

Water monitoring in vinyl chloride plants

PIR3502 Multiwave process photometer



Reliable monitoring of water in EDC in vinyl chloride plants.

Measurement made easy

PIR3502
IR process photometer

Industries

Chemical | Petrochemical

Introduction

The versatile plastic, polyvinyl chloride (PVC) is made from vinyl chloride monomer (VCM). Vinyl chloride is produced by the pyrolysis of ethylene dichloride (EDC). VCM facilities are usually integrated with EDC plants. The measurement of water in EDC is a very important photometer application in vinyl chloride plants. The reaction of water with HCl in the vinyl chloride reactor can lead to plugging of the reactor and serious corrosion problems. The continuous output of the ABB PIR3502 process photometer provides for fast remedial response when a water upset occurs in the VCM process

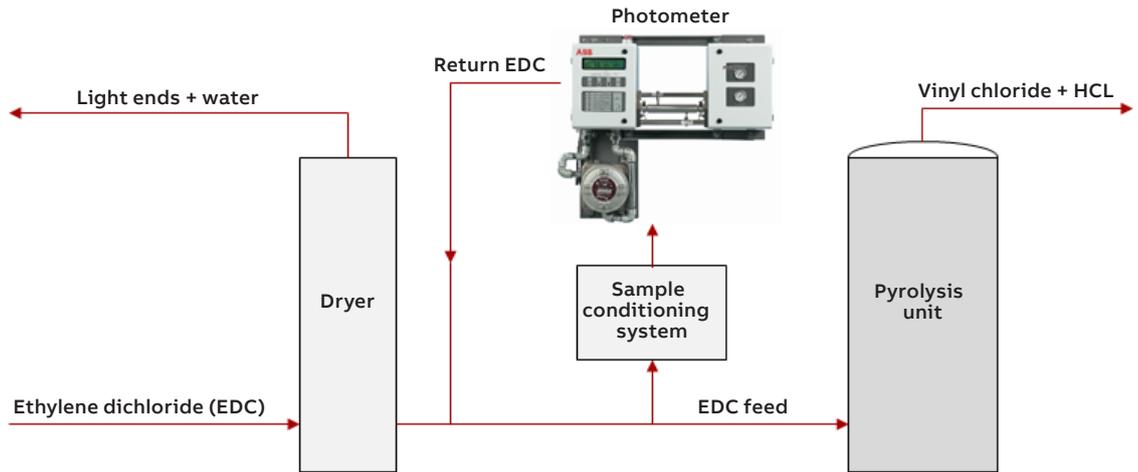
Benefits

Careful control of the water content in EDC in vinyl chloride plants provides the following benefits:

- Protection from catastrophic corrosion of reactor tubes
- Prevention of plugging of reactor tubes
- Increased throughput of the reactor by avoiding costly shutdowns

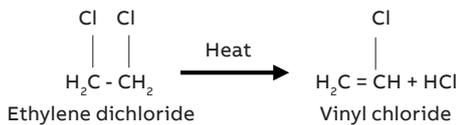
The analyzer

The ABB PIR3502 Multiwave photometer is a multiple channel filter photometer, which can accommodate up to eight different optical filters. The analyzer ratios the energy from the analytical wavelength filters to the reference wavelength filter. The water in EDC analyzer utilizes optical filters in the Infrared (IR) region of the electromagnetic spectrum. The calibration of the PIR3502 photometer uses a matrix algorithm that allows for compensation of interfering components in the analysis. The ABB PIR3502 Multiwave photometer has established an excellent reputation for reliable and stable performance in vinyl chloride plants.



Discussion

Cracking ethylene dichloride in a pyrolysis furnace makes vinyl chloride monomer by the following reaction:



Ethylene dichloride is passed through a dryer where the light ends and water are removed in the overheads of the fractionator. Purified EDC is removed from the fractionator column and fed to the pyrolysis unit. The EDC passes over a catalyst (ferric chloride) that is packed in the reactor tubes of the pyrolyzer. The reaction of water with HCl in the pyrolyzer can lead to plugging and corrosion problems.

Therefore, it is important to control the water content of the feed to the pyrolyzer in the vinyl chloride process. The sample conditioning system extracts a liquid sample of the EDC feed stream and sends it to the Multiwave Photometer. A typical range for the water analysis is 0 to 50 ppm by weight of water in EDC. A normal operating range

for water in EDC feed streams is 5 ppm with an alarm level set at 25 ppm. The use of the Multiwave photometer provides a continuous readout of the water concentration. This rapid response allows for fast corrective action when water upset occurs in the process. The careful selection of optical filters compensates for the effects of sample temperature fluctuations and color changes which come from ferric chloride and coke particles in the EDC feed stream.

Conclusion

The ABB PIR3502 Multiwave photometer provides reliable monitoring of water in EDC in vinyl chloride plants. We have an excellent track record with over 300 successful water in EDC analyzers in the field. These analyzers offer accurate and thermally stable readings that are not affected by ferric chloride and coke particles that can color the sample. ABB has developed a strong expertise in photometer applications for vinyl chloride plants.