

Measuring Water in Anhydrous Solvents (Chlorobenzene, MIBK, Acrylonitrile)

Applied Analytics Application Note No. AN-055

Application Summary

Analyte: **Water**

Detector: **MCP-200 - IR photometer**

Process Stream: **Chlorobenzene, MIBK, or Acrylonitrile**

Typical Measurement Range: **0 – 100 ppmv**

Introduction

Anhydrous solvents must contain very little to no water. The presence of water can have a negative effect on reactions that the solvent is being used for. The presence of water can impede a chemical reaction, prevent a reaction from proceeding, or cause the formation of undesirable products. Producing perfectly “dry” anhydrous compounds is a difficult process as these solvents are often hygroscopic and will absorb water if not produced and stored properly.

Various methods of drying liquid solvents exist. Older methods consist of using distillation to remove unwanted water or using certain chemical reactions involving reactive metals/metal hydrides. Newer methods consist of running the solvent through a molecular sieve or purification column. Once anhydrous solvents are produced, they are carefully packed to ensure they maintain dryness. Most producers of anhydrous solvents require the solvent to contain below 100 ppmv of water.

The concentration of water contained within anhydrous solvents is closely monitored during their production to ensure the solvents are meeting quality standards. An older method for measuring the water content of an anhydrous solvent is the Karl Fischer titration method. This method uses coulometric or volumetric titration to measure trace amounts of water in a sample. The Karl Fischer method is useful, but in certain cases this method suffers from drift error over prolonged periods of time.

The MCP-200 Process Analyzer is the best choice for water measurements in anhydrous solvents. The MCP-200 will not suffer from drift error. The MCP-200 also offers a faster solution for water measurements, continuously providing new measurements every 5 seconds (as opposed to every minute or so with Karl Fischer titration methods).

System Benefits: MCP-200 Process Analyzer

- » Continuously measures H₂O levels using NDIR photometer
- » Totally solid-state build with no moving parts — modern design for low maintenance

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Further Reading

Subject	Location
Microspec MCP-200 Infrared Analysis Module Data sheet	https://aai.solutions/documents/AA_DS003A_MCP200.pdf
Human Machine Interface Data sheet	https://aai.solutions/documents/AA_DS202A_HMI.pdf



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