

DETECTING ULTRA-TRACE LEVEL TOTAL NITROGEN / SULFUR ANALYSIS WITH NEXIS TN/TS ANALYZER



INTRODUCTION

The future requirements of Total Sulfur/Nitrogen analysis in light liquid hydrocarbons such like petrochemical base, intermediate and final products are heading towards very low concentration levels (ppb). This application note shows the precision, Level of Detection (LOD) and repeatability performance when a simultaneous analysis of Total Nitrogen and Sulfur is conducted using the NEXIS Combustion analyzer equipped with both ONE-Cal™ functionality and Digital Signal Processing Technology (DSP). DSP Technology will enhance the Sulfur/Nitrogen detector performance resulting in a level of high sensitivity and repeatability.

This note shows the raw analytical calibration data and achieved LOD's for both Nitrogen and Sulfur using the NEXIS model equipped with the AS120 liquids autosampler in the range of 0 – 1000 ppb.



NEXIS PERFORMANCE DATA FOR TOTAL NITROGEN

A proportional calibration line 0-1000 ppb Nitrogen has been prepared with 11 calibration points with 5 replicates of each. Figures 2a and 2b show the raw data for all the Nitrogen calibration points with an automatically calculated LOD for Nitrogen of less than 1 ppb. Figure 3 shows the sample peak for all individual standards and figure 4 the sample peak of a 100 ppb standard compared to a blank.



Figure 1:
NEXIS analyzer with AS120
autosampler

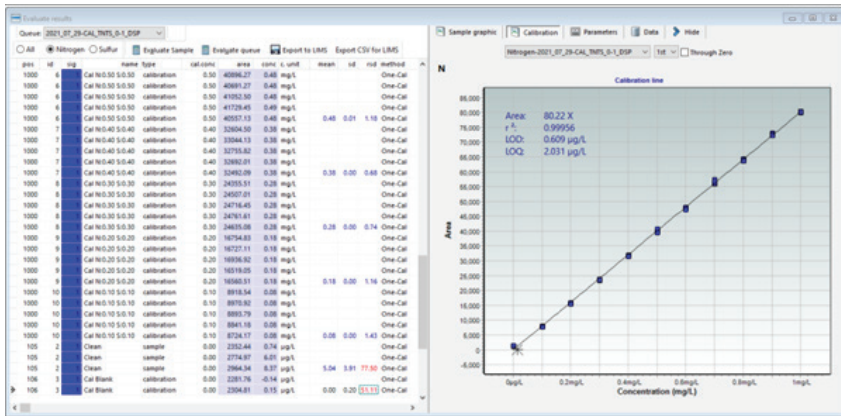
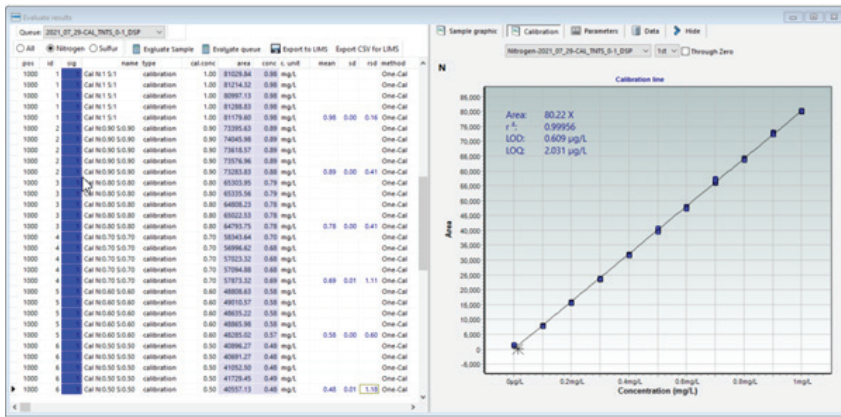


Figure 2a and 2b:
Nitrogen calibration line 0 - 1000 ppb
at NEXIS model analyzer

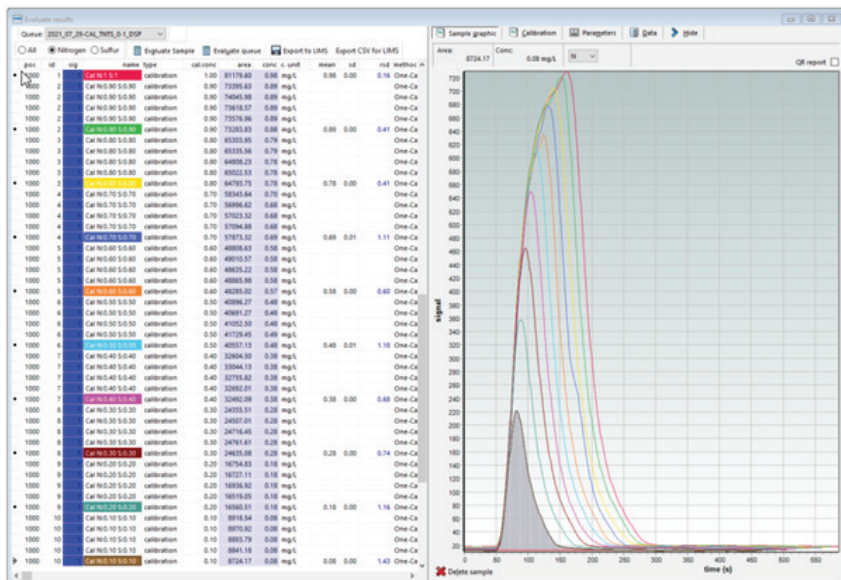


Figure 3:
All Total Nitrogen concentration
levels displayed as overlaid peaks

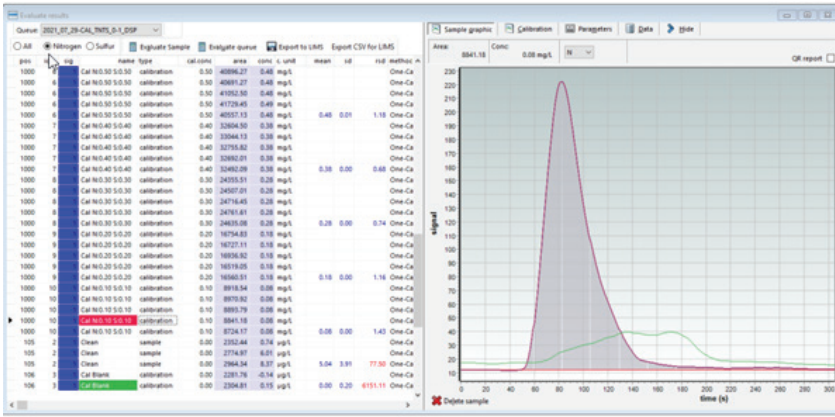


Figure 4:
Nitrogen Sample peak of 100 ppb
and blank

NEXIS PERFORMANCE DATA FOR TOTAL SULFUR

A proportional calibration line 0-1000 ppb Sulfur has been prepared with 11 calibration points and each point with 5 replicates. In below figures you can find the raw data of all the sulfur calibration points and the automatically calculated LOD (Lowest Detection Limit) for sulfur which became less than 2 ppb. Figure 6 shows the sample peak for all individual standards and figure 7 the sample peak of a 100 ppb standard compare to a blank.

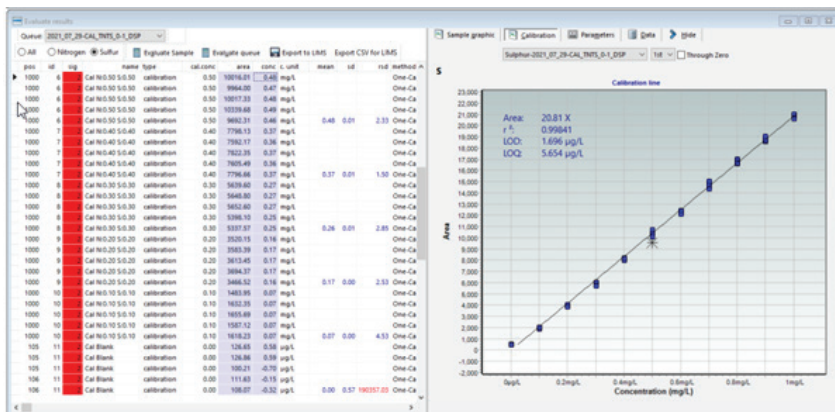
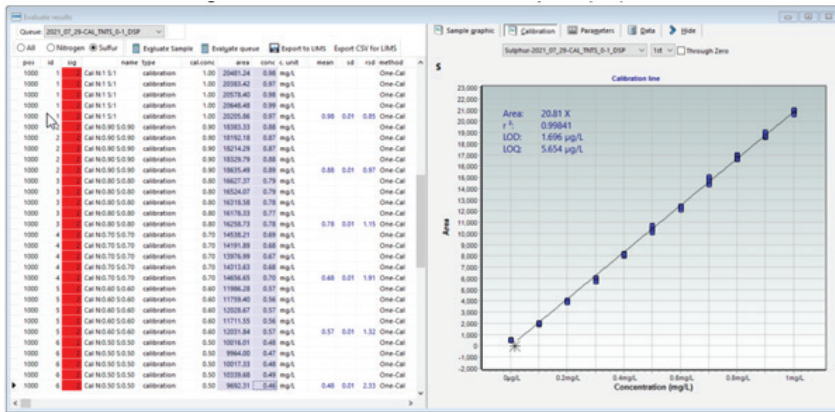


Figure 5a and 5b:
Sulfur calibration line 0 -1000 ppb at
NEXIS model analyzer

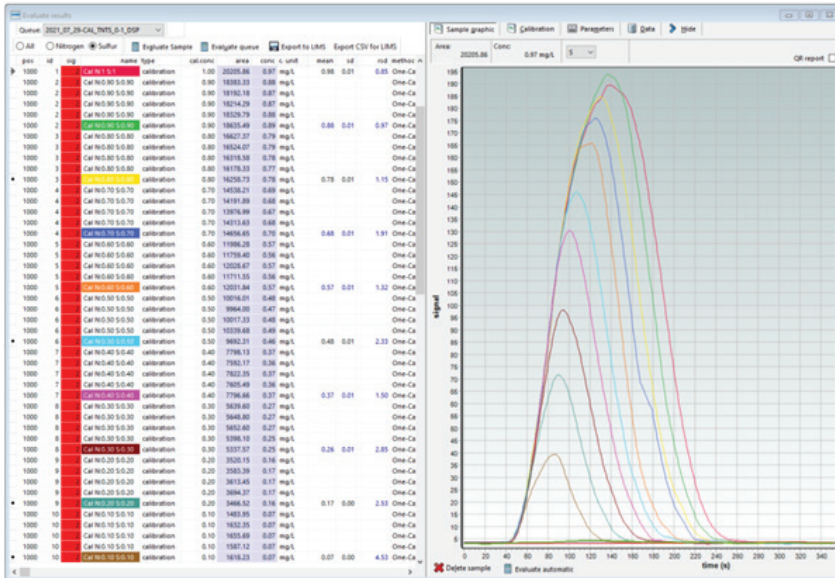


Figure 6:
All Total Sulfur concentration levels displayed as overlaid peaks

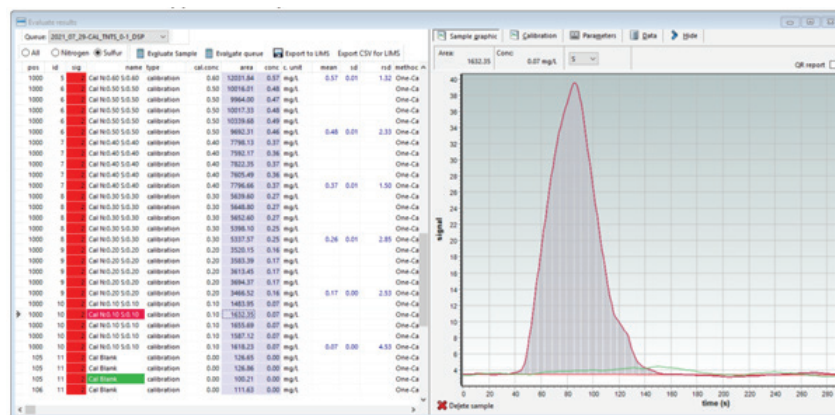


Figure 7:
Sulfur Sample peak of 100 ppb and blank

CONCLUSION

The NEXIS TN/TS analyzer when calibrated in a dedicated ultra trace range of 0 – 1000 ppb will achieve excellent calibration data with outstanding repeatability performance and achieved LOD's of 1 and 2 ppb for Nitrogen and Sulfur respectively. The use of DSP Technology™ and ONE-Cal™ functionality makes the NEXIS model equipped with AS120 liquids autosampler a novel solution that sets a new standard in Combustion analyzer performance.

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