

# APPLICATION NOTE

# LD15-01



## Measurement of hydrocarbons, including the organic hormone (Ethylene) in CO<sub>2</sub> production with MultiDetek-2 and PlasmaDetek-E.

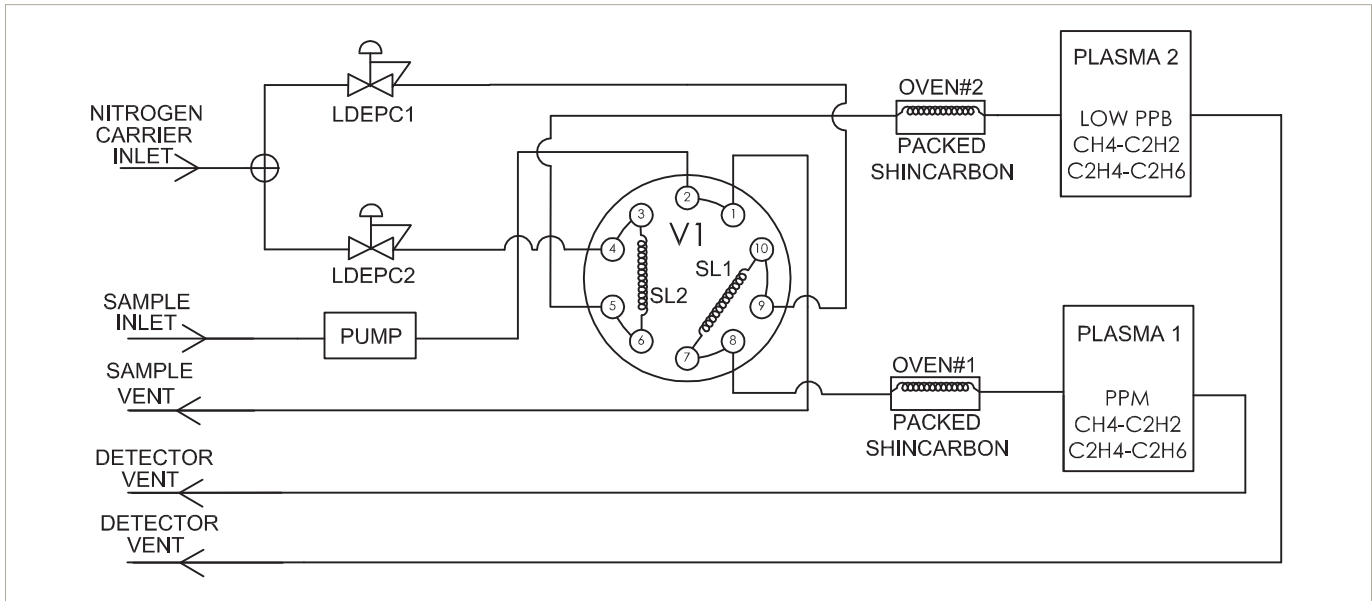


A Greenhouse CO<sub>2</sub> environment is commonly used for the production of organics like fruits, plants and flowers. In this case, the production and control of the CO<sub>2</sub> gas purity are critical to ensure the proper growth of the organics.

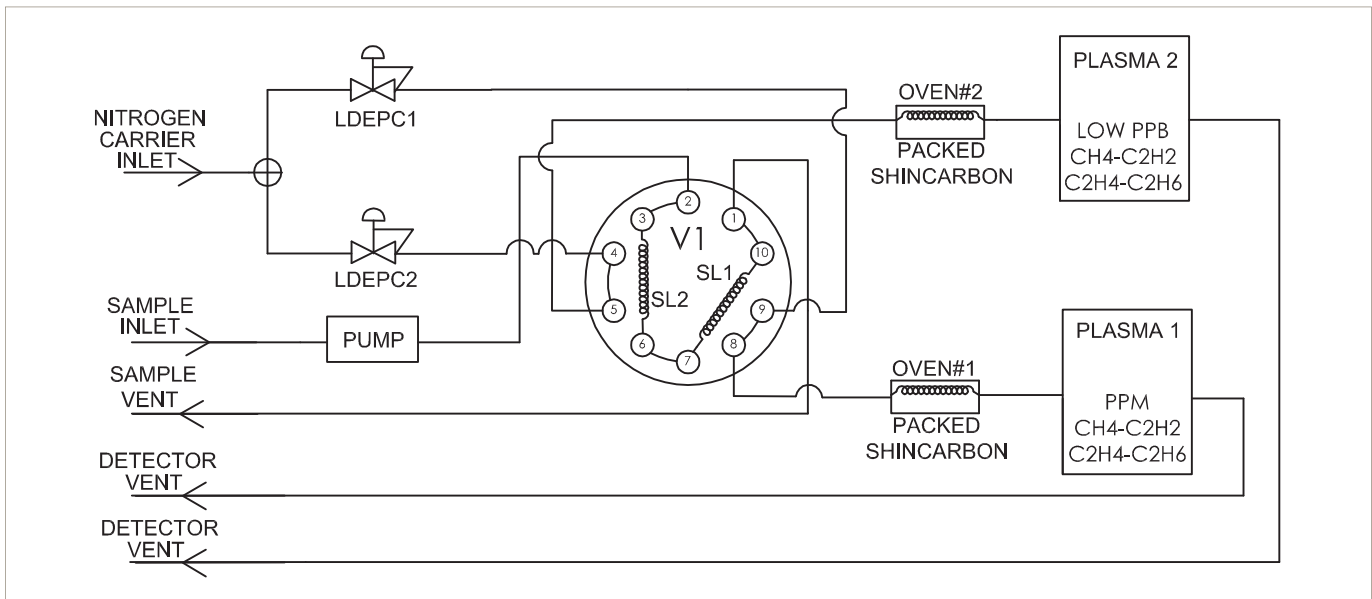
### LDTEK SOLUTION:

The recovery of the flue gas waste is one major source of low cost CO<sub>2</sub> production and it is also part of an environmental well-known solution. The sample gas is extracted from the flue gas or the pure CO<sub>2</sub> source by the gas provider via a sampling unit. After cooling it back to an acceptable temperature, the sample is filtered and dried by sampling filters and a dew point dryer. After this step, a sample pump is simply carrying the sample with a limited flow at a fixed pressure to the MultiDetek-2 and other flue gas sensors. The analyzers are located on the outside of the catalyst building. The sample gas is pumped from the MultiDetek-2 integrated pump that is used to fill the sampling loops for analysing.





**MultiDetek-2 configuration diagram #1** » Valve position OFF: Filling both sampling loops



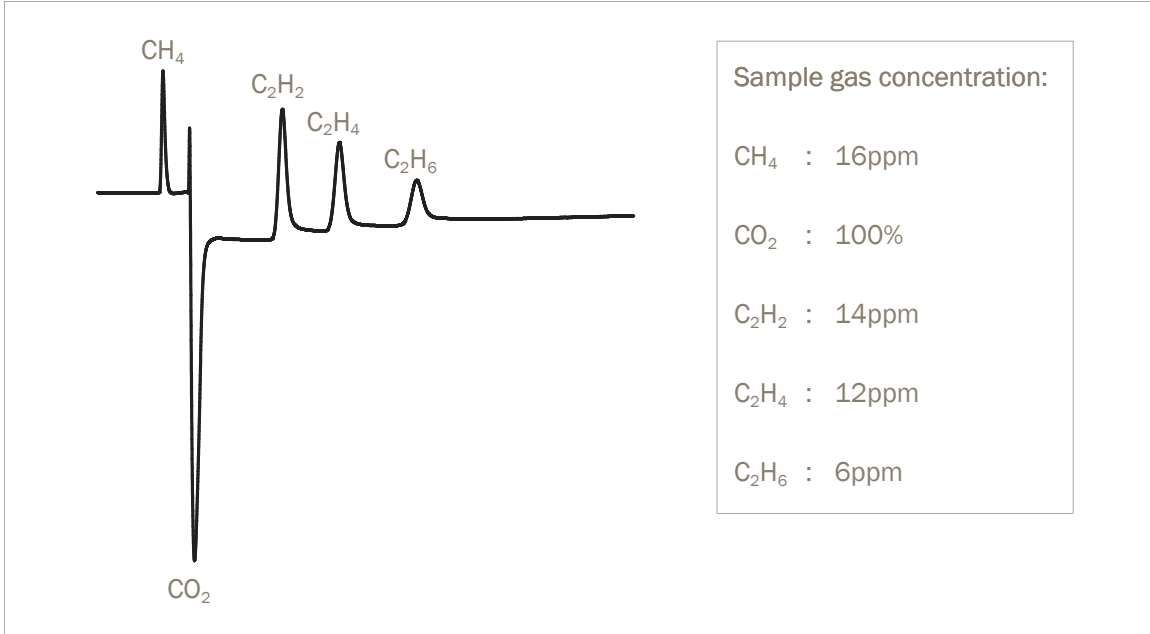
**MultiDetek-2 configuration diagram #2** » Valve position ON: Injecting both sampling loops in dual channels and running parallel analysis

A ten-port double injection valve is configured to inject both sampling loops at the same time through the dual channels. Each channel is configured with a Shincarbon packed column mounted in an isothermal or mini-programmable oven. The loop sizes and Plasma configurations allow a detection range going from 5ppb up to 3000ppm (other ranges are easily configurable depending on the requested application). The analysis time is speed up by using parallel chromatography technique and the possibility of using the LDetek mini-programmable ovens. This way, the high ppm and low ppb can be analyzed simultaneously to allow the full control of the process. The MultiDetek-2 will automatically select the appropriate channel depending on the sample impurity concentrations detected during the analysis.

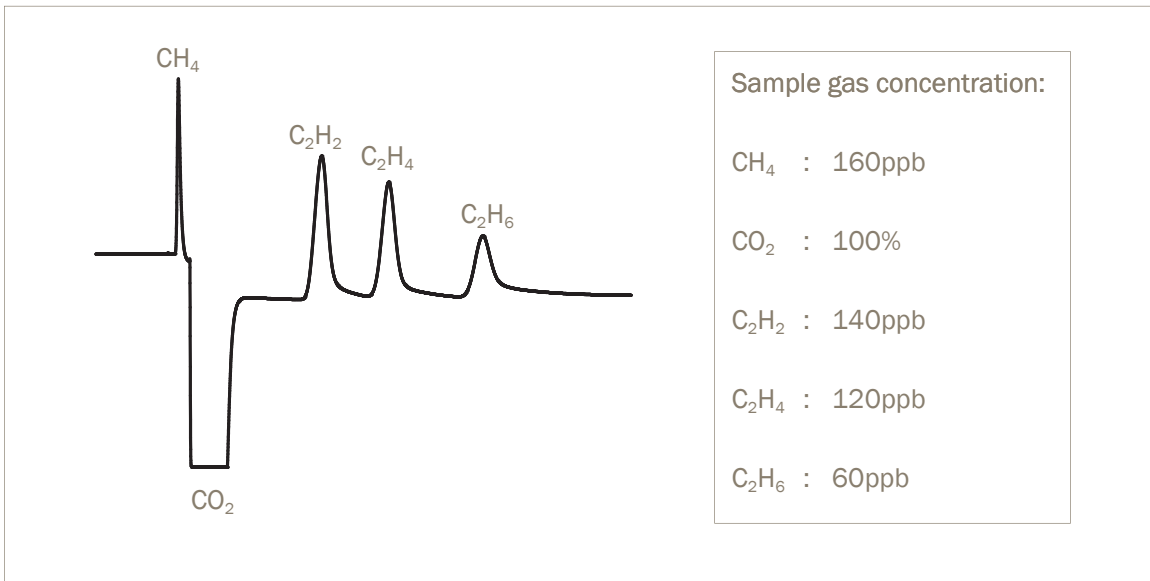
The enhanced selectivity of the LDetek PlasmaDetek-E (patent pending) gives the possibility of using a single injection configuration. This easy to use technique improves the system performances, accelerates the analysis time and reduces the maintenance interventions.

Conventional solutions will tend to use an FID for such analysis. However, such technology requires complex and costly installation with air and fuel gas supplies. Moreover, the safety surrounding the use of an FID becomes complex. Other alternative solution to an FID is the use of a conventional HID or a PED that are non selective to hydrocarbons in CO<sub>2</sub> matrix. This solution will lead to the use of complex chromatography configuration with heartcut valves to remove the interference of CO<sub>2</sub> background gas over the hydrocarbons.

## RESULTS:



Chromatogram of ppm hydrocarbon in pure CO<sub>2</sub> measured in MultiDetek-2 Channel #1



Chromatogram of low ppb hydrocarbon in pure CO<sub>2</sub> measured in MultiDetek-2 Channel #2

## CONCLUSION:

With its user-friendly interface and the simple configuration of this compact MultiDetek-2 GC, it is easy to use the instrument as a process control instrument that is a perfect fit for this Greenhouse application. Combined with the PlasmaDetek-E (patent pending) which is using a single Nitrogen source as carrier gas, this unique solution provides all the advantages to have a performing and reliable system for continuous monitoring of the CO<sub>2</sub> purity for Greenhouse.



LDetek

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