



CALIBRATIONS - SAVE TIME AND REDUCE COSTS WITH ONE-CAL™ TECHNOLOGY

INTRODUCTION

Labs around the globe share a common need to enhance lab productivity and stability when analyzing Total Sulfur, Nitrogen and Chlorine. Today, that process consumes too much time and money. When done improperly it can also contribute to poor data outcomes requiring labs to repeat calibrations and delay much needed sample analysis.

Labs of all types need an alternative in order to reduce the preparation time and lab costs when calibrating combustion analyzers.

EST Analytical - TSHR has developed a new exciting user-interface tool to enhance the customer experience to automatically prepare liquid calibration standards and obtain calibration plots of your Combustion Analyzer. The NEXIS trace level Sulfur, Nitrogen and Chlorine Analyzer models equipped with AS120 liquid autosampler enables customers to perform a multiple point calibration line using ONE-Cal™ Technology.

The use of only a single source calibration stock standard and solvent blank solution positioned at the AS120 sampler of the NEXIS and NEXIS VP model analyzers provide:

- a unique and excellent tool to save time and costs
- reduces the risk of dilution errors and potential human handling errors of calibration vial positions
- is consistent with ASTM Calibration and Standardization sections.
- mitigates stock standard lot number documentation errors

The ONE-Cal™ feature incorporates an easy to use Wizard to automatically build a calibration queue, prepare customized calibration standards for every working range, select number of replicates and weight of your calibration points. Labs can efficiently build up the whole calibration queue within seconds to begin calibration standards.

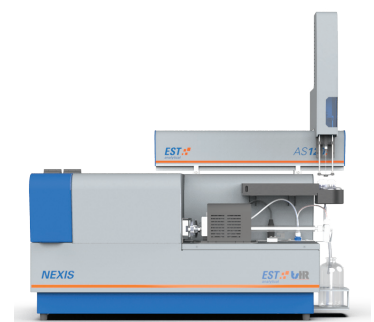
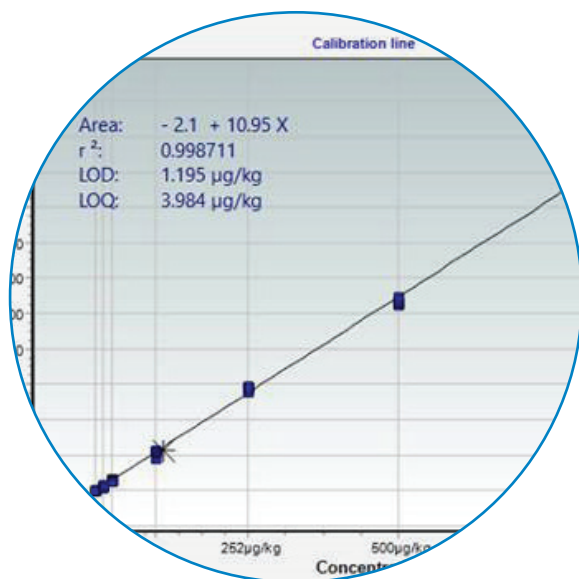


Figure 1:
NEXIS analyzer with AS120
autosampler

A BREAK-THROUGH ADVANCEMENT

The ONE-Cal™ feature incorporates an easy to use Wizard to automatically build a calibration queue, prepare customized calibration standards for every working range, select number of replicates and weight of calibration points. Now labs can build a whole calibration queue within seconds, and the NEXIS analyzer is ready for running calibration standards.

This performance note describes the principle of ONE-Cal™ technology feature incorporated in the NEXIS LINK instrument software and supported with the guidance of an interface tool and example of performance data.



BACKGROUND OF ONE-CAL™ TECHNOLOGY

Calibration lines for Combustion analyzers for the determination of sulfur and nitrogen content are based on Concentration versus Area counts. A combustion signal peak is an integration of signal against time and can have various peak shapes. The peak shape generated through a combustion analyzer is definitely not a Gaussian looking peak. The combustion signal peaks are free to be designed by the detector where a certain (a) amount of volume and (b) concentration passes the detector.

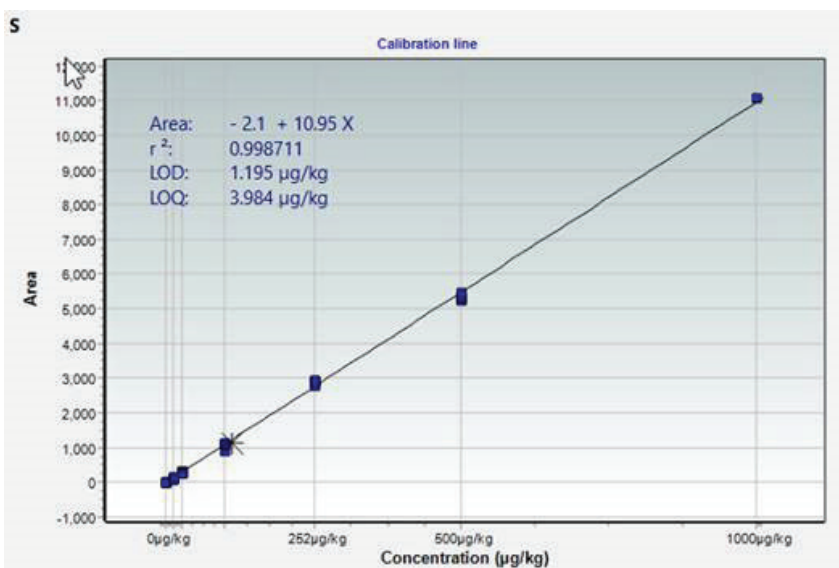
This “certain” amount, can be:

- 1) the (a) injected volume as the volume of the injection correlates linear to the number of area counts, and it can also be,
- 2) the (b) concentration, as the concentration is also a linear correlation to the area counts.

A basic and common practice to prepare calibration curves for Combustion analyzers is to have a set of variable concentrations using a fixed sample volume. Labs report this can be problematic as it requires multiple steps and time, both of which if done improperly can result in errors.

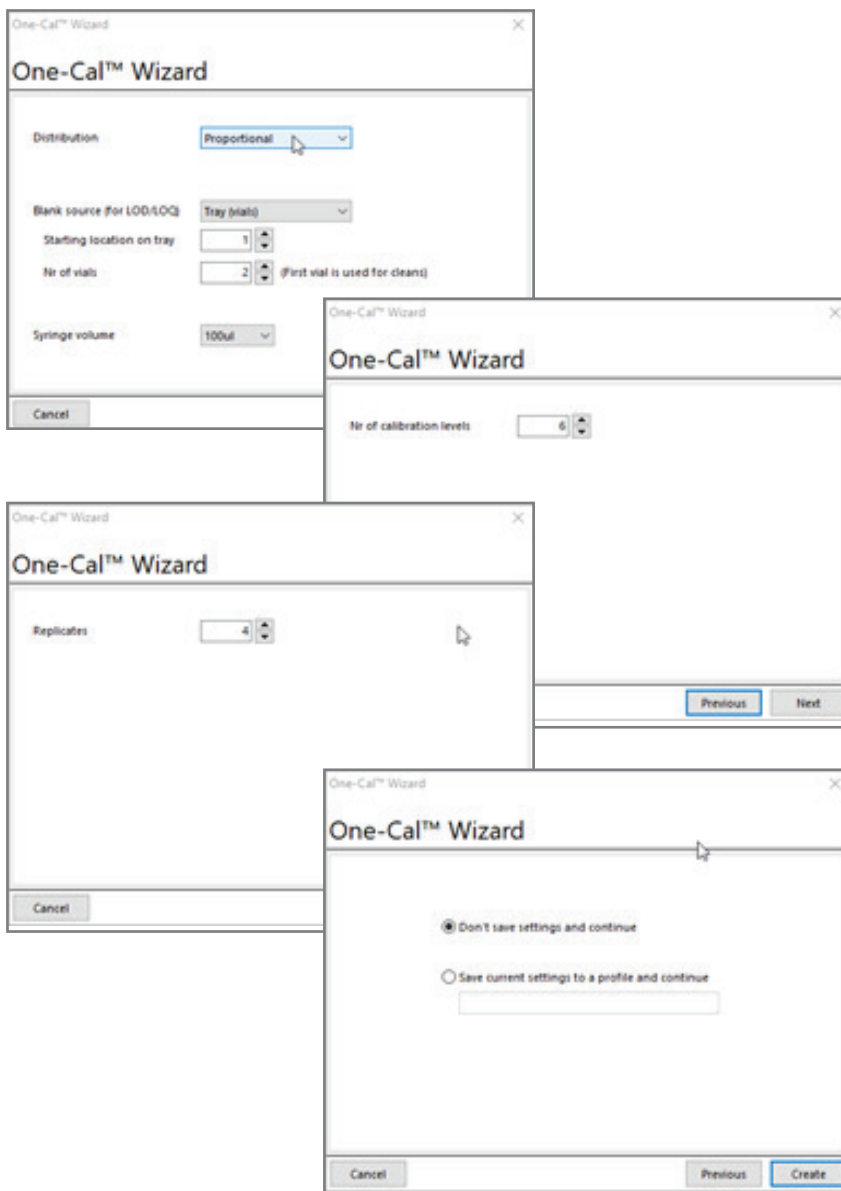
A more advanced approach is to work with a fixed concentration using variable injection volumes. This advanced approach requires proper sampling management and backward sample re-calculation features of an autosampler and combustion analyzer design. Given most combustion systems and relative auto-samplers are not manufactured by the same company these manufacturers cannot provide an advanced approach and therefore keep it simple and easy by implementing the basic approach of using variable concentrations at a fixed sample volume.

This fully validated option called ONE-Cal™ is incorporated in the NEXIS LINK instrument software.



USER INTERFACE TOOL

The use of the ONE-Cal™ wizard tool within the software enables users to create a full calibration queue with all its variables by simply entering the stock standard concentration, the number of calibration points and replicates. The measurements will be done automatically by using a single stock standard filled in a single bottle positioned at the AS120 liquids autosampler. Below you can find a few screenshots of the ONE-Cal™ Wizard tool, which quickly helps prepare a sample queue for calibration of the NEXIS and NEXIS VP TN/TS analyzer configuration.

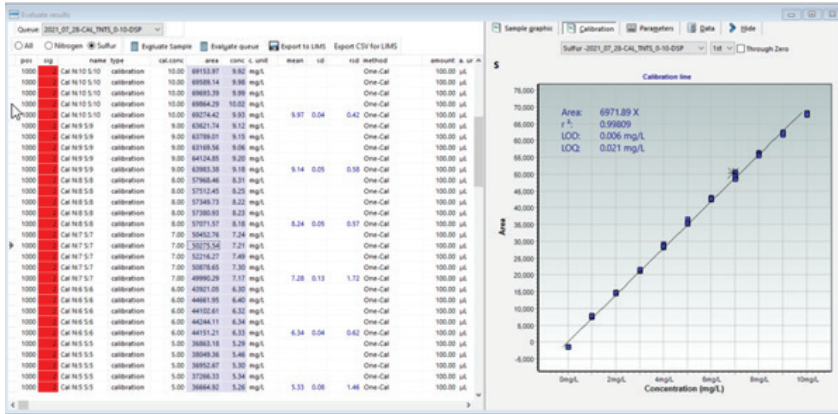


ONE-CAL™

Figure 2:
ONE-Cal™ Wizard user
interface tool for quick preparation of
calibration lines

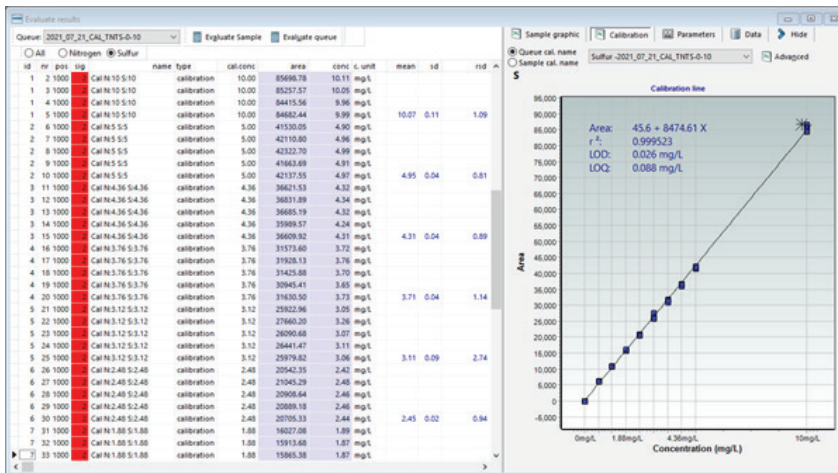
PERFORMANCE DATA

Below are the results of calibration plots for Total Sulfur and Nitrogen for a 0 – 10 ppm calibration line carried out at a NEXIS VP using the ONE-Cal™ Wizard. The calibration line can be prepared in a proportional mode and in an aggravated mode based on customer preference. Both modes have been used in examples below.



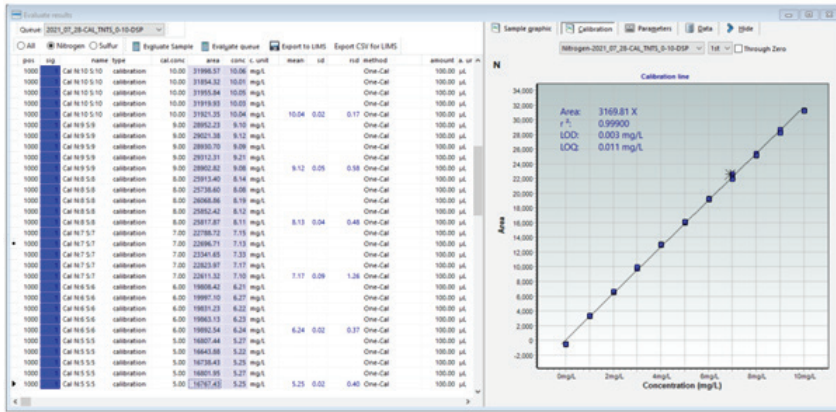
Sulfur Linearity
0.9998

Figure 3:
Sulfur calibration line (0-10 ppm) in proportional mode



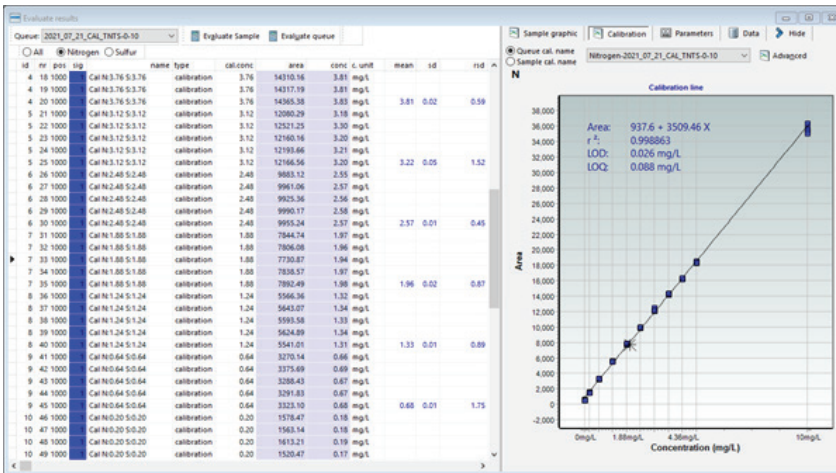
Sulfur Linearity
0.9995

Figure 4:
Sulfur calibration line (0-10 ppm) in aggravated mode



Nitrogen Linearity 0.9990

Figure 5:
Nitrogen calibration line (0-10 ppm)
in proportional mode



Nitrogen Linearity 0.9988

Figure 6:
Nitrogen calibration line (0-10 ppm)
in aggravated mode

SUMMARY

The ONE-Cal™ functionality within NEXIS LINK software solves a problem labs have had in productivity and stability in the analysis of Total Sulfur, Nitrogen and Chlorine. This solution makes the NEXIS models analyzers equipped with AS120 nitrogen autosampler a very powerful and productive tool for labs to reduce extensive costs, eliminate lot documentation of individual standards and save time. The accuracy of the offered NEXIS solution provides labs an excellent tool to keep up reliability of the NEXIS Combustion analyzer and precision of their final reported sulfur and nitrogen data.

CONTACT INFO

E-mail: sales.tshr@estanalytical.com
 E-mail (US only): sales@estanalytical.com
 Our website: www.estanalytical.com

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