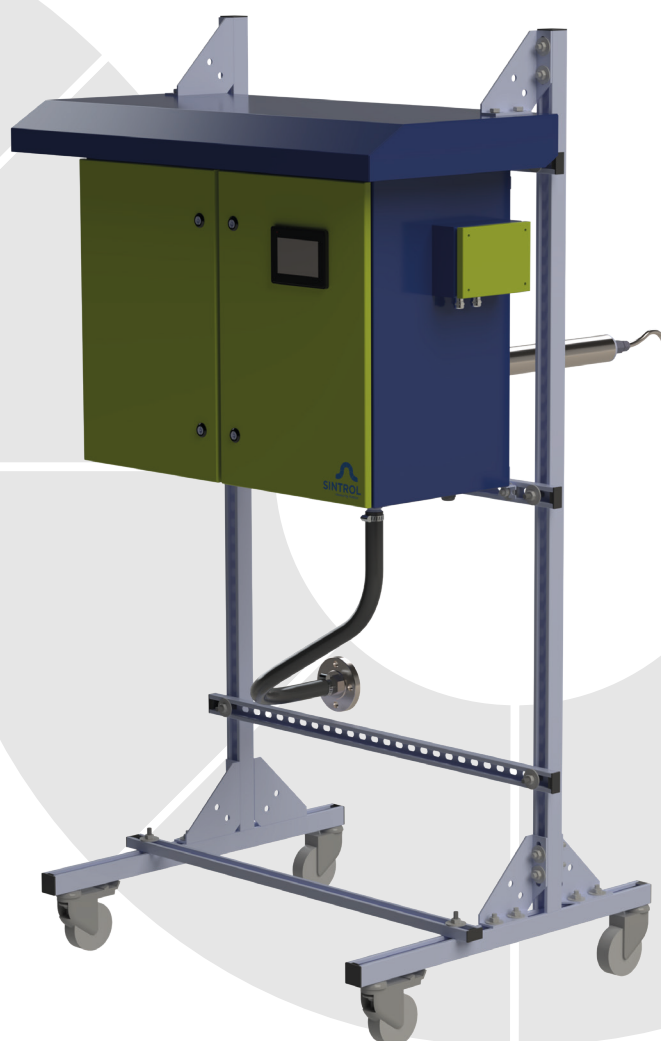


PRODUCT BROCHURE

EXO QAL

Optical Wet Gas Extractive Dust Monitor



**Continuous Dust
Measurement in Wet
and Challenging
Industrial Applications**



When Process Conditions Challenge Dust Measurement

Conventional in-situ dust monitors are primarily suited to dry, non-condensing process conditions. In wet, condensing and sticky process environments, moisture, water droplets, contamination, material build-up and corrosive process gases can interfere with measurement and increase maintenance needs.

The challenge is not only obtaining a measurement – it is maintaining a measurement that you can trust.

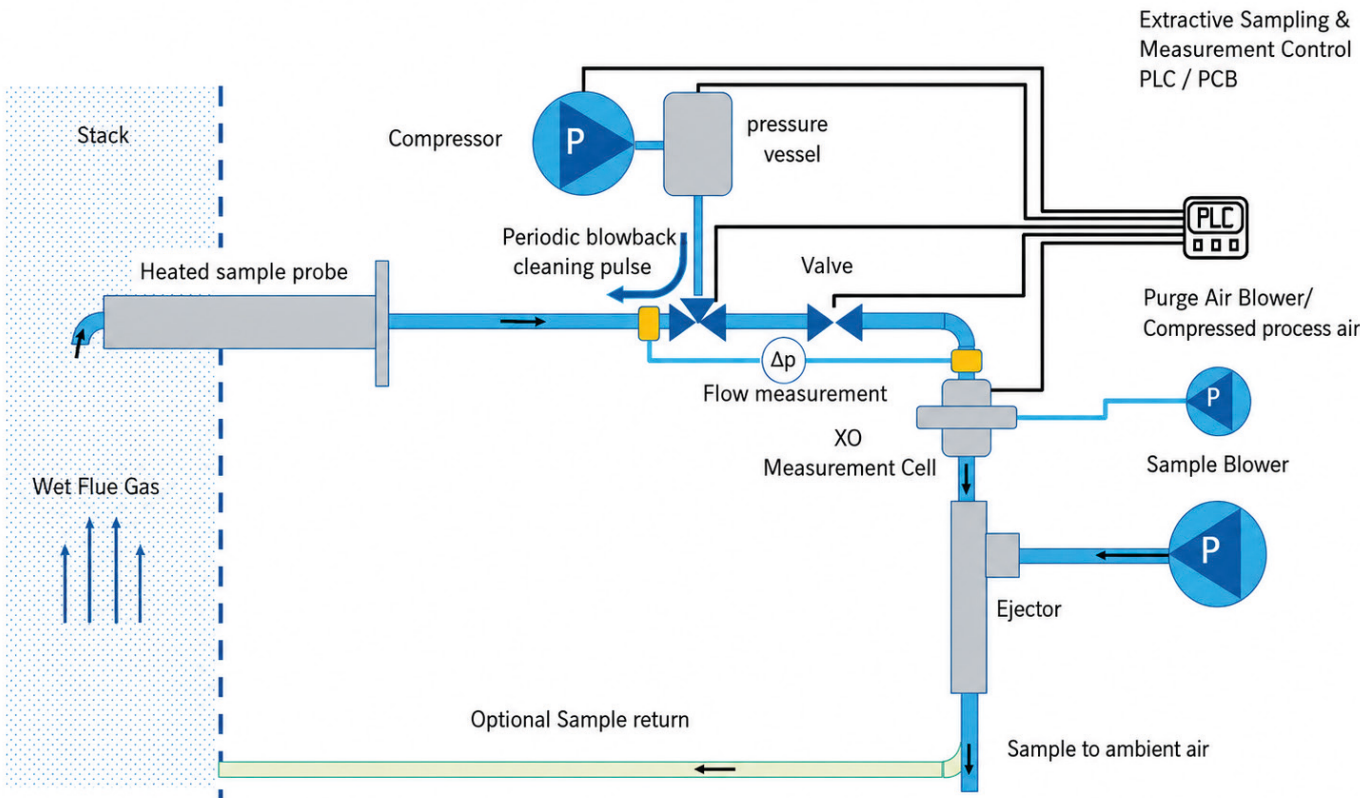
Why Wet Gas Particulate Matter Measurement Requires Extraction

In these conditions, an extractive approach allows sample conditioning and optical measurement to take place outside the most demanding part of the process, removing the influence of moisture and liquid droplets on the measurement.

EXO Extraction System in Brief

EXO QAL uses an extractive measurement approach:

- A heated sampling probe extracts a representative gas sample and heats it above the water and acid dew points.
- The conditioned sample is transported to the optical measurement cell.
- Particulate matter concentration is measured using optical forward-scattering technology with a wideband white LED light source
- After measurement, the sample can be returned to the process or discharged to ambient air, depending on the installation configuration.



A Different Approach to Dust Monitoring

Reliable dust measurement starts with a representative sample. EXO QAL extracts and conditions the sample before optical measurement, removing the influence of moisture and liquid droplets from the measurement process.

Representative Sample Extraction

A representative sample is continuously extracted from the process and conditioned before measurement. The ejector-based sampling system draws the sample through the measurement path, while automatic probe backpurging helps remove accumulated dust and deposits from the sampling probe.

- Continuous sample gas flow monitoring supports stable sample extraction.
- Periodic automatic backpurging helps keep the probe and sampling path clear.
- Optional external flow measurement supports automatic isokinetic sampling control

Unlike conventional sampling pumps, EXO uses an ejector-based sampling system designed for demanding applications where high dust loads, moisture, and condensable compounds may be present.

Controlled Sample Conditioning

The heated sampling probe begins conditioning the sample directly at the extraction point. Heating the sample above the water and acid dew points vaporises liquid droplets and helps prevent condensation before the sample reaches the optical measurement cell.

This is a key difference in wet gas measurement: moisture is managed before optical measurement takes place.

Heating at the extraction point also helps preserve sample representativeness by preventing droplets from capturing and removing particulate matter from the sample stream. In addition, maintaining the sample above the water and acid dew points reduces the risk of acid condensation within the sampling system and contributes to longer instrument life.

Precise Optical Measurement with Patented Air-Curtain Technology

The conditioned sample passes through an optical measurement cell, where particulate matter concentration is continuously measured using optical forward-scattering technology and a wideband white LED light source.

The long-life white LED light source helps reduce maintenance needs and lifetime ownership costs. Its broad optical spectrum also makes the measurement less sensitive to particle-size variation than narrow-wavelength laser technologies.

Reliable long-term measurement performance is supported by several integrated design features:

- Patented air-curtain technology eliminates the need for dilution air, helping maintain higher signal levels and preserving sample representativeness.
- Integrated reference and diagnostic functions continuously verify instrument performance and help ensure measurement integrity.
- Integrated diagnostics reduce troubleshooting time and support predictive maintenance.



Designed for Easy, Low-Maintenance Operation

EXO QAL is designed to maximise uptime and minimise maintenance effort. Routine maintenance and service operations can be performed using standard tools, while integrated cleaning functions and diagnostics help maintain reliable operation throughout the instrument lifecycle.

- Integrated sample blower inside the enclosure.
- Automatic periodic probe backpurging.
- Simple sampling path with no dilution-air adjustments or calculations.
- Heated sampling probe can be exchanged without dismantling the system from the stack.
- Ejector can be opened for cleaning and overhaul using standard tools.
- Local and remote operation over Ethernet TCP/IP.

Easy-to-use User Interface

Designed for instant clarity, the user interface provides easy access to measurement values, trends, alarms, and diagnostics. Operators can quickly understand instrument status and access the information needed for operation, troubleshooting, and maintenance.

The same interface can be accessed locally from the touchscreen or remotely over Ethernet TCP/IP, supporting efficient operation, troubleshooting, and remote support.

Flexible Installation for New and Existing Plants

EXO QAL is designed to simplify both new installations and retrofit projects. The adjustable support frame and wide height-adjustment range help align the sampling probe with existing process connections, reducing the need for modifications at the installation site.

The multiflange process connection supports several common flange standards, while flexible sample discharge configurations allow the sample to be either returned to the process or discharged to ambient air, depending on site requirements. Optional accessories, including transport wheels, further simplify handling and installation.



For outdoor installations, discharge to ambient air is typically recommended. For indoor installations, returning the sample to the process is generally preferred.

EXO QAL has been specifically designed for harsh, wet, and demanding process conditions.

Typical EXO QAL Applications

Wet and condensing gas streams commonly occur downstream of wet scrubbers, wet electrostatic precipitators (wet ESPs) and other gas-cleaning or cooling stages where process gas comes into contact with water or reagent solutions.

Battery materials and powder drying

Particulate monitoring in drying and powder-processing applications where moisture and particulate loading can vary.

Waste-to-Energy and waste incineration

Particulate monitoring downstream of wet scrubbers, quench systems and flue-gas cleaning equipment.

Coal-fired power plants

Applications downstream of flue-gas desulphurisation (FGD), gas-cooling and wet gas-treatment systems.

Petroleum refining

Monitoring downstream of gas-cooling, scrubbing and treatment equipment where moisture and condensable compounds may be present.



Biomass combustion

Dust monitoring where high-moisture fuels and wet gas-cleaning technologies create humid or condensing gas conditions.

Metals processing and foundries

Applications downstream of gas cooling and wet cleaning systems.

Chemical processing and acid production

Particulate monitoring in moisture-rich process gases and downstream of wet gas-treatment systems, including acid production, chlor-alkali and other specialty chemical processes.

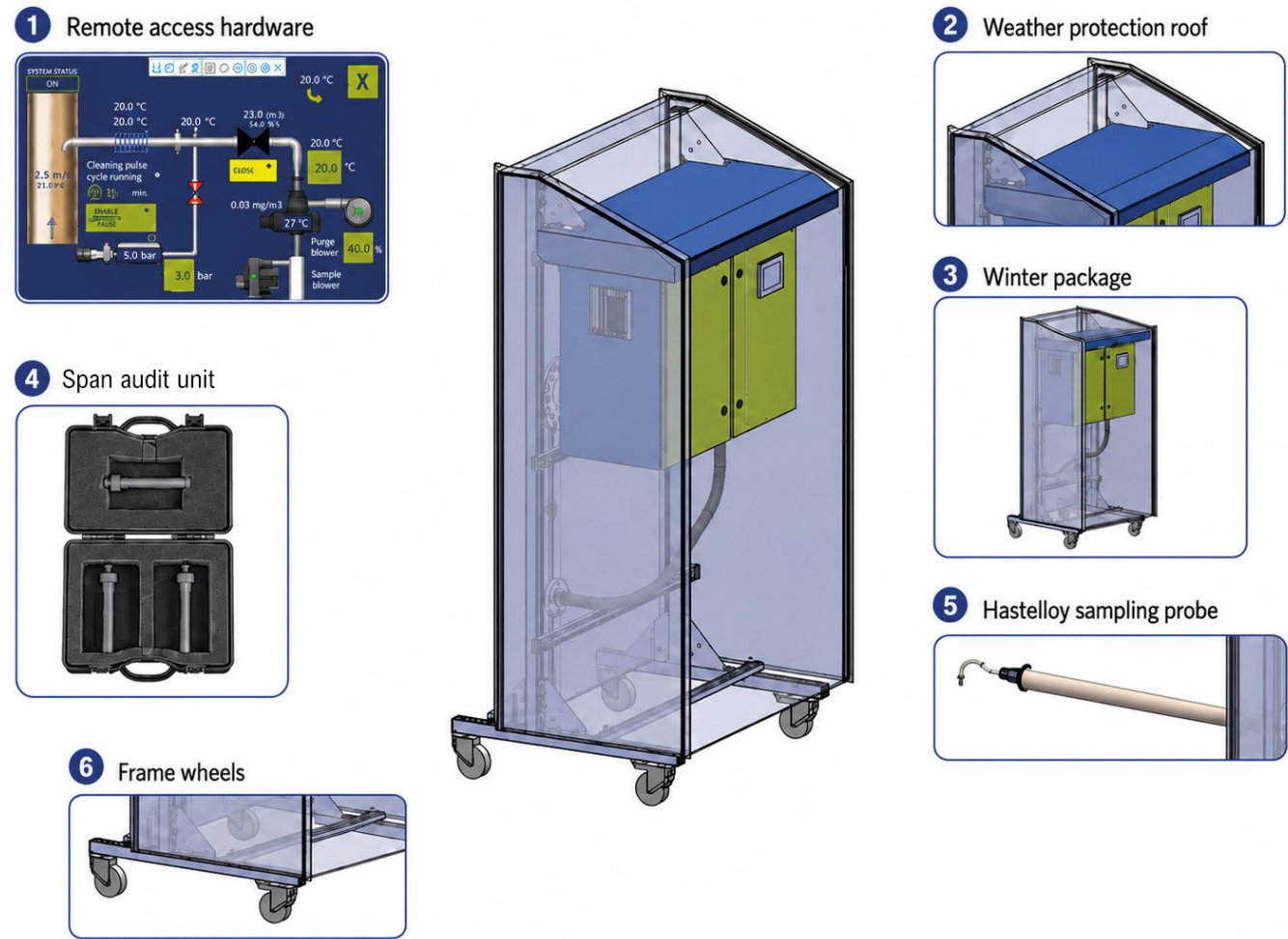
Odour control and air treatment systems

Particulate monitoring downstream of wet scrubbers in wastewater treatment, pulp and paper, rendering, food processing and other air-treatment applications where gas streams can be highly humid, condensing or corrosive.



Options for EXO QAL

Options for different installation, environmental and maintenance requirements.

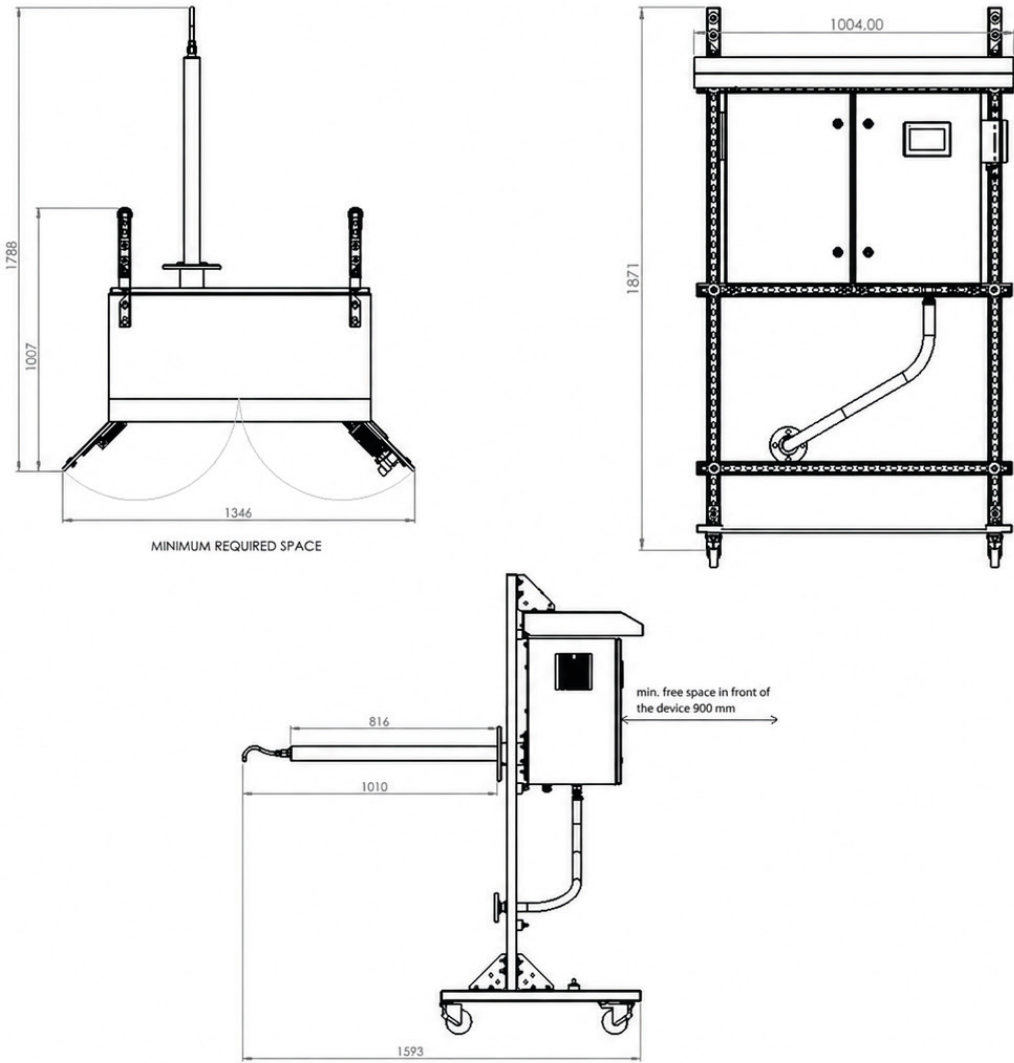


1. Remote access hardware	Includes preconfigured hardware for secure remote access and an industrial VPN solution for connecting, monitoring and maintaining the EXO QAL remotely
2. Weather protection roof	Recommended for outdoor installations exposed to rain, snow and direct sunlight.
3. Winter package	Enables operation below 0 °C (32 °F). Includes a protective hood and thermostat-controlled cabinet heater. Requires the Weather Protection Roof option.
4. Span audit unit	Applies a series of reference points across the measurement range for manual verification of instrument linearity.
5. Hastelloy sampling probe	Sampling probe in Hastelloy C276 for applications involving corrosive substances such as acidic gases.
6. Frame wheels	Wheels allow the system to be assembled at ground level and moved to the final installation location.

Ordering information

Ordering information	Product code
EXO QAL Optical Wet Gas Extractive Dust Monitor	PC900900
Remote access hardware	PC900820
Weather protection roof	PC900825
Winter package	PC900831
Span audit unit	PC900870
Hastelloy sampling probe	PC900851
Frame wheels	PC900822

Dimensions



Technical Specifications

Parameter	Value
Product name	EXO QAL Optical Wet Gas Extractive Dust Monitor
Measurement	Total suspended particles (TSP); optical forward scattering (LED-based), extractive
Particle size	From 0.01 µm
Detection limit	From 0.1 mg/m ³
QAL1 certification	Pending , proposed certification range 0–15 mg/m ³ ; supplementary range 0–300 mg/m ³
Measurement range	Up to 0–300 mg/m ³ , user changeable
Isokinetic sampling¹	Automatic sampling-flow control based on external flow velocity measurement
Power supply	100 – 230 VAC / 2500 VA
Purge air supply	Internal purge air blower
Input signals	Digital input for start/stop sampling; analog 4–20 mA input for external flow measurement enabling automatic isokinetic sampling-velocity control
Output signals	2 × 4–20 mA outputs, electrically isolated; 3 × digital outputs, 24 VDC, 0.5 A; Modbus RTU (RS-485); Modbus TCP (Ethernet); Ethernet TCP/IP; USB for data logging
Signal averaging time	1 – 3600 s, adjustable in 1-second increments
Stack process conditions	Flue gas below dew point with water droplets
Ambient temperature	–40...+50 °C (below 0 °C requires winter package)
Ambient humidity	Max. 95% RH, non-condensing
Flue gas velocity	0–25 m/s (0–82 ft/s)
Process temperature	Max. 200 °C (392 °F)
Process pressure	±40 mbar(g) / hPa(g) (depending on flue gas velocity and installation location)
Probe length	1 m
Probe cleaning purge	Periodic back purge; selectable interval 0–7200 min
Process connection / multiflange	DN80 PN10/16; DN100 PN10/16; ANSI 3 in Class 150 FF; ANSI 4 in Class 150 FF
Wetted parts	Probe: stainless steel 316L, optionally Hastelloy C276. Internal piping: stainless steel 316L.
Calibration	SRM (standard reference method), gravimetric sampling
Enclosure	Powder-coated steel, IP54
Weight	Approx. 100 kg fully assembled without options; shipment weight approx. 100 kg

¹Requires an external flow velocity signal. Flow velocity measurement device not included.