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Law Enforcement and Corrections Standards and Testing Program

Guide for the Selection of Chemical Agent and Toxic Industrial Material Detection Equipment for Emergency First Responders

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ABOUT THE LAW ENFORCEMENT AND CORRECTIONS STANDARDS AND TESTING PROGRAM

The Law Enforcement and Corrections Standards and Testing Program is sponsored by the Office of Science and Technology of the National Institute of Justice (NIJ), U.S. Department of Justice. The program responds to the mandate of the Justice System Improvement Act of 1979, which created NIJ and directed it to encourage research and development to improve the criminal justice system and to disseminate the results to Federal, State, and local agencies.

The Law Enforcement and Corrections Standards and Testing Program is an applied research effort that determines the technological needs of justice system agencies, sets minimum performance standards for specific devices, tests commercially available equipment against those standards, and disseminates the standards and the test results to criminal justice agencies nationally and internationally.

The program operates through:

The *Law Enforcement and Corrections Technology Advisory Council* (LECTAC) consisting of nationally recognized criminal justice practitioners from Federal, State, and local agencies, which assesses technological needs and sets priorities for research programs and items to be evaluated and tested.

The *Office of Law Enforcement Standards* (OLES) at the National Institute of Standards and Technology, which develops voluntary national performance standards for compliance testing to ensure that individual items of equipment are suitable for use by criminal justice agencies. The standards are based upon laboratory testing and evaluation of representative samples of each item of equipment to determine the key attributes, develop test methods, and establish minimum performance requirements for each essential attribute. In addition to the highly technical standards, OLES also produces technical reports and user guidelines that explain in nontechnical terms the capabilities of available equipment.

The *National Law Enforcement and Corrections Technology Center (NLECTC),* operated by a grantee, which supervises a national compliance testing program conducted by independent laboratories. The standards developed by OLES serve as performance benchmarks against which commercial equipment is measured. The facilities, personnel, and testing capabilities of the independent laboratories are evaluated by OLES prior to testing each item of equipment, and OLES helps the NLECTC staff review and analyze data. Test results are published in Equipment Performance Reports designed to help justice system procurement officials make informed purchasing decisions.

Publications are available at no charge through the National Law Enforcement and Corrections Technology Center. Some documents are also available online through the Internet/World Wide Web. To request a document or additional information, call 800-248-2742 or 301-519-5060, or write:

National Law Enforcement and Corrections Technology Center
P.O. Box 1160
Rockville, MD 20849-1160
E-Mail: *asknlectc@nlectc.org*
World Wide Web address: *http://www.nlectc.org*

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Guide for the Selection of Chemical Agent and Toxic Industrial Material Detection Equipment for Emergency First Responders

NIJ Guide 100-00

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National Institute of Justice

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David G. Boyd, Director,
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Foreword

The Office of Law Enforcement Standards (OLES) of the National Institute of Standards and Technology (NIST) furnishes technical support to the National Institute of Justice (NIJ) program to support law enforcement and criminal justice in the United States. OLES's function is to develop standards and conduct research that will assist law enforcement and criminal justice agencies in the selection and procurement of quality equipment.

OLES is: (1) subjecting existing equipment to laboratory testing and evaluation, and (2) conducting research leading to the development of several series of documents, including national standards, user guides, and technical reports.

This document covers research conducted by OLES under the sponsorship of the NIJ. Additional reports as well as other documents are being issued under the OLES program in the areas of protective clothing and equipment, communications systems, emergency equipment, investigative aids, security systems, vehicles, weapons, and analytical techniques and standard reference materials used by the forensic community.

Technical comments and suggestions concerning this report are invited from all interested parties. They may be addressed to the Office of Law Enforcement Standards, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8102, Gaithersburg, MD 20899-8102.

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We wish to acknowledge the Interagency Board (IAB) for Equipment Standardization and Interoperability. The IAB (made up of government and first responder representatives) was commissioned by the Attorney General of the United States in conjunction with the Department of Defense's Director of Military Support. The IAB was established to ensure equipment standardization and interoperability and to oversee the research and development of advanced technologies to assist first responders at the state and local levels in establishing and maintaining a robust crisis and consequence management capability. [3]

We also sincerely thank all vendors who provided us with information about their products.

[3] The Marshall Convention, Standardized Weapons of Mass Destruction (WMD) Response Force Equipment and InterOperability, 2 to 4 November 1999.

Contents

Commonly Used Symbols and Abbreviations

A	ampere	H	henry	nm	nanometer
ac	alternating current	h	hour	No.	number
AM	amplitude modulation	hf	high frequency	o.d.	outside diameter
cd	candela	Hz	hertz	Ω	ohm
cm	centimeter	i.d.	inside diameter	p.	page
CP	chemically pure	in	inch	Pa	pascal
c/s	cycle per second	IR	infrared	pe	probable error
d	day	J	joule	pp.	pages
dB	decibel	L	lambert	ppm	parts per million
dc	direct current	L	liter	qt	quart
°C	degree Celsius	lb	pound	rad	radian
°F	degree Fahrenheit	lbf	pound-force	rf	radio frequency
dia	diameter	lbf·in	pound-force inch	rh	relative humidity
emf	electromotive force	lm	lumen	s	second
eq	equation	ln	logarithm (base e)	SD	standard deviation
F	farad	log	logarithm (base 10)	sec.	Section
fc	footcandle	M	molar	SWR	standing wave ratio
fig.	Figure	m	meter	uhf	ultrahigh frequency
FM	frequency modulation	min	minute	UV	ultraviolet
ft	foot	mm	millimeter	V	volt
ft/s	foot per second	mph	miles per hour	vhf	very high frequency
g	acceleration	m/s	meter per second	W	watt
g	gram	N	newton	λ	wavelength
gr	grain	N·m	newton meter	wt	weight

area=unit^2 (e.g., ft^2, in^2, etc.); volume=unit^3 (e.g., ft^3, m^3, etc.)

ACRONYMS SPECIFIC TO THIS DOCUMENT

BAW	Bulk Acoustic Wave	IMS	Ion Mobility Spectrometry
CA	Chemical Agent	LIDAR	Light Detection and Ranging
CZE	Capillary Zone Electrophoresis	LCt_{50}	(Lethal Concentration x Time) $_{50}$
SF	Selection Factor	MS	Mass Spectrometry
FID	Flame Ionization Detector	NFPA	National Fire Protection Association
FLIR	Forward Looking Infrared	PCR	Polymerase Chain Reaction
FPD	Flame Photometric Detector	PID	Photo Ionization Detection
FTIR	Fourier Transform Infrared	SAT	Sensor Array Technology
GC	Gas Chromatography	SAW	Surface Acoustic Wave
HPLC	High Performance Liquid Chromatography	SCBA	Self Contained Breathing Apparatus
IC	Ion Chromatography	TICs	Toxic Industrial Chemicals
IDLH	Immediately Dangerous to Life and Health	TIMs	Toxic Industrial Materials
IR	Infrared		

PREFIXES
(See ASTM E380)

d	deci (10^{-1})	da	deka (10)
c	centi (10^{-2})	h	hecto (10^{2})
m	milli (10^{-3})	k	kilo (10^{3})
μ	micro (10^{-6})	M	mega (10^{6})
n	nano (10^{-9})	G	giga (10^{9})
p	pico (10^{-12})	T	tera (10^{12})

COMMON CONVERSIONS

0.30480 m =1ft	4.448222 N = lbf
2.54 cm = 1 in	1.355818 J =1 ft·lbf
0.4535924 kg = 1 lb	0.1129848 N m = lbf·in
0.06479891g = 1gr	14.59390 N/m =1 lbf/ft
0.9463529 L = 1 qt	6894.757 Pa = 1 lbf/in^2
3600000 J = 1 kW·hr	1.609344 km/h = mph

Temperature: $T°_C = (T°_F - 32) \times 5/9$

Temperature: $T°_F = (T°_C \times 9/5) + 32$

Executive Summary

The National Institute of Justice is the focal point for providing support to state and local law enforcement agencies in the development of counterterrorism technology and standards, including technological needs for chemical and biological defense. In recognizing the needs of state and local emergency first responders, the National Institute of Standards and Technology, working with the National Institute of Justice, the Technical Support Working Group, the U.S. Army Soldier and Biological Chemical Command, and the Interagency Board, is developing chemical and biological defense equipment guides. The guides will focus on chemical and biological equipment in areas of detection, personal protection, decontamination, medical, and communication. This document focuses specifically on chemical detection equipment for chemical agents and toxic industrial materials and was developed to assist the emergency first responder community in the evaluation and purchase of chemical detection equipment.

The long range plans are to: (1) subject existing chemical detection equipment to laboratory testing and evaluation against a specified protocol, and (2) conduct research leading to the development of a series of documents, including national standards, user guides, and technical reports. It is anticipated that the testing, evaluation, and research processes will take several years to complete; therefore, the National Institute of Justice has developed this initial guide for the emergency first responder community in order to facilitate their evaluation and purchase of chemical detection equipment.

In conjunction with this program, additional guides, as well as other documents, are being issued in the areas of biological agent detection equipment, decontamination equipment, personal protective equipment, medical kits and equipment, and communications equipment used in conjunction with protective clothing and respiratory equipment.

This specific work is Volume II of the Guide for the Selection of Chemical Agent and Toxic Industrial Material Detection Equipment for Emergency First Responders. It contains the information data sheets that were used to support the detection equipment evaluation detailed in Volume I. The compilation of data in Volume II is the result of the merger of several data acquisition methods used independently by NIST and TSWG.

The information contained in this guide has been obtained through literature searches and market surveys. The vendors were contacted multiple times during the preparation of this guide to ensure data accuracy. In addition, the information is supplemented with test data obtained from other sources (e.g., Department of Defense) if available. It should also be noted that the purpose of this guide is not to provide recommendations but rather to serve as a means to provide information to the reader to compare and contrast commercially available detection equipment. *Reference herein to any specific commercial products, processes, or services by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government. The information and statements contained in this guide shall not be used for the purposes of advertising, nor to imply the endorsement or recommendation of the United States Government.*

With respect to information provided in this guide, neither the United States Government nor any of its employees make any warranty, expressed or implied, including but not limited to the warranties of merchantability and fitness for a particular purpose. Further, neither the United States Government nor any of its employees assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed.

Technical comments, suggestions, and product updates are encouraged from interested parties. They may be addressed to the Office of Law Enforcement Standards, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8102, Gaithersburg, MD 20899-8102. It is anticipated that this guide will be updated periodically.

Questions relating to the specific devices included in this document should be addressed directly to the proponent agencies or the equipment manufacturers. Contact information for each equipment item included in this guide can be found in this volume (Volume II).

GUIDE FOR THE SELECTION OF CHEMICAL AGENT AND TOXIC INDUSTRIAL MATERIAL DETECTION EQUIPMENT FOR EMERGENCY FIRST RESPONDERS

This guide includes information intended to be useful to the emergency first responder community in the selection of chemical agent and toxic industrial material detection techniques and equipment for different applications. This specific work, Volume II of the *Guide for the Selection of Chemical Agent and Toxic Industrial Material Detection Equipment for Emergency First Responders*, includes details on the 148 detectors/instruments that are referenced in Volume I.

SECTION 1.0
INTRODUCTION

The *Guide for the Selection of Chemical Agent and Toxic Industrial Material Detection Equipment for Emergency First Responders* includes information intended to be useful to the emergency first responder community in the selection of chemical agent and toxic industrial material detection equipment. Due to the large number of chemical detection equipment items identified for the guide, the guide is separated into two volumes. Volume I serves as the selection tool while Volume II serves as a repository for the detection equipment data sheets.

This specific work represents Volume II of the *Guide for the Selection of Chemical Agent and Toxic Industrial Material Detection Equipment for Emergency First Responders*. Volume II includes three sections and six appendices. Section 1.0 is the introduction. Section 2.0 discusses the market survey that was conducted to identify the 148 commercially available chemical agent and TIM detection equipment items. Section 3.0 provides a description of the thirty-eight data fields that were identified for providing information relating to the equipment. Appendix A lists the references that were used in developing this document. Appendix B sequentially indexes the chemical detectors by detector identification number and includes the manufacturers. Appendix C alphabetically indexes the chemical detectors by the equipment names. Appendix D alphabetically indexes the chemical detectors by the manufacturer names. Appendix E provides the immediately dangerous to life and health (IDLH) values for the chemical agents and most of the TIMs that are listed. Appendix F contains the data sheets for each item of chemical detection equipment.

SECTION 2.0
MARKET SURVEY

An extensive market survey was conducted to identify commercially available chemical agent and TIM detection equipment. This market survey encompassed the assessment of past market surveys, identification of new equipment, and interaction with numerous equipment vendors. Section 2.1 provides a summary of the assessment of previous market surveys. Section 2.2 provides the identification of new and updated equipment, and section 2.3 provides a summary of information obtained through interfacing with the vendors.

2.1 Past Market Surveys

Several previously conducted market surveys were reviewed during the development of this guide. A complete list of these surveys is provided in Appendix B. However, two specific sources proved to be the most valuable in the market survey conducted for this guide. These documents are:

- *Worldwide Chemical Detection Equipment Handbook*
- *Final Report on Chemical Detection Equipment Market Survey for Emergency Responders*.

Detailed references are provided for each of these market surveys in Appendix B.

The *Worldwide Chemical Detection Equipment Handbook* was published in October 1995, and serves as a compendium of information pertaining to chemical warfare agent detection systems. It includes U.S. and foreign military chemical warfare agent detectors, as well as commercially available detectors. It is being used worldwide.

The *Final Report on Chemical Detection Equipment Market Survey for Emergency Responders* was published in September 1998, and serves as a compendium of commercially available chemical agent detectors.

The review of these two documents resulted in the inclusion of approximately 62 detection equipment items within this guide.

2.2 Identification of New Equipment

Since the past market surveys focused on detection of chemical agents, there were very few detectors identified that detected TIMs. Therefore, a follow-on market survey was initiated to obtain TIM detection equipment. This market survey was also expanded to include chemical agent detection equipment that had been developed since the 1998 market survey.

A variety of techniques were utilized to identify applicable detection equipment including a Commerce Business Daily (CBD) Announcement, literature searches,

database searches, Internet searches, technical conferences, and technical contacts. These techniques resulted in the identification of 86 additional detection equipment items.

2.3 Vendor Contact

Vendors were contacted at three separate times in order to obtain additional information, as well as to finalize their specific equipment data for inclusion in the guide. The first contact occurred in the last quarter of 1999. Each of the vendors received a facsimile or an electronic mail message containing the data sheets for their specific equipment item(s). They were asked to identify missing data and certify the accuracy of the existing data.

The second contact occurred during the March/April 2000 time period in order to finalize the equipment data sheets and the information contained in the guide. This contact was conducted by facsimile and electronic mail. The vendors were given two weeks to review the information.

The third contact was made during the third week of April 2000. Each vendor again received a facsimile or an electronic mail message that contained the data sheets for their specific equipment item(s), the selection factors that were developed to assist with the selection and purchase of the most appropriate equipment, and the results of the evaluation of the detection equipment against the selection factors. The vendors were asked to review the data sheets and tables for completeness and accuracy of the incorporated data.

SECTION 3.0
DATA FIELDS

Appendix E serves as a compendium of commercially available chemical agent and TIM detection equipment. Each of the identified 148 detection equipment items is detailed within Appendix E. Thirty-eight data fields, as defined in this section, were used for providing information relating to the detection equipment. It is important to note that these data fields were developed using input from the emergency responder community.

The data fields are organized into five categories. These categories include:

- General
- Operational Parameters
- Physical Parameters
- Logistical
- Special Requirements

The remainder of this section defines each of the thirty-eight data fields by category.

3.1 General Category

The 'General' category includes the following eight data fields:

- Name
- Detector ID #
- Detector Type
- Technology
- Manufacturer
- Source
- Availability
- Current User

Each of these data fields is defined in more detail in the remainder of this section.

3.1.1 Name

The 'Name' data field is used to identify the name of the piece of equipment.

3.1.2 Detector ID

The 'Detector ID #' data field is for identification purposes only.

3.1.3 Detector Type

The 'Detector Type' data field identifies whether the equipment is military, commercial, or both.

3.1.4 Technology

The 'Technology' data field is used to identify the type of technology employed by the equipment. Examples of technologies employed are ion mobility spectrometry, mass spectrometry, gas chromatography, infrared spectroscopy, photoionization, electrochemistry, and color change chemistry.

3.1.5 Manufacturer

The 'Manufacturer' data field is populated with the company that developed the piece of equipment (to include the name, address, telephone number, and POC).

3.1.6 Source

The 'Source' data field indicates where the equipment information was obtained. Potential sources include past market surveys and Internet web sites.

3.1.7 Availability

The 'Availability' data field refers to how readily available a piece of equipment is (e.g., how long it takes to receive equipment upon purchasing).

3.1.8 Current User

The 'Current User' data field is used to identify organizations that are currently using the piece of equipment.

3.2 Operational Parameters Category

The 'Operational Parameters' category includes the following eight data fields:

- Chemical Agents Detected
- Toxic Industrial Material Detected (High, Medium, or Low Hazard)
- Detection State
- Sensitivity
- Resistance to Interferents
- Start-up Time
- Response Time
- Alarm Capability

Each of these data fields is defined in more detail in the remainder of this section.

3.2.1 Chemical Agents Detected

The 'Chemical Agents Detected' data field indicates the type of chemical warfare (CW) agent detected by the equipment. The most common types of classic CW agents are the nerve and blister agents. Nerve agents include GA (Tabun), GB (Sarin), GD (Soman),

GF, and VX. Blister agents include H and HD (Sulfur Mustards), HN (Nitrogen Mustard), and L (Lewisite).

3.2.2 Toxic Industrial Material Detected

The 'Toxic Industrial Material Detected' data field indicates the type of non-CW agent (TIM) detected by the equipment. TIMs are used in a variety of settings such as manufacturing facilities, maintenance areas, and storage areas. TIMs are further characterized by using a high, medium, or low hazard index. Examples of TIMs are ammonia, carbon monoxide, hydrogen cyanide, phosgene, and mineral acids (i.e., hydrochloric acid, sulfuric acid, nitric acid, etc.).

3.2.3 Detection State

The 'Detection State' data field indicates the physical state of an agent (vapor, liquid, aerosol) that can be detected by the equipment.

3.2.4 Sensitivity

The 'Sensitivity' data field indicates the lowest concentration of the CW agent or TIM that can be detected by the equipment. The sensitivity may be dependent upon the agent, environmental conditions, operation, and other factors.

3.2.5 Resistance to Interferents

The 'Resistance to Interferants' data field is a measure of the ability of the equipment to distinguish between various compounds in the sample. An interferent is a compound that causes a detector to false alarm or fail to alarm. The two types of false alarms are false positives and false negatives.

3.2.6 Start-up Time

The 'Start-up Time' data field indicates the time required to set up the instrument and begin sampling.

3.2.7 Response Time

The 'Response Time' data field indicates the time required to collect a sample, analyze the sample, determine if agent is present, and provide feedback.

3.2.8 Alarm Capability

The 'Alarm Capability' indicates the ability of the detector to auto alarm either through visible or audible means.

3.3 Physical Parameters Category

The 'Physical Parameters' category includes the following three data fields:

- Size
- Weight
- Power Requirements

Each of these data fields is defined in more detail in the remainder of this section.

3.3.1 Size

The 'Size' data field indicates the external dimensions of the equipment.

3.3.2 Weight

The 'Weight' data field indicates the total weight of the equipment in operational status.

3.3.3 Power Requirements

The 'Power Requirements' data field indicates the type of power (AC, DC, etc.) required to operate the equipment

3.4 Logistical Parameters Category

The 'Logistical Parameters' category includes the following nine data fields:

- Transportability
- Durability
- Environmental Conditions
- Consumables Required
- Calibration Required
- Repairs Required
- Shelf Life
- Unit Cost
- Maintenance Cost

Each of these data fields is defined in more detail in the remainder of this section.

3.4.1 Transportability

The **'**Transportability' data field refers to the ability of the equipment to be transported including any support equipment required to operate it (e.g., handheld portable, handheld stationary, vehicle mounted, fixed-site detection, fixed-site analytical laboratory, or standoff unit).

3.4.2 Durability

The **'**Durability' data field describes how rugged the equipment is, i.e., how well can the equipment withstand rough handling and still operate.

3.4.3 Environmental Conditions

The 'Environmental Conditions' data field indicates the type of environment required for the equipment to operate optimally. For example, some equipment is designed to operate under common environmental conditions (e.g., rain, snow, fog, etc.). Other equipment may require climate-controlled conditions.

3.4.4 Consumables Required

The 'Consumables Required' data field includes supplies that the equipment uses during operation and storage. Examples of consumables are batteries, filters, sensors, compressed gases, etc.

3.4.5 Calibration Required

The 'Calibration Required' data field indicates if any adjustments are necessary to bring operating characteristics into substantial agreement with standardized scales or markings. This will include any built-in testing and diagnostic capabilities.

3.4.6 Repairs Required

The 'Repairs Required' data field includes the services and parts that are necessary to keep the equipment at its peak operational readiness. This includes any parts needed during preventative maintenance.

3.4.7 Shelf Life

The 'Shelf Life' data field refers to the length of time a piece of equipment can be stored before it needs to be replaced.

3.4.8 Unit Cost

The 'Unit Cost' data field is the cost of the equipment including the cost of all consumables and support equipment.

3.4.9 Maintenance Cost

The 'Maintenance Cost' data field is the cost to maintain and operate the equipment and is normally based on equipment usage rates.

3.5 Special Requirements Category

The ‘Special Requirements’ category includes the following ten data fields:

- Operator Skills Required
- Training Requirements
- Training Available
- Manuals Available
- Support Equipment
- Communications Interface Capability
- Tamper Resistance
- Warranty
- Testing Information
- Applicable Regulations

Each of these data fields is defined in more detail in the remainder of this section.

3.5.1 Operator Skills Required

The ‘Operator Skills Required’ data field refers to the level of education and training required to operate the equipment.

3.5.2 Training Requirements

The ‘Training Requirements’ data field refers to the amount of instruction time the operator needs to become proficient in operating the equipment.

3.5.3 Training Available

The ‘Training Available’ data field refers to training availability from the manufacturer.

3.5.4 Manuals Available

The ‘Manuals Available’ data field indicates the types of manuals available from the manufacturer (e.g., user manuals, training documentation, etc.).

3.5.5 Support Equipment

The ‘Support Equipment’ data field includes any additional equipment required to operate the primary unit.

3.5.6 Communications Interface Capability

The ‘Communications Interface Capability’ data field refers to the ability of the detection equipment to interface with a communications system (network capability, hardwire capability, RF communication, etc.).

3.5.7 Tamper Resistance

The ‘Tamper Resistance’ data field indicates if the equipment can be protected from tampering (e.g., password protected).

3.5.8 Warranty

The ‘Warranty’ data field refers to the length of time a piece of equipment would be guaranteed by the manufacturer.

3.5.9 Testing Information

The ‘Testing Information’ data field includes data obtained from the manufacturer and other sources regarding the equipment (e.g., validation testing).

3.5.10 Applicable Regulations

The ‘Applicable Regulations’ data field includes any government and/or safety regulations that may apply to the possession, use, or storage of a piece of equipment (for example, some detectors may require the use of a radioactive source material which requires licensure by the Nuclear Regulatory Commission).

APPENDIX A
REFERENCES

REFERENCES

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APPENDIX B
INDEX BY CHEMICAL DETECTOR IDENTIFICATION NUMBER

Index by Chemical Detector Identification Number

ID #	Detector Name	Manufacturer	Page F-#
30	MiniRae 2000	RAE Systems, Inc.	76
31	Miniature Chemical Agent Monitor (MINICAM)	CMS Research Corporation	79
32	Scentograph Plus II	Sentex Systems, Inc.	82
33	Miniature Air Sampling System (MASS)	Canadian Centre for Advanced Instrumentation	85
34	Portable Odor Monitor	Sensidyne, Inc.	88
35	Miran SaphIRe Portable Ambient Air Analyzer	The Foxboro Company	91
36	Chemical Biological Mass Spectrometer (CBMS)	Bruker Daltonics	94
39	SXC-20 VOC Monitor	Spectrex Corporation	97
40	M21 Automatic Chemical Agent Alarm	Intellitec	100
41	AN/KAS-1/AN/KAS-1A Chemical Warfare Directional Detector	Intellitec	103
42	Air Sentry-FTIR	Environmental Technologies Group, Inc.	106
43	Laser Remote Detector (LIDAR)	Research Institute 070 BRNO	109
44	Kodiak 1200	Bear Instruments, Inc.	112
45	API 365	Pe Sciex	115
46	Agilent 6890-5973, GC/MSD	Agilent Technologies - Subsidiary of Hewlett-Packard	118
47	HP 6890	Hewlett-Packard Co.	121
48	Automatic Continuous Air Monitoring System (ACAMS)	Abb Process Analytics	124
49	Dual-Flame Photometric Detector	SRI Instruments, Inc.	127
50	Photovac Snapshot Hand Held Gas Chromatograph	Perkin-Elmer Corporation Chromatography Division (The)	130
51	Scentoscreen (Gas Chromatography) with Argon Ionization Detector	Sentex Systems, Inc.	133
52	Saturn 2000	Varian Chromatography Systems	136
53	HP 2350 Atomic Emission Detector	Hewlett-Packard Co.	139
54	Infrared Detector for Gas Chromatograph	Biorad, Digilab Division	142
56	CW Sentry	Microsensor Systems, Inc	145
57	4100 Vapor Detector	Electronic Sensor Technology	148
58	7100 Vapor Detector	Electronic Sensor Technology	151
59	Century TVA-1000 Toxic Vapor Analyzer	The Foxboro Company	154

ID #	Detector Name	Manufacturer	Page F-#
60	AP2C CW Detector	Giat Industries	157
61	ADLIF System	Proengin SA	160
62	5-Step Field Identification Kit 8 Model 2000	Heinz Laboratories International	163
63	Kitagawa Gas Detector Tubes	Matheson Safety Products	166
64	Sensidyne Gas Detection Tubes	Sensidyne, Inc.	169
65	MSA Gas Detection Tubes	MSA Instrument Division	172
66	Miran 981B Multipoint , Ambient Air Monitoring System	The Foxboro Company	175
67	Automatic Continuous Environmental Monitor (ACEM) 900	Dynathem Analytical Instrumentation, Inc.	178
68	HP 6890 Series II	Hewlett-Packard Co.	181
69	MM-1 Mobile Mass Spectrometer	Bruker Daltonics	184
70	EM-640 Mobile Mass Spectrometer	Bruker Daltonics	187
71	Viking 573	Bruker Daltonics	190
72	Trace Ultra High Sensitivity	Biorad, Digilab Division	193
73	Innova Gas Analyzer Type 1301	California Analytical Instruments, Inc.	196
74	Voyager	Perkin-Elmer Corporation Chromatography Division (The)	199
75	Hapsite	Inficon	202
76	Electronic Reader	Assay Technology, Inc.	205
77	MSA Passport II PID Monitor	MSA Instrument Division	208
78	MicroFID Handheld Detector	Perkin-Elmer Corporation Chromatography Division (The)	211
79	eNOSE 5000 Electronic Nose	Marconi Applied Technologies	214
80	Photovac 2020 PID Monitor	Perkin-Elmer Corporation Chromatography Division (The)	217
81	Chrom Air Badges	K & M Environmental	220
82	SureSpot Badges	Scott/Bacharach LLC	223
83	Innova Type 1312 Multigas Monitor	California Analytical Instruments, Inc.	226
84	Advanced Portable Detector (APD) 2000	Environmental Technologies Group, Inc.	229
86	Hewlett Packard HP1000 HPLC System	Hewlett-Packard Co.	232

ID #	Detector Name	Manufacturer	Page F-#
87	Perkin-Elmer Turbo LC Plus HPLC System	Perkin-Elmer Corporation Chromatography Division (The)	235
88	Shimadzu LC-10 HPLC System	Shimadzu Scientific Instruments	238
89	Varian ProStar Analytical HPLC System	Varian, Inc.	241
90	Dionex DX-500 IC System	Dionex Corporation	244
91	Brinkmann Metrohm Model 1761 IC System	Brinkmann Instruments, Inc.	247
92	Hewlett-Packard HP3D CZE System	Hewlett-Packard Co.	250
93	Beckman-Coulter P/ACE 5000 CZE System	Beckman Coulter, Inc.	253
94	Bio-Rad BioFocus 2000 System CZE	Bio-Rad Laboratories	256
95	ToxiRae Plus Personal Gas Monitor	RAE Systems	259
99	Chemkey TLD Toxic Gas Monitor	Zellweger Analytics, Inc.	262
100	Neotox-XL Single Gas Monitor	Zellweger Analytics, Inc.	265
101	Gas Beacon/Gas Leader	Zellweger Analytics, Inc.	268
102	Model 7100 Gas Monitor	Zellweger Analytics, Inc.	271
103	Omni-4000 Gas Detector	Enmet Corporation	274
104	AutoStep Plus	Scott/Bacharach LLC	277
105	Model TS400 Toxic Gas Detector	General Monitors	280
108	Spectrum	Enmet Corporation	283
109	Logic 400 series (Model 450) Personal Air Monitor	AIM Safe-Air Products Limited	286
110	Safeye Model 400 Gas Detection System	Spectrex Inc.	289
111	7000 Series Data Logging Compact Portable Gas Detector	Interscan Corporation	292
112	TLV Panther Gas Detector	International Sensor Technology	295
113	FoxTox Personal Multi-Gas Monitor	The Foxboro Company	298
114	Pac III Single Gas Detector	Draeger Safety, Inc.	301
115	LTX312 Gas Monitor	Industrial Scientific Corporation	304
116	C16 PortaSens II Gas Detector	Analytical Technology	307
117	MultiRae Plus Gas Detector	RAE Systems, Inc.	310
118	Bodyguard 4 Personal Monitor	Scott/Bacharach LLC	313
119	PhD2 Personal Gas Detector	Biosystems	316
120	Haz-Alert Gas Detector	Grace Industries	319

ID #	Detector Name	Manufacturer	Page F-#
121	Tox-Array 1000 Gas Detector	Mil-Ram Technology, Inc.	322
122	AMC Series 1100 Portable Gas Detector	Armstrong Monitoring Corporation (The)	325
123	MultiLog 2000 Multi-Gas Monitor	Quest Technologies, Inc.	328
124	IQ-250 Single Gas Detector	International Sensor Technology	331
125	CM4 Gas Monitor	Zellweger Analytics, Inc.	334
126	MiniGas-XL Multi-gas Monitor	Zellweger Analytics, Inc.	337
127	Toxibee Personal Gas Alarm	Lumidor Safety Products	340
128	MicroPac Personal Gas Alarm	Draeger Safety, Inc.	343
129	Toxi Gas Detector	Biosystems	346
130	Toxi Plus Gas Detector	Biosystems	349
131	Toxi Ultra Gas Detector	Biosystems	352
132	TMX412 Multi-Gas Monitor	Industrial Scientific Corporation	355
133	ATX 612 Multi-Gas Aspirated Monitor	Industrial Scientific Corporation	358
134	T80 Single Gas Monitor	Industrial Scientific Corporation	361
135	Gas Badge Personal Gas Alarm	Industrial Scientific Corporation	364
136	Unimax Personal Single Gas Detector	Lumidor Safety Products	367
137	MicroMax Multigas Monitor	Lumidor Safety Products	370
138	MiniWarn Gas Detector	Draeger Safety, Inc.	373
139	Multiwarn II Gas Detector	Draeger Safety, Inc.	376
140	Smart Logger Gas Detector	Enmet Corporation	379
142	Target Gas Detector	Enmet Corporation	382
143	Quadrant Portable Gas Detector	Enmet Corporation	385
144	VRAE Hand Held 5 Gas Surveyor (Model 7800 Monitor)	RAE Systems, Inc.	388
145	Gasman Portable Multiple Toxic Gas Monitor	Spectral Sciences Incorporated	391
146	Model 680EZ Portable Photoionization Detector	Thermo Environmental Instruments, Inc.	394
147	GT Series Portable Gas Monitor	Gas Tech, Inc.	397
148	Genesis Portable Gas Monitor	Gas Tech, Inc.	400
149	95 Series Single Gas Monitor	Gas Tech, Inc.	403
150	MultiCheck 2000 Multi-Gas Monitor	Quest Technologies, Inc.	406

ID #	*Detector Name*	*Manufacturer*	*Page F-#*
151	Fixed Site/Remote Chemical Agent Detector	Environmental Technologies Group, Inc.	409
153	TX-2000 Toxic Gas Detector	Enmet Corporation	412
154	DET INDIV Individual Nerve Agent Detector	Giat Industries	415
155	KDTC	Giat Industries	418
156	RAPID I (Remote Air Pollution Infrared Detector)	Bruker Saxonia Analytik GmbH	421
157	ProtectAir Personal Multi-Gas Monitor Model 8570	TSI Incorporated	424
158	GID-2A Chemical Detector	Graseby Dynamics	427
159	Lightweight Chemical Detector (LCD-2)	Graseby Dynamics	430
160	ppbRae	Rae Systems, Inc.	433
161	GasAlertMax	BW Technologies	436
162	BW Defender	BW Technologies	439
163	GasAlert	BW Technologies	442

APPENDIX C
INDEX BY CHEMICAL DETECTOR NAME

Index by Chemical Detector Name

Detector Name	*Manufacturer*	*ID #*	*Page F-#*
BW Defender	BW Technologies	162	439
C16 PortaSens II Gas Detector	Analytical Technology	116	307
Century TVA-1000 Toxic Vapor Analyzer	The Foxboro Company	59	154
Chemical Agent Detector Kit	Anachemia Canada, Inc.	20	46
Chemical Agent Monitor (CAM)/Improved Chemical Agent Monitor (ICAM)	Environmental Technologies Group, Inc.	3	7
Chemical Agent Monitor-2 (CAM-2)	Graseby Dynamics	6	16
Chemical Biological Mass Spectrometer (CBMS)	Bruker Daltonics	36	94
Chemkey TLD Toxic Gas Monitor	Zellweger Analytics, Inc.	99	262
Chrom Air Badges	K & M Environmental	81	220
CM4 Gas Monitor	Zellweger Analytics, Inc.	125	334
CW Sentry	Microsensor Systems, Inc	56	145
DET INDIV Individual Nerve Agent Detector	Giat Industries	154	415
Dionex DX-500 IC System	Dionex Corporation	90	244
Draeger CDS Kit	Draeger Safety, Inc.	26	64
Dual-Flame Photometric Detector	SRI Instruments, Inc.	49	127
Electronic Reader	Assay Technology, Inc.	76	205
EM-640 Mobile Mass Spectrometer	Bruker Daltonics	70	187
eNOSE 5000 Electronic Nose	Marconi Applied Technologies	79	214
Fixed Site/Remote Chemical Agent Detector	Environmental Technologies Group, Inc.	151	409
FoxTox Personal Multi-Gas Monitor	The Foxboro Company	113	298
Gas Badge Personal Gas Alarm	Industrial Scientific Corporation	135	364
Gas Beacon/Gas Leader	Zellweger Analytics, Inc.	101	268
GasAlert	BW Technologies	163	442
GasAlertMax	BW Technologies	161	436
Gasman Portable Multiple Toxic Gas Monitor	Spectral Sciences Incorporated	145	391
Genesis Portable Gas Monitor	Gas Tech, Inc.	148	400
GID-2A Chemical Detector	Graseby Dynamics	158	427
GID-3, Chemical Agent Detection System	Graseby Dynamics	7	19
GT Series Portable Gas Monitor	Gas Tech, Inc.	147	397
Hapsite	Inficon	75	202

Detector Name	*Manufacturer*	*ID #*	*Page F-#*
Haz-Alert Gas Detector	Grace Industries	120	319
Hewlett Packard HP1000 HPLC System	Hewlett-Packard Co.	86	232
Hewlett-Packard HP3D CZE System	Hewlett-Packard Co.	92	250
HP 2350 Atomic Emission Detector	Hewlett-Packard Co.	53	139
HP 6890	Hewlett-Packard Co.	47	121
HP 6890 Series II	Hewlett-Packard Co.	68	181
Improved Chemical Agent Monitor-Advanced Portable Detector (ICAM-APD)	Environmental Technologies Group, Inc.	5	13
IMS 2000	Bruker Daltonics	1	1
Individual Chemical Agent Detector (ICAD)	Environmental Technologies Group, Inc.	13	31
Infrared Detector for Gas Chromatograph	Biorad, Digilab Division	54	142
Innova Gas Analyzer Type 1301	California Analytical Instruments, Inc.	73	196
Innova Type 1312 Multigas Monitor	California Analytical Instruments, Inc.	83	226
IQ-250 Single Gas Detector	International Sensor Technology	124	331
IS-101	HNU Systems, Inc.	29	73
KDTC	Giat Industries	155	418
Kitagawa Gas Detector Tubes	Matheson Safety Products	63	166
Kodiak 1200	Bear Instruments, Inc.	44	112
Laser Remote Detector (LIDAR)	Research Institute 070 BRNO	43	109
Lightweight Chemical Detector (LCD-2)	Graseby Dynamics	159	430
Logic 400 series (Model 450) Personal Air Monitor	AIM Safe-Air Products Limited	109	286
LTX312 Gas Monitor	Industrial Scientific Corporation	115	304
M18A2 Chemical Agent Detector Kit	Truetech, Inc.	21	49
M21 Automatic Chemical Agent Alarm	Intellitec	40	100
M256A1 Kit	Anachemia Canada, Inc.	22	52
M272 Water Kit	Truetech, Inc.	23	55
M8A1 Automatic Chemical Agent Alarm	Intellitec	2	4
M9 Chemical Agent Detector Paper	Truetech, Inc.	18	40
M90-D1 Chemical Warfare Agent Detector	Sensor Applications, Inc.	8	22

Detector Name	*Manufacturer*	*ID #*	*Page F-#*
MicroFID Handheld Detector	Perkin-Elmer Corporation Chromatography Division (The)	78	211
MicroMax Multigas Monitor	Lumidor Safety Products	137	370
MicroPac Personal Gas Alarm	Draeger Safety, Inc.	128	343
Miniature Air Sampling System (MASS)	Canadian Centre for Advanced Instrumentation	33	85
Miniature Chemical Agent Monitor (MINICAM)	CMS Research Corporation	31	79
MiniGas-XL Multi-gas Monitor	Zellweger Analytics, Inc.	126	337
MiniRae 2000	RAE Systems, Inc.	30	76
MiniWarn Gas Detector	Draeger Safety, Inc.	138	373
Miran 981B Multipoint , Ambient Air Monitoring System	The Foxboro Company	66	175
Miran SaphIRe Portable Ambient Air Analyzer	The Foxboro Company	35	91
MM-1 Mobile Mass Spectrometer	Bruker Daltonics	69	184
Model 680EZ Portable Photoionization Detector	Thermo Environmental Instruments, Inc.	146	394
Model 7100 Gas Monitor	Zellweger Analytics, Inc.	102	271
Model TS400 Toxic Gas Detector	General Monitors	105	280
MSA Gas Detection Tubes	MSA Instrument Division	65	172
MSA Passport II PID Monitor	MSA Instrument Division	77	208
MultiCheck 2000 Multi-Gas Monitor	Quest Technologies, Inc.	150	406
MultiLog 2000 Multi-Gas Monitor	Quest Technologies, Inc.	123	328
MultiRae Plus Gas Detector	RAE Systems, Inc.	117	310
Multiwarn II Gas Detector	Draeger Safety, Inc.	139	376
Neotox-XL Single Gas Monitor	Zellweger Analytics, Inc.	100	265
Nerve Agent Vapor Detector (NAVD)	Anachemia Canada, Inc.	24	58
No. 1 Mark 1 Detector Kit	Richmond Packaging Limited (UK)	25	61
Omni-4000 Gas Detector	Enmet Corporation	103	274
Pac III Single Gas Detector	Draeger Safety, Inc.	114	301
Perkin-Elmer Turbo LC Plus HPLC System	Perkin-Elmer Corporation Chromatography Division (The)	87	235
PhD2 Personal Gas Detector	Biosystems	119	316

Detector Name	*Manufacturer*	*ID #*	*Page F-#*
Phemtochem Ion Mobility Spectrometer, Model 110	PCP, Inc.	9	25
Photovac 2020 PID Monitor	Perkin-Elmer Corporation Chromatography Division (The)	80	217
Photovac Microtip Handheld Air Monitor/Photoionization Detector	Perkin-Elmer Corporation Chromatography Division (The)	28	70
Photovac Snapshot Hand Held Gas Chromatograph	Perkin-Elmer Corporation Chromatography Division (The)	50	130
Portable Odor Monitor	Sensidyne, Inc.	34	88
ppbRae	Rae Systems, Inc.	160	433
ProtectAir Personal Multi-Gas Monitor Model 8570	TSI Incorporated	157	424
Quadrant Portable Gas Detector	Enmet Corporation	143	385
Rapid Alarm and Identification Device-1 (RAID-1)	Bruker Daltonics	4	10
RAPID I (Remote Air Pollution Infrared Detector)	Bruker Saxonia Analytik GmbH	156	421
Safeye Model 400 Gas Detection System	Spectrex Inc.	110	289
Saturn 2000	Varian Chromatography Systems	52	136
SAW Minicad II	Microsensor Systems, Inc	27	67
Scentograph Plus II	Sentex Systems, Inc.	32	82
Scentoscreen (Gas Chromatography) with Argon Ionization Detector	Sentex Systems, Inc.	51	133
Sensidyne Gas Detection Tubes	Sensidyne, Inc.	64	169
Shimadzu LC-10 HPLC System	Shimadzu Scientific Instruments	88	238
Smart Logger Gas Detector	Enmet Corporation	140	379
Spectrum	Enmet Corporation	108	283
SureSpot Badges	Scott/Bacharach LLC	82	223
SXC-20 VOC Monitor	Spectrex Corporation	39	97
T80 Single Gas Monitor	Industrial Scientific Corporation	134	361
Target Gas Detector	Enmet Corporation	142	382
TLV Panther Gas Detector	International Sensor Technology	112	295
TMX412 Multi-Gas Monitor	Industrial Scientific Corporation	132	355
Tox-Array 1000 Gas Detector	Mil-Ram Technology, Inc.	121	322
Toxi Gas Detector	Biosystems	129	346

Detector Name	*Manufacturer*	*ID #*	*Page F-#*
Toxi Plus Gas Detector	Biosystems	130	349
Toxi Ultra Gas Detector	Biosystems	131	352
Toxibee Personal Gas Alarm	Lumidor Safety Products	127	340
ToxiRae Plus Personal Gas Monitor	RAE Systems	95	259
Trace Ultra High Sensitivity	Biorad, Digilab Division	72	193
TX-2000 Toxic Gas Detector	Enmet Corporation	153	412
Unimax Personal Single Gas Detector	Lumidor Safety Products	136	367
Varian ProStar Analytical HPLC System	Varian, Inc.	89	241
Viking 573	Bruker Daltonics	71	190
Voyager	Perkin-Elmer Corporation Chromatography Division (The)	74	199
VRAE Hand Held 5 Gas Surveyor (Model 7800 Monitor)	RAE Systems, Inc.	144	388

APPENDIX D
INDEX BY CHEMICAL DETECTOR MANUFACTURER NAME

Index by Chemical Detector Manufacturer Name

Manufacturer	*Detector Name*	*ID #*	*Page F-#*
Bruker Saxonia Analytik GmbH	RAPID I (Remote Air Pollution Infrared Detector)	156	421
BW Technologies	BW Defender	162	439
BW Technologies	GasAlert	163	442
BW Technologies	GasAlertMax	161	436
California Analytical Instruments, Inc.	Innova Gas Analyzer Type 1301	73	196
California Analytical Instruments, Inc.	Innova Type 1312 Multigas Monitor	83	226
Calspan, Operation of Veridian	Automatic Liquid Agent Detector (ALAD) System	16	34
Canadian Centre for Advanced Instrumentation	Miniature Air Sampling System (MASS)	33	85
CMS Research Corporation	Miniature Chemical Agent Monitor (MINICAM)	31	79
Dionex Corporation	Dionex DX-500 IC System	90	244
Draeger Safety, Inc.	Draeger CDS Kit	26	64
Draeger Safety, Inc.	MicroPac Personal Gas Alarm	128	343
Draeger Safety, Inc.	MiniWarn Gas Detector	138	373
Draeger Safety, Inc.	Multiwarn II Gas Detector	139	376
Draeger Safety, Inc.	Pac III Single Gas Detector	114	301
Dynathem Analytical Instrumentation, Inc.	Automatic Continuous Environmental Monitor (ACEM) 900	67	178
Electronic Sensor Technology	4100 Vapor Detector	57	148
Electronic Sensor Technology	7100 Vapor Detector	58	151
Enmet Corporation	Omni-4000 Gas Detector	103	274
Enmet Corporation	Quadrant Portable Gas Detector	143	385
Enmet Corporation	Smart Logger Gas Detector	140	379
Enmet Corporation	Spectrum	108	283
Enmet Corporation	Target Gas Detector	142	382
Enmet Corporation	TX-2000 Toxic Gas Detector	153	412
Environmental Technologies Group, Inc.	Advanced Portable Detector (APD) 2000	84	229
Environmental Technologies Group, Inc.	Air Sentry-FTIR	42	106

Manufacturer	*Detector Name*	*ID #*	*Page F-#*
Environmental Technologies Group, Inc.	Chemical Agent Monitor (CAM)/Improved Chemical Agent Monitor (ICAM)	3	7
Environmental Technologies Group, Inc.	Fixed Site/Remote Chemical Agent Detector	151	409
Environmental Technologies Group, Inc.	Improved Chemical Agent Monitor-Advanced Portable Detector (ICAM-APD)	5	13
Environmental Technologies Group, Inc.	Individual Chemical Agent Detector (ICAD)	13	31
Gas Tech, Inc.	95 Series Single Gas Monitor	149	403
Gas Tech, Inc.	Genesis Portable Gas Monitor	148	400
Gas Tech, Inc.	GT Series Portable Gas Monitor	147	397
General Monitors	Model TS400 Toxic Gas Detector	105	280
Giat Industries	AP2C CW Detector	60	157
Giat Industries	DET INDIV Individual Nerve Agent Detector	154	415
Giat Industries	KDTC	155	418
Grace Industries	Haz-Alert Gas Detector	120	319
Graseby Dynamics	Chemical Agent Monitor-2 (CAM-2)	6	16
Graseby Dynamics	GID-2A Chemical Detector	158	427
Graseby Dynamics	GID-3, Chemical Agent Detection System	7	19
Graseby Dynamics	Lightweight Chemical Detector (LCD-2)	159	430
Heinz Laboratories International	5-Step Field Identification Kit 8 Model 2000	62	163
Hewlett-Packard Co.	Hewlett Packard HP1000 HPLC System	86	232
Hewlett-Packard Co.	Hewlett-Packard HP3D CZE System	92	250
Hewlett-Packard Co.	HP 2350 Atomic Emission Detector	53	139
Hewlett-Packard Co.	HP 6890	47	121
Hewlett-Packard Co.	HP 6890 Series II	68	181
HNU Systems, Inc.	IS-101	29	73
Industrial Scientific Corporation	ATX 612 Multi-Gas Aspirated Monitor	133	358
Industrial Scientific Corporation	Gas Badge Personal Gas Alarm	135	364
Industrial Scientific Corporation	LTX312 Gas Monitor	115	304
Industrial Scientific Corporation	T80 Single Gas Monitor	134	361
Industrial Scientific Corporation	TMX412 Multi-Gas Monitor	132	355
Inficon	Hapsite	75	202

Manufacturer	*Detector Name*	*ID #*	*Page F-#*
Intellitec	AN/KAS-1/AN/KAS-1A Chemical Warfare Directional Detector	41	103
Intellitec	M21 Automatic Chemical Agent Alarm	40	100
Intellitec	M8A1 Automatic Chemical Agent Alarm	2	4
International Sensor Technology	IQ-250 Single Gas Detector	124	331
International Sensor Technology	TLV Panther Gas Detector	112	295
Interscan Corporation	7000 Series Data Logging Compact Portable Gas Detector	111	292
K & M Environmental	Chrom Air Badges	81	220
Lumidor Safety Products	MicroMax Multigas Monitor	137	370
Lumidor Safety Products	Toxibee Personal Gas Alarm	127	340
Lumidor Safety Products	Unimax Personal Single Gas Detector	136	367
Marconi Applied Technologies	eNOSE 5000 Electronic Nose	79	214
Matheson Safety Products	Kitagawa Gas Detector Tubes	63	166
Microsensor Systems, Inc	CW Sentry	56	145
Microsensor Systems, Inc	SAW Minicad II	27	67
Mil-Ram Technology, Inc.	Tox-Array 1000 Gas Detector	121	322
MSA Instrument Division	MSA Gas Detection Tubes	65	172
MSA Instrument Division	MSA Passport II PID Monitor	77	208
PCP, Inc.	Phemtochem Ion Mobility Spectrometer, Model 110	9	25
Pe Sciex	API 365	45	115
Perkin-Elmer Corporation Chromatography Division (The)	MicroFID Handheld Detector	78	211
Perkin-Elmer Corporation Chromatography Division (The)	Perkin-Elmer Turbo LC Plus HPLC System	87	235
Perkin-Elmer Corporation Chromatography Division (The)	Photovac 2020 PID Monitor	80	217
Perkin-Elmer Corporation Chromatography Division (The)	Photovac Microtip Handheld Air Monitor/Photoionization Detector	28	70
Perkin-Elmer Corporation Chromatography Division (The)	Photovac Snapshot Hand Held Gas Chromatograph	50	130
Perkin-Elmer Corporation Chromatography Division (The)	Voyager	74	199
Proengin SA	ADLIF System	61	160

Manufacturer	*Detector Name*	*ID #*	*Page F-#*
Proengin SA	APACC Chemical Control Alarm Portable Apparatus (Model M266 E 10 002)	11	28
Quest Technologies, Inc.	MultiCheck 2000 Multi-Gas Monitor	150	406
Quest Technologies, Inc.	MultiLog 2000 Multi-Gas Monitor	123	328
RAE Systems	ToxiRae Plus Personal Gas Monitor	95	259
RAE Systems, Inc.	MiniRae 2000	30	76
RAE Systems, Inc.	MultiRae Plus Gas Detector	117	310
Rae Systems, Inc.	ppbRae	160	433
RAE Systems, Inc.	VRAE Hand Held 5 Gas Surveyor (Model 7800 Monitor)	144	388
Research Institute 070 BRNO	Laser Remote Detector (LIDAR)	43	109
Richmond Packaging Limited (UK)	No. 1 Mark 1 Detector Kit	25	61
Scott/Bacharach LLC	AutoStep Plus	104	277
Scott/Bacharach LLC	Bodyguard 4 Personal Monitor	118	313
Scott/Bacharach LLC	SureSpot Badges	82	223
Sensidyne, Inc.	Portable Odor Monitor	34	88
Sensidyne, Inc.	Sensidyne Gas Detection Tubes	64	169
Sensor Applications, Inc.	M90-D1 Chemical Warfare Agent Detector	8	22
Sentex Systems, Inc.	Scentograph Plus II	32	82
Sentex Systems, Inc.	Scentoscreen (Gas Chromatography) with Argon Ionization Detector	51	133
Shimadzu Scientific Instruments	Shimadzu LC-10 HPLC System	88	238
Spectral Sciences Incorporated	Gasman Portable Multiple Toxic Gas Monitor	145	391
Spectrex Corporation	SXC-20 VOC Monitor	39	97
Spectrex Inc.	Safeye Model 400 Gas Detection System	110	289
SRI Instruments, Inc.	Dual-Flame Photometric Detector	49	127
The Foxboro Company	Century TVA-1000 Toxic Vapor Analyzer	59	154
The Foxboro Company	FoxTox Personal Multi-Gas Monitor	113	298
The Foxboro Company	Miran 981B Multipoint , Ambient Air Monitoring System	66	175
The Foxboro Company	Miran SaphIRe Portable Ambient Air Analyzer	35	91
Thermo Environmental Instruments, Inc.	Model 680EZ Portable Photoionization Detector	146	394

Manufacturer	*Detector Name*	*ID #*	*Page F-#*
Truetech, Inc.	ABC-M8 VGH Chemical Agent Detector Paper	17	37
Truetech, Inc.	M18A2 Chemical Agent Detector Kit	21	49
Truetech, Inc.	M272 Water Kit	23	55
Truetech, Inc.	M9 Chemical Agent Detector Paper	18	40
TSI Incorporated	ProtectAir Personal Multi-Gas Monitor Model 8570	157	424
Varian Chromatography Systems	Saturn 2000	52	136
Varian, Inc.	Varian ProStar Analytical HPLC System	89	241
Zellweger Analytics, Inc.	Chemkey TLD Toxic Gas Monitor	99	262
Zellweger Analytics, Inc.	CM4 Gas Monitor	125	334
Zellweger Analytics, Inc.	Gas Beacon/Gas Leader	101	268
Zellweger Analytics, Inc.	MiniGas-XL Multi-gas Monitor	126	337
Zellweger Analytics, Inc.	Model 7100 Gas Monitor	102	271
Zellweger Analytics, Inc.	Neotox-XL Single Gas Monitor	100	265

APPENDIX E
IMMEDIATELY DANGEROUS TO LIFE AND HEALTH VALUES (IDLH)

Chemical Agent	IDLH (ppm(v))
GA/Tabun	0.03
GB/Sarin	0.03
GD/Soman	0.008
VX	0.002
H/Mustard[1]	0.0004
L/Lewisite[2]	0.0003

TIMs	IDLH (ppm)
1,2-Dimethylhydrazine	15
Acetone cyanohydrin	
Acrolein	2
Acrylonitrile	85
Allyl alcohol	20
Allyl chlorocarbonate	
Allyl isothiocyanate	
Allylamine	
Ammonia	300
Arsenic trichloride	
Arsine	3
Boron tribromide	
Boron trichloride	ND
Boron trifluoride	25
Bromine	3
Bromine chloride	
Bromine pentafluoride	
Bromine trifluoride	
Carbon disulfide	500
Carbon monoxide	1200
Carbonyl fluoride	
Carbonyl sulfide	
Chlorine	10
Chlorine pentafluoride	
Chlorine trifluoride	20
Chloroacetaldehyde	45
Chloroacetone	
Chloroacetonitrile	
Chloroacetyl chloride	
Chlorosulfonic acid	
Crotonaldehyde	50
Cyanogen chloride	
Diborane	15
Diketene	
Dimethyl sulfate	7

[1] The value used for HD is the 8-hour time weighted average (TWA) since no IDLH value has been identified.
[2] The value used for L is the 8-hour TWA since no IDLH value has been identified.

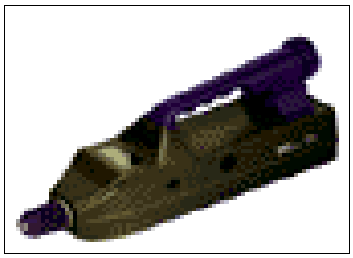
TIMs	IDLH (ppm)
Diphenylmethane-4,4'-diisocyanate	
Ethyl phosphonic dichloride	
Ethyl phosphonothioic dichloride	
Ethyl chloroformate	
Ethyl chlorothiolformate	
Ethylene dibromide	100
Ethylene oxide	800
Ethyleneimine	100
Fluorine	25
Formaldehyde	20
Hexachlorocyclopentadiene	
Hydrogen bromide	30
Hydrogen chloride	50
Hydrogen cyanide	50
Hydrogen fluoride	30
Hydrogen iodide	
Hydrogen selenide	1
Hydrogen sulfide	100
Iron pentacarbonyl	
Isobutyl chloroformate	
Isopropyl chloroformate	
Isopropyl isocyanate	
Methanesulfonyl chloride	
Methyl bromide	250
Methyl chloroformate	
Methyl chlorosilane	
Methyl hydrazine	20
Methyl isocyanate	3
Methyl mercaptan	150
n-Butyl chloroformate	
n-Butyl isocyanate	
Nitric acid, fuming	25
Nitric oxide	100
Nitrogen dioxide	20
n-Propyl chloroformate	
Parathion	0.8
Perchloromethyl mercaptan	10
Phosgene	2
Phosphine	50
Phosphorus oxychloride	
Phosphorus pentafluoride	
Phosphorus trichloride	25
sec-Butyl chloroformate	
Selenium hexafluoride	2
Silicon tetrafluoride	
Stibine	5
Sulfur dioxide	100

TIMs	IDLH (ppm)
Sulfur trioxide	1
Sulfuric acid	4
Sulfuryl chloride	
Sulfuryl fluoride	200
Tellurium hexafluoride	1
tert-Butyl isocyanate	
n-Octyl mercaptan	
Tetraethyl lead	3
Tetraethyl pyrophosphate	0.4
Tetramethyl lead	3
Titanium tetrachloride	
Toluene 2,4-diisocyanate	2.5
Toluene 2,6-diisocyanate	2.5
Trichloroacetyl chloride	
Trifluoroacetyl chloride	
Tungsten hexafluoride	

APPENDIX F
CHEMICAL DETECTOR DATA SHEETS

General

Detector Name *IMS 2000*



Detector ID # 1

Detector Type Military

Technology Ion Mobility Spectrometry

Manufacturer
Bruker Daltonics
Manning Park
Billerica, MA 01821
POC: Brian Abraham, Ph.D.
(978) 667-9580 ext. 464 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Cyanide
Chlorine
Phosgene

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected Cyanogen Chloride

Detection State	Vapor
Sensitivity	Detects GB at 0.0009 ppm (v) (Below IDLH) Detects VX at 0.0004 ppm (v) (Below IDLH) Detects HD at 0.003 ppm (v) (No IDLH) Detects Hydrogen Cyanide at 0.9 ppm (v) (Below IDLH) Detects Cyanogen Chloride at 0.4 ppm (v) (No IDLH) Detects Phosgene at 0.5 ppm (v) (Below IDLH)
Resistance to Interferents	It has been demonstrated to detect GB in the presence of many interferents. Less than one false alarm per 200 hours of operation.
Start-up Time	Less than 2 minutes
Response Time	Less than 2 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	Less than 1.06 cubic feet
Weight	Less than 22 pounds
Power Requirements	Battery or AC powered (operates on special and expensive batteries)

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Batteries
Calibration Required	Yes
Repairs Required	By manufacturer only
Shelf Life	No information available
Unit Cost	$12,000.00
Maintenance Cost	> $200 per unit/per year

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal

Training Available	No information available
Manuals Available	User manual
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	The Bruker Point Chemical Detector (PCD) contains a radioactive source licensed for use by the U.S Nuclear Regulatory Commission (NRC). NRC and applicable local regulations must be followed for storage, shipment, and disposal.

General

Detector Name *M8A1 Automatic Chemical Agent Alarm*

Detector ID # 2

Detector Type Military

Technology Ion Mobility Spectrometry

Manufacturer
Intellitec
2000 Brunswick Lane
Deland, FL 32724
POC: Ron Nekula
(904) 736-1700 (Tel)
(904) 736-2250 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User
U.S. Army
U.S. Air Force

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects GA at 0.02 ppm (v) (Below IDLH) Detects GB at 0.02 ppm (v) (Below IDLH) Detects GD at 0.02 ppm (v) (Above IDLH) Detects VX at 0.04 ppm (v) (Above IDLH)
Resistance to Interferents	The M43A1 Detector is moderately to highly selective when used as intended. The M43A1 may false alarm when used in enclosed spaces or when sampling near strong vapor sources (i.e., In dense smoke). Some vapors known to give false readings are: aromatic vapors, cleaning compounds, smoke, fumes, and some wood preservatives.
Start-up Time	Greater than 5 minutes
Response Time	Less than 2 minutes
Alarm Capability	Audible alarm Visual alarm (with M42 Remote alarm attached)

Physical Parameters

Size	M43A1 Detector - 6.5 in x 5.5 in x 10.9 in M42 Alarm - 8.7 in x 5.8 in x 2.4 in
Weight	M43A1 Detector-7.48 pounds M42 Alarm-4.18 pounds
Power Requirements	36 VDC BA-3517/U Battery, nominal 24 VDC vehicle power, and 110/220 VAC (when used with M10A1 power supply) D-cell batteries for M42 alarm and BB-501 batteries for M253 Winterization Kit.

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged; designed for use in harsh environments
Environmental Conditions	-40°F to 120°F (operating temperature) M253 Winterization Kit is required for operation below 20°F. An outlet filter is required when operated indoors to minimize risk of exposure to potential radioactive Am-241 effluent.
Consumables Required	BA-3517/U Battery, M273 Maintenance Kit, outlet filter, M312 Maintenance Kit, M293 Maintenance Kit
Calibration Required	None
Repairs Required	Battery, inlet dust filters, and test paddles need to be changed

	Other repairs by manufacturer
Shelf Life	> 10 years
Unit Cost	Currently out of production. Price dependent on quantity.
Maintenance Cost	> $200 per unit/per year

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	Yes
Manuals Available	TM 3-6665-312-12&P Operator's and Unit Maintenance Manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	The cell module of the M43A1 contains a radioactive source licensed for use by the U.S Nuclear Regulatory Commission (NRC). NRC and applicable local regulations must be followed for storage, shipment, and disposal. NRC regulations include licensing and tracking of radiation source and annual wipe test.

General

Detector Name *Chemical Agent Monitor (CAM)/Improved Chemical Agent Monitor (ICAM)*

Detector ID # 3

Detector Type Military

Technology Ion Mobility Spectrometry

Manufacturer Environmental Technologies Group, Inc.
1400 Taylor Avenue
Baltimore, MD 21234
POC: Tom Brown
(410)-321-5200 (Tel)
(410) 321-5255 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User The CAM is in service with 16 countries including Australia, Bahrain, Belgium, Canada, Denmark, Italy, Netherlands, Norway, Spain, Sweden, Turkey, United Kingdon, United States, and other Middle Eastern countries.

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD
HN

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected	None
Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detects GA at 0.02 ppm (v) (Below IDLH) Detects GB at 0.02 ppm (v) (Below IDLH) Detects GD at 0.02 ppm (v) (Above IDLH) Detects VX at 0.02 ppm (v) (Above IDLH) Detects HD at 0.02 ppm (v) (No IDLH)
Resistance to Interferents	The ICAM has moderate to high selectivity when used as intended. The ICAM may false alarm when used in enclosed spaces or when sampling near strong vapor sources (i.e., in dense smoke). Some vapors known to give false readings are: aromatic vapors, cleaning compounds, smoke, fumes, and some wood preservatives.
Start-up Time	Approximately 1 minute
Response Time	30 seconds-1 minute
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	15 in x 3.1 in x 5.7 in
Weight	3.74 pounds
Power Requirements	Operates on 1 internal 6V lithium-sulfur dioxide battery (6-8 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	-13°F to 113°F (operating temperature) -67°F to 158°F (storage temperature)
Consumables Required	BA-5800/U Batteries, filters
Calibration Required	None
Repairs Required	Weekly preventative maintenance checks and services are required to maintain the operational readiness of the ICAM

	Internal ICAM sieve pack, one nut and screw needs to be replaced every 400 hours of operation Other repairs by manufacturer
Shelf Life	5 years
Unit Cost	$6,333
Maintenance Cost	> $200 per unit/per year

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	The CAM and ICAM contain a radioactive source licensed for use by the U.S. Nuclear Regulatory Commission (NRC). NRC and applicable local regulations must be followed for storage, shipment, and disposal. NRC regulations include licensing and tracking of radiation source and annual wipe test.

General

Detector Name *Rapid Alarm and Identification Device-1 (RAID-1)*

Detector ID # 4

Detector Type Military

Technology Gas Chromatography with Ion Mobility Spectrometry

Manufacturer

Bruker Daltonics
Manning Park
Billerica, MA 01821
POC: Brian Abraham, Ph.D.
(978) 667-9580 ext. 464 (Tel)

Source

1. Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

2. http://www.bruker.com

Availability Commercially available

Current User Many organization have the RAID systems. Details can be provided upon request. Examples of some of the organizations are: US Army SBCCOM, CBDE Porton Down-UK, OPCW-The Netherlands, FOA-Sweden, National Police Agency-Japan, and others.

Operational Parameters

Chemical Agents Detected

GA
GB
GD
VX
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected

Ammonia
Chlorine
Hydrogen Cyanide
Phosgene

	Sulfur dioxide
Medium Hazard Index TIMs Detected	None
Low Hazard Index TIMs Detected	None
Detection State	Vapor Aerosol Liquid (With surface sampling probe)
Sensitivity	Detects GB at 0.002-0.006 ppm (v) (Below IDLH) Detects VX at 0.001-0.003 ppm (v) (Below IDLH)) Detects HD at 0.01-0.02 ppm (v) (No IDLH)
Resistance to Interferents	The RAID-1 may false alarm when used in enclosed spaces or when sampling near strong vapor sources (i.e., in dense smoke). Some vapors known to give false readings are: aromatic vapors, cleaning compounds, smoke, fumes, and some wood preservatives.
Start-up Time	3-12 minutes
Response Time	Detects GA, GB, and GD in about 20 seconds Detects VX in about 3 minutes Detects HD, HN, and L in about 20 seconds Detects Hydrogen Cyanide in about 10 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	Base detector and battery: 16 in x 7.1 in x 7.9 in
Weight	6.6 pounds (3.08 pounds w/o batteries)
Power Requirements	The RAID operate at any DC voltage from 6 to 32 volts with a power consumption of 6 W. An adapter is available to run off AC power.

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	-58°F to +167°F (Storage) temperature) -13°F to 131°F @ 0 to 100% relative humidity (operating temperature)

Consumables Required	Batteries Drying filters (changes ~ every 800 hours of operation).
Calibration Required	System automatically performs self-test when turned on. Calibration part of self test procedure.
Repairs Required	Back flush filter needs to be replaced every 2 days to some weeks of operation Charge or change the battery pack, change the dust filter, and perform confidence check if required Internal circuit filter needs to be replaced approximately every 4-6 months of operations and pumps as required Other repairs by manufacturer
Shelf Life	The estimated life span of the RAID 1 is >10 years.
Unit Cost	The unit cost of the RAID 1 with accessories is $15,000-20,000 in quantities of 1. Larger quantities will reduce the per unit costs.
Maintenance Cost	Service contracts typically run ~10% of the per unit cost.

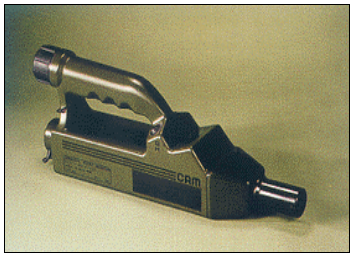
Special Requirements

Operator Skills Required	The RAID 1 is designed to be operated by an unskilled technician with a high school education.
Training Required	Training time of ~2 hours is required to operate the instrument.
Training Available	A variety of training is available through the manufacturer.
Manuals Available	User manual
Support Equipment	The RAID requires no additional support equipment. However, option equipment such as AC voltage adapter are available.
Communications Interface Capability	There are two standard hardware interfaces available; RS-232 and RS-485/422.
Tamper Resistance	The RAID 1 is not password protected.
Warranty	1-year parts and labor (depot level) standard. Service Contracts for 2nd year are ~10% of the unit cost.
Testing Information	No information available
Applicable Regulations	The RAID-1 contains a radioactive source licensed for use by the U.S Nuclear Regulatory Commission (NRC). NRC and applicable local regulations must be followed for storage, shipment, and disposal. NRC regulations include licensing and tracking of radiation source and annual wipe test.

General

Detector Name

Improved Chemical Agent Monitor-Advanced Portable Detector (ICAM-APD)



Detector ID #

5

Detector Type

Military

Technology

Ion Mobility Spectrometry

Manufacturer

Environmental Technologies Group, Inc.
1400 Taylor Avenue
Baltimore, MD 21234
POC: Tom Brown
(410)-321-5200 (Tel)
(410) 321-5255 (Fax)

Source

Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability

Commercially available

Current User

No information available

Operational Parameters

Chemical Agents Detected

GA
GB
GD
VX
H
HD

Biological Agents Detected

None

High Hazard Index TIMs Detected

None

Medium Hazard Index TIMs Detected

None

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detects VX at 0.009 ppm (v) (Above IDLH) Detects GB at 0.017 ppm (v) (Below IDLH) Detects HD at 0.015 ppm (v) (Above IDLH)
Resistance to Interferents	The ICAM-APD may false alarm when used in enclosed spaces or when sampling near strong vapor sources (i.e., in dense smoke). Some vapors known to give false readings are: aromatic vapors, cleaning compounds, smoke, fumes, and some wood preservatives.
Start-up Time	5 to 30 minutes
Response Time	10-60 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	6.3 in x 5.3 in x 14 in
Weight	Less than 12.1 pounds including batteries
Power Requirements	115/230 VAC 24-32 VDC input 1 to 4 lithium batteries BA-5847/U, 28 hour life @ 70F Power supply M10A1

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	-22°F to 126°F (operating temperature) -80°F to 160°F (storage temperature)
Consumables Required	Charcoal canister, sieve pack, confidence samples
Calibration Required	None
Repairs Required	Charcoal filter replacement once every 72 hours Replacement of internal ICAM sieve pack, one nut and screw every 400 hours of operation Three minutes is required for routine service and operator tests for each accumulated operating time of 12 hours

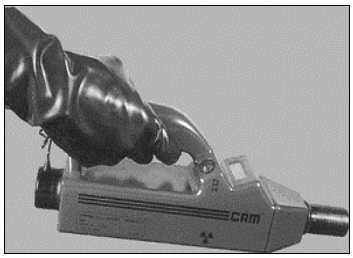
	Other repairs by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	> $200 per unit/per year

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	No information available
Manuals Available	Operator and Maintenance Manual
Support Equipment	No information available
Communications Interface Capability	A RS-232 cable port allows data to be communicated with a data communications system.
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	The ICAM-APD contains a radioactive source licensed for use by the U.S Nuclear Regulatory Commission (NRC). NRC and local applicable regulations must be followed for storage, shipment, and disposal. NRC regulations include licensing and tracking of radiation source and annual wipe test.

General

Detector Name *Chemical Agent Monitor-2 (CAM-2)*



Detector ID # 6

Detector Type Military and Commercial

Technology Ion Mobility Spectrometry

Manufacturer

Graseby Dynamics
10640 Main Street
Suite 200 Fairfax, VA 22030
POC: Mr. Neil Bloomfield
(703) 218-0380 (Tel)
(703) 358-6470 (Fax)

Source

1. Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

2. Graseby Dynamics

Availability Commercially available

Current User US DoD, New York Police, Philadelphia Fire Department, EPA, UK MoD, Canadian DND, Australian Army, USMC CBIRF Team, militaries of 30 other nations.

Operational Parameters

Chemical Agents Detected

GA
GB
GD
VX
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected

Chlorine
Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected	None
Low Hazard Index TIMs Detected	None
Detection State	Vapor Aerosol
Sensitivity	Detects GA at 0.003 ppm (v) (Below IDLH) Detects GB at 0.003 ppm (v) (Below IDLH) Detects GD at 0.003 ppm (v) (Below IDLH) Detects VX at 0.002 ppm (v) (At IDLH) Detects HD at 0.008 ppm (v) (No IDLH) Detects HN at 0.008 ppm (v) (No IDLH) Detects L at 0.005 ppm (v) (No IDLH) Detects Arsine at 3 ppm (v) (At IDLH) Detects Hydrogen Cyanide at 9 ppm (v) (Below IDLH) Detects Phosgene at 2 ppm (v) (At IDLH)
Resistance to Interferents	Below 5% false positive rate
Start-up Time	Less than 3 minutes
Response Time	Less than 1 second
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	15.5 in x 6 in x 3 in
Weight	4 pounds with battery
Power Requirements	Lithium sulphur di-oxide military batteries, Ni-cad rechargeable batteries, D-cell commercial batteries, and main power supply options.

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged; designed to be used in harsh environments.
Environmental Conditions	Designed to operate in practically all environmental conditions (Temperatures ranging from 22°F to 122°F @ 5% to 95% relative humidity)
Consumables Required	Batteries Stand-off collars
Calibration Required	None

Repairs Required	Services required approximately every 1500 hours of operation
Shelf Life	Greater than 10 years
Unit Cost	Kit, including small number of consumables – less than $ 8500.
Maintenance Cost	Subject to level of use, however commonly below 20% of purchase cost for the life-time of the equipment.

Special Requirements

Operator Skills Required	None
Training Required	Operator training can commonly be completed within 2 hours
Training Available	Yes
Manuals Available	Operator and Maintenance manuals
Support Equipment	None
Communications Interface Capability	Can interface with remote alarm or computer
Tamper Resistance	Special tools are needed to open equipment
Warranty	1 year
Testing Information	No information available
Applicable Regulations	This item contains a radioactive source licensed for use by the U.S Nuclear Regulatory Commission (NRC). NRC and applicable local regulations must be followed for storage, shipment, and disposal. NRC regulations include licensing and tracking of radiation source and annual wipe test.

General

Detector Name *GID-3, Chemical Agent Detection System*

Detector ID # 7

Detector Type Military and Commercial

Technology Ion Mobility Spectrometry

Manufacturer

Graseby Dynamics
10640 Main Street
Suite 200 Fairfax, VA 22030
POC: Mr. Neil Bloomfield
(703) 218-0380 (Tel)
(703) 358-6470 (Fax)

Source

1. Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

2. Graseby Dynamics

Availability Commercially available

Current User US DoD, UK MoD, Canadian DND, Australian Army, USMC CBIRF Team, militaries of other nations including Middle East.

Operational Parameters

Chemical Agents Detected

GA
GB
GD
VX
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected

Chlorine
Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected	Not Specified
Low Hazard Index TIMs Detected	None
Detection State	Vapor Aerosol
Sensitivity	Detects GA at 0.001 ppm (v) (Below IDLH) Detects GB at 0.002 ppm (v) (Below IDLH) Detects GD at 0.002 ppm (v) (Below IDLH) Detects VX at 0.0009 ppm (v) (Below IDLH) Detects HD at 0.015 ppm (v) (No IDLH) Detects HN at 0.015 ppm (v) (No IDLH) Detects L at 0.01 ppm (v) (No IDLH)
Resistance to Interferents	Below 5% false positive rate
Start-up Time	Less than 3 minutes
Response Time	Less than 3 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	6.5 in x 7 in x 11 in
Weight	10.6 pounds
Power Requirements	Lithium sulphur di-oxide military batteries, Ni-cad rechargeable batteries, and main power supply options.

Logistical Parameters

Transportability	Fixed-Site Detection
Durability	Ruggedized to military standards Tested in extreme environments
Environmental Conditions	22°F to 122°F @ 5 to 100% relative humidity (operating temperature) -40°F to 158°F @ 5 to 100% relative humidity (storage temperature)
Consumables Required	Batteries Protective caps
Calibration Required	None

Repairs Required	Service recommended approximately every 1500 hours of operation
Shelf Life	Greater than 10 years
Unit Cost	Contact manufacturer for pricing information
Maintenance Cost	Subject to level of use, however commonly below 20% of purchase cost for the life-time of the equipment.

Special Requirements

Operator Skills Required	Basic
Training Required	Operator training can commonly be completed within 2 hours
Training Available	Yes
Manuals Available	Operation and maintenance manuals Traning documentation
Support Equipment	None
Communications Interface Capability	Communications port provides a data output in a RS232 format.
Tamper Resistance	Internal core is tamper proof
Warranty	1 year
Testing Information	Contact manufacturer for testing information
Applicable Regulations	The GID-3 contains a radioactive source licensed for use by the U.S Nuclear Regulatory Commission (NRC). NRC and applicable local regulations must be followed for storage, shipment, and disposal. NRC regulations include licensing and tracking of radiation source and annual wipe test.

General

Detector Name *M90-D1 Chemical Warfare Agent Detector*

Detector ID # 8

Detector Type Military

Technology Ion Mobility Spectrometry

Manufacturer
Sensor Applications, Inc.
737 Walker Rd., Suite 1
Great Falls, VA 22066
POC: Mr. Richard C. Krahe, Program Manager
(703) 759-6000 (Tel)
(703) 759-6867 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User U.S. Air Force

Operational Parameters

Chemical Agents Detected
GB
GD
VX
HD
L

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State	Vapor Aerosol
Sensitivity	Detects GB at 0.003 ppm (v) (Below IDLH) Detects VX at 0.002 ppm (v) (At IDLH) Detects HD at 0.03 ppm (v) (No IDLH) Detects GD at 0.003 ppm (v) (Below IDLH) Detects L at 0.09 ppm (v) (No IDLH)
Resistance to Interferents	U.S Army test data exist indicating potential problems with gasoline and diesel exhausts. False alarm rate: less than one per 24 hours of operations.
Start-up Time	Automatic start-up time- 5 minutes. In field environment-6 minutes After long-term storage- it is recommended to let the detector "sun" for 5 to 10 minutes before live agent exposure.
Response Time	Less than 1 minute
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	11.8 In x 4.1 in x 11 in
Weight	10.34 pounds
Power Requirements	Can be powered by external power supply Battery BA5598/U, One Required, 17 Hour Life @ 70°F Power Supply Provided With Detector The M90 Battery Box will hold two BA5598/U's, however, only one is connected electrically DC power-the types of batteries used are: M90-NB (NiCd) life of 8 hours M90-LB (lithium battery) M90-MB (magnesium battery) Vehicle power-M90-VP1/C vehicle power supply uses a standard cigarette lighter. AC power-N90-MP1 main 5 power supply: 110/220 VDC.

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Batteries, inlet tube,external micro filter, inside filter, test sample kit
Calibration Required	No information available

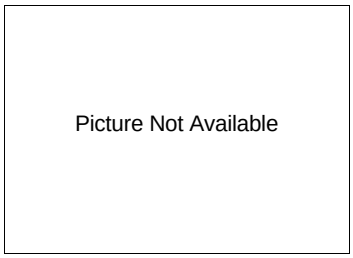
Repairs Required	Replacement of internal dust filter and external dust filter as required by bit Replacement of NiCD batteries after every 8 hours Replacement of Semiconductor Cell after every 1500 hours 10 to 15 minutes required for routine service and operator tests for each accumulated operating time for 12 hours
Shelf Life	No information available
Unit Cost	$16,500 with a standard accessory kit
Maintenance Cost	> $200 per unit/per year

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	None
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	The M90-D1 Chemical Warfare Agent Detector has been tested by the U.S. Army Edgewood Chemical and Biological Center (ECBC). The final report is scheduled to be released in 2nd Quarter FY2000.
Applicable Regulations	The M90-D1 Chemical Warfare Agent Detector contains a radioactive source licensed for use by the U.S Nuclear Regulatory Commission (NRC). NRC and lapplicable local regulations must be followed for storage, shipment, and disposal. NRC regulations include licensing and tracking of radiation source and annual wipe test.

General

Detector Name *Phemtochem Ion Mobility Spectrometer, Model 110*



Detector ID # 9

Detector Type Commercial

Technology Ion Mobility Spectrometry

Manufacturer
PCP, Inc.
2155 Indian Road
W. Palm Beach, FL 3340
POC: Charlene Wernlund, Office Manager
(800) 637-5307 (Tel)
(800) 637-5307(Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State Vapor

	Aerosol
Sensitivity	This detector has not been tested against chemical warfare agents. Sensitivity is approximately 1 ppb by volume for industrial chemicals.
Resistance to Interferents	This detector may false alarm when used in enclosed spaces or when sampling near strong vapor sources (i.e., in dense smoke). Some vapors known to give false readings are: aromatic vapors, cleaning compounds, smoke, fumes, and some wood preservatives.
Start-up Time	Approximately 30 minutes
Response Time	Less than 2 minutes
Alarm Capability	Audible alarm

Physical Parameters

Size	Sensor - 12.6 in x 7.1 in x 9.8 in Gas Supply - 12.6 in x 7.1 in x 9.8 in
Weight	> 30.8 pounds
Power Requirements	AC power, average 70 watts Battery powered

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	32°F to 113°F (operating temperature)
Consumables Required	Carrier gases
Calibration Required	Yes (factory calibrated)
Repairs Required	By manufacturer only
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	> $200 per unit/per year

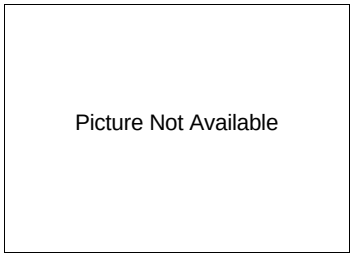
Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	Yes

Manuals Available	User manual
Support Equipment	12 V DC battery Ccomputer
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	6 months
Testing Information	No information available
Applicable Regulations	This detector contains a radioactive source licensed for use by the U.S Nuclear Regulatory Commission (NRC). NRC and applicable local regulations must be followed for storage, shipment, and disposal. NRC regulations include licensing and tracking of radiation source and annual wipe test.

General

Detector Name *APACC Chemical Control Alarm Portable Apparatus (Model M266 E 10 002)*



Detector ID # 11

Detector Type Military

Technology Flame Photometry

Manufacturer Proengin SA
Attn: Mr. Fernand Nerbonne
3 Rue de l'Industrie
78210 Saint-Cyr L'Ecole, France
011 33 1 30 58 47 34 (Tel)
011 33 1 30 58 93 51 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User French Army, Navy, Air Force and medical services

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor Liquid Aerosol
Sensitivity	Detects GB at 0.002 ppm (v) (Below IDLH) Detects GA at 0.002 ppm (v) (Below IDLH) Detects GD at 0.001 ppm (v) (Below IDLH) Detects VX at 0.001 ppm (v) (Below IDLH) Detects HD at 0.06 ppm (v) (No IDLH)
Resistance to Interferents	This detector is known to false alarm to sulfur and phosphorous compounds
Start-up Time	1 to 5 minutes
Response Time	2 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	16.5 in x 3.4 in x 5.5 in
Weight	4.84 pounds including battery and hydrogen pack
Power Requirements	19 VDC – 32 VDC lithium battery or external power supply. Inverter required to operate on vehicle power source.

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Battery Carrier gas
Calibration Required	Yes, every 1,000 hours of operation
Repairs Required	Optical part and burner need to be cleaned every 5,000 hours of operation Chopper motor needs to be replaced every 5,000 hours of operation 3 minutes for routine service and operator tests are required for each accumulated operating time of 12 hours Integrated auto-test for first level of maintenance, automatic diagnostic

box for second level, computerized test bench for third level

Change battery for portable version

Routine service of hydrogen cartridges (Shelf life of 10 years)

Shelf Life No information available

Unit Cost $11,250 (with accessories and case)

Maintenance Cost $700 for every 1,000 hours of operation

Special Requirements

Operator Skills Required Non-technical background

Training Required Basic training for some maintenance personnel

Training Available No information available

Manuals Available No information available

Support Equipment
AP2C Diagnostic Module
Ear phone headset
Remote Alarm Unit
ADAC

Communications Interface Capability No information available

Tamper Resistance No information available

Warranty No information available

Testing Information No information available

Applicable Regulations None

General

Detector Name *Individual Chemical Agent Detector (ICAD)*

Detector ID # 13

Detector Type Military

Technology Electrochemistry

Manufacturer Environmental Technologies Group, Inc.
1400 Taylor Avenue
Baltimore, MD 21234
POC: Tom Brown
(410)-321-5200 (Tel)
(410) 321-5255 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available (Lead time is 6 to 8 months for the sensor module)

Current User In service with the Armed Forces of all NATO countries

Operational Parameters

Chemical Agents Detected
GA
GB
GD
HD
L

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	Cyanogen Chloride
Detection State	Vapors Aerosols
Sensitivity	Detects GA at 0.03 to 0.07 ppm (v) (At IDLH) Detects GB at 0.03 to 0.09 ppm (v) (At IDLH) Detects GD at 0.03 to 0.07 ppm (v) (Above IDLH) Detects HD at 1.5 ppm (v) (No IDLH) Detects L at 6.0 ppm (v) (No IDLH) Detects Hydrogen Cyanide at 44.54 ppm (v) (Below IDLH)) Detects Phosgene at 6.08 ppm (v) (Above IDLH)) Detects Cyanogen Chloride at 19.57 ppm (v) (Below IDLH)
Resistance to Interferents	The ICAD may false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	4 hour activation (1 time only). Always ready thereafter.
Response Time	60 seconds to 2 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	1.1 in x 2.6 in x 4.3 in
Weight	7.6 oz
Power Requirements	A lithium battery internal to the electronics module that will last up to four months.

Logistical Parameters

Transportability	Handheld Portable
Durability	The ICAD is constructed of ABS plastic.
Environmental Conditions	-0.4°F to 113°F at 5% to 95% relative humidity
Consumables Required	None
Calibration Required	No information available
Repairs Required	Replacement of sensor module after four months of continuous operation Replacement of battery (Shelf life of 5 years)
Shelf Life	5 years

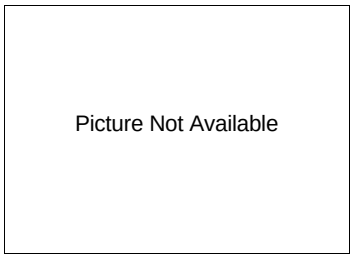
Unit Cost	Cost based upon the quantity ordered:1 to 49 - $2798.00; 50 to 499 - $2233.00; 500 to 999 - $1622.00
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Automatic Liquid Agent Detector (ALAD) System*



Detector ID # 16

Detector Type Military

Technology Electrochemistry

Manufacturer Calspan, Operation of Veridian
Director, Chemical/Biological Defense Group
P.O. Box 400
Buffalo, NY 14225
POC: Mr. Thomas McMahon
(716) 631-6905 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User U.S. Air Force

Operational Parameters

Chemical Agents Detected GD
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State aerosols

Sensitivity	Detects HD, GD, and VX in 200 micron liquid droplets
Resistance to Interferents	The ALAD system may false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	10-60 seconds.
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	12.3 in x 9.6 in x 5.3 in
Weight	9.9 pounds
Power Requirements	12 VDC lithium battery (BA5588) 110/220 VAC 50-60 Hz Battery life-30 +days

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Battery Sensors
Calibration Required	No information available
Repairs Required	Replacement of battery after 30 days of operation Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal

Training Available	No information available
Manuals Available	No information available
Support Equipment	None
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *ABC-M8 VGH Chemical Agent Detector Paper*

Detector ID # 17

Detector Type Military

Technology Color Change Chemistry

Manufacturer

Truetech, Inc.
680 Elton Street
Riverhead, NY 11301
(516) 727-8600 (Tel)
(516) 727-7592 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User In service with the Armed Forces of all NATO countries

Operational Parameters

Chemical Agents Detected

GA
GB
GD
GF
VX
HD
H
L

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Liquid
Sensitivity	Responds to droplets of 100 micron or larger
Resistance to Interferents	M8 paper responds to some common battlefield interferents. Among them are certain cleaning solvents (ammonia), DS2, “break free” (a weapons cleaner and lubricant), high temperatures, and some petroleum products.
Start-up Time	None
Response Time	Within 30 seconds
Alarm Capability	Visual alarm

Physical Parameters

Size	3.9 in x 2 in
Weight	Less than 1 pound
Power Requirements	None

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged; designed to operate in harsh environments.
Environmental Conditions	Operates in most environments (M8 paper will not respond to chemical agents when wet)
Consumables Required	M8 paper
Calibration Required	None
Repairs Required	None
Shelf Life	None
Unit Cost	$19/box
Maintenance Cost	Less than $10.00

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Non-formal

Training Available	No information available
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	None
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *M9 Chemical Agent Detector Paper*

Detector ID # 18

Detector Type Military

Technology Color Change Chemistry

Manufacturer Truetech, Inc.
680 Elton Street
Riverhead, NY 11901
(516) 727-8600 (Tel)
(516) 727-7592 (Fax)
POC: Fort McClellan Center for Domestic Preparedness

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User In service with the Armed Forces of all NATO countries

Operational Parameters

Chemical Agents Detected
GA
GB
GD
GF
VX
HD
H
L

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Liquid
Sensitivity	Responds to 100 micron or larger droplets
Resistance to Interferents	M9 paper responds to some common battlefield interferents. Among them are certain cleaning solvents (ammonia), DS2, “break free” (a weapons cleaner and lubricant), high temperatures, and some petroleum products.
Start-up Time	Immediate
Response Time	20 seconds or less
Alarm Capability	Visual alarm

Physical Parameters

Size	Dispenser box - 2.5 in x 3.5 in x 3.3 in Detector paper - 3.6 in x 2 in
Weight	Dispenser box-7 oz
Power Requirements	None

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged; designed to operate in harsh environments.
Environmental Conditions	Operates in most environments (M9 paper will not respond to chemical agents when wet)
Consumables Required	M9 paper
Calibration Required	None
Repairs Required	None
Shelf Life	8 years
Unit Cost	$5/roll
Maintenance Cost	Less than $20.00

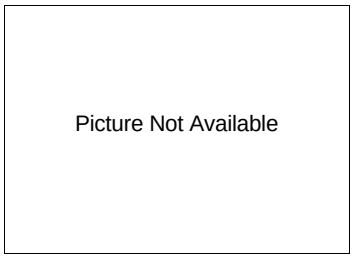
Special Requirements

Operator Skills Required	Non-technical background

Training Required	Non-formal
Training Available	No information available
Manuals Available	TM 3-6665-311-10 Operator's Manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	None
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *3-Way Paper, Chemical Agent Liquid Detectors*



Detector ID # 19

Detector Type Military

Technology Color Change Chemistry

Manufacturer
Anachemia Canada, Inc.
500 Second Avenue
P.O. Box 147
Lacine (Montreal), Quebec H8S 4A7
Canada
POC: Ms. Magda Perfecto
(514) 489-5711 (Tel)
(514) 485-9825 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User In service with the Armed Forces of all NATO countries

Operational Parameters

Chemical Agents Detected
GA
GB
GF
VX
HD
H

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Liquid
Sensitivity	Detects H, G, and V agents in 0.02 ml droplets
Resistance to Interferents	Color change may occur with some solvents and solvent/base mixtures
Start-up Time	Immediate
Response Time	Immediate
Alarm Capability	Visual alarm

Physical Parameters

Size	3.9 in x 2.6 in x 0.2 in
Weight	Less than 1 pound
Power Requirements	None

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged; designed to operate in harsh environments.
Environmental Conditions	Operates in all environments
Consumables Required	Sheets of paper
Calibration Required	None
Repairs Required	None
Shelf Life	No information available
Unit Cost	$2.97
Maintenance Cost	Less than $10.00

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Non-formal
Training Available	No information available

Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	None
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Chemical Agent Detector Kit*

Detector ID # 20

Detector Type Military

Technology Color Change Chemistry

Manufacturer Anachemia Canada, Inc.
500 Second Avenue
P.O. Box 147
Lacine (Montreal), Quebec H8S 4A7
Canada
POC: Ms. Magda Perfecto
(514) 489-5711 (Tel)
(514) 485-9825 (Fax)

Source Manufacturer's literature, Army Materiel Command (AMC)-Regulation 385-131, Army Technical Manual 3-6665-307-10

Availability Commercially available

Current User Fire departments, emergency management agencies, HAZMAT teams

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
H
HD
HN

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Cyanide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	Cyanogen Chloride
Detection State	Vapor Aerosol and Liquid (Using the component Liquid Chemical Agent Detector Paper)
Sensitivity	Detects GB at 0.001 ppm (v) (Below IDLH) Detects VX at 0.002 ppm (v) (at IDLH) Detects H agents at 0.6 ppm (v) (No IDLH) Detects L at 2 ppm (v) (No IDLH) Detects Hydrogen Cyanide at 6.2 ppm (v) (Below IDLH)
Resistance to Interferents	No information available
Start-up Time	3-5 minutes (inexperienced); 1-3 minutes (experienced)
Response Time	20-25 minutes (experienced and inexperienced)
Alarm Capability	Visual alarm

Physical Parameters

Size	5.3 in x 6.8 in x 3 in
Weight	1 pounds
Power Requirements	None

Logistical Parameters

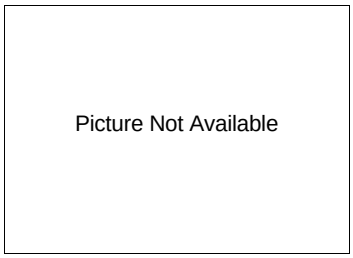
Transportability	Handheld Stationary
Durability	Very rugged; designed to operate in harsh environments.
Environmental Conditions	Operates in all environments
Consumables Required	None
Calibration Required	None
Repairs Required	None
Shelf Life	5 years
Unit Cost	Operational Kit: $220.75 Training Kit: $466.20
Maintenance Cost	None

Special Requirements

Operator Skills Required	High school education sufficient to read and understand operator instructions. Training should be performance oriented, with practice on at least 6 training sampler detector tickets. This should result in proficient operators.
Training Required	A minimum of 4-6 hours of performance oriented training is recommended.
Training Available	Yes (By distributor: GEOMET Technologies, Inc.)
Manuals Available	Instructions are printed on each sampler/detector ticket pouch. A detailed instruction card is attached to each carrying case with waxed cord.
Support Equipment	Training kit
Communications Interface Capability	None
Tamper Resistance	None
Warranty	5 years
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *M18A2 Chemical Agent Detector Kit*



Detector ID # 21

Detector Type Military

Technology Color Change Chemistry

Manufacturer Truetech, Inc.
680 Elton Street
Riverhead, NY 11901
(516) 727-8600 (Tel)
(516) 727-7592 (Fax)
POC: Fort McClellan Center for Domestic Preparedness

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User U.S., U.K., and Canadian Armed Forces

Operational Parameters

Chemical Agents Detected
GB
VX
H
HD
HN
HT
L

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor Aerosol Liquid
Sensitivity	Detects H, HD, HT, and HN at 0.08 ppm (v) (No IDLH) Detects GB at 0.17 ppm (tube) ppm (v) (Above IDLH) Detects GB at 0.02 ppm (v) (ticket) (Below IDLH) Detects VX at 0.01 ppm (v) (Above IDLH) Detects L at 1 ppm (v) (No IDLH) Detects Phosgene at 2 ppm (v) (At IDLH) Detects Phosgene at 2.1-3 ppm (v) (Above IDLH) Detects Hydrogen Cyanide at 8 ppm (v) (Below IDLH)
Resistance to Interferents	This detector responds to some battlefield interferant materials including smoke and decontaminants.
Start-up Time	Immediate
Response Time	2-4 minutes
Alarm Capability	Visual alarm

Physical Parameters

Size	8 in x 3 in x 6 in
Weight	2.486 pounds
Power Requirements	None

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged; designed to operate in harsh environments.
Environmental Conditions	Operates in all environments
Consumables Required	M30A1 refill kit
Calibration Required	None
Repairs Required	None
Shelf Life	3 years
Unit Cost	$294.00
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background (with some special training)
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	M30A1 Refill Kit
Communications Interface Capability	None
Tamper Resistance	None
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *M256A1 Kit*

Detector ID # 22

Detector Type Military

Technology Color Change Chemistry

Manufacturer
Anachemia Canada, Inc.
500 Second Avenue
P.O. Box 147
Lacine (Montreal), Quebec H8S 4A7
Canada
POC: Ms. Magda Perfecto
(514) 489-5711 (Tel)
(514) 485-9825 (Fax)
POC: Fort McClellan Center for Domestic Preparedness

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User In service with the Armed Forces of all NATO countries

Operational Parameters

Chemical Agents Detected
GB
GD
VX
HD
H
L

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Cyanide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	Cyanogen Chloride
Detection State	Vapor Liquid
Sensitivity	Detects HD at 0.31 ppm (v) (Above IDLH) Detects GB at 0.0008 ppm (v) (Below IDLH) Detects VX at 0.002 ppm (v) (At IDLH) Detects L at 1 ppm (v) (No IDLH) Detects Hydrogen Cyanide at 7.13 ppm (v) (Below IDLH) Detects Cyanogen Chloride at 3.13 ppm (v)
Resistance to Interferents	Some smokes, high temperatures, DS2, and petroleum products may cause false readings.
Start-up Time	Immediate
Response Time	15-25 minutes
Alarm Capability	Visual alarm

Physical Parameters

Size	7 in x 3 in x 5 in
Weight	1.1 pounds
Power Requirements	None

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged; designed to operate in harsh environments.
Environmental Conditions	Operates in all environments
Consumables Required	M256A1 Kit
Calibration Required	None
Repairs Required	None
Shelf Life	6 years
Unit Cost	$40
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Non-formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	M8 Paper
Communications Interface Capability	None
Tamper Resistance	None
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *M272 Water Kit*

Detector ID # 23

Detector Type Military

Technology Color Change Chemistry

Manufacturer
Truetech, Inc.
680 Elton Street
Riverhead, NY 11901
(516) 727-8600 (Tel)
(516) 727-7592 (Fax)
POC: Fort McClellan Center for Domestic Preparedness

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User NATO countries, U.S Army

Operational Parameters

Chemical Agents Detected
GA
GB
GD
GF
VX
HD
L

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Cyanide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Liquid
Sensitivity	Detects G and V agents at 0.000003 ppm (v) (Below IDLH) Detects HD at 0.00032 ppm (v) (No IDLH) Detects L at 0.00022 ppm (v) (No IDLH) Detects Hydrogen Cyanide at 0.02 ppm (v) (Below IDLH)
Resistance to Interferents	The M272 Kit may respond to some battlefield interferants.
Start-up Time	None
Response Time	6-7 minutes
Alarm Capability	Visual alarm

Physical Parameters

Size	9.9 in x 6.2 in x 2.8 in
Weight	2.42 pounds
Power Requirements	None

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged; designed to operate in harsh environments.
Environmental Conditions	Operates in all environments
Consumables Required	No information available
Calibration Required	None
Repairs Required	None
Shelf Life	5 years
Unit Cost	$178.00
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Non-formal

Training Available	No information available
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	None
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Nerve Agent Vapor Detector (NAVD)*

Detector ID # 24

Detector Type Military

Technology Color Change Chemistry

Manufacturer
Anachemia Canada, Inc.
500 Second Avenue
P.O. Box 147
Lacine (Montreal), Quebec H8S 4A7
Canada
POC: Ms. Magda Perfecto
(514) 489-5711 (Tel)
(514) 485-9825 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User In service with the Armed Forces of all NATO member countries

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detects GB and GD at 0.0007 ppm (v) (Below IDLH) Detects VX at 0.0006 ppm (v) (Below IDLH)
Resistance to Interferents	Strong acid vapors may give positive response and strong alkaline vapors may give a negative response.
Start-up Time	Immediate
Response Time	Immediate
Alarm Capability	Visual alarm

Physical Parameters

Size	2.2 in x 1 in x < 0.1 in
Weight	Less than 1 pound
Power Requirements	None

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Enzyme impregnated test paper
Calibration Required	None
Repairs Required	None
Shelf Life	No information available
Unit Cost	$2.97
Maintenance Cost	No information available

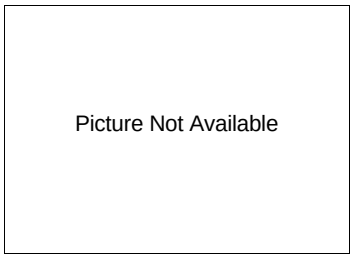
Special Requirements

Operator Skills Required	Non-technical background
Training Required	Non-formal

Training Available	No information available
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	None
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *No. 1 Mark 1 Detector Kit*



Detector ID # 25

Detector Type Military

Technology Color Change Chemistry

Manufacturer Richmond Packaging (UK) Limited
New Road
Winsford, Cheshire CW7 2NY
United Kingdom
441 606 557422 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User In service with the UK Armed Forces

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD
HN

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State	Vapor Aerosol
Sensitivity	Detects GB and GD at 0.003 ppm (v) (Below IDLH) Detects VX at 0.004 ppm (v) (Above IDLH) Detects HD at 0.008 ppm (v) (No IDLH) Detects HN at 0.04 ppm (v) (No IDLH) Detects GA at 0.004 ppm (v) (Below IDLH)
Resistance to Interferents	False positives are caused when Cl2 is at concentrations of greater than 10 to 20 ppm and SO2 is at concentrations of greater than 3 ppm; or if there is very dense and acrid wood smoke.
Start-up Time	3 minutes
Response Time	The response time is temperature and agent concentration dependant.
Alarm Capability	Visual alarm

Physical Parameters

Size	5.9 in x 5.1 in x 2 in
Weight	12 oz
Power Requirements	None

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Tickets Chemicals
Calibration Required	None
Repairs Required	None
Shelf Life	4 years in temperate climates. Laboratory kits show no significant decrease in chemical reactivity after 10 years.
Unit Cost	< $500
Maintenance Cost	Spare tickets and chemicals available

Special Requirements

Operator Skills Required	Non-technical background

Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	None
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Draeger CDS Kit*

Detector ID # 26

Detector Type Military/Commercial

Technology Color Change Chemistry

Manufacturer

Draeger Safety, Inc.
101 Technology Drive
Pittsburgh, PA 15275
(412) 787-8383 (Tel)
(800) 922-5518 (Tel)
(800) 922-5519 (Fax)

Source

1. Draeger Safety, Inc.

2. Testing of Commercially Available Detectors Against Chemical Warfare Agents: Summary Report, February 1999 (SBCCOM)

Availability Commercially available

Current User

US Army
Navy Regional Fire/Rescue
Fire Department (City of New York, Kansas City, Missori)

Operational Parameters

Chemical Agents Detected

GA
GB
GD
VX
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected

Arsine
Chlorine
Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected	None
Low Hazard Index TIMs Detected	Cyanogen Chloride
Detection State	Vapor Aerosol
Sensitivity	Detects GA and GB at 0.025 ppm (v) (Below IDLH) Detects GD at 0.025 ppm (v) (Above IDLH) Detects HD at 0.15 ppm (v) (No IDLH) Detects Phosgene at 0.2 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 1 ppm (v) (Below IDLH) Detects L at 0.1 ppm (v) (No IDLH) Detects Arsine at 0.1 ppm (v) (Below IDLH) Detects Chlorine at 0.2 ppm (v) (Below IDLH) Detects Cyanogen Chloride at 0.25 ppm (v) (No IDLH)
Resistance to Interferents	No information available
Start-up Time	1 minute
Response Time	5 minutes
Alarm Capability	Visual alarm

Physical Parameters

Size	13 in x 1.5 in x 3.5 in
Weight	Less than 1 pound
Power Requirements	None

Logistical Parameters

Transportability	Handheld Stationary
Durability	Contained in durable case with foam inserts for protection.
Environmental Conditions	Equipment may be used under normal environmental conditions.
Consumables Required	CDS Test Sets
Calibration Required	None
Repairs Required	None
Shelf Life	CDS Test Sets - 2 year shelf life

Unit Cost	$2,396.00 per complete CDS Kit
Maintenance Cost	None

Special Requirements

Operator Skills Required	Non-technical background
Training Required	30 minutes of training is required
Training Available	Yes
Manuals Available	User manuals, color comparison charts
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	None
Warranty	Accuro bellows pump - 5 year warranty CDS Sets - 2 years according to expiration date
Testing Information	The Drager CDS kit have been tested by the Edgewood Chemical and Biologica Center (ECBC).
Applicable Regulations	None

General

Detector Name *SAW Minicad II*

Detector ID # 27

Detector Type Commercial

Technology Surface Acoustic Wave

Manufacturer Microsensor Systems, Inc
1818 South Highway 441 Apopka, Fl. 32703
POC Shane Smith
(407) 884-3392 (Tel)
(407) 886-7061(Fax)

Source 1. Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

2. http://www.sawtek.com

3. The Emergency Responder's Ability to Detect Chemical Agent Critical Review/Technology Assessment, July 1998 (DTIC)

Availability Commercially available

Current User Federal Agencies, Special Warfare Communities, First Responders

Operational Parameters

Chemical Agents Detected
GA
GB
GD
GF
HD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor Aerosol
Sensitivity	Detects GA at 0.04 ppm (v) (Above IDLH) Detects GB at 0.17 ppm (v) (Above IDLH) Detects GD at 0.02 ppm (v) (Above IDLH) Detects GF at 0.03 ppm (v) (No IDLH) Detects VX at 0.01 ppm (v) (Above IDLH) Detects HD at 0.09 ppm (v) (No IDLH)
Resistance to Interferents	Not prone to interferents
Start-up Time	2 minutes
Response Time	60 seconds
Alarm Capability	Audible alarm Visible alarm

Physical Parameters

Size	1.3 in x 4.3 in x 5.2 in
Weight	18 oz
Power Requirements	4 Lithium Cells, Type DL 123A An external 6.3V, 3.4 Amp-hr, rechargeable, fully sealed, lead-acid, gel-cell is supplied with every Minicad A battery charger for the external rechargeable battery is supplied with every Minicad.

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	41°F to 104°F (operating temperature)
Consumables Required	Batteries
Calibration Required	Calibration not required
Repairs Required	None
Shelf Life	10 years non-operating
Unit Cost	$5,495

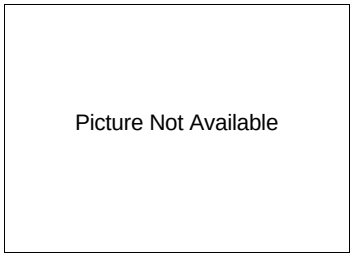
Maintenance Cost	$65 every 6-8 months to replace check source

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	A small vapor diffusion kit is supplied with the Minicad to permit vapor testing of the instrument in the field.
Communications Interface Capability	RS-232 cable port allows data to be communicated with a network.
Tamper Resistance	No information available
Warranty	1 year or 500 hours of operation (parts and labor)
Testing Information	The U.S. Army Edgewood Chemical and Biological Center (ECBC) is planning on testing the SAW Minicad MKII in FY2000.
Applicable Regulations	None

General

Detector Name *Photovac Microtip Handheld Air Monitor/Photoionization Detector*



Detector ID # 28

Detector Type Commercial

Technology Photo Ionization

Manufacturer The Perkin-Elmer Corporation
Chromatography Division
761 Main Avenue, M/S 270
Norwalk, CT 06859-0270
(203) 775-4642 (Tel)
(203) 761-2678 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State	Vapor
Sensitivity	Detects GB at 0.0013 ppm (v) (Below IDLH) Detects VX at 0.0015 ppm (v) (Below IDLH) Detects HD at 0.064 ppm (v) (No IDLH)
Resistance to Interferents	Photoionization detectors are not very specific, any species with an ionization potential close to that of the agents in question may cause a false alarm.
Start-up Time	2-10 minutes
Response Time	2 seconds
Alarm Capability	Audible alarm

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	Operates on rechargeable batteries

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Batteries
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

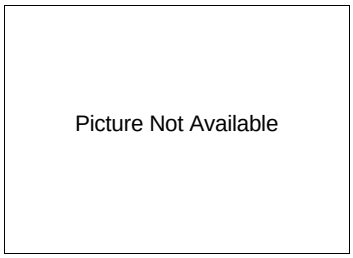
Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	No information available

Manuals Available	User manual
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *IS-101*



Detector ID # 29

Detector Type Commercial

Technology Photo Ionization

Manufacturer HNU Systems, Inc.
160 Charlemont Street
Newton, MA 02461-9987
(800) 724-5600 (Tel)
(617) 964-6690 (Tel)
(617) 558-0056 (Fax)

Source 1. Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

2. Testing of Commercially Available Detectors Against Chemical Warfare Agents: Summary Report, February 1999 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected GA
GB
HD

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide
Ammonia
Arsine

Medium Hazard Index TIMs Detected Phosphine

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detects GA at 0.67 ppm (v) (Above IDLH) Detects GB at 0.86 ppm (v) (Above IDLH) Detects HD at 0.3 ppm (v) (No IDLH) Detects Hydrogen Sulfide at 0.1 ppm to -2000 ppm (v) (Below IDLH) Detects Ammonia at 0.1 ppm to 2000 ppm (v) (Below IDLH) Detects Arsine at 0.1 ppm to 2000 ppm (v) (Below IDLH)
Resistance to Interferents	Specifically depends on availability of lamps to produce specific output energy desired
Start-up Time	None
Response Time	Less than 3 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	Probe - 2.5 in x 13.5 in Readout - 3.3 in x 5.2 in x 6.5 in
Weight	13.2 pounds
Power Requirements	Operates on rechargeable batteries, recharger uses 120 VAC

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged; designed for use in harsh environments
Environmental Conditions	No information available
Consumables Required	Lamps
Calibration Required	Yes
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	$4,195
Maintenance Cost	$1,500

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	None
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *MiniRae 2000*

Detector ID # 30

Detector Type Commercial

Technology Photo Ionization

Manufacturer RAE Systems, Inc.
1339 Moffett Park Drive
Sunnyvale, CA 94089
(408) 752-0723 (Tel)
(408) 752-0724 (Fax)

Source 1. Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM).

2. Testing of Commercially Available Detectors Against Chemical Warfare Agents: Summary Report, February 1999 (SBCCOM).

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected GA
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No Information available

Detection State	Vapor
Sensitivity	Detects GA at 0.5 ppm (v) (Above IDLH) Detects HD at 0.26 ppm (v) (No IDLH)
Resistance to Interferents	No information available
Start-up Time	1 minute
Response Time	Less than 3 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	8.2 in x 3 in x 2 in
Weight	19.5 oz
Power Requirements	Rechargeable NiCad or AA Alkaline batteries

Logistical Parameters

Transportability	Handheld Portable
Durability	The MiniRae 2000 is resistant to radio frequency interferences (RFI).
Environmental Conditions	14º F to 104º F @ 0 to 95 % relative humidity (operating temperature)
Consumables Required	Calibrating gas and dust filters
Calibration Required	Yes
Repairs Required	Yes
Shelf Life	No information available
Unit Cost	$3275
Maintenance Cost	$150 per year

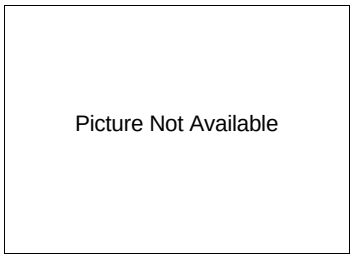
Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Non-formal
Training Available	No information available
Manuals Available	No information available

Support Equipment	110 VAC adapter/charger Remote probe
Communications Interface Capability	No information available
Tamper Resistance	Optional password protected calibration settings, alarm limits and stored data
Warranty	No information available
Testing Information	The MiniRae Plus has been tested by the U.S. Army Edgewood Chemical and Biological Center (ECBC).
Applicable Regulations	None

General

Detector Name *Miniature Chemical Agent Monitor (MINICAM)*



Detector ID # 31

Detector Type Military/Commercial

Technology Gas Chromatography with Flame Photometry

Manufacturer
CMS Research Corporation
200 Chase Park South, Suite 100
Birmingham, AL 35244
(205) 733-6900 (Tel)
(205) 733-6919 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
H
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor Aerosol
Sensitivity	Detects GB at 0.000017 ppm (v) (Below IDLH) Detects VX at 0.00001 ppm (v) (Below IDLH) Detects H, HD, HN at 0.0006 ppm (v) (No IDLH) Detects GA at 0.000013 ppm (v) (Below IDLH) Detects GD at 0.000015 ppm (v) (Below IDLH))
Resistance to Interferents	The MINICAM may false alarm to sulfur and phosphorus compounds. However, gas chromatographs minimizes false alarms from interferents.
Start-up Time	No information available
Response Time	3-10 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	10 in x 12 in x 8.5 in
Weight	18.92 pounds
Power Requirements	Not battery powered, house current, 110 VAC

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Gas for GC and detector
Calibration Required	Yes
Repairs Required	Yes
Shelf Life	No information available
Unit Cost	$24,873
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Scentograph Plus II*

Detector ID # 32

Detector Type Commercial

Technology Gas Chromatography

Manufacturer Sentex Systems, Inc.
553 Broad Ave.
Ridgefield, NJ 07657
POC: Dr. Amos Linenberg
(973) 439-0140 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected GB
VX
HD
H

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State Vapor

	Liquid Aerosol
Sensitivity	Detects HD at 0.010 ppm (v) (No IDLH) Detects GB at 0.0035 ppm (v) (Below IDLH)
Resistance to Interferents	No information available
Start-up Time	Greater than 30 minutes
Response Time	Less than 2 minutes
Alarm Capability	No information available

Physical Parameters

Size	6 in x 20 in x 20 in
Weight	30.8 pounds
Power Requirements	Battery powered (battery charger supplied)

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Argon gas (ultra high purity), syringes, tedlar bags, and water vials
Calibration Required	Every 12 hours
Repairs Required	None
Shelf Life	No information available
Unit Cost	$24,835 Free training at factory ($950 + expenses for off-sight training)
Maintenance Cost	$1000 per year

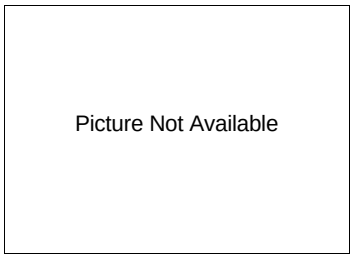
Special Requirements

Operator Skills Required	Technical background
Training Required	Formal, mandatory (from Sentex)
Training Available	Yes
Manuals Available	User manual

Support Equipment	None
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Miniature Air Sampling System (MASS)*



Detector ID # 33

Detector Type Military/Commercial

Technology Gas Chromatography

Manufacturer Canadian Centre for Advanced Instrumentation (Saskatchewan Research Council)
15 Innovation Blvd.
Saskatoon, Saskatchewan, Canada S7N 2X8
POC: Craig Murray
(306) 933-5482 (Tel)
(306) 933-7446 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
GF
VX
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected Ethylene Oxide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor Aerosol
Sensitivity	This is a sampler/collector and is used to collect air samples. There is no sensitivity associated with a sampler/collector.
Resistance to Interferents	Selectivity depends on complexity of air sample collected and selectivity of analytical equipment and analytical procedure.
Start-up Time	No information available
Response Time	Greater than 1 hour
Alarm Capability	No information available

Physical Parameters

Size	9.1 in x 4.7 in x 13 in
Weight	25.74 pounds
Power Requirements	Air samplers may be powered from small battery pack or use AC power (115 V AC/230 V AC) depending on application.

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	GC supplies
Calibration Required	Required for the GC analyzer
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

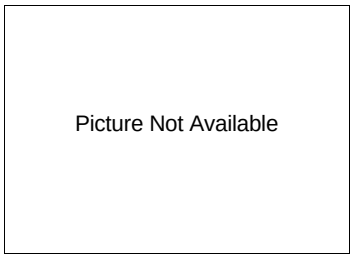
Special Requirements

Operator Skills Required	Technical background

Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Analytical Instrumentation Automated Thermal Desorption Unit (ATDU) Controller Initiator MINITUBE Carousel
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Portable Odor Monitor*



Detector ID # 34

Detector Type Commercial

Technology Thermal and Electrical Conductivity

Manufacturer Sensidyne, Inc.
16333 Bay Vista Drive
Clearwater, Fl 34620
(800) 451-9444 (Tel)
(727) 539-0550 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Ammonia
Formaldehyde

Medium Hazard Index TIMs Detected Methyl Mercaptan
Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Sensitivity is expected to be around 10 ppb
Resistance to Interferents	Very non-specific, responds to changes in a known vapor concentration
Start-up Time	None
Response Time	1-2 minutes
Alarm Capability	None built in. Has 0-200 mV DC output

Physical Parameters

Size	3.3 in x 7.5 in x 1.6 in
Weight	1.496 pounds
Power Requirements	4 AA batteries (10 hours of operation) AC adapter

Logistical Parameters

Transportability	Handheld Stationary
Durability	The Odor Monitor is housed in a high impact, corrosion-resistant and dust tight plastic case suitable for use in both harsh environments or in environments which require extremely sanitary and hygeinic samplings.
Environmental Conditions	32°F-104°F (operating temperature)
Consumables Required	Batteries
Calibration Required	None
Repairs Required	None
Shelf Life	5 years for sensor
Unit Cost	No information available
Maintenance Cost	Replacement of batteries

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual

Support Equipment	None
Communications Interface Capability	Recorder output 0-200 mV DC
Tamper Resistance	No information available
Warranty	1 year
Testing Information	Response chart available upon request
Applicable Regulations	None

General

Detector Name *Miran SaphIRe Portable Ambient Air Analyzer*

Detector ID # 35

Detector Type Commercial

Technology Infrared Spectroscopy (Filter Based)

Manufacturer
The Foxboro Company
P.O. Box 500
East Bridgewater, MA
(508) 378-5556 (Tel)
(508) 378-5505 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State
Vapor
Aerosol

Sensitivity	Detects GB, VX, HD, H, hyrogen cyanide, and phosgene at their IDLH concentrations
Resistance to Interferents	No information available
Start-up Time	Less than 5 minutes
Response Time	10 seconds
Alarm Capability	Visual alarm

Physical Parameters

Size	Roughly the size of a large brief case
Weight	18.04 pounds
Power Requirements	Battery powered

Logistical Parameters

Transportability	Handheld Stationary
Durability	Designed to be used in harsh environments.
Environmental Conditions	No information available
Consumables Required	Carrier gas Battery
Calibration Required	Baseline spectrum required
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	$21,000
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	The Miran SaphIRe has been tested by the U.S. Army Edgewood Chemical and Biological Center (ECBC). The final report is scheduled to be released in 2nd Quarter FY2000.
Applicable Regulations	None

General

Detector Name *Chemical Biological Mass Spectrometer (CBMS)*

Detector ID # 36

Detector Type Military

Technology Mass Spectrometry

Manufacturer
Bruker Daltonics
Manning Park
Billerica, MA 01821
POC: Brian Abraham, Ph.D.
(978) 667-9580 ext. 464 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User Fielding will be concurrent with future fieldings of BIDS and NBCRS

Operational Parameters

Chemical Agents Detected
GB
GD
VX
HD
L

Biological Agents Detected All (agents not specified)

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State	Vapor Liquid Aerosol
Sensitivity	Detects GB at 0.007 ppm (v) (Below IDLH) Detects GD at 0.006 ppm (v) (Below IDLH) Detects VX at 0.002 ppm (v) (Below IDLH) Detects HD at 0.01 ppm (v) (No IDLH) Detects L at 0.16 ppm (v) (No IDLH) Bacterial spores-100 ng
Resistance to Interferents	Mass spectrometry is highly selective. The ability to further perform MS/MS analysis when a compound is detected to confirm the detection virtually eliminates all false positive and negative alarms.
Start-up Time	Less than 20 minutes
Response Time	Less than 10 seconds for chemical agents 3 minutes for biological agents
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	15 in x 3.9 in x 5.4 in
Weight	4.3 pounds
Power Requirements	The CBMS operates with 24VDC voltage with a power consumption of 25-40A.

Logistical Parameters

Transportability	Vehicle Mounted
Durability	The CBMS is designed to meet the requirements of MIL STD 810E.
Environmental Conditions	The CBMS is designed to meet the requirements of MIL STD 810E.
Consumables Required	Membranes for the heated probe, pyrolysis tubes
Calibration Required	System automatically performs self-test when turned on. An autotune is performed automatically when needed.
Repairs Required	System can be maintained on site or returned to factor. Typically system can be returned to service within 24-72 hours. A mass spectrometer is a high performance sophisticated instrument. Failure modes often occur due to insufficient training. With appropriate training, these are overcome.
Shelf Life	Greater than 10 years

Unit Cost	The unit cost of the CBMS with accessories is ~$250,000.
Maintenance Cost	Service contracts typically run ~10% of the per unit cost.

Special Requirements

Operator Skills Required	The CBMS is designed to be operated by an unskilled technician with a high school education when run in the automatic mode.
Training Required	Training time of 2 hours is required to operate the instrument in automatic mode
Training Available	A variety of training is available through the manufacturer.
Manuals Available	A technical manual for operation and maintenance of the CBMS is available.
Support Equipment	None
Communications Interface Capability	A variety of data communications are possible, depending on the requirements, including RS-232 and RS-485/422.
Tamper Resistance	The CBMS can be set up with password protection.
Warranty	1-year parts and labor (depot level) standard. Service Contracts for 2nd year are ~10% of the unit cost.
Testing Information	Testing was performed at the US Army Dugway Proving Ground and at Geomet, MD. Test reports are classified, however some test data is available through the manufacturer.
Applicable Regulations	None

General

Detector Name *SXC-20 VOC Monitor*

Detector ID # 39

Detector Type Commercial

Technology Thermal and Electrical Conductivity

Manufacturer

Spectrex Corporation
3580-T Haven Avenue
Redwood City, Ca 94063-4603
(800) 822 3940
(650) 365-6567 (Tel)
(650) 365-5845 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User

U.S. Army
U.S. Marine Corp.

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Ammonia
Diborane
Hydrogen Bromide
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Sulfide
Sulfur Dioxide

Medium Hazard Index TIMs Detected

Allyl Alcohol
Carbon Monoxide
Phosphine

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detection range is in between 3-5 ppm (v) (Above IDLH)
Resistance to Interferents	Detects all volatile organic compounds specific with charcoal tube detector
Start-up Time	10 seconds
Response Time	10-60 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.6 in x 4.1 in x 2.4 in
Weight	2 pounds
Power Requirements	12V DC or 110 V AC

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	No information available
Consumables Required	None
Calibration Required	Yes (with standard gases)
Repairs Required	By manufacturer only
Shelf Life	Indefinite
Unit Cost	$1400 plus minimal training cost
Maintenance Cost	$100 to $200 per year for maintenance and $100/year for support

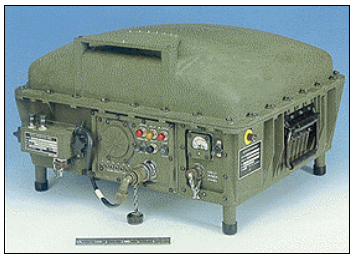
Special Requirements

Operator Skills Required	Non-technical background (with some special training)
Training Required	Non-formal (Good manual)

Training Available	Manual is sufficient
Manuals Available	TM 3-6665-315-10 Operator's Manual TM 3-6665-315-23&P Unit and Direct Support Maintenance Manual
Support Equipment	None
Communications Interface Capability	Interface to computer
Tamper Resistance	No information available
Warranty	90 Days
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *M21 Automatic Chemical Agent Alarm*



Detector ID # 40

Detector Type Military

Technology Fourier Transform Infrared Spectroscopy

Manufacturer

Intellitec
2000 Brunswick Lane
Deland, FL 32724
POC: Ron Nekula
(904) 736-1700 (Tel)
(904) 736-2250 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User U.S. Army, U.S. Marine Corps

Operational Parameters

Chemical Agents Detected

GA
GB
GD
HD
L

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State

Vapor

Sensitivity

The M21 responds to the product of concentration times path length (one cannot be specified without the other)

Detects GA at 90 mg/mL2
Detects GB at 90 mg/mL2
Detects GD at 90 mg/mL2
Detects HD at 2300 mg/mL2
Detects L at 500 mg/mL2
Detects GA at 12 ppm (v) (Above IDLH
Detects GB at 15.3 ppm (v) (Above IDLH)
Detects GD at 13.5 ppm (v) (Above IDLH)
Detects HD at 460 ppm (v) (No IDLH)
Detects L at 50 ppm (v) (No IDLH)

Resistance to Interferents

The M21 is "trained" to recognize agent in the presence of most common battlefield interferants. However, large quantities of military Halon (a fire suppressant), organophosphorus insecticides, and alcohols could cause a false positive. The presence of direct, low angle sunlight in the field of view may cause blister false alarms.

Start-up Time

3-14 minutes

Response Time

Less than 1 minute

Alarm Capability

Audible alarm
Visual alarm

Physical Parameters

Size

Detector - 19 in x 21 in x 13 in
Transit Case - 30 in x 30 in x 22 in
Tripod Bag Assembly - 36 in x 10 in x 10 in

Weight

Detector-54 pounds

Transit Case-51 pounds

Tripod Bag Assembly-41pounds

Power Requirements

Requires power source with 80 watts instantaneous power capacity.

Logistical Parameters

Transportability

Stand-off Detection

Durability

Designed to be operated in harsh environments.
Should only be transported in a transit case.

Environmental Conditions

-25.6°F to 120.2°F (operating temperature)

-41.8°F to 140°F (storage temperature)

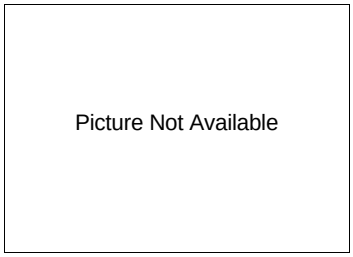
Consumables Required	None
Calibration Required	None
Repairs Required	Periodic purging and recharging with dry nitrogen may be required
Shelf Life	> 10 years
Unit Cost	Currently out of production. Price dependent on quantity
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Minimal half day training recommended.
Training Available	Sellf directed Operator and Unit/DS Maintenance training CD-ROMs are available
Manuals Available	TM 3-6665-315-10 Operator's Manual, TM 3-6665-315-23&P Unit and Direct Support Maintenance Manual
Support Equipment	Power source The Tripod Bag contains the detector tripod, the M42 Remote Alarm and miscellaneous items of support equipment.
Communications Interface Capability	A RS-232 cable allows data to be communicated with a PC.
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *AN/KAS-1/AN/KAS-1A Chemical Warfare Directional Detector*



Detector ID # 41

Detector Type Military

Technology Forward Looking Infrared (FLIR) with Spectral Filtering

Manufacturer
Intellitec
2000 Brunswick Lane
Deland, FL 32724
POC: Ron Nekula
(904) 736-1700 (Tel)
(904) 736-2250 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User U.S. Navy

Operational Parameters

Chemical Agents Detected
GA
GB
GF
GD
VX

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Dependent on the environmental conditions that are present.
Resistance to Interferents	Operator dependent Water vapors, and other components structurally similar to agent may cause interferents Based on Operator skill and experience
Start-up Time	Less than 10 minutes
Response Time	Based on operator skill and cloud density
Alarm Capability	Visual alarm

Physical Parameters

Size	Sensor - 18 in x 20 in x 18 in Power Control Unit - 12 in x 20 in x 7 in
Weight	Sensor-27.94 pounds Power Control Unit - 18.04 pounds
Power Requirements	115 VAC, 60 Hz

Logistical Parameters

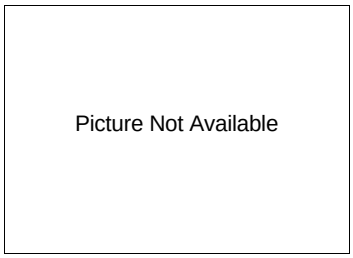
Transportability	Stand-off Detection
Durability	MIL-STD-810C, MIL-STD-901
Environmental Conditions	-54.4°F to 125.6°F (operating temperature) -65.2°F to 154.4°F (storage temperature)
Consumables Required	Lens cleaner, purge gas, lens pad, and lamp kit (6 & 115 V)
Calibration Required	None
Repairs Required	Yes
Shelf Life	No information available
Unit Cost	Currently out of production. Price dependent on quantity
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background (with some special training)
Training Required	Formal Mandatory
Training Available	Yes
Manuals Available	User manual
Support Equipment	Carrying case Dry nitrogen purse kit Lens cleaning material
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Air Sentry-FTIR*



Detector ID # 42

Detector Type Military

Technology Infrared Spectroscopy (Fourier Transform)

Manufacturer
Environmental Technologies Group, Inc.
1400 Taylor Avenue
Baltimore, MD 21234
POC: Tom Brown
(410)-321-5200 (Tel)
(410) 321-5255 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State Vapor

	Aerosol
Sensitivity	Depends on concentration and path length.
Resistance to Interferents	No information available
Start-up Time	Less than 10 seconds (does not include start time)
Response Time	Less than 1 minute
Alarm Capability	No information available

Physical Parameters

Size	Fourier Transform Spectrometer - 24 in x 18 in x 12 in Telescope - 24 in x 15 in
Weight	Fourier Transform Spectrometer- 165 pounds
Power Requirements	240 VAC, 4 Amps, 50/60 Hz

Logistical Parameters

Transportability	Stand-off Detection
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Purge gas, liquid nitrogen
Calibration Required	Frequent baseline checks
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	$98,500
Maintenance Cost	No information available

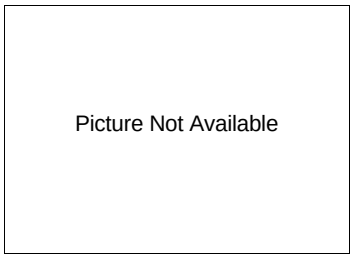
Special Requirements

Operator Skills Required	Technical background
Training Required	Formal
Training Available	No information available
Manuals Available	No information available

Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Laser Remote Detector (LIDAR)*



Detector ID # 43

Detector Type Military

Technology Light Detection and Ranging

Manufacturer Research Institute 070 BRNO
P.O. BOX 547
602 00 BRNO
Czech Republic
POC: Jiri Kadlcak, PhD
420 5 4118 3086/3159 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected GA
GB
GD
VX

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Depends on concentration (C) and path length (L). GB C x L = 40 mg/m3 x m VX C x L = 72 mg/m3 x m
Resistance to Interferents	All agents having strong absorption in the spectral region of the laser beam wavelength could interfere.
Start-up Time	20 minutes (does not include initial setup)
Response Time	30 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	39 in x 30 in x 32 in
Weight	198 pounds
Power Requirements	Battery powered, house current, or small generator

Logistical Parameters

Transportability	Stand-off Detection
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Helium Carbon dioxide Nitrogen gas
Calibration Required	By the manufacturer
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	$120,000-$150,000
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Technical background
Training Required	Formal Mandatory

Training Available	No information available
Manuals Available	No information available
Support Equipment	None
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Kodiak 1200*

Detector ID # 44

Detector Type Commercial

Technology Mass Spectrometry

Manufacturer

Bear Instruments, Inc.
3645 Enochs Street
Santa Clara, Ca 95051
(408) 773-0461 (Tel)
(408) 773-0463 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected

GA
GB
GD
GF
VX
H
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected	No information available
Detection State	Vapor Aerosol Liquid
Sensitivity	Detection should be in the low ppb range
Resistance to Interferents	No information available
Start-up Time	5 minutes
Response Time	Less than 60 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	18 in x 25 in x 15 in
Weight	132 pounds
Power Requirements	1000 VAC 50/60 Hz

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	59°F to 95°F (operating temperature)
Consumables Required	Filaments
Calibration Required	Self calibrating, once a month
Repairs Required	None
Shelf Life	5 years
Unit Cost	$150,000
Maintenance Cost	$2000/year

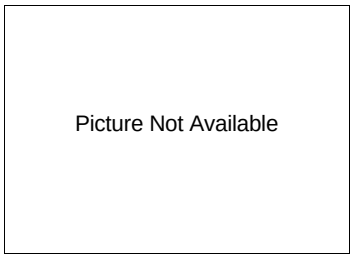
Special Requirements

Operator Skills Required	Non-technical background (with some special training)
Training Required	Formal

Training Available	Yes
Manuals Available	User manual
Support Equipment	Gas Chromatograph
Communications Interface Capability	Capable of interfacing with a Data Communications system
Tamper Resistance	Yes (optional)
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *API 365*



Detector ID # 45

Detector Type Commercial

Technology Mass Spectrometry

Manufacturer
Pe Sciex
71 Four Valley Drive
Concord, Ontario, Canada
L4K4V8
(905)-660-9005 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
GF
VX
H
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected	No information available
Detection State	Vapor Aerosol Liquid
Sensitivity	This detector has not been tested against chemical warfare agents. However, analytical equipment of this type should be able to detect all chemical warfare agents.
Resistance to Interferents	No information available
Start-up Time	20 minutes
Response Time	Less than 5 seconds
Alarm Capability	No information available

Physical Parameters

Size	20 in x 53 in x 22 in
Weight	224.4 pounds
Power Requirements	120 VAC

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Yes
Calibration Required	Yes
Repairs Required	By manufacturer only
Shelf Life	No information available
Unit Cost	$280,000
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background (with some special training)

Training Required	Formal
Training Available	No information available
Manuals Available	TM 3-6665-315 Operator's Manual TM 3-6665-315-23&P Unit and Direct Support Maintenance Manual
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Agilent 6890-5973, GC/MSD*

Detector ID # 46

Detector Type Commercial

Technology Gas Chromatography/Mass Spectrometry

Manufacturer

Agilent Technologies - Subsidiary of Hewlett-Packard
2850 Centerville Road,
Wilmington, DE 19808
POC: Mr. Bill Arnold
bill_arnold@agilent.com
www.chem.agilent.com/cag/main.html
(410) 362-7594 (Tel)
(410) 362-7650 (Fax)

Source

1) Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

2) Bill Arnold - Sales Representative for Agilent Technologies
Chemical Defense Team

bill_arnold@agilent.com
www.chem.agilent.com/cag/main.html

Availability Commercially available

Current User

Marine CBIRF Vans, US Army RTAP
US Army SBCCOM - Egdewood Arsenal Monitoring Branch
- Toxicology
- Medical Research Institure for Chemical Defense
- Forensic Analytical Center
- Technical Escort Unit
- Chemical Demil Training Facility

Operational Parameters

Chemical Agents Detected

GA
GB
GD
GF
VX
H

	HD HN L
Biological Agents Detected	None
High Hazard Index TIMs Detected	Most organic compounds
Medium Hazard Index TIMs Detected	No information available
Low Hazard Index TIMs Detected	No information available
Detection State	Vapor Aerosol Liquid
Sensitivity	The sensitivity is less than 0.2 TWA for all chemical warfare agents.
Resistance to Interferents	Highly selective Ploitive identification with spectral confirmation
Start-up Time	4 hours
Response Time	5 to 30 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	MSD with the GC - 20 in x 39 in x 22 in
Weight	Approximately 200 pounds for entire system
Power Requirements	120 VAC, 20 Amps

Logistical Parameters

Transportability	Fixe-Site Analytical 2 man transportable, mobile laboratory
Durability	Can be packaged in hardened cases for commercial air transport. Has also been mounted and used in Mobile Laboratory.
Environmental Conditions	Climate control that is human habital - e.g. 32°F to 95°F
Consumables Required	Chromatography supplies

Calibration Required	None
Repairs Required	By the manufacturer
Shelf Life	Indefinite
Unit Cost	$85,000-$100,000
Maintenance Cost	$10,000 per year

Special Requirements

Operator Skills Required	Chemist or other scientific background preferred. System can be operated remotely by scientist while having field technician follow instructions.
Training Required	2 - 4 weeks
Training Available	Yes
Manuals Available	No information available
Support Equipment	None
Communications Interface Capability	Local Area Network (LAN), Inter/Intra net, modem
Tamper Resistance	Password protected
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *HP 6890*

Detector ID # 47

Detector Type Commercial

Technology Gas Chromatography with Flame Photometry

Manufacturer Hewlett-Packard Co.
3701 Koppers Street
Baltimore, MD 21227
POC: Mr. Bill Arnold
(410) 362-7594 (Tel)
(410) 362-7650 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State	Vapor Liquid
Sensitivity	Detects GB at 0.000017 ppm (v) (Below IDLH) Detects VX at 0.00001 ppm (v) (Below IDLH) Detects HD at 0.00012 ppm (v) (No IDLH) Detects GA at 0.000013 ppm (v) (Below IDLH) Detects GD at 0.000015 ppm (v) (Below IDLH)
Resistance to Interferents	No information available
Start-up Time	2 hours
Response Time	Less than 30 minutes
Alarm Capability	Audible alarm

Physical Parameters

Size	20 in x 23 in x 20 in
Weight	Approximately 99 pounds for the system
Power Requirements	110 VAC

Logistical Parameters

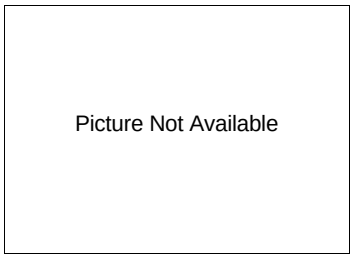
Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	-4°F to 95°F @ 0 to 95 % relative humidity (operating temperature)
Consumables Required	Helium Hydrogen Nitrogen GC columns Ferrules Injection port liners Standards for calibration
Calibration Required	Yes
Repairs Required	Periodic column maintenance
Shelf Life	Not applicable
Unit Cost	$35,000
Maintenance Cost	$2000/year

Special Requirements

Operator Skills Required	Technical background
Training Required	Formal
Training Available	Yes
Manuals Available	User manual
Support Equipment	Helium or Nitrogen carrier gas
Communications Interface Capability	Data system is Windows NT based. Can output results via TCP/IP or modem. Results output can be to Excel or database
Tamper Resistance	Yes
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Automatic Continuous Air Monitoring System (ACAMS)*



Detector ID # 48

Detector Type Military

Technology Gas Chromatography with Flame Photometry

Manufacturer

Abb Process Analytics
843 North Jefferson St.
P.O. Box 843
Lewisburg, WV 24901
POC: John Barnes
(304) 647-1709 (Tel)
(304) 645-4988 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User U.S. Army Chemical Demilitarization Facilities

Operational Parameters

Chemical Agents Detected

GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State	Vapor Aerosol
Sensitivity	Detects HD at 0.0006 ppm (v) (No IDLH) Detects GB at 0.000017 ppm (v) (Below IDLH) Detects VX at 0.00001 ppm (v) (Below IDLH)
Resistance to Interferents	The ACAMS may false alarm to some ambient volatile compounds and some organic compounds.
Start-up Time	One or two days for equipment to become operational from a cold start
Response Time	Detects GB and HD at their TWA concentrations in 3 minutes Detects VX at the TWA concentration in 5 minutes Detects GB, VX, and HD at their IDLH concentrations in 2 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	ACAMS Monitor - 17 in x 19 in x 9 in Strip Chart Recorder - 11 in x 7 in x 5 in Sample Pump - 18 in x 6 in x 6 in Computer Interface - 6 in x 7 in x 5 in
Weight	70.4 pounds
Power Requirements	115 VAC (approximately 600 watts)

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	Very rugged; designed for use in harsh environments
Environmental Conditions	No information available
Consumables Required	Support gases (hydrogen, nitrogen, and air)
Calibration Required	Yes
Repairs Required	Yes
Shelf Life	Indefinite
Unit Cost	$35,000
Maintenance Cost	No information available

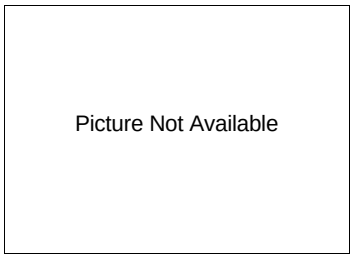
Special Requirements

Operator Skills Required	Technical background

Training Required	Formal (2 week operational training)
Training Available	Yes
Manuals Available	User manual
Support Equipment	Sample system
Communications Interface Capability	Capable of interfacing with a data communication system
Tamper Resistance	None
Warranty	1 year
Testing Information	Complete test data available
Applicable Regulations	None

General

Detector Name *Dual-Flame Photometric Detector*



Detector ID # 49

Detector Type Commercial

Technology Gas Chromatography with Flame Photometry

Manufacturer SRI Instruments, Inc.
20720 Earl St.
Torrance, Ca 90503
POC: Hugh Goldsmith
(310) 214-5092 (Tel)
(310) 214-5097 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State Vapor

	Aerosol Liquid
Sensitivity	Validation of testing with chemical agents is unknown. The expected sensitivity of this instrument is 1 ppb with concentrator, 1 ppm without concentrator
Resistance to Interferents	Dependent on chromatography column used. FPD detection should be sensitive to nerve and sulfur based blister agents. Sulfur gases could cause interference.
Start-up Time	20 minutes
Response Time	1 to 10 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	8610 GC Series -19.5 in x 14.5 in x 12.5 in 310 GC Series - 12.5 in x 14.5 in x 12.5 in
Weight	8610 GC Series 88-338.8 pounds depending on configuration 3110 GC Series 66-242 pounds depending on configuration
Power Requirements	120 VAC or 220 VAC, or operated from generator or inverter

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Compressed gases
Calibration Required	Yes
Repairs Required	By manufacturer only
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

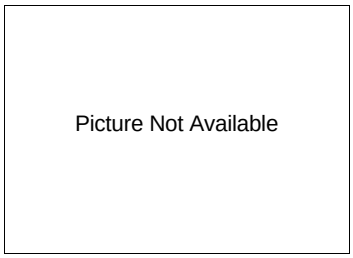
Special Requirements

Operator Skills Required	Technical background
Training Required	Formal

Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Photovac Snapshot Hand Held Gas Chromatograph*



Detector ID # 50

Detector Type Commercial

Technology Gas Chromatography

Manufacturer The Perkin-Elmer Corporation
Chromatography Division
761 Main Avenue, M/S 270
Norwalk, CT 06859-0270
(203) 775-4642 (Tel)
(203) 761-2678 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State Vapors

	Aerosols
Sensitivity	Validation of testing with chemical warfare agents is unknown. This instrument is expected to be highly sensitive and should detect concentrations close to the 8 hour Time Weighted Average (TWA). HD - 5 x 10(-4) ppm(v) (No IDLH) GB - 2 x 10(-5) ppm(v) (Below IDLH) VX - 9 x 10(-7) ppm(v) (Below IDLH)
Resistance to Interferents	No information available
Start-up Time	Less than 10 minutes (does not include initial setup)
Response Time	Less than 60 minutes
Alarm Capability	Visual alarm

Physical Parameters

Size	No information available
Weight	<22 pounds
Power Requirements	Battery powered

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Carrier gases
Calibration Required	Yes
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	$500-$2000
Maintenance Cost	No information available

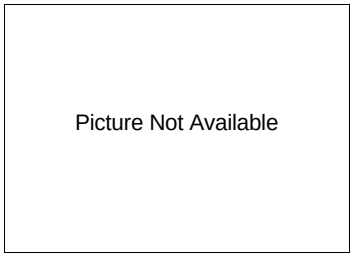
Special Requirements

Operator Skills Required	Technical background
Training Required	Formal

Training Available	No information available
Manuals Available	User manual
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Scentoscreen (Gas Chromatography) with Argon Ionization Detector*



Detector ID # 51

Detector Type Commercial

Technology Gas Chromatography with Mass Spectrometry

Manufacturer Sentex Systems, Inc.
553 Broad Ave.
Ridgefield, NJ 07657
POC: Dr. Amos Linenberg
(973) 439-0140 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State	Vapor Aerosol Liquid
Sensitivity	Detects HD at 0.010 ppm (v) (No IDLH) Detects GB at 0.03 ppm (v) (At IDLH)
Resistance to Interferents	Dependent on chromatography column used. Molecules with an identical retention time as the agents can act as interferants.
Start-up Time	30 minutes
Response Time	Less than 2 minutes
Alarm Capability	No information available

Physical Parameters

Size	6.5 in x 13.5 in x 19.5 in
Weight	48.4 pounds
Power Requirements	Battery powered

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Argon gas (ultra high purity) Syringes Tedlar bags Water vials
Calibration Required	Yes (recommended every 12 hours)
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	$17,525 plus $950 + costs for on-sight training (free training at factory)
Maintenance Cost	$1,000/Year + 8% of purchase price per year for technical support

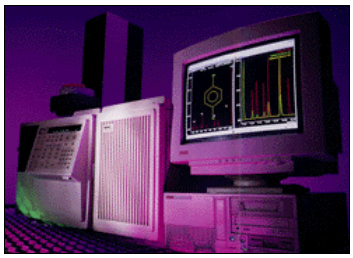
Special Requirements

Operator Skills Required	Technical background
Training Required	Formal

	Mandatory (by manufacturer)
Training Available	Yes
Manuals Available	User manual
Support Equipment	Battery charger
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Saturn 2000*



Detector ID # 52

Detector Type Commercial

Technology Gas Chromatography with Mass Spectrometry

Manufacturer

Varian Chromatography Systems
505 Julie Rivers Rd. # 150
Sugarland, Tx 77478
(800) 926-3000 (Tel)
(281) 240-6752 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected

GA
GB
GD
VX
H
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected	No information available
Detection State	Vapor Aerosol Liquid
Sensitivity	This detector has not been tested against chemical warfare agents. The estimated sensitivity is based on the technology and is below the 8 hour TWA.
Resistance to Interferents	Little interference, low probability of false alarms
Start-up Time	0.5 to 8 hours
Response Time	Approximately 30 minutes after the injection of sample
Alarm Capability	No information available

Physical Parameters

Size	48 in x 24 in x 22 in
Weight	Approximately 154 pounds
Power Requirements	110 VAC, 20 Amps

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Ultra pure helium, standards, and lab-ware
Calibration Required	Yes
Repairs Required	Qualified Varian engineer for other than routine maintenance
Shelf Life	No information available
Unit Cost	$65-82k plus Operator Training course $1,800/week/person for operator course ($1,440/day on site)
Maintenance Cost	$4,200/year for maintenance

Special Requirements

Operator Skills Required	Technical background

Training Required	Formal Mandatory (Operators course)
Training Available	Yes
Manuals Available	User manual
Support Equipment	Ultra pure helium in tank Miscellaneous lab-ware GC equipment
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *HP 2350 Atomic Emission Detector*

Detector ID # 53

Detector Type Commercial

Technology Gas Chromatography with Mass Spectrometry

Manufacturer

Hewlett-Packard Co.
3701 Koppers Street
Baltimore, MD 21227
POC: Mr. Bill Arnold
(410) 362-7594 (Tel)
(410) 362-7650 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected

GA
GB
GD
VX
H
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected	No information available
Detection State	Vapor Aerosol Liquid
Sensitivity	Manufacturer stated that the instrument has been tested against chemical warfare agents. The sensitivity indicated by the manufacturer is 0.2 TWA for a 5 liter sample of chemical warfare agents .
Resistance to Interferents	No information available
Start-up Time	4-6 hours
Response Time	3-5 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	23 in x 20 in x 16 in
Weight	Entire unit approximately 253 pounds
Power Requirements	110 VAC, 20 Amp

Logistical Parameters

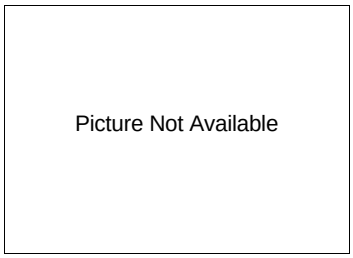
Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Bottled gas and other GC consumables
Calibration Required	Yes
Repairs Required	By manufacturer
Shelf Life	No information available
Unit Cost	$80,000 plus $10k for on site training ($2k for off site)
Maintenance Cost	$6,000/year plus $3,000/year for support

Special Requirements

Operator Skills Required	Technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Infrared Detector for Gas Chromatograph*



Detector ID # 54

Detector Type Commercial

Technology Gas Chromatography with Infrared Spectrometry

Manufacturer Biorad, Digilab Division
237 Putnam Ave.
Cambridge, MA 02139
(800) 225-1248 (Tel)
(617) 234-7045 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected	No information available
Detection State	Vapor Aerosol Liquid
Sensitivity	This detector has not been tested against chemical warfare agents. It will detect nanogram quantities of organics and therefore should detect similar quantities of chemical warfare agents.
Resistance to Interferents	No false alarms
Start-up Time	30 minutes
Response Time	Limited by the gas chromatograph
Alarm Capability	Visual alarm

Physical Parameters

Size	13 in x 30 in x 30 in (does not include a Gas Chromatograph)
Weight	116.6 pounds (does not include a Gas Chromatorgraph)
Power Requirements	Two 110 VAC lines with stabilized voltage

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	4 liters liquid nitrogen per day
Calibration Required	Yes
Repairs Required	Yes
Shelf Life	No information available
Unit Cost	Approximately$90,000 complete with computer system and spectral libraries(does not include a Gas Chromatograph)
Maintenance Cost	$1,500/tune-up (once per year) + cost of liquid nitrogen

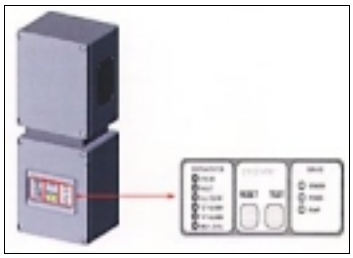
Special Requirements

Operator Skills Required	Technical background

Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Gas Chromatograph and computer system
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *CW Sentry*



Detector ID # 56

Detector Type Commercial

Technology Surface Acoustic Wave

Manufacturer
Microsensor Systems, Inc
1818 South Highway 441 Apopka, Fl. 32703
POC Shane Smith
(407) 884-3392 (Tel)
(407) 886-7061(Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
GF
VX
HD
HN-3

Biological Agents Detected None

High Hazard Index TIMs Detected
Arsine
Chlorine
Diborane
Ethylene Oxide
Fluorine
Hydrogen Cyanide
Phosgene
Sulfur Dioxide

Medium Hazard Index TIMs Detected	None
Low Hazard Index TIMs Detected	Cyanogen Chloride
Detection State	Vapor Aerosol
Sensitivity	Detects GA at 0.0133 ppm (v) (Below IDLH) Detects GB at 0.017 ppm (v) (Below IDLH) Detects GD at 0.015 ppm (v) (Above IDLH) Detects VX at 0.01 ppm (v) (Above IDLH) Detects HD at 0.09 ppm (v) (No IDLH) Detects HN-3 at 0.06 ppm (v) (No IDLH) Detects Arsine at 3 ppm (v) (At IDLH) Detects Chlorine at 3.44 ppm (v) (Below IDLH) Detects Diborane at 10.2 ppm (v) (Below IDLH) Detects Ethylene Oxide at 5.6 ppm (v) (Below IDLH) Detects Fluorine at 6.33 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 9 ppm (Below IDLH) Detects Phosgene at 2 ppm (v) (At IDLH) Detects Sulfur Dioxide at 4 ppm (v) (Below IDLH)
Resistance to Interferents	SAW sensors - > 95% resistance to interferents; Electrochemical cells - less selective-depends on the selected cell
Start-up Time	60-90 seconds
Response Time	Two modes: 2 minutes for Sensitive mode 20 seconds for Fast Response
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	0.64 cubic feet
Weight	25.08 pounds
Power Requirements	Requires external battery power - 24 volts DC @ 0.3 A to 2.0A max

Logistical Parameters

Transportability	Fixed-Site Detection
Durability	Designed to operate in a controlled environment. Additional modifications are required to operate outdoors.
Environmental Conditions	14°F to 122°F @ 0 to 95% relative humidity

Consumables Required	Sensors
Calibration Required	SAW Sensors - No Calibration Electrochemical Cells - every 6 months (sold as an option)
Repairs Required	If electrochemical cell option is exercised, replacement of the sensor will be required every 1-2 years
Shelf Life	5 years operating 10 years non-operating
Unit Cost	Depending on options - $15,000 to $20,000
Maintenance Cost	If electrochemical cell option is exercised, replacement of the sensor will be about $200 a piece.

Special Requirements

Operator Skills Required	Non-technical background
Training Required	30 minutes of training is required
Training Available	Yes
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	RS232 interface. Designed to integrate with common security and fire systems.
Tamper Resistance	None
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *4100 Vapor Detector*

Detector ID # 57

Detector Type Commercial

Technology Gas Chromatography with Surface Acoustic Wave Detection

Manufacturer
Electronic Sensor Technology
1077 Business Center Circle
Newbury Park, CA 91320
(805) 480-1994 (Tel)
(805) 480-1994 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GB
GD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	This detector has not been tested against chemical warfare agents. The sensitivity is in the low ppb level for most industrial compounds. However, this instrument can detect as low as the ppt level.
Resistance to Interferents	Gas chromatograph separates CW agents from interferents.
Start-up Time	20 minutes
Response Time	10 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	20 in x 14 in x 9.8 in
Weight	35.2 pounds
Power Requirements	90 V-260 V AC

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	32°F to 104°F @ 0 to 99 % relative humidity
Consumables Required	Helium gas
Calibration Required	Yes
Repairs Required	None
Shelf Life	No information available
Unit Cost	$18,000 to $31,000
Maintenance Cost	~ $90.00/year

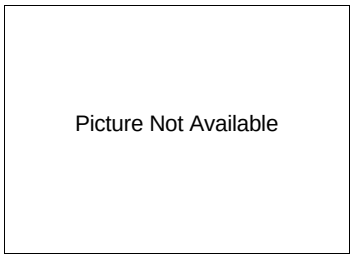
Special Requirements

Operator Skills Required	Non-technical background when using EST method and calibration
Training Required	Formal
Training Available	Yes (3 day classroom training)
Manuals Available	User manual

Support Equipment	Pentium or greater class lap top personal computer running Windows 98 or Windows 2000
Communications Interface Capability	An RS-232 port allows data to be sent to a PC.
Tamper Resistance	Password protection available on System Controller.
Warranty	1 year parts and labor
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *7100 Vapor Detector*



Detector ID # 58

Detector Type Commercial

Technology Gas Chromatography with Surface Acoustic Wave Detection

Manufacturer
Electronic Sensor Technology
1077 Business Center Circle
Newbury Park, CA 91320
(805) 480-1994 (Tel)
(805) 480-1994 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GB
GD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	This detector has not been tested against chemical warfare agents. The sensitivity is in the low ppb level for most industrial compounds. However, this instrument can detect as low as the ppt level.
Resistance to Interferents	Gas chromatograph separates CW agents from interferents.
Start-up Time	20 minutes
Response Time	10 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	14.2 in x 7.5 in x 14.2 in
Weight	29.92 pounds
Power Requirements	90 V-260 V AC

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	32°F to 104°F @ 0 to 99 % relative humidity
Consumables Required	Helium gas
Calibration Required	Yes
Repairs Required	None
Shelf Life	No information available
Unit Cost	$18,000 to $31,000
Maintenance Cost	~ $90.00/year

Special Requirements

Operator Skills Required	Non-technical background when using EST method and calibration
Training Required	Formal
Training Available	Yes (3 day classroom training)
Manuals Available	User manual

Support Equipment	Pentium or greater class lap top personal computer running Windows 98 or Windows 2000
Communications Interface Capability	An RS-232 port allows data to be sent to a PC.
Tamper Resistance	Password protection available on System Controller.
Warranty	1 year parts and labor
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Century TVA-1000 Toxic Vapor Analyzer*

Detector ID # 59

Detector Type Commercial

Technology Photoionization

Manufacturer

The Foxboro Company
P.O. Box 500
East Bridgewater, MA
(508) 378-5556 (Tel)
(508) 378-5505 (Fax)

Source

1. Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

2. Testing of Commercially Available Detectors Against Chemical Warfare Agents: Summary Report, February 1999 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected

GA
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State	Vapor Aerosol
Sensitivity	Detects GA at 0.61 ppm (v) (Above IDLH) Detects HD at 0.29 ppm (v) (No IDLH)
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	3.5 seconds
Alarm Capability	No information available

Physical Parameters

Size	13.5 in x 10 in x 3.2 in
Weight	12.32 pounds
Power Requirements	Rechargeable NiCAD battery

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Hydrogen source, rechargeable lithium NiCAD battery.
Calibration Required	Yes
Repairs Required	No information specified
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual

Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *AP2C CW Detector*

Detector ID # 60

Detector Type Military and Commercial

Technology Flame spectrophotometer

Manufacturer

Giat Industries
4600 No. Fairfax Drive
Suite 400
Arlington, VA 22203
POC: Julian D. Wynnyckyj
(703) 525-4444 (Tel)
(703) 525-2349 (Fax)

www.centechgroup.com

Source Giat Industries

Availability Commercially available (subject to end-user certificate)

Current User French Armed Forces and Civil Defense, Sweden Armed Forces and Civil Defense, Singapore Armed Forces, Israel Armed Forces and Civil Defence, Australia Security Forces

Operational Parameters

Chemical Agents Detected

GA
GB
GD
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor Liquid
Sensitivity	Detects GA at 0.002 ppm (v) (Below IDLH) Detects GB at 0.002 ppm (v) (Below IDLH) Detects GD at 0.001 ppm (v) (No IDLH) Detects HD at 0.06 ppm (v) (Above IDLH) Detects VX at 0.001 ppm (v) (Below IDLH)
Resistance to Interferents	Sulfur and phosphorus containing compounds can act as interferents.
Start-up Time	15 seconds
Response Time	2 seconds
Alarm Capability	ADAC adaptor inserted in place of AP2C battery compartment to convert into Chemical Control and Alarm Detector

Physical Parameters

Size	12.6 in x 6.7 in x 8.7 in
Weight	9.68 pounds (including battery)
Power Requirements	Lithium-thionyl chloride battery (24 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	Military Specifications; Rugged NATO Standard
Environmental Conditions	Unaffected by environment; -25°F to 131°F (operating temperature) -38°F to 160°F (storage temperature)
Consumables Required	Hydrogen Gas
Calibration Required	Every 5 years
Repairs Required	None
Shelf Life	15 years
Unit Cost	$19,998.71 (Includes 2 year free maintenance/ 4 free refills of H2 Canisters, 1 free calibration)
Maintenance Cost	N/A

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Users Manual/CD ROM Training
Training Available	CD ROM Training/ Users Manual
Manuals Available	CD ROM Training/Users manual available
Support Equipment	Kit includes: AP2C Monitor, H2 Canisters, Lithium Batteries, S4PE for liquid monitoring, packs of 10 operational scrapers, packs of 10 simulant scrapers, 2 lithium batteries for S4PE, belt, buzzer clip, S4PE pipes, strap, users manual/training CD ROM, Carrying case.
Communications Interface Capability	ADAC
Tamper Resistance	None
Warranty	1 year
Testing Information	The U.S. Army Edgewood Chemical and Biological Center (ECBC) is planning on testing the AP2C Chemical Agent Detector Kit in FY 2000. TNO, Netherlands, CEB France, Israel, Swecen, and Singapore
Applicable Regulations	Requires end-user certification.

General

Detector Name *ADLIF System*

Detector ID # 61

Detector Type Military

Technology Flame Photometry

Manufacturer
Proengin SA
Attn: Mr. Fernand Nerbonne
3 Rue de l'Industrie
78210 Saint-Cyr L'Ecole, France
011 33 1 30 58 47 34 (Tel)
011 33 1 30 58 93 51 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
H
HD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor Aerosol
Sensitivity	Detects GB at 0.0007 ppm (v) (Below IDLH) Detects GA at 0.0008 ppm (v) (Below IDLH) Detects GD at 0.0007 ppm (v) (Below IDLH) Detects VX at 0.0004 ppm (v) (Below IDLH) Detects HD at 0.06 ppm (v) (No IDLH)
Resistance to Interferents	Sulfur and phosphorus containing compounds can act as interferents.
Start-up Time	1 hour
Response Time	2 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	33.5 in x 19.3 in x 16.1 in
Weight	99 pounds
Power Requirements	18 Volt DC to 32 Volt DC External Power Supply

Logistical Parameters

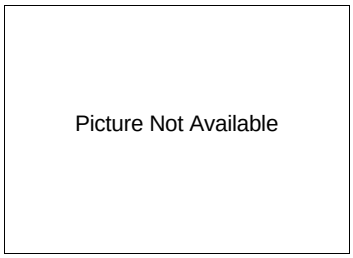
Transportability	Fixed-Site Detection
Durability	Very rugged;designed to be operated in harsh environments
Environmental Conditions	No information available
Consumables Required	Demineralized water
Calibration Required	None
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	Approximately $66,660.00 at a conversion rate of .1666.
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Technical background
Training Required	Non-formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	CAE electrical power box CSC chemical alarm signaling box BRC chemical alarm repetition box
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *5-Step Field Identification Kit 8 Model 2000*



Detector ID # 62

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer Heinz Laboratories International
9090 Mountain View Drive
Atascadero, CA 93422-5006
(805) 466-7330 (Tel)
(805) 460-0619 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State Liquid

Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Visual alarm

Physical Parameters

Size	Contained in portable tote (hand held)
Weight	Less than 2 pounds
Power Requirements	None

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Reagents Test strips
Calibration Required	None
Repairs Required	None
Shelf Life	No information available
Unit Cost	$1,695
Maintenance Cost	No information available

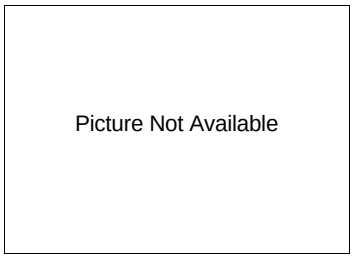
Special Requirements

Operator Skills Required	Non-technical background
Training Required	4-8 hours of training required
Training Available	In house training provided
Manuals Available	User manual
Support Equipment	None

Communications Interface Capability	No information available
Tamper Resistance	None
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Kitagawa Gas Detector Tubes*



Detector ID # 63

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer
Matheson Safety Products
166 Keystone Drive
Montgomeryville, PA 18936
(215) 641-2700 (Tel)
(215) 641-2714 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Arsine
Ammonia
Carbon Disulfide
Chlorine
Diborane
Ethylene Oxide
Formaldehyde
Hydrogen Sulfide
Nitric Acid
Phosgene
Sulfur Dioxide
Hydrogen Cyanide
Hydrogen Chloride

Hydrogen Fluoride
Nitrogen Dioxide

Medium Hazard Index TIMs Detected

Carbon Monoxide
Allyl Alcohol
Carbonyl Sulfide
Hydrogen Selenide
Phosphine

Low Hazard Index TIMs Detected

Bromine

Detection State

Vapor

Sensitivity

Detects Arsine at 0.02 ppm (v) (Below IDLH)
Detects Ammonia at 0.1 ppm (v) (Below IDLH)
Detects Carbon Disulfide at 0.3 ppm (v) (Below IDLH)
Detects Chlorine at 0.01 ppm (v) (Below IDLH)
Detects Diborane at 0.01 ppm (v) (Below IDLH)
Detects Ethylene Oxide at 0.5 ppm (v) (Below IDLH)
Detects Formaldehyde at 0.05 ppm (v) (Below IDLH)
Detects Hydrogen Sulfide at 0.05 ppm (v) (Below IDLH)
Detects Nitric Acid at 0.5 ppm (v) (Below IDLH)
Detects Phosgene at 0.05 ppm (v) (Below IDLH)
Detects Sulfur Dioxide at 0.1 ppm (v) (Below IDLH)
Detects Hydrogen Cyanide at 0.2 ppm (v) (Below IDLH)
Detects Hydrogen Chloride at 0.2 ppm (v) (Below IDLH)
Detects Hydrogen Fluoride at 0.2 ppm (v) (Below IDLH)
Detects Nitrogen Dioxide at 0.1 ppm (v) (Below IDLH)
Detects Carbon Monoxide at 1 ppm (v) (Below IDLH)
Detects Allyl Alcohol at 5 ppm (v) (At IDLH)
Detects Carbonyl Sulfide at 2 ppm (v) (No IDLH)
Detects Hydrogen Selenide at 0.5 ppm (v) (At IDLH)
Detects Phosphine at 0.02 ppm (v) (Below IDLH)
Detects Bromine 0.1 ppm (v) (Below IDLH)

Resistance to Interferents

Some interferences

Start-up Time

15 seconds

Response Time

Less than 60 seconds

Alarm Capability

Visual alarm

Physical Parameters

Size

8 in x 2 in diameter

Weight

Less than 1 pound

Power Requirements

None

Logistical Parameters

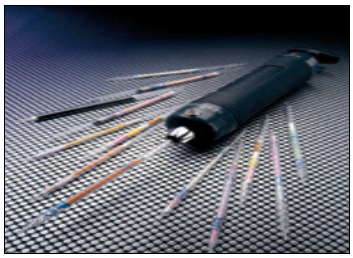
Transportability	Handheld Portable
Durability	Robust
Environmental Conditions	Operates in all environments
Consumables Required	Specific detector tubes
Calibration Required	None
Repairs Required	None
Shelf Life	3 months to 3 years
Unit Cost	< $400
Maintenance Cost	Less than $50 per unit/ per year

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Non-formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Sampling pump
Communications Interface Capability	None
Tamper Resistance	None
Warranty	5 years
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Sensidyne Gas Detection Tubes*



Detector ID # 64

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer

Sensidyne, Inc.
16333 Bay Vista Drive
Clearwater, Fl 34620
(800) 451-9444 (Tel)
(813) 539-0550 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Ammonia
Arsine
Chlorine
Diborane
Ethylene Oxide
Formaldehyde
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Fluoride
Hydrogen Sulfide
Nitric Acid

Medium Hazard Index TIMs Detected

Acrolein
Acrylonitrile
Carbon Monoxide
Carbonyl Sulfide
Hydrogen Selenide
Methyl Bromide
Methyl Mercaptan
Nitrogen Dioxide

Low Hazard Index TIMs Detected

Allyl Isothiocyanate

Detection State

Vapor

Sensitivity

Detects Acrolein at 50-1800 ppm (v) (Above IDLH)
Detects Acrylonitrile at 0.25-35,000 ppm (v) (Below IDLH)
Detects Ammonia at 0.2 ppm-10% (v) (Below IDLH)
Detects Ammonia at 0.2 ppm-10% (v) (Below IDLH)
Detects Arsine at 0.05-160 ppm (v) (Below IDLH)
Detects Bromine at 1-20 ppm (v) (Above IDLH)
Detects Carbon Monoxide at 1 ppm -20% (v) (Below IDLH)
Detects Chlorine at 0.05-40 ppm (v) (Below IDLH)
Detects Carbonyl Sulfide at 5-60 ppm (v) (No IDLH)
Detects Diborane at 0.02-5 ppm (v) (Below IDLH)
Detects Ethylene Oxide at 1-18,000 ppm (v) (Below IDLH)
Detects Formaldehyde at 0.05-1500 ppm (v) (Below IDLH)
Detects Hydrogen Chloride at 0.4-1200 ppm (v) (Below IDLH)
Detects Hydrogen Cyanide at 0.5-30,000 ppm (v) Below IDLH)
Detects Hydrogen Fluoride at 0.25-30 ppm (v) (Below IDLH)
Detects Hydrogen Sulfide at 0.2 ppm-40% (v) (Below IDLH)
Detects Hydrogen Selenide at 0.09-600 ppm (v) (Below IDLH)
Detects Methyl Bromide at 0.5-500 ppm (v) (Below IDLH)
Detects Methyl Mercaptan at 0.5-1000 ppm (v) (Below IDLH)
Detects Nitric Acid at 1-20 ppm (v) (Below IDLH))
Detects Phosgene at 0.5-20 ppm (v) (Above IDLH)
Detects Phosphine at 0.05-700 ppm (v) (Below IDLH)

Resistance to Interferents

No information available

Start-up Time

None

Response Time

No information available

Alarm Capability

Visual alarm

Physical Parameters

Size

No information available

Weight

No information available

Power Requirements

None

Logistical Parameters

Transportability	Handheld Portable
Durability	Lightweight, corrosion-resistant, and spark resistant if dropped.
Environmental Conditions	Operates in all environments
Consumables Required	None
Calibration Required	None
Repairs Required	None
Shelf Life	No information available
Unit Cost	$225 for pump
Maintenance Cost	Less than $50 per unit/ per year

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Non-formal
Training Available	Training video
Manuals Available	User manual
Support Equipment	Sampling pump
Communications Interface Capability	No information available
Tamper Resistance	None
Warranty	Lifetime on pump
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *MSA Gas Detection Tubes*

Detector ID # 65

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer MSA Instrument Division
P.O. Box 427
Pittsburgh, PA 15230
POC: Evan Erickson
(724) 733-9274 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD
L

Biological Agents Detected None

High Hazard Index TIMs Detected
Phosgene
Hydrogen Cyanide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected Cyanogen Chloride

Detection State

Vapor
Aerosol

Sensitivity

Detects GA at 0.0013 ppm (v) (Below IDLH)
Detects GB at 0.0017 ppm (v) (Below IDLH)
Detects GD at 0.0015 ppm (v) (Below IDLH)
Detects VX at 0.001 ppm (v) (Below IDLH)
Detects HD at 0.20 ppm (v) (No IDLH)
Detects L at 0.20 ppm (v) (No IDLH)
Detects Phosgene at 1.24 ppm (v) (Below IDLH)
Detects Hydrogen Cyanide at 4.53 ppm (v) (Below IDLH)
Detects Cyanogen Chloride at 2 ppm (v) (No IDLH)

Resistance to Interferents

False detections are minimal

Start-up Time

Sampling can begin immediately with hand-held pump, Toximeter II, automated pump takes less than one minute to run its self calibration.

Response Time

Color change is immediate after pump stroke have been completed. Some CW agent tubes require up to 5 minutes of pump time (50 strokes).

Alarm Capability

Audible alarm

Physical Parameters

Size

Tubes are 4 inches in length and .25 inches in diameter. Toximeter II is 6 inches high x 3 inches wide x 1 inch thick. Hand pump is 6 inches long x 3 inches in diameter.

Weight

Tubes weigh less than an ounce each. Toximeter and hand pump weigh eight ounces.

Power Requirements

Hand pump requires no power. Toximeter II has a NiCad rechargeable battery and a 110 volt charger. NiCad cells charge in less than 4 hours and can run continuously for over eight hours.

Logistical Parameters

Transportability

Handheld Portable

Durability

Tubes require care to keep from breaking.

Environmental Conditions

Operates in all environments

Consumables Required

Detector tubes

Calibration Required

Toximeter runs a self calibration on start-up, no other requirements are needed. Color changes are clearly marked on the tube boxes.

Repairs Required

None

Shelf Life

Tubes have a four year shelf life. Toximeter II battery has a five +

year life.

Unit Cost Prices vary for the tubes. They are too numerous to list, contact MSA for pricing. All products are on GSA.

Maintenance Cost None

Special Requirements

Operator Skills Required Minimal skill required beyond typical haz mat training.

Training Required Less than one hour

Training Available Video tape is available

Manuals Available User manual

Support Equipment Sampling pump

Communications Interface Capability None

Tamper Resistance None

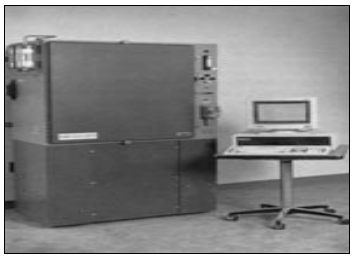
Warranty Pumps carry a one year warrenty.

Testing Information The MSA Gas Detection Tubes have been tested by the U.S. Army Edgewood Chemical and Biological Center (ECBC).

Applicable Regulations None

General

Detector Name *Miran 981B Multipoint , Ambient Air Monitoring System*



Detector ID # 66

Detector Type Commercial

Technology Infrared Spectroscopy (Filter Based)

Manufacturer The Foxboro Company
P.O. Box 500
East Bridgewater, MA
(508) 378-5556 (Tel)
(508) 378-5505 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State Vapor

Sensitivity	Detects Phosgene at 0.05 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0.4 ppm (v) (Below IDLH)
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	1-60 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	No information available
Weight	68.2 pounds
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Detection
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	Yes
Repairs Required	Yes
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Automatic Continuous Environmental Monitor (ACEM) 900*

Detector ID # 67

Detector Type Military

Technology Gas Chromatography

Manufacturer Dynathem Analytical Instrumentation, Inc.
178 S Jennersville Rd
Kelton, PA 19346
(610) 869-8702 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GB
GD
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	IDLH, TWA, GPL (with appropriate Gas Chromatograph configuration)
Resistance to Interferents	Most site specific interferents can be separated with proper GC.
Start-up Time	No information available
Response Time	11-17 minutes
Alarm Capability	None

Physical Parameters

Size	9.25 in x 14.6 in x 15 in
Weight	25 pounds
Power Requirements	120 V, 50/60 Hz, 7.5 amp

Logistical Parameters

Transportability	Fixed-Site Detection
Durability	Must remain stationary (Can be mounted in a Mobile Laboratory)
Environmental Conditions	32°F to 122°F (operating temperature) 5-95% relative humidity
Consumables Required	Sample Collection tubes, focus traps, ferrules, fused silica
Calibration Required	Through ausilliary gas chromatography and software
Repairs Required	Yes
Shelf Life	Indefinite, within range of environmental conditions
Unit Cost	$10,645 (ACEM 900 only)
Maintenance Cost	Average 10% of purchase price/year plus consumables

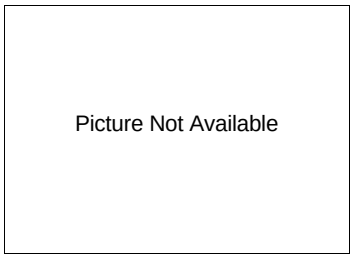
Special Requirements

Operator Skills Required	Technical background
Training Required	Formal
Training Available	Training available on-site or in factory laboratory
Manuals Available	User manual, tutorials, training manual
Support Equipment	Required to operate: Hookup to a gas chromatograph with appropriate software to control analysis and report data.

	Required to operate as continuous monitor: Vacuum interface Model 225 FF/Can; vacuum pump, mass flow controlleror needle valve restrictor and mass flow meter.
Communications Interface Capability	Remote start output to GC, GC ready Input, external sample output, external ready input, RS 232 Interface.
Tamper Resistance	No information available
Warranty	1 year parts and labor
Testing Information	UL/CE Approved
Applicable Regulations	None

General

Detector Name *HP 6890 Series II*



Detector ID # 68

Detector Type Commercial

Technology Gas Chromatography with Mass Spectrometry

Manufacturer
Hewlett-Packard Co.
3701 Koppers Street
Baltimore, MD 21227
POC: Mr. Bill Arnold
(410) 362-7594 (Tel)
(410) 362-7650 (Fax)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GB
GD
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State	Vapor
Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	15 minutes
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	90 pounds
Power Requirements	120 V, 50/60 Hz, 2 amp

Logistical Parameters

Transportability	Vehicle Mounted
Durability	Must remain stationary
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *MM-1 Mobile Mass Spectrometer*

Detector ID # 69

Detector Type Military

Technology Gas Chromatography with Mass Spectrometry

Manufacturer

Bruker Daltonics
Manning Park
Billerica, MA 01821
POC: Brian Abraham, Ph.D.
(978) 667-9580 ext. 464 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User German Army, Navy, and Air Force, U.S Army and Marines, British Army, Israeli Self-Defense Forces, Saudi Arabian Armed Forces

Operational Parameters

Chemical Agents Detected

GA
GB
GD
VX
H
HD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor Aerosol Liquid
Sensitivity	Detects toluene at greater than 10 ppb in air (Below IDLH) Detects CW agents at their IDLH concentrations
Resistance to Interferents	Extremely low interferences due to the use of GC separation and software precautions against the false alarm.
Start-up Time	Greater than 30 minutes
Response Time	Greater than 2 minutes
Alarm Capability	No information available

Physical Parameters

Size	12.5 cubic feet
Weight	319 pounds
Power Requirements	600 watts, 24 VDC

Logistical Parameters

Transportability	Vehicle Mounted
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Technical background
Training Required	Formal

Training Available	No information available
Manuals Available	User manual
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *EM-640 Mobile Mass Spectrometer*

Detector ID # 70

Detector Type Military

Technology Gas Chromatography with Mass Spectrometry

Manufacturer

Bruker Daltonics
Manning Park
Billerica, MA 01821
POC: Brian Abraham, Ph.D.
(978) 667-9580 ext. 464 (Tel)

Source Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

Availability Commercially available

Current User NIST-Gaithersburg MD, OPCW-The Netherlands, other (reference information available upon request).

Operational Parameters

Chemical Agents Detected

GA
GB
GD
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected

Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State

Vapor
Aerosol
Liquid

Sensitivity

No information available

Resistance to Interferents

Mass spectrometry is highly selective. The ability to further perform GC/MS analysis virtually eliminates all false positive and negative alarms.

Start-up Time

<30 minutes

Response Time

Depends on the operation mode. Analysis can be as fast at 30 seconds. Typical analysis range from 5 - 30 minutes.

Alarm Capability

No information available

Physical Parameters

Size

25.2 in x 18 in x 13.2 in

Weight

144 pounds

Power Requirements

System Requires >650W power supply (vehicle, line, generator, battery)

Logistical Parameters

Transportability

Vehicle Mounted

Durability

The EM640S was designed for field use. The system is manufactured to be rugged and withstand shock and vibration.

Environmental Conditions

The EM640S is designed to operate in most conditions where the technician would be comfortable, for example moderate temperatures, not raining, etc.

Temp: 23°F to 104°F (Humidity: <99% non-condensing)

Consumables Required

Carrier gas
Septa
Ferrules
Liners
O-rings

Calibration Required

If the system is to be used for identification, the tune should be checked daily and re-tuned if necessary. The tune should remain stable for up to 30 days. Tuning is performed by the operator and takes ~15 minutes. For quantitation, the calibration should be checked daily and re-calibrated if necessary. Calibration is performed by the operator and the time required will be determined by the Data Quality Objectives.

Repairs Required

System can be maintained on site or returned to factor. Typically

system can be returned to service within 24-72 hours. A mass spectrometer is a high performance sophisticated instrument. Failure modes often occur due to insufficient training. With appropriate training, these are overcome.

Shelf Life The estimated life span of the EM640S is >10 years.

Unit Cost The unit cost of the EM640S with accessories is ~$150,000 - 175,000.

Maintenance Cost Service contracts typically run ~10% of the per unit cost.

Special Requirements

Operator Skills Required Technical background

Training Required A one week training course is required for all users and additional courses in chromatography and mass spectrometry are helpful and recommended for the advanced user.

Training Available Operation, maintenance, advanced and custom courses are offered by the manufacturer.

Manuals Available A technical manual for operation and maintenance of the EM640S is available.

Support Equipment Chromatography supplies such as syringes, chemical standards and calibration compounds. Other supplies are provided with the system.

Communications Interface Capability Communications interfaces can be customized for the EM640S.

Tamper Resistance The EM640S can be set up with extensive security features including password protection and blinded software.

Warranty 1-year parts and labor (depot level) standard. Service Contracts for 2nd year are ~10% of the unit cost.

Testing Information Testing has been conducted by a wide variety of sources. Typically validation testing is application specific and applied for a particular use. The instruments all go through a rigorous validation test in-house before they are delivered to the customer. CWA validation testing was performed by the OPCW as part of their evaluation and selection process.

Applicable Regulations None

General

Detector Name *Viking 573*

Detector ID # 71

Detector Type Commercial

Technology Gas Chromatograph with Mass Spectrometry

Manufacturer
Bruker Daltonics
Manning Park
Billerica, MA 01821
POC: Brian Abraham, Ph.D.
(978) 667-9580 ext. 464 (Tel)

Source http://www.daltonics.bruker.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD
HN

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected Cyanogen Chloride

Detection State

Vapor
Liquids

Sensitivity

No information available

Resistance to Interferents

Mass spectrometry is highly selective. The ability to further perform GC/MS analysis virtually eliminates all false positive and negative alarms.

Start-up Time

<30 minutes

Response Time

Depends on the operation mode. Analysis can be as fast at 10 seconds. Typical analysis range from 5 - 30 minutes.

Alarm Capability

No information available

Physical Parameters

Size

18.5 in x 24 in x 13 in

Weight

85.8 pounds

Power Requirements

System Requires >650W average power with an ~1200W transient at cold startup. (vehicle, line, generator, battery)

Logistical Parameters

Transportability

Fixed-Site Analytical

Durability

The Viking 573 was designed for field use. The system is manufactured to be rugged and withstand shock and vibration.

Environmental Conditions

40°F to 90°F @ 0 to 90% relative humidity (operating temperature)

Consumables Required

Helium gas
GC column
Septa and syringe
Calibration samples

Calibration Required

If the system is to be used for identification, the tune should be checked daily and re-tuned if necessary. The tune should remain stable for up to 30 days. Tuning is performed by the operator and takes ~15 minutes. For quantitation, the calibration should be checked daily and re-calibrated if necessary. Calibration is performed by the operator and the time required will be determined by the Data Quality Objectives.

Repairs Required

System can be maintained on site or returned to factory. Typically system can be returned to service within 24-72 hours. A mass spectrometer is a high performance sophisticated instrument. Failure modes often occur due to insufficient training. With appropriate training, these are overcome.

Shelf Life

The estimated life span of the Viking 573 is >10 years.

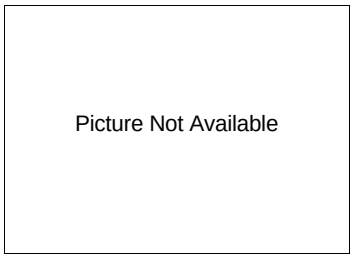
Unit Cost	The unit cost of the Viking 573 with accessories is ~$125,000 - 150,000.
Maintenance Cost	Service contracts typically run ~10% of the per unit cost.

Special Requirements

Operator Skills Required	Technical background
Training Required	A one week training course is required for all users and additional courses in chromatography and mass spectrometry are helpful and recommended for the advanced user.
Training Available	Operation, maintenance, advanced and custom courses re offered by the manufacturer.
Manuals Available	A technical manual for operation and maintenance of the Viking 573 is available.
Support Equipment	None
Communications Interface Capability	A RS-232 cable allows data to be communicated with a PC.
Tamper Resistance	Password protected.
Warranty	1-year parts and labor (depot level) standard. Service Contracts for 2nd year are ~10% of the unit cost.
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Trace Ultra High Sensitivity*



Detector ID # 72

Detector Type Commercial

Technology Gas Chromatography with Fourier Transform Infrared Spectroscopy

Manufacturer Biorad, Digilab Division
237 Putnam Ave.
Cambridge, MA 02139
(800) 225-1248 (Tel)
(617) 234-7045 (Fax)

Source CSEPP Chemical Detection Equipment Assessment Volume II, July 1998 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State Vapor
Aerosol

	Liquid
Sensitivity	Detects HD at 4.6 x 10(-4) ppm (v) (No IDLH) Detects GB at 1.7 x 10(-5) ppm (v) (Below IDLH) Detects VX at 9 x 10(-7) ppm (v) (Above IDLH)
Resistance to Interferents	Dependent on chromatography column
Start-up Time	Less than 10 minutes (does not include initial setup)
Response Time	Less than 1 hour
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	House current

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	Carrier gasses for GC
Calibration Required	Yes
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	$200,000
Maintenance Cost	No information available

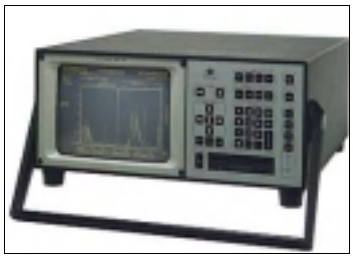
Special Requirements

Operator Skills Required	Technical background
Training Required	Formal
Training Available	No information available
Manuals Available	No information available

Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Innova Gas Analyzer Type 1301*



Detector ID # 73

Detector Type Commercial

Technology Photoacoustic Infrared Spectroscopy

Manufacturer

California Analytical Instruments, Inc.
1238 West Grove Avenue
Orange, California 92865-4134
POC: Hal Peper
(714) 974-5560 (Tel)
(714) 921-2531 (Fax)

Source

1.Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

2.http://www.innova.dk

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected

GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State	Vapors Aerosols
Sensitivity	Detects HD at 0.0005 ppm (v) (No IDLH) Detects GB at 0.00002 ppm (v) (Below IDLH) Detects VX at 9x10(-7) ppm (v) (Below IDLH)
Resistance to Interferents	Highly selective when set up correctly for the environment. False alarms are dependent on detection frequency range and environmental fluctuations.
Start-up Time	Less than 10 minutes (does not include initial setup)
Response Time	Less than 2 minutes
Alarm Capability	Visual alarm

Physical Parameters

Size	No information available
Weight	140 pounds
Power Requirements	90 V AC-140 V AC 180 V AC-264 V AC (47.5 Hz-66 Hz) Can be powered by a battery pack with inverter

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	(Noncondensing) 41°F to 104°F, 70% relative humidity at 86°F
Consumables Required	Particulate Filters as required
Calibration Required	None
Repairs Required	Available in Orange, CA
Shelf Life	Indefinite
Unit Cost	$38,500
Maintenance Cost	Minimal, $500/year

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal

Training Available	Available in Orange, CA
Manuals Available	User manual and service manual at additional cost
Support Equipment	No information available
Communications Interface Capability	RS232 / IEE 488
Tamper Resistance	Data concentrations are tamper proof
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Voyager*

Detector ID # 74

Detector Type Commercial

Technology Gas Chromatography

Manufacturer

The Perkin-Elmer Corporation
Chromatography Division
761 Main Avenue, M/S 270
Norwalk, CT 06859-0270
(203) 775-4642 (Tel)
(203) 761-2678 (Fax)

Source http://www.perkin-elmer.com

Availability Commercially available

Current User Environmental Consultants, Industrial Hygienists, Remediation Project Managers, Government Regulator Agencies

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Ammonia
Arsine
Carbon Disulfide
Ethylene Oxide
Hydrogen Sulfide
Phosgene

Medium Hazard Index TIMs Detected

Acrolein
Acrylonitrile
Allyl Alcohol
Phosphine

Low Hazard Index TIMs Detected	None
Detection State	Vapors
Sensitivity	Detects in the PPB to PPM range, compound dependent.
Resistance to Interferents	Has few non-critical interferences.
Start-up Time	Less than 20 minutes
Response Time	10-15 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	15.4 in x 3 in x 2 in
Weight	14.96 pounds
Power Requirements	Battery operated.

Logistical Parameters

Transportability	Handheld Stationary
Durability	The Voyager is designed for outdoor use in rugged environments.
Environmental Conditions	32°F to 104°F @ 0 to 100% relative humidity
Consumables Required	Carrier gas
Calibration Required	Yes (vendor recommends every 8 hours)
Repairs Required	None
Shelf Life	No information available
Unit Cost	$18,000-$22,000
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Technical background
Training Required	Formal
Training Available	Yes (1 day paid training available and strongly recommended)

Manuals Available	User manual Site chart software manual
Support Equipment	Battery pack AC adapter Communication cable kit 10 fluoropore membrane filters Carrying strap Carrier gas connection kit Tool kit Site chart LX software
Communications Interface Capability	A RS-232 cable allows data to be sent to a PC using Photovac Sitechart software.
Tamper Resistance	Password protected
Warranty	1 year
Testing Information	EPA ETV Program Verification
Applicable Regulations	None

General

Detector Name *Hapsite*

Detector ID # 75

Detector Type Commercial

Technology Gas Chromatography with Mass Spectrometry

Manufacturer
Inficon
Two Technology Place
East Syracuse, NY 13057-9714
POC: Chuck Sadowski
(315) 434-1100 (Tel)
(315)437-3803 (Fax)

Source http://www.inficon.com

Availability Commercially available

Current User Air Toxics Analytical Support Team (ATAST) from the State of North Carolina's Department of Environment and Natural Resources.

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State	Vapors
Sensitivity	Detection limit is compound specific.
Resistance to Interferents	Not prone to false positives.
Start-up Time	20-30 minutes
Response Time	Less than 12 minutes
Alarm Capability	Audible alarm

Physical Parameters

Size	18 in x 17 in x 7 in
Weight	35 pounds
Power Requirements	24 V battery (2-3 hours) or AC with converter

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged; designed to be used in harsh environments
Environmental Conditions	32°F to 113°F (operating temperature)
Consumables Required	Nitrogen carrier gas Internal standard gas NEG vacuum pump
Calibration Required	Yes
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	$60,000-$95,000
Maintenance Cost	$150-$200

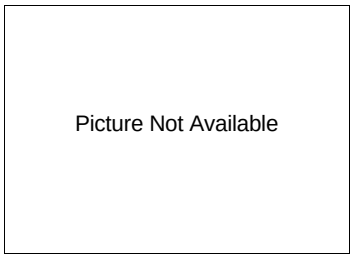
Special Requirements

Operator Skills Required	Technical background
Training Required	Formal
Training Available	Yes
Manuals Available	User manual

	Site chart software manual
Support Equipment	Laptop computer
Communications Interface Capability	Parallel port communications to laptop computer for transfer of raw data and results
Tamper Resistance	Yes
Warranty	1 year
Testing Information	Tested for Volatile Organic Compounds (VOCs) in air, soil, and water; EPA reports available. Tested for response to chemical warfare agents.
Applicable Regulations	None

General

Detector Name *Electronic Reader*



Detector ID # 76

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer Assay Technology, Inc.
1070 East Meadow Circle
Palo Alto, CA 94303
POC: Gus Manning, Ph.D.
(650) 424-9944 (Tel)
(800) 833-1258 (Tel)

Source http://www.assaytech.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Ethylene Oxide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State Vapors

Sensitivity	Detects Ethylene Oxide at 0.1-1 ppm (v) (Below IDLH)
Resistance to Interferents	No information available
Start-up Time	20 minutes
Response Time	60 seconds to 2 minutes
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	110 VAC outlet

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	Yes
Repairs Required	Yes
Shelf Life	No information available
Unit Cost	Approximately $1,250
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	None
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *MSA Passport II PID Monitor*

Detector ID # 77

Detector Type Commercial

Technology Photo Ionization

Manufacturer MSA Instrument Division
P.O. Box 427
Pittsburgh, PA 15230
POC: Evan Erickson
(724) 733-9274 (Tel)

Source 1. http://www.msanet.com

2. Testing of Commercially Available Detectors Against Chemical Warfare Agents: Summary Report, February 1999 (SBCCOM)

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State	Vapors
Sensitivity	Detects HD at 1.94 ppm (v) (No IDLH)
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	Approximately $8500
Maintenance Cost	No information available

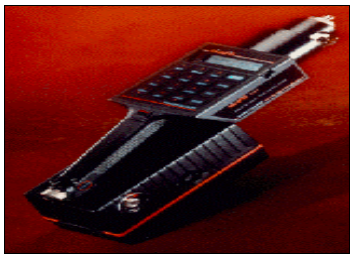
Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	Alkaline battery pack

	Pistol grip 8-inch probe PVC case
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	The MSA Passport II PID has been tested by the U.S. Army Edgewood Chemical and Biological Center (ECBC).
Applicable Regulations	None

General

Detector Name *MicroFID Handheld Detector*



Detector ID # 78

Detector Type Commercial

Technology Flame Ionization

Manufacturer

The Perkin-Elmer Corporation
Chromatography Division
761 Main Avenue, M/S 270
Norwalk, CT 06859-0270
(203) 775-4642 (Tel)
(203) 761-2678 (Fax)

Source http://www.perkin-elmer.com

Availability Commercially available

Current User Environmental Consultants, Industrial Hygienists, Remediation Project Managers, Government Regulator Agencies

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State Vapors

Sensitivity	Detects in the range of 0.5-50,000 ppm (v) (Above IDLH))
Resistance to Interferents	Has many interferants
Start-up Time	Less than 3 minutes
Response Time	Less than 3 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	17.1 in x 3.9 in x 7.4 in
Weight	8.14 pounds
Power Requirements	Sealed lead-acid battery (automatically charges and maintains full charge in battery pack)

Logistical Parameters

Transportability	Handheld Portable
Durability	The MicroFID is designed for outdoor use in rugged environments.
Environmental Conditions	41°F to 105°F (operating temperature)
Consumables Required	Hydrogen gas
Calibration Required	Yes (methane calibration every 8 hours)
Repairs Required	None
Shelf Life	Indefinite
Unit Cost	$6,850
Maintenance Cost	Less than $250/year

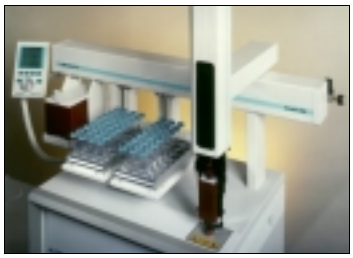
Special Requirements

Operator Skills Required	Non-technical background
Training Required	Non-formal (read manual)
Training Available	Yes
Manuals Available	User manual
Support Equipment	Battery charger

Communications Interface Capability	A RS-232 port allows data to be sent to a PC using Windows Hyperterminal.
Tamper Resistance	None
Warranty	1 year
Testing Information	Tested - Forwarded for public release approval.
Applicable Regulations	None

General

Detector Name *eNOSE 5000 Electronic Nose*



Detector ID # 79

Detector Type Commercial

Technology Thermal and Electrical Conductivity

Manufacturer Marconi Applied Technologies
4 Westchester Plaza,
Elmsford, NY 10523-1482
(914) 592-6050 (Tel)
1-800-342-5338 (Tel)
(914) 592-5148 (Fax)

Source http://www.eev.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State Vapor

Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Vehicle Mounted
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No inforrmation available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	No information available

General

Detector Name *Photovac 2020 PID Monitor*

Detector ID # 80

Detector Type Commercial

Technology Photo Ionization

Manufacturer The Perkin-Elmer Corporation
Chromatography Division
761 Main Avenue, M/S 270
Norwalk, CT 06859-0270
(203) 775-4642 (Tel)
(203) 761-2678 (Fax)

Source http://www.perkin-elmer.com

Availability Commercially available

Current User Environmental Consultants, Industrial Hygienists, Remediation Project Managers, Government Regulator Agencies

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State Vapors

Sensitivity	Detects in the range of 0.5 to 2000 ppm (v)
Resistance to Interferents	Has many interferants
Start-up Time	Less than 1 minute
Response Time	Less than 15 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	10 in x 3 in x 2 in
Weight	1.76 pounds
Power Requirements	7.2 V field-replaceable Nickel/Cadmium or AC operation from charger

Logistical Parameters

Transportability	Handheld Portable
Durability	The Photovac 2020 is designed for outdoor use in rugged environments.
Environmental Conditions	32°F to 105°F (operating temperature)
Consumables Required	None
Calibration Required	Yes (vendor recommends every 8 hours)
Repairs Required	None
Shelf Life	No information available
Unit Cost	$3,395
Maintenance Cost	Less than $100/year

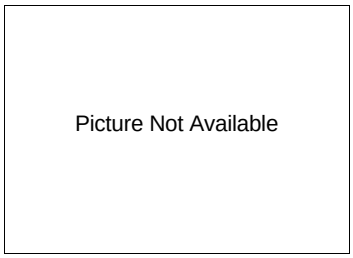
Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Non-formal (read manual)
Training Available	Yes
Manuals Available	User manual Quick reference card

Support Equipment	10.6 eV lamp 10 hour rechargeable battery pack 115 V AC adapter Teflon sampling probe with spring relief 10 Fluoropore membrane filters, Adjustable wrist strap
Communications Interface Capability	A RS-232 port allows data to be sent to a PC using Windows Hyperterminial.
Tamper Resistance	Password protected
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Chrom Air Badges*



Detector ID # 81

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer K & M Environmental
2421 Bowland Parkway #102
Virginia Beach, VA 23454
POC: Kimberly Chapman
1-800-808-2234 (Tel)

Source http://www.kandmenvironmental.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Ammonia
Chlorine
Formaldehyde
Hydrogen Chloride
Hydrogen Fluoride
Hydrogen Sulfide
Phosgene

Medium Hazard Index TIMs Detected
Carbon Monoxide
Nitrogen Dioxide
Phosphine

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	Less than 30 seconds
Response Time	60 seconds to 2 minutes
Alarm Capability	Visual alarm

Physical Parameters

Size	Varies
Weight	Varies
Power Requirements	None

Logistical Parameters

Transportability	Handheld Portable
Durability	Very rugged
Environmental Conditions	No information available
Consumables Required	Badges
Calibration Required	None
Repairs Required	None
Shelf Life	Varies
Unit Cost	Varies
Maintenance Cost	None

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Less than five minutes of training is required
Training Available	Yes

Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	None
Warranty	According to shelf life
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *SureSpot Badges*

Detector ID # 82

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer

Scott/Bacharach LLC
251 Welsh Pool Rd
Exton, PA 19341
(800) 634-4046 (Tel)
(610) 363-0167 (Fax)

POC: James Elliot
(410) 963-2066

Source http://www.scottbacharach.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Arsine
Diborane
Phosgene

Medium Hazard Index TIMs Detected Phosphine

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Arsine in the range of 0.012 ppm (v) hours to 0.188 ppm (v) hours (Below IDLH) Detects Phosphine in the range of 0.012 ppm (v) hours to 0.188 ppm (v) hours (Below IDLH) Detects Diborane in the range of 0.012 ppm (v) hours to 0.188 ppm (v) hours (Below IDLH) Detects Phosgene at 1 ppm/min to 250 ppm/min (Below IDLH)
Resistance to Interferents	Has few non-critical interferences
Start-up Time	Less than 30 seconds
Response Time	60 seconds to 2 minutes
Alarm Capability	Visual alarm

Physical Parameters

Size	1.75 in x 2.5 in
Weight	Less than 1 oz
Power Requirements	None

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	14°F to 104°F (operating temperature)
Consumables Required	None
Calibration Required	None
Repairs Required	None
Shelf Life	Varies, 5-12 months
Unit Cost	$1-$3 per badge
Maintenance Cost	None

Special Requirements

Operator Skills Required	Non-technical background
Training Required	None

Training Available	Yes, minimal
Manuals Available	User manual
Support Equipment	Dose estimator, color wheel
Communications Interface Capability	None
Tamper Resistance	Built in control and reference window
Warranty	Based on shelf life
Testing Information	Reviewed by CMA phosgene panel; no third party testing for arsine
Applicable Regulations	None

General

Detector Name *Innova Type 1312 Multigas Monitor*

Detector ID # 83

Detector Type Commercial

Technology Photoacoustic Infrared Spectroscopy

Manufacturer

California Analytical Instruments, Inc.
1238 West Grove Avenue
Orange, California 92865-4134
POC: Hal Peper
(714) 974-5560 (Tel)
(714) 921-2531 (Fax)

Source

1.Chemical Detection Equipment Market Survey for Emergency Responders, September 23, 1998 (SBCCOM)

2. http://www.innova.dk

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected

GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State	Vapors Aerosols
Sensitivity	Detects GB in the 0.01-1ppm (v) range depending on temperature and humidity (Below IDLH) Detects VX in the 0.01-1.0 ppm (v) range depending on temperature and humidity (Above IDLH) Detects HD in the 0.01-1.0 ppm (v) range depending on temperature and humidity (No IDLH)
Resistance to Interferents	Automatically compensates for interferences caused by environmental fluctuations.
Start-up Time	Less than 30 minutes
Response Time	Less than 1 minute
Alarm Capability	Audible alarm

Physical Parameters

Size	6.9 in x 15.6 in x 11.8 in
Weight	19.8 pounds
Power Requirements	100 V-127 V and 200-240V (50Hz – 400Hz) Battery powered

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	41°F to 104°F (operating temperature)
Consumables Required	Batteries, particulate Filters
Calibration Required	Yes, semi annual
Repairs Required	Internal filters need to be changed (4 times a year)
Shelf Life	No information available
Unit Cost	$27,000
Maintenance Cost	$500/year

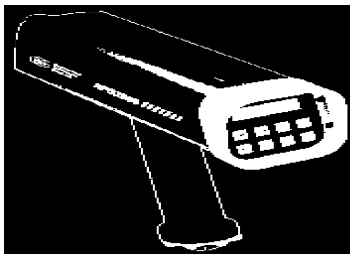
Special Requirements

Operator Skills Required	Non-technical background (with some special training required)

Training Required	Formal
Training Available	Factory training available
Manuals Available	User manual
Support Equipment	Service available at Orange, CA
Communications Interface Capability	RS232, REE 488
Tamper Resistance	Data tamper proof
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Advanced Portable Detector (APD) 2000*



Detector ID # 84

Detector Type Commercial

Technology Ion Mobility Spectrometry

Manufacturer Environmental Technologies Group, Inc.
1400 Taylor Avenue
Baltimore, MD 21234
POC: Tom Brown
(410)-321-5200 (Tel)
(410) 321-5255 (Fax)

Source http://www.envtech.com

Availability Commercially available

Current User FBI, Capitol Police, US EPA, State and Local Police, Fire, and Emergency Response teams

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detects GA at 0.015 ppm(v) (Below IDLH) Detects GB at 0.015 ppm(v) (Below IDLH) Detects GD at 0.015 ppm(v) (Above IDLH) Detects VX at 0.015 ppm(v) (Above IDLH) Detects HD and HN at 0.300 ppm(v) (No IDLH) Detects L at 0.200 ppm(v) (No IDLH)
Resistance to Interferents	Not highly selective in some environments. Some false alarms to industrial chemicals.
Start-up Time	3-4 minutes
Response Time	Less than 30 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	3.9 in x 3.5 in x 11 in
Weight	Less than 6.6 pounds
Power Requirements	6 standard or rechargeable "C" batteries, AC, or 9 to 18 V DC

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	-22°F to 126°F (operating temperature) -80°F to 160°F (storage temperature)
Consumables Required	Batteries Nozzle filters Confidence tester
Calibration Required	None
Repairs Required	
Shelf Life	No information available
Unit Cost	$7030
Maintenance Cost	> $200 per unit/per year

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	Training CD
Manuals Available	User manual
Support Equipment	No information available
Communications Interface Capability	RS232C, data logging, software/detection upgrades, RF transmitter module.
Tamper Resistance	No information available
Warranty	1 year
Testing Information	The APD 2000 has been tested by the U.S. Army Edgewood Chemical and Biological Center (ECBC). The final report is scheduled to be released in 2nd Quarter FY2000.
Applicable Regulations	NRC and applicable local regulations must be followed for storage, shipment, and disposal. NRC regulations include licensing and tracking of radiation source and annual wipe test.

General

Detector Name *Hewlett Packard HP1000 HPLC System*

Detector ID # 86

Detector Type Commercial

Technology High Performance Liquid Chromatography

Manufacturer

Hewlett-Packard Co.
3701 Koppers Street
Baltimore, MD 21227
POC: Mr. Bill Arnold
(410) 362-7594 (Tel)
(410) 362-7650 (Fax)

Source http://www.hp.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State No information available

Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	No information available

General

Detector Name *Perkin-Elmer Turbo LC Plus HPLC System*

Detector ID # 87

Detector Type Commercial

Technology High Performance Liquid Chromatography

Manufacturer

The Perkin-Elmer Corporation
Chromatography Division
761 Main Avenue, M/S 270
Norwalk, CT 06859-0270
(203) 775-4642 (Tel)
(203) 761-2678 (Fax)

Source http://www.perkin-elmer.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State No information available

Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	No information available

General

Detector Name *Shimadzu LC-10 HPLC System*

Detector ID # 88

Detector Type Commercial

Technology High Performance Liquid Chromatography

Manufacturer Shimadzu Scientific Instruments
7102 Riverwood Drive
Columbia, MD 21046
POC: John Strait
(800) 388-6996 (Tel)

Source http://www.shimadzu.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State No information available

Sensitivity No information available

Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available
Communications Interface Capability	No information available

Tamper Resistance No information available

Warranty No information available

Testing Information No information available

Applicable Regulations No information available

General

Detector Name *Varian ProStar Analytical HPLC System*

Detector ID # 89

Detector Type Commercial

Technology High Performance Liquid Chromatography

Manufacturer Varian, Inc.
2700 Mitchell Drive
Walnut Creek, CA 94598
(800) 926-3000 (Tel)
(281) 240-6752 (Fax)

Source http://www.varianinc.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State No information available

Sensitivity No information available

Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available
Communications Interface Capability	No information available

Tamper Resistance No information available

Warranty No information available

Testing Information No information available

Applicable Regulations No information available

General

Detector Name *Dionex DX-500 IC System*

Detector ID # 90

Detector Type Commercial

Technology Ion Chromatography

Manufacturer

Dionex Corporation
1228 Titan Way
P.O. Box 3603
Sunnyvale, CA 94088-3603
(408) 737-0700 (Tel)
(408) 739-4398 (Fax)

Source http://www.dionex.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State No information available

Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	No information available

General

Detector Name *Brinkmann Metrohm Model 1761 IC System*

Detector ID # 91

Detector Type Commercial

Technology Ion Chromatography

Manufacturer Brinkmann Instruments, Inc.
One Cantiague Road
P.O. Box 1019
Westbury, NY 11590-0207
(800) 645-3050 (Tel)
(516) 334-7506 (Fax)

Source http://www.brinkmann.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State No information available

Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	audible alarm

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	No information available

General

Detector Name *Hewlett-Packard HP3D CZE System*

Detector ID # 92

Detector Type Commercial

Technology Capillary Zone Electrophoresis

Manufacturer

Hewlett-Packard Co.
3701 Koppers Street
Baltimore, MD 21227
POC: Mr. Bill Arnold
(410) 362-7594 (Tel)
(410) 362-7650 (Fax)

Source http://www.hp.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State No information available

Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	audible alarm

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	No information available

General

Detector Name *Beckman-Coulter P/ACE 5000 CZE System*

Detector ID # 93

Detector Type Commercial

Technology Capillary Zone Electrophoresis

Manufacturer Beckman Coulter, Inc.
4300 N. Harbor Blvd. Box 3100
Fullerton, CA 92834-3100
(800) 233-4685 (Tel)
(714) 773-8283 (Fax)

Source http://www.beckmancoulter.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State No information available

Sensitivity No information available

Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available
Communications Interface Capability	No information available

Tamper Resistance No information available

Warranty No information available

Testing Information No information available

Applicable Regulations No information available

General

Detector Name *Bio-Rad BioFocus 2000 System CZE*

Detector ID # 94

Detector Type Commercial

Technology Capillary Zone Electrophoresis

Manufacturer Bio-Rad Laboratories
1000 Alfred Nobel Drive
Hercules, CA 94547
(410) 526-3691 (Tel)
(410) 526-3692 (Fax)

Source http://www.biorad.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected No information available

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State No information available

Sensitivity No information available

Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Analytical
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available
Communications Interface Capability	No information available

Tamper Resistance No information available

Warranty No information available

Testing Information No information available

Applicable Regulations No information available

General

Detector Name *ToxiRae Plus Personal Gas Monitor*

Detector ID # 95

Detector Type Commercial

Technology 1) Electrochemistry (single gas monitor)

2) Photo Ionization (multiple gas monitor)

Manufacturer

RAE Systems
1339 Moffett Park Drive
Sunnyvale, CA. 94089
(408)-752-0723 (Tel)
(408)-752-0724 (Fax)

Source http://www.raesystems.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Hydrogen Sulfide
Sulfur Dioxide
Chlorine
Ammonia
Hydrogen Cyanide

Medium Hazard Index TIMs Detected

Carbon Monoxide
Nitrogen Dioxide
Phosphine

Low Hazard Index TIMs Detected	Nitric oxide
Detection State	Vapor
Sensitivity	Detects Carbon monoxide at 0-500 ppm (v) (Below IDLH) Detects Hydrogen sulfide at 0-100 ppm (v) (Below IDLH) Detects Sulfur dioxide at 0-20 ppm (v) (Below IDLH) Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-100 ppm (v) (Below IDLH) Detects Ammonia at 0-50 ppm (v) (Below IDLH) Detects Phosphine at 0-5 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-20 ppm (v) (Below IDLH) Detects Nitric oxide at 0-250 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	15 second-3 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	6 in x 1.8 in x 1 in
Weight	Less than 1 pound
Power Requirements	Electrochemical detector: 2 AAA alkaline batteries or rechargeable NiCad batteries (1000 hours of operation) PID detector: NiCad battery (10 hours of operation) or AC power

Logistical Parameters

Transportability	Handheld Stationary
Durability	The ToxiRae Plus is constructed of a rugged, weatherproof composite material.
Environmental Conditions	5°F to 104°F@ 0 to 95 % relative humidity (operating temperature)
Consumables Required	Calibration kit Sensors Batteries
Calibration Required	Two point field calibration for zero and standard reference gas
Repairs Required	Replacement of batteries after 1000 hours of operaton

Replacement of sensors

Other maintenance as required by manufacturer

Shelf Life No information available

Unit Cost Electrochemical Detector: $495

PID Detector: $1750

Maintenance Cost No information available

Special Requirements

Operator Skills Required Non-technical background

Training Required Formal

Training Available No information available

Manuals Available User manual

Support Equipment Calibration adapter
Hand pump
Carrying case
Batteries

Communications Interface Capability No information available

Tamper Resistance No information available

Warranty No information available

Testing Information No information available

Applicable Regulations None

General

Detector Name *Chemkey TLD Toxic Gas Monitor*

Detector ID # 99

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer

Zellweger Analytics, Inc.
4331 Thurmond Tanner Road
Flowery Beach, GA 30542
POC: Jeff Kruzich
(800) 323-2000 (Tel)
(847) 634-1371 (Fax)

Source http://www.zelana.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Ammonia
Chlorine
Arsine
Diborane
Hydrogen Cyanide
Hydrogen Sulfide
Hydrogen Bromide
Hydrogen Chloride
Hydrogen Fluoride
Nitric Acid
Sulfuric Acid
Sulfur Dioxide
Phosgene

Medium Hazard Index TIMs Detected	Dimethyl Hydrazine Hydrogen Selenide Phosphine
Low Hazard Index TIMs Detected	Bromine Toluene Diisocyanate
Detection State	Vapor
Sensitivity	Detects Ammonia in the range of 2.6-75 ppm (v) (Below IDLH) Detects Bromine in the range of 11-300 ppb (v) (Below IDLH) Detects Chlorine in the range of 0.1-3 ppm (v) (Below IDLH) Detects Toluene Diisocyanate at 2-60 ppb (v) (Below IDLH) Detects Dimethyl hydrazine in the range of 5-30 ppb (v) (Below IDLH) Detects Arsine in the range of 15-150 ppb (v) (Below IDLH) Detects Diborane in the range of 31-300 ppb (v) (Below IDLH) Detects Hydrogen selenide in the range of 20-150 ppb (v) (Below IDLH) Detects Hydrogen sulfide in the range of 1.1-30 ppm (v) (Below IDLH) Detects Hydrogen bromide in the range of 0.3 to 9 ppm (v) (Below IDLH) Detects Hydrogen chloride in the range of 0.5-15 ppm (v) (Below IDLH) Detects Hydrogen fluoride in the range of 0.6-9 ppm (v) (Below IDLH) Detects Nitric acid and Sulfur dioxide in the range of 0.2-6 ppm (v) (Below IDLH) Detects Sulfuric acid in the range of 26-750 ppb (v) (Below IDLH) Detects Phosgene in the range of 11-300 ppb (v) (Below IDLH) Detects Phosphine at 32-900 ppb (v) (Below IDLH)
Resistance to Interferents	No informationa available
Start-up Time	Less than 1 minute
Response Time	10 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	6.5 in x 8.4 in x 7 in
Weight	9 pounds
Power Requirements	Battery (rechargeable sealed lead-acid) or 115 V AC, 50/60 Hz

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available

Environmental Conditions	32°F to 104°F (operating temperature)
Consumables Required	Batteries Chemcassettes
Calibration Required	No information available
Repairs Required	Yes
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Battery charger
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Neotox-XL Single Gas Monitor*

Detector ID # 100

Detector Type Commercial

Technology Electrochemistry

Manufacturer Zellweger Analytics, Inc.
4331 Thurmond Tanner Road
Flowery Beach, GA 30542
POC: Jeff Kruzich
(800) 323-2000 (Tel)
(847) 634-1371 (Fax)

Source http://www.zelana.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide
Chlorine
Sulfur Dioxide
Hydrogen Cyanide
Ammonia

Medium Hazard Index TIMs Detected Nitrogen Dioxide

Low Hazard Index TIMs Detected None

Detection State	Vapors
Sensitivity	Detects Carbon Monoxide at 0-999 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 101-499 ppm (v) (Above IDLH) Detects Chlorine at 0-99.9 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-99.9 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-99.9 ppm (v) (Below IDLH) Detects Ammonia at 0-60 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-30 ppm (v)(Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.5 in x 2.6 in x 1.9 in
Weight	Less than 1 pound
Power Requirements	Rechargeable or dry cell (3 x AA) battery pack

Logistical Parameters

Transportability	Handheld Portable
Durability	The Neotox-XL is constructed of a stainless steel-loaded ABS plastic.
Environmental Conditions	-4°F to 122°F (operating temperature)
Consumables Required	Batteries Sensors (for each chemicla detected)
Calibration Required	No information available
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Battery charger Sensor grill filters
Communications Interface Capability	None
Tamper Resistance	No information available
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Gas Beacon/Gas Leader*

Detector ID # 101

Detector Type Commercial

Technology Electrochemistry

Manufacturer Zellweger Analytics, Inc.
4331 Thurmond Tanner Road
Flowery Beach, GA 30542
(800) 535-0606 (Tel)
(847) 634-1371 (Fax)

Source http://www.zelana.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide
Chlorine
Sulfur Dioxide

Medium Hazard Index TIMs Detected Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Hydrogen Sulfide at 0-50 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-1000 ppm (v) (Below IDLH)) Detects Sulfur Dioxide at 0-20 ppm (v) (Below IDLH) Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-20 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	Gas Beacon - 16.1 in x 9.1 in x 8.7 in Gas Leader - 7.7 in x 7.1 in x 3.4 in
Weight	Gas Beacon-26.4 pounds Gas Leader-3.74 pounds
Power Requirements	Gas Beacon-Lead acid rechargable Gas Leader-NiCad rechargable

Logistical Parameters

Transportability	Handheld Stationary
Durability	The Gas Beacon/Gas Leader is designed to be used in harsh environments.
Environmental Conditions	14°F to 122°F (operating temperature)
Consumables Required	Calibration kits Sensors (for each chemical detected)
Calibration Required	No information available
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Model 7100 Gas Monitor*

Detector ID # 102

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer

Zellweger Analytics, Inc.
4331 Thurmond Tanner Road
Flowery Beach, GA 30542
POC: Jeff Kruzich
(800) 323-2000 (Tel)
(847) 634-1371 (Fax)

Source http://www.zelana.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Ammonia
Chlorine
Arsine
Diborane
Hydrogen Cyanide
Hydrogen Sulfide
Hydrogen Bromide
Hydrogen Chloride
Hydrogen Fluoride
Nitric Acid
Sulfuric Acid
Phosgene
Sulfur Dioxide

Medium Hazard Index TIMs Detected	Dimethyl Hydrazine Hydrogen Selenide Nitrogen Dioxide
Low Hazard Index TIMs Detected	Bromine Toluene Diisocyanate Ethylchloroformate
Detection State	Vapor
Sensitivity	Detects Ammonia at 2.5-200 ppm (v) (Below IDLH) Detects Chlorine at 0.2-10 ppm (v) (Below IDLH) Detects Bromine at 18-1000 ppb (v) (Below IDLH) Detects Toluene Diisocyanate at 1-200 ppb (v) (Below IDLH) Detects Ethylchloroformate at 0.03-10 ppm (v) (Below IDLH) Detects Dimethyl Hydrazine at 10-5000 ppb (v) (Below IDLH) Detects Arsine at 3-500 ppb (v) (Below IDLH) Detects Diborane at 15-1000 ppb (v) (Below IDLH) Detects Hydrogen Selenide at 21-1000 ppb (v) (Below IDLH) Detects Phosphine at 5-3000 ppb (v) (Below IDLH) Detects Hydrogen Cyanide at 0.5-100 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0.2-50 ppm (v) (Below IDLH) Detects Hydrogen Bromide at 0.1-30 ppm (v) (Below IDLH) Detects Hydrogen Chloride at 40-9999 ppb (v) (Below IDLH) Detects Hydrogen Fluoride at 0.7-30 ppm (v) (Below IDLH) Detects Nitric Acid at 0.1-20 ppm (v) (Below IDLH) Detects Sulfuric Acid at 75-2500 ppb (v) (Below IDLH) Detects Nitrogen Dioxde at 0.4-50 ppm (v) (Below IDLH) Detects Phosgene at 12-1000 ppb (v) (Below IDLH) Detects Sulfur Dioxide at 0.1-20 ppm (v) (Below IDLH)
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	10 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	6.5 in x 17 in x 18 in
Weight	44.9 pounds
Power Requirements	115 VAC, 50/60 Hz or 230 VAC 50/60 Hz available

Logistical Parameters

Transportability	Handheld Stationary
Durability	The Model 7100 Gas Monitor is designed for use in nonhazardous

atmospheres.

Environmental Conditions	32°F to 104°F
Consumables Required	Chemcassettes Sample filter RS-232 cable
Calibration Required	Yes
Repairs Required	Periodic replacement of the sample filter and optics cleaning (every 4 weeks)
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	No information available
Communications Interface Capability	A RS-232 cable allows data to be sent to a PC.
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Omni-4000 Gas Detector*

Detector ID # 103

Detector Type Commercial

Technology Electrochemistry; Catalytic; NDIR

Manufacturer

Enmet Corporation
P.O. Box 979
Ann Arbor, MI 48106-0979
POC: Ray Kelley, Sales Manager
(734) 761-1270 (Tel)
(734) 761-3220 (Fax)

Source http://www. enmet.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Hydrogen Sulfide
Chlorine
Hydrogen Cyanide
Hydrogen Chloride
Sulfur Dioxide
Ammonia
Ethylene Oxide

Medium Hazard Index TIMs Detected

Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Hydrogen Chloride at 0-30 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-10 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-30 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-1000 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-30 ppm (v) (Below IDLH) Detects Ammonia at 0-100 ppm (v) (Below IDLH) Detects Ethylene Oxide at 0-30 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	5 to 60 seconds (depending on gas/vapor)
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	7.6 in x 4.7 in x 2.3 in
Weight	4.84 pounds
Power Requirements	NiCad battery pack (12-14 hours of operation Lithium battery (3-5 years) Lithium battery pack (for data storage)

Logistical Parameters

Transportability	Handheld Portable
Durability	Impact resistant ABS casing; Radio Frequency Interference (RFI) resistant
Environmental Conditions	14°F to 104°F (operating temperature)
Consumables Required	Sensors Calibration kit Batteries
Calibration Required	Yes (vendor recommends every 3 months)
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer

Shelf Life	18-30 months
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technicial background
Training Required	Formal
Training Available	Video Training tape available
Manuals Available	User manual
Support Equipment	Carrying strap Battery charger Calibration adapter Lithium battery pack (for data storage)
Communications Interface Capability	Data can be downloaded to a PC using the COM 4000 software.
Tamper Resistance	None
Warranty	I year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *AutoStep Plus*

Detector ID # 104

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer

Scott/Bacharach LLC
251 Welsh Pool Rd
Exton, PA 19341
(800) 634-4046 (Tel)
(610) 363-0167 (Fax)

POC: James Elliot
(410) 963-2066

Source http://www.scottbacharach.com

Availability Commercially available

Current User US Army (SBBCOM), Chemical Manufacturers (Dow, Bayer Corp, BASF)

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Arsine
Phosgene
Toluene Diisocyanate

Medium Hazard Index TIMs Detected Phosphine

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Arsine at 0-0.001 ppm (v) (Below IDLH) Detects Toluene diisocyanate at 0-0.001 ppm (v) (Below IDLH) Detects Phosgene at 0-0.1 ppm (v) (Below IDLH) Detects Phosphine at 0-0.001 ppm (v) (Below IDLH)
Resistance to Interferents	Minimal. Heavy dust, particulate matter, and heavy water vapor can interfere
Start-up Time	20 seconds
Response Time	20 seconds to 4 minutes
Alarm Capability	Audible alarm

Physical Parameters

Size	9.6 in x 3.9 in x 8.5 in
Weight	4.75 pounds
Power Requirements	Rechargeable lead acid batteries (16 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	For field and outdoor use
Environmental Conditions	14°F to 104°F @ 5 to 95 % relative humidity (operating temperature) -4°F to 122°F@ 5 to 95 % relative humidity (storage temperature)
Consumables Required	Paper tape casette
Calibration Required	Yes (vendor recommends every 12 to 18 months)
Repairs Required	None
Shelf Life	Based on consumables
Unit Cost	$4600
Maintenance Cost	Minimal

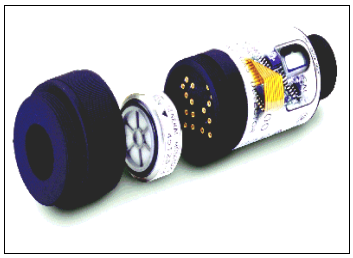
Special Requirements

Operator Skills Required	Non-technical background
Training Required	Minimal

Training Available	Minimal, manual and manufacturer
Manuals Available	User manual
Support Equipment	Battery charger
Communications Interface Capability	Capable of communicating with a PC.
Tamper Resistance	No information available
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Model TS400 Toxic Gas Detector*



Detector ID # 105

Detector Type Commercial

Technology Electrochemistry

Manufacturer

General Monitors
26776 Simpatica Circle
Lake Forest, CA 92630
POC: Thomas H. Aoki
toma@generalmonitors.com
(949) 581-4464 (Tel)
(949) 581-1151 (Fax)

Source http://www.generalmonitors.com

Availability Commercially available

Current User Chemical processing industry,food & beverage industry, water and waste water treatment, pulp and paper industry

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Chlorine
Hydrogen Chloride
Hydrogen Cyanide
Sulfur Dioxide
Nitric oxide

Medium Hazard Index TIMs Detected

Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detects Carbon Monoxide at 0-100 ppm (v) (Below IDLH) Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Hydrogen Chloride at 0-20 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-20 ppm (v) (Below IDLH)) Detects Nitrogen Dioxide at 0-20 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-20 ppm (v) (Below IDLH) Detects Nitric Oxide at 0-100 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	1 hour
Response Time	10 seconds to 2 minutes
Alarm Capability	None

Physical Parameters

Size	4.5 in (length) 1.7 in (diameter)
Weight	5.6 pounds
Power Requirements	Loop powered or +24 VDC

Logistical Parameters

Transportability	Fixed-Site Detection
Durability	The TS400 is available with explosion-proof housing (for use in explosion-proof protected installations) or with polyester housing (intrinsically safe environments or increased-safety protected installations).
Environmental Conditions	-40°F to 167°F (operating temperature) -40°F to 185°F (storage temperature) 5% to 100% relative humidity (non-condensing)
Consumables Required	Calibration kits Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	None
Shelf Life	No information available

Unit Cost	~ $800
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technicial background
Training Required	Formal
Training Available	Yes
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	None
Warranty	1 year (cell) 2 years (electronics)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Spectrum*

Detector ID # 108

Detector Type Commercial

Technology Electrochemistry

Manufacturer

Enmet Corporation
P.O. Box 979
Ann Arbor, MI 48106-0979
POC: Ray Kelley, Sales Manager
(734) 761-1270 (Tel)
(734) 761-3220 (Fax)

Source http://www.enmet.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Hydrogen Sulfide
Chlorine
Hydrogen Cyanide
Sulfur Dioxide
Ammonia
Hydrogen Chloride
Hydrogen Fluoride
Fluorine

Medium Hazard Index TIMs Detected

Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detects Chlorine, Fluoride, Hydrogen Fluoride, and Nitrogen dioxide at 0-10 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-200 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 101-200 ppm (v) (Above IDLH) Detects Sulfur dioxide and Hydrogen Chloride at 0-20 ppm (v) (Below IDLH) Detects Ammonia at 0-100 ppm (v) (Below IDLH) Detects Carbon monoxide at 0-1000 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	5 to 60 seconds (depending on gas/vapor)
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.3 in x 2.4 in x 1.2 in
Weight	Less than 1 pound
Power Requirements	Replaceable 9V alkaline battery

Logistical Parameters

Transportability	Handheld Portable
Durability	The spectrum is constructed of cast aluminum for durability and RFI suppression.
Environmental Conditions	14°F to 113°F (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	None
Shelf Life	0.5-3 years
Unit Cost	No information available

Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	Password Protected
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Logic 400 series (Model 450) Personal Air Monitor*

Detector ID # 109

Detector Type Commercial

Technology Electrochemistry

Manufacturer AIM Safe-Air Products Limited
8403 Cross Park Dr.
Austin, Texas 78754
(512) 832-5665 (Tel)
(512) 832-2188 (Fax)

Source http://209.153.232.170

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide
Chlorine
Ammonia
Sufur Dioxide
Hydrogen Cyanide

Medium Hazard Index TIMs Detected Nitrogen Dioxide

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Hydrogen Sulfide at 10 ppm (v) (Below IDLH) Detects Chlorine at 0.5 ppm (v) (Below IDLH) Detects Ammonia at 25 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 2 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	3.7 in x 1.7 in x 1.1 in
Weight	1.65 pounds
Power Requirements	8 month (non-alarming Lithium battery)

Logistical Parameters

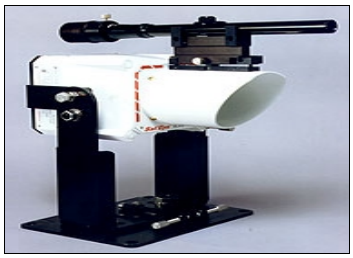
Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	-4°F to 113°F @ 0 to 99 % relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of battery after 8 months of operation Replacemetn of sensors Other maintenance as required by manufacturer
Shelf Life	18 months
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available
Communications Interface Capability	None
Tamper Resistance	None
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Safeye Model 400 Gas Detection System*



Detector ID # 110

Detector Type Commercial

Technology Ultraviolet Spectroscopy

Manufacturer

Spectrex Inc.
218 Little Falls Road
Cedar Grove, NJ 07009
POC: Eric Zin
(973) 239-8398 (Tel)
(973) 239-7614 (Fax)

Source http://www.spectrex-inc.com

Availability Commercially available

Current User Petrochemical Industry, BP, Shell, Oil & Gas Industry

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Hydrogen Sulfide
Ammonia
Benzene
Aromatic compounds

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Hydrogen Sulfide at 0-500 ppm (v) (Below IDLH) Detects Ammonia at 0-500 ppm (v) (Below IDLH) Detects Benzene at 0-500 ppm (v) (No IDLH) Detects Aromatics at 0-500 ppm (v) (No IDLH)
Resistance to Interferents	Has few non-critical interferences
Start-up Time	1 minute
Response Time	1-5 seconds
Alarm Capability	Audible arlarm, optional output (4-20mA

Physical Parameters

Size	5.2 in x 5.2 in
Weight	8.8 pounds
Power Requirements	24 VDC

Logistical Parameters

Transportability	Handheld Stationary
Durability	Explosion proof and Radio Frequency Interference resistant.
Environmental Conditions	- 4°F to 131°F @ 0 to 95 % relative humidity (operating temperature) - 40°F to 149°F @ 0 to 95 % relative humidity (storage temperature)
Consumables Required	Calibration kit
Calibration Required	Auto-calibration
Repairs Required	Yes
Shelf Life	> 5 years
Unit Cost	$8,000-$10,000
Maintenance Cost	None

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	Yes

Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	An optional RS-485 output provides data communication for a single system or a network to a host computer for central monitoring.
Tamper Resistance	None
Warranty	2 years
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *7000 Series Data Logging Compact Portable Gas Detector*

Detector ID # 111

Detector Type Commercial

Technology Electrochemistry, Electrochemical Voltametric

Manufacturer
Interscan Corporation
P.O. Box 2496
Chatsworth, CA 91313-2496
(818) 882-2331 (Tel)
(818) 341-0642 (Fax)

Source http://www.gasdetection.com

Availability Commercially available

Current User USAF, USN, NASA

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Ethylene Oxide
Hydrogen Cyanide
Hydrogen Sulfide
Sulfur Dioxide
Chlorine
Formaldehyde
Hydrogen Chloride

Medium Hazard Index TIMs Detected
Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Carbon Monoxide at 0-100 ppm (v) (Below IDLH) Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Ethylene Oxide at 0-10 ppm (v) (Below IDLH) Detects Formaldehyde at 0-1 ppm (v) (Below IDLH) Detects Hydrogen Chloride at 0-10 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-10 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-10 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-10 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-10 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	Less than 30 seconds
Response Time	Less than 30 seconds for 90% operability; 2 minutes for ethylene oxide
Alarm Capability	Audible alarm (optional) Visual alarm

Physical Parameters

Size	7 in x 4 in x 8.9 in
Weight	4.4 pounds
Power Requirements	Rechargeable NiCad batterires (10 hours of operation)

Logistical Parameters

Transportability	Handheld Stationary
Durability	Very rugged per drop tests
Environmental Conditions	0°F to 120°F
Consumables Required	Sensors, alkaline betteries
Calibration Required	Yes, every 3-12 months depending on usage
Repairs Required	Replacement of sensors and alkaline batteries Other maintenance as required by manufacturer
Shelf Life	Equipment life greater than 15 years
Unit Cost	~ $2500
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Minimal
Training Available	Customer service department has 800 telephone number available.
Manuals Available	User manual
Support Equipment	Battery charger Carrying case Sample probe
Communications Interface Capability	Datalogger included; 0-100 mV recorder output
Tamper Resistance	None
Warranty	1 year for instrument; 6 months for sensor
Testing Information	Drop tests; UL category - intrinsically safe; CE approved
Applicable Regulations	None

General

Detector Name *TLV Panther Gas Detector*

Detector ID # 112

Detector Type Commercial

Technology Photo Ionization

Manufacturer International Sensor Technology
3 Whatney
Irvine, CA 92618-2824
POC: Jeff Lowe
(949) 452-9000 (Tel)
(949) 452-9009 (Fax)

Source http://www.intlsensor.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Ammonia
Ethylene Oxide
Hydrogen Sulfide

Medium Hazard Index TIMs Detected Methyl Bromide
Phosphine

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Ammonia at 0-2400 ppm (v) (Below IDLH) Detects Ethylene Oxide at 0-260 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-70 ppm (v) (Below IDLH) Detects Methyl Bromide at 0-35 ppm (v) (Below IDLH) Detects Phosphine at 0-60 ppm (v) (Below IDLH)
Resistance to Interferents	No information available
Start-up Time	1 minute
Response Time	Less than 20 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	9 in x 4.5 in x 5.4 in
Weight	5.984 ppounds
Power Requirements	6 "D" size alkaline or nickel cadmium batteries (14 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The TLV Panther is constructed of an aluminum housing.
Environmental Conditions	32°F to 122°F @ 0 to 99 % relative humidity (operating temperature)
Consumables Required	No information available
Calibration Required	Yes (every 6 months recommended)
Repairs Required	None
Shelf Life	No information available
Unit Cost	$3500
Maintenance Cost	None

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	Yes
Manuals Available	User manual

Support Equipment	None
Communications Interface Capability	An RS-232 port allows data to be sent to a PC.
Tamper Resistance	Password protected
Warranty	1 year electronics, 1 year sensor
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *FoxTox Personal Multi-Gas Monitor*

Detector ID # 113

Detector Type Commercial

Technology Electrochemistry

Manufacturer
The Foxboro Company
P.O. Box 500
East Bridgewater, MA
(508) 378-5556 (Tel)
(508) 378-5505 (Fax)

Source http://www.foxboro.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Sulfide
Sulfur Dioxide
Chlorine
Ammonia
Hydrogen Cyanide

Medium Hazard Index TIMs Detected
Carbon Monoxide
Nitrogen Dioxide
Phosphine

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-20 ppm (v) (Below IDLH)) Detects Chlorine at 0-10 ppm (v) (Below IDLH)) Detects Ammonia at 0-50 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-100 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-500 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-20 ppm (v) (Below IDLH) Detects Phosphine at 0-5 ppm (v) (Below IDLH))
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	15 seconds to 3 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.6 in x 3 in x 1.9 in
Weight	Less than 1 pound
Power Requirements	Rechargeable, 4.8 Volt 1.2 Ah, NiCad battery pack or 4 AA alkaline battery adapter (10 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The FoxTox Personal Multi-Gas Monitor is constructed of a high impact chrome exterior.
Environmental Conditions	-4°F to 113°F @ 0 to 95 % relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Battery charger Calibration adapter Sample pump
Communications Interface Capability	The FoxTox Personal Multi-gas Monitor can easily communicate with a Personal Computer.
Tamper Resistance	No information available
Warranty	2 years (electronics) 1 year (sensors)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Pac III Single Gas Detector*

Detector ID # 114

Detector Type Commercial

Technology Electrochemistry

Manufacturer Draeger Safety, Inc.
101 Technology Drive
Pittsburgh, PA 15275
(412) 787-8383 (Tel)
(800) 922-5518 (Tel)
(800) 922-5519 (Fax)

Source http://www.draeger.net

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Ammonia
Arsine
Chlorine
Diborane
Fluorine
Hydrogen Cyanide
Hydrogen Sulfide
Phosgene
Sulfur Dioxide

Medium Hazard Index TIMs Detected
Carbon Monoxide
Hydrogen Selenide
Phosphine

Low Hazard Index TIMs Detected	Bromine
Detection State	Vapor
Sensitivity	Detects Ammonia at 0-300 ppm (v) (Below IDLH) Detects Arsine at 0-10 ppm (v) (Below IDLH) Detects Bromine at 0-20 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-2000 ppm (v) (Below IDLH) Detects Chlorine at 0-20 ppm (v) (Below IDLH) Detects Diborane at 0-1 ppm (v) (Below IDLH) Detects Fluorine at 0-20 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-50 ppm (v) (Below IDLH) Detects Hydrogen Selenide at 0-1 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Phosgene at 0-3 ppm (v) (Below IDLH) Detects Phosphine at 0-10 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	2.6 in x 4.6 in x 1.3 in
Weight	Less than 1 pound
Power Requirements	9V alkaline battery (600 hours of operation), Lithium battery (1100 hours of operation), or NiCad battery (200 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The Pac III is constructed of high impact resistant composite material with conductive coating to ensure radio frequency interference (RFI) protection.
Environmental Conditions	-4°F to 122°F@ 0 to 99% relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	One-button autocalibration

Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	~$1500-$2000
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Calibration adapter Battery charger
Communications Interface Capability	The Pac III Single Gas Detector can easily communicate with a Personal Computer.
Tamper Resistance	Password protected for added security
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *LTX312 Gas Monitor*

Detector ID # 115

Detector Type Commercial

Technology Electrochemistry

Manufacturer
Industrial Scientific Corporation
1001 Oakdale Road
Oakdale, PA 15071 - 1500
POC: Lavern Walker
(800) 338-3287 (Tel)
(412) 788-8353 (Fax)

Source http://www.indsci.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Ammonia
Hydrogen Sulfide
Chlorine
Hydrogen Cyanide
Hydrogen Chloride
Sulfur Dioxide

Medium Hazard Index TIMs Detected
Nitrogen Dioxide
Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Carbon Monoxide at 0.2-999 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0.2-999 ppm (v) (Below IDLH) Detects Chlorine at 0.2-99.9 ppm (v) (Below IDLH) Detects Hydrogen Chloride at 0.2-99.9 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0.2-99.9 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0.2-99.9 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0.2-99 ppm (v) (Below IDLH) Detects Ammonia at 0.2-99 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	20 seconds
Response Time	10-60 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.8 in x 2.8 in x 1.7 in
Weight	1.272 pounds
Power Requirements	Rechargeable nickel-cadmium battery pack or 9-volt alkaline battery pack (10 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The LTX312 is constructed of 304 Stainless Steel, RFI resistant, and equipped with shock-resistant electronics preparing it for the worst of impacts.
Environmental Conditions	-4°F to 122°F@ 0 to 90% relative humidity (operating temperature)
Consumables Required	Calibration kit Calibration adapter Sensors (for each chemical detected) Batteries
Calibration Required	One-button autocalibration
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available

Unit Cost ~ $1050-$1545

Maintenance Cost No information available

Special Requirements

Operator Skills Required Non-technical background

Training Required Formal

Training Available A VHS video tape for training in the use, calibration, and maintenance is availabe from the manufacturer.

An interactive training tutorial in a CD-rom format is also available from the manufacturer.

Manuals Available User manual

Support Equipment
Sampling pump
Manual pump
Battery charger
Probes
Transport case
Calibration log software

Communications Interface Capability None

Tamper Resistance Password protected

Warranty Lifetime

Testing Information No information available

Applicable Regulations None

General

Detector Name *C16 PortaSens II Gas Detector*

Detector ID # 116

Detector Type Commercial

Technology Electrochemistry

Manufacturer
Analytical Technology
680 Hollow Road
Box 879
Oaks, PA 19456
POC: John Boswell
(800) 959-0299 (Tel)
(610) 917-0992 (Fax)

Source http:// www.analyticaltechnology.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Ammonia
Ethylene Oxide
Formaldehyde
Phosgene
Chlorine
Fluorine
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Fluoride
Hydrogen Sulfide
Sulfur Dioxide
Arsine

Diborane

Medium Hazard Index TIMs Detected

Nitrogen Dioxide
Carbon Monoxide
Phosphine
Hydrogen Selenide

Low Hazard Index TIMs Detected

Bromine

Detection State

Vapor

Sensitivity

Detects Ammonia at 0-500 ppm (v) (Below IDLH)
Detects Carbon Monoxide at 0-1000 ppm (v) (Below IDLH)
Detects Ethylene Oxide at 0-200 ppm (v) (Below IDLH)
Detects Formaldehyde at 0-200 ppm (v) (Below IDLH)
Detects Phosgene at 0-5 ppm (v) (Below IDLH)
Detects Bromine at 0-100 ppm (v) (Below IDLH)
Detects Chlorine at 0-100 ppm (v) (Below IDLH)
Detects Fluorine at 0-100 ppm(v) (Below IDLH)
Detects Hydrogen Chloride at 0-200 ppm (v) (Below IDLH)
Detects Hydrogen Cyanide at 0-200 ppm (v) (Below IDLH))
Detects Hydrogen Fluoride at 0-200 ppm (v) (Below IDLH)
Detects Hydrogen Sulfide at 0-200 ppm (v) (Below IDLH)
Detects Nitrogen Dioxide at 0-200 ppm (v) (Below IDLH)
Detects Sulfur Dioxide at 0-200 ppm (v) (Below IDLH)
Detects Arsine at 0-200 ppm (v) (Below IDLH)
Detects Diborane at 0-200 ppm (v) (Below IDLH)
Detects Phosphine at 0-200 ppm (v) (Below IDLH)
Detects Hydrogen Selenide at 0-200 ppm (v) (Below IDLH))

Resistance to Interferents

May false alarm to heavy concentrations of various smokes and engine exhausts

Start-up Time

No information available

Response Time

Less than 1 minute

Alarm Capability

Audible alarm
Visual alarm

Physical Parameters

Size

3.5 in x 9 in x 5.5 in

Weight

7 pounds

Power Requirements

"D" cell alkaline battery
Internal rechargeable NiCad for backup power

Logistical Parameters

Transportability

Handheld Portable

Durability	The PortaSens II Gas Detector is constructed of a glass-filled polycarbonate material.
Environmental Conditions	-13°F to 122°F @ 0 to 95% relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	$1000
Maintenance Cost	$200/year-$500/year

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	10" Teflon-lined sampling wand Battery charger Spare filters Flowmeter RS-232 output cable Spare "D" cell battery Calibration "T" fitting Carrying case
Communications Interface Capability	An RS-232 output allows stored data to be downloaded to a PC through an interface cable supplied with the unit.
Tamper Resistance	None
Warranty	I year parts and labor
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *MultiRae Plus Gas Detector*

Detector ID # 117

Detector Type Commercial

Technology Electrochemistry Mode and Photo Ionization Mode (two modes)

Manufacturer

RAE Systems, Inc.
1339 Moffett Park Drive
Sunnyvale, CA 94089
(408) 752-0723 (Tel)
(408) 752-0724 (Fax)

Source http://www.raesystems.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Hydrogen Sulfide
Sulfur Dioxide
Chlorine
Hydrogen Cyanide
Ammonia

Medium Hazard Index TIMs Detected

Carbon Monoxide
Nitrogen Dioxide
Phosphine

Low Hazard Index TIMs Detected Nitric Oxide

Detection State	Vapor
Sensitivity	Detects Carbon Monoxide at 0-500 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-100 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-250 ppm (v) (Below IDLH) Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-100 ppm (v) (Below IDLH) Detects Ammonia at 0-50 ppm (v) (Below IDLH) Detects Phosphine at 0-5 ppm (v) (Below IDLH) Detects Nitric Oxide at 0-250 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	15 seconds to 3 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.6 in x 3 in x 1.9 in
Weight	1 pound
Power Requirements	Rechargeable 4.8 V, 1.4 Ah, NiCad battery pack, 4 AA alkaline battery adapter, field replaceable (10 hours operating time)

Logistical Parameters

Transportability	Handheld Portable
Durability	The MultiRae Plus detector is constructed of a weather-proof composite material and is Radio Frequency Interference (RFI) protected.
Environmental Conditions	-4°F to 113°F @ 0 to 95% relative humidity (operating temperature)
Consumables Required	Sensors Calibration kit Batteries
Calibration Required	Two-point field calibration for zero and standard reference gas
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	$3185

Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Battery adapter Calibration adapter Inlet probe Water trap filter Carbon filters Rubber boot with belt clip Carrying case
Communications Interface Capability	The MultiRae Plus Detector can easily communicate with a Personal Computer.
Tamper Resistance	None
Warranty	2 years
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Bodyguard 4 Personal Monitor*

Detector ID # 118

Detector Type Commercial

Technology Electrochemistry

Manufacturer

Scott/Bacharach LLC
251 Welsh Pool Rd
Exton, PA 19341
(800) 634-4046 (Tel)
(610) 363-0167 (Fax)

POC: James Elliot
(410) 963-2066

Source http://www.scottbacharach.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Ammonia
Chlorine
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Sulfide
Hydrogen Fluoride
Sulfur Dioxide

Medium Hazard Index TIMs Detected

Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detects Ammonia at 0-100 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-999 ppm (v) (Below IDLH) Detects Chlorine at 0-21 ppm (v) (Below IDLH) Detects Hydrogen Chloride at 0-30 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-30 ppm (v) (Below IDLH) Detects Hydrogen Fluoride at 0-10 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-100 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-100 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	15 seconds
Response Time	20 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	3.3 in x 1.7 in x 6.3 in
Weight	1 pound
Power Requirements	3 AAA alkaline batteries or nickel metal hydride pack (10 to 12 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The Bodyguard 4 is constructed of water resistant three piece, metalized ABS, impact resistant plastic
Environmental Conditions	-4°F to 122°F @ 0 to 99% relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries after 10-12 hours of operation Replacement of sensors

	Other maintenance as required by manufacturer
Shelf Life	Based on sensors and battery life
Unit Cost	$1900
Maintenance Cost	Sensor @ $200 Batteries @ $8

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Minimal
Training Available	By manufacturer
Manuals Available	User manual
Support Equipment	Sample pump
Communications Interface Capability	The Bodyguard 4 can easily communicate with a Personal Computer.
Tamper Resistance	Sealed tamper proof button controls calibration, adjustable audible and visual alarm set levels and operational parameters.
Warranty	Lifetime (parts and labor)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *PhD2 Personal Gas Detector*

Detector ID # 119

Detector Type Commercial

Technology Electrochemistry

Manufacturer Biosystems
651 South Main Street.
Middletown, CT 06457
(860) 344-1079 (Tel)
(860) 344-1068 (Fax)

Source http://www.biosystems.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide
Ammonia
Chlorine
Sulfur Dioxide
Hydrogen Cyanide

Medium Hazard Index TIMs Detected Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Hydrogen Sulfide, Ammonia, Chlorine, Sulfur Dioxide, Hydrogen Cyanide, Carbon Monoxide, and Nitrogen Dioxide at the Short Term Exposure Level (STEL) and Time Weighted Average (TWA) level.
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	7.2 in x 4.3 in x 2.2 in
Weight	2 pounds
Power Requirements	Sealed lead acid or NiCad rechargeable battery (10 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The PhD2 is housed in a super durable, steel impregnated, gasketed, water resistant polycarbonate case.
Environmental Conditions	No information available
Consumables Required	Calibration kits Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	~$1900-$4000
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background

Training Required	Formal
Training Available	A training video is included with the PhD2.
Manuals Available	User manual Quick reference card
Support Equipment	Calibration adapter/sample draw pump Computer link kit Battery charger
Communications Interface Capability	Automatic data downloading with Biosystem's data-link kit.
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Haz-Alert Gas Detector*

Detector ID # 120

Detector Type Commercial

Technology Electrochemistry
Metal Oxide Sensor

Manufacturer Grace Industries
P.O. Box 430
5443 Southern Maryland Blvd.
Lothian, Maryland 20711
(800) 204-7277 (Tel)
(410) 741-6002 (Fax)

Source http://www.graceindustries.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Ethylene Oxide
Fluorine
Formaldehyde
Sulfur Dioxide

Medium Hazard Index TIMs Detected Methyl Bromide
Methyl Mercaptan

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Sensitivity less than 100 ppm (v) (methane)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	2 minutes
Response Time	No information available
Alarm Capability	Audible alarm (95 dBA) Visual alarm (LED)

Physical Parameters

Size	2 in x 3.3 in x 1.1 in
Weight	7 oz including battery
Power Requirements	2 AA alkaline batteries (5 hours of use)

Logistical Parameters

Transportability	Handheld Portable
Durability	The Haz-Alert is housed in a rugged high impact polycarbonate case.
Environmental Conditions	No information available
Consumables Required	Calibration kit Batteries
Calibration Required	Every 6 months
Repairs Required	Replacement of batteries after 5-8 hours of operation Other maintenance as required by manufacturer
Shelf Life	Indefinite
Unit Cost	~$298.00
Maintenance Cost	$59 parts and labor for calibration

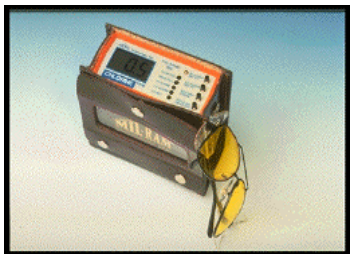
Special Requirements

Operator Skills Required	Non-technical background
Training Required	No special training required
Training Available	Instruction manual

Manuals Available	User manual
Support Equipment	No information available
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Tox-Array 1000 Gas Detector*



Detector ID # 121

Detector Type Commercial

Technology Electrochemistry

Manufacturer

Mil-Ram Technology, Inc.
2360 Qume Drive, Suite C
San Jose, CA 95131
(408) 324-0660 (Tel)
(408) 324-1661 (Fax)

Source http://www.mil-ram.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Ammonia
Chlorine
Fluorine
Hydrogen Bromide
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Fluoride
Hydrogen Sulfide
Nitric Acid
Sufur Dioxide
Sulfuric Acid

Medium Hazard Index TIMs Detected	None
Low Hazard Index TIMs Detected	Bromine
Detection State	Vapor
Sensitivity	No information available
Resistance to Interferents	Has few non-critical interferences.
Start-up Time	No information available
Response Time	Less than 30 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	2 in x 5 in x 5 in
Weight	Less than 2 pounds
Power Requirements	Battery powered

Logistical Parameters

Transportability	Handheld Portable
Durability	The Tox-Array 1000 is constructed of high impact ABS and is RFI resistant.
Environmental Conditions	-13°F to 122°F @ 5 to 95 % relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	Sensor life greater than 2 years
Unit Cost	No information available

Maintenance Cost No information available

Special Requirements

Operator Skills Required Non-technical background

Training Required Formal

Training Available No information available

Manuals Available User manual

Support Equipment No information available

Communications Interface Capability No information available

Tamper Resistance None

Warranty No information available

Testing Information No information available

Applicable Regulations None

General

Detector Name *AMC Series 1100 Portable Gas Detector*

Detector ID # 122

Detector Type Commercial

Technology Electrochemistry

Manufacturer The Armstrong Monitoring Corporation
215 Colonnade Road South
Nepean, Ontario
(613) 225-9531 (Tel)
(800) 465-5777 (Tel)

Source http://www.armstrongmonitoring.com

Availability Commercially available

Current User Pulp and Paper Mills
Indoor air quality firms
Regional government workers
Tunnel workers

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide
Hydrogen Cyanide
Sulfur Dioxide
Chlorine

Medium Hazard Index TIMs Detected Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Hydrogen Cyanide at 0-20 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-20 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-10 ppm (v) (Below IDLH) Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-500 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	Less than 1 minute
Response Time	Typically 10-60 seconds within a 90% step change. HCN is less than 100 seconds within a 90% stem change.
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	5.7 in x 3.1 in x 1.4 in
Weight	8 oz
Power Requirements	9 V alkaline battery (greater than 500 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The AMC-1100 is constructed of High impact ABS plastic enclosed inside a heavy duty leather case.
Environmental Conditions	-4°F to 122°F @ 0 to 80 % relative humidity (operating temperature)
Consumables Required	Calibration kit (supplied by other) Calibration adapter 9 Volt alkaline battery Sensors (for each chemical detected)
Calibration Required	Span gas, use zero and span pots
Repairs Required	Replacement of batteries after 5 hours of operation Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	Greater than 2 years for sensors
Unit Cost	$850.00

Maintenance Cost	$392.00/year

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	Yes
Manuals Available	User manual
Support Equipment	Heavy duty leather carry case Belt clip Earphone jack
Communications Interface Capability	0-1 V DC recorder output
Tamper Resistance	None
Warranty	1 year
Testing Information	None
Applicable Regulations	None

General

Detector Name *MultiLog 2000 Multi-Gas Monitor*

Detector ID # 123

Detector Type Commercial

Technology Electrochemistry

Manufacturer
Quest Technologies, Inc.
1060 Corporate Center Drive
Oconomowoc, WI 53066
POC: Tim Bailey, Vice President
(800) 245-0779 (Tel), ext. 111
(414) 567-4047 (Fax)

Source http://www.quest-technologies.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Sulfide
Ammonia
Hydrogen Cyanide
Ethylene Oxide
Chlorine
Sulfur Dioxide

Medium Hazard Index TIMs Detected
Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Carbon Monoxide at 0-999 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-500 ppm (v) (Below IDLH) Detects Chlorine at 0-20 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-50 ppm (v) (Below IDLH) Detects Ammonia at 0-50 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-50 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-50 ppm (v) (Below IDLH) Detects Ethylene Oxide at 0-20 ppm (v) (Below IDLH)
Resistance to Interferents	Has many interferences
Start-up Time	Less than 1 minute
Response Time	25 seconds to 2 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	6.9 in x 3.4 in x 2 in
Weight	1.32 pounds
Power Requirements	2 "C" alkaline batteries (16 hours of operation) Rechargeable battery packs available, NiCad and nickel metal hydride (10-12 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The MultiLog 2000 Multi-Gas Monitor is constructed of a Nickel alloy plated high impact ABS polycarbonate material which is RFI/EMI protected.
Environmental Conditions	14°F to 104°F (operating temperature) 5°F to 140°F (storage temperature)
Consumables Required	Calibration Gas/Kit Calibration Adapter Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries after 16 hours of operation Recharge batteries after 10-12 hours of operation

	Replacement of sensors
	Other maintenance as required by manufacturer
Shelf Life	Indefinite; sensors must be replaced
Unit Cost	$1695
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Informal
Training Available	Yes
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	Set-up menu protected by password.
Warranty	Instrument: 2 years Sensors: 2 years for carbon monoxide and hydrogen sulfide sensors
Testing Information	No information available
Applicable Regulations	OSHA confined space

General

Detector Name *IQ-250 Single Gas Detector*

Detector ID # 124

Detector Type Commercial

Technology Electrochemistry

Manufacturer
International Sensor Technology
3 Whatney
Irvine, CA 92618-2824
POC: Jeff Lowe
(949) 452-9000 (Tel)
(949) 452-9009 (Fax)

Source http://www.intlsensor.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Ammonia
Arsine
Boron Trichloride
Boron Trifluoride
Chlorine
Diborane
Ethylene Oxide
Fluorine
Formaldehyde
Hydrogen Bromide
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Sulfide

Hydrogen Fluoride
Phosgene
Sulfur Dioxide
Tungsten Hexafluoride

Medium Hazard Index TIMs Detected

Acrolein
Allyl alcohol
Carbon Monoxide
Methyl Mercaptun
Nitrogen Dioxide
Phosphine
Phosphorous Oxychloride
Silicon Tetrafluoride

Low Hazard Index TIMs Detected

Bromine
Cyanogen Chloride
Nitric Oxide
Toluene Diisocyanate

Detection State

Vapor

Sensitivity

Detects from low ppm ranges to % by volume

Resistance to Interferents

May false alarm to heavy concentrations of various smokes and engine exhausts

Start-up Time

No information available

Response Time

5-60 seconds

Alarm Capability

Audible alarm
Visual alarm

Physical Parameters

Size

6.3 in x 3 in x 4 in

Weight

1.375 pounds

Power Requirements

4 AA alkaline batteries (14 hours of operation)

Logistical Parameters

Transportability

Handheld Portable

Durability

The IQ-250 is constructed of aluminum housing.

Environmental Conditions

-4°F to 122°F @ 0 to 95 % relative humidity (operating temperature)

Consumables Required

Calibration kit
Batteries
Sensors (for each chemical detected)

Calibration Required	Yes (every 6 months recommended)
Repairs Required	Replacement of batteries after 14 hours of operation
	Replacement of sensors
	Other maintenance as required by manufacturer
Shelf Life	Depends on sensor
Unit Cost	$795-$1495
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	Yes
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	None
Warranty	1 year electronics, 1 year sensors
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *CM4 Gas Monitor*

Detector ID # 125

Detector Type Commercial

Technology Color Change Chemistry

Manufacturer

Zellweger Analytics, Inc.
4331 Thurmond Tanner Road
Flowery Beach, GA 30542
POC: Jeff Kruzich
(800) 323-2000 (Tel)
(847) 634-1371 (Fax)

Source http://www.zelana.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Diborane
Hydrogen Cyanide
Hydrogen Sulfide
Hydrogen Bromide
Hydrogen Chloride
Hydrogen Fluoride
Phosgene
Arsine

Medium Hazard Index TIMs Detected

Hydrogen Selenide
Phosphine
Nitrogen Dioxide
Boron Trifluoride

Low Hazard Index TIMs Detected	Hydrogen Iodide
Detection State	Vapor
Sensitivity	Detects Diborane at 15-1000 ppb (v) (Below IDLH) Detects Hydrogen Selenide at 6-500 ppb (v) (Below IDLH) Detects Phosphine at 5-3000 ppb (v) (Below IDLH) Detects Hydrogen Cyanide at 0.5-50 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0.5-100 ppm (v) (Below IDLH) Detects Hydrogen Bromide and Hydrogen Fluoride at 0.3-30 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0.3-30 ppm (v) (Below IDLH) Detects Phosgene at 7-1000 ppb (v) (Below IDLH) Detects Hydrogen Chloride at 0.5-30 ppm (v) (Below IDLH) Detects Hydrogen Iodide at 0.1-25 ppm (v) (No IDLH) Detects Arsine at 5-500 ppb (v) (Below IDLH) Detects Boron Trifluoride at 100-1500 ppb (v) (Below IDLH
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	10 seconds to 2 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	17 in x 9.2 in x 17.7 in
Weight	55 pounds
Power Requirements	100/110 V AC @ 50/60 Hz

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	50°F to 104°F (operating temperature)
Consumables Required	Chemcassettes
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available

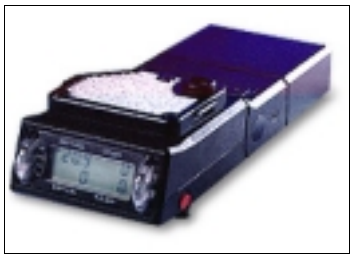
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	A RS-232 port allows data to be sent to a PC.
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	No information available

General

Detector Name *MiniGas-XL Multi-gas Monitor*



Detector ID # 126

Detector Type Commercial

Technology Electrochemistry

Manufacturer
Zellweger Analytics, Inc.
4331 Thurmond Tanner Road
Flowery Beach, GA 30542
POC: Jeff Kruzich
(800) 323-2000 (Tel)
(847) 634-1371 (Fax)

Source http://www.zelana.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide

Medium Hazard Index TIMs Detected Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Hydrogen Sulfide at 0-999 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-499 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	2.6 in x 4.3 in x 6.9 in
Weight	1.936 pounds
Power Requirements	Rechargeable NiCad battery pack (15 hours) or AA alkaline batteries

Logistical Parameters

Transportability	Handheld Portable
Durability	The MiniGas-XL is designed to be used in the harshest environments.
Environmental Conditions	32°F to 104°F @ 0 to 99% relative humidity (operating temperature)
Consumables Required	Calibration kits Batteries Sensor grill filters Software Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal

Training Available	Interactive CD-ROM Training available from manufacturer
Manuals Available	User manual
Support Equipment	Dry cell or rechargeable battery pack Belt/pocket clip Body harness
Communications Interface Capability	Data can be downloaded to a PC using the MiniGas-XL software
Tamper Resistance	No information available
Warranty	Lifetime (excluding sensors and batteries)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Toxibee Personal Gas Alarm*

Detector ID # 127

Detector Type Commercial

Technology Electrochemistry

Manufacturer Lumidor Safety Products
11221 Interchange Circle South
Miramar, Florida 3302
(800) 433-7220 (Tel)
(954) 433-7730 (Fax)

Source http://www.lumidor.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide

Medium Hazard Index TIMs Detected Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity Detects Hydrogen Sulfide at 0-1000 ppm (v) (Below IDLH)

	Detects Carbon Monoxide at 0-500 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	3 to 5 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	2.2 in x 2.8 in x 0.72 in
Weight	2 oz
Power Requirements	No information available

Logistical Parameters

Transportability	Handheld Portable
Durability	No information available
Environmental Conditions	-4°F to 122°F (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	None
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	None

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	No information available

Support Equipment	Calibration hose Calibration cup
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	2 years
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *MicroPac Personal Gas Alarm*

Detector ID # 128

Detector Type Commercial

Technology Electrochemistry

Manufacturer Draeger Safety, Inc.
101 Technology Drive
Pittsburgh, PA 15275
(412) 787-8383 (Tel)
(800) 922-5518 (Tel)
(800) 922-5519 (Fax)

Source http://www.draeger.net

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide

Medium Hazard Index TIMs Detected Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Carbon Monoxide at 0-400 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	Less than 15 minutes
Response Time	20-35 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	2.1 in x 3.3 in x 1.3 in
Weight	3.7 oz
Power Requirements	AA Lithium battery

Logistical Parameters

Transportability	Handheld Portable
Durability	High impact composite material with radio frequency interference (RFI) protection.
Environmental Conditions	-20°C to 50°C @ 10 to 95 % relative humidity (operating temperature)
Consumables Required	Calibration kits Sensors (for each chemical detected)
Calibration Required	One-button calibration
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	3 months
Unit Cost	$345
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Non-formal
Training Available	No information available

Manuals Available	User manual
Support Equipment	Calibration adapter Battery charger
Communications Interface Capability	Infrared communications link for reconfiguration
Tamper Resistance	This instrument is tamper resistant in the field. No menu structure is accessible.
Warranty	2 years
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Toxi Gas Detector*

Detector ID # 129

Detector Type Commercial

Technology Electrochemistry

Manufacturer Biosystems
651 South Main Street.
Middletown, CT 06457
(860) 344-1079 (Tel)
(860) 344-1068 (Fax)

Source http://www.biosystems.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide
Carbon Monoxide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity No information available

Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.3 in x 2.1 in x 1.1 in
Weight	4.5 oz
Power Requirements	3 AAA batteries

Logistical Parameters

Transportability	Handheld Portable
Durability	The Toxi Gas Detector is constructed of metal-plated ABS to provide maximum protection against radio frequency interference.
Environmental Conditions	No information available
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	A training video is available from the manufacturer

Manuals Available	Reference manual Quick reference card
Support Equipment	Calibration adapter Weather cover
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Toxi Plus Gas Detector*

Detector ID # 130

Detector Type Commercial

Technology Electrochemistry

Manufacturer Biosystems
651 South Main Street.
Middletown, CT 06457
(860) 344-1079 (Tel)
(860) 344-1068 (Fax)

Source http://www.biosystems.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide
Sulfur Dioxide

Medium Hazard Index TIMs Detected Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity No information available

Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.3 in x 2.1 in x 1.1 in
Weight	4.5 oz
Power Requirements	3 AAA batteries

Logistical Parameters

Transportability	Handheld Portable
Durability	The Toxi Plus Gas Detector is constructed of metal-plated ABS to provide maximum protection against radio frequency interference.
Environmental Conditions	No information available
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	A training video is available from the manufacturer

Manuals Available	Reference manual Quick reference card
Support Equipment	Calibration adapter Weather cover
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Toxi Ultra Gas Detector*

Detector ID # 131

Detector Type Commercial

Technology Electrochemistry

Manufacturer Biosystems
651 South Main Street.
Middletown, CT 06457
(860) 344-1079 (Tel)
(860) 344-1068 (Fax)

Source http://www.biosystems.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Ammonia
Chlorine
Sulfur Dioxide
Hydrogen Sulfide

Medium Hazard Index TIMs Detected Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	No information available
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.3 in x 2.1 in x 1.1 in
Weight	4.5 oz
Power Requirements	3 AAA batteries

Logistical Parameters

Transportability	Handheld Portable
Durability	The Toxi Ultra Detector is constructed of metal-plated ABS to provide maximum protection against radio frequency interference.
Environmental Conditions	No information available
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal

Training Available	A training video is supplied with the Toxi Ultra Detector.
Manuals Available	Reference manual Quick reference card
Support Equipment	Calibration adapter Weather cover
Communications Interface Capability	The Toxi Ultra Gas Detector can easily communicate with a Personal Computer.
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *TMX412 Multi-Gas Monitor*

Detector ID # 132

Detector Type Commercial

Technology Electrochemistry

Manufacturer Industrial Scientific Corporation
1001 Oakdale Road
Oakdale, PA 15071 - 1500
POC: Lavern Walker
(800) 338-3287 (Tel)
(412) 788-8353 (Fax)

Source http://www.indsci.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide
Chlorine
Sulfur Dioxide

Medium Hazard Index TIMs Detected Nitrogen Dioxide
Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Carbon Monoxide at 0.2-999 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0.2-999 ppm (v) (Below IDLH) Detects Chlorine at 0.2-99.9 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0.2-99.9 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0.2-99.9 ppm (v) (Below IDLH))
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	45 seconds
Response Time	15-20 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.8 in x 2.8 in x 2 in
Weight	1.624 pounds
Power Requirements	Rechargeable nickel-cadmium battery pack, 9 Volt Alkaline battery pack, or a lithium battery

Logistical Parameters

Transportability	Handheld Portable
Durability	The TMX412 is constructed of 304 Stainless Steel, RFI resistant, and equipped with shock-resistant electronics preparing it for the worst of impacts.
Environmental Conditions	-4°F to 122°F@ 0 to 90% relative humidity (operating temperature)
Consumables Required	Calibration kit Calibration adapter Batteries Sensors (for each chemical detected)
Calibration Required	One-button autocalibration
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	~ $1225-$2196
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	Video Tutorial software
Manuals Available	User manual
Support Equipment	Sampling pump Manual pump Battery charger Probes Transport case Calibration log software
Communications Interface Capability	The TMX412 can easily communicate with a Personal Computer.
Tamper Resistance	Password protected.
Warranty	Lifetime (1 year on sensors, 1 year on all other consumable items)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *ATX 612 Multi-Gas Aspirated Monitor*

Detector ID # 133

Detector Type Commercial

Technology Electrochemistry

Manufacturer Industrial Scientific Corporation
1001 Oakdale Road
Oakdale, PA 15071 - 1500
POC: Lavern Walker
(800) 338-3287 (Tel)
(412) 788-8353 (Fax)

Source http://www.indsci.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide
Chlorine
Sulfur Dioxide

Medium Hazard Index TIMs Detected Nitrogen Dioxide
Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Carbon Monoxide at 0.2-999 ppm(v) (Below IDLH) Detects Hydrogen Sulfide at 0.2-999 ppm(v) (Below IDLH) Detects Chlorine at 0.2-99.9 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0.2-99.9 ppm(v) (Below IDLH) Detects Sulfur Dioxide at 0.2-99.9 ppm(v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts.
Start-up Time	50 seconds
Response Time	4-20 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	8.2 in x 3.7 in x 3.2 in
Weight	3.3 pounds
Power Requirements	Rechargeable nickel-cadmium battery pack (16 hours operating time) or alkaline battery pack (20 hour operating time)

Logistical Parameters

Transportability	Handheld Portable
Durability	The ATX612 is constructed of 304 Stainless Steel, RFI resistant, and equipped with shock-resistant electronics preparing it for the worst of impacts.
Environmental Conditions	-40°F to 122°F @ 0 to 90% relative humidity (operating temperature)
Consumables Required	Calibration kit Calibration adapter Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	~$1650-$2645
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	Video Tutorial software
Manuals Available	User manual
Support Equipment	Internal sampling pum Battery charger Probes Transport cases Calibration log
Communications Interface Capability	Capable of interfacing with a PC.
Tamper Resistance	Password protected.
Warranty	Lifetime (1 year on sensors, 1 year on all other consumable items)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *T80 Single Gas Monitor*

Detector ID # 134

Detector Type Commercial

Technology Electrochemistry

Manufacturer Industrial Scientific Corporation
1001 Oakdale Road
Oakdale, PA 15071 -1500
POC: Lavern Walker
(800) 338-3287 (Tel)
(412) 788-8353 (Fax)

Source http://www.indsci.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Sulfide
Chlorine
Sulfur Dioxide
Hydrogen Cyanide

Medium Hazard Index TIMs Detected
Nitrogen Dioxide
Carbon Monoxide
Phosphine

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Carbon Monoxide at 0.2-1999 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0.2-1999 ppm(v) (Below IDLH) Detects Chlorine at 0.2-99.9 ppm(v) (Below IDLH) Detects Nitrogen Dioxide at 0.2-99.9 ppm(v) (Below IDLH) Detects Phosphine at 0.2-1 ppm (v) (Below IDLH)
Resistance to Interferents	The T80 Single Gas Monitor may false alarm to heavy concentrations of various smokes and engine exhausts.
Start-up Time	5 seconds
Response Time	5-20 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4 in x 2.7 in x 1.3 in
Weight	7 oz
Power Requirements	9-volt Alkaline Battery (2600 hours) or Lithium battery

Logistical Parameters

Transportability	Handheld Portable
Durability	The T80 Single Gas Monitor is constructed of an high impact composite with radio frequency interference (RFI) protection.
Environmental Conditions	-4°F to 122°F @ 0 to 90% relative humidity (operating temperature)
Consumables Required	Calibration kit Calibration adapter Batteries Sensors (for each chemical detected)
Calibration Required	One-buttion autocalibration
Repairs Required	Replacement of batteries after 2600 hours of operation Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	~ $495-$795
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	Yes
Manuals Available	User manual
Support Equipment	Calibration cup Manual pump
Communications Interface Capability	None
Tamper Resistance	None
Warranty	Lifetime on instruments (2 years on Carbon Monoxide and Hydrogen Sulfide sensors, 1 year on all other sensors)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Gas Badge Personal Gas Alarm*

Detector ID # 135

Detector Type Commercial

Technology Electrochemistry

Manufacturer Industrial Scientific Corporation
1001 Oakdale Road
Oakdale, PA 15071 -1500
POC: Lavern Walker
(800) 338-3287 (Tel)
(412) 788-8353 (Fax)

Source http://www.indsci.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide

Medium Hazard Index TIMs Detected Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Hydrogen Sulfide at 0-125 ppm(v) (Below IDLH) Detects Carbon Monoxide at 0-500 ppm (v) (Below IDLH)
Resistance to Interferents	The GasBadge Single Gas Monitor may false alarm to heavy concentrations of various smokes and engine exhausts.
Start-up Time	5 seconds
Response Time	5-8 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	3 in x 1.7 in x 1.3 in
Weight	5 oz
Power Requirements	6 volt Lithium battery

Logistical Parameters

Transportability	Handheld Portable
Durability	The Gas Badge Personal Alarm is constructed of impact, RFI-resistant composite material.
Environmental Conditions	-4°F to 113°F@ 0 to 99% relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	One button autocalibration
Repairs Required	Sensor and battery replacement yearly
Shelf Life	4 months
Unit Cost	~ $295
Maintenance Cost	~ $195

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	Yes
Manuals Available	User manual

Support Equipment	Calibration adapter
Communications Interface Capability	None
Tamper Resistance	None
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Unimax Personal Single Gas Detector*

Detector ID # 136

Detector Type Commercial

Technology Electrochemistry

Manufacturer Lumidor Safety Products
11221 Interchange Circle South
Miramar, Florida 3302
(800) 433-7220 (Tel)
(954) 433-7730 (Fax)

Source http://www.lumidor.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Ammonia
Chlorine
Hydrogen Sulfide
Sulfur Dioxide

Medium Hazard Index TIMs Detected
Carbon Monoxide
Nitrogen Dioxide
Phosphine

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Ammonia at 25 ppm (v) (Below IDLH) Detects Carbon Monoxide at 35 ppm (v) (Below IDLH) Detects Chlorine at 0.5 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 10 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 3 ppm (v) (Below IDLH) Detects Phosphine at 0.3 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 2 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.1 in x 2.5 in x 1.1 in
Weight	5 oz
Power Requirements	3 AAA alkaline batteries (800 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The UniMax is RFI/EMI resistant.
Environmental Conditions	5°F to 113°F (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries after 800 hours of operation Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	Calibration hose Calibration cap
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	Lifetime (excluding sensors & batteries)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *MicroMax Multigas Monitor*

Detector ID # 137

Detector Type Commercial

Technology Electrochemistry

Manufacturer
Lumidor Safety Products
11221 Interchange Circle South
Miramar, Florida 3302
(800) 433-7220 (Tel)
(954) 433-7730 (Fax)

Source http://www.lumidor.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Ammonia
Chlorine
Hydrogen Cyanide
Hydrogen Sulfide
Sulfur Dioxide

Medium Hazard Index TIMs Detected
Carbon Monoxide
Phosphine

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Ammonia at 0-500 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-800 ppm (v) (Below IDLH) Detects Chlorine at 0-1000 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-800 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-500 ppm (v) (Below IDLH) Detects Phosphine at 0-20 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-20 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible (90 dB)

Physical Parameters

Size	4.8 in x 3 in x 1.8 in
Weight	Less than 1 pound
Power Requirements	Rechargeable NiCad battery pack with quick charge option or 2 AA alkaline batteries (10 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The MicroMax is housed in a rugged water resistant anodized aluminum enclosure.
Environmental Conditions	-4°F to 122°F @ 0 to 98% relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes (The MicroMax automatically performs self test and auto functions)
Repairs Required	Replacement of batteries after 10 hours of operation Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available

Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	Sampling hose Particulate filter
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *MiniWarn Gas Detector*

Detector ID # 138

Detector Type Commercial

Technology Electrochemistry

Manufacturer Draeger Safety, Inc.
101 Technology Drive
Pittsburgh, PA 15275
(412) 787-8383 (Tel)
(800) 922-5518 (Tel)
(800) 922-5519 (Fax)

Source http://www.draeger.net

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Ammonia
Arsine
Chlorine
Diborane
Fluorine
Hydrogen Cyanide
Hydrogen Sulfide
Phosgene
Sulfur Dioxide

Medium Hazard Index TIMs Detected
Carbon Monoxide
Hydrogen Selenide
Phosphine

Low Hazard Index TIMs Detected	Bromine
Detection State	Vapor
Sensitivity	Detects Ammonia at 0-300 ppm (v) (Below IDLH) Detects Arsine at 0-10 ppm (v) (Below IDLH) Detects Bromine at 0-20 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-2000 ppm (v) (Below IDLH) Detects Chlorine at 0-20 ppm (v) (Below IDLH) Detects Diborane at 0-1 ppm (v) (Below IDLH) Detects Fluorine at 0-20 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-50 ppm (v) (Below IDLH) Detects Hydrogen Selenide at 0-1 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Phosgene at 0-3 ppm (v) (Below IDLH) Detects Phosphine at 0-10 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	3.1 in x 5.6 in x 2.3 in
Weight	Less than 1 pound
Power Requirements	NiCad (>8 hours of operation) or 4 AA Alkaline battery (>12 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The MiniWarn Gas Detector is constructed of a high impact resistant composite material with radio frequency interference (RFI) protection.
Environmental Conditions	-4°F to 104°F @ 10 to 95% relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	One-button calibration

Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Calibration adapter Sample pump Battery charger
Communications Interface Capability	All stored measurements are transferred to a PC via a wireless Infrared Interface.
Tamper Resistance	Menu structure is password protected.
Warranty	5 years
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Multiwarn II Gas Detector*

Detector ID # 139

Detector Type Commercial

Technology Electrochemistry

Manufacturer

Draeger Safety, Inc.
101 Technology Drive
Pittsburgh, PA 15275
(412) 787-8383 (Tel)
(800) 922-5518 (Tel)
(800) 922-5519 (Fax)

Source http://www.draeger.net

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Ammonia
Arsine
Chlorine
Diborane
Fluorine
Hydrogen Cyanide
Hydrogen Sulfide
Phosgene
Sulfur Dioxide

Medium Hazard Index TIMs Detected

Carbon Monoxide
Hydrogen Selenide
Phosphine

Low Hazard Index TIMs Detected	Bromine
Detection State	Vapor
Sensitivity	Detects Ammonia at 0-300 ppm (v) (Below IDLH) Detects Arsine at 0-10 ppm (v) (Below IDLH) Detects Bromine at 0-20 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-2000 ppm (v) (Below IDLH) Detects Chlorine at 0-20 ppm (v) (Below IDLH) Detects Diborane at 0-1 ppm (v) (Below IDLH) Detects Fluorine at 0-20 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-50 ppm (v) (Below IDLH) Detects Hydrogen Selenide at 0-1 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Phosgene at 0-3 ppm (v) (Below IDLH) Detects Phosphine at 0-10 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	2.2 in x 4.3 in x 2.6 in
Weight	2.2 pound
Power Requirements	NiCad battery (10 hours of operation) or 4 "C" alkaline batteries

Logistical Parameters

Transportability	Handheld Portable
Durability	The MultiWarn II Gas Detector is constructed of a high impact resistant composite material with radio frequency interference (RFI) protection.
Environmental Conditions	-4°F to 104°F @ 10 to 95% relative humidity (operating temperature)
Consumables Required	Calibration kit Sensors (for each chemical detected)
Calibration Required	One-button calibration
Repairs Required	Replacement of sensors

	Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	NiCad battery charger Calibration adapter
Communications Interface Capability	The MiniWarm II can be linked via an optional RS-232 computer interface to a corresponding PC for bidirectional data communication.
Tamper Resistance	Password protected for added security
Warranty	1 year
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Smart Logger Gas Detector*

Detector ID # 140

Detector Type Commercial

Technology Electrochemistry

Manufacturer
Enmet Corporation
P.O. Box 979
Ann Arbor, MI 48106-0979
POC: Ray Kelley, Sales Manager
(734) 761-1270 (Tel)
(734) 761-3220 (Fax)

Source http://www. enmet.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Sulfide
Chlorine
Hydrogen Cyanide
Hydrogen Chloride
Sulfur Dioxide
Ammonia
Ethylene Oxide

Medium Hazard Index TIMs Detected
Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected	None
Detection State	Vapor
Sensitivity	Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Hydrogen Chloride at 0-30 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-10 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-30 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-1000 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-30 ppm (v) (Below IDLH) Detects Ammonia at 0-100 ppm (v) (Below IDLH) Detects Ethylene Oxide at 0-30 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	5.1 in x 2.5 in x 1.7 in
Weight	7.9 oz
Power Requirements	Rechargeable NiCad battery

Logistical Parameters

Transportability	Handheld Portable
Durability	The Smart Logger is constructed of a high impact composite material with radio frequency interference (RFI) protection.
Environmental Conditions	14°F to 104°F (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes Self-test on start-up
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer

Shelf Life	18-48 months
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Battery charger Calibration adapter
Communications Interface Capability	Data can be downloaded to a PC.
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Target Gas Detector*

Detector ID # 142

Detector Type Commercial

Technology Electrochemistry; Catalytic; Solid State MOS

Manufacturer

Enmet Corporation
P.O. Box 979
Ann Arbor, MI 48106-0979
POC: Ray Kelley, Sales Manager
(734) 761-1270 (Tel)
(734) 761-3220 (Fax)

Source http://www. enmet.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide

Medium Hazard Index TIMs Detected Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Hydrogen Sulfide at 0-200 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-500 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	5 to 60 seconds (depending on gas/vapor)
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	5.9 in x 4.5 in x 1.8 in
Weight	1.98 pound
Power Requirements	Nickel metal hydride battery pack or optional alkaline (16 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The Target is housed in a rugged metal enclosure and designed to minimize Radio Frequency Interference (RFI).
Environmental Conditions	5° F to 122° F @ 5 to 99 % relative humidity (operating temperature)
Consumables Required	Sensors Calibration kit Batteries
Calibration Required	Yes (auto zero calibration)
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal

Training Available	No information available
Manuals Available	No information available
Support Equipment	Battery charger
Communications Interface Capability	Serial communications to PC
Tamper Resistance	Password protected
Warranty	2 years
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Quadrant Portable Gas Detector*

Detector ID # 143

Detector Type Commercial

Technology Electrochemistry; Catalytic

Manufacturer

Enmet Corporation
P.O. Box 979
Ann Arbor, MI 48106-0979
POC: Ray Kelley, Sales Manager
(734) 761-1270 (Tel)
(734) 761-3220 (Fax)

Source http://www. enmet.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide

Medium Hazard Index TIMs Detected Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-500 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	5 to 60 seconds (depending on gas/vapor)
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	3.1 in x 5.9 in x 1.6 in
Weight	Less than 1 pound
Power Requirements	Alkaline (15-20 hours of operation) or NiCad (12-14 hours of operation) battery pack

Logistical Parameters

Transportability	Handheld Portable
Durability	The Quadrant is constructed of a polycarbonate material and is Radio Frequency Interference (RFI) resistant.
Environmental Conditions	No information available
Consumables Required	Sensors Calibration kit Batteries
Calibration Required	Yes (auto zero calibration)
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	2 years
Unit Cost	< $1500
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal

Training Available	No information available
Manuals Available	User manual
Support Equipment	Calibration adapter Battery charger
Communications Interface Capability	Data can be downloaded to a personal computer.
Tamper Resistance	Password protected
Warranty	18 months
Testing Information	Non information available
Applicable Regulations	None

General

Detector Name *VRAE Hand Held 5 Gas Surveyor (Model 7800 Monitor)*

Detector ID # 144

Detector Type Commercial

Technology Electrochemistry

Manufacturer RAE Systems, Inc.
1339 Moffett Park Drive
Sunnyvale, CA 94089
(408) 752-0723 (Tel)
(408) 752-0724 (Fax)

Source http://www.raesystems.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Sulfide
Sulfur Dioxide
Chlorine
Hydrogen Cyanide
Ammonia

Medium Hazard Index TIMs Detected
Nitrogen Dioxide
Carbon Monoxide
Phosphine

Low Hazard Index TIMs Detected Nitric Oxide

Detection State	Vapor
Sensitivity	Detects Carbon Monoxide at 0-500 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-20 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-30 ppm (v) (Below IDLH) Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-100 ppm (v) (Below IDLH) Detects Ammonia at 0-50 ppm (v) (Below IDLH) Detects Phosphine at 0-5 ppm (v) (Below IDLH) Detects Nitric Oxide at 0-250 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	7.8 in x 2.8 in x 1.5 in
Weight	1.25 pound
Power Requirements	Rechargeable, field replaceable 4.8 V, 1.1 Ah NMH battery pack 4 AA alkaline battery adapter (10 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	RFI resistant
Environmental Conditions	-4°F to 113°F @ 0 to 95% relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Two points field calibration of zero and span gas
Repairs Required	Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available

Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Sampling pump Battery charger
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	2 years
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Gasman Portable Multiple Toxic Gas Monitor*

Detector ID # 145

Detector Type Commercial

Technology Infrared Spectroscopy

Manufacturer
Spectral Sciences Incorporated
99 South Bedford St.
Burlington, MA 01803
(781) 273-4770 (Tel)
(781) 270-1161 (Fax)

Source http://www.spectral.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Sulfide
Hydrogen Bromide
Hydrogen Chloride

Medium Hazard Index TIMs Detected
Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available

Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Model 680EZ Portable Photoionization Detector*

Detector ID # 146

Detector Type Commercial

Technology Photo Ionization

Manufacturer Thermo Environmental Instruments, Inc.
8 West Forge Pky.
Franklin, MA 02038
(800) 449-4561 (Tel)
(508) 520-1460 (Fax)

Source

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected No information available

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No information available

Detection State Vapor

Sensitivity No information available

Resistance to Interferents	No information available
Start-up Time	No information available
Response Time	No information available
Alarm Capability	No information available

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Handheld Stationary
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	No information available
Training Required	No information available
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available
Communications Interface Capability	No information available

Tamper Resistance No information available

Warranty No information available

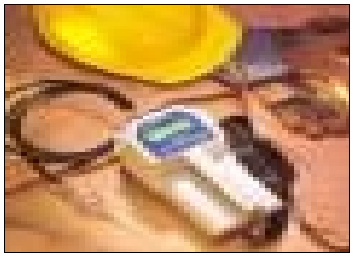
Testing Information No information available

Applicable Regulations No information available

General

Detector Name

GT Series Portable Gas Monitor



Detector ID #

147

Detector Type

Commercial

Technology

Electrochemistry

Manufacturer

Gas Tech, Inc.
8407 Central Ave
Newark, CA 94560-3431
(510) 745-8700 (Tel)
(510) 794-6201 (Fax)

Source

http://www.gastech.com

Availability

Commercially available

Current User

No information available

Operational Parameters

Chemical Agents Detected

None

Biological Agents Detected

None

High Hazard Index TIMs Detected

Ammonia
Chlorine
Hydrogen Sulfide
Sulfur Dioxide

Medium Hazard Index TIMs Detected

Carbon Monoxide

Low Hazard Index TIMs Detected

None

Detection State	Vapor
Sensitivity	Detects Ammonia at 0-100 ppm (v) (Below IDLH) Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-300 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-200 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-10 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	30-150 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	10 in x 6 in x 5 in
Weight	4.95 pound
Power Requirements	Four D alkaline (20 hours of operation) or NiCd batteries (10 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The GT Series Portable Gas Monitor is constructed of high impact, chemical & RF resistant, polycarbonate-polyester plastic.
Environmental Conditions	-4°F to 113°F @ 0 to 95% relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries after 10-20 hours of operation Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	$1410-$2280
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Sample pump
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	1 year (parts & labor)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *Genesis Portable Gas Monitor*

Detector ID # 148

Detector Type Commercial

Technology Electrochemistry

Manufacturer

Gas Tech, Inc.
8407 Central Ave
Newark, CA 94560-3431
(510) 745-8700 (Tel)
(510) 794-6201 (Fax)

Source http://www.gastech.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Ammonia
Hydrogen Sulfide
Chlorine
Sulfur Dioxide
Hydrogen Cyanide

Medium Hazard Index TIMs Detected

Carbon Monoxide
Nitrogen Dioxide
Phosphine

Low Hazard Index TIMs Detected Nitric Oxide

Detection State	Vapor
Sensitivity	Detects Ammonia at 0-100 ppm (v) (No IDLH) Detects Hydrogen Sulfide at 0-200 ppm (v) (Below IDLH) Detects Chlorine at 0-9.9 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-9.9 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-30 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-250 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-9.9 ppm (v) (Below IDLH) Detects Phosphine at 0-3 ppm (v) (Below IDLH) Detects Nitric Oxide at 0-100 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	60 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	2.3 in x 3.7 in x 6 in
Weight	1 pound
Power Requirements	3 AA-size alkaline (22 hours of operation) or NiHy battery pack (16 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The Genesis is constructed of a powder coated die cast aluminum with molded end caps.
Environmental Conditions	-4°F to 113°F @ 0 to 95% relative humidity (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries after 22 hours of operation Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available

Unit Cost	$795-$1295
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual Quick reference card
Support Equipment	Battery charger Sample pump
Communications Interface Capability	Capable of interfacing with a Personal Computer
Tamper Resistance	Password protection for added security
Warranty	2 years (parts & labor)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *95 Series Single Gas Monitor*

Detector ID # 149

Detector Type Commercial

Technology Electrochemistry

Manufacturer Gas Tech, Inc.
8407 Central Ave
Newark, CA 94560-3431
(510) 745-8700 (Tel)
(510) 794-6201 (Fax)

Source http://www.gastech.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide

Medium Hazard Index TIMs Detected Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH)

	Detects Carbon Monoxide at 0-500 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	30 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4.5 in x 2.5 in x 1 in
Weight	6.5 oz
Power Requirements	One 9 V alkaline battery (25 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The 95 Series Single Gas Monitor is constructed of high impact, chemical resistant polycarbonate-polyester plastic.
Environmental Conditions	-4°F to 113°F @ 0 to 95% relative humidity (operating temperature)
Consumables Required	Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries after 25 hours of operation
	Replacement of sensors
	Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	$295
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available

Manuals Available	No information available
Support Equipment	Calibration kit
Communications Interface Capability	None
Tamper Resistance	No information available
Warranty	1 year (parts & labor)
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *MultiCheck 2000 Multi-Gas Monitor*

Detector ID # 150

Detector Type Commercial

Technology Electrochemistry

Manufacturer

Quest Technologies, Inc.
1060 Corporate Center Drive
Oconomowoc, WI 53066
POC: Tim Bailey, Vice President
(800) 245-0779 (Tel), ext. 111
(414) 567-4047 (Fax)

Source http://www.quest-technologies.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Hydrogen Sulfide
Hydrogen Dioxide
Ammonia
Hydrogen Cyanide
Ethylene Oxide
Chlorine

Medium Hazard Index TIMs Detected

Carbon Monoxide
Nitrogen Dioxide

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	Detects Carbon Monoxide at 0-999 ppm (v) (Below IDLH) Detects Hydrogen Sulfide at 0-500 ppm (v) (Below IDLH) Detects Chlorine at 0-20 ppm (v) (Below IDLH) Detects Hydrogen Cyanide at 0-50 ppm (v) (Below IDLH) Detects Ammonia at 0-50 ppm (v) (Below IDLH) Detects Sulfur Dioxide at 0-50 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-50 ppm (v) (Below IDLH) Detects Ethylene Oxide at 0-20 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	Less than 1 minute
Response Time	25 seconds to 2 minutes
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	6.9 in x 3.4 in x 2 in
Weight	1.32 pounds
Power Requirements	2 "C" alkaline batteries (16 hours of operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	The MultiCheck 2000 Multi-Gas Monitor is constructed of a Nickel alloy plated high impact ABS polycarbonate material which is RFI/EMI protected.
Environmental Conditions	14°F to 104°F (operating temperature) 5°F to 140°F (storage temperature)
Consumables Required	Calibration kit Calibration adapter Batteries Sensors (for each chemical detected)
Calibration Required	Yes
Repairs Required	Replacement of batteries after 16 hours of operation Recharge batteries after 10-12 hours of operation Replacement of sensors

	Other maintenance as required by manufacturer
Shelf Life	Indefinite; Sensors must be replaced
Unit Cost	$1495
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Informal
Training Available	Yes
Manuals Available	User manual
Support Equipment	None
Communications Interface Capability	None
Tamper Resistance	Set-up menu protected by password.
Warranty	Instrument: 2 years Sensors: 2 years for hydrogen sulfide and carbon monoxide; 1 year on all others except ammonia
Testing Information	No information available
Applicable Regulations	OSHA confined space

General

Detector Name *Fixed Site/Remote Chemical Agent Detector*

Detector ID # 151

Detector Type Commercial

Technology Ion Mobility Spectrometry

Manufacturer
Environmental Technologies Group, Inc.
1400 Taylor Avenue
Baltimore, MD 21234
POC: Tom Brown
(410)-321-5200 (Tel)
(410) 321-5255 (Fax)

Source http://www.envtech.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD
L

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State	Vapor
Sensitivity	No information available
Resistance to Interferents	Has few non-critical interferences.
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm

Physical Parameters

Size	No information available
Weight	No information available
Power Requirements	No information available

Logistical Parameters

Transportability	Fixed-Site Detection
Durability	No information available
Environmental Conditions	No information available
Consumables Required	No information available
Calibration Required	No information available
Repairs Required	No information available
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Formal
Training Available	No information available
Manuals Available	No information available
Support Equipment	No information available

Communications Interface Capability	An RS-232 output allows stored data to be downloaded to a PC.
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *TX-2000 Toxic Gas Detector*

Detector ID # 153

Detector Type Commercial

Technology Electrochemistry

Manufacturer
Enmet Corporation
P.O. Box 979
Ann Arbor, MI 48106-0979
POC: Ray Kelley, Sales Manager
(734) 761-1270 (Tel)
(734) 761-3220 (Fax)

Source http://www. enmet.com

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Sulfide
Ammonia
Chlorine

Medium Hazard Index TIMs Detected
Nitrogen Dioxide
Carbon Monoxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects Hydrogen Sulfide at 0-100 ppm (v) (Below IDLH) Detects Carbon Monoxide at 0-500 ppm (v) (Below IDLH) Detects Ammonia at 0-100 ppm (v) (Below IDLH) Detects Chlorine at 0-10 ppm (v) (Below IDLH) Detects Nitrogen Dioxide at 0-30 ppm (v) (Below IDLH)
Resistance to Interferents	May false alarm to heavy concentrations of various smokes and engine exhausts
Start-up Time	No information available
Response Time	No information available
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	2.4 in x 3.4 in x 1 in
Weight	3.3 oz
Power Requirements	3 "AAA" alkaline batteries (1000 hours of operation)

Logistical Parameters

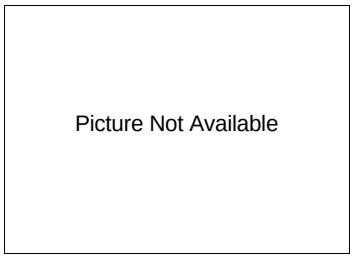
Transportability	Handheld Portable
Durability	The TX-2000 is constructed of an anti-static polycarbonate material.
Environmental Conditions	14°F to 104°F (operating temperature)
Consumables Required	Calibration kit Batteries Sensors (for each chemical detected)
Calibration Required	Yes (push button calibration) Self-tested when turned on
Repairs Required	Replacement of batteries after 1000 hours of operation Replacement of sensors Other maintenance as required by manufacturer
Shelf Life	No information available
Unit Cost	No information available
Maintenance Cost	No information available

Special Requirements

Operator Skills Required	Non-technical background
Training Required	Formal
Training Available	No information available
Manuals Available	User manual
Support Equipment	Calibration regulator assembly Tool kit Aspirator
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	No information available
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *DET INDIV Individual Nerve Agent Detector*



Detector ID # 154

Detector Type Military/Commercial

Technology Color Change Chemistry

Manufacturer

Giat Industries
4600 No. Fairfax Drive
Suite 400
Arlington, VA 22203
(703) 812-5393 (Tel)
(703) 525-2349 (Fax)

Source Giat Industries

Availability Commercially available

Current User French Forces and Civil Defense, Singapore Forces

Operational Parameters

Chemical Agents Detected

GA
GB
GD

Biological Agents Detected None

High Hazard Index TIMs Detected None

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	Detects GA at 0.01 ppm (v) (Below IDLH) Detects GB at 0.002 ppm (v) (Below IDLH) Detects GD at 0.003 ppm (v) (Below IDLH)
Resistance to Interferents	Low intereferent effect
Start-up Time	5 minutes
Response Time	5 minutes
Alarm Capability	None

Physical Parameters

Size	4.7 in x 1.6 in x 0.4 in
Weight	No information available
Power Requirements	None

Logistical Parameters

Transportability	Handheld Portable
Durability	Rugged for military use
Environmental Conditions	Ideal for all environments
Consumables Required	None
Calibration Required	None
Repairs Required	None
Shelf Life	3 years
Unit Cost	No information available
Maintenance Cost	None

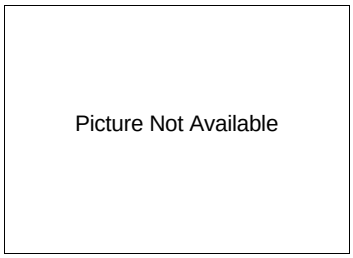
Special Requirements

Operator Skills Required	Non-technical background
Training Required	Non-formal
Training Available	Yes
Manuals Available	None
Support Equipment	None

Communications Interface Capability	None
Tamper Resistance	None
Warranty	1 year
Testing Information	No information available
Applicable Regulations	No information available

General

Detector Name *KDTC*



Detector ID # 155

Detector Type Military/Commercial

Technology Color Change Chemistry

Manufacturer
Giat Industries
4600 No. Fairfax Drive
Suite 400
Arlington, VA 22203
(703) 812-5393 (Tel)
(703) 525-2349 (Fax)

Source Giat Industries

Availability Commercially available

Current User French Armed Forces and Civil Defense, Singapore Armed Forces, Italian Armed Forces, Oman Armed Forces, UAE Armed Forces

Operational Parameters

Chemical Agents Detected
GA
GB
VX
HD

Biological Agents Detected None

High Hazard Index TIMs Detected
Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected Cyanogen Chloride

Detection State	Vapor Liquid
Sensitivity	Detects GA at 0.00013 ppm (v) (Below IDLH) Detects GB at 0.00017 ppm (v) (Below IDLH) Detects VX at 0.00001 ppm (v) (Below IDLH) Detects HD at 0.02 ppm (v) (No IDLH) Detects Hydrogen Cyanide at 0.31 ppm (v) (Below IDLH) Detects Phosgene at 0.5 ppm (v) (Below IDLH) Detects Cyanogen Chloride at 0.8 ppm (v)
Resistance to Interferents	Interferants: G agents : Chlorides Hydrogen Cyanide: exhaust fumes
Start-up Time	5-30 minutes
Response Time	1-3 minutes
Alarm Capability	None

Physical Parameters

Size	10.4 in x 9.6 in x 4.9 in
Weight	4.6 pounds
Power Requirements	Battery for electric torch for night detection

Logistical Parameters

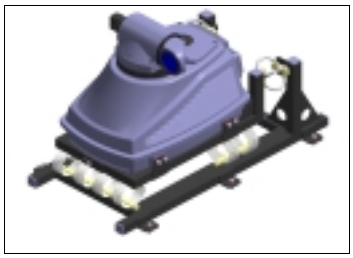
Transportability	Handheld Stationary
Durability	Rugged for emergency uses
Environmental Conditions	Military Standard
Consumables Required	Sampling ticket Reagents Cotton swab Battery for torch light
Calibration Required	None
Repairs Required	None
Shelf Life	3 years for reagents
Unit Cost	$2,612.37
Maintenance Cost	None

Special Requirements

Operator Skills Required	Hazmat technician or NBC trained personnel
Training Required	Formal (16 hrs)
Training Available	Yes
Manuals Available	User manual
Support Equipment	Kit box includes support
Communications Interface Capability	None
Tamper Resistance	None
Warranty	1 year
Testing Information	No information available
Applicable Regulations	No information available

General

Detector Name *RAPID I (Remote Air Pollution Infrared Detector)*



Detector ID # 156

Detector Type Military/Commercial

Technology Infrared Spectroscopy (Fourier Transform)

Manufacturer Bruker Saxonia Analytik GmbH, Permoserstr. 15
04318 Leipzig
Phone: (49) 341 235 2453
Fax: (49) 341 235 3605

Source Bruker Saxonia Analytik

Availability Commercially available

Current User German Civil Defense Agency; TUHH--Revingeby, Sweden (contact information available upon request).

Operational Parameters

Chemical Agents Detected
GA
GB
GD
HD
L

Biological Agents Detected None

High Hazard Index TIMs Detected
Ammonia
Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected
Acrolein
Acrylonitrile

Low Hazard Index TIMs Detected None

Detection State

Vapor
Aerosol

Sensitivity

Detects GA at 0.013 ppm (v) (Below IDLH)
Detects GB at 0.009 ppm (v) (Below IDLH)
Detects GD at 0.012 ppm (v) (Above IDLH)
Detects HD at 0.02 ppm (v) (No IDLH)
Detects L at 0.03 ppm (v) (No IDLH)
Detects Phosgene at 0.01 ppm (v) (Below IDLH)
Detects Hydrogen Cyanide at 0.03 ppm (v) (Below IDLH)

Resistance to Interferents

The RAPID System has up to 0.5cm-1 resolution which eliminates the effects of most interferences.

Start-up Time

4 minutes

Response Time

10-60 seconds

Alarm Capability

No information available

Physical Parameters

Size

15.6 in x 14.4 in x 9.8 in

Weight

40 pounds

Power Requirements

The system requires a power supply of 12-36 V and consumes 30W of power. Commercially available batteries can be used (i.e., 12/24V car batteries) for over 8 hours of operation.

Logistical Parameters

Transportability

Handheld Stationary

Durability

The RAPID is designed for field and vehicle mounted applications. It is very durable and rugged.

Environmental Conditions

No information available

Consumables Required

Batteries
Desiccant cartridges
Optical window
Reference laser
Fuses

Calibration Required

System automatically performs self-calibration with internal black-body (heated) sources. This can be programmed to be performed automatically at set intervals.

Repairs Required

The system is designed for organic maintenance (maintain in the field) with minimal need to be returned to the manufacturer for maintenance. Routine field repairs include replacement of the consumable items.

Shelf Life The estimated life span of the RAPID is >10 years.

Unit Cost The unit cost of the RAPID with accessories is $125,000-175,000 in quantities of 1. Larger quantities will reduce the per unit costs.

Maintenance Cost Service contracts typically run ~10% of the per unit cost.

Special Requirements

Operator Skills Required The RAPID is designed to be operated by an unskilled technician with a high school education.

Training Required Training time of ~2 hours is required to operate the instrument.

Training Available A variety of training, including train the trainer, is available through the manufacturer

Manuals Available A technical manual for operation and maintenance of the RAPID is available.

Support Equipment None

Communications Interface Capability There are two standard hardware interfaces available; RS-232 and RS-485/422.

Tamper Resistance None

Warranty 1-year parts and labor (depot level) standard. Service Contracts for 2nd year are ~10% of the unit cost.

Testing Information Test results are available through the manufacturer upon request.

Applicable Regulations None

General

Detector Name *ProtectAir Personal Multi-Gas Monitor Model 8570*

Detector ID # 157

Detector Type Commercial

Technology Electrochemistry

Manufacturer

TSI Incorporated
PO Box 64394
St. Paul, MN 55164
(800)926-8378 (Tel)
(651)490-2760 (Tel)
(651)490-2704 (Fax)

Source TSI Incorporated

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Hydrogen sulfide
Sulfur dioxide

Medium Hazard Index TIMs Detected

Carbon monoxide
Nitrogen dioxide

Low Hazard Index TIMs Detected None

Detection State Vapor

Sensitivity	No information available
Resistance to Interferents	No information available
Start-up Time	Immediate
Response Time	No information available
Alarm Capability	User-settable alarm for each of four sensors.

Physical Parameters

Size	5.8 in x 3 in x 2 in
Weight	1.8 pounds
Power Requirements	Uses Six AA alkaline or NiMH rechargeable batteries. Life is 20 hours for alkaline and 12 hours for NiMH.

Logistical Parameters

Transportability	Handheld Portable
Durability	This instrument is contained in a stainless steel case.
Environmental Conditions	-4°F to 122°F @ 15 to 90% rrelative humidity (operating temperature) -40°F to 140°F (storage temperature)
Consumables Required	Batteries Sensors (for each chemical detected)
Calibration Required	Monthly field calibration recommended.
Repairs Required	No information available
Shelf Life	Indefinite
Unit Cost	$1195.00 to $1495.00 depending on sensor configuration.
Maintenance Cost	No information available

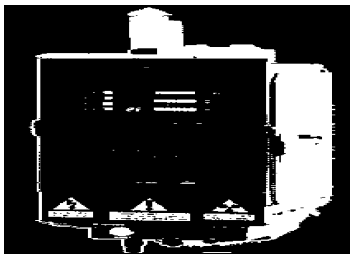
Special Requirements

Operator Skills Required	Non-technical background
Training Required	30 minutes of training is required to operate unit
Training Available	No information available
Manuals Available	Unit comes with Operation and Service Manual and Software User Manual.

Support Equipment	None
Communications Interface Capability	A RS-232 serial communication port allows data to be sent to a communications system.
Tamper Resistance	User-menus can be password protected.
Warranty	2 years
Testing Information	No information available
Applicable Regulations	None

General

Detector Name *GID-2A Chemical Detector*



Detector ID # 158

Detector Type Military and Commercial

Technology Ion Mobility Spectrometry

Manufacturer Graseby Dynamics
10640 Main Street
Fairfax, VA 22030
POC: Neil Bloomfield – Sales and Marketing Manager
(703) 218-0380 (Tel)

Source Graseby Dynamics

Availability Commercially available

Current User UK Ministry of Defense, other NATO nations

Operational Parameters

Chemical Agents Detected
GA
GB
GD
VX
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Cyanide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected None

Detection State	Vapor Aerosol
Sensitivity	Detects GA at 0.003 ppm (v) (Below IDLH) Detects GB at 0.003 ppm (v) (Below IDLH) Detects GD at 0.003 ppm (v) (Below IDLH) Detects VX at 0.002 ppm (v) (At IDLH) Detects HD at 0.008 ppm (v) (No IDLH) Detects HN at 0.008 ppm (v) (No IDLH) Detects L at 0.005 ppm (v) (No IDLH) Detects Hydrogen Cyanide at 9 ppm (v) (Below IDLH)
Resistance to Interferents	Below 5% false positive rate
Start-up Time	Less than 5 minutes from stand-by mode.
Response Time	Less than 1 second
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	8.5 in x 22 in x 11 in
Weight	37 pounds
Power Requirements	AC Powered

Logistical Parameters

Transportability	Fixed-Site Detection
Durability	Ruggedized to full military standards.
Environmental Conditions	Designed to operate in a wide range of environmental conditions (50°F to 131°F @ 5% to 95%)
Consumables Required	None
Calibration Required	None
Repairs Required	New sieve required approximately once each year of operation.
Shelf Life	Greater than 10 years
Unit Cost	Kit, including small number of consumables – less than $ 30000
Maintenance Cost	Subject to level of use, however commonly below 20% of purchase cost for the life-time of the equipment.

Special Requirements

Operator Skills Required	None
Training Required	Operator training can commonly be completed within 2 hours
Training Available	Yes
Manuals Available	Operator manual available
Support Equipment	None
Communications Interface Capability	A RS-485 cable port allows unit to be connected to a network.
Tamper Resistance	None
Warranty	1 year
Testing Information	Live agent testing was conducted by UK MoD
Applicable Regulations	Item contains a low powered radioactive source. Unit is distributed under manufacturers general NRC license. NRC regulations include licensing and tracking of radiation source and annual wipe test.

General

Detector Name *Lightweight Chemical Detector (LCD-2)*

Detector ID # 159

Detector Type Military and Commercial

Technology Ion Mobility Spectrometry

Manufacturer
Graseby Dynamics
10640 Main Street
Fairfax, VA 22030
POC: Neil Bloomfield – Sales and Marketing Manager
(703) 218-0380 (Tel)

Source Graseby Dynamics

Availability Commercially available

Current User
U.S. Special Forces
U.S. Department of Energy
Canadian DND

Operational Parameters

Chemical Agents Detected
GA
GB
GD
HD
HN
L

Biological Agents Detected None

High Hazard Index TIMs Detected
Chlorine
Hydrogen Cyanide
Phosgene

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	None
Detection State	Vapor Aerosol
Sensitivity	Detects GA at 0.0133 ppm (v) (Below IDLH) Detects GB at 0.017 ppm (v) (Below IDLH) Detects GD at 0.015 ppm (v) (Above IDLH) Detects VX at 0.009 ppm (v) (Above IDLH) Detects HD at 0.075 ppm (v) (No IDLH) Detects HN at 0.075 ppm (v) (No IDLH) Detects L at 0.05 ppm (v) (No IDLH) Detects Arsine at 6 ppm (v) (Above IDLH) Detects Hydrogen Cyanide at 18 ppm (v) (Below IDLH) Detects Phosgene at 4 ppm (v) (Above IDLH)
Resistance to Interferents	Below 5% false positive rate
Start-up Time	Less than 5 seconds
Response Time	Less than one second in most instances
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	7 in x 3.5 in x 1.6 in
Weight	1.5 pounds with battery
Power Requirements	Commercial batteries or Ni-Cad rechargeable batteries

Logistical Parameters

Transportability	Handheld Portable
Durability	Used by Navy Seals
Environmental Conditions	Designed to operate in a wide range of environmental conditions (14°F to 95°F @ 5% to 95%)
Consumables Required	Batteries
Calibration Required	None
Repairs Required	New sieve required approximately every 500 hours of operation
Shelf Life	Greater than 10 years
Unit Cost	Kit, including small number of consumables – less than $6500

Maintenance Cost	Subject to level of use, however commonly below 20% of purchase cost for the life-time of the equipment.

Special Requirements

Operator Skills Required	None
Training Required	Operator training can commonly be completed within 2 hours
Training Available	Yes
Manuals Available	Operator manual available
Support Equipment	None
Communications Interface Capability	Can interface with computer
Tamper Resistance	None
Warranty	1 year
Testing Information	Live agent testing was conducted by US Army
Applicable Regulations	None

General

Detector Name *ppbRae*

Detector ID # 160

Detector Type Commercial

Technology Photo Ionization

Manufacturer Rae Systems, Inc.
1339 Moffett Park Drive
Sunnyvale, CA 94089
(408) 752-0723 (Tel)
(408) 752-0724 (Fax)

Source Rae Systems

Availability Commercially available

Current User No information available

Operational Parameters

Chemical Agents Detected GA
HD

Biological Agents Detected None

High Hazard Index TIMs Detected Formaldehyde
Ethylene Oxide
Pesticides

Medium Hazard Index TIMs Detected No information available

Low Hazard Index TIMs Detected No Information available

Detection State Vapor

Sensitivity	Detection range is 0.001ppb -199 ppm
Resistance to Interferents	No information available
Start-up Time	1 minute
Response Time	Less than 3 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	7.75 in x 2.75 in x 1.5 in
Weight	19.5 oz with battery pack
Power Requirements	Rechargeable, external, field replaceable Nickel Metal Hydride battery pack. Alkaline battery holder (for 4 AA Alkaline batteries). 10 hours continuous operation.

Logistical Parameters

Transportability	Handheld Portable
Durability	The ppbRae is resistant to radio frequency interferences (RFI), rubber protective boot.
Environmental Conditions	-4º F to 113º F @ 0 to 95 % relative humidity (non condensing)
Consumables Required	Calibrating gas and dust filters
Calibration Required	Yes
Repairs Required	Yes
Shelf Life	No information available
Unit Cost	$3275
Maintenance Cost	$150 per year

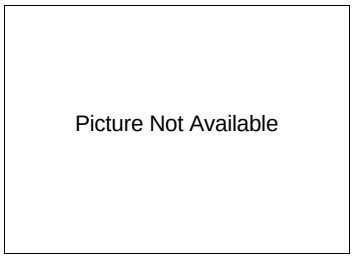
Special Requirements

Operator Skills Required	Non-technical background (with some special training required)
Training Required	Non-formal
Training Available	No information available
Manuals Available	No information available

Support Equipment	110 VAC adapter/charger Remote probe
Communications Interface Capability	No information available
Tamper Resistance	Optional password protected calibration settings, alarm limits and stored data
Warranty	No information available
Testing Information	The ppbRae Plus is currently being tested by the U.S. Army Edgewood Chemical and Biological Center (ECBC).
Applicable Regulations	None

General

Detector Name *GasAlertMax*



Detector ID # 161

Detector Type Commercially available worldwide

Technology Electrochemistry

Manufacturer

BW Technologies
242, 3030 3rd Ave NE
Calgary, AB Canada T2A 6T7
(800) 663-4164 (Tel)
(403) 248-9226 (Tel)
(403) 273-3708 (Fax)
(972) 264-8878 America
+44 (0) 1869-233004 Europe

http//: www.bwtnet.com

Source

BW Technologies
http//: www.bwtnet.com

Availability Commercially available

Current User Local firefighters, municipalities, industrial plants, military

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	Carbon Monoxide
Detection State	Vapor
Sensitivity	Detects H2S at 0 - 100 ppm (v) (Below IDLH) Detects CO at 0 - 300 ppm (v) (Below IDLH)
Resistance to Interferents	Not applicable
Start-up Time	Less than 10 seconds
Response Time	Less than 30 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	1.6 in x 3.0 in x 5.9 in
Weight	15.4 oz
Power Requirements	One (1) rechargable Black & Decker VersaPak battery NiMH (12 hours continuous operation)

Logistical Parameters

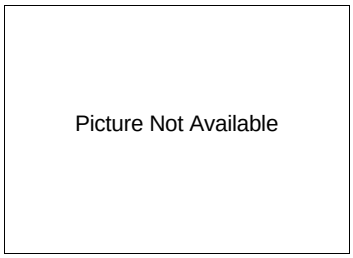
Transportability	Handheld Portable
Durability	Designed for rugged industrial use, operates in any position, drop-tested
Environmental Conditions	-4º F to 122º F @ 0 to 95 % relative humidity (non condensing)
Consumables Required	One (1) rechargable Black & Decker VersaPak battery NiMH (12 hours continuous operation) or NiCad (8 hours continuous operation), sensors, sensor filters
Calibration Required	Calibrate once every 3 months. Automatic calibration; Automatic zero, automatic span. Does not need to be performed by factory.
Repairs Required	Replace sensors every 2 years. Replace sensor filters as needed. Sensors and sensor filters are easily field replaceable.
Shelf Life	No information available
Unit Cost	US $1395 price includes instrument, sensors, internal motorized sampling pump, 2 NiMH batteries, 110 VAC battery charger, 10 ft sampling hose, calibration hose and carrying holster
Maintenance Cost	Easily maintained by field personnel

Special Requirements

Operator Skills Required	No special skills required
Training Required	None
Training Available	Training video and user manuals
Manuals Available	Yes, available in local languages
Support Equipment	Also available as a Confined Space Entry Kit (First Responder Kit) Accessories available: External vibrator alarm, external audible/visual alarm, shock resistant case with belt loop, 2-port vehicle battery charger
Communications Interface Capability	Available soon
Tamper Resistance	Password protected model available at no extra charge
Warranty	Full 2 year non-prorated warranty including sensors (1 year O2 sensor)
Testing Information	CSA classified to U.S. and Canadian Standards as intrinsically safe for Class I, Div. 1, Gr. A,B,C,D; Class 1 Zone 0, Gr. IIC Cenelec Certified - Eex ia IIC Conforms to European Union directives
Applicable Regulations	None

General

Detector Name *BW Defender*



Detector ID # 162

Detector Type Commercially available worldwide

Technology Electrochemistry

Manufacturer

BW Technologies
242, 3030 3rd Ave NE
Calgary, AB Canada T2A 6T7
(800) 663-4164 (Tel)
(403) 248-9226 (Tel)
(403) 273-3708 (Fax)
(972) 264-8878 America
+44 (0) 1869-233004 Europe

http//: www.bwtnet.com

Source

BW Technologies
http//: www.bwtnet.com

Availability Commercially available

Current User Local firefighters, municipalities, industrial plants, military

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected Hydrogen Sulfide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	Carbon Monoxide
Detection State	Vapor
Sensitivity	Detects H2S at 0 - 100 ppm (v) (Below IDLH) Detects CO at 0 - 500 ppm (v) (Below IDLH)
Resistance to Interferents	Not applicable
Start-up Time	Less than 10 seconds
Response Time	Less than 30 seconds
Alarm Capability	Audible alarm Visual alarm

Physical Parameters

Size	4 in x 4.8 in x 1.4 in With sampling pump: 4 in x 6 in x 1.4 in
Weight	13.27 oz including battery With sampling pump: 14.85 oz including battery
Power Requirements	One (1) rechargable Black & Decker VersaPak battery NiCad (8 hours continuous operation)

Logistical Parameters

Transportability	Handheld Portable
Durability	Designed for rugged industrial use, operates in any position, drop-tested
Environmental Conditions	H2S: -40º F to 114º F Other gases: -4º F to 122º F @ 0 to 95 % relative humidity (non condensing)
Consumables Required	One (1) rechargable Black & Decker VersaPak battery NiCad (8 hours continuous operation), sensors, sensor filters
Calibration Required	Calibrate once every 3 months. Automatic calibration; Automatic zero, automatic span. Does not need to be performed by factory.
Repairs Required	Replace sensors every 2 years. Replace sensor filters as needed. Sensors and sensor filters are easily field replaceable.
Shelf Life	No information available
Unit Cost	US $895 US $1190 with motorized sampling pump Prices include instrument, sensors, 110 VAC charger, 2 NiCad

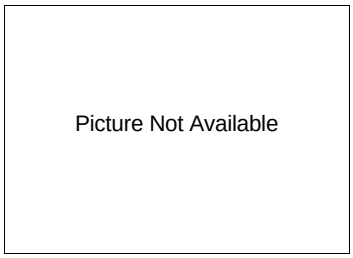
	batteries, calibration cup, earphone, wrist strap and option port
Maintenance Cost	Easily maintained by field personnel

Special Requirements

Operator Skills Required	No special skills required
Training Required	None
Training Available	Training video and user manuals
Manuals Available	Yes, available in local languages
Support Equipment	Also available as a Confined Space Entry Kit (First Responder Kit) Additional accessories available: Manual aspirator pump, external vibrator alarm, external audible/visual alarm, shock resistant case with belt loop, 2-port vehicle battery charger
Communications Interface Capability	No information available
Tamper Resistance	Password protected model available at no extra charge
Warranty	Full 2 year non-prorated warranty including sensors (1 year O2 sensor)
Testing Information	CSA classified to U.S. and Canadian Standards - Class I, Div. 1, Gr. A,B,C,D; Class 1 Zone 0, Gr. IIC Cenelec Certified by LCIE - Eexia d IIC Certified for use in Australia - Ex ia s IIC for Zone 0 Conforms to European Union directives Approved by the American Bureau of Shipping
Applicable Regulations	None

General

Detector Name *GasAlert*



Detector ID # 163

Detector Type Commercially available worldwide

Technology Electrochemistry

Manufacturer

BW Technologies
242, 3030 3rd Ave NE
Calgary, AB Canada T2A 6T7
(800) 663-4164 (Tel)
(403) 248-9226 (Tel)
(403) 273-3708 (Fax)
(972) 264-8878 America
+44 (0) 1869-233004 Europe

http//: www.bwtnet.com

Source

BW Technologies
http//: www.bwtnet.com

Availability Commercially available

Current User Local firefighters, municipalities, industrial plants, military

Operational Parameters

Chemical Agents Detected None

Biological Agents Detected None

High Hazard Index TIMs Detected

Hydrogen Sulfide
Sulfur Dioxide

Medium Hazard Index TIMs Detected None

Low Hazard Index TIMs Detected	Carbon Monoxide
Detection State	Vapor
Sensitivity	Detects H2S at 0 - 100 ppm (v) (Below IDLH) Detects SO2 at 0 - 50 ppm (v) (Below IDLH) Detects CO at 0 - 500 ppm (v) (Below IDLH)
Resistance to Interferents	Not applicable
Start-up Time	Less than 10 seconds
Response Time	Less than 30 seconds
Alarm Capability	Audible alarm Visual alarm (Built-in vibrator alarm optional)

Physical Parameters

Size	1.1 in x 2.0 in x 3.75 in
Weight	2.9 oz
Power Requirements	Uses a 3 volt lithium battery (camera battery available at local stores) with a battery life of 3 years (9000 hours)

Logistical Parameters

Transportability	Handheld Portable
Durability	Designed for rugged industrial use, operates in any position, drop-tested
Environmental Conditions	H2S: -40º F to 114º F Other gases: -4º F to 122º F @ 0 to 95 % relative humidity (non condensing)
Consumables Required	Battery (3 year life), sensors, sensor filters
Calibration Required	Calibrate once every 3 months. Automatic calibration; Automatic zero, automatic span. Does not need to be performed by factory.
Repairs Required	Replace sensors every 2 years. Replace sensor filters as needed. Sensors and sensor filters are easily field replaceable.
Shelf Life	No information available
Unit Cost	H2S: US $350 CO: US $350 SO2: US $450

	Prices include instrument, sensors, 3 year battery
Maintenance Cost	Easily maintained by field personnel

Special Requirements

Operator Skills Required	No special skills required
Training Required	None
Training Available	Training video and user manuals
Manuals Available	Yes, available in local languages
Support Equipment	Available with an internal vibrator Additional accessories available: Remote vibrator alarm, remote audible/visual alarm, earphone, hard hat clip, alligator clip
Communications Interface Capability	No information available
Tamper Resistance	No information available
Warranty	Full 2 year non-prorated warranty including sensors (1 year O2 sensor)
Testing Information	UL classified to U.S. and Canadian Standards as intrinsically safe for - Class I, Div. 1, Gr. A,B,C,D; Class 1 Zone 0, Gr. IIC Cenelec Certified - Eex ia d IIC Conforms to European Union directives
Applicable Regulations	None

U.S. Department of Justice
Office of Justice Programs
810 Seventh Street N.W.
Washington, DC 20531

Janet Reno
Attorney General

Daniel Marcus
Acting Associate Attorney General

Mary Lou Leary
Acting Assistant Attorney General

Julie E. Samuels
Acting Director, National Institute of Justice

For grant and funding information, contact:
Department of Justice Response Center
800-421-6770

Office of Justice Programs
World Wide Web Site:
http://www.ojp.usdoj.gov

National Institute of Justice
World Wide Web Site:
http://www.ojp.usdoj.gov/nij
