APPLICATION NOTE LD24-03



MultiDetek3 gas chromatograph uses for medical & pharmaceutical applications



LDETEK SOLUTION:

The MultiDetek3 gas chromatograph can be configured with a TCD (thermal conductivity detector) and/or a FID (Flame ionization detector) in the same instrument for the different applications requires by the European pharmacopeia standards. This application note shows the different configurations and results. Depending on the standards, the GC is configured with FID and/or TCD modules.

Various applications possible :

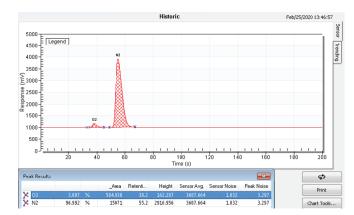
- Nitrogen: Analysis of % N2 by TCD (% 02 optional)
- Nitric Oxide: Analysis of ppm N20-C02-N2 by TCD
- ► Carbon dioxide: Analysis of ppm CO by FID/methanizer
- Nitrous Oxide: Analysis of ppm CO by FID/methanizer & ppm CO2 by TCD inside the same unit

RESULTS - NITROGEN ASSAY

Chromatogram of UHP Nitrogen

b/25/2020 14:06:0 5000 Legend 4500 Trending 4000 3500 £3000 ž 2500 ā. 2000 1500 1000 500 100 Time (s) Peak R × \$ Height Sensor Avg. _Area Print × 02 × N2 1.33105 0.531 3607.90 0.766 1.380 0.008 % 15589 55.1 3001.279 3607.907 0.766 1.380

Chromatogram of a gas mixture containing 3% Oxygen & 97% Nitrogen



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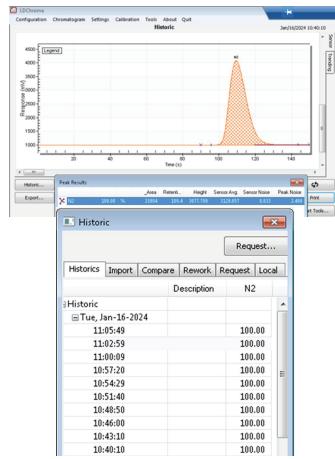
Where innovation leads to success

10 consecutive analyses to demonstrates a quick overview of the stability

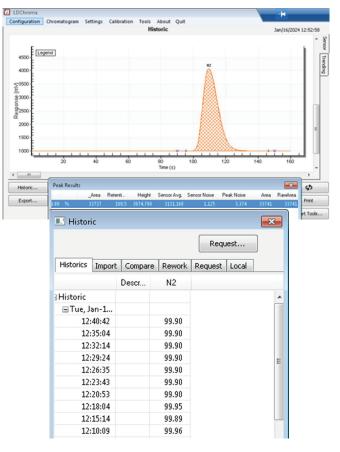
Start	02	N2
2020-02-21 11:47	3.007 %	97.024 %
2020-02-21 11:46	3.009 %	97.030 %
2020-02-21 11:44	3.004 %	97.038 %
2020-02-21 11:42	3.007 %	97.047 %
2020-02-21 11:40	3.008 %	97.045 %
2020-02-21 11:39	3.002 %	97.047 %
2020-02-21 11:37	3.004 %	97.031 %
2020-02-21 11:35	3.008 %	97.034 %
2020-02-21 11:33	3.008 %	97.033 %
2020-02-21 11:32	3.007 %	97.021 %
2020-02-21 11:30	3.015 %	97.000 %

TEST FOR N2 FOR PHARMACOPEIA

100% N2



99.9% N2



99.8% N2

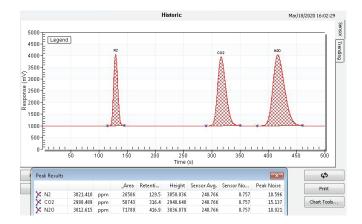
99.5% N2

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					Print	Export						
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Historics In Historics In 13:15 13:12 13:09 13:07 13:04 13:01 12:58	101.5 3074700 nport Compare Descr 22 32 43 52 04 14 25 37 47	Rework F N2 99.80 99.80 99.80 99.80 99.80 99.80 99.80 99.82 99.80 99.80	Request.		33741		Historics Impor Historic Wed, Jan 08:35:05 08:32:18 08:26:38 08:23:47 08:20:59 08:18:09		N2 99.57 99.56 99.50 99.50 99.52 99.55			

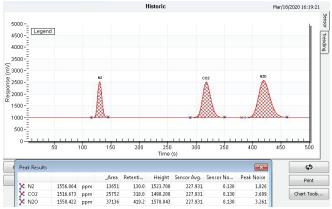
RESULTS - NITRIC OXIDE ASSAY

Chromatogram of a gas mixture

containing 3000ppm N2-C02-N20 in a balance of Nitric Oxide.



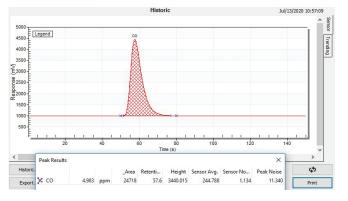
Chromatogram of a gas mixture containing 1500ppm N2-C02-N20 in a balance of Nitric Oxide. Considering a ratio of 3 times the noise level, the LDLs for the N2-C02-N20 have been established at 10ppm.

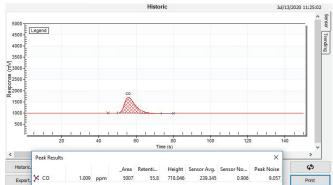


Chromatogram of a gas mixture

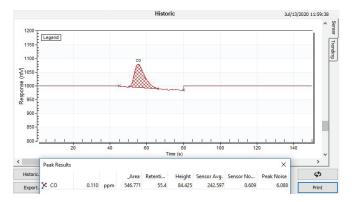
containing 5ppm CO in a balance of Carbon dioxide.

Chromatogram of a gas mixture containing 1ppm CO in a balance of Carbon dioxide.





Chromatogram of a gas mixture containing 0.1ppm C0 in a balance of Carbon dioxide. Considering a ratio of 3 times the noise level, the LDL for the C0 has been established at 25ppb.

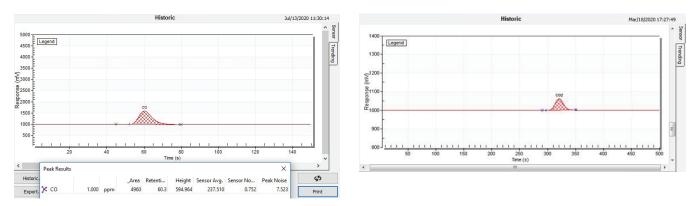


Repeatability Test: 10 Cycles @ 1.2ppm C0 in CO2 balance

Peak	Average	Standard Deviation Coefficient of Variation (%)		/ariation (%)	3 * CV (%)	Status	
со	1.21985583 ppm	0.00428070	0.35		1.05	Accepted	
Start			со				
2020-07	7-13 16:28		1.227 ppm				
2020-07	7-13 16:25		1.220 ppm	1.220 ppm			
2020-07	7-13 16:22		1.216 ppm				
2020-07	7-13 16:20		1.213 ppm				
2020-07	7-13 16:17		1.216 ppm				
2020-07	7-13 16:15		1.219 ppm				
2020-07	7-13 16:12		1.222 ppm				
2020-07	7-13 16:10		1.225 ppm				
2020-07	7-13 16:07			1.222 ppm			
2020-07	7-13 16:04			1.219 ppm			

RESULTS - NITROUS OXIDE ASSAY

Chromatogram of a gas mixture containing 1ppm CO on FID/methanizer channel and 100ppm CO2 on TCD channel in a balance of Nitrous oxide. Considering a ratio of 3 times the noise level, the LDL for the CO has been established at 25ppb and it has been established at 10ppm for the CO2.



CONCLUSION:

The MultiDetek3 gas chromatograph configured with a TCD and an FID in the same instrument makes it the ideal GC to fulfill the European pharmacopeia standards. Having both detectors in the same gas chromatograph makes it very compact. This application note well demonstrates the performances of the unit in different configuration requires by this medical market. The instrument comes with a large touchscreen interface, all the communication protocols and the data storage required. The LDChroma+ combined with the LDReport software are the right tools for this type of application.

