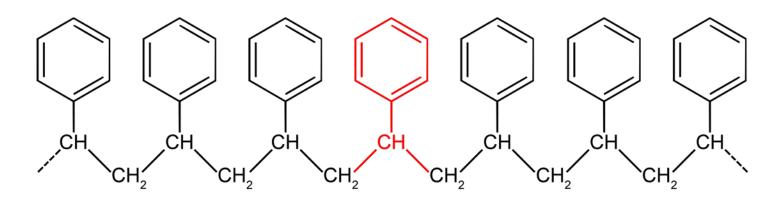# Measuring TBC (Polymerization Inhibitor)

Applied Analytics Application Note No. AN-001

Application Summary

Analyte: *tert*-butyl catechol (TBC)

Detector: OMA-300 Process Analyzer

Process Stream: Butadeine

Zero Fluid: Pure isopropanol

Typical Measurement Range: 0-200 ppm

Introduction

Polymerization inhibitors are chemicals which stabilize reactive monomers and prevent spontaneous polymerization. If too little inhibitor is added to a reactive monomer, polymerization can occur in pipes or vessels and require mechanical removal. On the other hand, if too much inhibtor is added, the final product may have difficulty polymerizing at the intended stage.

Monitoring *tert*-Butyl Catechol (TBC) in Butadeine

TBC is usually added as a polymerization inhibitor to monomers like butadiene and styrene. The concentration of TBC in the monomer needs to be regulated at approximately 100 ppm to avoid spontaneous polymerization as well as waste.

TBC has a distinct UV absorbance curve which allows the OMA system to easily monitor its real-time concentration. The full-spectrum analysis is critical for differentiating TBC absorbance from other absorbing impurities like toluene.

Since pure liquid butadeine is very difficult to prepare for system blanking purposes (i.e. at normal temperatures and pressures), pure isopropanol is used to zero the instrument. The full-spectrum analysis allows for normalization of the discrepancy between the butadeine spectrum and the isopropanol spectrum.
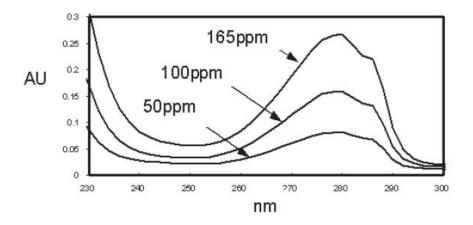
The OMA continuously outputs the TBC reading to the plant's main computer, providing new measurements at a 1 second interval — much faster than the traditional HPLC used for this application (15 minute interval). Response time is critical in order to respond quickly to sudden changes in TBC concentration.

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Absorbance Spectra of TBC in Isopropanol

These spectra were taken on calibration standard mixtures of TBC in isopropanol.

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The specifications below represent performance/build of the OMA-300 Process Analyzer in a typical TBC application.

For technical details about the OMA-300 Process Analyzer, see the data sheet:
http://www.a-a-inc.com/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.

Application Data	
Performance Specifcations	
Accuracy	**_tert_-butyl catechol** 0-200 ppm: ±1 ppm

Further Reading

Subject	Location
OMA-300 Process Analyzer Data sheet	http://www.a-a-inc.com/documents/AA_DS001A_OMA300.pdf
Advantage of Collateral Data Technical Note	http://www.a-a-inc.com/documents/AA_TN-202_CollateralData.pdf

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Headquarters + Manufacturing
Applied Analytics, Inc.
Burlington, MA │ sales@a-a-inc.com

North America Sales
Applied Analytics North America, Ltd.
Houston, TX   sales@appliedanalytics.us

Europe Sales
Applied Analytics Europe, SpA
Milan, Italy │ sales@appliedanalytics.eu

Asia Pacific Sales
Applied Analytics Asia Pte. Ltd.
Singapore │ sales@appliedanalytics.com.sg

Middle East Sales
Applied Analytics Middle East (FZE)
Sharjah, UAE │ sales@appliedanalytics.ae

Brazil Sales
Applied Analytics do Brasil
Rio de Janeiro, Brazil │ sales@aadbl.com.br

India Sales
Applied Analytics (India) Pte. Ltd.
Mumbai, India │ sales@appliedanalytics.in