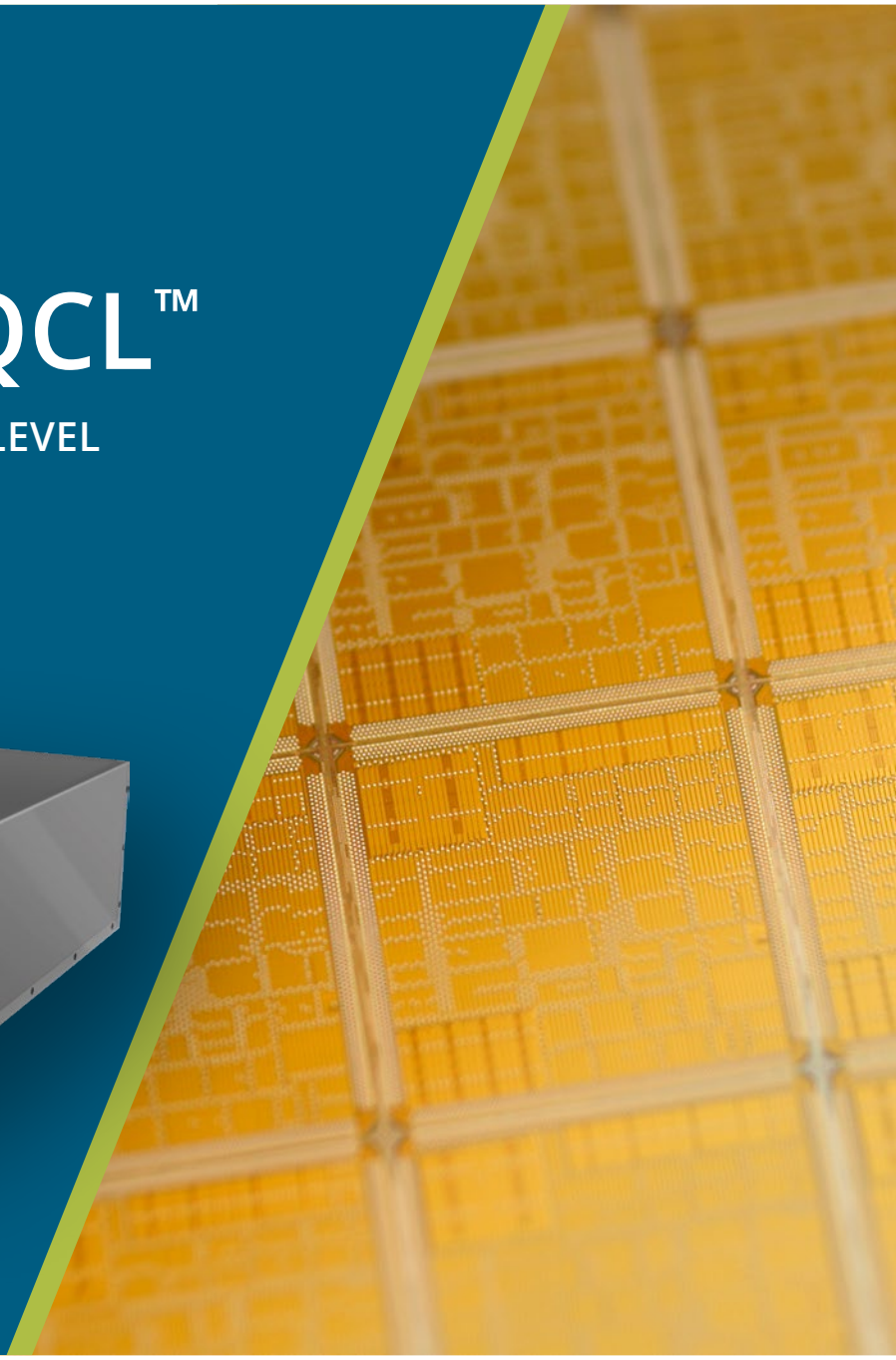
Process Insights™
Premium Insights Into Process

HIGH-PERFORMANCE GAS ANALYZERS

PRODUCT DATASHEET

HALO Max QCL™

QCL-CRDS ANALYZER FOR PPT LEVEL CO AND CO_2 DETECTION



Our first analyzer series based on Quantum Cascade Laser Cavity Ring-Down Spectroscopy (QCL-CRDS), the HALO Max QCL offers:

- Parts-per-trillion (ppt) detection capability for carbon monoxide (CO) and carbon dioxide (CO_2) in UHP bulk gases
- Incorporates mid-infrared QCL technology to achieve the ultimate sensitivity
- Absolute measurement (freedom from calibration)
- Excellent speed of response at ppb levels and below
- Continuous measurement – no batch processing typical with GCs
- Robust design & maximum ease of use

POWERED BY QCL ADVANCED TECHNOLOGY

Specifications

Performance

Operating range:	See gas performance table on the next page
Detection limit (LDL, 3σ/24h):	See gas performance table on the next page
Precision (1σ, greater of):	± 0.75% or see table on the next page
Accuracy (greater of):	± 4% or LDL
Speed of response:	< 1 min to 95%
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

Sample gas connections:	1/4" male VCR inlet and outlet
Leak tested to:	1 x 10^{-9} mbar l / sec
Inlet pressure:	6 − 125 psig (1.4 − 9.6 bara)
Flow rate:	<1 slpm in N_2 (gas dependent)
Sample gases:	Most inert and passive gases
Gas temperature:	Up to 60°C
Purge gas (CO_2 only)**:**	Inert gas (e.g. N_2), <1 ppm CO_2, 30 − 150 psig, 4 − 5 slpm
Purge gas connection:	1/8" Swagelok®

Dimensions & Weight

Standard sensor (19" rack-mountable)**:**	H × W × D 8.75 x 19.0 x 25.0 in (222 x 483 x 635 mm)
Standard sensor weight:	HALO Max QCL CO: 55 lbs (25 kg) HALO Max QCL CO_2: 60 lbs (27 kg)

Electrical and Interfaces

Alarm indicators:	2 user programmable, 1 system fault Form C relays
Power requirements:	90 − 240 VAC, 50/60 Hz
Power consumption:	100 Watts max.
Signal output:	Isolated 4−20 mA
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

HALO Max QCL CO

Performance, CO	Range	LDL (3σ)	Precision (1σ) @ zero
In Nitrogen:	0 – 0.5 ppm	200 ppt	70 ppt
In Helium:	0 – 0.35 ppm	130 ppt	45 ppt
In Argon:	0 – 0.4 ppm	150 ppt	50 ppt
In Hydrogen:	0 – 0.5 ppm	200 ppt	70 ppt
In Oxygen:	0 – 0.45 ppm	170 ppt	60 ppt
In Clean Dry Air (CDA):	0 – 0.5 ppm	200 ppt	70 ppt

HALO Max QCL CO_2

Performance*, CO_2	Range	LDL (3σ)	Precision (1σ) @ zero
In Nitrogen:	0 – 2.5 ppm	100 ppt	35 ppt
In Helium:	0 – 2 ppm	90 ppt	30 ppt
In Argon:	0 – 2 ppm	80 ppt	25 ppt
In Hydrogen:	0 – 4 ppm	180 ppt	60 ppt
In Oxygen:	0 – 2 ppm	90 ppt	30 ppt
In Clean Dry Air (CDA):	0 – 2.5 ppm	100 ppt	35 ppt

*Due to the high abundance of CO_2 in air, purging of the analyzer housing is required to achieve specified LDL (see previous page for purge gas requirements).

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

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