

# Measuring Purity of Acetonitrile

Applied Analytics Application Note No. AN-004



## Application Summary

Analyte: % Transmittance in acetonitrile

Detector: OMA-300 Process Analyzer

Process Stream: Acetonitrile

Measurement Range: 80-100 %T

Path Length: 1 cm

## Introduction

Generated as a by-product of acrylonitrile manufacture, acetonitrile is used as a solvent in butadiene purification and as a component in batteries. The purity of acetonitrile must be verified to ensure suitability for these industrial uses.

The traditional offline method for acetonitrile quality control relies on pulling samples for lab analysis. The lab system compares the sample's UV transmittance at a few wavelengths (220 nm, 240 nm, 275 nm, 350 nm) to that of demineralized water at the same wavelengths. Since pure acetonitrile has zero absorbance in the UV range, a simple principle applies: higher transmittance = higher purity.

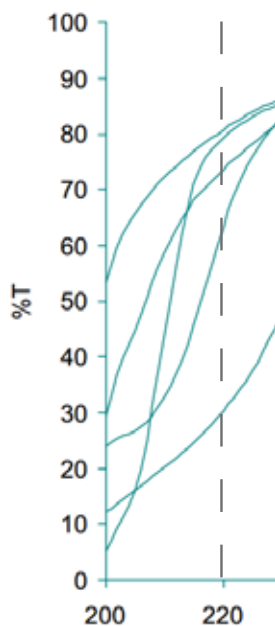
The OMA system applies the same principle but with enormous advantages, including: (1) continuous analysis updating every 1-5 seconds, as opposed to slow sample transport for discrete lab measurements; (2) fast response for immediately pinpointing changes in stream purity; (3) totally automated sampling system normalizes measurement by Auto Zero; (4) installation of system close to sampling point for convenience of process adjustment.

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## Transmittance Spectra of Different Acetonitrile Samples

The transmittance at 220 nm of various acetonitrile samples is shown below in spectra and table form.



	#601	#602	#603	#604	#605
nm	%T	%T	%T	%T	%T
200	12.29	29.49	24.02	5.32	53.44
220	30.29	73.58	63.31	79.34	80.69

## Accuracy in Terms of Transmittance

Some applications call for purity in the 99-100% transmittance range. Verification requires extremely accurate measurement.

## Wavelength Accuracy and Reproducibility

Transmittance measurement requires extremely stable wavelength accuracy. If the diode drifts wavelength assignment, significant measurement error is introduced. Mechanical scanning instruments with filters have moving parts that wear over time and lose wavelength assignment. The solid state OMA uses a photodiode array for extremely stable accuracy.

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## Rich Trend Data

Since the OMA performs continuous analysis of acetonitrile purity, trend data is available to the operator with easily configured data storage to view process history.



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The specifications below represent performance of the OMA-300 Process Analyzer in a typical acetonitrile purity application.

For technical details about the OMA-300 Process Analyzer, see the data sheet:

[http://aai.solutions/documents/AA\\_DS001A\\_OMA300.pdf](http://aai.solutions/documents/AA_DS001A_OMA300.pdf)

All performance specifications are subject to the assumption that the sample conditioning system and unit installation are approved by Applied Analytics. For any other arrangement, please inquire directly with Sales.

Subject to modifications. Specified product characteristics and technical data do not serve as guarantee declarations.

Application Data	
Performance Specifications	
Accuracy	<b>Acetonitrile Transmittance at 220 nm</b> @ 80-100 %T measurement range: $\pm 0.3$ %T

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## Further Reading

Subject	Location
OMA-300 Process Analyzer Data sheet	<a href="http://aai.solutions/documents/AA_DS001A_OMA300.pdf">http://aai.solutions/documents/AA_DS001A_OMA300.pdf</a>
Advantage of Collateral Data Technical Note	<a href="http://aai.solutions/documents/AA_TN-202_CollateralData.pdf">http://aai.solutions/documents/AA_TN-202_CollateralData.pdf</a>



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