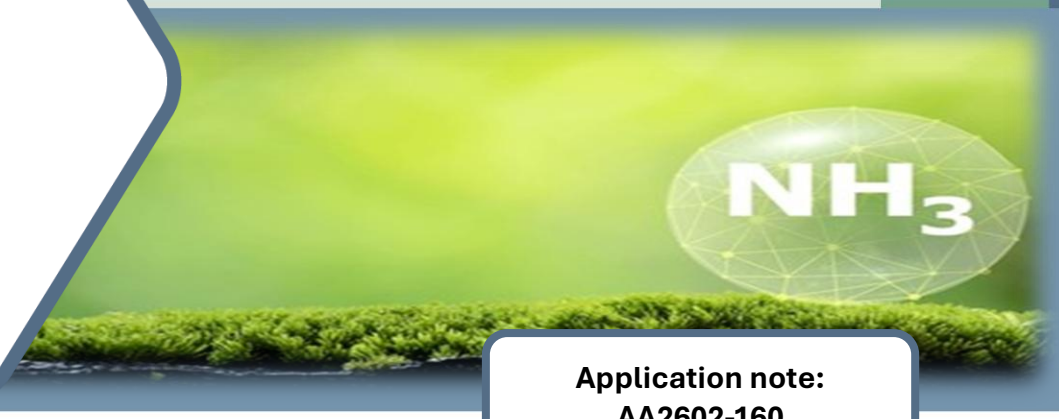
SRA INSTRUMENTS
ANALYTICAL SOLUTIONS



Application note:
AA2602-160

NH_3 calibration on Volamine

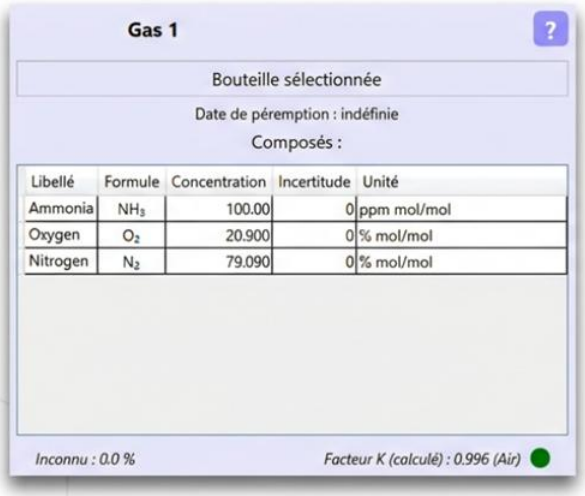
Objective: This application note describes the procedure for calibrating ammonia (NH_3) on a micro gas chromatograph (µGC) using a LiqMix Nephos dynamic diluter. The aim is to obtain a reliable and reproducible calibration curve for the quantification of NH_3.

Principle: The LiqMix NEPHOS diluter generates ammonia gas mixtures from a liquid solution or a concentrated source, with precise control of the dilution flow rates. The µGC then analyses these mixtures in order to establish a relationship between the injected concentration and the detector response.

Materials and equipment:

- **µGC fitted with a column suitable for NH_3**
- **LiqMix dynamic diluter (Nephos)**
- **Ammonia source (cylinder or solution)**
- **Carrier gas (He, N_2 or other, depending on configuration)**
- **Pressure regulators and flow meters**
- **NH_3-compatible tubing (inert materials recommended)**

LiqMix Nephos + µGC 990



Composition of the NH_3 calibration cylinder

Operating conditions

- µGC analytical method

Sample

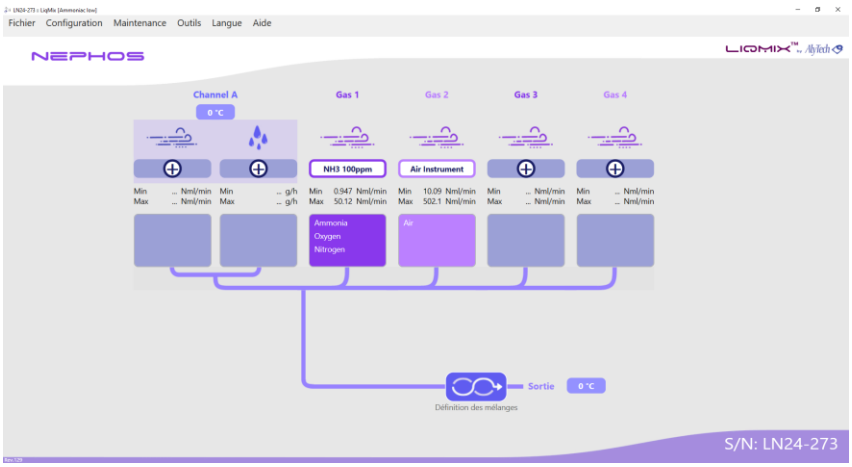
Matrix: Air

- **Compound**: NH_3 100ppm, diluted

µGC method

- **Technique**: µGC 990
- **Carrier gas:** Helium
- **Injector heating:** 80°C
- **Column**: CP Volamine 15m x 0.32mm
- **Column temperature**: 50° C
- **Injection time**: 150 ms
- **Column pressure:** 22Psi
- **Detector:** µTCD

- LiqMix NEPHOS diluter configuration:

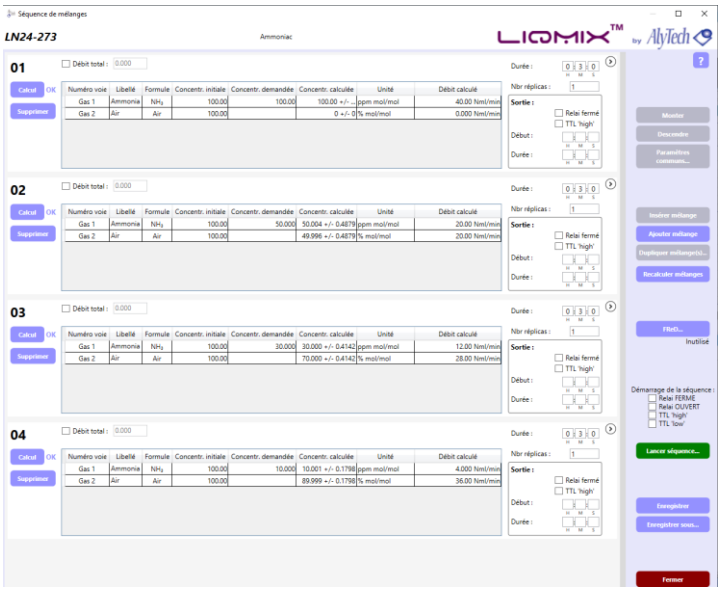


Diluter software interface

- A calibration sequence is configured in SOPRANE CDS, the µGC control software developed by SRA Instruments, together with the corresponding dilution sequence in the diluter software. The individual sequence lines are automatically synchronised between the µGC and the diluter, which simplifies the implementation of multi-point calibration curves.

	Nom de la série	Méthode	Nombre d'analyses
	Calibration NH3 100ppm	NH3 150ms	11
	Calibration NH3 50ppm	NH3 150ms	11
	Calibration NH3 30ppm	NH3 150ms	11
	Calibration NH3 10ppm	NH3 150ms	11

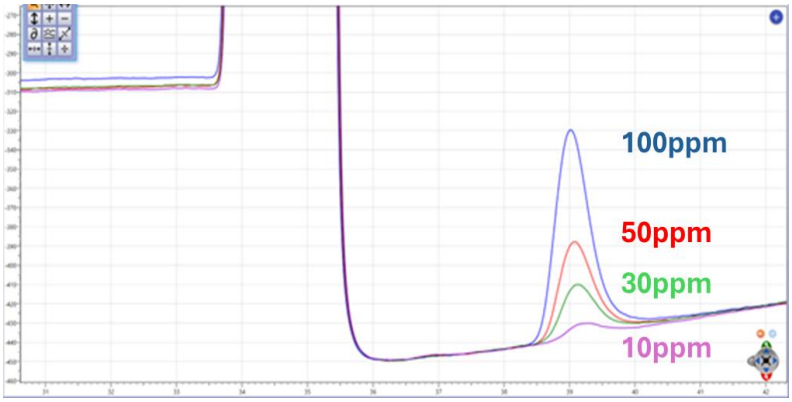
Calibration sequence prepared on the µGC 990



Programmed dilution sequence

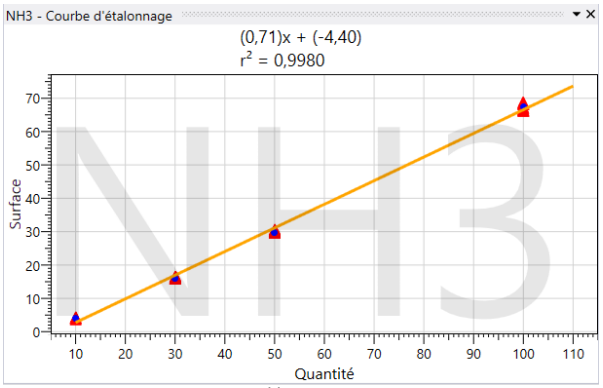
Results

The SOPRANE CDS software allows real-time monitoring of the analyses performed by the µGC, as well as the configuration of data-processing methods and chromatographic peak integration. The overlay of the chromatograms obtained at the successive dilution steps highlights the evolution of the analytical response: a progressive variation in the NH_3 peak area is observed as a function of the generated concentration. This direct relationship forms the basis of the calibration curve.



Overlay of calibration chromatograms

The linear regression shows an excellent correlation coefficient (R^2 = 0.998), confirming the quality of the linearity over the range investigated. Method repeatability was assessed from five injections at each concentration level. The results show relative standard deviations (RSD) below 5 % for all calibration points, indicating very good precision and excellent reproducibility of the system.



NH_3 calibration curve

Concentration	RSD %
100ppm	1,57
50ppm	0,96
30ppm	1,99
10ppm	4,75

RSD (%) at the different concentration levels

Conclusion

The solution offered by SRA Instruments, combining the dynamic diluter with the µGC controlled by SOPRANE CDS, enables reliable and reproducible calibrations of ammonia. It delivers the precise generation of gas mixtures and their analysis with excellent linearity, suitable for concentration levels in the ppm range. Despite the well-known difficulties associated with NH_3 sampling and analysis (adsorption, memory effects, sensitivity to operating conditions), this approach delivers robust analytical performance. It therefore represents a relevant solution for the accurate quantification of ammonia, both in routine and industrial applications.

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