United States
Environmental Protection
Agency

Environmental Monitoring
Systems Laboratory
Research Triangle Park NC 27711

Research and Development

EPA-600/S4-84-024 May 1984

EPA

Project Summary

Technical Assistance Document

The Use of Portable Volatile Organic Compound Analyzers for Leak Detection

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This document has been prepared for the purpose of providing guidance on the selection and use of portable volatile organic compound analyzers for monitoring process leaks. The types of VOC analyzers capable of performing U.S. EPA Method 21 determinations, their principles of operation, advantages, and limitations are discussed. Sections providing guidance on the operation of each of four types of VOC analyzers--photoionization, flame ionization, infrared, and catalytic combustion--are included in the document.

This Project Summary was developed by EPA's Environmental Monitoring Systems Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

In order to achieve the National Ambient Air Quality Standard (NAAQS) for ozone, the Clean Air Act (CAA) requires states to issue regulations limiting the amount of VOCs which can be emitted from various sources. While some VOC emissions are from classical point sources (e.g., stacks, automobiles), a large proportion of VOCs enter the atmosphere as fugitive emissions (leaks in valves, pumping systems, flanges, seals, and other types of process equipment). Consequently, detection and control of such fugitive emissions is important to the overall reduction of VOC emissions.

Effective control of fugitive VOC emissions requires the availability of a practical method for determining the location of leaks and other sources of fugitive emissions. While several sampling and analysis methods are available for determining VOC emissions, most require sophisticated equipment, highly trained personnel, or extensive completion time.

The U.S. Environmental Protection Agency (EPA) publishes Control Technique Guideline documents which serve as an information base concerning useful methods for controlling fugitive VOC emissions for specific industries. Recently, the EPA published a method, designated as Method 21 (presented in Appendix A of the document), intended for use as a rapid screening procedure for VOC emission points. Method 21 is highly flexible in that the user can select any type of monitoring device which meets the specifications and performance requirements discussed in the document. However, the method gives little guidance as to which type of analyzer is most suitable for particular monitoring situations.

The primary objectives of this document are to present a detailed summary of the available VOC monitoring approaches and to provide guidance to users concerning the advantages, limitations, and performance characteristics of the

available techniques. Manufacturers' literature and various reports have been used as background material for this document.

Section 2 of this document summarizes the performance requirements and specifications listed in Method 21 for VOC analyzers and provides a summary of the various techniques, limitations and performance characteristics. The remaining four sections provide detailed guidance on the operation of the four major types of VOC analyzers, flame ionization, photoionization, infrared adsorption, and catalytic combustion detectors.

Each section describes the system operation, calibration, routine maintenance, quality control/performance verification procedures, and safety requirements of a particular type of VOC analyzer. Relevant features of specific models of commercially available VOC analyzers are also tabulated in the document.

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The complete report, entitled "Technical Assistance Document: The Use of Portable Volatile Organic Compound Analyzers for Leak Detection," (Order No. PB 84-179 993; Cost: $10.00, subject to change) will be available only from:
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5285 Port Royal Road
Springfield, VA 22161
Telephone: 703-487-4650
The EPA Project Officer can be contacted at:
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☆ U.S. GOVERNMENT PRINTING OFFICE; 1984 — 759-015/7683

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