APPLICATION NOTE
LD26-04

HELIOX ANALYSIS USING MULTIDETEK LITE GC



Heliox, a precise blend of helium and oxygen, stands as a uniquely valuable gas mixture in various critical fields. Its defining characteristic is significantly lower density compared to air, which allows it to flow with far less resistance. This fundamental property makes Heliox an indispensable tool wherever gas delivery needs to be smooth, efficient, and gentle on systems or biological processes, opening doors to advanced solutions.

In the medical sector, Heliox is a vital aid in respiratory therapy. For patients struggling with airway obstruction from conditions like asthma, COPD exacerbations, or croup, the low density of Heliox reduces turbulent airflow, making it considerably easier to breathe. This diminished work of breathing can alleviate distress, improve oxygen delivery to the lungs, and facilitate the passage of aerosolized medications, offering crucial support during acute respiratory events.

Beyond healthcare, Heliox finds critical application in the challenging world of deep-sea diving. Replacing nitrogen with helium in breathing mixtures for deeper dives helps prevent nitrogen narcosis, a dangerous condition that affects divers' judgment and motor skills. The lower density of Heliox also reduces breathing resistance at depth, making extended subsea operations safer and more comfortable. Furthermore, its unique thermal conductivity and inertness are leveraged in specialized industrial processes like precision welding and leak detection, as well as in advanced scientific research.

The overarching benefit of Heliox lies in its ability to optimize gas delivery across diverse scenarios, leading to enhanced safety, improved efficiency, and greater precision. Whether it's reducing strain on a patient's lungs, enabling safer exploration of ocean depths, or ensuring the integrity of highly sensitive industrial systems, Heliox proves to be a powerful, specialized gas solution. It represents a commitment to advanced performance and a proactive approach to operational challenges.

HOW IT WORKS

- **Lower Density:** Helium is much lighter and has a significantly lower density than the nitrogen found in normal air.
- **Laminar Flow:** The lower density converts choppy, high-resistance turbulent airflow inside narrowed airways into smooth, steady laminar airflow, helping patients pull in air with less muscular effort.

LDETEK SOLUTION

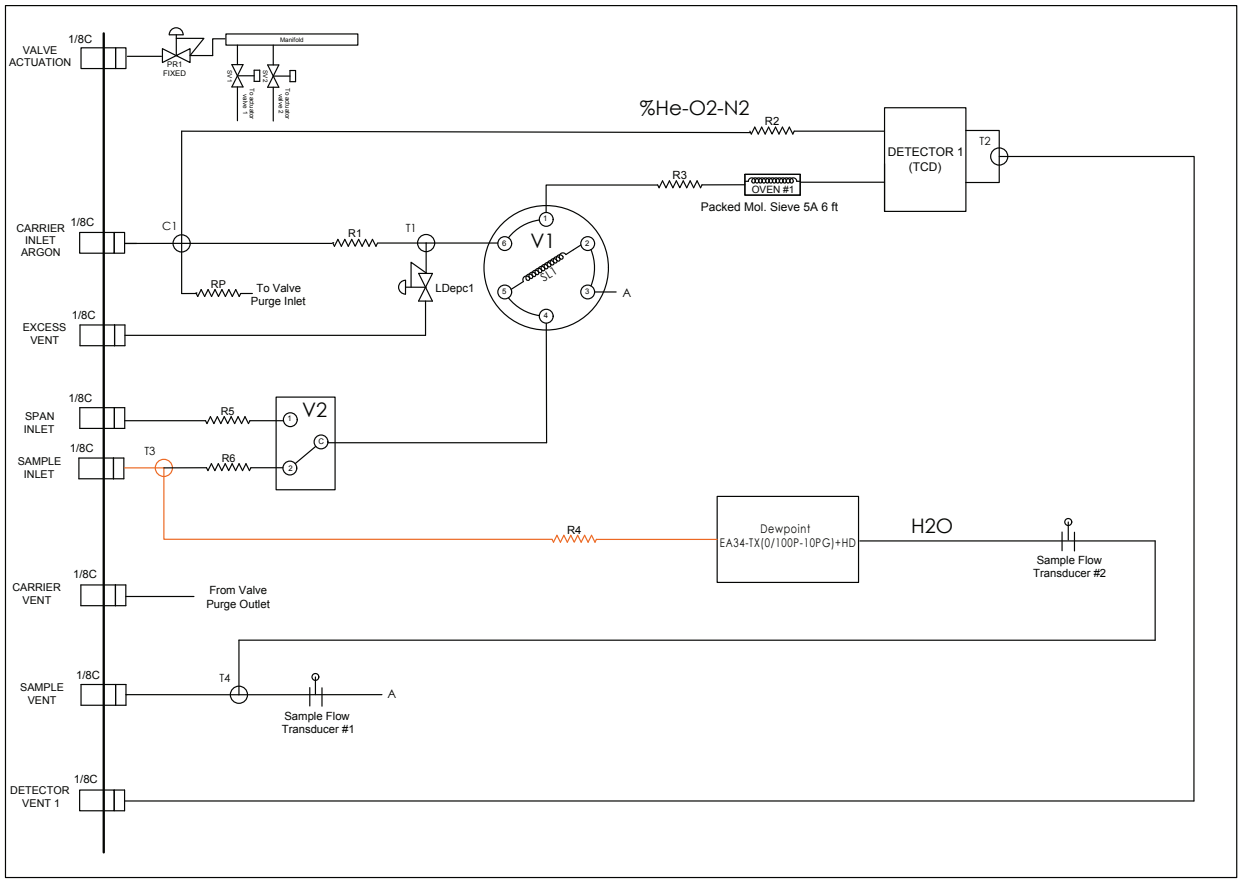
The MultiDetek Lite gas chromatograph configured with a TCD using Argon carrier gas reference to cover the analysis of percent He-02-N2 and a ceramic metal-oxide sensor to cover the trace moisture analysis is used for the Heliox analysis & quality control at the production stage. The method is conformed with the regulatory compliance.

Using this configuration, combining 2 types of sensors in the same analyser makes it ideal for Heliox production where it is required to measure percent analysis of He-02-N2 to control the different blend mixtures. Also, in the same blend mixtures, it is required to monitor and control the moisture rate.

The analysis range for He-02-N2 have been configured for 0-100% offering the full range required to fulfill the blend mixture requirements.

While the analysis range for trace moisture has been configured for 0-100ppm to be aligned with the regulatory compliance in medical gas.

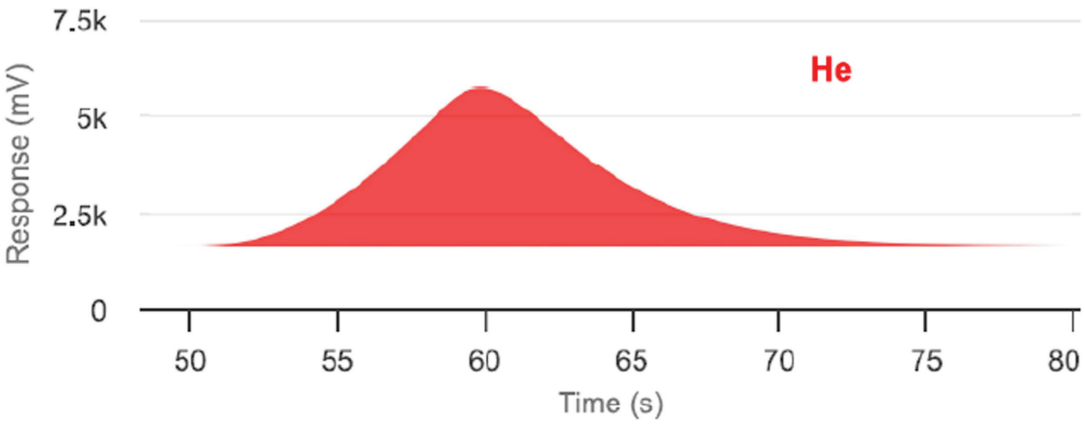
Regulatory Compliance: Pharmacopoeia standards and international guidelines (such as the European Pharmacopoeia, ISO 7396-1, and NFPA 99) cap maximum allowable moisture concentration (typically set around 67 ppmv or a −46 °C dew point equivalent) to guarantee clinical purity. Preventing condensation, avoiding corrosion and mitigating microbial growth and also additional reasons of the importance of the trace moisture(dewpoint) analysis.



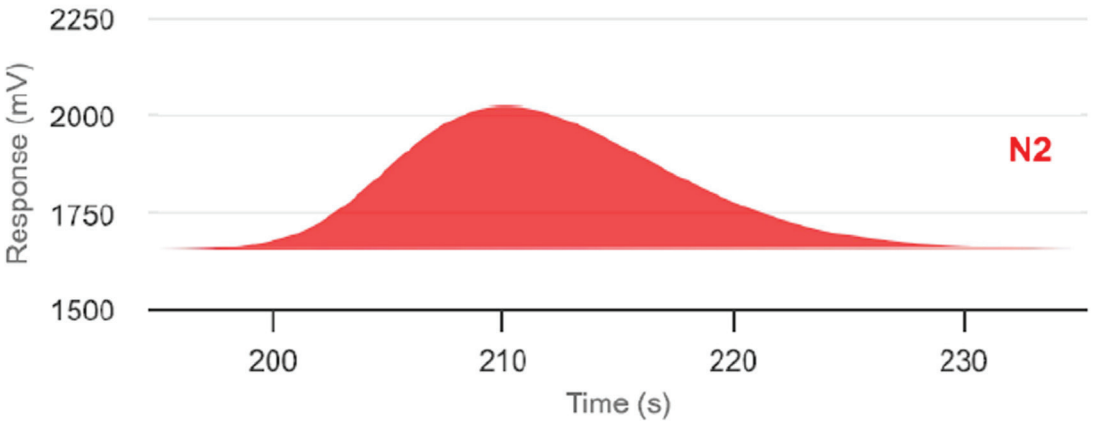
RESULTS

A series of chromatograms (Span calibration) at 100% has been performed for He-N2 and O2.

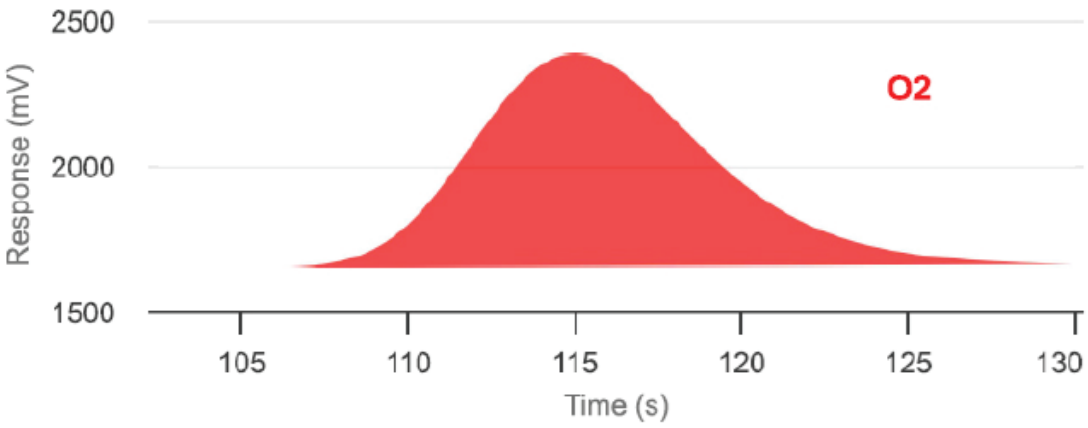
Component	Unit	Calibration Value	Area Counts
He	%	100	34591



Component	Unit	Calibration Value	Area Counts
N2	%	100	5186



Component	Unit	Calibration Value	Area Counts
02	%	100	6020



CONCLUSION

The MultiDetek Lite gas chromatograph configured with a TCD sensor offers the analysis of percent He-02-N2 using Argon as carrier gas reference. While the ceramic metal-oxide sensor measures the trace moisture. Both sensors are mounted in parallel in the same instrument offering an online analysis of percent He-02-N2 and H2O. The method is aligned with regulatory compliance.

LDetek

Where innovation leads to success

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