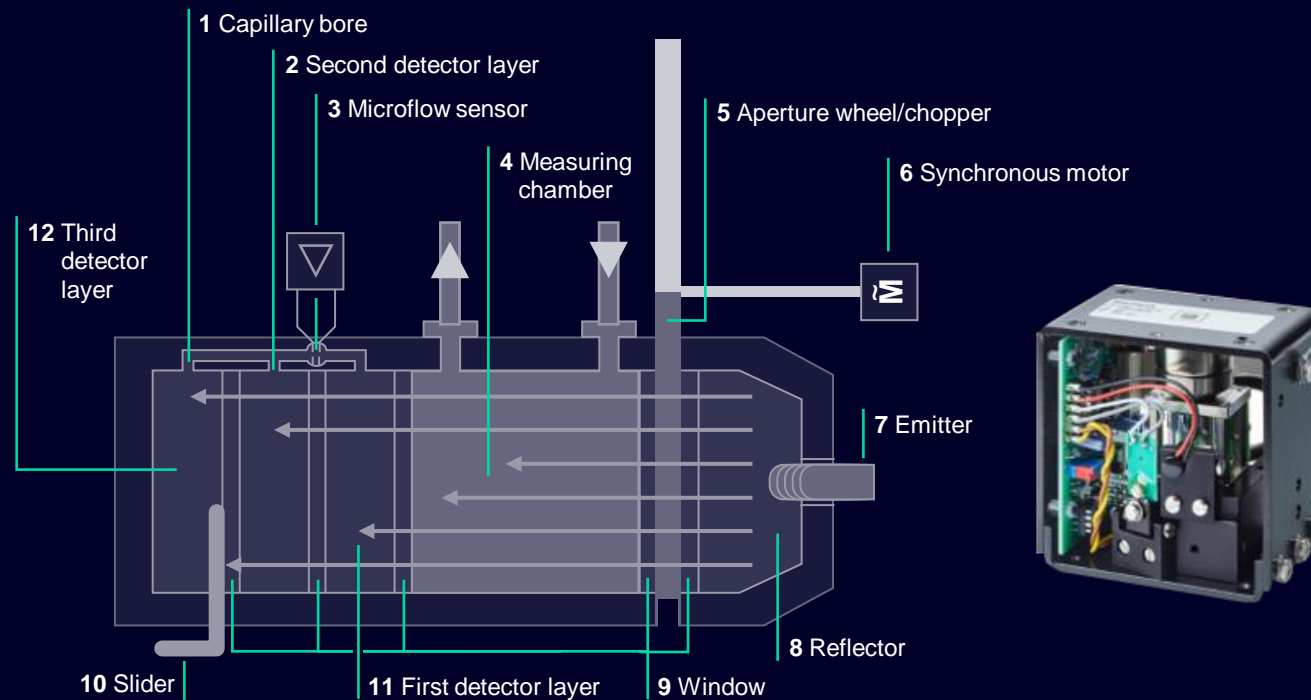
- Reliable analyzer which is highly protected against unexpected downtime (e.g., fulfill emission guidelines)
- Reduce maintenance inspections which leads to saved travel emissions
- Remote monitoring and service reduce travel emissions
- Get a better overview about remaining health status of the analyzer & spare parts helps to extend the device lifecycle (which saves unnecessary material waste)

[siemens.com/aidIQ](https://www.siemens.com/aidIQ)

Digitalization as Core Element to Contribute to Realize Sustainability – Predictive maintenance

Example: Predictive maintenance for **ULTRAMAT 23**

NDIR technology combined with an O₂ sensor and an H₂S sensor



What exactly does **AID IQ monitor**?

Examples of predictive maintenance for **ULTRAMAT 23**

H₂S sensor

O₂ sensor

IR sensor (incl. pollution)

O₂ sensor

Electronics

➤ All principle causes of failure are covered by **SITRANS AID IQ**

| Finally

New Solutions Finally

Not only one topic for adjustment



The three topics remain



The trend keeps moving





Thank you for listening!





Your questions?



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