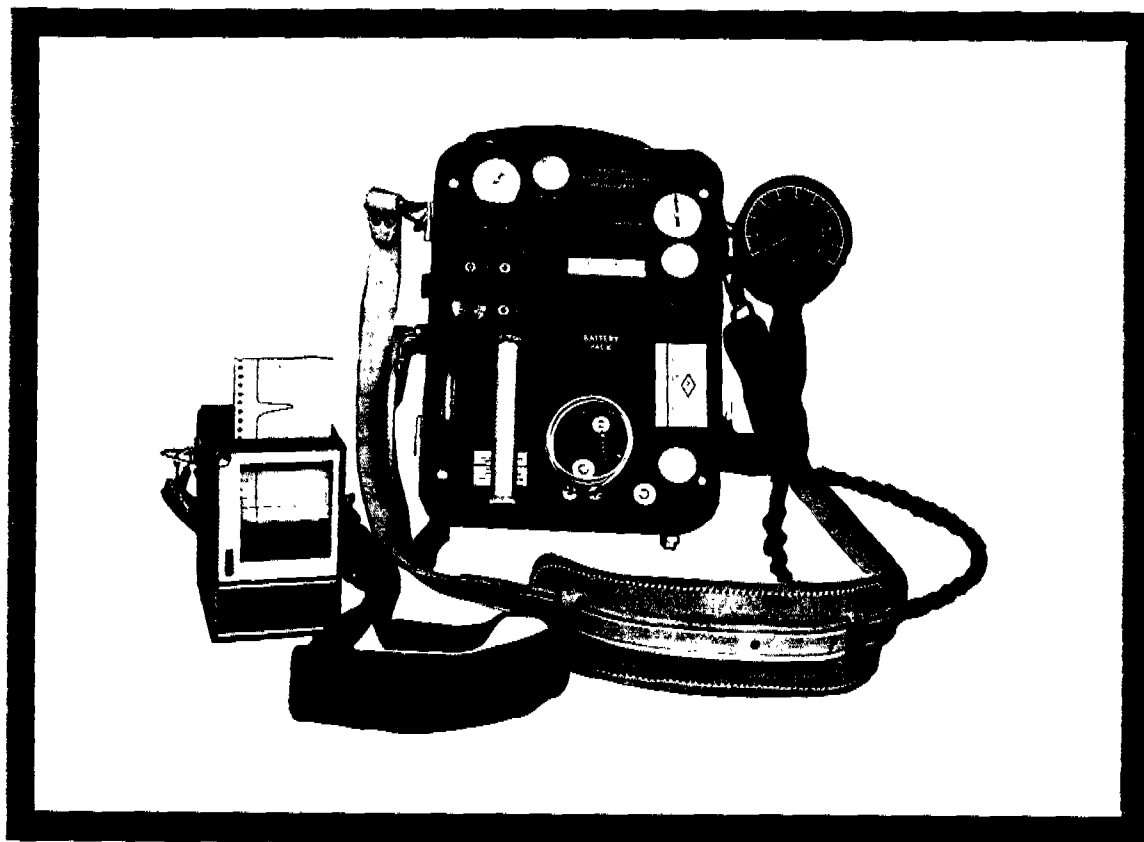




CENTURY DUAL-MODE ORGANIC VAPOR ANALYZER

Introduction

New governmental regulations and a general concern for safety have generated a demand for field portable, direct-reading instruments. The CENTURY Dual-Mode Organic Vapor Analyzer was designed to respond to requirements for immediate, on-site data using methods similar to and approaching the accuracy of laboratory instruments.

The CENTURY Organic Vapor Analyzer provides:

- Continuous direct readout of total organic vapor concentration for screening and survey purposes (Mode 1).
- Qualitative and quantitative analyses using the gas chromatographic option (Mode 2).
- Sensitivity to sub parts per million levels of organic vapors in air and parts per billion in water.
- Certification for use in Class I, Division 1, Groups A, B, C, and D hazardous areas.
- Proven field reliability.
- Logarithmic or linear meter readout.
- Complete field portability—5.5 kg (12 lb) package with 8-hour battery powered service life.
- Ease of operation.
- Short analysis time.

Theory of Analysis

The CENTURY Organic Vapor Analyzers utilize a flame ionization detector which is sensitive to the presence of organic vapors delivered to it by means of a small diaphragm air pump.

The detector is composed of a hydrogen delivery system, a sample delivery system, and an electronic amplification and display system. The hydrogen delivery system provides an 8-hour supply of a precisely controlled flow of hydrogen gas to the detector. The sample delivery system provides air to the detector chamber both to maintain the flame and to introduce organic air contaminants for analysis. (See Figure 1.)

In Mode 1, the air sample is delivered continuously to the detector chamber. When an organic vapor is exposed to the hydrogen flame via the air flow, the molecules ionize and a current is carried between the detector electrodes. This current is proportional to the concentration of vapor in the sample. Different compounds will ionize to varying extents in the flame, thus, the meter response of the Organic Vapor Analyzer (OVA) for a given compound is expressed relative to a standard (methane).

With the optional Mode 2, the OVA functions as a portable gas chromatograph utilizing the hydrogen fuel as a carrier gas and the flame ionization detector as the sensor. In this mode, a fixed volume of sample air is injected by means of a valve into the chromatographic column which contains a suitable packing material. At the same time that a sample is introduced to the column, the remaining sample air is directed through an integral charcoal filter (not shown) to provide the detector with a supply of pure air.

While moving through the chromatographic column, the sample constituents are separated based on their interaction with the column packing material. As the constituents leave the column, they are carried to the detector and register on the meter and/or attached chart recorder. The time, measured from the moment of sample injection until the component of interest exits the column, is known as the retention time and serves to identify the compound. The area under the chromatographic peak is proportional to the concentration of the compound in the air sample. The peak height can also be used to determine sample concentration since it closely correlates with peak area. (See Figure 2.)

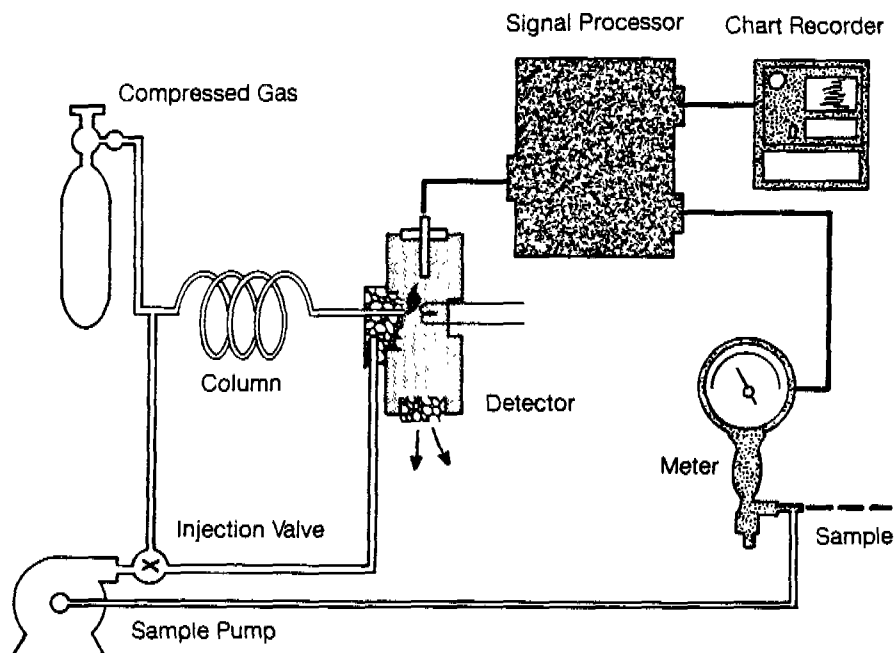


Figure 1. Organic Vapor Analyzer Schematic

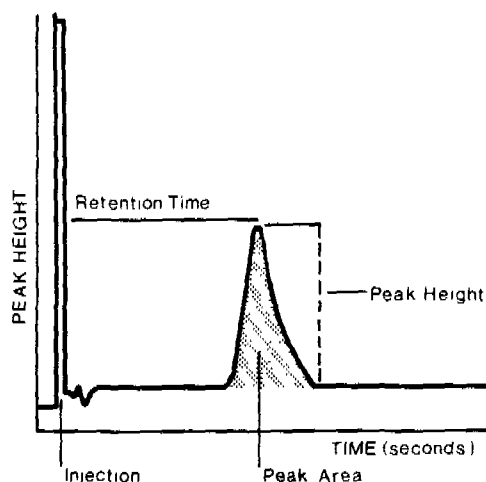


Figure 2. Generalized Chromatogram

Applications

The CENTURY Organic Vapor Analyzer can be utilized either as a survey instrument or as a chromatograph for quantitative measurements. Some applications for which the flame ionization detector alone is suitable are:

- Source identification and measurement for fugitive emissions (leaks) as defined by EPA.
- Survey of work areas for locations of vapor build-up.

- Natural gas leak detection.
- Surveys of spill (accident) locations for problem identification.
- Surveys of fire sites to determine arson related cause.
- Surveys of confined entry areas (tanks, ship's holds) where a vapor build-up is suspected.

Some applications for which the chromatographic option may be used are:

- OSHA compliance testing where both qualitative and quantitative data are required.
- Identification of water contamination by head-space analysis.
- Studies of hazardous spill situations.
- Identification of accelerants (solvents) used in an arson-caused fire.
- Analysis of fugitive emissions.

Available Column Materials

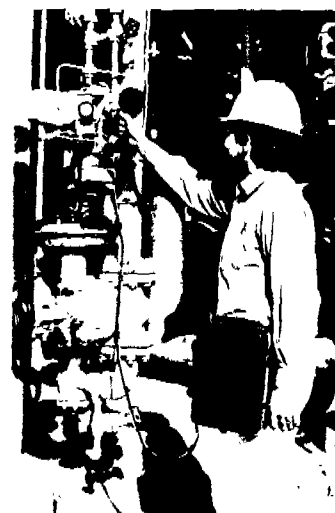
- B—3% Diisodecyl Phthalate on ANAKROM A, 60/80 mesh.
- C—10% OV-101 on ANAKROM Q, 60/80 mesh.
- T—10% 1,2,3-tris (2-cyanoethoxy) Propane on ANAKROM C22A, 60/80 mesh.
- PT—Porapak T, 60/80 mesh.
- Other column packing materials are available on request.



Industrial Hygiene Monitoring



Source Identification and Analysis

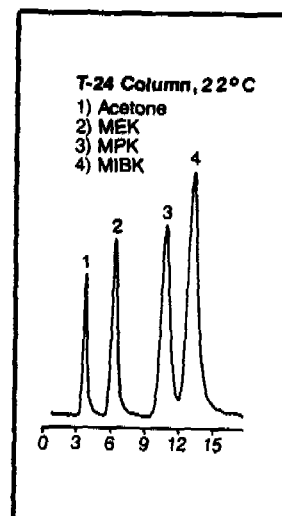
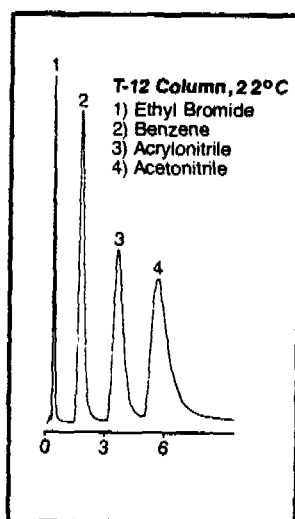
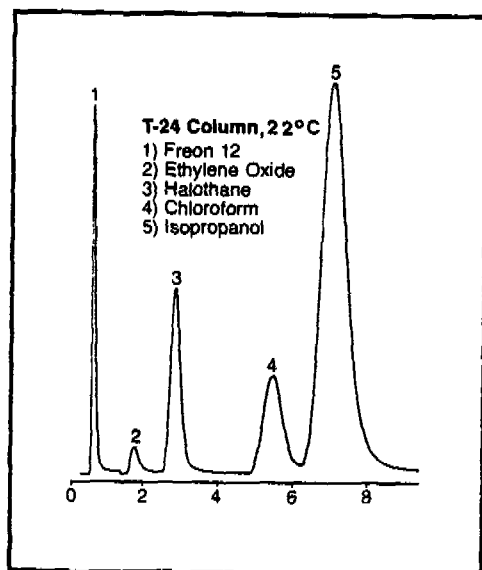
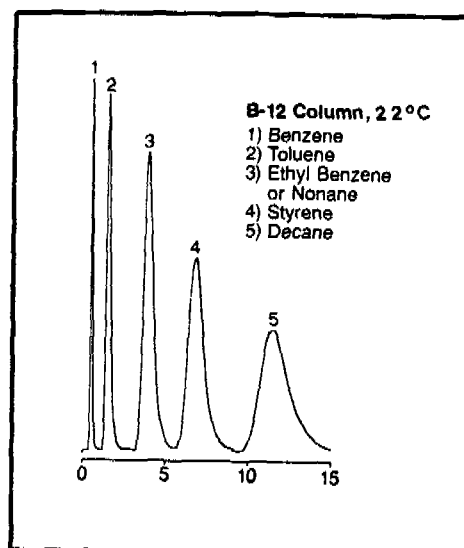
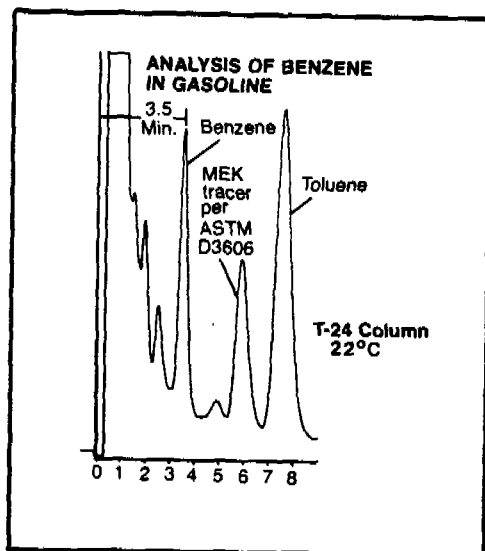


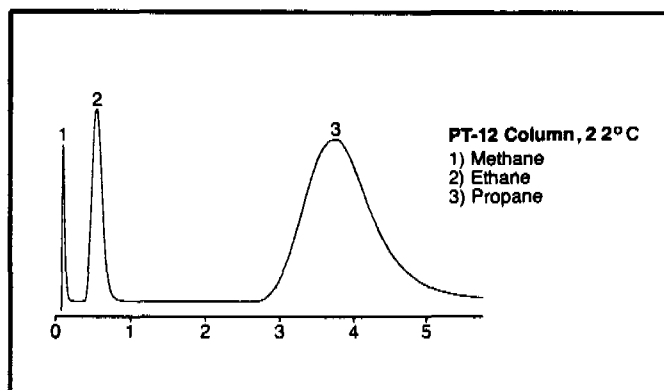
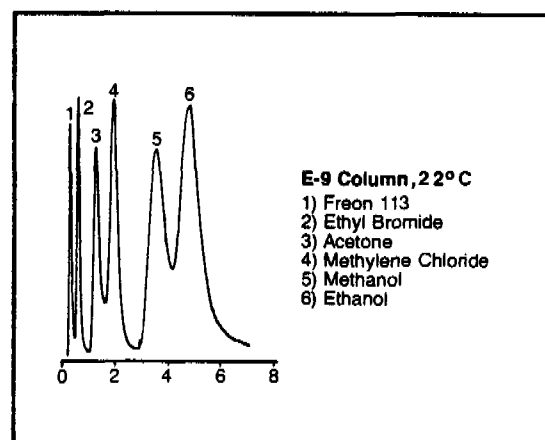
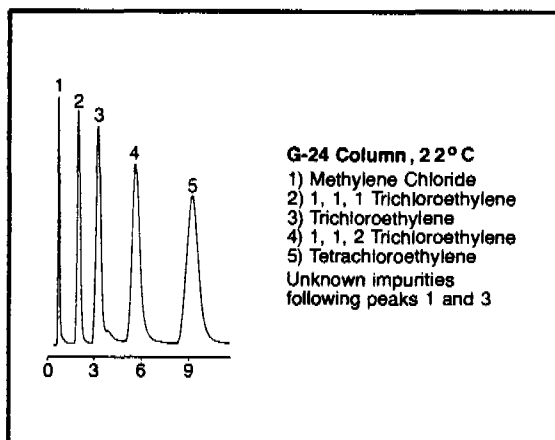
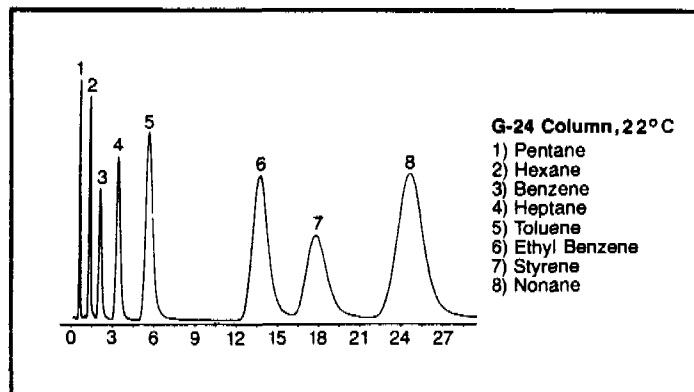
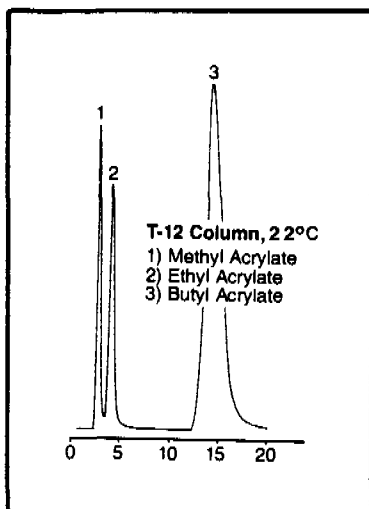
Leak Survey (Fugitive Emissions)

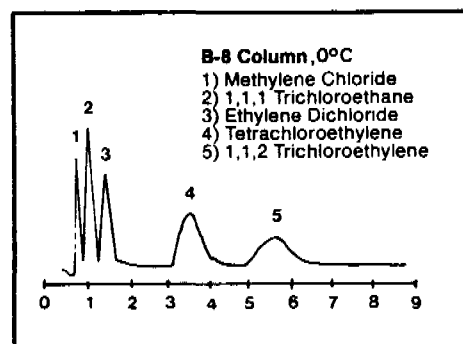
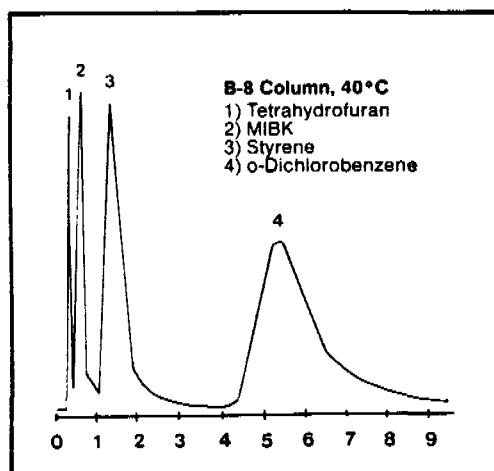
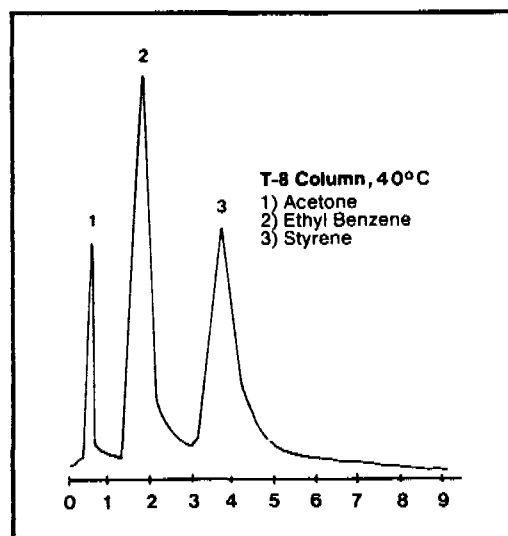
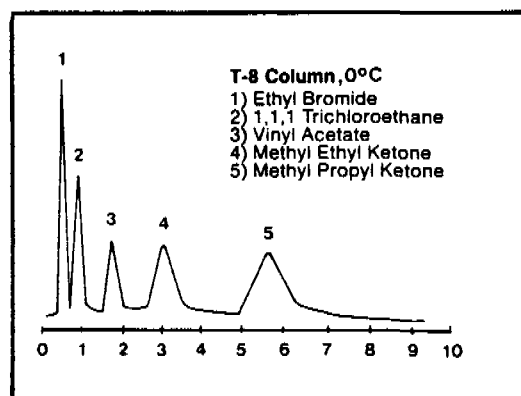
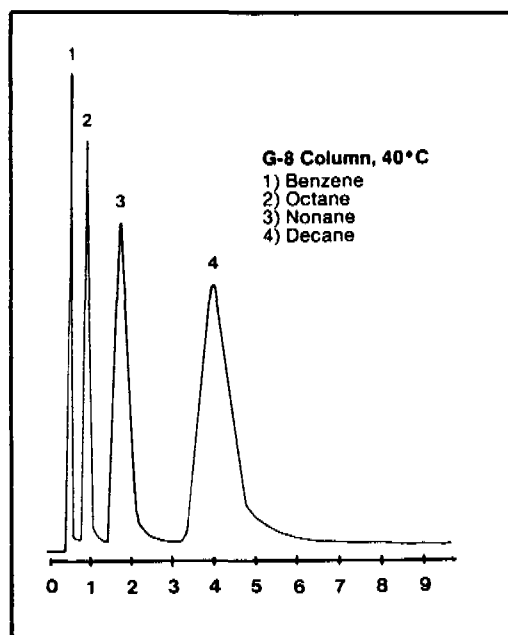
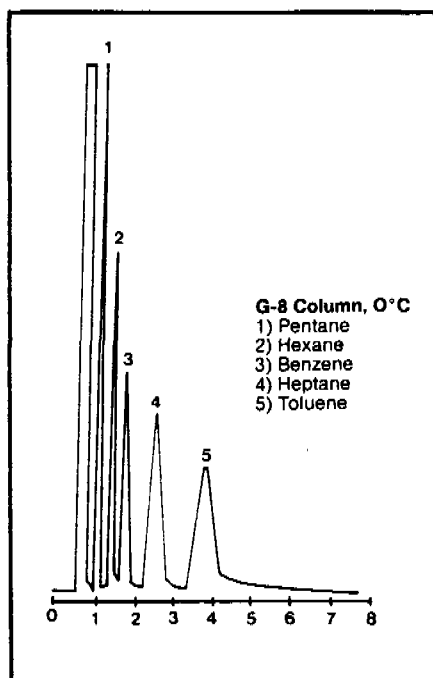
Typical Chromatograms

The following samples were run at 0°C, 22°C and 40°C.
All retention times are in minutes.

- B—3% Diisodecyl Phthalate on ANAKROM A, AW, 60/80 mesh.
- E—20% Carbowax 400 on ANAKROM C22A, AW, 60/80 mesh.
- G—10% OV-101 on ANAKROM Q, 60/80 mesh.
- T—10% 1,2,3-tris (2-cyanoethoxy) Propane on ANAKROM C22A, AW, 60/80 mesh.
- PT—Porapak T, 60/80 mesh.



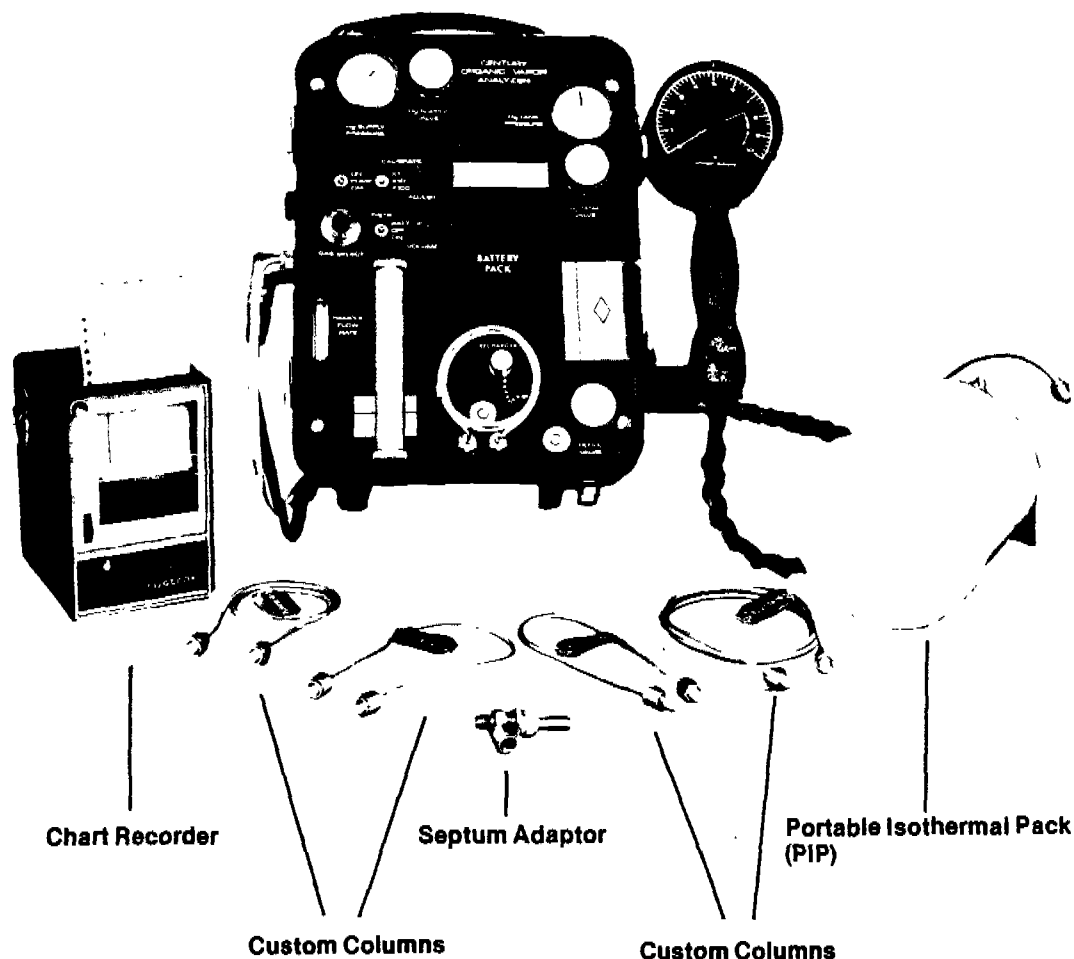




Options and Accessories

The following options and accessories are available for use with the CENTURY Organic Vapor Analyzer:

- Chromatographic option for quantitative analysis.
- Chart recorder for recording and interpretation of chromatograms.
- Septum adaptor for syringe injection of samples onto the chromatographic column.
- Sample dilutor kit for monitoring inert atmospheres or concentrated samples.
- Custom columns.
- Portable Isothermal Pack (PIP) for temperature control of chromatographic columns.
- Tri-Column GC option for rapid analysis of complex samples.



SPECIFICATIONS

	OVA-108	OVA-128
Readout:	1-10,000 ppm, logarithmic scale	0-10, 0-100, 0-1,000 ppm linear scales
Minimum Detectable Limit (Methane):	0.5 ppm	0.2 ppm
Response Time:	Approx. 2 seconds	Approx. 2 seconds
Fuel for Detector:	Hydrogen	Hydrogen
Carrier Gas for Chromatograph:	Hydrogen (self-contained tank)	Hydrogen (self-contained tank)
Sample Flow Rate:	Approx. 1 litre per minute	Approx. 1 litre per minute
Concentration Alarm:	Audible, user selectable level	Audible, user selectable level
Internal Calibration:	Yes, 2 point	No
Electrical Power:	12 volt, rechargeable battery	12 volt, rechargeable battery
Voltage Output to Recorder:	0.5 volt dc	0.5 volt dc
Flame Out Indication:	Audible and visual	Audible and visual
Service Life in Portable Mode:	8 hours	8 hours
Filters:	Sintered metal, user cleanable	Sintered metal, user cleanable
Mass:	5.5 kg (12 lb)	5.5 kg (12 lb)
Dimensions (sidepack):	Approx. 230 x 300 x 100 mm	Approx. 230 x 300 x 100 mm
Certification (both models):	Factory Mutual Corporation for use in Class I, Division 1, Groups A, B, C, and D, hazardous locations. Similar certification with BASEEFA and Japanese authorities.	

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