Process Insights
Premium Insights Into Process

Specialty Gas Solutions

Real-Time CRDS Analyzers for Electronic and Industrial Specialty Gases

SPECIALTY GAS APPLICATIONS

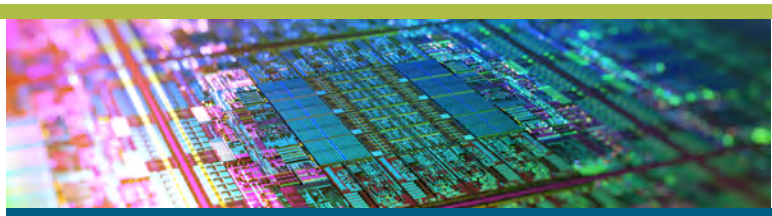
From carbon dioxide for beverages to ammonia for LED manufacturing or silane for semiconductor fabrication, high-quality specialty gases are important raw materials and process gases for many industries.

It is of utmost importance to processes that specialty gases meet high purity standards. For example, moisture impurities in ammonia directly influence the efficiency of the resulting LED. Gases used in the semiconductor industry generally require ultra-high purity, whether it is silane or germane for epitaxy, fluorine compounds for etching processes, or cleaning gases.

Process Insights offers ultra-sensitive, highly accurate and easy to use analysis instruments from its Tiger Optics brand, which are based on renowned Cavity Ring-Down Spectroscopy (CRDS) for a large variety of specialty gases and applications.

Oxygenated Gases

CO CO_2 NO N_2O

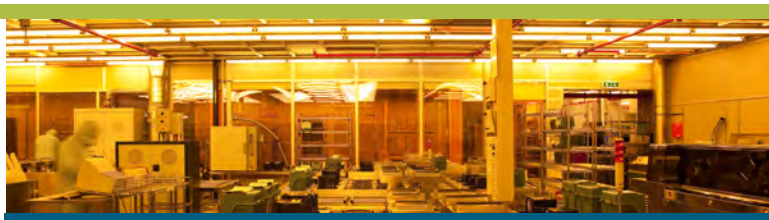


Hydrides, incl. Ammonia

NH_3 PH_3 AsH_3 SiH_4 GeH_4

Corrosive Gases

Cl_2 HCl HBr



Fluorinated Compounds

SF_6 NF_3 CF_4 C_xF_y

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ADVANTAGES OF CRDS TECHNOLOGY

Detecting impurities in specialty gases is complex due to the gases' chemical properties and possible background interference. This often rules out certain techniques or limits their sensitivity to levels not suitable for the industry's high purity requirements.

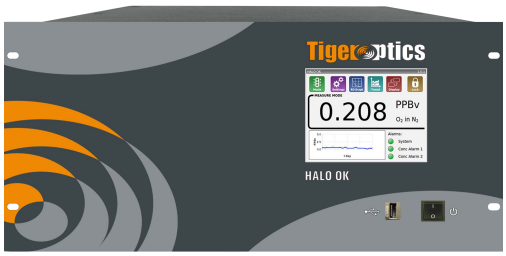
Process Insights CRDS analyzers have been widely used in a variety of specialty gas applications for many years because of their ease of use, fast response, accuracy, robustness, low flow rate, and freedom from calibration.

Advantages of Cavity Ring-Down Spectroscopy

- ✓ Optical, non-contact measurement
- ✓ High selectivity to minimize background
- ✓ High chemical and corrosion resistance
- ✓ Excellent sensitivity
- ✓ Real-time, 24/7 operation
- ✓ Low cost of ownership

Common Issues with Legacy Technologies

- ❖ Chemical reaction with background gas
- ❖ Background interference
- ❖ Material incompatibility
- ❖ Insufficient sensitivity
- ❖ Not real-time, batch processing
- ❖ Labor-intensive and costly to operate



HALO OK
ppt-Level Detection of oxygen

HALO 3 H_2O
Versatile, ppb-Level Moisture Analyzer

HALO Max QCL CO & CO_2
ppt-Level Detection of CO and CO_2

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DETECTION SPECIFICATIONS

CRDS Analyzer Lowest Detection Limit (LDL, 3σ/24h)

Background Gas \ Analyte	HALO KA H_2O	HALO 3 H_2O	Spark H_2O	Spark H_2O in CO_2	HALO H_2O in N_2O	HALO LP H_2O	ALOHA+ H_2O	HALO OK	HALO Max QCL CO	HALO 3 CO	HALO Max QCL CO_2	HALO 3 CO_2	HALO 3 CH_4	HALO 3 NH_3	HALO 3 HF	HALO 3 N_2O	HALO LP N_2O	HALO LP NO
CO	0.6	1.5	15	7					N/A	N/A								
CO_2	0.8	2.0		550				0.5/0.1†			N/A	N/A	35	2.5			200	500
NO						16												N/A
N_2O					7.5									10		N/A	N/A	
NH_3						9	3		<5‡		<5‡			N/A				
PH_3						9												
AsH_3						5												
SiH_4						400*												
GeH_4						20												
Cl_2	0.65	1.5																
HCl	1.2	3							<1‡		<1‡							
HBr	12	12																
SF_6	0.4	1.0	15												1.2			
NF_3	0.6	2.5	9							100		10			0.6	200		
CF_4	0.8	4	9												0.8			
C_2F_6	1.2	3													1.6			
C_3F_8	1.2	3													1.6			
C_4F_6	150	150													15			
C_4F_8	1.2	3													1.6			
C_5F_8	8	30																

*effective LDL based on 20:1 dilution with nitrogen
†LDL of 0.1 ppb requires addition of Tiger Optics' Zero Gas Panel and Linear Fit Mode
‡estimated LDL, pending experimental verification

Custom detection capabilities are available upon request. Please contact us to discuss your specific application.

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GAIN REAL-TIME INSIGHT INTO YOUR PROCESS

Process Insights manufactures and delivers premium sensors, monitors, detectors, analyzers, instrumentation, and software that are mission-critical to keep your operations, personnel, and the environment safe – every day across the globe.

Get the most reliable, precision analytical technologies available on the market today. We will work to match your needs and budget, and provide the optimal, and most stable process analysis solution for your application.

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Process Insights is committed to solving our customers' most complex analytical, process, and measurement challenges everyday.

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