Accurate. Reliable. Cost Effective.

Emissions Monitoring for Compliance & Process Improvement

CEMTEK KVB-Enertec

LaserCEM®

LaserCEM® For Part 75: Innovation That Fits, Not Disrupts

Being a CEMS Integrator allows us to service your CEMS needs by customizing CEMS systems that are of the utmost benefit to your specific application. With over 50 years of experience, we understand that not all CEMS systems are created equal and work for all applications. Therefore, CEMTEK KVB-Enertec has proudly partnered with Durag and their LaserCEM® which offers the same operational costs benefits of an IPCEMS while also meeting the requirements of Part 75.

In response to environmental challenges and given ongoing technological development, many industries are confronted with more and more stringent regulations governing emission limit values. This is where LaserCEM® from AP2E, a specialist in industrial gas analysis systems and member of DURAG GROUP, comes into play. LaserCEM® using patented OFCEAS® (optical feedback cavity enhanced absorption spectroscopy) technology is a technological breakthrough. It offers a more accurate, efficient and sustainable solution for continuous monitoring of gaseous pollutant emissions into the atmosphere.

YOUR SOLUTION TO REGULATORY AND ENVIRONMENTAL CHALLENGES

Air quality and the monitoring of industrial emissions play a major role in public health. Industrial stacks, for example, are subject to new regulations requiring continuous monitoring of pollutants at ever lower concentrations. The problem: conventional technologies for this type of measurement (NDIR, FTIR, etc.) are reaching their detection limits for many pollutants. This is exactly where LaserCEM® comes into play.

It utilizes patented OFCEAS® technology, based on extractive high resolution absorption spectroscopy. For a multigas analysis system, this laser-based technology enables unrivaled measurement quality in terms of accuracy and resolution, allowing measurement of gases in concentration ranges from percent to ppb.

OFCEAS® TECHNOLOGY: UNRIVALED ACCURACY, MINIMIZED MAINTENANCE + LOW OWNERSHIP COSTS

LaserCEM® operates with LPS® (low-pressure gas sampling) and a heat-traced sampling line, only maintained at maximum 80 °C in order to avoid condensation and guarantee accurate, consistent measurements. In addition, this technology reduces total sample mass flow, and therefore the amount of impurities. As a result, maintenance is minimized and sample transfer at 180 °C is avoided, considerably reducing the energy consumption of the analysis system. The very short response time and low sample volume required by the use of LPS®technology enable longer sample line lengths than conventional heated lines, and therefore greater ease of installation of the analysis system at lower cost.

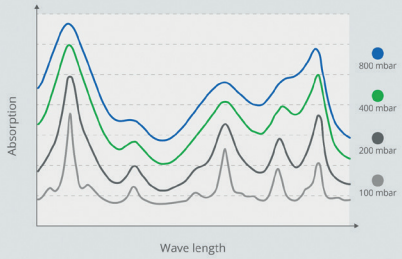
The combination of OFCEAS® and LPS® technologies enables fast, highly precise and interference-free spectral analysis, whatever the gas matrix to be analyzed. Thanks to its LPS®, LaserCEM® can be adapted to a wide range of applications without the need to heat or dry the sample prior to analysis, which greatly reduces installation, operating and maintenance costs.

KEY FEATURES

UNIQUE SELECTIVITY AND PRECISION

LaserCEM® OFCEAS® technology generates a high resolution absorption spectrum in the picometer range, always in combination with the zero signal. This unique capability minimizes or eliminates interferences, ensuring accurate and reliable measurements of various gases. Thanks to its exceptional selectivity, the system can clearly distinguish gases in complex matrices, offering unrivaled accuracy in pollutant detection. With LPS® technology, absorption spectra are so well defined that cross-sensitivity phenomena are virtually non-existent, enabling measurement of pollutants even in matrices containing over 60% water.

Because the system enables direct measurement without sample modification, it ensures maximum representativeness, guaranteeing measurement of peripheral parameters (water, oxygen) with the same analyzer.



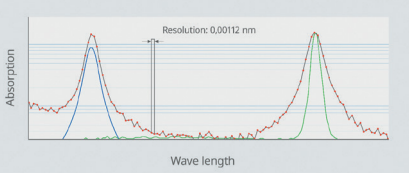
The graph shows how the absorption peaks varies at different pressures (100, 200, 400, and 800 mbar). Lower pressure increases peak sharpness, making the absorption ranges more distinct and reducing interference between different measuring components, resulting in more precise measurements.

DIRECT MEASUREMENT, EXCEPTIONAL SENSITIVITY

Thanks to an optical path of up to 10 km, signal intensity is multiplied by 1,000 compared with conventional technologies. This enhanced sensitivity enables the detection of extremely low concentrations of pollutants with exceptional accuracy, down to parts per billion (ppb).

The system provides direct measurement without sample modification, with unrivaled response times ensuring maximum integrity of the data collected. It is delivered fully precalibrated, eliminating the need for daily zero and span calibrations.

LaserCEM® requires no nitrogen, zero air, dilution air or other carrier gases, simplifying operation and reducing operating costs.

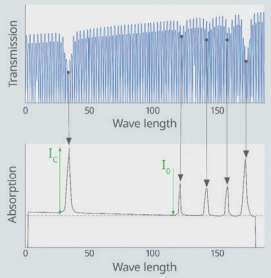


The graph shows the absorption of two gases (blue and green curves). Each gas absorbs specific wavelengths, creating a unique spectrum like a fingerprint. By analyzing the absorption (black line with red dots), the presence and concentration of gases can be accurately detected. AP2E devices excel at measuring gas mixtures, even when components vary greatly in concentration – from percentages down to parts per billion (ppb) or parts per trillion (ppt).

DOUBLE QAL1 CERTIFICATION FOR MEASUREMENTS THAT ARE ALWAYS ACCURATE

The LaserCEM® is a turnkey multi-gas analysis system for continuous, simultaneous measurement of multiple gases such as HF, HCl, NH_3, CH_4, SO_2, CO, CO_2, NO, NO_2, O_2, N_2O, H_2S, CHOH, H_2O, etc. It benefits from double QAL1 certification (by TÜV and MCERTs) in accordance with EN 15267 and EN 14181 and incorporates the QAL3 functionalities defined by EN 14181.

Only two reference gas cylinders need to be connected to the QAL3 module. It manages the injection of standard gases at the head of the sampling system, enabling the entire measurement system to be checked. Very low reference gas consumption ensures an extended gas cylinder change interval of up to one year, reducing costs for gases and labor.



The transmission spectrum (blue graph) shows wave-length changes during measurement, which reveal the absorption spectrum (black graph). Each gas component absorbs specific wavelengths, creating unique peaks in the absorption spectrum.

MODULARITY AND LOW ENERGY CONSUMPTION: ASSETS FOR A SUSTAINABLE FUTURE

LaserCEM® is designed and certified as a modular system, making different configurations and the addition of new gases or measuring ranges possible. This flexibility supports users in bringing their installations up to standard. Companies can easily adapt to new regulatory requirements with no need to invest in a completely new system, reducing costs and wasted resources.

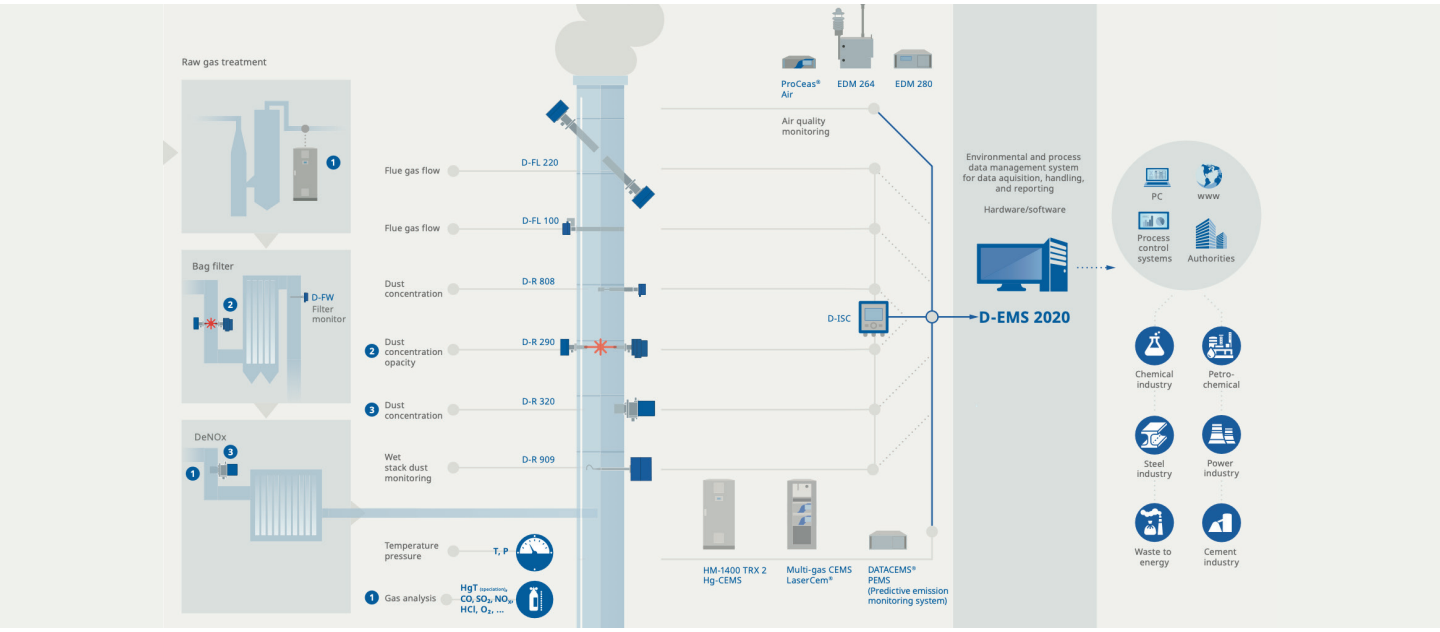
The technology is used in marine applications, guaranteeing the availability of spare parts or upgrades for over 25 years.

LaserCEM® also features much less energy consumption than other current analyzers. In fact, the system achieves energy savings of 50 to 80%, depending on the length of the sampling line. This energy efficiency helps to reduce the carbon footprint of emission monitoring operations, bringing industrial practices in line with sustainable development objectives.

GROWING ADOPTION BY INDUSTRY

Many industries are gradually adopting this technology. Interest is greatest in the energy production, chemical, metallurgy and waste-to-energy sectors, where pollutant emissions are particularly tightly controlled.

With its growing adoption (several hundred installations are already in service), LaserCEM® promises to become an essential tool for monitoring emissions into the atmosphere, paving the way for a cleaner, more sustainable future.



A COMPLETE, TURNKEY SOLUTION FOR REGULATORY COMPLIANCE OF INDUSTRIAL EMISSIONS

DURAG GROUP offers its customers a complete solution for monitoring stack emissions. In addition to LaserCEM® and mercury (Hg-CEMS) analyzers, DURAG offers continuous dust measurement analyzers, flue gas flow meters and the environmental and process data acquisition, handling, and reporting system needed to effectively monitor and report regulated pollutants. This comprehensive, integrated solution ensures full compliance with local regulatory requirements and offers optimized emission management for industries. DURAG's global reach, combined with local support, ensures efficient service and maintenance, enhancing plant operational performance.

TECHNICAL DATA

EU

Parameter**	Certified Measuring Range*		Typical Maximum Range	
CO (mg/m³)	0 0	75 1,249	0	3,000
CO low (mg/m³)	0 0	30 250	--	--
CO2 (% vol)	--	--	0	20
NO (mg/m³)	0 0 0	78 150 2,008	0	3,000
NO_2 (mg/m³)	0 0	40 100	0	2,000
N_2O (mg/m³)	0	500	0	500
HF (mg/m³)	0 0	2 10	0	100
SO_2 (mg/m³)	0 0	75 2,858	0	5,000
HCl (mg/m³)	0 0	15 98	0	150
NH^3 (mg/m³)	0 0 0	15 45 76	0	500
CH_4 (mg/m³)	0 0	5 20	0	500
O_2 (% vol)	0	21	0	25
H_2O (% vol)	0 0	30 40	0	60
H_2S (mg/m³)	0	100	0	7,500
CHOH (mg/m³)	0	5	0	30
TOCs by FID – on request				

US

Parameter**	Certified Measuring Range*		Typical Maximum Range	
CO (ppmv)	0 0	65 1,090	0	2,619
CO low (ppmv)	0 0	26 218	--	--
CO2 (% vol)	--	--	0	11
NO (ppmv)	0 0 0	64 122 1,636	0	2,444
NO_2 (ppmv)	0 0	21 53	0	1,063
N_2O (ppmv)	0	278	--	--
HF (ppmv)	0 0	2 12	0	122
SO_2 (ppmv)	0 0	29 1,091	0	1,908
HCl (mg/m³)	0 0	10 66	0	101
NH^3 (ppmv)	0 0 0	22 65 109	0	717
CH_4 (ppmv)	0 0	8 30	0	762
O_2 (% vol)	0	21	0	25
H_2O (% vol)	0 0	30 40	0	60
H_2S (ppmv)	0	72	0	5,380
CHOH (ppmv)	0	3	0	16
TOCs by FID – on request				

Linearity	< 2% range
Repeatability	< 1% range
Response Time	< 200 s all gases
Drift zero/span	< 3.0% all gases; O2 < 0.2 vol-%

* Certification in accordance with EN 15267-3, QAL1 by TÜV + MCERTs

** Concentrations based on standard conditions 1,013.25 hPa and 0 °C

TECHNICAL DATA

Analyzer	
Power Supply	110 … 230 VAC, 50 … 60 Hz, 150 VA + 10 to 45 VA/m of sampling line (consumption)
Compressed Air Supply	Dust free, oil free, dry, at ambient temperature 3 barg pressure at max 5.5 l/min flow, required only in maintenance mode
Ambient Conditions	• Temperature: +5 … +40 °C • Humidity: 10 … 90% relative humidity, non-condensing
Communication Interfaces	• USB ports, modbus TCP, • RS232, RS485 (RJ45), VGA, 4 … 20 mA • Remote access via Ethernet

Turnkey LaserCEM® Cabinet	
Dimensions (H x W x D)	• 24U: 134 x 60 x 91 cm • 38U: 183 x 60 x 80 cm

Sampling System	
Technology	Low pressure sampling (LPS®)
Sampling Line	Function of the ambient temperature, unheated sampling line or traced line temperature maintained at max 80 °C; maximum length 150 m
Sampling Probe	• Includes filter + sonic nozzle • Material: Inconel 600, other materials on request • Length: variable, tailor-made
Process Connection	DN65 PN16 flange, stainless steel (316L)
Sampling Box	• Dimensions (H x W x D): 44 x 40 x 18 cm • Degree of protection: IP65
Flue Gas	Temperature: +5 … +600 °C Absolute humidity: 0 … 80% vol., higher water content on request

* Certification in accordance with EN 15267-3, QAL1 by TÜV + MCERTs

** Concentrations based on standard conditions 1,013.25 hPa and 0 °C

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