

# APPLICATION NOTE

# LD17-02



## Gas analysis for wineries



In the wineries for proper wine production, inert gases like nitrogen, carbon dioxide and argon are used for sparging, blanketing as counter-pressure to move wine(usually from barrels), as well as to flush transfer lines and tanks prior to moving wine or juice. Sparging involves the introduction of a stream of very fine gas bubbles to help add or remove dissolved Oxygen or CO<sub>2</sub>. Blanketing partially-filled tanks attempts to maintain an inert gas layer above the wine/ juice surface in the hope of minimizing wine/air contact. The main reason for the use of inert gassing is to prevent the growth of aerobic microorganisms in the wine. The gas chromatography is a well known analysis technique to ensure the measurement of the purity and to control the production of wine to achieve the best quality.

### LDETEK SOLUTION:

Using the PlasmaDetek2(PED) plasma detector and the MultiDetek2 compact gas chromatograph, the analysis of the most critical impurities in carbon dioxide, nitrogen and argon used in wine production can be achieved with a single unit.

The configuration uses one channel for trace analysis of O<sub>2</sub>-N<sub>2</sub>-CO<sub>2</sub>-Ethanol with the PlasmaDetek2(PED) optimized for low concentrations. The second channel is configured with a conventional TCD optimized for high concentrations in % for O<sub>2</sub>-N<sub>2</sub>-CO<sub>2</sub>-Ethanol. This dual detectors configuration allows covering a wide analysis range.

- **Channel#1:** Trace O<sub>2</sub>-N<sub>2</sub>-CO<sub>2</sub>-Ethanol
- **Channel#2:** % O<sub>2</sub>-N<sub>2</sub>-CO<sub>2</sub>-Ethanol

Since the sample volume and pressure for this type of application is limited, the MultiDetek2 is equipped with a mini pump that sucks the right amount of sample to fill the sampling loops correctly prior to run the analysis. The parameters can be adjusted by the user easily from the software interface depending of the sample line selected. The sample collection system is designed(leak free) for low O<sub>2</sub>-N<sub>2</sub> analysis performances without air contamination.

The advantages of our solution over standard chromatograph systems is based on the use of Argon as carrier gas with the PlasmaDetek2. It allows an easy GC configuration that can measure O<sub>2</sub>-N<sub>2</sub> with a single column configuration, having low operating cost and getting good sensitivity at ppb level. This isn't feasible with standard ionisation detector because of the use of Helium as carrier gas, the O<sub>2</sub> analysis becomes not possible and the operating cost are higher.

## RESULTS

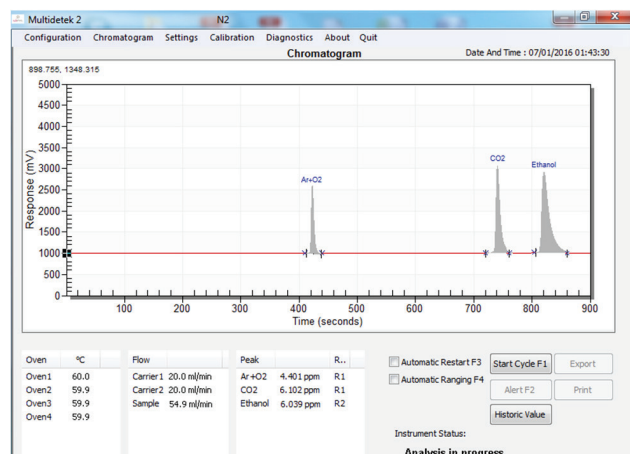
The results show the performances of the system for each pre configured method used to measure impurities in each sample type.

**Method #1** is configured and calibrated for trace (Ar+O<sub>2</sub>)-CO<sub>2</sub>-ethanol in sample gas nitrogen.

**Method #2** is configured and calibrated for trace N<sub>2</sub>-CO<sub>2</sub>-ethanol in sample gas argon.

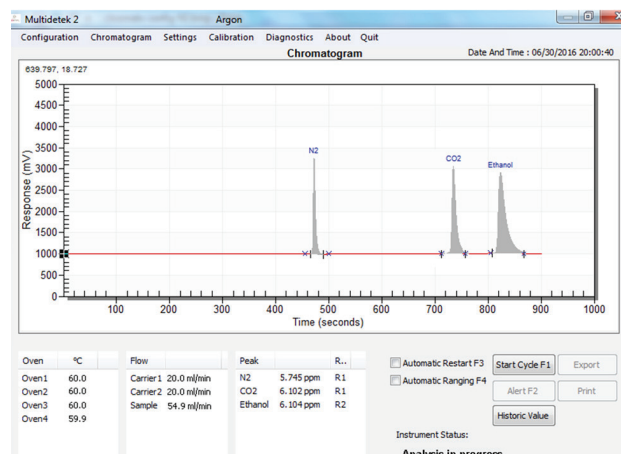
**Method #3** is configured and calibrated for percent (Ar+O<sub>2</sub>)-N<sub>2</sub>-ethanol in sample gas carbon dioxide.

### Span calibration chromatogram for Nitrogen method:



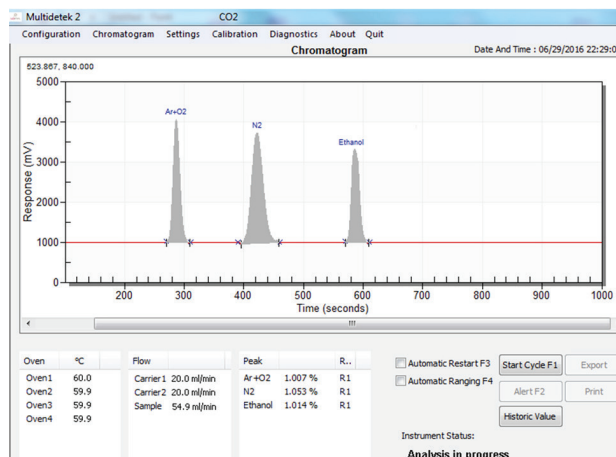
Chromatogram of a gas mixture containing 4.4ppm O<sub>2</sub>, 6.1ppm CO<sub>2</sub> and 6.0ppm ethanol in a balance gas Nitrogen.

### Span calibration chromatogram for Argon method:



Chromatogram of a gas mixture containing 5.7ppm N<sub>2</sub>, 6.1ppm CO<sub>2</sub> and 6.1ppm ethanol in a balance gas Argon.

### Span calibration chromatogram for Carbon dioxide method:



Chromatogram of a gas mixture containing 1% O<sub>2</sub>, 1% N<sub>2</sub> and 1% ethanol in a balance gas Carbon dioxide.

## CONCLUSION:

Our solution combines our PlasmaDetek2 for low ppb/ppm concentrations and a TCD for the percent concentrations. Having this dual detectors configuration, a wide range of analysis can be covered. The MultiDetek2 is configured with multiple methods depending of the requirements. It is easy for the user to simply load the proper method for his requirement. On request, additional impurities and methods can be added to the same system.

Our solution is robust and perfectly adapted for the gas analysis used in the wine production sector.



990 Monfette Est, Thetford Mines, (Qc), Canada, G6G 7K6  
Phone: 418 755-1319 • Fax: 418 755-1329 • [info@ldetek.com](mailto:info@ldetek.com)

[www.ldetek.com](http://www.ldetek.com)