

PRODUCT DATASHEET

HALO™ 3 D₂O/HDO

TRACE LEVEL HEAVY WATER ANALYZER



The HALO 3 D₂O/HDO analyzer ensures purity and process protection with:

- Parts-per-billion (ppb) D₂O and HDO detection capability
- Wide measurement range
- Freedom from calibration (absolute CRDS measurement technology)
- Low cost of ownership and zero maintenance
- Easy to use touchscreen and remote software interface

Deuterium (D_2 or 2H_2), also known as “heavy hydrogen”, is used in a variety of applications, including industrial and university research comparisons between hydrogen and deuterium in deposited film analysis, rapid thermal anneal for certain semiconductor devices, and optical fiber manufacturing to eliminate the water peak in the telecom E-band. Whether it is for process control or quality assurance, gas suppliers need accurate, low-level contaminant monitoring to ensure deuterium purity, especially for the detection of trace D_2O (heavy water) and HDO (semiheavy water).

The HALO™ 3 D_2O /HDO analyzer offers unparalleled accuracy and reliability for your deuterium purity analysis. Compact and easy to use, this analyzer features our proven Cavity Ring-Down Spectroscopy technology to effortlessly detect single-digit ppb levels of D_2O and HDO in your sample.

Users enjoy freedom from periodic sensor maintenance, and with no calibration gases required, operating costs are nearly eliminated. With drift-free stability and rapid response time, the HALO 3 D_2O /HDO analyzer is ideal for continuous, online gas monitoring that is critical to process control in gas and chemical industries or anywhere purity is a necessity.

Specifications

Performance

Operating range:	See table below
Detection limit (LDL, $3\sigma/24h$):	See table below
Precision (1σ, greater of):	$\pm 0.75\%$ or $1/3$ of LDL
Accuracy (greater of):	$\pm 4\%$ or LDL
Speed of response:	< 1 minute 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, 10 Ra surface finish
Gas connections:	1/4" male VCR inlet and outlet
Leak tested to:	1×10^{-9} mbar l / sec
Inlet pressure:	10 – 125 psig (1.7 – 9.6 bara)
Flow rate:	0.05 to 1.8 slpm
Sample gases:	D_2 and N_2
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, D₂O	Range	LDL (3σ)	Precision (1σ) @ zero
In Deuterium:	0 – 20 ppm	3 ppb	1.0 ppb
In Nitrogen:	0 – 50 ppm	7 ppb	2.5 ppb

Performance, HDO	Range	LDL (3σ)	Precision (1σ) @ zero
In Deuterium:	0 – 30 ppm	5 ppb	2 ppb
In Nitrogen:	0 – 40 ppm	6 ppb	2 ppb

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

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