

# Technical Brief

## Vinyl Acetate In Water

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### Abstract

Water has shown no reactivity challenges or method solvent interferences when used to preserve Phenova<sup>®</sup> Vinyl Acetate standards (Part No. AL0-101228). The following technical brief explains the effects and challenges of using vinyl acetate standards designed with different solvents compared to water. Phenova environmental standards are manufactured by Phenova, Inc. (Golden, Colorado USA), and distributed by Phenomenex.

### Introduction

Commercially, vinyl acetate is provided as a calibration standard to be used in US EPA volatile methodologies such as EPA 8240B, EPA 8260B, and EPA 8310. Within the environmental reference material market there are three primary solvents used in the manufacturing of this calibration standard; acetonitrile, methanol, and water. Regardless of the solvent used, vinyl acetate calibration standards are commonly supplied with various manufacturers' warnings about the instability, incompatibility, volatility, and reactivity. The warnings are well justified as vinyl acetate is an organic ester that is highly reactive under several conditions.<sup>1,2</sup>

### Standard Design by Solvent

#### *Vinyl Acetate in Acetonitrile*

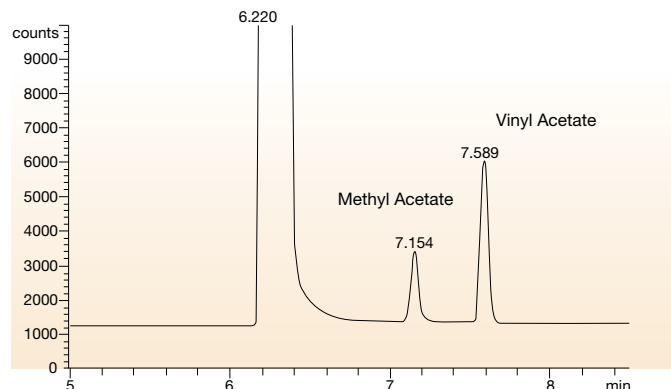
Acetonitrile is a good choice of solvent to minimize the reactivity of vinyl acetate, however, it is also a target analyte in many volatile analytical methods. In a volatiles analysis, the presence of a high concentration of acetonitrile is likely to mask early eluting analytes of interest. The calibration of vinyl acetate with acetonitrile as the solvent carrier can also lead to potential instrumentation clean-up issues and possible damage to dedicated volatile instrumentation.

#### *Vinyl Acetate in Methanol*

Vinyl acetate's stability in methanol is highly questionable as methanol is slightly acidic in nature thus causing vinyl acetate to readily react with methanol to form methyl acetate. It has been demonstrated that this reaction happens within minutes of the introduction of methanol at Phenova's laboratory. Therefore, this reaction places the quantitation of vinyl acetate in question during the volatile analysis. **Figure 1** demonstrates a GC/FID analysis of a commercially available vinyl acetate in methanol calibration standard. A comparison of vinyl acetate standard in methanol vs. vinyl acetate standard in water reveals a decrease in quantitation of approximately 20% due to the conversion of vinyl acetate to methyl acetate.

**Figure 1.**

Chromatogram from a GC/FID analysis of a commercially available vinyl acetate in methanol calibration standard

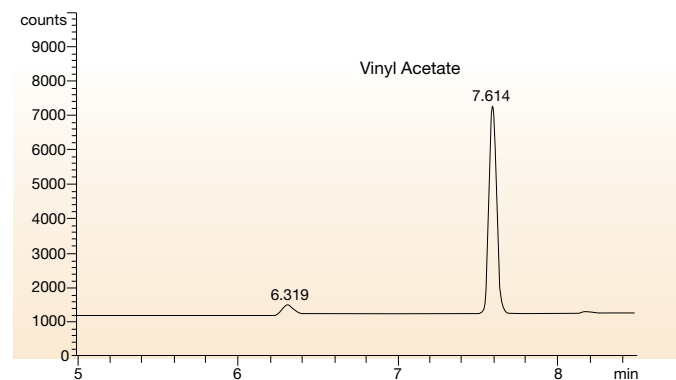


#### *Vinyl Acetate in Water*

There are no known reactivity challenges or method solvent interferences with a vinyl acetate calibration standard in water, making water a good choice of solvent to minimize the reactivity of vinyl acetate. While the use of water as the solvent ensures vinyl acetate remains at the intended concentration, due to the volatility of vinyl acetate this standard design has a relatively short shelf-life, just months from manufacturing. **Figure 2** demonstrates a GC/FID analysis of vinyl acetate in water manufactured by Phenova.

**Figure 2.**

Chromatogram from a GC/FID analysis of vinyl acetate in water manufactured by Phenova



### Phenova Vinyl Acetate Calibration Standard

Phenova's design for the vinyl acetate calibration standard (Part No. AL0-101228) employs water as the solvent to ensure the analyte remains intact at the intended concentration in the standard. Due to the instability of vinyl acetate, this standard is

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manufactured and shipped on demand and offered as an Analytical Reference Material under Phenova's ISO Guide 34 Reference Material Provider accreditation procedures. To minimize reactivity of vinyl acetate Phenova suggests the immediate use of this standard when mixed with other calibration standards during volatile analysis calibration. Additionally long-term storage of the standard is not advised to ensure best results.

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## References

1. ATSDR 1995, Toxicological Profile for Vinyl Acetate, U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, September 1995.
2. U.S. Environmental Protection Agency. *Integrated Risk Information System (IRIS) on Vinyl Acetate*. National Center for Environmental Assessment, Office of Research and Development, Washington, DC. 1999.  
[<http://www.epa.gov/iris/subst/0512.htm>]

## Ordering Information

Part Number	Product Name	Description	Calibration Standard	Internal Standard	Surrogate Standard
AL0101228*	Vinyl Acetate Standards	2000 µg/mL in Water	√		

\*Due to the instability of Vinyl Acetate, this standard (AL0-101228) is manufactured and shipped on demand and offered as an Analytical Reference Standard under Phenova's ISO Guide 34 Reference Material Provider accreditation procedures.

*Available in the USA and Canada.*

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