

PRODUCT DATASHEET

HALO 3 HF™

TRACE LEVEL HYDROGEN FLUORIDE ANALYZER



The HALO 3 HF offers:

- Low single-digit parts per billion (ppb) detection capability
- Absolute measurement (freedom from calibration gases)
- Wide dynamic range
- Low cost of ownership and operational simplicity
- Clean technology—no external calibration gases required
- Compact analyzer footprint

The HALO 3 HF™ trace level hydrogen fluoride gas analyzer provides users with the unmatched accuracy, reliability, speed of response and ease of operation that users of our analyzers have come to know and expect. Featuring our proven Cavity Ring-Down Spectroscopy-based trace gas sensor in a very compact and economic analyzer design, this versatile instrument allows users to measure HF in most inert and passive gases with just one device.

Users also enjoy freedom from requirements such as periodic sensor maintenance, span calibrations, purifier replacement and pump rebuilds. As a result, the HALO 3 is ideally suited to many applications where HF impurities are extremely critical, such as nitrogen trifluoride (NF₃), sulfur hexafluoride (SF₆) and fluorocarbon (CF₄, C₂F₆, etc.) production and semiconductor utilization.

Specifications

Performance

Operating range:	See table below
Detection limit (LDL, 3σ/24h):	See table below
Precision (1σ, greater of):	± 0.75% or 1/3 of LDL
Accuracy (greater of):	± 4% or LDL
Speed of response:	< 1 minutes to 90%
Environmental conditions:	10°C to 40°C, 30% to 80% RH (non-condensing)
Storage temperature:	-10°C to 50°C

Gas Handling System and Conditions

Wetted materials:	316L stainless steel (corrosive gas version optional) 10 Ra surface finish
Gas connections:	1/4" male VCR inlet and outlet
Leak tested to:	1 x 10 ⁻⁹ mbar l / sec
Inlet pressure:	10 – 125 psig (1.7 – 9.6 bara)
Flow rate:	Up to 1.8 slpm
Sample gases:	Most inert, toxic, passive and corrosive matrices
Gas temperature:	Up to 60°C

Dimensions & Weight

Standard sensor:	H × W × D: 8.73 x 8.57 x 23.6 in (222 x 218 x 599 mm)
Sensor rack (fits up to two sensors):	H × W × D: 8.73 x 19.0 x 23.6 in (222 x 483 x 599 mm)
Standard sensor weight:	28 lbs (12.7 kg)

Electrical and Interfaces

Platform:	Max series analyzer
Alarm indicators:	2 user programmable, 1 system fault, Form C relays
Power requirements:	90 – 240 VAC, 50/60 Hz
Power consumption:	40 Watts max.
Signal output:	Isolated 4–20 mA per sensor
User interfaces:	5.7" LCD touchscreen, 10/100 Base-T Ethernet USB, RS-232, RS-485 Modbus TCP (optional)
Data storage:	Internal or external flash drive
Certification:	CE Mark

Performance in HF	Range	LDL (3 σ)	Precision (1 σ) @ zero
In Nitrogen:	0 – 5 ppm	0.4 ppb	0.15 ppb
In Helium:	0 – 1.3 ppm	0.4 ppb	0.05 ppb
In SF ₆ :	0 – 8 ppm	1.2 ppb	0.4 ppb
In NF ₃ :	0 – 7.5 ppm	0.6 ppb	0.2 ppb
In CF ₄ :	0 – 6 ppm	0.8 ppb	0.3 ppb
In C ₂ F ₆ :	0 – 12 ppm	1.6 ppb	0.6 ppb
In C ₃ F ₈ :	0 – 12 ppm	1.6 ppb	0.6 ppb
In C ₄ F ₆ :	0 – 15 ppm	15 ppb	5 ppb
In C ₄ F ₈ :	0 – 14 ppm	1.6 ppb	0.6 ppb

Contact us for additional analytes, matrices and ranges.
U.S. Patent # 7,277,177

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