

APPLICATION NOTE

LD24-03



MultiDetek3 gas chromatograph uses for medical & pharmaceutical applications



LDETEK SOLUTION:

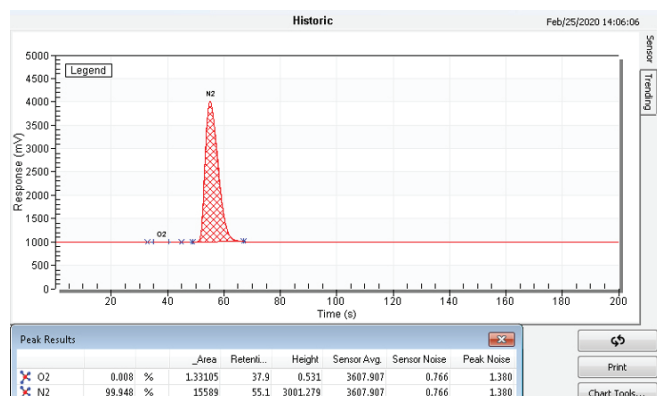
The MultiDetek3 gas chromatograph can be configured with a TCD (thermal conductivity detector) and/or a FID (Flame ionization detector) in the same instrument for the different applications requires by the European pharmacopeia standards. This application note shows the different configurations and results.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

Various applications possible :

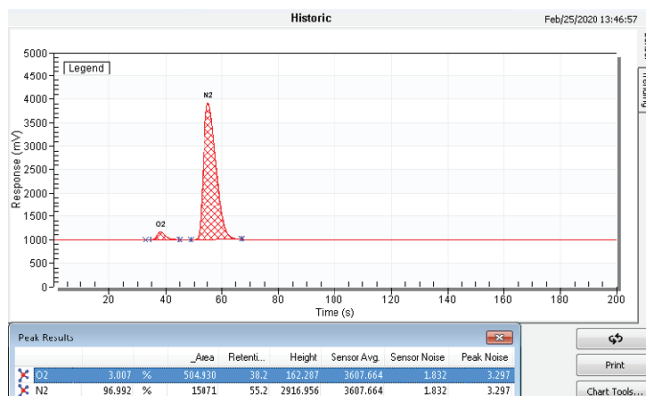
- ▶ **Nitrogen:** Analysis of % N₂ by TCD (% O₂ optional)
- ▶ **Nitric Oxide:** Analysis of ppm N₂O-CO₂-N₂ by TCD
- ▶ **Carbon dioxide:** Analysis of ppm CO by FID/methanizer
- ▶ **Nitrous Oxide:** Analysis of ppm CO by FID/methanizer & ppm CO₂ by TCD inside the same unit

RESULTS - NITROGEN ASSAY

Chromatogram of UHP Nitrogen



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

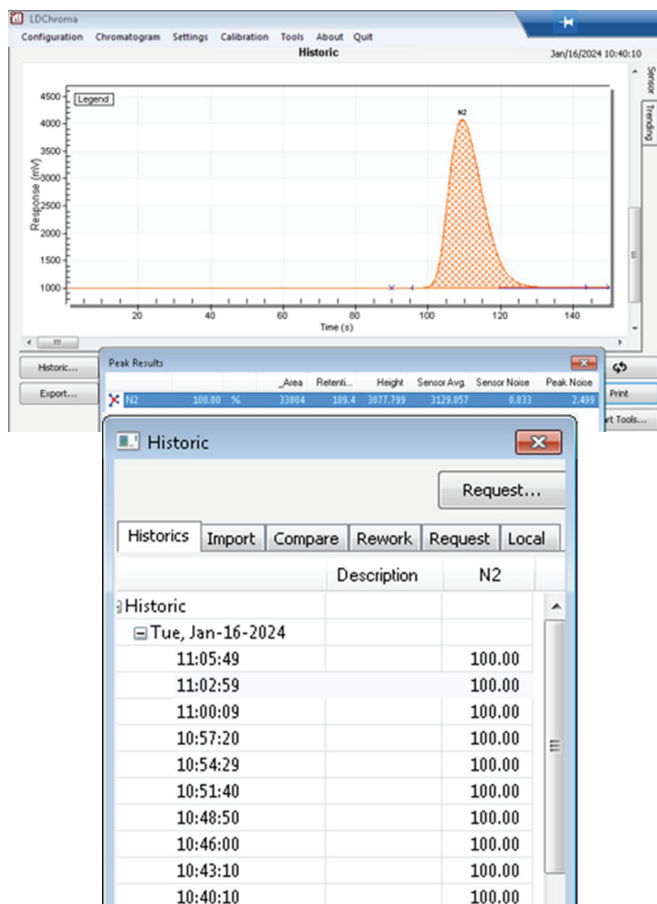


10 consecutive analyses to demonstrates a quick overview of the stability

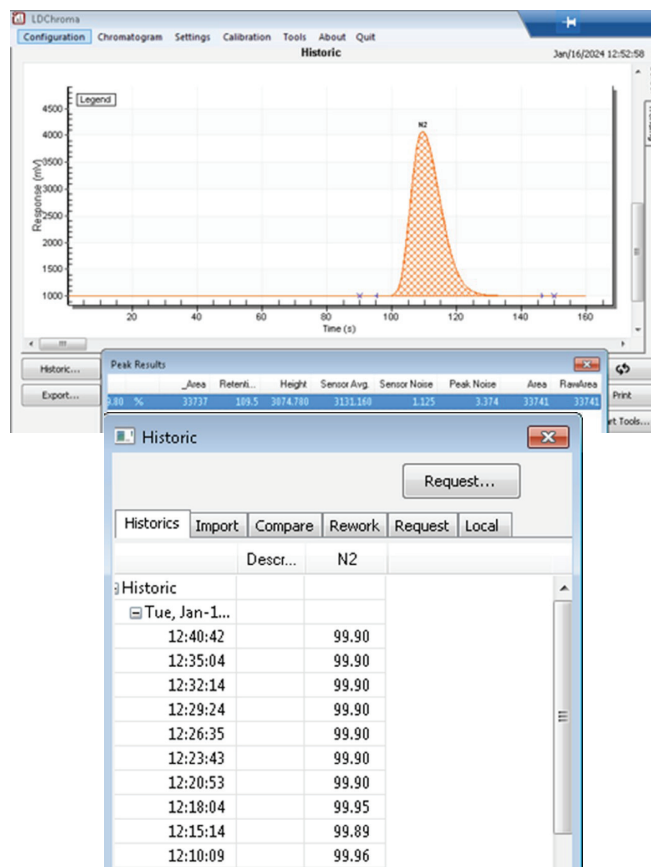
Start	O2	N2
2020-02-21 11:47	3.007 %	97.024 %
2020-02-21 11:46	3.009 %	97.030 %
2020-02-21 11:44	3.004 %	97.038 %
2020-02-21 11:42	3.007 %	97.047 %
2020-02-21 11:40	3.008 %	97.045 %
2020-02-21 11:39	3.002 %	97.047 %
2020-02-21 11:37	3.004 %	97.031 %
2020-02-21 11:35	3.008 %	97.034 %
2020-02-21 11:33	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

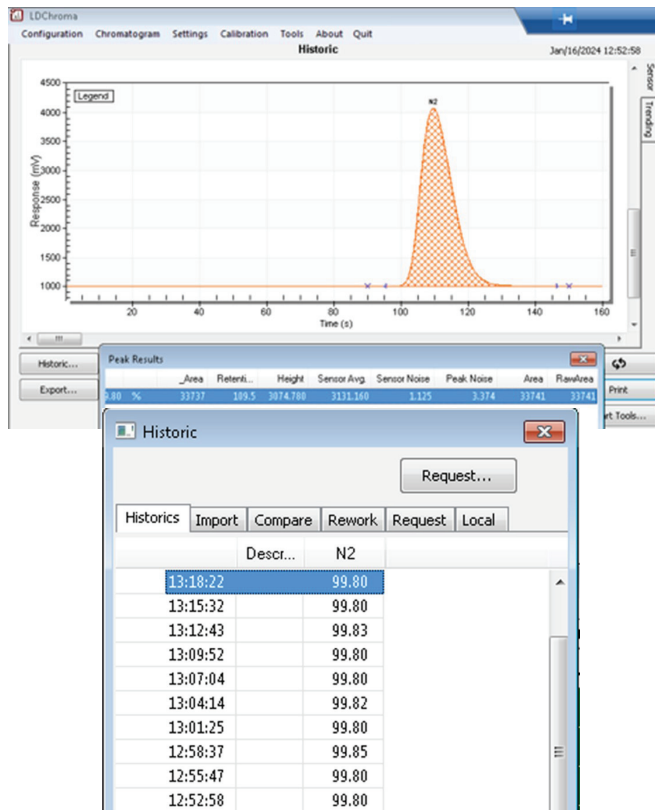
100% N2



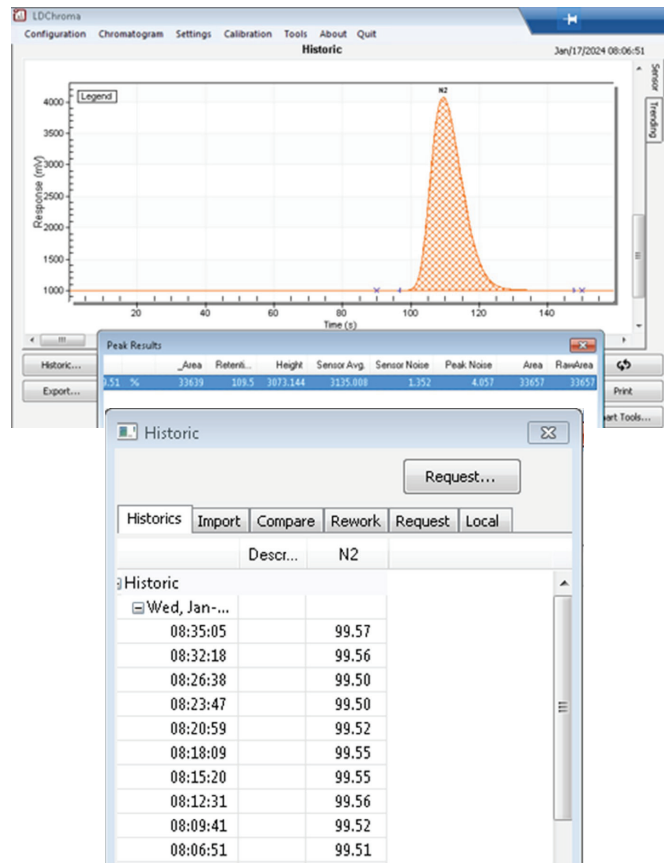
99.9% N2



99.8% N2

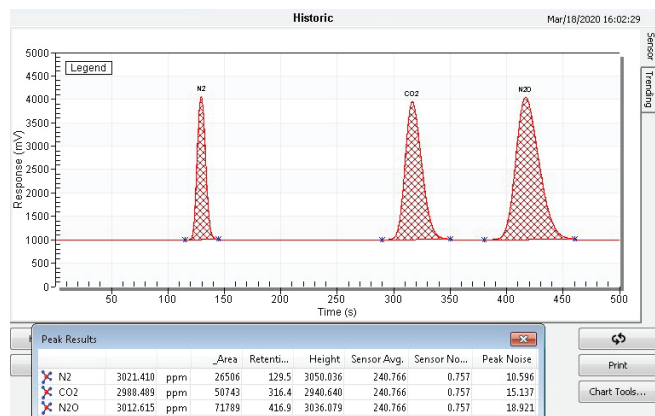


99.5% N2

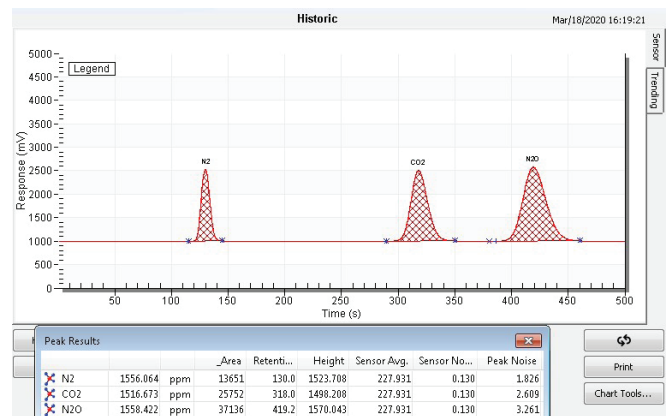


RESULTS - NITRIC OXIDE ASSAY

Chromatogram of a gas mixture containing 3000ppm N2-CO2-N2O in a balance of Nitric Oxide.

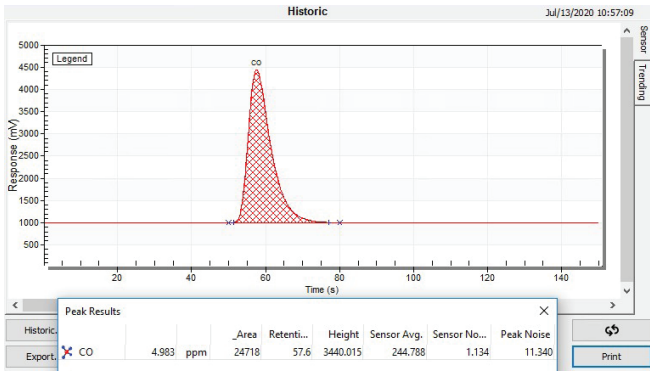


Chromatogram of a gas mixture containing 1500ppm N2-CO2-N2O in a balance of Nitric Oxide. Considering a ratio of 3 times the noise level, the LDLs for the N2-CO2-N2O have been established at 10ppm.

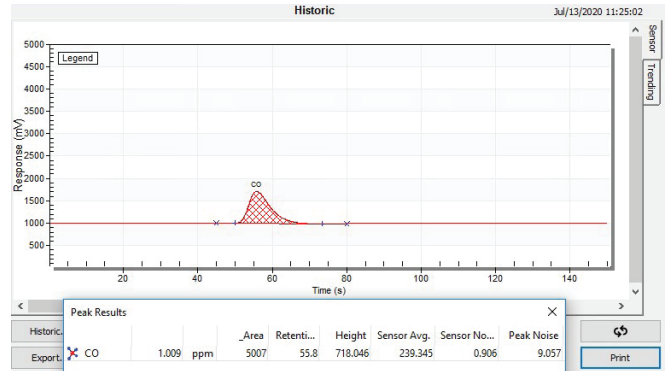


RESULTS - CARBON DIOXIDE ASSAY

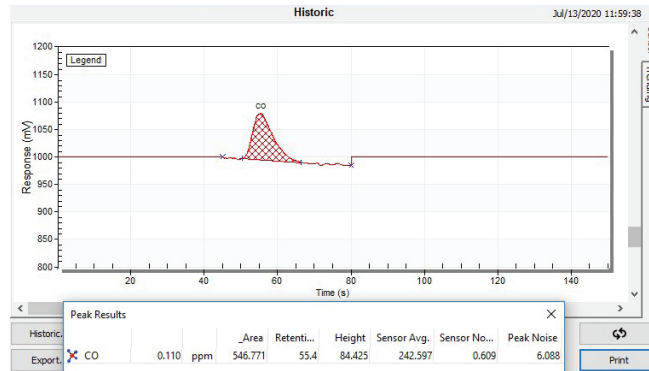
Chromatogram of a gas mixture containing 5ppm CO in a balance of Carbon dioxide.



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



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



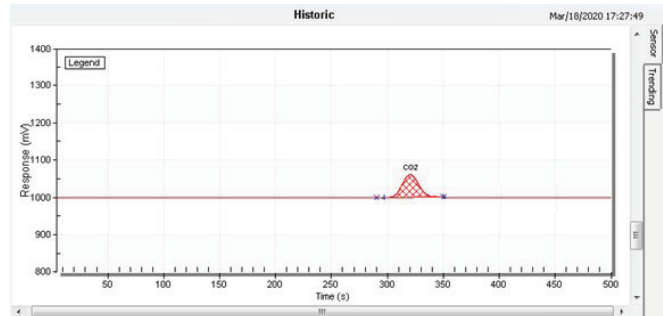
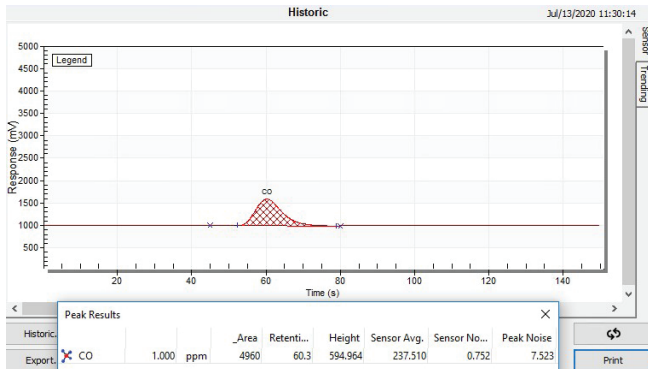
Repeatability Test: 10 Cycles @ 1.2ppm CO in CO2 balance

Peak	Average	Standard Deviation	Coefficient of Variation (%)	3 * CV (%)	Status
CO	1.21985583 ppm	0.00428070	0.35	1.05	Accepted

Start	CO
2020-07-13 16:28	1.227 ppm
2020-07-13 16:25	1.220 ppm
2020-07-13 16:22	1.216 ppm
2020-07-13 16:20	1.213 ppm
2020-07-13 16:17	1.216 ppm
2020-07-13 16:15	1.219 ppm
2020-07-13 16:12	1.222 ppm
2020-07-13 16:10	1.225 ppm
2020-07-13 16:07	1.222 ppm
2020-07-13 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.