Monitoring Ethylene Oxide in Air

Introduction

High sensitivity, simplicity and ease of use, without the complexity of a preconcentrator, makes the AMETEK Trace Analytical™ ta3000R an ideal gas chromatography monitor for the automatic determination of Ethylene Oxide (EtO) in air. Sensitivity is achieved by employing the Reduction Gas Detector (RGD). EtO is traditionally monitored by gas chromatography equipped with a Photo Ionization Detector (PID). However this detector does not have the sensitivity for direct parts per billion determinations and a preconcentrator is required. Employing the RGD, EtO can routinely be monitored at low ppb levels in air without any preconcentration device making ta3000R versatile, yet simple to operate.

Ethylene Oxide

EtO is a very reactive and important compound used to sterilize surgical equipment, tubing and even instrumentation used in surgery. It is also used as a fumigant for many foodstuffs and textiles. In agriculture, EtO is applied as a fungicide. It is also employed as intermediate in the chemical industry for manufacture of various commercial products such as ethylene glycol.

EtO is produced by oxidation of ethylene together with a catalyst. It is a very strong irritant to skin and mucous membranes in humans. Exposure to high concentrations can cause pulmonary edema and the compound is assumed to be carcinogenic. EtO is also highly flammable with a high degree of fire and explosion risk from 3%-100% concentration. Large walk-in sterilizers must be vented and cleared of any EtO before personnel can enter the chamber. Continuous monitoring is essential.

Analytical Instrumentation

The ta3000R gas chromatograph employs a RGD for sensitivities that are required by many regulatory agencies. Parts per billion or parts per million levels of EtO in air do not matter for the ta3000R. Unlike PID equipped monitors, the ta3000R routinely determines any level without the complexities of a preconcentration device for sub-ppm concentrations.

The RGD is a unique detector developed and sold exclusively by Trace Analytical. Employing a gas chromatographic separation together with the RGD, a very high degree of selectivity for EtO is achieved without interference from other volatile organics in the air. The ta3000R also includes a column system with backflush to prevent any interference from high molecular weight compounds from the air sample. Backflush of the column system speeds up the analysis cycle time by keeping the column clean and ready for the next analysis. The ta3000R achieves a cycle time of less than 5 minutes, which is important for reporting Time Weighted Averages.

AMETEK Trace Analytical has a history of leadership and experience in high quality gas monitoring equipment. The company manufactures and distributes specialty instrumentation that is rugged, has an unparalleled range of sensitivity in a compact package and is designed for demanding applications.

TRACE ANALYTICAL™
Application Note

AMETEK®
PROCESS INSTRUMENTS

455 Corporate Blvd., Newark, DE 19702
Ph. +1-302-456-4400, Fax +1-302-456-4444
www.ametekpi.com

REGISTERED ISO 9001 MANAGEMENT SYSTEM

F-0239 Rev. 2 (0311)

One of a family of innovative process analyzer solutions from AMETEK Process Instruments.
Specifications subject to change without notice.

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USA - Oklahoma
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USA - Pennsylvania
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