

## Standard Preparation in One Step with eVol® XR



### SGE Product Description

eVol® is the coupling of two precision devices: a digitally controlled electronic drive and an XCHANGE® enabled analytical syringe. The result is a digitally controlled positive displacement dispensing system that can be programmed to reproducibly and accurately perform a wide variety of liquid handling procedures.

### Reviewing Company Summary

**AFICIP**  
FORMATION CONTINUE

AFICIP was founded in 1985 by Dr Robert Gonin and other 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.

### Situation

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 uses a lot of glassware and solutions. 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. AFICIP's objective is to determine an accurate method for standard preparation. To address these methodology issues, AFICIP 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. Di-ethanolamine is used as the internal standard at 100 ppb.

Standards are prepared using eVol 5 µL, 50 µL, 100 µL, 500 µL, and 1 mL syringes.



## Results

Standard Prepared (3 dilutions)	Correlation Curve Coefficient	RSD (%)
NH <sub>4</sub>	0.99	0.31
Hydrazine	0.99	0.05
Morpholine	0.98	1.37
Na	0.99	0.05
Di-ethanolamine	1.00	0.00

## Discussion

Using eVol for standard preparation AFICIP are able to prepare, with a high level of accuracy, the standards 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 morpholine is also now possible using eVol. 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.

## Summary

Using eVol Dr Robert Gonin at AFICIP has an easy and accurate tool to prepare the standards in only one step. This saves time and reduces the quantity of solutions and glassware used. The positive displacement mechanism of eVol provides an advantage in that it can be used with unstable solutions. The portability of eVol enables AFICIP to use their eVol while teaching users in their own laboratories.