

APPLICATION NOTE

LD25-03

Analysis of trace impurities in UHP Carbon Dioxide



▲ Carbo2Detek



Our Carbo2Detek system has been configured here for a European customer involved in the production of carbon dioxide used for the beverage carbonisation industry. The system is configured in regulation with the standard European industrial gases association (EIGA).

LDETEK SOLUTION:

The purity CO₂ quality control solution proposed here with the MultiDetek3 gas chromatograph is for the analysis of trace impurities: THCs/VOCs-H2O-O2-CH4-CO-H2S-COS-SO2-CH3CHO (acetaldehyde)-CH3OH (methanol)-C6H6 (benzene)-NH3 (ammonia) and NOx. The PED with Helium carrier gas has been configured for the ppb/ppm trace analysis of oxygen, methane, carbon monoxide, sulfurs, acetaldehyde, methanol, benzene and ammonia.

An additional channel configured with an FID is used for the analysis of THCs/VOCs. Another channel configured with a quartz crystal detector allows the analysis of trace water.

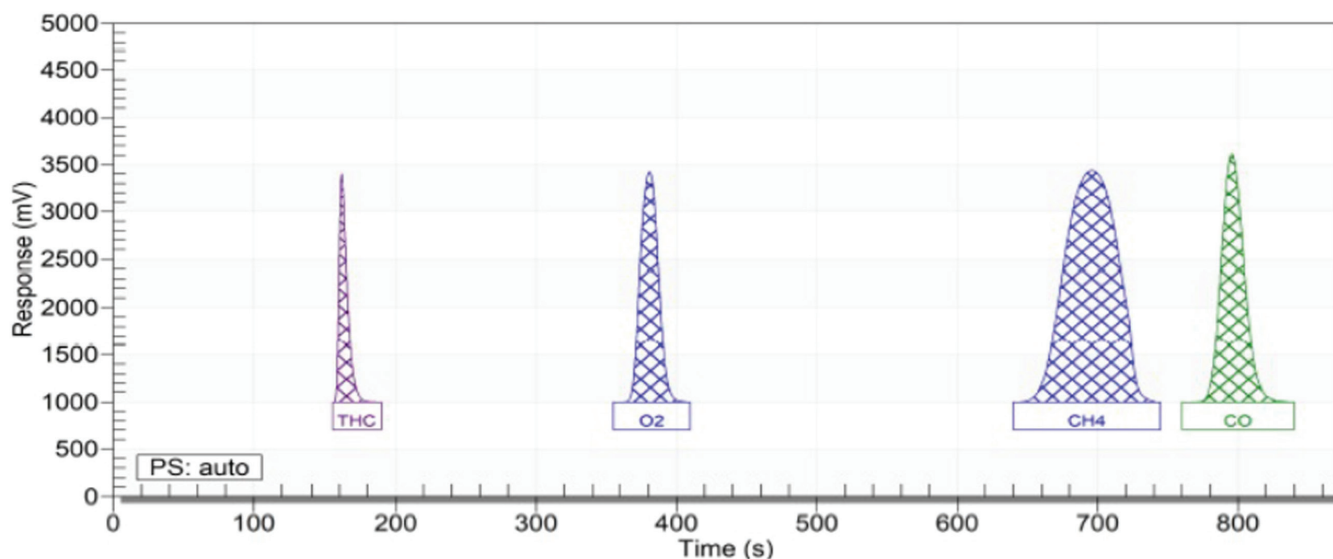
And finally, a separate third-party analyser using chemiluminescence has been integrated for the analysis of NOx.

COMPONENTS	RANGE (PPM)	LDL (PPB)	INSTRUMENT	TECHNOLOGY
THC	0-100	100	MultiDetek3	Flame ionization detector
O2	0-100	100	MultiDetek3	Plasma emission detector
CH4	0-100	100	MultiDetek3	Plasma emission detector
CO	0-100	100	MultiDetek3	Plasma emission detector
H2O	0-100	100	MultiDetek3	Quartz crystal detector
H2S	0-10	10	MultiDetek3	Plasma emission detector
COS	0-10	10	MultiDetek3	Plasma emission detector
SO2	0-10	50	MultiDetek3	Plasma emission detector
CH3CHO	0-10	50	MultiDetek3	Plasma emission detector
CH3OH	0-100	100	MultiDetek3	Plasma emission detector
C6H6	0-100	100	MultiDetek3	Plasma emission detector
NH3	0-10	100	MultiDetek3	Plasma emission detector
NOX	0-100	100	Third party	Chemiluminescence detector

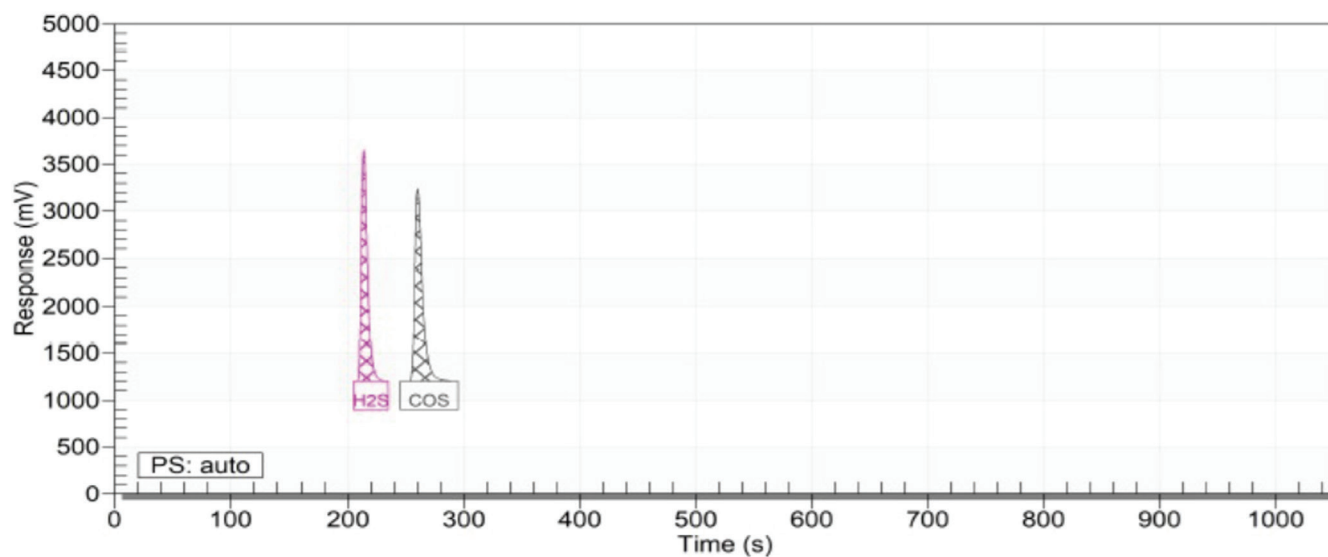
Note: Other configurations with more/less impurities to measure and different ranges/ldl are possible on request.

RESULTS:

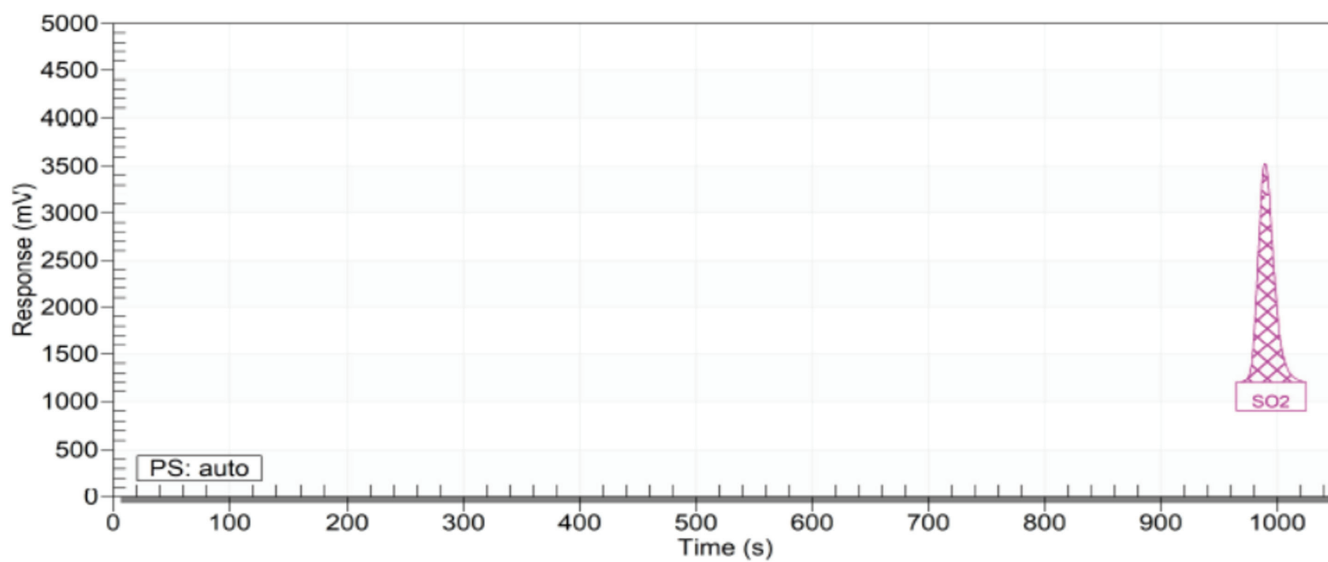
See the typical chromatograms (Span calibration) of trace impurities THC-O2-CH4-CO-H2S-COS-SO2-CH3CHO-CH3OH-C6H6-NH3 in balance gas CO2. Each of the chromatogram has been performed in a balance gas carbon dioxide.



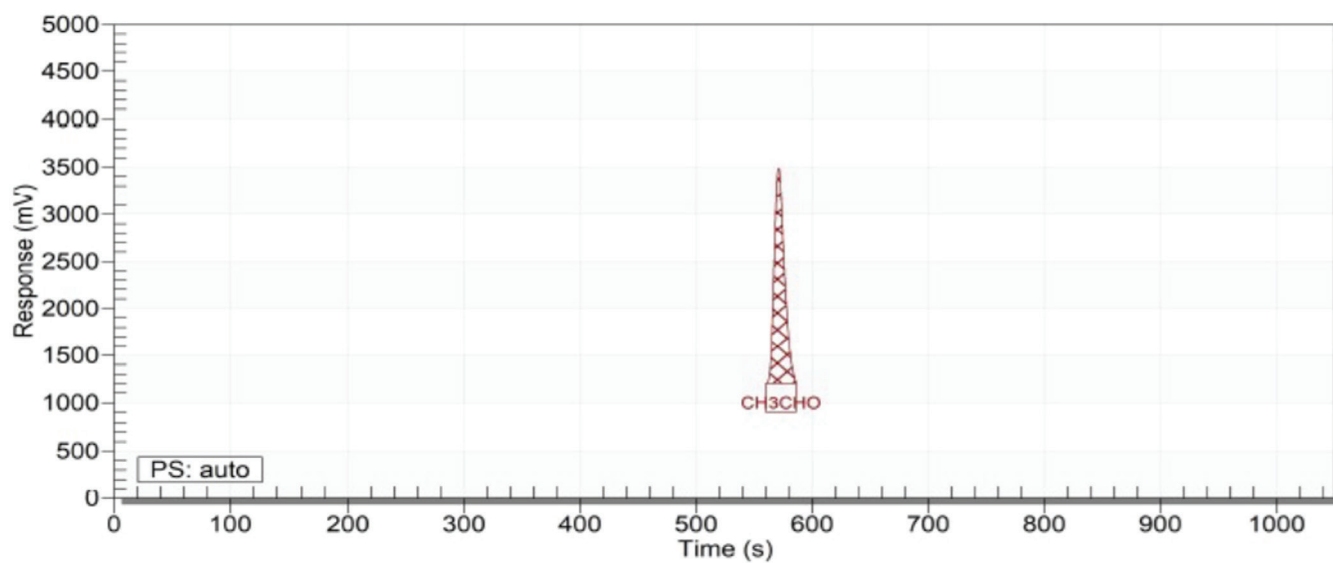
Peak	Unit	Calibration Value	_Area Counts
THC	ppm	96.82	12940
O2	ppm	96.82	18862
CH4	ppm	96.82	42903
CO	ppm	104.34	60668



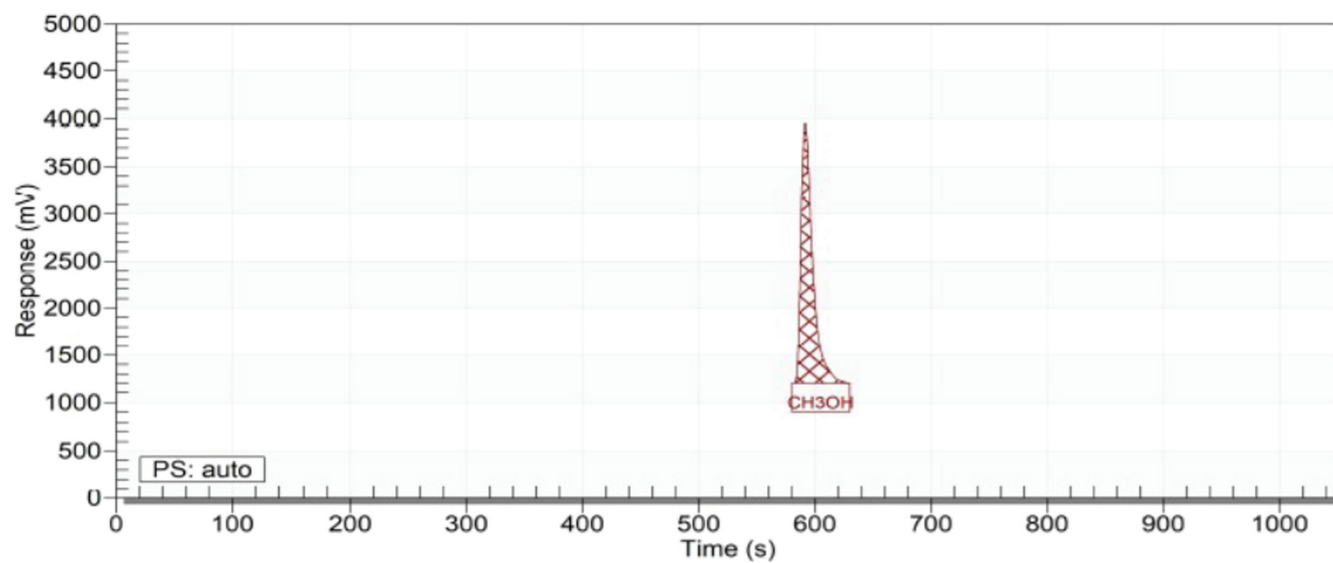
Peak	Unit	Calibration Value	_Area Counts
H ₂ S	ppm	10.72	8840
COS	ppm	8.90	9213



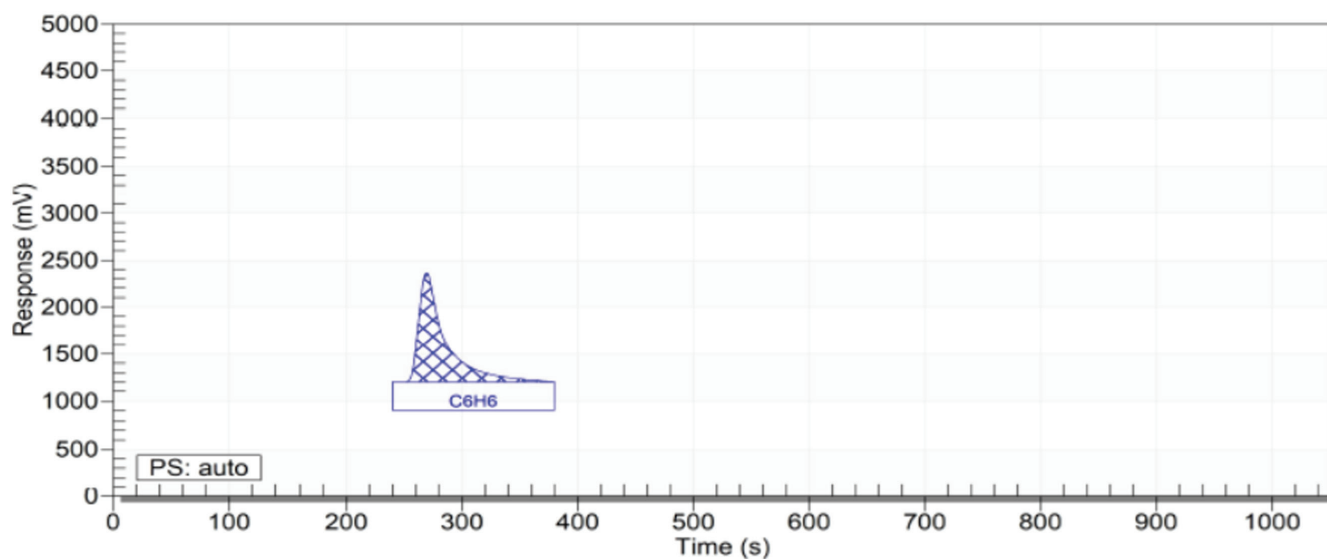
Peak	Unit	Calibration Value	_Area Counts
SO ₂	ppm	10.00	2068



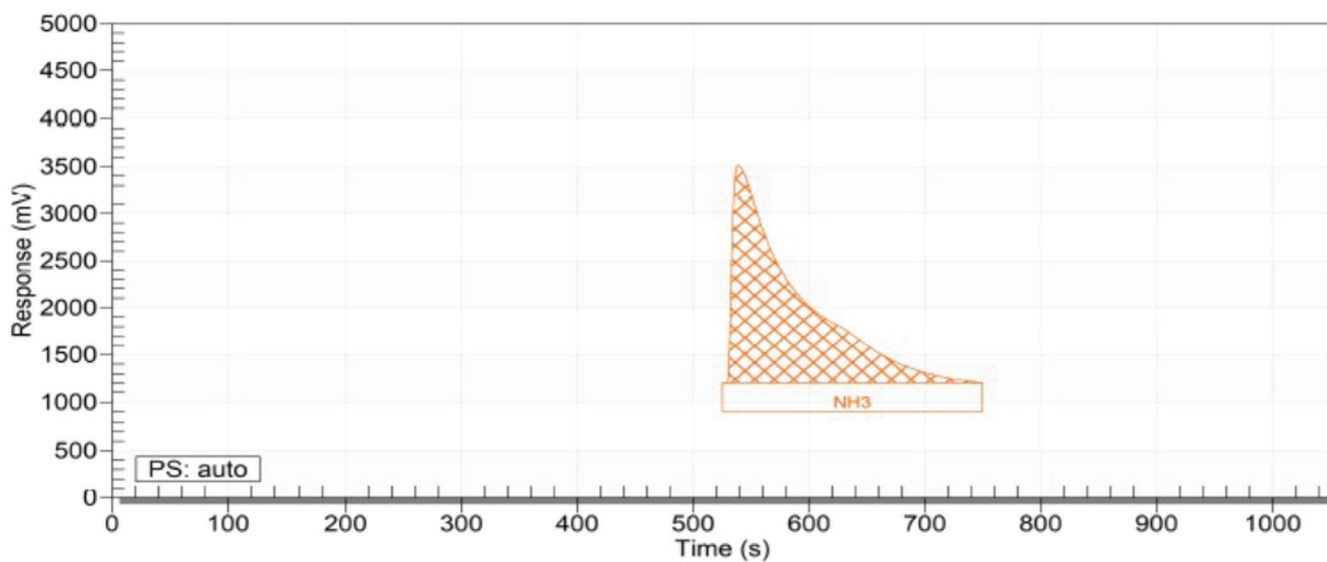
Peak	Unit	Calibration Value	_Area Counts
CH3CHO	ppm	10.00	7206



Peak	Unit	Calibration Value	_Area Counts
CH3OH	ppm	100.00	45406



Peak	Unit	Calibration Value	_Area Counts
C6H6	ppm	99.30	19063



Peak	Unit	Calibration Value	_Area Counts
NH3	ppm	10.00	295405

CONCLUSION

Our Carbo2Detek turnkey solution including the MultiDetek3 gas chromatograph configured with four technologies PED, FID, quartz crystal and chemiluminescence makes it ideal to be aligned with the standard European industrial gases association (EIGA). The Carbo2Detek is configured with all standard industrial communication protocols and a remote-control interface. The platform is modular to adapt any of additional requirement in terms of purity CO₂ production. The system fills all the quality and safety requirements of the gas production industry.