

# Cation Analysis by Capillary Electrophoresis

## Volatile Standards (Hydrazine) dilution at 20 ppb from a stock solution of 1 g/L with eVol®

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### INTRODUCTION

AFICIP was created in 1985 by chemical industry members. AFICIP is a training center for chemical companies across a range of industries handling analysis and techniques such as: GC, LC, Electrophoresis, UV Vis Atomic Absorption and IR Spectrometry.

### DESCRIPTION

For most analytical techniques the first step is sample and standard preparation. At AFICIP this involves serial dilutions at 10 ppb from a standard solution of 1 g/L. Traditionally these dilutions are performed using regular pipettes which is time consuming and use a lot of glassware and solutions.

AFICIP's objective is to analyze traces of ions (ppb), including ammonium, sodium and Hydrazine, in a Morpholinic matrix (4 to 5 ppm). This is performed via electro-kinetic injection mode using an internal standards method. Sodium is quantified using the addition of known quantities methods.

Despite the time and effort spent using this traditional methodology, AFICIP found it difficult to completely eliminate inaccuracy due to the number of dilutions required and these inaccuracies caused errors in subsequent work. AFICIP also found that due to Hydrazine being unstable in air, when using a pipette with its air displacement mechanism, the air exposure caused Hydrazine decomposition and inaccuracy.

To address these methodology issues, AFICIP have evaluated and now use eVol®, the world's first automated analytical syringe, for their sample and standard preparation.

### METHOD

All stock solutions are 1 g/L. Standards are prepared in one step using eVol®. Diethanolamine is used as internal standard at 100 ppb. 3 standard ranges are prepared as described in the following table:

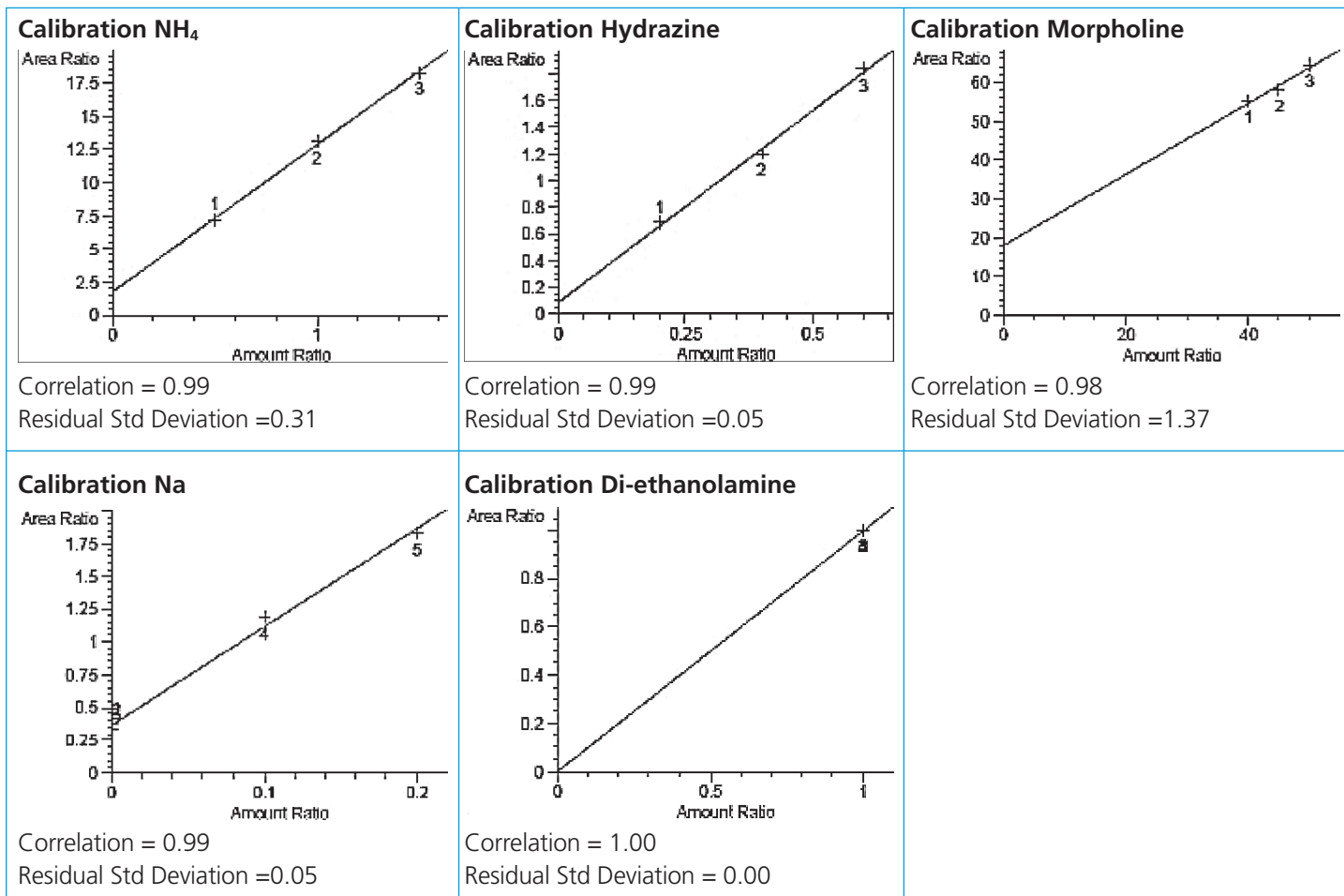
Standard	NH <sub>4</sub>		Hydrazine		Morpholine		Di-ethanolamine	
	ppb	Vol µL	ppb	Vol µL	ppb	Vol µL	ppb	Vol µL
1	50	5	20	2	4	400	100	10
2	100	10	40	4	4.5	450	100	10
3	150	15	60	6	5	500	100	10

Afterwards a quantified sodium solution is added to the standard 3. Ions concentrations are reported in the following table:

Standard	NH <sub>4</sub>		Na		Hydrazine		Morpholine		Di-ethanolamine	
	ppb	µL	ppb	µL	ppb	µL	ppm	µL	ppb	µL
3 + Na	150	15	10	1	60	6	5	500	100	10
3 + Na	150	15	20	2	60	6	5	500	100	10



## RESULTS



## CONCLUSIONS

Using eVol® for standards preparation AFICIP are able to quantify Hydrazine at 20 ppb, Sodium at 5 ppb and Ammonium at 50 ppb in a Morpholinic matrix at 5 ppm. The quantification of the Morpholine is also now possible using eVol®. As shown by the calibration curves, the linearity in these ranges of concentration is excellent for each standard. The positive displacement operation of eVol®, unlike the air displacement mechanism of pipettes, enables the preparation of standards by dilution to ppb levels in a single step, and greatly reduced exposure to air improved the standard accuracy. A high degree of precision and accuracy is maintained and both handling time and glassware usage are significantly reduced.

For more information contact our technical customer support team on: [techsupport@sge.com](mailto:techsupport@sge.com)

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