

## WATER EFFLUENTS CONTAINING GLYCOLS BY A UV DIODE ARRAY

### INTRODUCTION

Glycol is commonly used as a deicer in airports. When discharged into the ground, glycol can cause an increase in biological oxygen demand (BOD). The quantity of glycol allowed released into the sewage system has been regulated since 1995. The effluent water containing high levels of glycol needs to be monitored and diverted into recycling facilities or storage when the levels of glycol exceed a certain limit.

Monitoring the glycol concentration in water is critical at different stages of this process; due to limited amounts of storage, only water containing a predetermined amount of glycols is diverted into storage. At the recycling stage various concentrations of glycol are required for a range of by-products.

Accurate and reliable means of monitoring glycol are particularly important due to the fact that once the deicing process starts the monitoring needs to be with an uptime of 100%. This is true because the complete process of effluents discharge depends on the monitoring of the glycol concentrations in the water.

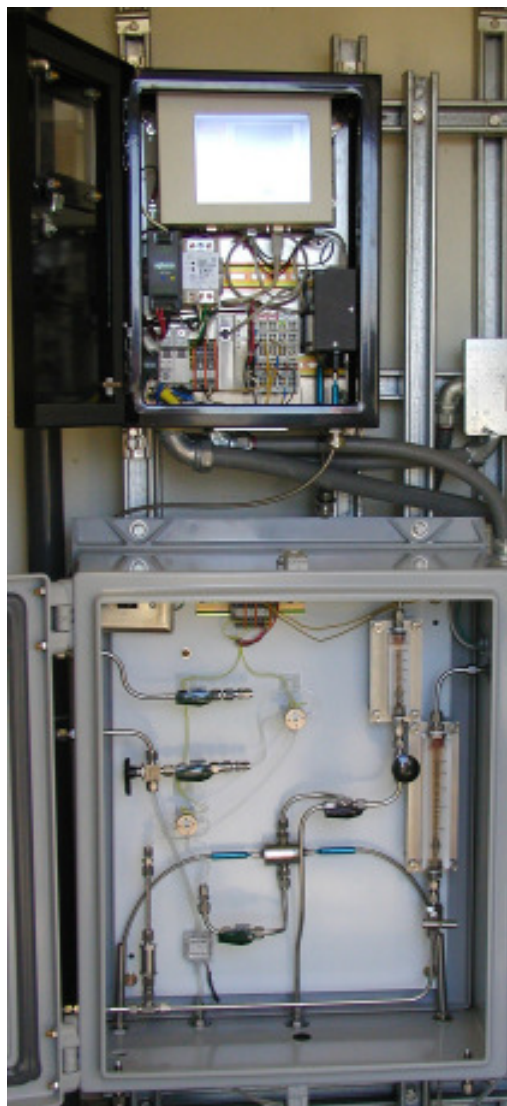
A UV diode array process spectrometer is used for a continuous monitoring of glycol in effluent water. Glycols have unique absorbance spectra in the UV range. The complete spectrum is measured instantaneously and analyzed giving accurate readings of the glycols concentration. The benefit of measuring a complete spectrum can be realized when the wide concentration range of glycols is considered; the wavelength range to monitor and the diode array exposure times are automatically adjusted, allowing for measurements of opaque streams. A 4-20mA signal proportional to the glycol concentration and an alarm to indicate high glycol levels are some of the standard options in which the analyzer can communicate with a control system.

### ON-LINE MONITORING

The OMA-300, an industrial UV/VIS/SWNIR diode array spectrophotometer, is utilized to measure the absorbance spectra of the stream. Fiber optics transmit the light to and from the sample to the detector. The glycol concentration is continuously sent to a central control location via a 4-20mA signal proportional to the glycol concentrations.

### THE DIODE ARRAY ADVANTAGE

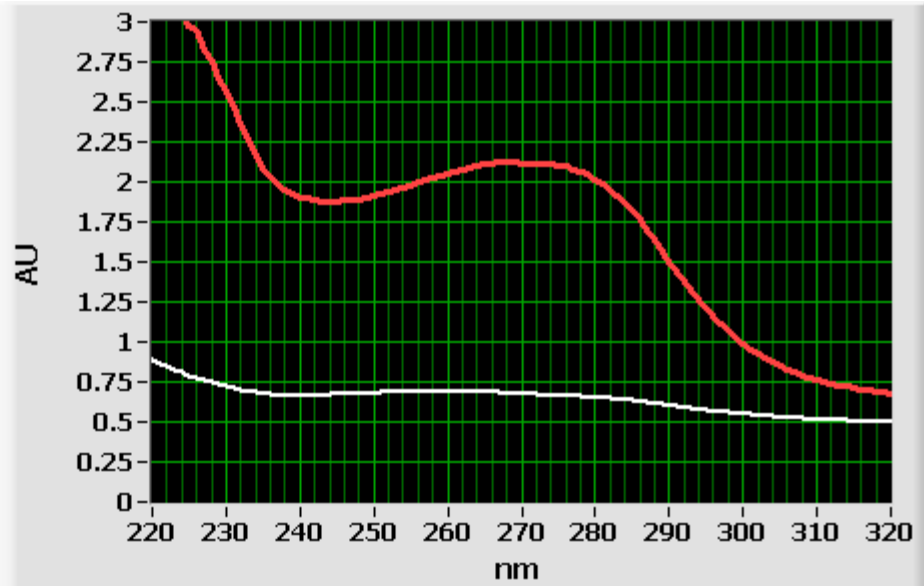
The glycol concentration may vary from few PPM to high percentage. When measuring a full spectrum there is no need to use different analyzers for different concentration ranges; the wavelength range automatically adjusts according to concentration levels. For opaque samples the exposure time, or the time the diode array collects light automatically, adjust to allow for low light levels measurements. It also allows for correction of signals coming from scattering of particles that were not filtered out prior to measurement. This is done by either a three point base line subtraction or by first derivative. See figures 1-3.



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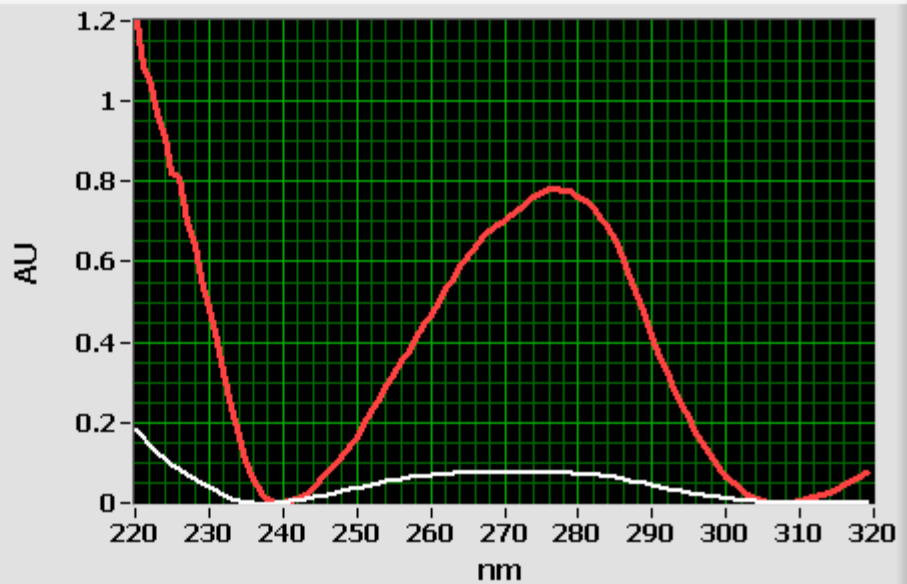
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Figure 1: Absorbance spectra of glycol in water



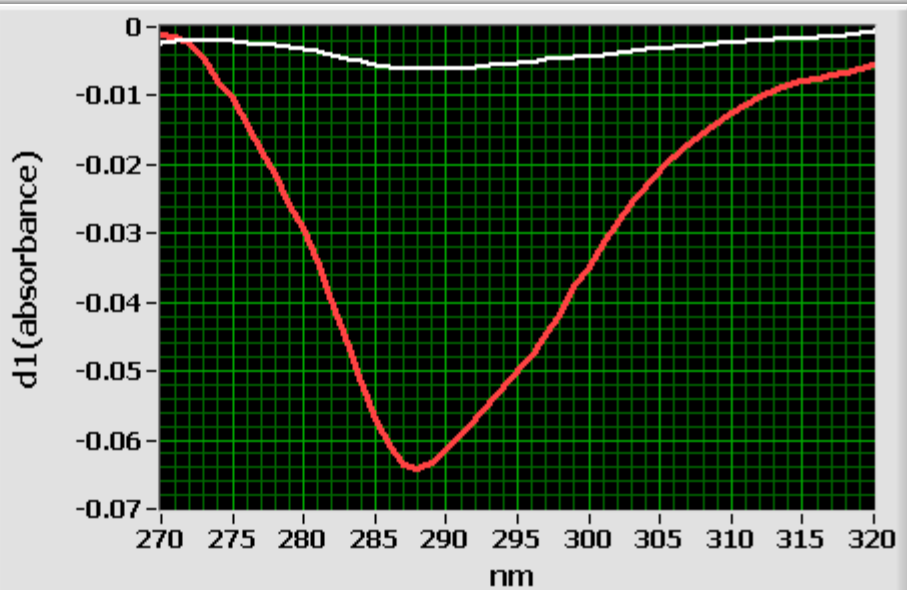
Glycol 5,000PPM  
Glycol 50,000PPM

Figure 2: Absorbance spectra of glycol in water, with a base line subtraction.



Glycol 5,000PPM  
Glycol 50,000PPM

Figure 3: 1st derivative spectra of glycol in water.



Glycol 5,000PPM  
Glycol 50,000PPM