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This report is a survey of current off-the-shelf (COTS) products for field detection of synthetic opioids, drugs of abuse, and pharmaceutical based agents. Specific performance, operational, and physical criteria were developed to narrow the focus of the survey to those products best suited for field detection scenarios. The technical approach for compiling product information was to review the open literature (including market surveys compiled by other groups), conduct internet searches, and contact vendors, users, and subject matter experts in the area of field-portable chemical detection products. The scores presented herein are applicable to the described scenarios only. Chemicals were identified by NATO International Task Force-25 (ITF-25). This market survey provides product information for 128 chemical detectors and includes a product summary, including performance, operational, and physical specifications for each product.

15. SUBJECT TERMS
Synthetic Opioid; drugs of abuse; pharmaceutical based agents; Detection; spectroscopy; x-ray diffraction; ultraviolet-visible; nuclear magnetic resonance; hyperspectral imaging; colorimetric; fluorescence; surface acoustic wave detection; sequentially shifted excitation; field-portable;

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Synthetic Opioids, Drugs of Abuse, and Pharmaceutical Based Agents

Revision 4

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Synthetic Opioids, Drugs of Abuse, and Pharmaceutical Based Agents

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Acronyms

AMU	Atomic Mass Units
ATR	Attenuated Total Reflectance
CBRND	Chemical, Biological, Radiological and Nuclear Defense
CBRNE	Chemical, Biological, Radiological, Nuclear, and Explosive
CCD	Charge Coupled Devices
CD	Compact Disk
COTS	Commercial Off-the-Shelf
CWA	Chemical Warfare Agent
DARPA	Defense Advanced Research Projects Agency
DC	Direct Current
DHS	Department of Homeland Security
DMS	Differential Mobility Spectrometry
DOJ	Department of Justice
ECBC	Edgewood Chemical Biological Center
EPA	Environmental Protection Agency
FAIMS	Field Asymmetric Ion Mobility Spectrometry
FTIR	Fourier Transform Infrared
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
HSI	Hyperspectral imaging
IMS	Ion Mobility Spectrometry
IR	Infrared
ITF	International Task Force
ITMS	Ion Trap Mass Spectrometer
JPEO	Joint Program Executive Office
LWIR	Long Wave Infrared
MASS, MS	Mass Spectrometry
MSD	Mass Spectrometry Detection
NATO	North Atlantic Treaty Organization
NIR	Near Infrared
NIST	National Institute of Standards and Technology
NMR	Nuclear Magnetic Resonance
PA	Photoacoustic
POC	Point of Contact
PPE	Personal Protective Equipment
RDECOM	Research Development and Engineering Command
RF	Radio Frequency
RFID	Radio Frequency Identification

RTMIS	Rapid Thermal Modulation Ion Spectrometry
SAW	Surface Acoustic Wave
SAVER	System Assessment and Validation for Emergency Responders
SBCCOM	U.S. Soldier and Biological Chemical Command
SERS	Surface Enhanced Raman Spectroscopy
SORS	Spatially Offset Raman Spectroscopy
TIC/TIM	Toxic Industrial Chemical/Toxic Industrial Material
TLC	Thin Layer Chromatography
TRL	Technology Readiness Level
UK	United Kingdom
URL	Uniform Resource Locator
USB	Universal Serial Bus
US EPA	United States Environmental Protection Agency
UV	Ultraviolet
UV-Vis	Ultraviolet-Visible
VAC	Volts, Alternating Current
VDC	Volts, Direct Current
VOC	Volatile Organic Compound
WMD	Weapons of Mass Destruction
XRD	X-ray Diffraction

Abbreviations

A	ampere
AC	alternating current
Ah	amp hour
ft	foot
g	gram
h	height
hr	hour
Hz	hertz
in	inch
kg	kilogram
l	length
lb	pound
min	minute
mo	month
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
RH	relative humidity
sec	second
W	watt
w	width
yr	year
°C	degree Celsius
°F	degree Fahrenheit
“	inch
µg	microgram
mg	milligram

Preface

Corrie Carnes-Lowe, Ph.D. wrote this report with assistance from Mr. Evan Durnal and Mrs. Krista Brady. Technical questions regarding this report should be directed to Dr. Carnes-Lowe at 816-326-5329.

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Executive Summary

This report is a survey of current off-the-shelf (COTS) products for field detection of synthetic opioids, drugs of abuse, and pharmaceutical based agents.

Specific performance, operational, and physical criteria were developed to narrow the focus of the survey to those products best suited for field detection scenarios. The technical approach for compiling product information was to review the open literature (including market surveys compiled by other groups), conduct internet searches, and contact vendors, users, and subject matter experts in the area of field-portable chemical detection products. The scores presented herein are applicable to the described scenarios only.

This market survey provides product information for 128 chemical detectors. Appendix 1 provides a list of Technology Readiness Levels. Appendix 2 is a list of hazardous industrial chemicals identified by NATO International Task Force-25 (ITF-25). Appendix 3 contains the product summaries, including performance, operational, and physical specifications for each product.

Section 1. Introduction

The objective of this survey is to provide the reader with a comprehensive review of available commercial off-the-shelf (COTS) field portable detectors that are suitable for field detection of synthetic opioids, drugs of abuse, and pharmaceutical based agents. Table 1 shows the detector technology categories represented in this survey.

Table 1. Detection Technology Categories

Technology	# Products
Colorimetric Detection	25
Differential Ion Mobility Spectrometry	1
Fluorescence Detection	2
Hyperspectral Imaging	2
Ion Mobility Spectrometry	16
Ion Trap Mass Spectrometry (IONTRAPMS)	10
Ion Trap Mobility Spectrometry	3
Mid-Infrared Spectroscopy (MIR)	15
Near- Infrared Spectroscopy (NIR)	3
Nuclear Magnetic Resonance (NMR)	3
Quadrupole Mass Spectrometry (MS)	3
Raman Spectroscopy	40
Surface Acoustic Wave (SAW)	1
Ultraviolet-Visible Spectroscopy (UV-Vis)	2
X-ray Diffraction (XRD)	2
Total Products:	**128**

1.1 Approach

The approach for developing this market survey consisted of the following steps:

- Establish selection criteria for products to include in the survey
- Identify sources for product information
- Compile product information using a common reporting format
- Establish scoring criteria and scenarios
- Apply scores to each product

1.2 Selection Criteria

Thresholds for selection of detection products to include in the survey were as follows:

- Currently available COTS/GOTS detectors,
- Person-portable, with maximum weight of 70 lbs and maximum volume of 12 cubic feet, with an exception made for larger ruggedized systems designed for non-laboratory use.
- Ability to operate without power or on DC (battery) power was considered highly desirable but not required,
- Mil-Spec environmental testing (highly desirable but not required), and
- Ability to identify targets, associated chemicals, and common cutting agents, which among others, included fentanyl and its analogues as well as caffeine and ephedrine.

- **Targets (have to detect a minimum of one target):** fentanyl, U-47700, carfentanil, remifentanil, sufentanil, alfentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate (BZ).
- **Associated Chemicals:** 4-piperidone, 4-anilino-N-phenethylpiperidine (4ANPP), norfentanyl, pyridine, and aniline.
- **Cutting Agents:** sugar, lactose, caffeine, aspirin, and ephedrine.

The survey team relaxed the guidelines if a product offered a feature or capability that was highly desirable for on-site detection even if it did not satisfy all of the selection criteria.

1.3 Information Sources

Product information was obtained from a variety of sources, including previous surveys compiled by the authors of this report, published surveys from other authors, vendor contacts, internet websites, open literature, interviews with end users, and the authors' own hands-on experience. Details of the information gathering process for each of these sources is provided below.

1.3.1 Other Market Surveys

The authors of this survey have issued multiple previous market surveys under contract to the U.S. Government. These surveys were not published in the open literature. The authors also reviewed a number of market surveys published in the open literature [1-8], most notably those issued by the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD), the Department of Justice (DOJ), and the Department of Homeland Security.

1.3.2 Online CBRNE Product Databases

Online CBRNE product databases are currently available on the internet:

1. CBRNE Tech Index (www.cbrnetechindex.com) [9] is an open-source CBRNE detection product database operated by MRIGlobal, and was the primary source of information for this survey. The product database is continuously updated to ensure that product information is accurate and current.

2. WMD Detector Selector (www.wmddetectorselector.army.mil) [10] is an open-source online CBRNE product database administered by ECBC. The website contains product information for both field-portable and laboratory-scale chemical detection equipment. Products are categorized into four use scenarios: field/man portable, mobile laboratory/field laboratory, diagnostic laboratory/point of care, and high sensitivity, high throughput analytical laboratory.

1.3.3 Product Test Reports

The survey team reviewed numerous independent third-party-evaluator individual product test reports:

- The U.S. Department of Homeland Security (DHS) has released several reports under the System Assessment and Validation for Emergency Responders (SAVER) program. These

reports cover various chemical detectors. The SAVER program was established to assist emergency responders making procurement decisions. [11-17]

- The National Forensic Science Technology Center has released several test and evaluation reports covering several of the systems included in this survey. These reports generally test for accuracy and reproducibility of the system under differing conditions. [18-23]

- Manufacturer's publications and published references regarding the identification, test and evaluation of COTS stand-off detectors for chemical detection. [24-25]

- Several test reports were issued by the U.S. Army Soldier and Biological Chemical Command (SBCCOM, later assimilated into RDECOM), whose mission was to develop, acquire, and maintain soldier support for nuclear, biological, and chemical defense technology systems and provide monitoring and detection capabilities for the battlefield. These evaluations, conducted at the Edgewood Chemical Biological Center (ECBC), consisted of chemical challenges under controlled conditions. [26-27]

- The U.S. Environmental Protection Agency (U.S. EPA) has tested a variety of products for detection of chemical pollutants and TIC/TIMs in the environment. [28-29]

- MRIGlobal has performed evaluations of numerous products included in the survey. The evaluations were all funded by the manufacturer or various USG clients.

1.3.4 Internet Searches

The survey team used information provided on product vendor websites. This survey provides URLs for vendor website homepages for each product in the Product Summary. In addition, a CD containing complete web pages of all products located on the internet is provided with this report, allowing users to view the same web content that is provided on the manufacturers' product information without accessing the internet.

1.3.5 Vendor Contacts

The survey team contacted vendor sales and technical representatives for additional information on most of the products listed in this market survey. A vendor Point Of Contact (POC), including name, telephone number, and address, is provided in each product's data sheet.

1.3.6 End User Contacts

Where possible, the survey team interviewed end users of products for their impressions and experiences with products included in this survey. The survey authors also included their own hands-on experiences using products under both controlled laboratory conditions and in the field.

Section 2. Results

The authors identified 128 COTS detection products that matched the guidelines described in section 1.2; see Table 2. Appendix 3 contains listings of the selected products: First by product name, secondly by detector technology, and lastly by manufacturer. Individual product summary sheets are also provided in Appendix 3.

Table 2. Detection Products

Product Name	Manufacturer	Technology
4000 MiD	Microsaic Systems	Quadrupole Mass Spectrometry
4100 ExoScan Series	Agilent Tech.	Mid-infrared Spectroscopy
4300 Handheld FTIR	Agilent Tech.	Mid-infrared Spectroscopy
4500 Series FTIR	Agilent Tech.	Mid-infrared Spectroscopy
5500 Series FTIR	Agilent Tech.	Mid-infrared Spectroscopy
ACE-ID	Smiths Detection	Raman Spectroscopy
Aerosols	Mistral Security	Colorimetric Detection
AET801A Portable Detector	Shenzhen Anertong Technology	Ion Mobility Spectrometry
AnywhereRaman™	Horiba Scientific	Raman Spectroscopy
ASSURx	TSI, Inc.	Raman Spectroscopy
B220-HT	L3 Technologies Security and Detection Systems	Ion Mobility Spectrometry
Biosens	Biosensor Applications	Surface Acoustic Wave
Bravo	Bruker	Raman Spectroscopy
Breeze	Bay Spec	Near-Infrared Spectroscopy
BTX-II and BTX Profiler	Olympus Scientific Solutions America	X-ray Diffraction
Cary 630 FTIR	Agilent Tech.	Mid-infrared Spectroscopy
Chem 500	SciAps, Inc.	Raman Spectroscopy
ChiralIR-2X™	Bio Tools	Mid-infrared Spectroscopy
Continuity	Bay Spec	Ion Trap Mass Spectrometry
Cora 5X00	Anton Paar USA	Raman Spectroscopy
Cora 7X00	Anton Paar USA	Raman Spectroscopy
Skylab Separations Kit	Bunk Police	Colorimetric Detection
DABIT™	Field Forensics	Colorimetric Detection
Detect 4 Drugs	Plexus Scientific	Colorimetric Detection
DE-tector	Bruker	Ion Mobility Spectrometry
DE-tector Flex	Bruker	Ion Mobility Spectrometry
Drug Identification Test Kits	Test Kit Plus	Colorimetric Detection
Drug Test 5000	Dräger Safety	Colorimetric Detection
Drug Testing Kits	Identa Corp.	Colorimetric Detection
DrugCheck®	Express Diagnostics	Colorimetric Detection
E^2 M / MM2	Bruker	Quadrupole Mass Spectrometry
EGIS Defender	Thermo Fisher Scientific, Inc.	Differential Ion Mobility Spectrometry
EN3300 Trace Detector	Scintrex Trace Corp.	Ion Mobility Spectrometry
EN5000 GC-IMS	Scintrex Trace Corp.	Ion Mobility Spectrometry
EZRaman-I	TSI, Inc.	Raman Spectroscopy
EZRaman-N	TSI, Inc.	Raman Spectroscopy
Fen-Her™	Field Forensics	Colorimetric Detection

Product Name	Manufacturer	Technology
FirstDefender RM	Thermo Fisher Scientific, Inc.	Raman Spectroscopy
FirstDefender RMX	Thermo Fisher Scientific, Inc.	Raman Spectroscopy
Gemini	Thermo Fisher Scientific, Inc.	Mid-infrared Spectroscopy; Raman Spectroscopy
Griffin™ G410	FLIR Systems	Ion Trap Mass Spectrometry
Griffin™ G460	FLIR Systems	Ion Trap Mass Spectrometry
Griffin™ G465	FLIR Systems	Ion Trap Mass Spectrometry
Griffin™ G510	FLIR Systems	Quadrupole Mass Spectrometry
GUARDION	Smiths Detection	Ion Trap Mass Spectrometry
H150E	L3 Technologies Security and Detection Systems	Ion Mobility Spectrometry
HandyRam™ II	Field Forensics	Raman Spectroscopy;
Hardened MobileTrace	Rapiscan Systems	Ion Mobility Spectrometry
HazCat 2.0 Pro	Haztech Systems	Colorimetric Detection
HazMatID Elite	Smiths Detection	Mid-infrared Spectroscopy
HD600	Shenzhen Anertong Technology	Ion Mobility Spectrometry
Herosol	Plexus Scientific	Colorimetric Detection
Narcotic Detection Kits	Nartec, Inc.	Colorimetric Detection
IM-52	Metrohm	Raman Spectroscopy
InPhochelle	InPhotonics	Raman Spectroscopy
InPhotote	InPhotonics	Raman Spectroscopy
Insight200M	Agilent Tech.	Raman Spectroscopy
Inspector Series	SciAps, Inc.	Raman Spectroscopy
Ionscan 500DT	Smiths Detection	Ion Mobility Spectrometry
Ionscan 600	Smiths Detection	Ion Mobility Spectrometry
i-Raman Series	B&W Tek	Raman Spectroscopy;
i-Spec® Series	B&W Tek	Ultraviolet-Visible; Near Infrared;
iSpin-NMR	SpinCore Technologies, Inc.	Nuclear Magnetic Resonance
Itemiser 3 Enhanced	Rapiscan Systems	Ion Trap Mobility Spectrometry
Itemiser DX Series	Rapiscan Systems	Ion Trap Mobility Spectrometry
iXR Raman Spectrometer	Thermo Fisher Scientific, Inc.	Raman Spectroscopy
MacroRam™	Horiba Scientific	Raman Spectroscopy
Mandelin Reagent Testing Kit	DanceSafe	Colorimetric Detection
microPHAZIR	Thermo Fisher Scientific, Inc.	Near-Infrared Spectroscopy
Mira DS	Metrohm	Raman Spectroscopy
MMTD	Smiths Detection	Ion Mobility Spectrometry
Mobile μ-Raman and μ-BioRaman	Bio Tools	Raman Spectroscopy;
MobileDetect Pouch	DetectaChem	Colorimetric Detection
MobileTrace Narcotics	Rapiscan Systems	Ion Trap Mobility Spectrometry
MT Explorer 50	MassTech	Ion Trap Mass Spectrometry
MX908	908 Devices, Inc.	Ion Trap Mass Spectrometry
N2200 Trace Detector	Scintrex Trace Corp.	Ion Mobility Spectrometry
NanoRam	B&W Tek	Raman Spectroscopy
NarcoPouch®	The Safariland Group	Colorimetric Detection
Narcotic Field Tests	M.M.C. International B.V.	Colorimetric Detection
Narcotics & Cannabis Test Kits	BBI Detection	Mid-infrared Spectroscopy
NARK II Drug Tests	Sirchie	Colorimetric Detection
Nartest NTX2000 Analyzer	NarTest	Fluorescence Detection

Product Name	Manufacturer	Technology
Nicolet iS5	Thermo Fisher Scientific, Inc.	Mid-infrared Spectroscopy
Nicolet™ iS™ 5N FT-NIR	Thermo Fisher Scientific, Inc.	Near-Infrared Spectroscopy
NIK® Master Pack Kit	The Safariland Group	Colorimetric Detection
NirSpector	Bay Spec	Visible-Near Infrared
NMReady 60	Nanalysis	Nuclear Magnetic Resonance
PDT	Mistral Security	Colorimetric Detection
PeakSeeker	Agiltron	Raman Spectroscopy
PenTest	Mistral Security	Colorimetric Detection
PGR-1064	Chemring Detection Systems	Raman Spectroscopy
picoSpin 45/80 MHz	Thermo Fisher Scientific, Inc.	Nuclear Magnetic Resonance
PinPointer™	Agiltron	Raman Spectroscopy
Portability	Bay Spec	Ion Trap Mass Spectrometry
PRIED	Alakai Defense Systems	Raman Spectroscopy
Progeny ResQ	Rigaku Analytical Devices	Raman Spectroscopy
ProRaman- W Series	TSI, Inc.	Raman Spectroscopy
ProRaman-L	TSI, Inc.	Raman Spectroscopy
QuickCheck Narcotic Identification Kits	Lynn Peavy Company	Colorimetric Detection
Rapid Response Fentanyl Test Kit	BTNX	Colorimetric Detection
Resolve	Agilent Tech.	Raman Spectroscopy;
Resource Effective BioIdentification System	Battelle	Raman Spectroscopy
ResQ CQL	Rigaku Analytical Devices	Raman Spectroscopy
RMP-510	Jasco, Inc.	Raman Spectroscopy
RoadRunner	Bruker	Ion Mobility Spectrometry
RT series	NucTech	Raman Spectroscopy
Sabre 5000	Smiths Detection	Ion Mobility Spectrometry
SEEKER Series	DetectaChem	Colorimetric Detection
SEEKERe	DetectaChem	Colorimetric Detection
Serstech 100 Indicator	Serstech 100 Indicator	Raman Spectroscopy;
Sierra	Metrohm	Raman Spectroscopy
SPE7000	Security Electronic Equipment	Ion Mobility Spectrometry
Spectrum Two FT-IR	Perkin Elmer	Mid-infrared Spectroscopy
Spot.On.ID™	Field Forensics	Colorimetric Detection
SuperGamut™ Series	Bay Spec	Hyperspectral Imaging
TacticID-GP	B&W Tek	Raman Spectroscopy;
Target-ID	Smiths Detection	Mid-infrared Spectroscopy
Terra Portable XRD/XRF	Olympus Scientific Solutions America	X-Ray Diffraction (XRD); X-Ray Fluorescence (XRF);
Torion T-9	Perkin Elmer	Ion Trap Mass Spectrometry
TRACER 1000 MS	1st Detect	Ion Trap Mass Spectrometry
TruDefender FT	Thermo Fisher Scientific, Inc.	Mid-infrared Spectroscopy
TruDefender FTX/FTXi	Thermo Fisher Scientific, Inc.	Mid-infrared Spectroscopy
TruNarc™	Thermo Fisher Scientific, Inc.	Raman Spectroscopy
TruScan RM	Thermo Fisher Scientific, Inc.	Raman Spectroscopy
VeroVision	ChemImage	Hyperspectral Imaging
VIR-100/200/300	Jasco, Inc.	Mid-infrared Spectroscopy
XCat	RedXDefense	Fluorescence Detection

Product Name	Manufacturer	Technology
SuperGamut™ Series	Bay Spec	Hyperspectral Imaging
TacticID-GP	B&W Tek	Raman Spectroscopy;
Target-ID	Smiths Detection	Mid-infrared Spectroscopy
Terra Portable XRD/XRF	Olympus Scientific Solutions America	X-Ray Diffraction
Torion T-9	Perkin Elmer	Ion Trap Mass Spectrometry
TRACER 1000 MS	1st Detect	Ion Trap Mass Spectrometry
TruDefender FT	Thermo Fisher Scientific, Inc.	Mid-infrared Spectroscopy
TruDefender FTX/FTXi	Thermo Fisher Scientific, Inc.	Mid-infrared Spectroscopy
TruNarc™	Thermo Fisher Scientific, Inc.	Raman Spectroscopy
TruScan RM	Thermo Fisher Scientific, Inc.	Raman Spectroscopy
VeroVision	ChemImage	Hyperspectral Imaging
VIR-100/200/300	Jasco, Inc.	Mid-infrared Spectroscopy
XCat	RedXDefense	Fluorescence Detection

2.1 Product Scoring and Ranking

MRIGlobal scored the products based on JPEO CBRND needs and objectives. The following four scoring categories with a total of 14 scoring criteria were tabulated for each product.

1. Detection Capability
    a. Targets Detected
    b. Associated Compounds Detected
    c. Common Cutting Agents Detected
    d. Sensitivity
    e. Selectivity
2. Analysis Factors
    a. Sample Preparation Needs
    b. Response Time
    c. Adaptability
3. Physical Factors
    a. Portability
    b. Environmental Ruggedness
    c. Maintenance and Consumables
4. Technology Characteristics
    a. Training Required
    b. Maturity
    c. User Feedback

Each scoring category was assigned a weighting factor of 1 to 4 that corresponds to the importance of that criterion to the client's mission. Where 4 is a mission critical criterion and 1 is the least critical criterion. Within each criteria, several specific metrics were divided into bins for which each survey product received a score, see Table 3. For example, within the weight criteria, a product that is pocket sized (< 2 lbs) was given a score of 4 for that criteria. A product that is considered heavy portable (> 30 lbs) was given a score of 1 for that criteria. The individual scores were then be multiplied by the weighting factor assigned to the Physical Factors category.

Table 3. Product Scoring and Ranking

Category	Criteria	Weight	Scoring Levels
Detection	Targets Detected	4	4 – Detects all 10 targets 3 – Detects 5-9 targets 2 – Detects 2-4 targets 1 – Detects 1 target
	Associated Compounds Detected	4	3 – Detects all 5 related compounds 2 – Detects 1-4 related compounds 1 – Does not detect related compounds
	Common Cutting Agents	2	3 – Detects all 5 cutting agents 2 – Detects 1-4 cutting agents 1 – Does not detect cutting agents
	Sensitivity	4	3 – Detects less than 1% in mixture 2 – Detects < 10% in mixture 1 – Detects at > 10%
	Selectivity	3	4 – Identifies all targets in complex mixtures 3 – Identifies specific targets in complex mixtures 2 - Identifies all targets in simple mixtures 1 - Identifies specific targets in simple mixtures
Analysis	Sample Preparation	2	3 – Does not require direct sample analysis (vapor/trace) 2 – Requires analysis of contained samples (samples need to be placed into specific containers) 1 – Requires analysis of sample without containment
	Response Time	3	4 – < 30 seconds 3 – 30-60 seconds 2 – 1-5 minutes 1 – > 5 minutes
	Adaptability	3	3 – User can add new targets to detector 2 – Manufacturer can add new targets to detector 1 – Cannot detect or add new targets
Physical	Portability	1	4 – Pocket size, < 2 lbs 3 – Handheld, 2-10 lbs 2 – Portable, 10-30 lbs 1 – Portable heavy, >30 lbs
	Ruggedness	2	3 – Can operate at extreme temps (high and low) AND has vibration testing 2 - Can operate at extreme temps (high and low) OR has vibration testing 1 – No ruggedness testing/claims
	Consumables/ Maintenance	2	4 – No consumables or scheduled maintenance necessary 3 – Minor consumables (< $1,000/year) and user provided maintenance 2 – Major consumables (> $1,000/year) and user provided maintenance 1 – Manufacturer maintenance necessary

Category	Criteria	Weight	Scoring Levels
Technology	Training Required	3	3 – Less than 1 hour of training to be proficient 2 –1-8 hours of training to be proficient 1 – 8-40 hours of training to be proficient
	Maturity	1	4 – COTS or GOTS immediately available 3 – 1-2 months delivery after order 2 – 2-12 months delivery after order 1 - >12 months delivery after order
	User Feedback	2	3 – Positive user feedback 2 – No user feedback 1 – Negative user feedback

The relevance and weighting of the scoring categories is heavily dependent on the end-user profile and any given product may prove the best fit for a specific operation, regardless of score. The profile and operational definitions in this instance assume a dismounted user in one of the below outlined operational scenarios:

1. Production Facility

The operators will likely encounter and be sampling bulk (visible) pure PBA targets and/or precursors present in this type of environment. Trace detection and separation techniques are not required in this type of setting. Detection methods such as Raman and/or FTIR spectroscopy are the most applicable and likely to deliver identification of unknown materials. Colorimetric tests may be useful, as a function of simplicity and cost, but are more likely to generate false positives in a setting in which precursors are present. Technologies with high target and precursor scores should be considered for use at potential production or clandestine laboratory sites.

2. Transportation Routes

Two primary transportation routes exist; international mail and physical border crossings. Operators screening containers in a port of entry will likely encounter low concentrations of PBA target material with elevated amounts of benign cutting agents or other illicit drugs. Due to the widespread nature of this scenario, colorimetric tests are useful in that they are highly portable, cheap, and relatively selective. Operators screening freight and mail will likely encounter and be sampling either bulk pure PBA targets if containers are opened, or sampling for trace residues of PBA targets on the outside of packaging and/or persons. Illicit materials are transported in pure bulk form to maximize potential profits. For non-invasive surface and/or wipe sampling, detection methods with lower detection limits become more useful in these scenarios. Technologies such as IMS, hand held MS, and GC/MS may be used by personnel in fixed positions, portable IMS, MS and Raman systems should be considered for personnel with mobile responsibilities. Technologies with high target and sensitivity scores should be considered for use in this scenario.

3. Distribution and Packaging Centers

The operators will likely encounter and be sampling a mix of bulk PBA targets and bulk cutting agents. Illicit materials are cut in order to obtain the desired physiological affect and maximize

dealer profits. Technologies such as FTIR, and Raman should be prevalent here, as the potential for false positives in colorimetric and IMS-based products increases as bulk cutting agents are sampled and the concentration of PBA target materials is reduced. Technologies with high target, cutting agent, and selectivity scores should be considered for use in this scenario.

4. Final Street Product

Operators will likely encounter low concentrations of PBA target material with elevated amounts of benign cutting agents or other illicit drugs. Due to the widespread nature of this scenario, colorimetric tests are useful in that they are highly portable, cheap, and relatively selective. The ultimate identification of the chemical composition of a final street product must involve both chemical separation and subsequent identification through techniques such as GC/MS or LC/MS (LC/MS not covered by the survey as no portable LC/MS systems exist). These type of samples are typically not fully characterized until they reach a laboratory setting, unless the responding personnel have a portable GC/MS, MS, or IMS capable of detecting trace (<5%) amounts of the PBA target in a potentially complex matrix. Technologies with high sensitivity and selectivity scores should be considered for this scenario.

Section 3. Detection Technologies

3.1 Colorimetric Detection

Colorimetric detectors indicate the presence of a target chemical through a chemical reaction that results in a color change typically visible to the naked eye. Colorimetric detection covers a wide variety of products, from simple test strips to more complicated thin layer chromatography (TLC) plate detection. All of the products in the colorimetric detection category are generally simple to operate and have well-documented product test results to support vendor claims.

Advantages: Small size, little or no power requirement, low cost, and minimal operator training.

Limitations: Typically analyte specific and are not typically suited for determination of unknowns; One-time use consumables such as cartridges, reagents, papers or swabs for each target chemical; Detection limits are typically in the part-per-million to part-per-thousand range (ppm-ppth); Interpretation of results may be subjective; and results cannot typically be stored for review at a later time.

3.2 Differential Ion Mobility Spectrometry (DMS) / Ion Mobility Spectrometry (IMS) / Ion Trap Mobility Spectrometry (ITMS) / Field Asymmetric Ion Mobility Spectrometry (FAIMS) / Rapid Thermal Modulation Ion Spectrometry (RTMIS)

Ion mobility spectrometry identifies compounds based on the time required for ionized molecules to drift through an electric field. In operation, sample molecules in the gas phase are ionized using either a corona discharge source or a radiation source such as ^{63}Ni or ^{241}Am. The ions then enter a drift region with an electric gradient, where they drift toward a collector. The time required for an ion to reach the collector depends on several factors, including shape, mass, and charge. In theory, unknowns may be identified via comparison of their drift profiles to an on-board library.

- ITMS is very similar to IMS in that both techniques use ion mobility for identification, but ITMS differs from IMS in the source-drift tube interface design. ITMS systems have an interface which isolates the source from the drift tube, and provides greater sensitivity versus IMS.

- FAIMS and DMS operate on the same principle: sample molecules in the gas phase are ionized and the resulting ions pass through a drift region to which a high-frequency waveform is applied. Identification of compounds is achieved by measuring the difference in ion mobility at high electric field relative to low field. Advantages of FAIMS/DMS over IMS include reportedly higher sensitivity, better selectivity, and reduced size.

- RTMIS functions the same as FAIMS but with the distinction of utilizing ultra-high electric fields and extreme temperature fluctuations on the microsecond timescale. The thermal modulation is said to allow controlled manipulation of the ion chemistry within

the separation channel causing fragmentation via thermal dissociation. Chemical separation and identification is improved, and false-alarm rates are said to be reduced.

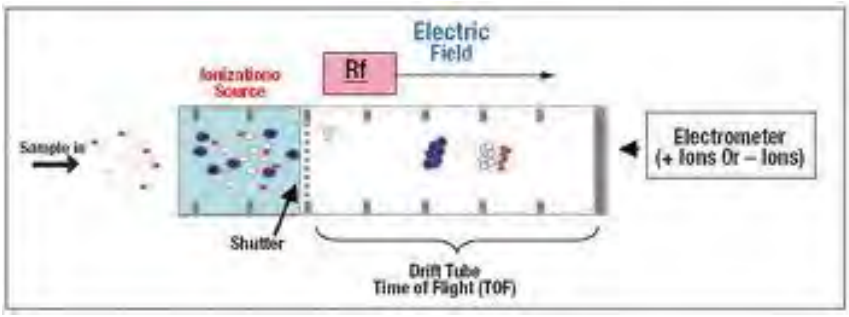


Figure 1. Ion Mobility Spectrometry Schematic (www.gasesmag.com)

Advantages: Small size, portability, low power requirement, sensitivity, and quick analysis time (less than a few seconds in most cases).

Limitations: Limitations of IMS include high false positive rate (i.e., low target specificity), long clean-up times, and limited number of target chemicals.

3.3 Fluorescence Detection (FD)

Fluorescence detectors identify chemicals by their fluorescence spectral signature. Only two fluorescence detection systems are included in this survey, the XCAT by RedXDefense and the NTX2000 Analyzer by NarTest. The XCAT utilizes a wand similar to a lint roller to pick up trace particles from a target area. A fluorescent dye is then sprayed onto the roller and the roller surface is analyzed by UV fluorimetry. Field users have reported a high occurrence of false negatives with this product. The NTX2000 measures the fluorescence spectra of a sample at multiple excitation and emission wavelengths, then compares these known materials.

Advantages: Small size, portability, low power requirement, simple operation.

Limitations: The main limitation of FD is the high false positive rate.

3.4 Hyperspectral Imaging (HSI)

Hyperspectral imaging (HSI) is the collection of electromagnetic spectral information over a 2-dimensional or 3-dimensional space. In general, the electromagnetic range that can be exploited by HSI ranges from visible to long wave infrared (LWIR). In HSI large numbers of spectra recorded by multiple charge coupled devices (CCD) are reconstructed into an image depicting the spectral makeup of the probed area. The data can be evaluated in two ways. The first is as an image comprised of specific wavelengths of interest. The second is a reconstructed image based upon interrogation of the spectra dominating each pixel in the original hyperspectral image.

Advantages: The ability to analyze sample at stand-off distances and over potentially large areas such as battlefields and chemical release plumes.

Limitations: Chemical detection is typically non-selective, or class specific. The instruments will generally be able to locate chemical contamination, but not identify the chemicals.

3.5 Infrared Spectroscopy (IR) / Near-Infrared Spectroscopy (NIR) / Mid-Infrared Spectroscopy

Infrared spectroscopy (IR) is a molecular spectroscopy technique that identifies chemicals based on the interaction of molecules with radiation in the infrared region of the electromagnetic spectrum. The absorption of infrared light by a molecule causes a transition between quantized vibrational energy states. The molecular vibrations, or vibrational modes, are dependent on the structural symmetry of the molecule and the functional groups present (e.g., hydroxyl, carbonyl, nitrile, etc.). Except for enantiomers, the IR spectrum produced is unique and can be used to identify a material by comparison of its characteristic spectrum versus a library of reference spectra.

- The mid-infrared region (400-4000 cm^{-1}) is the region most heavily used for chemical identification and verification.

- Near-infrared spectroscopy is analogous to mid-infrared spectroscopy (FTIR) by identifying chemicals based on the interaction of molecules with electromagnetic radiation in the near-infrared region (4000-10,000 cm^{-1}). NIR differs from mid-infrared spectroscopy in that the molecular absorbances are of higher-energy light, making the vibrations of the molecules of higher orders (i.e., combination and overtones) than that of mid-infrared.

Advantages: The IR spectra are unique and can be compared to large commercial libraries for identification.

Limitations: Most of the portable IR systems are attenuated total reflectance (ATR) systems and meant only for liquids and solids. Mixtures can be difficult to resolve, and typically only detect materials > 5% composition.

3.6 Ion Trap Mass Spectrometry (IONTRAPMS) / Mass Spectrometry / Quadrupole Mass Spectrometry (MS)

Mass spectrometry detectors (MSD) identifies a chemical by measuring characteristic mass fragments produced as the chemical is ionized. Sample molecules are ionized, and the resulting molecular ion and fragment ions then pass through a mass analyzer where their mass-to-charge ratio, m/z, is measured. A separation technique such as gas chromatography (GC) or liquid chromatography (LC) is typically added to the front end of the MS to separate mixtures into individual components. Mass spectrometry is generally considered the benchmark for identification of unknown organic chemicals because it is highly sensitive and selective, and mass spectra are easily searchable against vast reference databases.

The main differentiator between the MS systems included in the survey is the use of traditional electron ionization and quadrupole mass spectrometers versus ion trap mass spectrometers. Systems using traditional electron ionization and a quadrupole mass spectrometer produce mass spectra that can be readily searched and confirmed using commercially available libraries. Ion trap mass spectrometers, however, can give distinctly different mass spectra. These systems typically use a non-traditional ionization energy, resulting in a softer ionization. This can drastically change the number of fragments that enter the ion trap. Once in the ion trap these

fragments can interact prior to detection. Because of these factors, the resulting mass spectra must to be searched against a library that was built using the same ion trap technology.

Advantages: Mass spectrometry systems generally allow for multiple introduction options, very sensitive, and absolutely specific in their identification.

Limitations: These systems are typically very expensive, analysis can take 5-40 minutes, and the software and hardware are the most complex of portable instrumentation.

3.7 Nuclear Magnetic Resonance (NMR)

NMR uses radio-frequency pulses (1 – 1000 MHz) to excite molecules placed within a strong magnetic field (0.5 – 20 Tesla). Molecules containing NMR-active nuclei produce detectable signals as they relax back to the ground spin state. The detected peaks appear shifted from a reference standard based upon the specific chemical environment surrounding the nuclei. Each unique nuclear environment gives rise to a peak at a specific chemical shift. Peak signal intensities can be integrated to determine the relative number of nuclei occupying each unique environment. Peaks can also be split based upon local chemical neighbors; which provides spatial proximity between coupled chemical environments. The most common nucleus analyzed is ^{1}H because of its high natural abundance, high sensitivity, and occurrence in organic molecules. Other common nuclei amenable to NMR spectroscopy include ^{13}C, ^{31}P, ^{19}F, and ^{15}N.

NMR can analyze neat liquids or dissolved organic solids (preferably in deuterated solvents) with concentrations down to 100 mM. Chemical identification can be made based upon processing raw data and fitting the resultant spectrum against theoretically simulated data. Spectral libraries are not required. Identification is most confident when the sample contains a single chemical. The miniaturized NMR systems are currently limited to ^{1}H, and sometimes ^{19}F, NMR spectra. Chemicals best analyzed with NMR include drugs, explosives, chemical weapons, solvents, and other organic molecules (with molecular weights below 500 amu).

Advantages: Commercial libraries or reference standards are not necessary for manual interpretation.

Limitations: NMR is not for trace nor mixture identification. Instrumentation and software can be complex. Consumables (solvents) necessary.

3.8 Raman Spectroscopy / Spatially Offset Raman Spectroscopy (SORS) / Surface Enhanced Raman Spectroscopy (SERS) / Sequentially Shifted Excitation (SSE)

Raman spectroscopy is a technique that measures the energy of photons generated by the inelastic scattering of monochromatic excitation photons. During excitation, photons interact with the electron cloud of an analyte and a small percentage of these photons undergo a change in energy as a result of the interaction. This energy change corresponds with molecular vibrations, rotations, and other low-frequency modes and is plotted by instrumental operating software to produce a spectrum.

- Spatially Offset Raman Spectroscopy (SORS) allows for the analysis of samples within a container by separating the laser excitation source from the detector. When the detector and source are together the detector signal is dominated by container or surface signal. By separating the laser and detector, the signal from the container or surface is minimized.

- Surface Enhanced Raman Spectroscopy (SERS) generally has specialized sample vials, swabs or plates that have a coating that interact with the sample to form a Raman active bond. The SERS capability will typically increase an instruments sensitivity significantly.

- Orbital Raster Scanning (ORS) scans a larger sample area, which gives better result for heterogeneous samples, and can decrease the likelihood of sample ignition.

- Sequentially Shifted Excitation (SSE) collects Raman spectra from lasers operating at slightly different temperatures which allows it to subtract the fluorescence. This allows the systems to detect and identify some materials that would not normally be amenable due to strong fluorescence.

Advantages: Raman spectra are unique and can be compared to large commercial libraries for identification. Depending on system, can analyze through glass or plastic containers.

Limitations: Fluorescence can occur with impurities or colored materials (fluorescence is most apparent with 785 nm excitation lasers). Radiation from the laser can ignite the sample. Mixtures can be difficult to resolve, and typically only detect materials > 5% composition.

3.9 Surface Acoustic Wave Detection (SAW)

Surface Acoustic Wave (SAW) devices employ a piezoelectric crystal plate with two sets of interdigital transducers on either end of the plate. The application of an alternating voltage to one of the transducers results in expansion and contraction of the crystal plate, and a surface acoustic wave is generated due to this mechanical strain. The wave travels along the surface of the crystal and is then converted back to an electrical signal by the output transducer. Alterations in the surface of the crystal, such as deposits of a target vapor, impact the frequency of the wave propagation. It is this change in frequency that is taken advantage of in SAW technology and is exploited to determine the amount of target chemical vapor on the surface of the piezoelectric plate. Figure 2 illustrates a SAW sensor.

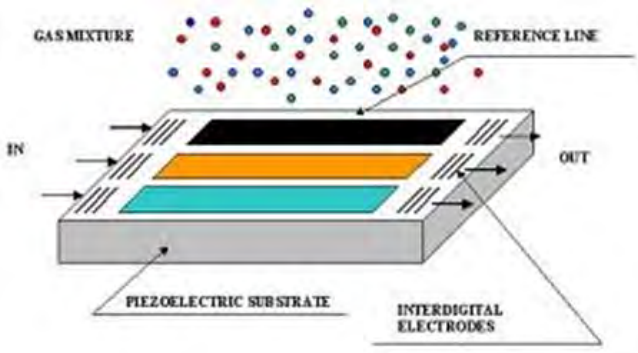


Figure 2. Schematic of a SAW Sensor

Advantages: Small size, easy to operate and maintain.

Limitations: Selectivity sometimes limited to chemical classes, long recovery times (high concentration exposure), and sensitivity to temperature and humidity.

3.10 Ultraviolet-Visible (UV-VIS)

Ultraviolet-visible (UV-Vis) spectroscopy is a technique that identifies chemicals based on the interaction of molecules with electromagnetic radiation in the ultraviolet-visible region (10,000-33,333cm-1 or 300-1000 nm). Molecular absorbances of UV-Vis light cause electronic transitions within molecules. These transitions typically occur with the presence of a transition metal ion, or a conjugated organic molecule. There are UV-Vis reference databases, but there is much less specificity in a UV-Vis spectrum compared to mid-IR data, making it a secondary verification technique with unknown chemicals. Point analysis ("bench top") systems are used for analyzing liquid phase materials, although a few systems are also capable of analyzing gases and solids. The UV-VIS systems included in this survey from B&W Tek or Bay Spec have additional Near-IR capability, making them more robust.

Advantages: UV systems are often combined with other detection techniques (NIR), giving additional complementary data.

Limitations: The UV spectra are much less specific than IR or Raman, making these systems much less selective.

3.11 X-ray Diffraction (XRD)

X-ray diffraction (XRD) is a technique in which a crystalline sample is exposed to X-ray radiation to determine its composition. The sample diffracts X-rays into a pattern which is unique to each crystalline substance. The diffracted X-rays are collected by scintillations counters, semiconductor (solid-state) detectors, charge coupled devices (CCD), or other detectors. The characteristic patterns acquired are then matched to diffraction pattern libraries for compound identification. XRD is a technique capable of providing both qualitative and quantitative information about the crystalline compounds in a sample.

Advantages: XRD identifies materials based on their crystal structure. For compounds that exist in multiple crystallite forms (such as minerals) the technique will identify the structure, which is often determined by oxidation state.

Limitations: XRD requires the sample to have a crystal structure, so very amorphous powders or liquids will not be compatible.

Section 4. Conclusions

The Detection Market Survey for Synthetic Opioids, Drugs of Abuse, and Pharmaceutical Based Agents includes 128 detection products. The top scoring products are shown in Table 4. The total scorecards are shown in Section 4.4 (by highest score) and Section 4.5 (by manufacturer).

Table 4. Top Scoring Products

Name	Score	Manufacturer	Technology
Mira DS	112	**Metrohm**	Raman Spectroscopy
FirstDefender RM	109	**Thermo Fisher Scientific, Inc.**	Raman Spectroscopy
Sierra	109	**Metrohm**	Raman Spectroscopy
Bravo	108	**Bruker**	Raman Spectroscopy
FirstDefender RMX	108	**Thermo Fisher Scientific, Inc.**	Raman Spectroscopy
Gemini	108	**Thermo Fisher Scientific, Inc.**	FTIR, Raman Spectroscopy
MMTD	108	**Smiths Detection**	Ion Mobility Spectrometry
PGR-1064	108	**Chemring Detection Systems**	Raman Spectroscopy
HandyRam™ II	107	**Field Forensics**	Raman Spectroscopy
Resolve	107	**Agilent Tech.**	Raman Spectroscopy
TruNarc™	107	**Thermo Fisher Scientific, Inc.**	Raman Spectroscopy
TruScan RM	107	**Thermo Fisher Scientific, Inc.**	Raman Spectroscopy

4.1 Scorecard Trends and Observations

It is extremely important to keep in mind that the scoring is highly dependent on a given and specific set of expected operational parameters. Departure from these parameters requires the re-evaluation and ranking of available products.

Raman Systems tended to be the highest scoring technology. These are typically small, lightweight, and can detect the targets, precursors, and cutting agents of interest through packaging with no sample prep. Important notes regarding Raman spectroscopy:

- Raman spectroscopy is only going to be able to identify materials that are > 5-10% of the sample content (no trace detection) and will therefore not be useful for samples already in pill or cut form (post-distribution) or at ports of entry.
- Raman spectroscopy can be highly sensitive to fluorescence and so molecules which strongly fluoresce may not be identified by Raman spectroscopy. The most common Raman excitation wavelength for instrumentation is 785 nm. Fluorescence is most apparent with excitation wavelengths 300-900 nm. Selecting a Raman system with a higher laser (e.g. 980 or 1064) would reduce the fluorescence, but it would also reduce the sample excitation efficiency. Some systems have taken steps to overcome fluorescence problems, such as:
    - **Utilizes Higher Excitation Laser:** Cora systems, i-Raman series, PGR-1064, Progeny ResQ, RMP-510, Sierra, Chem 500, and Inspector series
    - **Incorporated Mathematical Subtraction**: Bravo, and Resolve

IMS Systems scored next to the highest as a technology category. These are typically small and lightweight. Important notes regarding IMS include:

- These products can detect trace amounts, but generally need some sample manipulation (such as wiped onto a swab).
- These systems have high false positive rates, as multiple materials can have similar drift times.
- These systems can be easily overloaded and require potentially long bake-out times when low volatility compounds such as PBAs are introduced at high levels.

Handheld FTIR Systems appear on the list next. These are small, lightweight, and can detect all of the targets, cutting agents, and precursors. Important notes regarding FTIR:

- These systems do require the sample to be openly applied to the instrument.
- FTIR (like Raman) is only going to be able to identify materials that are > 5% of the sample content (no trace detection).

Portable Mass Spectrometers were next on the scoring list. These are typically larger, heavier, and more complicated systems that require more training. However, they can detect trace quantities, with highest level of specificity. An important differentiation between mass spectrometers is the ability to produce NIST compatible data. NIST compatible data allows for identification based on comparison to the NIST database (200,000 library entries). Whereas most ion trap spectrometers are going to be limited to libraries built on the specific instrument, which can greatly limit the ability to perform unknown analysis.

- **Mass spectrometers that produce NIST compatible data include** 4000 MiD, E^2M/MM2, and G510. Ion trap based mass spectrometers can also produce NIST compatible spectra, but will also produce differing ions such as a protonated parent due to the softer ionization techniques typically used in such systems.

Colorimetric Kits scored lowest on the list. These kits are simple, easy, and effective, but they are very selective in what they detect and therefore only provide insight into a short list or single threat at a time.

4.2 Recommended Products

4.2.1 Raman Spectrometers

There are 40 Raman spectrometers in this survey. They populate the top 14 of 15 products, with scores ranging from 87-112.

- The **Mira DS** (Score - 112) from Metrohm was the highest ranking product. The Mira is a rugged, light-weight handheld Raman spectrometer that uses orbital raster scanning (ORS) to analyze liquid and solid samples. The main differentiator that score Mira above other systems are optional sampling attachments, including a Standoff Attachment (allowing for the stand-off detection of illegal substances of up to 1.5 meters). One limitation to the Mira system is fluorescence, as it employs a 785 nm excitation laser.
- The Bruker **Bravo** (Score - 108) is a handheld Raman spectrometer that uses Bruker's patented fluorescence mitigation SSE™ (Sequentially Shifted Excitation) which allows it

to detect and identify some materials that would not normally be able to be characterized through Raman spectroscopy due to strong fluorescence.

4.2.2 Mid-Infrared Spectrometers

There are 15 FTIR systems in this survey, with scores ranging from 92-108.

- The Thermo Fisher Scientific **Gemini** (Score - 108) is a rugged handheld spectrometer that combines both FTIR and Raman technologies into a single instrument. The additional Raman capability boosts this FTIR score above other systems. It should be noted that this systems cost ($90,000) is much higher than the other FTIR systems ($20,000-$50,000). The combined unit is versatile, but does create a single point of failure should the unit become damaged or malfunction.
- The Smiths Detection **HazMatID Elite** (Score - 105) and Thermo Scientific **TruDefender** systems (Scores 104 and 103) are very similar systems with similar capabilities. The Elite has temperature documented MIL-SPEC testing, which accounts for the higher score. These are two of the most widely used hand-held systems in the field today. Operational use typically comes down to user preference between the systems.

4.2.3 Portable Mass Spectrometer

There are 13 mass spectrometers in this survey (10 ion trap systems and 3 quadrupole systems), with scores ranging from 90-104.

- FLIR's **Griffin G510** (Score - 97) is a portable, heavy (36 lbs) GC/MS system that can analyze solid, liquid, and vapor/gas samples. The G510 is a self-contained GC/MS complete with its own battery and helium gas cartridge. Solid samples are collected with a capillary tube and directly analyzed without the need for liquid extraction using FLIR's PSI (Prepless Sample Introduction) probe. The G510 has a quadrupole mass spectrometer utilizing 70eV EI, making the data compatible with the NIST Mass Spectral Database. The G510 scores slightly lower than the Perkin Elmer **Torion T-9** (Score 101), due to the T-9 system having temperature documented MIL-SPEC testing, a faster deliver time, and shorter analysis times. We chose to recommend the G510 over the T-9, based on the generation of NIST compatible data making broad-scope unknown analyses easier, and the ability to analyze solids.
- The **MX908** (Score - 104) from 908 Devices is a handheld (8.7 lbs) mass spectrometer based on High Pressure Mass Spectrometry that can analyze solid, liquid, and gas samples. It is capable of trace detection, requiring 50 ng or less of a substance to identify it. The MX908 is small, lightweight, easy to use, and highly desirable when a known and bounded set of threat materials is expected. We chose to recommend the G510 over this unit for two reasons: 1) broad-scope unknown analysis is not possible with the MX908, and 2) the G510 has a GC for mixture separation.

4.2.4 Ion Mobility Spectrometers

There are 16 IMS systems in this survey, with scores tightly grouped from 97-108.

- Smiths Detection's **MMTD** (Multi-Mode Threat Detector, Score - 108) is a rugged, portable ion mobility spectrometer that can analyze both solids and vapors/gases. It is

capable of detecting both explosives and narcotics in trace amounts (< 30 ng narcotics; < 1000 ng explosives) as both solid samples and vaporized/aerosolized samples. MMTD units are widely used.

- Smiths Detection's **Ionscan 600** (Score - 105) is a desktop (23.8 lbs) ion mobility spectrometer that can analyze both solids and vapors/gases. It can operate using mains power or hot swappable batteries. It is capable of simultaneously detecting both explosives and narcotics. The Ionscan 600 also has a specialized fentanyl detector that can operate in two modes: high sensitivity fentanyl detection and general explosives/narcotics dual detection. Ionscan and similar systems are widely used, most typically at transportation hubs such as airports and border crossings.

4.2.5 Colorimetric Kits

There are 25 colorimetric kits in this survey, with scores ranging from 62-90.

- DetectaChem's **Mobile Detect Pouches** (Score - 90) was the highest scoring colorimetric kit. The Mobile Detect Pouches are designed for trace detection (low ng range) and can be paired with the MobileDetect App (iOS/Android) for color change reading. These kits are very easy to use: swab area for testing, place swab into holder, crush reagent vials, and read results within 1-min. The Mobile Detect Pouches are capable of detecting fentanyl, heroin, ketamine, and ephedrine. The Mobile Detect DFT Pouch has been tested by MRIGlobal and was determined to detect, in addition to fentanyl, carfentanil, sufentanil, 3-methylfentanil, lofentanil, and mirfentanil.
- The **Fen-Her** test (Score - 85) from Field Forensics is a Thin Layer Chromatography (TLC)-based colorimetric test that can distinguish heroin and fentanyl. The Fen-Her test is a multi-step test that takes approximately15 minutes to complete: break reagent vial in swab pen, swab area for testing, transfer sample to TLC plate, place reagents into TLC chamber, place plate in chamber for development, allow plate to dry, apply color reagent to plate to reveal spots. The Fen-Her test was tested by MRIGlobal and found to give a positive result for heroin, fentanyl, 3-methylfentanil, carfentanil, sufentanil, remifentanil, lofentanil, and mirfentanil.

4.3 Recommended Equipment Suites

Equipment suites (based on technologies) have been recommended for two different scenarios, an easily fielded suite and a full analysis suite.

4.3.1 Easily Fielded Equipment Suite

The easily fielded suite was recommended for personnel in the field that need to be able to identify if dangerous opioids, drugs of abuse, and pharmaceutical based agents are present for immediate action, but are not dependent on the analysis for definitive results (samples can later be tested by a laboratory). The items recommended for this suite will:

- Identify if these targets are present in trace amounts, but possibly not selectively identify the specific analyte.
- Identify bulk materials with a high level of certainty.
- Be small, rugged, and not over complicated for a non-technical operator.

The items selected for this suite include:

1. Colorimetric kits for trace analysis
2. Raman spectrometer and/or FTIR for bulk analysis

4.3.2 Full Analysis Equipment Suite

The full analysis equipment suite was recommended for personnel in the field that need to be able to identify if dangerous opioids, drugs of abuse, and pharmaceutical based agents to a high level of specification. The items chosen for this equipment suite will allow the field analyst to make important decisions based only on field data (without having confirmation from laboratory analysis). The items recommended for this suite will:

- Identify if these targets are present in trace amounts with a high level of specificity.
- Identify bulk materials with a high level of certainty.
- Have multiple systems to allow for complementary analysis.
- Be larger and more expensive than the easily fielded suite, but still rugged and portable.
- Be more complicated and require additional training for a non-technical operator.

The items selected for this suite include:

1. Mass spectrometer for trace analysis
2. Raman spectrometer for bulk analysis
3. FTIR spectrometer for bulk analysis

4.4 Product Scorecard – Listed by Highest Score (Rev 4, 9 Jan 2019)

Product	Manufacturer	Total Score (Max 122)	Detection (Max 58)	Analysis (Max 27)	Physical (Max 18)	Technology (Max 19)	Price
Mira DS	Metrohm	112	54	27	18	13	Not Given
FirstDefender RM	Thermo Fisher Sci.	109	54	22	18	15	$50,000
Sierra	Metrohm	109	54	25	15	15	$40,000
Bravo	Bruker	108	54	25	15	14	$60,000
FirstDefender RMX	Thermo Fisher Sci.	108	54	22	17	15	$56,800
Gemini	Thermo Fisher Sci.	108	54	22	17	15	$90,000
MMTD	Smiths Detection	108	58	27	12	11	$37,000
PGR-1064	Chemring Detection Systems	108	54	25	15	14	$32,500
HandyRam™ II	Field Forensics	107	54	22	18	13	Not Given
Resolve	Agilent Tech.	107	54	22	17	14	$60,000
TruNarc™	Thermo Fisher Sci.	107	54	22	16	15	Not Given
TruScan RM	Thermo Fisher Sci.	107	54	22	16	15	Not Given
ACE-ID	Smiths Detection	106	48	25	18	15	$25,995
IM-52	Metrohm	106	54	23	14	15	$40,000
InPhotote	InPhotonics	106	54	25	12	15	$28,000
Sabre 5000	Smiths Detection	106	58	27	9	12	$25,000
EN5000 GC-IMS	Scintrex Trace Corp.	105	58	23	11	13	$42,000
HazMatID Elite	Smiths Detection	105	54	20	17	14	$45,000
Ionscan 600	Smiths Detection	105	58	25	12	10	$29,900
Inspector Series	SciAps, Inc.	104	54	22	13	15	$28,000
MX908	908 Devices, Inc.	104	58	17	13	16	$65,000
N2200	Scintrex Trace Corp.	104	58	17	16	13	Not Given
NanoRam	B&W Tek	104	54	22	13	15	Not Given
PeakSeeker	Agiltron	104	54	25	13	12	Not Given
PinPointer™	Agiltron	104	54	25	13	12	Not Given
RoadRunner	Bruker	104	58	20	11	15	$30,000
TruDefender FTX/FTXi	Thermo Fisher Sci.	104	54	20	15	15	$50,000
InPhochelle	InPhotonics	103	54	25	12	12	$45,000
Progeny ResQ	Rigaku Analytical	103	54	22	11	16	$46,000
Serstech 100 Indicator	Serstech	103	54	22	14	13	$25,580
TruDefender FT	Thermo Fisher Sci.	103	54	20	15	14	$45,000
AET801A Detector	Shenzhen Anertong	102	55	23	11	13	Not Given
EN3300	Scintrex Trace Corp.	102	52	20	17	13	Not Given
Hardened MobileTrace	Rapiscan Systems	102	53	23	14	12	$32,000
HD600	Shenzhen Anertong	102	55	23	11	13	Not Given
Ionscan 500DT	Smiths Detection	102	58	25	9	10	$48,867
Mobile µ-Raman and µ-BioRaman	Bio Tools	102	54	23	12	13	Not Given
Portability	Bay Spec	102	52	27	10	13	$109,960

Color Legend

Color Presents Score Percentile Range

Green	85-100%	Yellow	70 – 84%	Orange	50-69%	Red	0-49%

Product	Manufacturer	Total Score (Max 122)	Detection (Max 58)	Analysis (Max 27)	Physical (Max 18)	Technology (Max 19)	Price
ResQ CQL	Rigaku Analytical	102	54	22	13	13	$46,000
Spectrum Two FT-IR	Perkin Elmer	102	54	23	12	13	Not Given
TacticID-GP	B&W Tek	102	54	22	13	13	Not Given
AnywhereRaman™	Horiba Scientific	101	54	23	13	11	Not Given
Chem 500	SciAps, Inc.	101	54	22	13	12	$20,000
Continuity	Bay Spec	101	52	27	9	13	Not Given
Itemiser 3 Enhanced	Rapiscan Systems	101	56	23	10	12	$45,200
Itemiser DX Series	Rapiscan Systems	101	56	23	10	12	$48,200
Target-ID	Smiths Detection	101	54	20	15	12	$25,000
Torion T-9	Perkin Elmer	101	56	17	13	15	$83,000
Cary 630 FTIR	Agilent Tech.	100	48	23	13	16	$26,332
RT series	NucTech	100	54	20	12	14	$22,000
DE-tector	Bruker	99	58	20	11	10	$37,500
DE-tector Flex	Bruker	99	58	20	12	9	$30,000
i-Raman Series	B&W Tek	99	54	25	7	13	Not Given
MacroRam™	Horiba Scientific	99	54	23	11	11	Not Given
ASSURx	TSI, Inc.	98	48	25	11	14	$32,500
ChiralIR-2X™	Bio Tools	98	54	23	9	12	Not Given
Nicolet iS5	Thermo Fisher Sci.	98	54	20	10	14	$50,000
EGIS Defender	Thermo Fisher Sci.	97	58	17	9	13	$42,070
Griffin™ G510	FLIR Systems	97	58	14	11	14	$125,000
GUARDION	Smiths Detection	97	56	17	13	11	$115,895
Nicolet™ iS™ 5N	Thermo Fisher Sci.	97	54	20	10	13	Not Given
NirSpector	Bay Spec	97	48	22	14	13	$35,000
VeroVision	ChemImage	97	48	24	13	12	Not Given
Cora 5X00	Anton Paar USA	96	52	25	6	13	$45,000
Cora 7X00	Anton Paar USA	96	52	25	6	13	$54,500
E^2 M / MM2	Bruker	96	58	14	13	11	$240,000
MT Explorer 50	MassTech	96	52	23	9	12	$100,000
4100 ExoScan Series	Agilent Tech.	95	48	17	15	15	$46,000
4300 Handheld FTIR	Agilent Tech.	95	48	17	15	15	$45,000
ProRaman-L	TSI, Inc.	95	52	19	10	14	Not Given
ProRaman- W Series	TSI, Inc.	94	52	19	9	14	Not Given
SuperGamut Series	Bay Spec	94	48	20	13	13	Not Given
EZRaman-N	TSI, Inc.	93	48	19	12	14	$20,000
4500 Series FTIR	Agilent Tech.	92	48	17	14	13	$24,000
Griffin™ G410	FLIR Systems	92	58	14	11	9	$95,000
Griffin™ G460	FLIR Systems	92	58	14	11	9	$125,000
Griffin™ G465	FLIR Systems	92	58	14	11	9	Not Given
i-Spec® Series	B&W Tek	92	48	25	7	12	Not Given
iXR Raman	Thermo Fisher Sci.	92	54	20	5	13	Not Given
VIR-100/200/300	Jasco, Inc.	92	54	20	9	9	$32,090

Color Legend

Color Presents Score Percentile Range

Green 85-100% **Yellow** 70 – 84% **Orange** 50-69% **Red** 0-49%

Product	Manufacturer	Total Score (Max 122)	Detection (Max 58)	Analysis (Max 27)	Physical (Max 18)	Technology (Max 19)	Price
BTX-II, BTX Profiler	Olympus Scientific	91	54	14	12	11	$53,750
EZRaman-I	TSI, Inc.	91	48	19	10	14	$37,000
microPHAZIR	Thermo Fisher Sci.	91	40	25	13	13	$41,000
4000 MiD	Microsaic Systems	90	58	14	9	9	$50,000
5500 Series FTIR	Agilent Tech.	90	48	17	12	13	$23,000
MobileDetect Pouch	DetectaChem	90	41	17	16	16	$30/10pk
RMP-510	Jasco, Inc.	90	54	22	5	9	$99,480
Terra XRD/XRF	Olympus Scientific	90	54	14	11	11	$75,800
TRACER 1000 MS	1st Detect	90	52	20	5	13	$50,000
PRIED	Alakai Defense Sys.	89	43	22	11	13	Not Given
Insight200M	Agilent Tech.	87	48	20	7	12	Not Given
PenTest	Mistral Security	87	37	17	16	17	$10
Drug Test Kits	Test Kit Plus	86	37	14	16	19	$85/50pk
NarcoPouch®	The Safariland Gp	86	37	14	16	19	$20/10pk
Fen-Her™	Field Forensics	85	39	11	16	19	$115
NMReady 60	Nanalysis	85	55	8	9	13	$45,000
Spot.On.ID™	Field Forensics	85	35	17	16	17	$3,000
NIK® Kit	The Safariland Gp	84	35	14	16	19	$26/10pk
REBS	Battelle	84	48	16	11	9	Not Given
DABIT™	Field Forensics	83	33	17	16	17	$45/10pk
Drug Testing Kits	Identa Corp.	83	37	17	12	17	$3
SEEKER Series	DetectaChem	83	35	17	16	15	$8,500
SEEKERe	DetectaChem	83	35	17	16	15	$12,995
XCat	RedXDefense	83	37	14	16	16	$2,100
picoSpin 45/80MHz	Thermo Fisher Sci.	82	48	8	10	16	$31,245
Aerosols	Mistral Security	81	31	17	16	17	$100/can
Skylab Sep. Kit	Bunk Police	81	35	17	12	17	$195
Detect 4 Drugs	Plexus Scientific	81	35	17	12	17	$88
NARK II Drug Tests	Sirchie	81	33	17	12	19	$22/10pk
Breeze	Bay Spec	78	35	20	10	13	$7,900
DrugCheck®	Express Diagnostics	78	39	8	14	17	$96/25pk
iSpin-NMR	SpinCore Technologies, Inc.	78	48	8	10	12	$12,995
Herosol	Plexus Scientific	77	31	17	12	17	$48
Narcotic Kits	Nartec, Inc.	77	31	17	12	17	$88/50pk
Mandelin Reagent	DanceSafe	77	31	17	12	17	$20
Narcotics & Cannabis Test Kits	BBI Detection	77	27	17	16	17	$188/50pk
QuickCheck	Lynn Peavy Company	77	31	17	12	17	$16/10pk
Narcotic Field Tests	M.M.C. International	76	33	14	12	17	$37/10pk
Rapid Response Fentanyl Test Kit	BTNX	72	33	8	12	19	$100/100pk

Color Legend

Color Presents Score Percentile Range

Green	85-100%	Yellow	70 – 84%	Orange	50-69%	Red	0-49%

Product	Manufacturer	Total Score (Max 122)	Detection (Max 58)	Analysis (Max 27)	Physical (Max 18)	Technology (Max 19)	Price
PDT	Mistral Security	69	21	17	16	15	$9/10pk
Biosens	Biosensor App.	68	31	14	10	13	$50,000
SPE7000	Security Electronic Equip.	65	29	14	9	13	$12,600
Drug Test 5000	Dräger Safety	63	31	8	11	13	$5,982
NTX2000 Analyzer	NarTest	63	27	14	8	14	Not Given
HazCat 2.0 Pro	Haztech Systems	62	31	8	12	11	$6,280
B220-HT	L3 Technologies	59	25	14	7	13	$25,900
MobileTrace	Rapiscan Systems	56	25	8	9	14	$33,200
H150E	L3 Technologies	54	25	8	8	13	$25,900

Color Legend

Color Presents Score Percentile Range

Green	85-100%	Yellow	70 – 84%	Orange	50-69%	Red	0-49%

4.5 Product Scorecard – Listed by Manufacturer (Rev 4, 9 Jan 2019)

Product	Manufacturer	Total Score (Max 122)	Detection (Max 58)	Analysis (Max 27)	Physical (Max 18)	Technology (Max 19)	Price
TRACER 1000 MS	1st Detect	90	52	20	5	13	$50,000
MX908	908 Devices, Inc.	104	58	17	13	16	$65,000
4100 ExoScan Series	Agilent Tech.	95	48	17	15	15	$46,000
4300 FTIR	Agilent Tech.	95	48	17	15	15	$45,000
4500 Series FTIR	Agilent Tech.	92	48	17	14	13	$24,000
5500 Series FTIR	Agilent Tech.	90	48	17	12	13	$23,000
Cary 630 FTIR	Agilent Tech.	100	48	23	13	16	$26,332
Insight200M	Agilent Tech.	87	48	20	7	12	Not Given
Resolve	Agilent Tech.	107	54	22	17	14	$60,000
PeakSeeker	Agiltron	104	54	25	13	12	Not Given
PinPointer™	Agiltron	104	54	25	13	12	Not Given
PRIED	Alakai Defense Sys	89	43	22	11	13	Not Given
Cora 5X00	Anton Paar USA	96	52	25	6	13	$45,000
Cora 7X00	Anton Paar USA	96	52	25	6	13	$54,500
i-Raman Series	B&W Tek	99	54	25	7	13	Not Given
i-Spec® Series	B&W Tek	92	48	25	7	12	Not Given
NanoRam	B&W Tek	104	54	22	13	15	Not Given
TacticID-GP	B&W Tek	102	54	22	13	13	Not Given
REBS	Battelle	84	48	16	11	9	Not Given
Breeze	Bay Spec	78	35	20	10	13	$7,900
Continuity	Bay Spec	101	52	27	9	13	Not Given
NirSpector	Bay Spec	97	48	22	14	13	$35,000
Portability	Bay Spec	102	52	27	10	13	$109,960
SuperGamut Series	Bay Spec	94	48	20	13	13	Not Given
Narcotics & Cannabis Test Kits	BBI Detection	77	27	17	16	17	$188/50pk
ChiralIR-2X™	Bio Tools	98	54	23	9	12	Not Given
Mobile µ-Raman and µ-BioRaman	Bio Tools	102	54	23	12	13	Not Given
Biosens	Biosensor App.	68	31	14	10	13	$50,000
Bravo	Bruker	108	54	25	15	14	$60,000
DE-tector	Bruker	99	58	20	11	10	$37,500
DE-tector Flex	Bruker	99	58	20	12	9	$30,000
E^2 M / MM2	Bruker	96	58	14	13	11	$240,000
RoadRunner	Bruker	104	58	20	11	15	$30,000
Rapid Response Fentanyl Test Kit	BTNX	72	33	8	12	19	$100/100pk
Skylab Sep. Kit	Bunk Police	81	35	17	12	17	$195
VeroVision	ChemImage	97	48	24	13	12	Not Given
PGR-1064	Chemring Detection Systems	108	54	25	15	14	$32,500

Color Legend

Color Presents Score Percentile Range

Green	85-100%	Yellow	70 – 84%	Orange	50-69%	Red	0-49%

Product	Manufacturer	Total Score (Max 122)	Detection (Max 58)	Analysis (Max 27)	Physical (Max 18)	Technology (Max 19)	Price
Mandelin Testing Kit	DanceSafe	77	31	17	12	17	$20
MobileDetect Pouch	DetectaChem	90	41	17	16	16	$30/10pk
SEEKER Series	DetectaChem	83	35	17	16	15	$8,500
SEEKERe	DetectaChem	83	35	17	16	15	$12,995
Drug Test 5000	Dräger Safety	63	31	8	11	13	$5,982
DrugCheck®	Express Diagnostics	78	39	8	14	17	$96/25pk
DABIT™	Field Forensics	83	33	17	16	17	$45/10pk
Fen-Her™	Field Forensics	85	39	11	16	19	$115
HandyRam™ II	Field Forensics	107	54	22	18	13	Not Given
Spot.On.ID™	Field Forensics	85	35	17	16	17	$3,000
Griffin™ G410	FLIR Systems	92	58	14	11	9	$95,000
Griffin™ G460	FLIR Systems	92	58	14	11	9	$125,000
Griffin™ G465	FLIR Systems	92	58	14	11	9	Not Given
Griffin™ G510	FLIR Systems	97	58	14	11	14	$125,000
HazCat 2.0 Pro	Haztech Systems	62	31	8	12	11	$6,280
AnywhereRaman™	Horiba Scientific	101	54	23	13	11	Not Given
MacroRam™	Horiba Scientific	99	54	23	11	11	Not Given
Drug Testing Kits	Identa Corp.	83	37	17	12	17	$3
InPhochelle	InPhotonics	103	54	25	12	12	$45,000
InPhotote	InPhotonics	106	54	25	12	15	$28,000
RMP-510	Jasco, Inc.	90	54	22	5	9	$99,480
VIR-100/200/300	Jasco, Inc.	92	54	20	9	9	$32,090
B220-HT	L3 Technologies	59	25	14	7	13	$25,900
H150E	L3 Technologies	54	25	8	8	13	$25,900
QuickCheck	Lynn Peavy Company	77	31	17	12	17	$16/10pk
Narcotic Field Tests	M.M.C. International	76	33	14	12	17	$37/10pk
MT Explorer 50	MassTech	96	52	23	9	12	$100,000
IM-52	Metrohm	106	54	23	14	15	$40,000
Mira DS	Metrohm	112	54	27	18	13	Not Given
Sierra	Metrohm	109	54	25	15	15	$40,000
4000 MiD	Microsaic Systems	90	58	14	9	9	$50,000
Aerosols	Mistral Security	81	31	17	16	17	$100/can
PDT	Mistral Security	69	21	17	16	15	$9/10pk
PenTest	Mistral Security	87	37	17	16	17	$10
NMReady 60	Nanalysis	85	55	8	9	13	$45,000
Narcotic Kits	Nartec, Inc.	77	31	17	12	17	$88/50pk
NTX2000 Analyzer	NarTest	63	27	14	8	14	Not Given
RT series	NucTech	100	54	20	12	14	$22,000
BTX-II, BTX Profiler	Olympus Scientific	91	54	14	12	11	$53,750
Terra XRD/XRF	Olympus Scientific	90	54	14	11	11	$75,800
Spectrum Two FT-IR	Perkin Elmer	102	54	23	12	13	Not Given
Torion T-9	Perkin Elmer	101	56	17	13	15	$83,000

Color Legend

Color Presents Score Percentile Range

Green 85-100% **Yellow** 70 – 84% **Orange** 50-69% **Red** 0-49%

Product	Manufacturer	Total Score (Max 122)	Detection (Max 58)	Analysis (Max 27)	Physical (Max 18)	Technology (Max 19)	Price
Detect 4 Drugs	Plexus Scientific	81	35	17	12	17	$88
Herosol	Plexus Scientific	77	31	17	12	17	$48
Hardened MobileTrace	Rapiscan Systems	102	53	23	14	12	$32,000
Itemiser 3 Enhanced	Rapiscan Systems	101	56	23	10	12	$45,200
Itemiser DX Series	Rapiscan Systems	101	56	23	10	12	$48,200
MobileTrace	Rapiscan Systems	56	25	8	9	14	$33,200
XCat	RedXDefense	83	37	14	16	16	$2,100
Progeny ResQ	Rigaku Analytical	103	54	22	11	16	$46,000
ResQ CQL	Rigaku Analytical	102	54	22	13	13	$46,000
Chem 500	SciAps, Inc.	101	54	22	13	12	$20,000
Inspector Series	SciAps, Inc.	104	54	22	13	15	$28,000
EN3300	Scintrex Trace Corp.	102	52	20	17	13	Not Given
EN5000 GC-IMS	Scintrex Trace Corp.	105	58	23	11	13	$42,000
N2200	Scintrex Trace Corp.	104	58	17	16	13	Not Given
SPE7000	Security Electronic Equip.	65	29	14	9	13	$12,600
Serstech 100 Indicator	Serstech	103	54	22	14	13	$25,580
AET801A Detector	Shenzhen Anertong	102	55	23	11	13	Not Given
HD300/600	Shenzhen Anertong	102	55	23	11	13	Not Given
NARK II Drug Tests	Sirchie	81	33	17	12	19	$22/10pk
ACE-ID	Smiths Detection	106	48	25	18	15	$25,995
GUARDION	Smiths Detection	97	56	17	13	11	$115,895
HazMatID Elite	Smiths Detection	105	54	20	17	14	$45,000
Ionscan 500DT	Smiths Detection	102	58	25	9	10	$48,867
Ionscan 600	Smiths Detection	105	58	25	12	10	$29,900
MMTD	Smiths Detection	108	58	27	12	11	$37,000
Sabre 5000	Smiths Detection	106	58	27	9	12	$25,000
Target-ID	Smiths Detection	101	54	20	15	12	$25,000
iSpin-NMR	SpinCore Tech.	78	48	8	10	12	$12,995
Drug Test Kits	Test Kit Plus	86	37	14	16	19	$85/50pk
NarcoPouch	The Safariland Gp	86	37	14	16	19	$20/10pk
NIK® Test Kit	The Safariland Gp	84	35	14	16	19	$26/10pk
EGIS Defender	Thermo Fisher Sci.	97	58	17	9	13	$42,070
FirstDefender RM	Thermo Fisher Sci.	109	54	22	18	15	$50,000
FirstDefender RMX	Thermo Fisher Sci.	108	54	22	17	15	$56,800
Gemini	Thermo Fisher Sci.	108	54	22	17	15	$90,000
iXR Raman	Thermo Fisher Sci.	92	54	20	5	13	Not Given
microPHAZIR	Thermo Fisher Sci.	91	40	25	13	13	$41,000
Nicolet iS5	Thermo Fisher Sci.	98	54	20	10	14	$50,000
Nicolet™ iS™ 5N	Thermo Fisher Sci.	97	54	20	10	13	Not Given

Color Legend

Color Presents Score Percentile Range

Green	85-100%	Yellow	70 – 84%	Orange	50-69%	Red	0-49%

Product	Manufacturer	Total Score (Max 122)	Detection (Max 58)	Analysis (Max 27)	Physical (Max 18)	Technology (Max 19)	Price
picoSpin 45/80MHz	Thermo Fisher Sci.	82	48	8	10	16	$31,245
TruDefender FT	Thermo Fisher Sci.	103	54	20	15	14	$45,000
TruDefender FTX/FTXi	Thermo Fisher Sci.	104	54	20	15	15	$50,000
TruNarc™	Thermo Fisher Sci.	107	54	22	16	15	Not Given
TruScan RM	Thermo Fisher Sci.	107	54	22	16	15	Not Given
ASSURx	TSI, Inc.	98	48	25	11	14	$32,500
EZRaman-I	TSI, Inc.	91	48	19	10	14	$37,000
EZRaman-N	TSI, Inc.	93	48	19	12	14	$20,000
ProRaman- W Series	TSI, Inc.	94	52	19	9	14	Not Given
ProRaman-L	TSI, Inc.	95	52	19	10	14	Not Given

Color Legend

Color Presents Score Percentile Range

Green	85-100%	Yellow	70 – 84%	Orange	50-69%	Red	0-49%

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Appendix 1
Technology Readiness Levels

Technology Readiness Levels (TRL)

Technology readiness level	Description
1. Basic principles observed and reported	Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Example might include paper studies of a technology's basic properties.
2. Technology concept and/or application formulated	Invention begins. Once basic principles are observed, practical applications can be invented. The application is speculative and there is no proof or detailed analysis to support the assumption. Examples are still limited to paper studies.
3. Analytical and experimental critical function and/or characteristic proof of concept	Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.
4. Component and/or breadboard validation in laboratory environment	Basic technological components are integrated to establish that the pieces will work together. This is "low fidelity" compared to the eventual system. Examples include integration of 'ad hoc' hardware in a laboratory.
5. Component and/or breadboard validation in relevant environment	Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so that the technology can be tested in a simulated environment. Examples include "high fidelity" laboratory integration of components.
6. System/subsystem model or prototype demonstration in a relevant environment	Representative model or prototype system, which is well beyond the breadboard tested for TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high fidelity laboratory environment or in simulated operational environment.
7. System prototype demonstration in an operational environment	Prototype near or at planned operational system. Represents a major step up from TRL 6, requiring the demonstration of an actual system prototype in an operational environment, such as in an aircraft, vehicle, or space. Examples include testing the prototype in a test bed aircraft.
8. Actual system completed and "flight qualified" through test and demonstration	Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental test and evaluation of the system in its intended weapon system to determine if it meets design specifications.
9. Actual system "flight proven" through successful mission operations	Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation. In almost all cases, this is the end of the last "bug fixing" aspects of true system development. Examples include using the system under operational mission conditions.

Appendix 2

ITF-25 Listing of Hazardous Industrial Chemicals

HIGH	MEDIUM	LOW
ammonia	acetone cyanohydrin	allyl isothiocyanate
arsine	acrolein	arsenic trichloride
boron trichloride	acrylonitrile	bromine
boron trifluoride	allyl alcohol	bromine chloride
carbon disulfide	allyl amine	bromine pentafluoride
chlorine	allyl chlorocarbonate	bromine trifluoride
diborane	boron tribromide	carbonyl fluoride
ethylene oxide	carbon monoxide	chlorine pentafluoride
fluorine	carbonyl sulfide	chlorine trifluoride
formaldehyde	chloroacetone	chloroacetaldehyde
hydrogen bromide	chloroacetonitrile	chloroacetyl chloride
hydrogen chloride	chlorosulfonic acid	cyanogen
hydrogen cyanide	crotonaldehyde	diphenylmethane-4'-diisocyanate
hydrogen fluoride	diketene	ethyl chloroformate
hydrogen sulfide	1,2-dimethyl hydrazine	ethyl chlorothioformate
nitric acid, fuming	dimethyl sulfate	ethylene imine
phosgene	ethylene dibromide	ethyl phosphonothioicdichloride
phosphorus trichloride	hydrogen selenide	ethyl phosphonous dichloride
sulfur dioxide	iron pentacarbonyl	hexachlorocyclopentadiene
sulfuric acid	methanesulfonyl chloride	hydrogen iodide
tungsten hexafluoride	methyl bromide	isobutyl chloroformate
	methyl chloroformate	isopropyl chloroformate
	methyl chlorosilane	isopropyl isocyanate
	methyl hydrazine	n-butyl chloroformate
	methyl isocyanate	nitric oxide
	methyl mercaptan	n-propyl chloroformate
	n-butyl isocyanate	parathion
	nitrogen dioxide	perchloromethyl mercaptan
	phosphine	sec-butyl chloroformate
	phosphorus oxychloride	sulfuryl fluoride
	phosphorus pentafluoride	tert-butyl isocyanate
	selenium hexafluoride	tetraethyl lead
	silicon tetrafluoride	tetraethyl pyrophosphate
	stibine	tetramethyl lead
	sulfur trioxide	toluene 2,4-diisocyanate
	sulfuryl chloride	toluene 2,6-diisocyanate
	tellurium hexafluoride	
	tert-octyl mercaptan	
	titanium tetrachloride	
	trichloroacetyl chloride	
	trifluoroacetyl chloride	

Source: ITF-25 (March 1996). A.K. Steumpfle, S.J. Armour, C.A. Boulet and D.J. Howells, Final Report of ITF-25: Hazard from Industrial Chemicals, US/UK/CA Memorandum of Understanding on Chemical and Biological Defence.

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Colorimetric

PRODUCT NAME

Aerosols

TECHNOLOGY CATEGORY

Colorimetric;



Mistral Security, Inc.
7910 Woodmont Avenue, Suite 820
Bethesda, Maryland 20814

www.mistralsecurityinc.com

Greg Warfield
+1 301 913 9366
securitysales@mistralgroup.com



Model Number	1002 (100 Test Kit), 1022 (50 Test Kit)
Synopsis	Aerosols are presumptive drug tests, detecting both trace and bulk levels of drugs. Mistral Security's aerosol tests are available in three different sizes – allowing for 10, 50 or 100 sprays.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Forensics;Emergency Response;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2002
Number Of Units Fielded	10,000+
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Marijuana, Heroin, Amphetamine, Methamphetamine, cocaine, ecstasy, plus 10 other drugs
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	trace, < 50 µg
Known Interferents Inhibitors	Pharmaceuticals of the same drug class/family as the illicit substance

Aerosols

False Positive Rates	Low
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Sampling: Spray can onto surface and wipe with specialized paper

Physical Parameters

Weight	< 1 lb (0.45kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Field deployable
Operating Conditions	0 to 54°C (32 to 130°F)
Consumables	Single use item
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	2 years
Unit Cost	~$100 per spray can
Expected Operational Life	Single use item
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes

PBA Detection

Targets Detected Score	heroin
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	trace; < 50 ug
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Swab and spray
Response Time	seconds
Customize for New Targets	Cannot detect or add new targets
Portability	< 150 g
Ruggedness	Can operate at extreme temps (0-54°C). Rugged colorimetric.
Consumables	Product itself is a consumable
Training Required	30 minutes to 4 hours depending on variety purchased customer's needs
Maturity	5 - 7 days
User Feedback	No Feedback Total PBA Score- 81/122

Colorimetric

PRODUCT NAME

DABIT™

TECHNOLOGY CATEGORY

Colorimetric;

Field Forensics, Inc.
1601 3rd Street South
St. Petersburg, Florida

www.fieldforensics.com

Craig Johnson
+1 727 490 3609
cjohnson@fieldforensics.com





Model Number	Not Applicable
Synopsis	The DABIT™ is a pocket sized colorimetric device used for narcotic screening. Dab or rub the suspect material or residue. Drop back into its tube and squeeze the tube. A color match indicates a positive. Sold as a box of 10 tests. Each test is a one time use. Multiple models available, to accommodate use based on suspected drug type.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Screening;Forensics;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2012
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Cocaine, opiates, marijuana, LSD, methamphetamine, ephedrine, pseudophedrine, barbiturates, valium, mephedrone, MDMA, MDA, MDEA, opium alkaloids, heroin, papaverine, hydrocodone, thebaine, PCP, mescaline, ketamine, PMA, psilocybin, morphine, codeine, methadone, marijuana, THC, hashish, diazepam, rohypnol, mephedrone
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;

DABIT™

Sensitivity Detection Limits	< mg
Known Interferents Inhibitors	The tests are only for presumptive identification. Further more in-detail analysis is necessary to confirm identity.
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds
Total Run Time	Not Applicable
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	~ 0.5 x 4 in (1.3 x 10 cm)
Weight	< 1 lb (0.45 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Rugged
Operating Conditions	-40 to 65°C (-40 to 149°F)
Consumables	Single use item
Solvents Reagents	Contained within the device and comply with The National Institute of Justice, Standard 0605.00, Color Test Reagents/Kits for Preliminary Identification of Drugs of Abuse,
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	2 years
Unit Cost	$20 to $45 per box of 10 kits
Expected Operational Life	Single use item
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	No
Manuals Available	Yes
Reachback Service	Not Applicable
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	Heroin, Ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	Ephedrine
Sensitivity	< mg
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Dab with testing tubes
Response Time	seconds
Customize for New Targets	Cannot detect or add new targets
Portability	Negligible

DABIT™

Ruggedness	Can operate at extreme temps (-40-65°C). Rugged colorimetric.
Consumables	Unit is a consumable
Training Required	Less than 1 hour of training required
Maturity	2 - 4 weeks
User Feedback	No Feedback Total PBA Score- 83/122

Colorimetric

PRODUCT NAME

Detect 4 Drugs Detection Kit

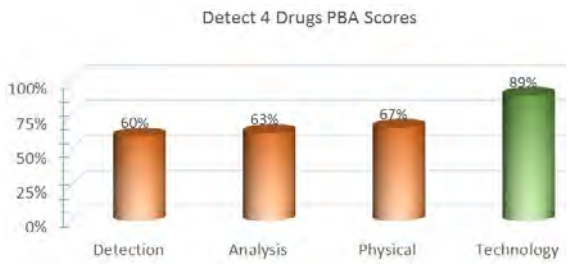
TECHNOLOGY CATEGORY

Colorimetric;

Plexus Scientific
5510 Cherokee Avenue
Suite 350
Alexandria, VA 22312

wwww.plexsci.com

+1 703 820 3339





Model Number	M01710, M01715 (mini)
Synopsis	Detect 4 Drugs (D4D) is an aerosol reagent that detects and identifies four types of drugs at once. The product is available in 50 and 100 test size cans that enable the preliminary detection and identification of 4 drugs from a single trace sample. Wiping a surface once with the Special Test paper, and spraying with D4D reveals traces of: Hashish or Marijuana, as reddish brown stains; Heroin, as purple-gray stains; Amphetamine, as canary-yellow stains; and Meth-amphetamines, as orange stains.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;Screening;
Type	Wet Chemistry
Availability	Commercially Available
Readiness Level	9

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Yes; Hashish, Marijuana, Heroin, Amphetamine, and Methamphetamine
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds

Detect 4 Drugs Detection Kit

Total Run Time	Seconds
Alarm Capability	Visual color change
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Rugged
Consumables	Collection papers
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Unit Cost	Regular - $88.00; Mini - $71.00
Expected Operational Life	Regular - 100 Tests; Mini - 50 Tests
AvailableAccessories	collection and test papers, color chart, carrying case
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Instructions, color chart
Reachback Service	Not Applicable

PBA Detection

Targets Detected Score	Herion, Ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	Trace
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Apply chem to sample
Response Time	Seconds
Customize for New Targets	Cannot detect or add new targets
Portability	< 1 lb.
Ruggedness	No ruggedness testing/claims
Consumables	Unit is a consumable
Training Required	Less than 1 hour of training required
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 81/122

Colorimetric

PRODUCT NAME

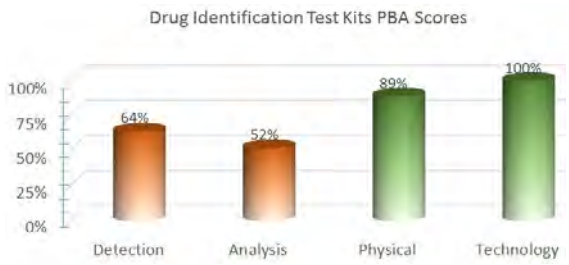
Drug Identification Test Kits

TECHNOLOGY CATEGORY

Colorimetric;

Test Kit Plus
CP 32092 SAINTE-ANDRE
MONTREAL, QC
H2L 4Y5

www.testkitplus.com





Synopsis	Test kits used for identifying common narcotics.A small sample amount is placed into the testing vial then 1 to 2 drops of the testing liquid from the dropper bottle is placed onto the sample. After 1 minute the color of the sample is compared to a color chart for identification and results. Also sold as FentKit from Bunk Police and Fentanyl Test Strips from DanceSafe.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Forensics;Emergency Response;Screening;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	MDMA/MDA/MDE (ecstasy), amphetamine, methamphetamine, heroin, morphine, codeine, methylone, mescaline, oxycodone, DXM, 2C-B, 2C-I, ritalin, ketamine, PMA/PMMA, Methoxetamine, BZP, TFMPP, LSD, Psilobin, others.
Other Chemical Targets	sugar, aspirin
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Known Interferents Inhibitors	Lighting, impurities
Start-Up Time From Cold Start To Sample Ready	Immediate

Drug Identification Test Kits

Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Visual
Software Control	Not Applicable
Other Operational Parameters	Collect sample into testing vial and add a few drops of the reagent. Detection is indicated by the presence of a color change.

Physical Parameters

Dimensions	4.7 x 4.7 x 2.4 in (12 x 12 x 6 cm)
Weight	13 oz (0.372 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Field deployable
Consumables	Single use item
Solvents Reagents	Yes
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Unit Cost	$85 complete kit (5 reagents) at 50 tests per bottle
Expected Operational Life	Single use item
AvailableAccessories	Kits include color charts for each test and multiple use testing vials
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	No
Manuals Available	Yes
Reachback Service	No
Warranties	No
ITAR Export Regulations	Not Applicable
Approved Vendors	Bunk Police; www.bunkpolice.com DanceSafe; www.dancesafe.com

PBA Detection

Targets Detected Score	heroin, ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	sugar, aspirin
Sensitivity	trace
Selectivity	Identifies specific targets in complex mixtures
Sample Preparation	Need to manipulate sample. Samples without containment.
Response Time	< 60 seconds
Customize for New Targets	Cannot detect or add new targets
Portability	7.0 oz (3-in-1); 13 oz (5-in-1)
Ruggedness	Can operate at extreme temps (0-54°C). Rugged colorimetric.
Consumables	Product itself is a consumable
Training Required	Less than 1 hour of training required
Maturity	< 1 week

Drug Identification Test Kits

User Feedback	MRIGlobal tested Total PBA Score- 86/122

Colorimetric

PRODUCT NAME

Drug Test 5000

TECHNOLOGY CATEGORY

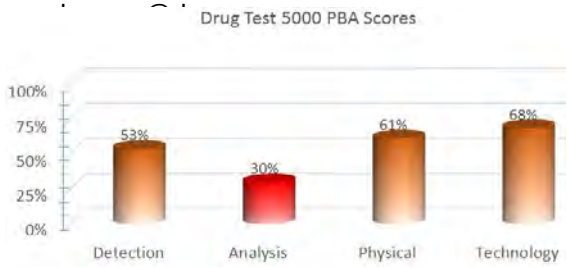
Colorimetric;



Dräger Safety, Inc.
7256 South Sam Houston Parkway,
Suite 100
Houston, TX 77085

www.draeger.com

Sandra Parr
+1 800 437 2437



Synopsis	The Dräger DrugTest® 5000 is a mobile drug screening system that uses oral fluid to test for seven types of the most commonly abused drugs. The system is comprised of two main components: the Dräger DrugTest® 5000 Test Kit and the Dräger DrugTest® 5000 Analyzer. The Analyzer interprets the results from the DrugTest® 5000 Kit. The full color display interface indicates “Positive” or “Negative” for each drug class. The DrugTest® 5000 Analyzer can also be linked to data recording devices such as a PC, Dräger mobile printer or barcode scanner. The analyzer allows up to 500 individual measurements to be stored for printing or upload to a PC. The product is sold for law enforcement use only.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response; Screening; Bulk Analysis; Trace Analysis;
Type	Instrument
Availability	Military Only
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Amphetamines, opiates, cocaine and metabolites, benzodiazepines, cannabinoids, heroin, lorazepam
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid; Vapor/Gas

Drug Test 5000

Sensitivity Detection Limits	ng
Known Interferents Inhibitors	Not Specified
Start-Up Time From Cold Start To Sample Ready	Seconds
Response Time Sample Application To Output	5 to 10 minutes depending on type of test
Total Run Time	Seconds to minutes
Alarm Capability	Not Applicable
Software Control	Configurable on-board software
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	7.9 x 9.8 x 8.7 in (20 x 25 x 22 cm)
Weight	9.9 lbs (4.5 kg)
Power Requirements	12 VDC
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Not militarized, drop sensitive.
Operating Conditions	5 to 40°C (41° to 104°F); 5 to 95% RH, non-condensing
Consumables	DrugTest 5000 Test Kits
Solvents Reagents	Not Applicable
Calibration Schedule	Built-in self-test capability controls temperature, optics, and general operation.
Suggested Routine Maintenance	Not Applicable
Shelf Life	Expiration date printed on each cartridge
Unit Cost	$5,982
Expected Operational Life	Not Specified
AvailableAccessories	Compact Keyboard Car Cable 12 V Dräger Mobile Printer Thermal Paper for Mobile Printer Carrying Bag Transport Case Bar Code Scanner
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Specified
Communications Interface	Optical IRDA (printer), PS/2, USB Slave
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Not Specified
Manuals Available	Instruction Manual
Reachback Service	Not Specified
Warranties	Not Specified
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	opiates (heroin), benzodiazepines (lorazepam)
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	ng
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	swabs
Response Time	5 - 10 minutes
Customize for New Targets	Cannot detect or add new targets
Portability	9.9 lbs

Drug Test 5000

Ruggedness	No ruggedness testing/claims
Consumables	Cassettes are consumables
Training Required	1 day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 63/122

Colorimetric

PRODUCT NAME

DrugCheck®

TECHNOLOGY CATEGORY

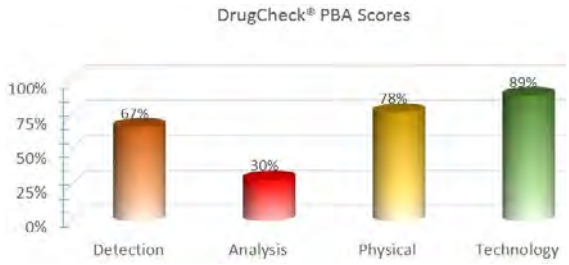
Colorimetric;



Express Diagnostics International
1550 Industrial Drive, P.O. Box 310
Blue Earth, MN 56013

www.drugcheck.com

Nick Skaden
+1 507 526 3951
nick.skaden@drugcheck.com



Synopsis	DrugCheck® onsite screening devices incorporate single drug, color-coded test strips. All DrugCheck urine test cups, dips, and the SalivaScan™ oral fluid drug test use common color coding for quick recognition of individual drug strips.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;Forensics;Screening;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2006
User Feedback Sources	MRIGlobal Hands-on experience
Number Of Units Fielded	100,000+
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Amphetamine, barbiturate, benzodiazepine, buprenorphine, cocaine, cotinine, eddp, etg, fentanyl, ghb, k2-spice, MDMA/ecstasy, methamphetamine, methadone, opiates, oxycodone, phencyclidine, propoxyphene, tricyclic antidepressants, tramadol, marijuana. Fentanyl analogues such as alfentanil and sufentanil will give a positive result for the fentanyl test, though at much higher concentrations than fentanyl. (fentanyl, carefentanil, ketamine, heroin, benzodiazepine (lorazepam), alfentanil and sufentanil give a positive result for the fentanyl test.)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

DrugCheck®

Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;
Sensitivity Detection Limits	ppm; 100 ng/mL
Known Interferents Inhibitors	Similar pharmaceuticals will result in false positives
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	5 to 10 minutes
Total Run Time	5 minutes
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	0.5 x 4 x 5 in (1.3 x 10 x 12.7 cm) for box of 25
Weight	< 1 lb (0.45 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Field deployable
Operating Conditions	2 to 30°C (36 to 86°F)
Consumables	Single use item
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	18 months
Unit Cost	$96 per box of 25
Expected Operational Life	One time use
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Not Applicable
Warranties	Yes
ITAR Export Regulations	None
IATA Shipping Restrictions	None
Approved Vendors	www.drugtestkits.ca, many other online vendors

PBA Detection

Targets Detected Score	fentanyl, carefentanil, ketamine, heroin, benzodiazepine (lorazepam), alfentanil and sufentanil give a positive result for the fentanyl test.
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	ppm; 100 ng/mL
Selectivity	Only detects specific targets, in complex mixture

DrugCheck®

Sample Preparation	Test strips are dipped into bodily fluid
Response Time	5 - 10 minutes
Customize for New Targets	Cannot detect or add new targets
Portability	Negligible
Ruggedness	Cannot operate at extreme temps (2-30°C). Rugged colorimetric.
Consumables	Unit is a consumable
Training Required	Less than 1 hour of training required
Maturity	1 - 2 weeks
User Feedback	No Feedback Total PBA Score- 78/122

Colorimetric

PRODUCT NAME

Drugs and Explosives Suitcase

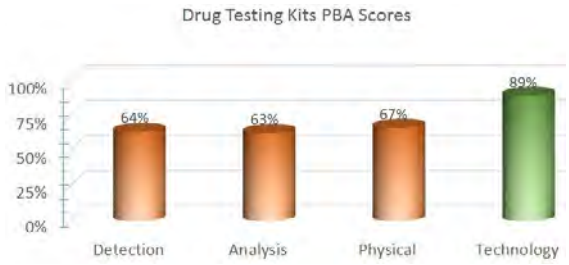
TECHNOLOGY CATEGORY

Colorimetric;

IDenta Corp.
3501 Keyser Avenue
Hollywood, FL 33021

www.identa-corp.com

+1 855 5IDENTA
info@identacorp.com





Model Number	Drugs: IDT0101-20 Explosives: IDT0102-20
Synopsis	The IDenta Drugs Suitcase contains 20 drug or explosives identification tests and instructional cards. Each identification test is a single use item.
Category	Chemical; Explosives;
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Screening;Emergency Response;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Urea nitrate, ammonium nitrate, TATP, peroxide, chlorate, bromate, perchlorate
Tested For Narcotics	Cocaine, heroin, marijuana, LSD, synthetic cannabinoids and cathinones, ecstasy, methamphetamine, amphetamine, ketamine, GHB, barbituates, flunitrazepam, morphine, PCP, mandrax, mephedrone, fentanyl, paracetamol, methadone
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
False Positive Rates	1%
False Negative Rates	1%

Drugs and Explosives Suitcase

Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds
Total Run Time	Immediate
Alarm Capability	Visual color change
Software Control	Not Applicable

Physical Parameters

Dimensions	13 x 10.6 x 3.5 in (34 x 27 x 9 cm)
Weight	2.8 lbs (1.25 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Rugged
Operating Conditions	Operates under all conditions
Consumables	Single use items
Solvents Reagents	Yes
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	3 years
Unit Cost	$85
Expected Operational Life	Single use items
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Yes
Warranties	3 year

Colorimetric

PRODUCT NAME

Fen-Her™

TECHNOLOGY CATEGORY

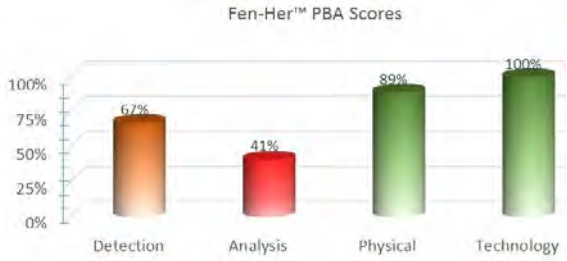
Colorimetric;



Field Forensics, Inc.
1601 3rd Street South
St. Petersburg, Florida

www.fieldforensics.com

Craig Johnson
+1 727 490 3609
cjohnson@fieldforensics.com



Model Number	DXC-001
Synopsis	Presumptive testing for Fentanyl and Heroin. Each kit contains 5 tests. The test can differentiate heroin (morphine and heroin) with fentanyl (fentanyl derivatives).
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;Forensics;Screening;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2017
User Feedback Sources	MRIGlobal Experience
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Morphine, monoacetyl morphine, heroin salts, heroin freebase, fentanyl freebase, carfentanil, acetyl fentanyl, fentanyl citrate, methoxyacetyl fentanyl, furanyl fentanyl, a-methylfentanyl, 3-methyl fentanil, sufentanil, remifentanil, lofentanil, mirfentanil
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	2.5% (solid); 1 µg (liquid)

Fen-Her™

Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Minutes
Total Run Time	< 5 minutes
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	Box: 6 x 3 x 4.25 in (15.2 x 7.6 x 10.8 cm) Pouch: 3.3 x 1.6 x 0.8 in (8.4 x 4.1 x 2 cm)
Weight	Box of 5 tests: 7.6 oz (215g), One pouch 1.2 oz (33 g)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Field deployable
Operating Conditions	-10 to 50°C (14 to 122°F)
Consumables	Single use item
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	1 year
Unit Cost	$115
Expected Operational Life	Single time use
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	No
Manuals Available	Yes
Reachback Service	No
Warranties	No
ITAR Export Regulations	None
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	Fentanyl, Heroin, Carfentanil, Sufentanil, Remifentanil, and other Fentanyl analogues
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	2.5% (solid); 1 ug (liquid)
Selectivity	Identifies specific targets in complex mixtures
Sample Preparation	Requires analysis of sample without containment
Response Time	Minutes
Customize for New Targets	Cannot detect or add new targets
Portability	1.2 oz.
Ruggedness	Can operate at extreme temps (-10-50°C). Rugged colorimetric.

Fen-Her™

Consumables	Unit is a consumable
Training Required	Less than 1 hour of training required
Maturity	2 - 4 weeks
User Feedback	MRIGlobal tested Total PBA Score- 85/122

Colorimetric

PRODUCT NAME

HazCat 2.0 Pro



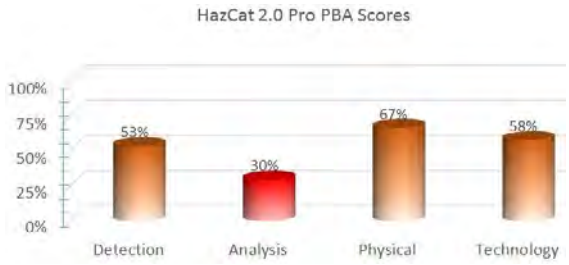
TECHNOLOGY CATEGORY

Colorimetric;

Haztech Systems, Inc.
P.O. Box 929 3919 Bootjack Lane
Mariposa, CA 95338

www.hazcat.com

Stacia Law
+1 800 543 5487



Model Number	KT2011
Synopsis	HazCat® 2.0 Pro detects and screens all WMD agents and selected industrial chemicals. The Pro kit is a combination of multiple other HazCat kits and detects radiological, chemical, and biological threats including explosives and narcotics.
Category	Chemical; Biological; Radiological/Nuclear; Explosives
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response; Laboratory Analysis; Screening; Bulk Analysis; Survey Meter;
Type	Colorimetric
Availability	Commercially available
Readiness Level	9
Market Entry Date	1986
Number Of Units Fielded	10,000+
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	G-series, V-series, GV-series, DC, DF, QL, chlorosarin, chlorosaman, carbamates, Sulfur based (HD, T, Q), Arsenic based (L, PD, MD, ED), Nitrogen based (HN1, HN2, HN3), key precursors
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Military and common explosives
Tested For Narcotics	Opiates (morphine, codeine, heroin), brown heroin, black tar, demerol, LSD, Amphetamines, methamphetamine, MDMA, marijuana, hashish, hash oil, cocaine, crack, PCP, Ephedrine
Other Chemical Targets	Illicit drugs, radiological, and BWs
Tested For Biological Agents	Anthrax, Ricin, Botulinum Toxin, plague, brucella, tularemia, orthopox, SEB
Other Biological Targets	amino acids, pesticides
Radiological Targets	Yes
Library Size	Identifies over 1,000 chemicals
Customize For New Targets	Not Applicable

HazCat 2.0 Pro

Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	ppm; mg
Known Interferents Inhibitors	May false alarm for nerve agents if exposed to commercial organophosphate pesticides
Start-Up Time From Cold Start To Sample Ready	15 minutes
Response Time Sample Application To Output	< 30 minutes
Total Run Time	Not Specified
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	21 x 15 x 15 in (53 x 38 x 38 cm)
Weight	26 lbs (11.8 kg)
Power Requirements	Rechargeable battery (2 D cell or AC. Also requires 9 V battery for radiation monitor).
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Durable; Watertight protective pelican case
Operating Conditions	0 to 38°C (32 to 100°F)
Consumables	Disposable test tubes, pipettes, scoops, test strips, slides, reagents
Solvents Reagents	Yes
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Expiration dates of reagents should be periodically checked. Replace reagents as required. (See Shelf Life below.)
Shelf Life	Most reagents have an indefinite shelf life. Six reagents are considered perishable and must be replaced annually.
Unit Cost	$6,280
Expected Operational Life	Reagent shelf life
AvailableAccessories	Hardware, cases, additional solvents
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	$500 or less/year

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background; microscopy skills desirable.
Training Available	4-day HazCat® workshop or 1-day refresher course
Manuals Available	User manual and MSDS manual, flow charts, and field sheet packets
Reachback Service	Yes, 24/7
Warranties	1 year parts and labor
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Title 29 CFR 1910.120 Req. for ID, IATA shipping confirmation. Exempt-level quantities of reagents
Approved Vendors	Manufacturer only

PBA Detection

Targets Detected Score	heroin
Associated Compounds Detected	None
Common Cutting Agents Detected	ephedrine
Sensitivity	ppm; mg

HazCat 2.0 Pro

Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Put drug into pouch
Response Time	< 30 minutes
Customize for New Targets	Cannot detect or add new targets
Portability	26 lbs.
Ruggedness	Rugged colorimetric
Consumables	Minor consumables
Training Required	4 days of training required
Maturity	7 - 10 business days
User Feedback	No Feedback Total PBA Score- 62/122

Colorimetric

PRODUCT NAME

Herosol

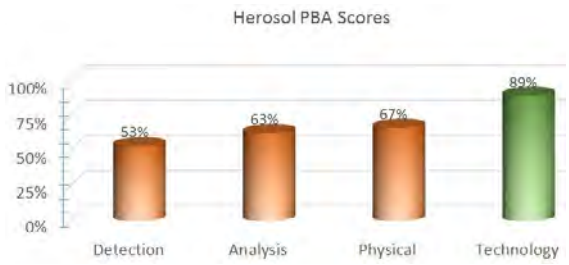
TECHNOLOGY CATEGORY

Colorimetric;

Plexus Scientific
5510 Cherokee Avenue
Suite 350
Alexandria, VA 22312

www.plexsci.com

+1 703 820 3339





Model Number	M01110, M01115 (mini)
Synopsis	Herosol is a one-step field test reagent for the detection and identification of street grade heroin, brown tar heroin, china white, and other designer heroin-related narcotics. Herosol provides sensitivity to residue levels less than 10 micrograms. Using our collection paper, simply wipe the suspected surface or touch the seized substance and spray with Herosol. A purple color reaction on the collection paper indicates a positive reaction.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;Forensics;Screening;
Type	Wet Chemistry
Availability	Commercially Available
Readiness Level	9

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Heroin, Methamphetamines, LSD, Methadone, Amphetamine
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	less than 10 micrograms
Start-Up Time From Cold Start To Sample Ready	Immediate

Herosol

Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Visual color change
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Not Applicable
Consumables	Collection and test papers
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Unit Cost	Regular - $48.00; Mini - $37.00
Expected Operational Life	Regular - 100 Tests; Mini - 50 Tests
AvailableAccessories	Collection and test papers, color chart, carrying case
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Instructions
Reachback Service	Not Applicable

PBA Detection

Targets Detected Score	Heroin
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	Trace
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Apply chem to sample
Response Time	Seconds
Customize for New Targets	Cannot detect or add new targets
Portability	< 1 lb.
Ruggedness	No ruggedness testing/claims
Consumables	Unit is a consumable
Training Required	Less than 1 hour of training required
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 77/122

Colorimetric

PRODUCT NAME

Mandelin Reagent Testing Kit

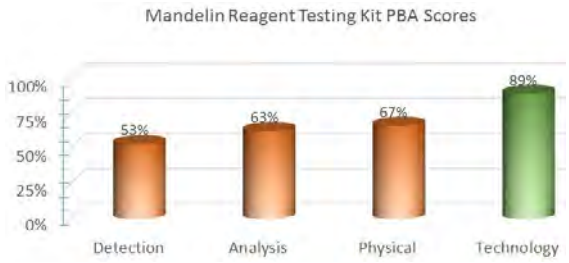
TECHNOLOGY CATEGORY

Colorimetric;

DanceSafe
12081 West Alameda Parkway
#442
Lakewood, CO 80228

www.dancesafe.org

+1 888 MDMA 411
store@dancesafe.org





Synopsis	Mandelin reagent is an important test primarily because, unlike Marquis and Mecke, it positively identifies the presence of ketamine and the deadly adulterants PMA and PMMA. It also detects MDxx (“ecstasy/molly”), meth/amphetamine, cocaine and more. Contains enough reagent for approximately 50 tests.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Screening;
Type	Wet Chemistry
Availability	Commercially Available
Readiness Level	9

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Ketamine, MDxx, PMA/PMMA, Methamphetamine, amphetamine, Cocaine, mDPV, methylone, oxycodone
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Known Interferents Inhibitors	The color reactions for MDMA, MDA, and MDE are very similar. Methamphetamine and amphetamine are the same green. You can use the Simon’s Reagent to tell the difference between MDA and MDMA/MDE, or between methamphetamine and amphetamine.
Start-Up Time From Cold Start To Sample Ready	Immediate

Mandelin Reagent Testing Kit

Response Time Sample Application To Output	Seconds
Total Run Time	< 1 minute
Alarm Capability	Visual color change
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	3.5 x 1.75 x 1.75 in (8.9 x 4.4 x 4.4 cm)
Weight	0.1 lbs (0.04 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Rugged
Consumables	Not Applicable
Solvents Reagents	Sulfuric acid
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Unit Cost	$20
Expected Operational Life	50 tests
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Instructions
Reachback Service	No

PBA Detection

Targets Detected Score	Ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	Trace
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Apply chem to sample
Response Time	Seconds
Customize for New Targets	Cannot detect or add new targets
Portability	< 1 lb.
Ruggedness	No ruggedness testing/claims
Consumables	Unit is a consumable
Training Required	Less than 1 hour of training required
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 77/122

Colorimetric

PRODUCT NAME

MobileDetect Pouch

TECHNOLOGY CATEGORY

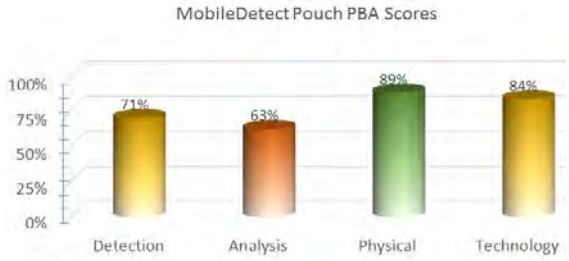
Colorimetric;



DetectaChem
710 North Post Oak Road, Suite 103
Houston, TX 77024

www.detectachem.com

Garrett Preston
+1 855 573 3537
gpreston@detectachem.com



Model Number	Varies by Target Chemical; MDT (fentanyl), DDT
Synopsis	MobileDetect Pouch allows for presumptive identification of drugs and substances outlined by the DEA as drugs of concern. The MobileDetect Pouch chemistries are based on the National Institute of Justice Standard 0604.01 for chemical reagents for preliminary identification of a suspected drug or class of drugs in their pure and/or diluted forms. Users can swab a surface or apply bulk material to the test swab. Results are meant to be interpreted by smartphone-based application but are visible to the naked eye.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;Screening;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2017
User Feedback Sources	MRIGlobal Hands-on Experience
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Heroin, Morphine, Fentanyl, and its analogues (carfentanil, sufentanil, 3-methylfentanil, lofentanil, mirfentanil), Amphetamines, Cocaine, Meth, Barbiturates, Ephedrine, Rohypnol, Ecstasy, MDMA, K2/Spice, Ketamine, Psilocybin, Psilocin, THC, PCP, GHB, LSD, Syntheic Cannabinoids, Suboxone®. Benzphetamine, Chlorpromazine, Codeine, Diacetylmorphine, Dimethoxy-meth, Doxepin, Dristan, LSD, MDA, Meperidine, Mescaline, Methadone, Methylphenidate, Morphine monohydrate, Opium, Oxycodone, Propoxyphene
Other Chemical Targets	Not Applicable

MobileDetect Pouch

Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid; Solid;
Sensitivity Detection Limits	2.5% (solid); 20 µg (liquid)
Known Interferents Inhibitors	Similar pharmaceuticals will result in false positives.
False Positive Rates	Low
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Meant for use with the MobileDetect smartphone application for identification of results.

Physical Parameters

Dimensions	1.98 x 3.54 x 0.31 in (0.29 x 89.92 x 7.86 mm)
Weight	< 1 lb (0.45 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Field deployable
Consumables	Test strips
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	Indefinite
Unit Cost	$100 box of 10
Expected Operational Life	One time use
AvailableAccessories	MobileDetect Ready Kit (MDRK): Mix of 30 Pouches, Rugged Pelican Case for storage.
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, through videos, online training, or in-person. Training takes 1 to 4 hours depending on what is needed by customer.
Manuals Available	Yes
Reachback Service	No
Warranties	No
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, heroin, ketamine, carfentanil, sufentanil
Associated Compounds Detected	None

MobileDetect Pouch

Common Cutting Agents Detected	ephedrine
Sensitivity	2.5% (solid); 20 ug (liquid)
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Swabs
Response Time	seconds
Customize for New Targets	Cannot detect or add new targets
Portability	< 1 lb
Ruggedness	Can operate at extreme temps. Rugged colorimetric.
Consumables	Unit is a consumable
Training Required	Training can take 1 - 4 hours depending on the customer's needs
Maturity	3 weeks
User Feedback	MRIGlobal tested Total PBA Score- 90/122

Colorimetric

PRODUCT NAME

NarcoPouch

TECHNOLOGY CATEGORY

Colorimetric;

The Safariland Group
13386 International Parkway
Jacksonville, FL 32218

www.safariland.com

Roger Cox
+1 501 765 1181
roger.p.cox@safariland.com





Model Number	915 (Sixty Kit); 918 (Professional Kit); 920 (Squad Pack)
Synopsis	Contains nine NarcoPouch refill boxes for a total of 90 individual tests. One each of Mayer's Reagent, Marquis Reagent and one box of tests each for cocaine, barbiturates, LSD, as well as two types of tests for marijuana (Duquenois-Levine and KN methamphetamine/MDMA, and heroin, Reagents). NarcoPouch® presumptive field drug tests show all color reactions directly in front of the ampoule being broken. To eliminate background colors and improve visibility in low light situations, a white panel has been added to the rear of the pouch. Each box includes 10 individual tests with the exception of test 928 GHB Reagent which only has 5 Tests per box.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	1980
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	100,000+
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Base cocaine and salt forms (904B), Barbiturates (905-Dille-Koppanyi), Methadone (906-Mandelin), LSD (907-Ehrlichs), Marijuana (908-Duquenois-Levine and 909-KN), Ketamine (912-Morris and 925-Valium), PCP/Methaqualone (914), Opiates (Heroin, oxycodone) (922), Methamphetamine/MDMA, (923), Heroin (924-Meckes), Rohypnol and Valium (925-Valium), Pentazocine (926-Frohdes), Ephedrine and Pseudoephedrine (927-Chens), GHB (928), Psilocybin (929)

NarcoPouch

Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Solid;Liquid;
Sensitivity Detection Limits	Neat/mixtures; mg; g
Known Interferents Inhibitors	Not Specified
Start-Up Time From Cold Start To Sample Ready	< 5 minutes
Response Time Sample Application To Output	< 1 minute
Total Run Time	< 6 minutes
Alarm Capability	Visual
Software Control	Not Applicable
Other Operational Parameters	White background on each pouch makes identifying color changes easier and more accurate; Color results for target substance is printed on the front of each pouch

Physical Parameters

Dimensions	4 x 8 x 3 in (10 x 20 x 78 cm)
Weight	5 lbs (2.3 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Pelican case, field deployable
Operating Conditions	Not Specified
Consumables	Reagents, Report forms
Solvents Reagents	Mayer’s Reagent, Marquis Reagent
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	3 years
Unit Cost	$96.00 (Squad Pack); $134.75 (Sixty Kit); $299.75 (Professional Kit)
Expected Operational Life	Single use item
AvailableAccessories	Kits also come with an acid neutralizer pouch
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes; DVD format
Manuals Available	Instructions
Reachback Service	None
Warranties	Not Specified
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Title 29 CFR 1910.120 Req. for ID, IATA shipping confirmation. Exempt-level quantities of reagents
Approved Vendors	Forensic Group

NarcoPouch

PBA Detection

Targets Detected Score	heroin, ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	ephedrine
Sensitivity	> 5 µg
Selectivity	Identifies specific targets in complex mixtures
Sample Preparation	Need to manipulate sample. Samples without containment.
Response Time	< 60 seconds
Customize for New Targets	Cannot detect or add new targets
Portability	Negligible
Ruggedness	Can operate at extreme temps (0-54°C). Rugged colorimetric.
Consumables	Product itself is a consumable
Training Required	Less than 1 hour of training required
Maturity	< 1 week
User Feedback	MRIGlobal tested Total PBA Score- 86/122

Colorimetric

PRODUCT NAME

Narcotic Detection Kits

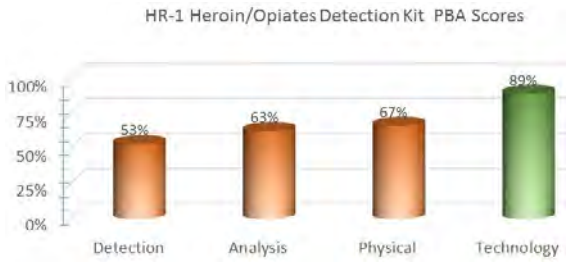


TECHNOLOGY CATEGORY

Colorimetric;

NARTEC, Inc.
www.nartec.com

Afton Ware
+1 417 587 3340
aware@nartec.com



Model Number	Hr-1 (heroin), CO-2 (cocaine), MH-21 (marijuana/hashish), METH-1
Synopsis	Colorimetric ampule-based detection kits using Meckes reagent. Multiple product models; test target dependent. To use, press or rub the ampule fiber tip onto the suspect powder or residue. Powder should adhere to the fiber tip. Hold plastic tube upward, insert test ampule downward partially into the tube. Squeeze the paper cap to break the glass ampule inside the test vial. Slowly squeeze the cardboard cap (three or four times) to force the liquid into the fiber tip and to completely moisten the flat end of the tip where the suspect powder is located.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Forensics;Emergency Response;Screening;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Heroin, codeine, morphine, opium, cocaine, amphetamine, marijuana, hashish, methamphetamine, ecstasy, MDMA, MDM, MDA, MMDA
Other Chemical Targets	procaine, lidocaine, tetracaine, propoxyphene, meperidine
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;

Narcotic Detection Kits

Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	10 seconds
Alarm Capability	Visual color change
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Rugged
Consumables	Single use item
Solvents Reagents	Meckes reagent, sulfuric acid (ampule), sodium bicarbonate solution, cobalt thiocyanate reagent
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Unit Cost	$18.50 for box of 10
Expected Operational Life	Single use item
AvailableAccessories	Product packs; combination of multiple kit models
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Instruction manual
Warranties	30 days

PBA Detection

Targets Detected Score	Heroin
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	Trace
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Have to apply sample to swab end
Response Time	Seconds
Customize for New Targets	Cannot detect or add new targets
Portability	4.9 g
Ruggedness	No ruggedness testing/claims
Consumables	Unit is a consumable
Training Required	Less than 1 hour of training required
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 77/122

Colorimetric

PRODUCT NAME

Narcotic Field Tests



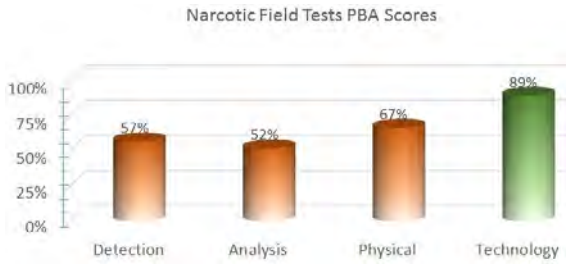
TECHNOLOGY CATEGORY

Colorimetric;

M.M.C. International B.V.
Frankenthalerstraat 16
4816 KA, Breda, The Netherlands

www.mmcinter.com

+31 76 5711140
info@mmcinter.com



Model Number	OXY0110, HER0230, MH0210, KETA0250, EPH0110, CA0110, COC0140, OPA0150, METAM0110, LSD0120, SCT0110, BARB0110, FNT03, FTC02, DTK02A, and 24 others
Synopsis	MMC International narcotic field tests contain very little reagents and do not require the use of an acid neutralizer. They are one step, safe and easy to use presumptive tests giving accurate results within seconds. They can be purchased in kits that come with a variety of tests as well as accessories such as spatulas, pipettes, evidence bags, and even a scale with a calculator (Forensic Narcotic Testing Case).
Category	Chemical;
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Forensics;Emergency Response;Screening;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Number Of Units Fielded	100,000+
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Fentanyl/Oxycodone, Heroin/Morphine, Codeine (OXY0110), Heroin (White, Brown, Black Tar - HER0230), Heroin, Morphine (MH0210), Ketamine (KETA0250), ephedrine/pseudoephedrine/norephedrine (EPH0110), cannabis/marijuana/hashish (CA0110), cocaine/crack (COC0140), amphetamines, methamphetamine, demerol, heroin, opium alkaloids (OPA0150), methamphetamine and MDMA (METAM0110), LSD (LSD0120), bath salts (SCT0110), barbiturates (BARB0110), others
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable

Narcotic Field Tests

Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Solid
Sensitivity Detection Limits	1 mg
Known Interferents Inhibitors	Fentanyl/Oxycodone, Heroin/Morphine, Codeine test has no known cross reactivity with other similar drugs.
False Positive Rates	2.55%
False Negative Rates	0.62%
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Sampling: Place a small amount of the suspected drug into ampoule.

Physical Parameters

Weight	0.13 lb (60 g) for box of 10 tests
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Field deployable
Operating Conditions	-55 to 50°C (-68 to 122°F)
Consumables	Single use item
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Unit Cost	$19 to $37 per pack (10 tests/pack)
Expected Operational Life	Single use item
AvailableAccessories	Depending on the kit purchased, each kit can also contain: scissors, spatulas, scale, pipettes, sample tubes, forceps, evidence bags, gloves, and more.
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes via video
Manuals Available	Yes

PBA Detection

Targets Detected Score	fentanyl, heroin, ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	ephedrine
Sensitivity	bulk; g; mg
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Must manipulate sample. Samples without containment.
Response Time	< 1 minute
Customize for New Targets	Cannot detect or add new targets
Portability	Negligible

Narcotic Field Tests

Ruggedness	No ruggedness testing/claims
Consumables	Product itself is a consumable
Training Required	Less than 1 hour of training required
Maturity	< 4 weeks
User Feedback	No Feedback Total PBA Score-76 /122

Colorimetric

PRODUCT NAME

Narcotics & Cannabis Test Kits

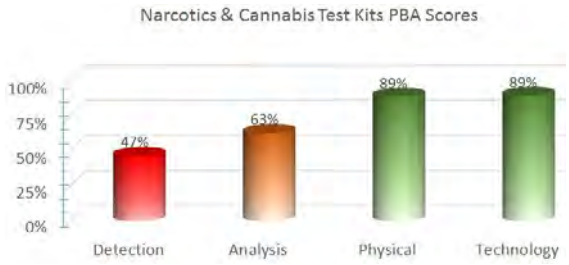
TECHNOLOGY CATEGORY

Colorimetric;

BBI Detection
8 Tom McDonald Avenue, Medipark
Dundee DD2 1NH

www.bbidetection.com

David Fraser
+44 1382 564083
DavidFraser@BBIDetection.com





Model Number	BBINTK-AM , BBINTK-COC, BBINTK-HER, BBICTK
Synopsis	The Narcotics Test Kit (NTK) is a single-use spot test. The NTK is provided as a paper strip with dry reagent test zones applied to the strip surface. The Cannabis Test Kit (CTK) is similar to the NTK in that it is a single-use spot test. A cotton swab is also provided for suspect residue transfer to the paper strip test zone for analysis. Positive indication is rapid, if not instant, taking less than 2 seconds. If no positive color indication has been observed after 10 seconds, the suspect residue is unlikely to contain detectable cannabis material.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;Forensics;Screening;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2015
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Amphetamine, Cocaine, Heroin, some Cathinones, Cannabidiol, Cannabichromene, THC, Ccannabinoid
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable

Narcotics & Cannabis Test Kits

Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	mg
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	< 2 seconds
Total Run Time	< 30 seconds
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	~ 4 x 5 in (10 x 12.7 cm) booklet
Weight	< 1 lb (0.45 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Field deployable
Consumables	Single use item
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	> 18 months
Unit Cost	$187.50 for Box of 50
Expected Operational Life	Single use
AvailableAccessories	Leather Carry Pouch ($6.50)
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Yes
Reachback Service	No
ITAR Export Regulations	Not Applicable
IATA Shipping Restrictions	Not Applicable
Approved Vendors	S2 Threat Detection Technologies

PBA Detection

Targets Detected Score	heroin
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	mg
Selectivity	Only detects heroin target, in complex mixture
Sample Preparation	Swab
Response Time	< 2 seconds
Customize for New Targets	Colorimetric
Portability	0.02 g
Ruggedness	Can operate at extreme temps. Rugged colorimetric.
Consumables	Product itself is a consumable
Training Required	Less than 1 hour of training required

Narcotics & Cannabis Test Kits

Maturity	7 - 10 days
User Feedback	No Feedback Total PBA Score- 77/122

Colorimetric

PRODUCT NAME

NARK II Drug Tests

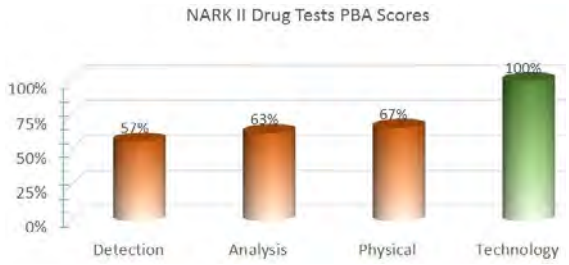
TECHNOLOGY CATEGORY

Colorimetric;

Sirchie
100 Hunter Place
Youngsville, NC 27596

www.sirchie.com

+1 800 356 7311





Model Number	Not Applicable
Synopsis	NARK II drug reagents are presumptive tests designed to identify common narcotics.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Forensics;Emergency Response;Screening;
Type	Colorimetric
Availability	Military Only
Readiness Level	9
User Feedback Sources	MRIGlobal Hands-on Experience
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Fentanyl and some analogues (3-methylfentanil, acetyl-fentanyl, carfentanil, lofentanil, mirfentanil), Heroin, methadone, amphetamine, methamphetamine, MDMA, methylone, MDPV, morphine, phencyclidine (PCP), cannabis, oxycodone, barbiturates, LSD, ephedrine, pseudophedrine, ketamine, mollies, THC, GHB, cocaine, and many others.
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	ng

NARK II Drug Tests

Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Presumptive Test only

Physical Parameters

Dimensions	1 x 2 in (2.5 x 5 cm) pouch
Weight	< 1 lb (0.45 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Field deployable
Consumables	Single use item
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	< 1 year
Unit Cost	$20.55 for pack of 10
Expected Operational Life	Single use item
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Not Applicable
ITAR Export Regulations	Not Applicable
IATA Shipping Restrictions	None
Approved Vendors	Shop Evident

PBA Detection

Targets Detected Score	fentanyl, carfentanil, heroin, ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	Ephedrine
Sensitivity	1% (solid)
Selectivity	Identifies specific targets in complex mixtures
Sample Preparation	Swabs
Response Time	< 30 seconds
Customize for New Targets	Cannot detect or add new targets
Portability	Negligible
Ruggedness	No ruggedness testing/claims
Consumables	Product itself is a consumable
Training Required	Less than 1 hour

NARK II Drug Tests

Maturity	< 3 weeks
User Feedback	MRIGlobal tested Total PBA Score- 81/122

Colorimetric

PRODUCT NAME

NIK Master Pac Test Kit



TECHNOLOGY CATEGORY

Colorimetric;

The Safariland Group
13386 International Parkway
Jacksonville, FL 32218

www.safariland.com

Roger Cox
+1 501 765 1181
roger.p.cox@safariland.com



Synopsis	NIK test kits are general screening tests for presumptive identification of typical narcotics. Using wet chemistry, the system presumptively identifies the most commonly encountered narcotic and street drugs. Kits are available for all commonly abused drugs including cocaine, marijuana, heroin, methamphetamine, amphetamine, LSD, and psilocybin.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	1980
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	100,000+
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Presumptively identifies 25 controlled substances. Morphine, Codeine, Heroin, barbiturates, LSD, marijuana, GHB, ephedrine, amphetamines, methadone, ketamine, PCP, Methaqualone, Oxycodone, Quaaludes, Ephedrine, Valium, Rohypnol, Methcathinone, fentanyl, carfentanil
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable

NIK Master Pac Test Kit

Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	ug
Start-Up Time From Cold Start To Sample Ready	< 5 minutes
Response Time Sample Application To Output	< 1 minute
Total Run Time	7 minutes
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Designed as presumptive field screening

Physical Parameters

Dimensions	6.5 x 8.38 x 7 in (16.5 x 21.2 × 17.7 cm)
Weight	10 lbs (4.5 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Pelican case
Operating Conditions	Designed for field use
Consumables	Reagent tests
Solvents Reagents	Yes
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	Verify after 5 years – recommend not purchasing more than will be used within 1 year.
Unit Cost	$290
Expected Operational Life	5+ years
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background
Training Available	Yes – DVD format
Manuals Available	User's manual
Reachback Service	No
Warranties	None
ITAR Export Regulations	None
IATA Shipping Restrictions	Ground transport only
Approved Vendors	Amazon.com; CopQuest; Forensic Source

PBA Detection

Targets Detected Score	fentanyl, carfentanil, heroin, ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	ephedrine
Sensitivity	> 5 µg, (10% solids, fentanyl detection, test W)
Selectivity	Identifies specific targets in complex mixtures
Sample Preparation	Need to manipulate sample. Samples without containment.
Response Time	< 60 seconds
Customize for New Targets	Cannot detect or add new targets

NIK Master Pac Test Kit

Portability	Negligible
Ruggedness	Can operate at extreme temps (0-54°C). Rugged colorimetric.
Consumables	Product itself is a consumable
Training Required	Less than 1 hour of training required
Maturity	< 1 week
User Feedback	MRIGlobal tested Total PBA Score- 84/122

Colorimetric

PRODUCT NAME

PDT

TECHNOLOGY CATEGORY

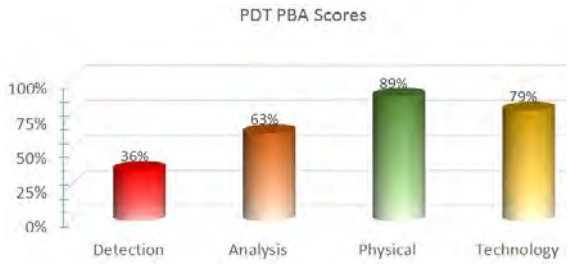
Colorimetric;



Mistral Security, Inc.
7910 Woodmont Avenue, Suite 820
Bethesda, MD 20814

www.mistralsecurityinc.com

Greg Warfield
+1 301 913 9366
securitysales@mistralgroup.com



Model Number	Not Applicable
Synopsis	PDT is a series of individual, presumptive reagent drug tests to identify controlled substances while in the field. The fentanyl test has a high false positive rate, even for blank samples.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;Forensics;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2013
User Feedback Sources	MRIGlobal Experience
Number Of Units Fielded	10,000+
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	GHB, KN, methadone, methamphetamine, methaqualone, mollies, opiates, heroin, MDMA, PCP, bath salts, cannabis, propoxphene, psilocybin, rohypnol, barbiturates, cocaine, others
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Solid
Sensitivity Detection Limits	bulk, g, mg

PDT

False Positive Rates	High
False Negative Rates	Pharmaceuticals of the same drug class/family as the illicit substance
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Sampling: Put drug into pouch

Physical Parameters

Dimensions	~ 1 x 2 in (2.5 x 5 cm) pouch
Weight	< 1 lb (0.45 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Rugged
Operating Conditions	0 to 54°C (32 to 130°F)
Consumables	Single use item
Solvents Reagents	Reagents
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	2 years
Unit Cost	$9 for box of 10
Expected Operational Life	Single use item
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Not Applicable
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	heroin (MRIGlobal detemined that PDT gives a positive result for the fentanyl test even for a blank)
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	bulk; g; mg
Selectivity	False alarms on blanks and all samples
Sample Preparation	Must manipulate sample
Response Time	seconds
Customize for New Targets	Cannot detect or add new targets
Portability	Negligible
Ruggedness	Can operate at extreme temps (0-54°C). Rugged colorimetric.
Consumables	Product itself is a consumable

PDT

Training Required	30 minutes to 4 hours depending on variety purchased customer's needs
Maturity	5 - 7 days
User Feedback	Blank gives positive result for fentanyl Total PBA Score- 69/122

Colorimetric

PRODUCT NAME

PenTest



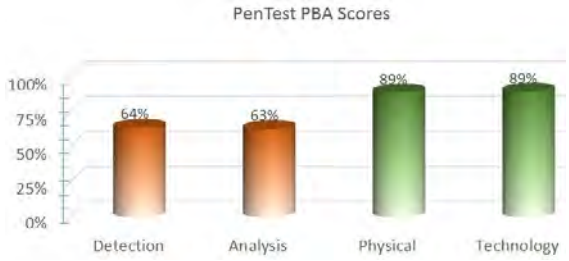
TECHNOLOGY CATEGORY

Colorimetric;

Mistral Security, Inc.
7910 Woodmont Avenue, Suite 820
Bethesda, Maryland 20814

www.mistralsecurityinc.com

Greg Warfield
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securitysales@mistralgroup.com



Synopsis	The PenTest is an ampoule-based technology that detects trace amounts of drugs as well as bulk amounts. Containing up to five tests per kit, can mix and match any test you might need. An optional carry pouch can be purchased for storage of individual pens.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;Forensics;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2006
Number Of Units Fielded	1,000 to 10,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Marijuana, Heroin, Amphetamine, Methamphetamine, PCP, Morphone, Methadone, Codeine, Ketamine, Ephedrine-Pseudoephedrine, coca, diazepam, rohynpol, barbiturates, cannabis, LSD, opiates, morphine, opium, ecstasy
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	Trace, < 50 µg

PenTest

Known Interferents Inhibitors	Pharmaceuticals of the same drug class/family as the illicit substance
False Positive Rates	Low
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Weight	Negligible
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Rugged, field deployable
Operating Conditions	0 to 54°C (32 to 130°F)
Consumables	Single use item
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	3 to 4 years (as long as it is protected from light and extreme temperatures)
Unit Cost	$10
Expected Operational Life	Single use item
AvailableAccessories	Carry pouch
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	No

PBA Detection

Targets Detected Score	heroin, ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	ephedrine
Sensitivity	trace; < 50 ug
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Must manipulate sample
Response Time	seconds
Customize for New Targets	Cannot detect or add new targets
Portability	Negligible
Ruggedness	Can operate at extreme temps (0-54°C). Rugged colorimetric.
Consumables	Product itself is a consumable
Training Required	30 minutes to 4 hours depending on variety purchased customer's needs
Maturity	5 - 7 days

PenTest

User Feedback	No Feedback Total PBA Score- 87/122

Colorimetric

PRODUCT NAME

QuickCheck Narcotic Identification Kits

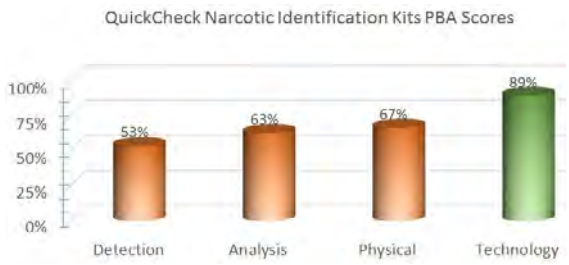
TECHNOLOGY CATEGORY

Colorimetric;

Lynn Peavey Company
11042 Strang Line Road
Lenexa, KS 66215

www.lynnpeavey.com

+1 800 255 6499
lpv@peaveycorp.com





Synopsis	QuickCheck narcotic test kits are a presumptive testing kit for cocaine, two types of marijuana, methamphetamine, ecstasy, MDMA, MDEA, MDA, MDPA , the opiate family and amphetamines. Tube-type tests also available. Foldout instructions attached on every kit provide step-by-step directions for a successful test.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response;Forensics;Screening;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2006

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Cocaine, methamphetamine, ecstasy, marijuana, heroin, MDMA, MDEA, MDA, MDPA, opiates, amphetamines
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds

QuickCheck Narcotic Identification Kits

Total Run Time	Seconds
Alarm Capability	Visual color change
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Weight	< 5 lbs (2.2 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Rugged
Consumables	Single use item
Solvents Reagents	Sulfuric acid and selenious acid ampules
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Unit Cost	$25 for box of 10
Expected Operational Life	Single use itme
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes

PBA Detection

Targets Detected Score	Heroin
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	Trace
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Have to apply sample to swab end
Response Time	Seconds
Customize for New Targets	Cannot detect or add new targets
Portability	< 1 lb.
Ruggedness	No ruggedness testing/claims
Consumables	Unit is a consumable
Training Required	Less than 1 hour of training required
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 77/122

Colorimetric

PRODUCT NAME

Rapid Response Fentanyl (FYL) Forensic Test Kit

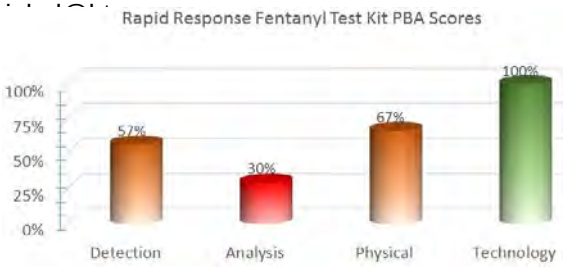
TECHNOLOGY CATEGORY

Colorimetric;Immunological;

BTNX Inc.
570 Hood Road, Unit 23
Markham, Ontario, L3R 4G7,
Canada

www.btnx.com

Iqbal Sunderani
+1 905 944 9565 ext. 205





Synopsis	The Rapid ResponseTM Fentanyl (FYL) Forensic Test Kit is a lateral flow chromatographic immunoassay for the qualitative detection of Fentanyl/Norfentanyl in liquid and powder substances at the cut-off concentration of 400 ng/mL. It is specific for Fentanyl screening with no significant cross reactivity to other opiates, such as Morphine and Heroin. The Rapid ResponseTM Fentanyl (FYL) Forensic Test Kit is able to detect Fentanyl and many other Fentanyl analogues such as Carfentanil, Acetyl Fentanyl, Butyryl Fentanyl, Remifentanil, Ocfentanil, Sufentanil, p-Fluoro Fentanyl, Furanyl Fentanyl, Valeryl Fentanyl, and 3-Methyl Fentanyl. The test strips are also able to be purchased separately.
Category	Chemical
Detection Method	Colorimetric;Lateral Flow/ Hand Held Immunoassay;
Detection Principle	Colorimetric;Immunological;
Application	Forensics;Screening;
Type	Wet Chemistry
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2008
User Feedback Sources	MRIGlobal Experience
Number Of Units Fielded	100,000+
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Fentanyl, carfentanil, acetyl fentanyl, butyryl fentanyl, remifentanil, ocfentanil, sufentanil, p-fluoro fentanyl, furanyl fentanyl, valeryl fentanyl, 3-methyl fentanyl, norfentanyl
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

Rapid Response Fentanyl (FYL) Forensic Test Kit

Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	2.5% (solid); 400 ng (liquid)
False Positive Rates	2%
False Negative Rates	2%
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	5 minutes
Total Run Time	5 minutes
Alarm Capability	Not Applicable
Software Control	Not Applicable
Other Operational Parameters	Interpretation of test results are: positive (one line), negative (two lines), invalid (no lines or no control line).

Physical Parameters

Dimensions	4.7 x 3.1 x 3.1 (12 x 8 x 8 cm)
Weight	3.5 oz (0.1 kg)
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Field deployable
Operating Conditions	15 to 30°C (59 to 86°F)
Consumables	Single use item
Solvents Reagents	Yes
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	2 years
Unit Cost	$1 per test strip; $100 per test kit (100 strips)
Expected Operational Life	Single use item
AvailableAccessories	Swabs, test tubes, extraction buffers, workstation, product insert
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	No
Manuals Available	Instruction manual
Approved Vendors	DanceSafe, Test Kit Plus

PBA Detection

Targets Detected Score	fentanyl, carfentanil, remifentanil, sufentanil
Associated Compounds Detected	norfentanyl
Common Cutting Agents Detected	None
Sensitivity	2.5% (solid); 400 ng (liquid)
Selectivity	Identifies specific targets in simple mixtures
Sample Preparation	Need to manipulate sample. Samples without containment.
Response Time	5 minutes
Customize for New Targets	Cannot detect or add new targets
Portability	3.5 oz

Rapid Response Fentanyl (FYL) Forensic Test Kit

Ruggedness	No ruggedness testing/claims
Consumables	Product itself is a consumable
Training Required	Less than 1 hour of training required
Maturity	< 1 week
User Feedback	MRIGlobal tested Total PBA Score- 72/122

Colorimetric

PRODUCT NAME

SEEKER Series



TECHNOLOGY CATEGORY

Colorimetric;

DetectaChem
710 North Post Oak Road, Suite 103
Houston, Texas 77024

www.detectachem.com

Jeff Baker
+1 855 573 3537
info@detectachem.com



Model Number	XDU,DDU,MDU
Synopsis	The SEEKER comes in three models, the XDU (Explosives only), the DDU (Drugs only), and the MDU (Explosives and Drugs). The MDU is an automated colorimetric detection system that uses disposable cards. The system replies with the positive or negative detection of explosive or drug material and classifies it as Class 1 or Class 2.
Category	Chemical; Explosives
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Emergency Response; Screening; Bulk Analysis; Trace Analysis; Forensics;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2009
User Feedback Sources	MRIGlobal Hands-on experience
Number Of Units Fielded	501 to 1,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	MDU: Nitroaromatics, Nitramines , Nitrate Esters, Inorganic Nitrates, Chlorates, Peroxides, Perchlorates XDU: Same as MDU plus Combinations and Derivatives
Tested For Narcotics	DDU & MDU: Methamphetamine, MDMA, Ketamine, Cocaine, THC, LSD, Opiates, Heroin
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable

SEEKER Series

Customize For New Targets	Not Applicable
Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	100's of ng (explosives); µg (drugs)
Known Interferents Inhibitors	Not Specified
False Positive Rates	Low
False Negative Rates	Similar pharmaceuticals will result in false positives.
Start-Up Time From Cold Start To Sample Ready	< 1 minute
Response Time Sample Application To Output	45 seconds
Total Run Time	90 seconds
Alarm Capability	Visual
Software Control	On-board
Other Operational Parameters	Capable of storing reports and uploading them to an external computer; Sampling: Detection card contains a built-in swab for solids and liquids for both bulk and trace detection.

Physical Parameters

Dimensions	5.9 x 4.7 x 1.2 in (15 x 12 x 3 cmm)
Weight	1.25 lbs (0.57 kg)
Power Requirements	Removable and rechargeable Li-ion 7.4V 2000mAh Battery; AA optional, CR123 optional (100+ tests/charge)

Logistical Parameters

Transportability	Handheld
Durability	Plastic Case; Sealed, Waterproof, Ruggedized-Shockproof
Operating Conditions	-23 to 60°C (-10 to 140°F), 5 to 95% RH, non-condensing
Consumables	Detection cards ($0.99/each)
Solvents Reagents	Yes
Calibration Schedule	Self-calibrates in <10 seconds prior to each test
Suggested Routine Maintenance	Cleaining the small lens when indicated to do so by the device.
Shelf Life	6 months
Unit Cost	$8,500
Expected Operational Life	5 years
AvailableAccessories	Battery charger
Data Analysis Support Equipment	Not Specified
Data File Type Format	Not Specified
Communications Interface	GPS, SD card, USB, Bluetooth
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, through videos, online training, or in-person. Training takes 1 to 4 hours depending on what is needed by customer.
Manuals Available	Yes
Reachback Service	Yes, 24/7/365
Warranties	1 year parts and labor (extended plans are available)
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	heroin, ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	None

SEEKER Series

Sensitivity	ug
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Swab with detection cards
Response Time	10 - 59 seconds
Customize for New Targets	Cannot detect or add new targets
Portability	1.25 lbs
Ruggedness	Can operate at extreme temps (-23-60°C) AND has had shock/vibration testing.
Consumables	User can clean a small lens. Detection cards.
Training Required	Training can take 1 - 4 hours depedning on what's needed by the customer
Maturity	6 weeks
User Feedback	MRIGlobal tested Total PBA Score- 83/122

Colorimetric

PRODUCT NAME

SEEKERe

TECHNOLOGY CATEGORY

Colorimetric;

DetectaChem
710 North Post Oak Road, Suite 103
Houston, TX 77024

www.detectachem.com

Jeff Baker
+1 855 573 3537
sales@detectachem.com





Model Number	EDK, MDK, DDK
Synopsis	The SEEKERe is a handheld explosives and narcotics detector that uses colorimetric techniques. It is a rugged device with low maintenance and down time. Three models: Explosive Detection Kit (EDK) for explosives only, Multi Detection Kit (MDK) for explosives and drugs, and the Drug Detection Kit (DDK) for drugs only.
Category	Chemical; Explosives
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Bulk Analysis;Emergency Response;Screening;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2015
User Feedback Sources	MRIGlobal Hands-on Experience
Number Of Units Fielded	501 to 1,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Nitroaromatics, Nitramines, Nitrate Esters, HMEs, Inorganic Nitrates, Peroxides, Perchlorates, Chlorates and derivatives
Tested For Narcotics	MDK and DDK: Opiates, Amphetamine, Benzphetamine, Chlorpromazine, Codeine, Diacetylmorphine, Dimethoxy-meth, Doxepin, Dristan, Heroin, LSD, MDA, Meperidine, Mescaline, Methadone, Methamphetamine, Methylphenidate, Morphine monohydrate, Opium, Oxycodone, Propoxyphene, methamphetamine, Dimethoxy-meth, MDMA, Methamphetamine, Methylphenidate, Ecstasy, cocaine, THC, marijuana, ketamine, synthetic cannabinoids
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable

SEEKERe

Radiological Targets	Not Applicable
Library Size	Low
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	100's of ng (explosives); µg (drugs)
Known Interferents Inhibitors	Similar pharmaceuticals will result in false positives.
Start-Up Time From Cold Start To Sample Ready	< 30 seconds
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Audible and visual
Software Control	On-board
Other Operational Parameters	Capable of storing >100,000 tests and uploading them to an external computer; Multiple Languages; Sampling: Detection card contains a built-in swab for solids and liquids for both bulk and trace detection.

Physical Parameters

Dimensions	2.6 x 4.5 x 1.4 in (6.8 x 11.6 x 3.7 cm)
Weight	0.43 lbs (197 g)
Power Requirements	Rechargeable Li-ion battery
Noise Produced	Negligible

Logistical Parameters

Transportability	Handheld
Durability	Sealed, Water Resistant (IP66), Ruggedized-Shockproof (MIL-STD 810G)
Operating Conditions	-23 to 60°C (-10 to 140°F), 5 to 95% RH, non-condensing
Consumables	Detection cards ($0.99/each)
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Cleaining the small lens when indicated to do so by the device.
Shelf Life	10 years
Unit Cost	$12,995
Expected Operational Life	10 years
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Communications Interface	USB Dongle,Direct Print (Bluetooth, Wi-Fi, Encrypted Wireless capable), GPS, Recordable CD-R
Maintenance Cost	$5.99 per card

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes, 24/7/365
Warranties	1 year parts and labor (extended plans are available)
ITAR Export Regulations	None
IATA Shipping Restrictions	Lithium ion battery
Approved Vendors	None

PBA Detection

Targets Detected Score	Heroin, Ketamine
Associated Compounds Detected	None

SEEKERe

Common Cutting Agents Detected	None
Sensitivity	ug
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Swab with detection cards
Response Time	10 - 59 seconds
Customize for New Targets	Cannot detect or add new targets
Portability	0.43 lbs
Ruggedness	Can operate at extreme temps (-23-60°C) AND has had shock/vibration testing (mil-spec testing).
Consumables	User can clean a small lens. Detection cards.
Training Required	Training can take 1 - 4 hours depedning on what's needed by the customer
Maturity	6 weeks
User Feedback	MRIGlobal tested Total PBA Score- 83/122

Colorimetric

PRODUCT NAME

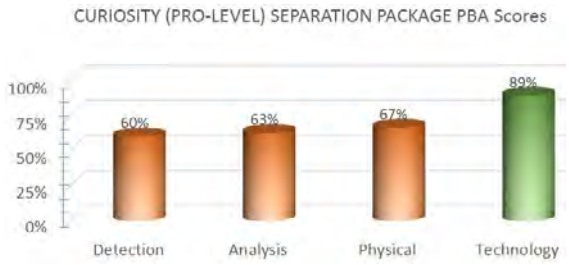
Skylab Separation Kits

TECHNOLOGY CATEGORY

Colorimetric;

Bunk Police
www.bunkpolice.com

Bunkdesk@gmail.com





Model Number	Curiosity (PRO-Level)
Synopsis	The Skylab separations kit is a Sixty (60) Use TLC Kit and Eight Spot Test Kits that includes a testing platform, developing chamber, UV-spotting light and 9 reagents to perform colorimetric testing for the identification of drugs.
Category	Chemical
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Screening;Emergency Response;
Type	Wet Chemistry
Availability	Commercially Available
Readiness Level	9

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Amphetamine, cocaine, heroin, ketamine, LSD, MDMA, methamphetamine, mushrooms
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	µg
Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds to 15 minutes when using TLC cards

Skylab Separation Kits

Alarm Capability	Visual color change
Software Control	Not Applicable
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	8 x 8 x 8 in (20.3 x 20.3 x 20.3 cm)
Weight	4 lbs (1.8 kg)
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Consumables	•(20) Testing Cards (capable of separating sixty (60) samples) •(1000 mL) Bottle of Testing Liquid •(60) Small Vials •(60) Glass Tubes •(20) Filter Paper Squares
Solvents Reagents	(1) Bottle of Marquis (50-100 uses) (1) Bottle of Mecke (50-100 uses) (1) Bottle of Ehrlich (50-100 uses) (1) Bottle of Froehde (50-100 uses) (1) Bottle of Liebermann (50-100 uses) (1) Bottle of Hofmann (50-100 uses) (1) Bottle of Mandelin (50-100 uses) (1) Bottle of Simon's A (50-100 uses) (1) Bottle of Simon's B (50-100 uses)
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Unit Cost	Glass bottle - $195, Plastic bottle - $175
Expected Operational Life	50 to 100 uses
AvailableAccessories	(1) Developing Chamber (1) UV Spotting Light
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Online video, online instructions
Manuals Available	20+ page booklet with dozens of color charts
Reachback Service	Not Applicable

PBA Detection

Targets Detected Score	Fentanyl, Heroin, Ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	Trace
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Have to apply sample to swab end
Response Time	Seconds
Customize for New Targets	Cannot detect or add new targets
Portability	< 1 lb.
Ruggedness	No ruggedness testing/claims
Consumables	Unit is a consumable
Training Required	Less than 1 hour of training required

Skylab Separation Kits

Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 81/122

Colorimetric

PRODUCT NAME

Spot.On.ID™

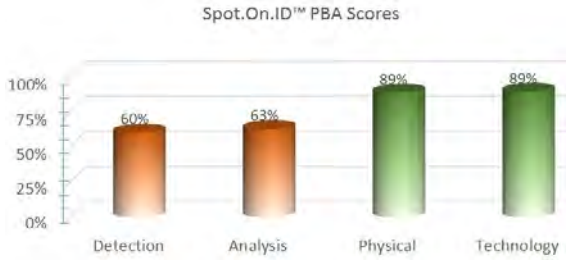
TECHNOLOGY CATEGORY

Colorimetric;

Field Forensics, Inc.
1601 3rd Street South
St. Petersburg, Florida

www.fieldforensics.com

Craig Johnson
+1 727 490 3609
cjohnson@fieldforensics.com





Synopsis	Portable TLC analysis for field and laboratory. The Spot.On.ID™ analyzes forensic and environmental samples to detect and identify explosives, illicit drugs, insecticides, pesticides and other targets in samples taken from surfaces, liquids and solids. Suitable for bulk or trace detection. To use, the sample is taken with the Spotter by rubbing a surface or the suspicious material; then the spotter spots the coded “TLC plate” to start the analysis process. The sampler itself can be analyzed later in the lab because remnants of the original sample will be on the sample tip; also, the TLC plate can be saved for later analysis in the lab.
Category	Chemical; Explosives
Detection Method	Colorimetric;
Detection Principle	Colorimetric;
Application	Screening;Forensics;
Type	Colorimetric
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2014
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	RDX, PETN, TNT, ammonium nitrate
Tested For Narcotics	Heroin, fentanyl, synthetic cannabinoids
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	100's ng

Spot.On.ID™

Start-Up Time From Cold Start To Sample Ready	Immediate
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	On-board
Other Operational Parameters	TLC test can be saved for further lab testing.

Physical Parameters

Weight	Negligible
Power Requirements	Not Applicable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Field deployable
Consumables	Disposable tests, $150 per box of 10
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	1 year
Unit Cost	$3,000
Expected Operational Life	One-time use
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	No
Manuals Available	Yes
Reachback Service	No
Warranties	No
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, heroin
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	100's ng
Selectivity	Identifies specific targets in complex mixtures
Sample Preparation	Swab
Response Time	seconds
Customize for New Targets	Cannot detect or add new targets
Portability	Negligible
Ruggedness	Can operate at extreme temps. Rugged colorimetric.
Consumables	Unit is a consumable
Training Required	Less than 1 hour of training required
Maturity	2 - 4 weeks
User Feedback	No Feedback Total PBA Score- 85/122

Differential Ion Mobility Spectrometry (DMS)

PRODUCT NAME

EGIS Defender

TECHNOLOGY CATEGORY

Chromatography; Spectrometry;

Thermo Fisher Scientific, Inc.
27 Forge Parkway
Franklin, MA 02038

www.thermoscientific.com

+1 973 224 1224





Model Number	EIDEGISDEF
Synopsis	The EGIS Defender explosive detection system is based on High-Speed Gas Chromatography (HSGC) combined with Micro Differential Ion Mobility Spectrometry (DMS). By combining these technologies the EGIS Defender is capable of simultaneously detecting plastic, commercial, and military explosives, TATP, HMTD, and nitrates. One of the EGIS Defender's features is its ability to detect new and emerging threats through software upgrades.
Category	Chemical; Explosives
Detection Method	Differential Ion Mobility Spectrometry (DMS); Gas Chromatography;
Detection Principle	Chromatography; Spectrometry;
Application	Emergency Response; Gas Analysis; Screening; Trace Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Nitrates (AN/UN), EGDN, NG, DNT/TNT, PETN, RDX, TATP, HMTD, tetryl, and DNMB
Tested For Narcotics	Cocaine, Heroin, Cannabis, Amphetamine-Based Drugs, PCP, Ecstasy, EVE, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700, and others
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Solid; Vapor/Gas
Sensitivity Detection Limits	ng, pg
Known Interferents Inhibitors	Glycerin products can potentially cause a false alarm

EGIS Defender

False Positive Rates	2 to 3% as library is increased
Start-Up Time From Cold Start To Sample Ready	30 minutes
Response Time Sample Application To Output	16 seconds
Total Run Time	Minutes
Alarm Capability	Audible and visual
Software Control	Yes, can be controlled via separate computer
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	22 x 22 x 10 in (55.9 x 55.9 x 25.4 cm)
Weight	60 lbs (27.2 kg)
Power Requirements	100 to 120/200 to 240 V AC 47 to 63 Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed
Durability	Shock Sensitive, IP20 tested
Operating Conditions	0 to 40°C (32 to 103°F), 5 to 95% RH non-condensing. Storage conditions: –20 to 50°C (14 to 122°F)
Consumables	Comes with 200 sample wipes and 25 snout filters
Calibration Schedule	Performance check only
Suggested Routine Maintenance	Not Applicable
Shelf Life	18 months
Unit Cost	$42,070
Expected Operational Life	5 years
AvailableAccessories	Start-Up kit $917, 12-month Consumables Pack $6,427
Data Analysis Support Equipment	PC, software
Communications Interface	Yes
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Operator’s classes
Manuals Available	Yes
Warranties	1 or 2 year extended warranty
ITAR Export Regulations	U.S. Nuclear Regulatory Agency regulations due to 63Ni source.
IATA Shipping Restrictions	U.S. Nuclear Regulatory Agency regulations due to 63Ni source.

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	pg; ng;
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs
Response Time	< 30 seconds
Customize for New Targets	Cannot detect or add new targets
Portability	60 lbs
Ruggedness	No ruggedness testing/claims
Consumables	Minimal maintenance and consumables (swabs)
Training Required	1 day of training required

EGIS Defender

Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 97/122

Fluorescence

PRODUCT NAME

XCat

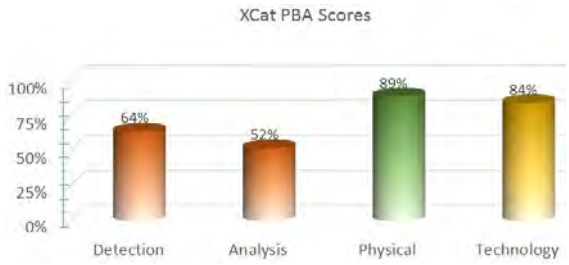
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

RedXDefense
7642 Standish Place
Rockville, MD 20855

www.redxdefense.com

Chris Ellis
+1 407 247 9321
cellis@redxdefense.com





Synopsis	The XCat handheld detection system detects narcotics, homemade and high explosives, and gunshot residue. The XCat is ruggedized for field use, has an expandable detection library and uses a rechargeable Li-ion battery. Detection cards are used to introduce the sample to the instrument. Each analyte or group of analytes is detected with a dedicated card. The XCat is typically used by police to sample suspicious drugs and other substances from hands, vehicles, packages and surfaces.
Category	Chemical; Explosives
Detection Method	Fluorescence;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis; Trace Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2013
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Specified
Tested For Explosives	Nitramines, C4, RDX, Semtex, Black Power, TNT, Piciric acidnitroaromatics, nitrates, and peroxides, others
Tested For Narcotics	Amphetamines, methamphetamines, MDMA, bath salts, cocaine, heroin, fentanyl, fentanyl related products, pseudoephedrine, PCP, others
Other Chemical Targets	Gunshot residue
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Yes, the detection library is expandable
Sample Introduction	Solid; Liquid

XCat

Sensitivity Detection Limits	< 40 µg
Known Interferents Inhibitors	Not Specified
False Negative Rates	Related pharmaceuticals
Start-Up Time From Cold Start To Sample Ready	30 seconds
Response Time Sample Application To Output	10 to 90 seconds, depending on the analyte
Total Run Time	10 to 90 seconds, depending on the analyte
Alarm Capability	Visual
Software Control	Not Applicable
Other Operational Parameters	Sampling: swab sample onto sampling card and insert into Xcat Device

Physical Parameters

Dimensions	3.6 x 1.7 x 6.0 in (92 x 44 x 153 mm)
Weight	1 lb (0.45 kg)
Power Requirements	Rechargeable Li-ion battery, car and wall charger, battery life is 7 hours continuous use

Logistical Parameters

Transportability	Pocket Size
Durability	Rugged, IP52, MIL-STD-810G, Vibration (1 hour truck bed simulator), Transit drop (26 drops from 4 feet), 1000X lifetime cycle testing completed without any failures
Operating Conditions	0 to 49°C (32 to 120°F)
Consumables	Sampling cards are purchased separately are a single use item. Explosives $39.50 for a box of ten, Narcotics $25 for a box of ten, Gunshot residue $50 for a box of ten
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	2 years (sampling card shelf life)
Unit Cost	$2,100
Expected Operational Life	Indefinite
AvailableAccessories	Not Specified
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Applicable
Communications Interface	Removable SD card
Maintenance Cost	$3.95/card(sample), sold in packs of 10

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	YouTube videos
Manuals Available	Field and Operation Guide
Reachback Service	Not Specified
Warranties	1 year, extended warranty is available for $190
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	fentanyl, heroin
Associated Compounds Detected	None
Common Cutting Agents Detected	ephedrine
Sensitivity	< 40 ug
Selectivity	Identifies specific targets in complex mixtures
Sample Preparation	Detection card/swab

XCat

Response Time	40 - 120 seconds
Customize for New Targets	Cannot detect or add new targets
Portability	< 1 lb
Ruggedness	Can operate at extreme temps (0-49°C) AND has shock/vibration testing (MIL-STD-810G)
Consumables	No maintenance necessary. Detection cards.
Training Required	YouTube videos, less than 1 hour of training required
Maturity	30 days
User Feedback	No Feedback Total PBA Score- 83/122

Hyperspectral Imaging

PRODUCT NAME

NirSpector™ Transportable VIS-NIR Analyzer

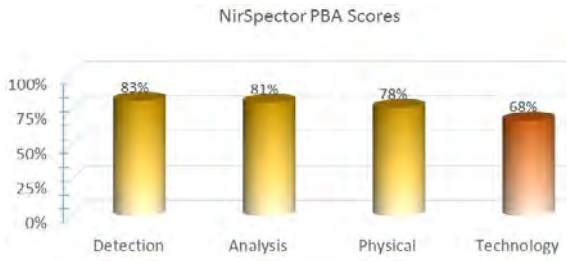
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Bay Spec
1101 McKay Drive
San Jose, CA 95131

www.bayspec.com

+1 408 512 5928
sales@bayspec.com





Synopsis	The NirSpector™ transportable benchtop VIS-NIR spectrometer is a turn-key system that integrates a near-IR spectrometer, active-trigger probe, light source and computer in a ruggedized device. It employs Volume Phase Gratings (VPG) as the spectral dispersion element, thereby providing high-speed parallel processing and continuous spectrum measurements. The NirSpector covers the wavelength range from 400-1700 nm.
Category	Chemical; Explosives
Detection Method	Hyperspectral Imaging;Near Infrared (NIR);
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2013
Number Of Units Fielded	< 10
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Not Applicable
Other Chemical Targets	Infrared active compounds
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	Not Applicable
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	Not Specified
Known Interferents Inhibitors	Water

NirSpector™ Transportable VIS-NIR Analyzer

Start-Up Time From Cold Start To Sample Ready	Not Specified
Response Time Sample Application To Output	3 milliseconds to 30 seconds
Total Run Time	< 1 minute
Alarm Capability	Not Applicable
Software Control	On-board, PC
Other Operational Parameters	Wavelength range: 400 to 1700nm (customer can determine range anywhere from 200nm to 2500 nm), Resolution: 5 to 20 nm

Physical Parameters

Dimensions	12 x 12 x 15 in (30.5 x 30.5 x 38.1 cm)
Weight	12 lbs (5 kg)
Power Requirements	USB, battery

Logistical Parameters

Transportability	Person-Portable
Durability	Rugged; Shock and vibration testing
Operating Conditions	-20 to 60°C (-4 to 140°F)
Consumables	Sample vials or cuvettes
Solvents Reagents	Not Applicable
Calibration Schedule	Factory calibrated
Suggested Routine Maintenance	User can perform basic maintenance
Shelf Life	7 years
Unit Cost	$35,000
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	NirSpec 20/20 Windows XP/Vista/7, Touchscreen Interface
Communications Interface	USB 2.0, Wi-Fi (optional)
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, either through video or telephone conferencing; Training takes 1/2 day
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year parts and labor
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	THEORETICALLY
Associated Compounds Detected	THEORETICALLY
Common Cutting Agents Detected	THEORETICALLY
Sensitivity	%
Selectivity	No library for detection of targets
Sample Preparation	Switchable active trigger probe or transmittance sampling accessory for flexible spectral collection
Response Time	3 ms - 30 s
Customize for New Targets	No library for detection of targets
Portability	12 lbs
Ruggedness	Can operate at extreme temps (-20-60°C) AND has shock/vibration testing (mil-spec)
Consumables	User can do basic maintenance. Sample vials and cuvettes.

NirSpector™ Transportable VIS-NIR Analyzer

Training Required	1/2 day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 97/122

Hyperspectral Imaging

PRODUCT NAME

VeroVision™ Threat Detector

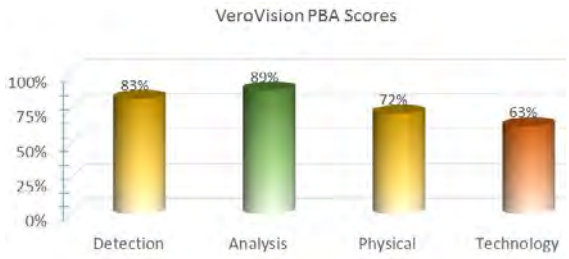
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

ChemImage Sensor Systems
7301 Penn Avenue
Pittsburgh, PA 15208

www.chemimage.com

Peter Safran
+1 412 241 7335 ext. 211
safranp@chemimage.com





Synopsis	ChemImage's VeroVision is a SWIR hyperspectral imaging device that provides near real-time, standoff detection of explosive, narcotic and chemical threat residues on surfaces. VeroVision is designed for non-contact, passive sensing which eliminates the need for hazardous reagents or excitation lasers. It also contains objective, automated detection which eliminates the need for operator interpretation of the results.
Category	Chemical; Explosives
Detection Method	Hyperspectral Imaging;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2017
Number Of Units Fielded	< 10
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes via manufacturer
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%

VeroVision™ Threat Detector

Response Time Sample Application To Output	8 seconds plus library search time
Software Control	Remote
Other Operational Parameters	Standoff Range: 1 to 20 meters Optics: Integrated zoom lens with 2x magnification range, Angular FOV: 0.19 to 0.38m (high-low zoom, short standoff distance), 10.1 to 19.3m (high-low zoom, long standoff distance)

Physical Parameters

Dimensions	Sensor Head: 18.5 x 7.9 x 9.4 in (47 x 20 x 24 cm) Sensor Lighting Module: 4.5 x 12 x 12 in (11.4 x 30.5 x 30.5 cm)
Weight	Sensor Head: 19.50 lbs (8.8 kg), Tripod (Manual Pan/Tilt): 20 lbs (9 kg), At Sensor Lighting Module: 2.90 lbs (1.3 kg), Power Supply: 11.3 lbs (5.1 kg), Operator Display Unit: 8 lbs (3.6 kg)
Power Requirements	90 to 240 VAC, 50/60 Hz, 60 watts

Logistical Parameters

Transportability	Person-Portable
Durability	In house shock and vibration tested
Operating Conditions	10 to 40°C (50 to 104°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	User can replace the laser source
Shelf Life	5 years
Expected Operational Life	3,000 hour laser lifetime
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Warranties	1 year parts and labor

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	%
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Standoff detection
Response Time	< 30 seconds
Customize for New Targets	Manufacturer can add new targets to detector
Portability	62 lbs
Ruggedness	Has had (in house) shock/vibration testing
Consumables	No consumables or scheduled maintenance necessary
Training Required	1 day of training required
Maturity	90 days
User Feedback	No Feedback

Ion Mobility Spectrometry

PRODUCT NAME

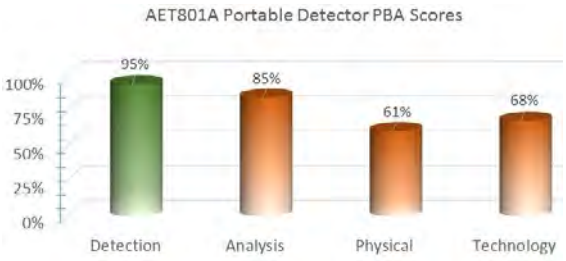
AET801A Portable Explosive Detector

TECHNOLOGY CATEGORY

Spectrometry;

Shenzhen Anertong Technology Co., Ltd
Area A, Floor 3, Building F,
Crown City Low Carbon Industrial Park
Gongming Town, Guangming New District, Shenzhen City

http://en.szaner.com/





Model Number	AET801A
Synopsis	The AET801A is a handheld explosives and narcotics detector using high resolution ion mobility spectrometry, and does not contain radioactive sources. Sample collection can be performed using trace particle adsorption and test paper sampling. It can operate in positive and negative double mode detecting explosives and drugs simultaneously. Similar products, TR1000DB-A sold by NucTech, and SPE9000 sold by SECUPLUS.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Screening;Emergency Response;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Black powder, ammonium nitrate (AN), TNT (TNT), Taian (PETN), cyclotrimethylene trinitramine (RDX), nitroglycerin, HMX, tetryl, two nitro toluene (DNT), C4, Semtex
Tested For Narcotics	Cocaine hydrochloride hydrochloride, four heroin, marijuana, methamphetamine (ice), ketamine (k), morphine hydrochloride, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, lorazepam, 3-quinuclidinyl benzilate, U-47700
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;

AET801A Portable Explosive Detector

Sensitivity Detection Limits	ng
False Positive Rates	< 1 %
Start-Up Time From Cold Start To Sample Ready	6 minutes
Response Time Sample Application To Output	< 2 seconds
Total Run Time	< 1 minute
Alarm Capability	Audible and visual
Other Operational Parameters	Sample collection: trace particle adsorption and test paper sampling

Physical Parameters

Weight	9.5 lbs (4.3 kg)
Power Requirements	220V, AC, 50-60Hz, lithium battery (> 3 hours continuous)

Logistical Parameters

Transportability	Handheld
Durability	Rugged
Operating Conditions	10 to 55 °C (50 to 131 °F), < 99% RH
Consumables	Test paper
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	PC
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Yes
IATA Shipping Restrictions	Lithium ion battery
Approved Vendors	Shenzhen Jinjian Era Technology Co., Ltd; Shenzhen Pinpoint Technology Co., Ltd;

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	ng
Selectivity	Identifies specific targets in complex mixtures
Sample Preparation	Swabs
Response Time	< 2 seconds
Customize for New Targets	User can add new targets to detector
Portability	9.5 lbs
Ruggedness	No ruggedness testing/claims
Consumables	Minimal maintenance and consumables (swabs)
Training Required	1 day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 102/122

Ion Mobility Spectrometry

PRODUCT NAME

B220 Series

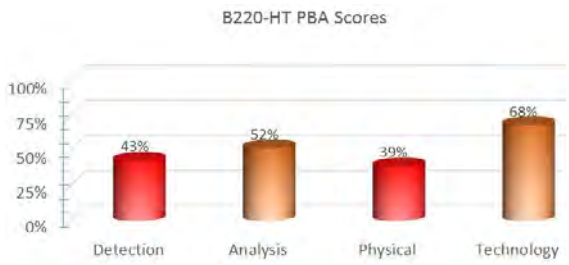
TECHNOLOGY CATEGORY

Spectrometry;

L3 Security & Detection Systems
10E Commerce Way
Woburn, MA 01801

www.sds.l-3com.com

'+1 781 939 3800





Model Number	B220, B220-HT, QS B220-HT (Formerly by Implant Sciences)
Synopsis	The B220 series devices are desktop real-time explosives and drug trace detectors. The B220-HT model is for high throughput. The devices feature a patented Dynamic Cleaning, which optimizes the unit for sampling on hands for high traffic environments. Dynamic Cleaning ensures optimal system performance and is resistant to contamination. The devices are Photonic (non-radioactive ionization).
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response;Trace Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Wide variety of explosives (military, commercial, HME's) Including Ammonium Nitrate, ANFO, Blackpowder, C-4, Detasheet, Detonating cords, Dinitroluene, DMNB, Dynamite,EGDN, HMTD, HMX, Nitroglycerin, Peroxides, PETN, RDX, Somkeless powder, Teryl, Triacetone Triperoxide, Trinitrotoluene, Urea Nitrate, Semtex
Tested For Narcotics	Wide variety including Cocaine, Heroin, THC, Methamphetamine, L-amphetamine, MDMA, MDA, Morphine, Ketamine.
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes via user
Sample Introduction	Liquid;Solid;Vapor/Gas;
Sensitivity Detection Limits	%

B220 Series

False Positive Rates	Low
False Negative Rates	Low
Start-Up Time From Cold Start To Sample Ready	<30 minutes
Response Time Sample Application To Output	<10 seconds
Total Run Time	< 30 minutes
Alarm Capability	Audible and visual
Software Control	On-board
Other Operational Parameters	Photonic (non-radioactive ionization).%

Physical Parameters

Dimensions	Without printer: 16.73 x 15.90 x 14.53 in (42.5 x 40.4 x 36.9 cm) With printer: 16.73 x 15.90 x 15.71 in (42.5 x 40.4 x 39.9 cm)
Weight	Without printer: 32.19 lbs (14.60 kg) With printer: 34.61 lbs(15.70 kg)
Power Requirements	100-240 V AC, 47-63Hz

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Operating Conditions	-15 to 55°C (5 to 131°F), < 95% RH,
Consumables	Molecular sieve drying agent, sample traps
Solvents Reagents	Not Applicable
Calibration Schedule	Fully automated internal calibration
Suggested Routine Maintenance	Cleaning and desiccant replacement as required
Shelf Life	Indefinite
Unit Cost	$25,900
Expected Operational Life	10 years
AvailableAccessories	Optional built-in printer
Data Analysis Support Equipment	Printer, 12.5 in high-resolution color touch screen
Communications Interface	USB 2.0, RJ-45, VGA port
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, $5,000
Manuals Available	Yes
Warranties	Yes
Approved Vendors	Security Detection

PBA Detection

Targets Detected Score	Heroin, Ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	%
Selectivity	Identifies specific targets in simple mixtures
Sample Preparation	Have to apply sample to swab end
Response Time	31 minutes
Customize for New Targets	User can add new targets to detector
Portability	32 lbs.
Ruggedness	No ruggedness testing/claims
Consumables	Swabs
Training Required	1 day
Maturity	6-8 weeks

B220 Series

User Feedback	No Feedback Total PBA Score- 59/122

Ion Mobility Spectrometry

PRODUCT NAME

DE-tector

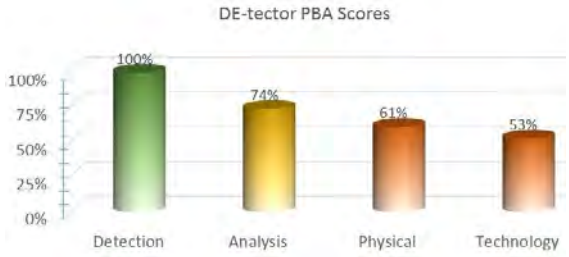
TECHNOLOGY CATEGORY

Spectrometry;

Bruker Corporation
40 Manning Road
Billerica, MA 01821

www.bruker.com

Frank Thibodeau
+1 978 663 3660
frank.thibodeau@brukerdetection.us





Model Number	1824953
Synopsis	DE-tector is a drugs and explosives detection instrument with a non radioactive ionization source and a unique twin-tube design that measures for drugs and explosives at the same time. Surfaces such as luggage, laptops and cargo packages, can be wiped using special glass fiber coated sampling strips and a strip holder. Dedicated software algorithms and a reference library provide automatic detection of explosives at trace concentrations (low ng range) on many different surfaces.Target molecules collected on sampling strips are desorbed thermally at 250°C for 9 s. Afterwards the evaporated molecules are ionized using a low energy photoionization source (XPI™)
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Screening;Forensics;Bulk Analysis;Emergency Response;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2016
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Ammonium Nitrate (NIT), Urea Nitrate (NIT), Nitroglycerine (NG), Pentaerythritol tetranitrate (PETN), Trinitrotoluene (TNT), 2,4-Dinitrotoluene (DNT), Tetryl (TET), Hexogen (RDX), Octogen (HMX), Hexamethylene triperoxide diamine (HMTD), Triacetone triperoxide (TATP), 2,3-dimethyl-2,3-dinitrobutane (DMNB), Black powder (BP), Ethylene glycol dinitrate (EGDN)

DE-tector

Tested For Narcotics	Morphine (MORPH), 3,6-Diacetylmorphine (Heroin) (HER), Cocaine (COC), Cannabinol (CBD), ?9-Tetrahydrocannabinol (THC), 6-Acetylmorphine (6-AM), Amphetamine (AMPH), Methamphetamine (METH), 3,4-Methylenedioxyamphetamine (MDA), 3,4-Methylenedioxy-N-ethylamphetamine (MDEA), 3,4-Methylenedioxy-N-methylamphetamine (MDMA), Lysergic acid diethylamide (LSD), Phencyclidine (PCP), Ketamine (KET), Ephedrine (EPH), fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Other Chemical Targets	Yes, drug additives and others. Does not detect some cutting agents such as sugar.
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Explosives and Narcotics libraries
Customize For New Targets	Yes via manufacturer
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	ng
Start-Up Time From Cold Start To Sample Ready	< 30 minutes
Response Time Sample Application To Output	< 7 seconds
Total Run Time	1 minute
Alarm Capability	Visual
Software Control	On-board
Other Operational Parameters	Detector type: Twin tube IMS allowing for identification of both positive and negative ions simultaneously

Physical Parameters

Dimensions	20 x 17 x 15 in (51 x 43.5 x 38 cm)
Weight	40 lbs (18 kg)
Power Requirements	96V AC to 240V AC, 47 to 63 Hz
Noise Produced	< 50dB(A)

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	IP20
Operating Conditions	0 to 45°C (32 to 113°F), < 95% RH, noncondensing
Consumables	Sampling strips, solution strips, drying filter, dopant, thermal paper, test marker (confidence sample
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	User can perform basic maintenance, No preventive maintenance required
Shelf Life	10 years
Unit Cost	$37,500
Expected Operational Life	Indefinite
AvailableAccessories	Mobile cart, Telescopic extension sampling wand, dust cover
Data Analysis Support Equipment	Printer, software
Communications Interface	USB 3.0, LAN
Maintenance Cost	< $1,000 per year in consumables

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, 1-2 days at manufacturer
Manuals Available	Operator's Manual, administrator manual, maintenance manual, operator's manual DE-Control Center
Warranties	Yes

DE-tector

PBA Detection	
Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	ng
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs
Response Time	< 7 seconds
Customize for New Targets	Manufacturer can add new targets to detector
Portability	40 lbs
Ruggedness	Can operate at extreme temps (0-45°C)
Consumables	User can do basic maintenance. Sampling strips, solution strips, drying filter, dopant, thermal paper, test marker (approx. < $1000/year)
Training Required	1 - 2 days at manufacturer facility
Maturity	30 - 60 days
User Feedback	No Feedback Total PBA Score- 99/122

Ion Mobility Spectrometry

PRODUCT NAME

DE-tector Flex



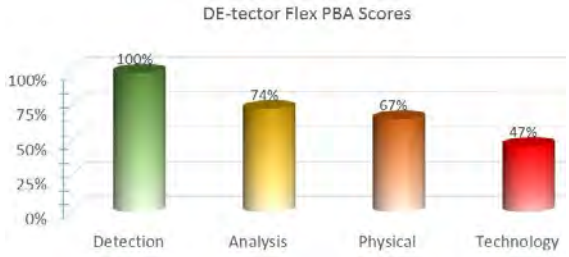
TECHNOLOGY CATEGORY

Spectrometry;

Bruker Corporation
40 Manning Road
Billerica, MA 01821

www.bruker.com

Frank Thibodeau
+1 978 663 3660
frank.thibodeau@brukerdetection.us



Model Number	1880000
Synopsis	The Bruker DE-tector Flex employs industry-standard IMS (Ion Mobility Spectrometry) technology, but uses a non-radioactive source. By swabbing with a non-scratch, disposable swab and inserting it into DE-tector flex, traces of substance can be identified automatically; and within a matter of seconds.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Forensics;Trace Analysis;
Type	Instrument
Availability	In Development
Readiness Level	8
Market Entry Date	2018
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable based on technology
Tested for ITF25TICTIMs	Amenable based on technology
Tested For Explosives	Ammonium Nitrate (NIT), Urea Nitrate (NIT), Nitroglycerine (NG), Pentaerythritol tetranitrate (PETN), Trinitrotoluene (TNT), 2,4-Dinitrotoluene (DNT), Tetryl (TET), Hexogen (RDX), Octogen (HMX), Hexamethylene triperoxide diamine (HMTD), Triacetone triperoxide (TATP), 2,3-dimethyl-2,3-dinitrobutane (DMNB), Black powder (BP), Ethylene glycol dinitrate (EGDN), Erythritol tetranitrate (ETN)
Tested For Narcotics	Morphine (MORPH), 3,6-Diacetylmorphine (Heroin) (HER), Cocaine (COC), Cannabinol (CBD), ?9-Tetrahydrocannabinol (THC), 6-Acetylmorphine (6-AM), Amphetamine (AMPH), Methamphetamine (METH), 3,4-Methylenedioxyamphetamine (MDA), 3,4-Methylenedioxy-N-ethylamphetamine (MDEA), 3,4-Methylenedioxy-N-methylamphetamine (MDMA), Lysergic acid diethylamide (LSD), Phencyclidine (PCP), Ketamine (KET), Ephedrine (EPH), fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700

DE-tector Flex

Other Chemical Targets	Yes, drug additives and others. Does not detect some cutting agents such as sugar.
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes via manufacturer
Sample Introduction	Solid;Liquid;
Sensitivity Detection Limits	ng
Start-Up Time From Cold Start To Sample Ready	<10 min at 20°C
Response Time Sample Application To Output	< 7 seconds
Total Run Time	< 1 minute
Alarm Capability	Visual
Software Control	On-board, PC
Other Operational Parameters	Detector type: Twin tube IMS allowing for identification of both positive and negative ions simultaneously

Physical Parameters

Dimensions	16 x 13 x 12 in (41.5 x 33.5 x 30.5 mm)
Weight	22.7 lbs (10.3 kg)
Power Requirements	100V AC to 240V AC, 50 to 60 Hz Battery (1 hour)
Noise Produced	< 50 dB(A)

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	IP20
Operating Conditions	-10 to 55°C (14 to 131°F), < 95% RH, noncondensing
Consumables	Sampling Strips, solution strips, dust filter, thermal paper, test marker ETD (confidence sample)
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	User can perform basic maintenance, No preventive maintenance required
Shelf Life	10 years
Unit Cost	$30,000
Expected Operational Life	Indefinite
AvailableAccessories	Included: Pack of 120 sample collectors (swabs), Sampling Wand Optional: Uninterruptible Power Supply (UPS), Telescopic extension to sampling wand
Data Analysis Support Equipment	PC
Communications Interface	Gigabit LAN, RJ45, USB 3.0, Type A.
Maintenance Cost	< $1,000 in consumables a year

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, 1-2 day at manufacturer
Manuals Available	Operator's Manual, administrator manual, maintenance manual, operator's manual DE-Control Center
Warranties	Yes

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin

DE-tector Flex

Sensitivity	ng
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs
Response Time	S40:V40
Customize for New Targets	Manufacturer can add new targets to detector
Portability	22.7 lbs
Ruggedness	Can operate at extreme temps (-10-55°C)
Consumables	User can do basic maintenance. Sampling strips, solution strips, drying filter, dopant, thermal paper, test marker (approx. < $1000/year)
Training Required	1 - 2 days at manufacturer facility
Maturity	5 months (not yet released)
User Feedback	No Feedback Total PBA Score- 99/122

Ion Mobility Spectrometry

PRODUCT NAME

EN3300 Trace Detector



TECHNOLOGY CATEGORY

Spectrometry;

Scintrex Trace Corp. (division of Autoclear)
300 Parkdale Avenue
Ottawa , Ontario K1Y 1G2 Canada

www.scintrextrace.com

Guy Cuiture
+1 613 224 1061 ext 267



Model Number	EN3300
Synopsis	The EN3300 identifies the presence of explosives or narcotics in seconds, is designed for performance in harsh environments and uses ion mobility spectrometry technology. Sample collection is performed via a sample trap or by suction through the vapor inlet port.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Screening;Gas Analysis;Emergency Response;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2013
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	TNT, RDX, NG, AN, PETN, EGDN, HMX and UN
Tested For Narcotics	Cocaine, opiates, THC, heroin, amphetamine-type stimulants, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes via manufacturer
Sample Introduction	Vapor/Gas;Solid;
Sensitivity Detection Limits	ng

EN3300 Trace Detector

Start-Up Time From Cold Start To Sample Ready	< 20 minutes
Response Time Sample Application To Output	10 seconds
Total Run Time	< 1 minute
Alarm Capability	Audible and visual
Software Control	PC
Other Operational Parameters	Stores up to 400 data records

Physical Parameters

Dimensions	17.0 x 4.8 x 6.3 in(43.2 x 12.1 x 15.9 cm)
Weight	8.2 lbs (3.7 kg)
Power Requirements	14.4 VDC rechargeable Li-Ion battery; 90-264 VAC, 50-60 Hz universal switching (Imput voltage)

Logistical Parameters

Transportability	Handheld
Durability	Field deployable. Internal vibration tested.
Operating Conditions	0 to 55°C (32 to 131°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Self cleaning "bake-off" function
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	12V AC adapter, external battery, printer, reusable metal swabs
Data Analysis Support Equipment	PC, software
Communications Interface	USB, RS232
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes
Warranties	1 year
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	ng
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Swabs
Response Time	10 seconds
Customize for New Targets	Manufacturer can add new targets to detector
Portability	8.2 lbs
Ruggedness	Can operate at extreme temps (0-55°C) AND has (in house) vibration testing
Consumables	No consumables or scheduled maintenance necessary.
Training Required	1 day of training required
Maturity	4 - 6 weeks

EN3300 Trace Detector

User Feedback	No Feedback Total PBA Score- 102/122

Ion Mobility Spectrometry

PRODUCT NAME

EN5000 GC-IMS

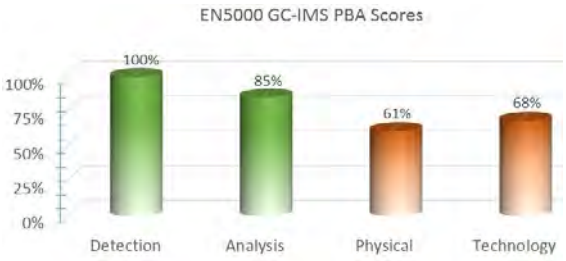
TECHNOLOGY CATEGORY

Spectrometry; Chromatography;

Scintrex Trace Corp. (division of Autoclear)
300 Parkdale Avenue
Ottawa , Ontario K1Y 1G2 Canada

www.scintrextrace.com

Guy Cuiture
+1 613 224 1061 ext 267





Model Number	EN5000
Synopsis	EN5000's GC/IMS dual detection identifies specific explosives or narcotics traces. Detects military grade explosives, Semtex, C4, RDX and TNT, and most homemade explosives such as TATP. Available option detects cocaine, opiates, cannabis, and amphetamine-type stimulants.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry; Gas Chromatography;
Detection Principle	Spectrometry; Chromatography;
Application	Laboratory Analysis; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2008
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Detects military grade explosives, PETN, NG, dynamite, Semtex, C4, RDX and TNT, and most homemade explosives such as TATP, other nitrogen and peroxide based explosive compounds
Tested For Narcotics	Cocaine, THC, heroin, opiates, cannabis, methamphetamines, amphetamine-type stimulants, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Vapor/Gas

EN5000 GC-IMS

Sensitivity Detection Limits	Explosives: pg; Narcotics: ng
Start-Up Time From Cold Start To Sample Ready	30 minutes
Response Time Sample Application To Output	6 to 40 seconds
Alarm Capability	Audible and visual
Software Control	On-board, PC
Other Operational Parameters	Sampling: Disposable sampling tickets

Physical Parameters

Dimensions	31.9 x 21.0 x 15.0 in. (80.9 x 53.3 x 38.1 cm)
Weight	57.8 lbs (26.2 kg)
Power Requirements	AC/DC 24V; 850264 VAC 47/63 Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Mounted
Durability	Drop sensitive, meant for everyday use in a stationary condition. internal vibration tested.
Operating Conditions	15 to 35°C (59 to 95°F); 0 to 90%RH, non-condensing
Consumables	Disposable sampling tickets, dopant
Solvents Reagents	Not Applicable
Calibration Schedule	Self-calibrates once installed
Suggested Routine Maintenance	Flushing the IMS chamber, self cleaning "bake-off" function, compressor replacement (depending on level of use)
Shelf Life	Indefinite
Unit Cost	$42,000
Expected Operational Life	Indefinite
AvailableAccessories	Trace collection device, Narcotics Detection, Nitrogen Generator for ICAO Taggants, Auto-preconcentrator, CE Marking, Uninterruptible power supply (UPS)
Data Analysis Support Equipment	Touchscreen Interface
Communications Interface	Network connection, hard drive, diskette, printer, RS232
Maintenance Cost	$1,000 to $2,000 per year, depending on application

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background for operation, additional training for maintenance
Training Available	Operator and Maintenance level training
Manuals Available	Operator’s manual
Warranties	1 year parts and labor
ITAR Export Regulations	Contains sealed Exempt radioactive source. No licensing required.
IATA Shipping Restrictions	Contains sealed Exempt radioactive source. No licensing required.

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	ng
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs
Response Time	6 - 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	57.8 lbs
Ruggedness	Has had (in house) vibration testing

EN5000 GC-IMS

Consumables	User can provide basic maintenance. Swabs.
Training Required	1 day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 105/122

Ion Mobility Spectrometry

PRODUCT NAME

H150 and H150E Handheld Trace Detectors

TECHNOLOGY CATEGORY

Spectrometry;

L3 Security & Detection Systems
10E Commerce Way
Woburn, MA 01801

www.sds.l-3com.com

+1 781 939 3800





Model Number	H150, H150E
Synopsis	The H150 and H150E are a handheld trace detectors. The 150E model includes explosives and narcotics. With rapid clear down and other features that minimize system contamination, the units is ready for the next sample within seconds, even after a positive detection. The presence of a threat is indicated by both visible and/or audible alarms, with the substance identification clearly displayed. The H150s design includes patented non-radioactive ion mobility spectrometry technology, so there are no associated certifications, licensing, inspection, testing or decommissioning costs normally associated with systems that contain radioactive materials.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response;Trace Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Wide variety of explosives (military, commercial, HME's)
Tested For Narcotics	Yes
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes via user
Sample Introduction	Liquid;Solid;Vapor/Gas;
False Positive Rates	Low
False Negative Rates	Low

H150 and H150E Handheld Trace Detectors

Start-Up Time From Cold Start To Sample Ready	< 30 minutes
Response Time Sample Application To Output	8 to 30 seconds
Total Run Time	< 30 minutes
Alarm Capability	Audible and visual
Software Control	On-board, PC

Physical Parameters

Dimensions	6 x 18 x 8.5 in (15.1 x 45.7 x 21.6 cm)
Weight	11 lbs (5kg)
Power Requirements	Li-ion battery, (hot swappable), 100-240 V AC, 47-63Hz 2A

Logistical Parameters

Transportability	Handheld
Operating Conditions	-10 to 55°C (14 to 131°F) < 95% RH,
Consumables	Molecular sieve drying agent, sample traps
Solvents Reagents	Not Applicable
Calibration Schedule	Fully automated internal calibration
Suggested Routine Maintenance	cleaning and desiccant replacement as required
Shelf Life	Indefinite
Unit Cost	$25,900
Expected Operational Life	10 years
AvailableAccessories	Sample wand, spare batteries, battery charger, printing kit
Data Analysis Support Equipment	4.3in high-resolution touch display, keyboard, monitor, sample wand
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, $5,000
Manuals Available	Yes
Warranties	L3 does not offer extended warranty, the following warranty is from Security Detection. 1-Year Extended Warranty (parts & labor) $2,650 2-Year Extended Warranty (parts & labor) $4584 3-Year Extended Warranty (parts & labor) $6,610
Approved Vendors	Security Detection

PBA Detection

Targets Detected Score	Heroin
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	Trace
Selectivity	Identifies specific targets in simple mixtures
Sample Preparation	Have to apply sample to swab end
Response Time	31 minutes
Customize for New Targets	Cannot detect or add new targets
Portability	11 lbs.
Ruggedness	No ruggedness testing/claims
Consumables	Swabs
Training Required	1 day
Maturity	6-8 weeks
User Feedback	No Feedback Total PBA Score- 54/122

Ion Mobility Spectrometry

PRODUCT NAME

HD600 Table Explosive and Narcotics Detector

TECHNOLOGY CATEGORY

Spectrometry;

Shenzhen Anertong Technology Co., Ltd
1522/1603/1633 Dongming Building,
Minzhi Street
Longhua New District, Shenzhen,
China

http://en.szaner.com/;
http://pinpointscanner.com/





Model Number	HD600
Synopsis	HD600 Table Explosive and Narcotics Detector utilizes high resolution ion mobility spectrometry (Photoionization Ion Mobility Spectrometry, PIMS) to identify explosives or drugs. The device will produce images and sound alarm at the same time. The LCD display will show the name of the explosive or drug detected. Similar product, TR20000DB sold by NucTech.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Laboratory Analysis;Screening;Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Military and civil and home-made explosives; such as black powder, ammonium nitrate, TNT, RDX, PETN, nitroglycerin, Octo Kim, DNT, TATP, tetryl, Gina, picric acid and C4, others
Tested For Narcotics	Cocaine, heroin, drug category: marijuana, methamphetamine, ketamine, morphine, ecstasy (MDMA), fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, lorazepam, 3-quinuclidinyl benzilate, U-47700, others
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	ng
False Positive Rates	< 1%

HD600 Table Explosive and Narcotics Detector

False Negative Rates	< 1%
Start-Up Time From Cold Start To Sample Ready	20 minutes
Response Time Sample Application To Output	8 seconds
Alarm Capability	Audible and Visual
Software Control	PC, on-board
Other Operational Parameters	Positive and Negative ion scanning modes; Sample Collection: test paper/wipe sampling.

Physical Parameters

Dimensions	14.6 x 13.9 x 9.5 in (37.1 x 35.2 x 24.1 cm)
Weight	< 15 kg (33 lbs)
Power Requirements	220V/AC 50-60Hz

Logistical Parameters

Transportability	Benchtop/Fixed
Durability	Field deployable
Operating Conditions	0 to 40 °C (32 to 104 °F), < 95% RH
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Auto-calibration
Suggested Routine Maintenance	Self-cleaning function, minimal
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Printer
Data Analysis Support Equipment	10 in touchscreen interface
Communications Interface	USB, bluetooth
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Warranties	Yes

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	ng
Selectivity	Identifies specific targets in complex mixtures
Sample Preparation	Swabs
Response Time	12 seconds
Customize for New Targets	User can add new targets to detector
Portability	33.1 lbs
Ruggedness	Can operate in extreme temps (-10-55°C)
Consumables	Minimal maintenance and consumables (swabs)
Training Required	1 day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 102/122

Ion Mobility Spectrometry

PRODUCT NAME

Ionscan 500DT

TECHNOLOGY CATEGORY

Spectrometry;

Smiths Detection, Inc.
2202 Lakeside Boulevard
Edgewood, MD 21040

www.smithsdetection.com

Warren Mino
+1 203 417 8693
warren.mino@smiths-detection.com





Model Number	Ionscan 500DT
Synopsis	The IONSCAN 500DT incorporates two IMS detectors in a single unit. The IONSCAN 500DT is capable of detecting and identifying explosives and narcotics in a single analysis.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response; Screening; Trace Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2005
Number Of Units Fielded	1,000 to 10,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Military, commercial and home-made explosives including DNT, EGDN, HMTD, HMX, NG, PETN, RDX, TATP, Tetryl, TNT and others
Tested For Narcotics	Amphetamine, cocaine, heroin, ketamine, MDA, MDEA, MDMA, methamphetamine, PCP, THC, procaine, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, lorazepam, 3-quinuclidinyl benzilate, U-47700 and others
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Multiple libraries; each library is customized to a specific chemical threat (narcotics, explosives, etc.)
Customize For New Targets	Yes

Ionscan 500DT

Sample Introduction	Solid; Vapor/Gas
Sensitivity Detection Limits	pg; ng
False Positive Rates	< 1% for both explosives and narcotics
False Negative Rates	< 1% for explosives and < 1% for narcotics
Start-Up Time From Cold Start To Sample Ready	30 minutes
Response Time Sample Application To Output	8 seconds
Total Run Time	1 minute
Alarm Capability	Audible and Visual
Software Control	Yes
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	16 x 12.5 x 16 in (40 x 31 x 40 cm) with screen down 16 x 22.5 x 16 in (40 x 57 x 40 cm) with screen up
Weight	43 lbs (19 kg)
Power Requirements	110/220 V

Logistical Parameters

Transportability	Benchtop/Fixed
Durability	Not designed for outdoor use or rough handling.
Operating Conditions	0 to 40°C (32 to 104°F); 0 to 90%RH
Consumables	Swabs, verification standards, filters, traps, and O-rings
Calibration Schedule	Automatic internal self-calibration
Suggested Routine Maintenance	Pump and valve replacements. User can perform basic maintenance such as cleaning. Higher level tasks require trained/certified technicians.
Shelf Life	10 years
Unit Cost	$48,867
Expected Operational Life	10 years
AvailableAccessories	Verification Pen, Sampling Swabs, Sampler frame assembly, Sampler assembly, Condenser tubes, Transportation case
Data Analysis Support Equipment	PC
Data File Type Format	CSV
Communications Interface	Ethernet; USB 2.0; COM
Maintenance Cost	~ $2,500 to $3,000 in consumables

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Basic and Advanced training available
Manuals Available	Operator’s manual
Reachback Service	Phone support
Warranties	1 year parts and labor
ITAR Export Regulations	U.S. Nuclear Regulatory Agency regulations due to 63Nickel source.
IATA Shipping Restrictions	U.S. Nuclear Regulatory Agency regulations due to 63Nickel source.

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	1 - 10 ng (narcotics)
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs, Wand

Ionscan 500DT

Response Time	5-8 seconds
Customize for New Targets	User can add new targets to detector
Portability	43 lbs
Ruggedness	No ruggedness testing/claims
Consumables	User can perform basic maintenance. Swabs, verification pen, filters
Training Required	1 - 4 days of training required
Maturity	1-5 units 4 weeks, >5 units 8 weeks
User Feedback	No Feedback Total PBA Score- 102/122

Ion Mobility Spectrometry

PRODUCT NAME

Ionscan 600

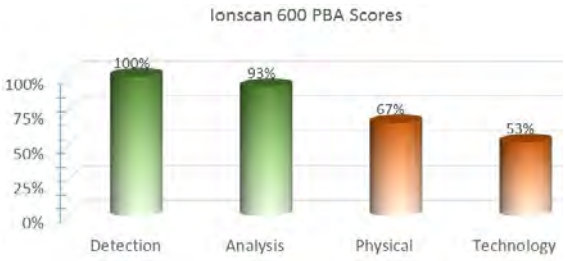
TECHNOLOGY CATEGORY

Spectrometry;

Smiths Detection, Inc.
2202 Lakeside Boulevard
Edgewood, MD 21040 USA

www.smithsdetection.com

+1 410 612 2625





Synopsis	The IONSCAN 600 is a portable desktop system used to detect and identify trace amounts of explosives. It features a proprietary non-radioactive ion mobility spectrometry (IMS) source, which means licensing from national nuclear regulatory agencies is not required. Onboard diagnostics also assist operators with maintenance and offer troubleshooting for error resolution. Sampling is done manually with single-use swabs, or with an optional low-cost, redesigned wand.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response; Screening; Trace Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2015
Number Of Units Fielded	1,000 to 10,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Yes. Military, commercial and HMEs (RDX, TNT, PETN, NG, AN, UN, HMTD, TATP, EGDN, Tetryl, HMX, Sulfur, TNB, DNT and others
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Yes
Sample Introduction	Liquid; Vapor/Gas

Ionscan 600

Sensitivity Detection Limits	pg; ng
Known Interferents Inhibitors	< 1% for explosives
Start-Up Time From Cold Start To Sample Ready	< 10 Minutes
Response Time Sample Application To Output	8 seconds
Total Run Time	Not Specified
Alarm Capability	Audible and visual
Software Control	Computer and detector are an integrated unit; touch screen display

Physical Parameters

Dimensions	14.6 x 11.4 x 12.8in (37.1 x 29.0 x 32.5cm)
Weight	23lbs (10.43kg)
Power Requirements	100-240V AC, 50-60Hz

Logistical Parameters

Transportability	Person-Portable
Durability	Not designed for outdoor use or rough handling.
Operating Conditions	-10 to 50°C (14 to 122°F); 0 to 95%RH
Consumables	Low cost single-use swab, verification pen
Solvents Reagents	Not Applicable
Calibration Schedule	Automatic internal self-calibration
Suggested Routine Maintenance	Air filter clean/replacement
Shelf Life	10 years
Unit Cost	$29,900
Expected Operational Life	10 years of normal operation
AvailableAccessories	Wand, Transportation Case, External Battery Charger
Data Analysis Support Equipment	Detector Controller Software (Included)
Data File Type Format	XML
Communications Interface	Data is downloadable to a computer or laptop
Maintenance Cost	~$1500 in consumables (based on 50,000 samples)

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background
Training Available	Yes
Manuals Available	Operator’s manual
Warranties	1 year parts and labor
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	50 - 1000 ng (narcotics)
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs, Wand
Response Time	8 - 12 seconds
Customize for New Targets	User can add new targets to detector
Portability	23.8 lbs.
Ruggedness	Can operate at extreme temps (-10-50°C)
Consumables	User can perform basic maintenance. Swabs, verification pen, filters
Training Required	1 - 2 1/2 days of training required

Ionscan 600

Maturity	1-5 units 4 weeks, >5 units 6 weeks
User Feedback	No Feedback Total PBA Score- 105/122

Ion Mobility Spectrometry

PRODUCT NAME

MMTD (Multi-Mode Threat Detector)

TECHNOLOGY CATEGORY

Spectrometry;

Smiths Detection, Inc.
2202 Lakeside Boulevard
Edgewood, MD 21040

www.smithsdetection.com

Warren Mino
+1 203-417-8693
warren.mino@smiths-detection.com





Synopsis	The Multi-Mode Threat Detector (MMTD) is a ruggedized, portable hand-held system for detection and identification of over 40 of chemical warfare agents, explosives, narcotics, and TIC/TIM threat substances in approximately 15 seconds. Two sample introduction modes are available: Vapor Mode for real-time monitoring of vapors, and Particle Mode for detection of condensed phase substances on swabs. The MMTD identifies chemicals by comparing the analysis results (called a plasmagram) versus an on-board library of reference plasmagrams of target chemicals.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response; Gas Analysis; Screening; Trace Analysis; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: >90 days for delivery
Readiness Level	9
Market Entry Date	2009
User Feedback Sources	MRIGlobal hands-on experience, DoD
Number Of Units Fielded	1,000 to 10,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	GA, GB, GD, GF, VX, RVX
Tested for ITF25TICTIMs	Phosgene, chlorine, HCN, SO2, NH3, and others
Tested For Explosives	RDX, PETN, TNT, TATP, NG, H2O2, EGDN and others
Tested For Narcotics	Cocaine, heroin, methamphetamines, THC, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700 and others
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

MMTD (Multi-Mode Threat Detector)

Library Size	Multiple libraries; each library is customized to a specific chemical threat (narcotics, explosives, CWA, etc.)
Customize For New Targets	Yes. Customization should be performed by a trained technician using reference standards of the target chemical.
Sample Introduction	Vapor/Gas; Solid
Sensitivity Detection Limits	2 to 750ng (explosives/narcotics swab); 2 to 1,000ng (explosives swab); 3 to 30ng (narcotics swab); 0.25-100ppm (narcotics/vapor)
False Positive Rates	< 1 %
False Negative Rates	< 1 %
Start-Up Time From Cold Start To Sample Ready	< 10 minutes
Response Time Sample Application To Output	< 10 minutes
Total Run Time	Continuous
Alarm Capability	Audible and visual
Software Control	On-board software, can also be operated via laptop using provided IonScan software package
Other Operational Parameters	Capable of operating in particle mode and vapor mode for explosives and narcotics. Can be configured in different modes: single mode (explosives), dual mode (explosives/narcotics), tri mode (explosives, narcotics, CWAs/TICs) Able to be remotely operated.

Physical Parameters

Dimensions	19 x 8.5 x 8 in (48.3 x 21.6 x 20.3 cm)
Weight	12.3 lbs (5.6 kg) including battery
Power Requirements	90-246 VAC, 1.6 A, 47-63 Hz Lithium battery (5-hour operation with two 2.5 hour batteries provided)

Logistical Parameters

Transportability	Person-Portable
Durability	IP54 (protection against dust, splashed water) Vapor sampling: IP53 (protection against dust, sprayed water)
Operating Conditions	–7 to 55°C (20 to 131°F), 0 to 95% RH, non-condensing
Consumables	Verification standards, Air Purification Cartridge (APC), membrane and associated gaskets, sampling swabs
Solvents Reagents	Not Applicable
Calibration Schedule	Self calibrating; operational status is confirmed via analysis of verification standard (provided)
Suggested Routine Maintenance	Replace Air Purifier Cartridge, replace membrane (annually). APC useful lifetime (2 weeks), with humid environments requiring more frequent APC replacement. System easily overloads when exposed to high analyte concentrations and may need cleaning and bake out to restore to operational ready condition.User can perform basic maintenance.
Shelf Life	Indefinite, with routine maintenance
Unit Cost	$37,000
Expected Operational Life	Indefinite
AvailableAccessories	Toolkit, batteries, AC Adaptor, USB cable, storage/shipping case
Data Analysis Support Equipment	Detector Controller software package (supplied) allows users to view plasmagrams and edit instrument parameters
Data File Type Format	Proprietary datafile format viewable with Detector Controller software (supplied)
Communications Interface	Wi-Fi, ethernet, USB, SD card
Maintenance Cost	$2,000 to $3,000 per year

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes

MMTD (Multi-Mode Threat Detector)

Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year; extended warranties are available.
IATA Shipping Restrictions	Sealed 63Ni 15 mCi source; exempt from NRC requirements.

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	3-30ng (narcotics swab); 0.25-100ppm (narcotics/vapor)
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs, vapor detection for narcotics
Response Time	< 10 seconds
Customize for New Targets	User can add new targets to detector
Portability	12.3 lbs
Ruggedness	Can operate at extreme temps (-7-55°C) AND has shock/vibration testing (MIL-STD-810G)
Consumables	User can provide basic maintenance. Swabs, verification standards, air purification cartridges, membranes, other consumables
Training Required	1 - 4 days of training required
Maturity	1-5 units 12 weeks, >5 units 16 weeks
User Feedback	MRIGlobal tested Total PBA Score- 108/122

Ion Mobility Spectrometry

PRODUCT NAME

N2200 Trace Detector



TECHNOLOGY CATEGORY

Spectrometry;

Scintrex Trace Corp. (division of Autoclear)
2 Gardner Road
Fairfield, NJ 07004

www.autoclear.com

Dao Hinh Nguyen, Ph.D.
+1 613 224 1061 ext. 230



Synopsis	The N2200 narcotics trace detector pinpoints minute traces of cocaine, opiates, cannabis, hashish, methamphetamine, and other amphetamine-type stimulants.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Trace Analysis;Screening;Forensics;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2005
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	TNT, RDX, NG, AN, PETN, EGDN, HMX and UN
Tested For Narcotics	Cocaine, opiates, THC, heroin, amphetamine-type stimulants, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Sample Introduction	Vapor/Gas;
Sensitivity Detection Limits	ng
Start-Up Time From Cold Start To Sample Ready	20 minutes

N2200 Trace Detector

Response Time Sample Application To Output	< 40 seconds
Total Run Time	Seconds
Alarm Capability	Audible and visual
Software Control	On-board, PC
Other Operational Parameters	Surface ionization detection, 1,000 retrievable data records

Physical Parameters

Dimensions	17.0 x 4.8 x 6.3 in (43.2 x 12.1 x 15.9 cm)
Weight	11.5 lbs (5.2 kg)
Power Requirements	12 VDC rechargeable battery; 12 VAC adapter; 90 to 264 VAC, 50 to 60 Hz universal switching (Imput voltage)

Logistical Parameters

Transportability	Handheld
Durability	Rugged. In house vibration tested.
Operating Conditions	0 to 55°C (32 to 131°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Self cleaning "bake-off" function
Suggested Routine Maintenance	Not Applicable
Shelf Life	5 years
Expected Operational Life	> 7 years
AvailableAccessories	External battery, printer, reusable metal swabs
Data Analysis Support Equipment	PC, software
Communications Interface	RS-232 serial output
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Warranties	1 year
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	ng
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs
Response Time	< 40 seconds
Customize for New Targets	Manufacturer can add new targets to detector
Portability	11.5 lbs
Ruggedness	Can operate at extreme temps (0-55°C) AND has (in house) vibration testing
Consumables	No consumables or scheduled maintenance necessary.
Training Required	1 day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 104/122

Ion Mobility Spectrometry

PRODUCT NAME

RoadRunner

TECHNOLOGY CATEGORY

Spectrometry;



Bruker Corporation
40 Manning Road
Billerica, MA 01821

www.bruker.com

Frank Thibodeau
+1 978 663 3660
frank.thibodeau@brukerdetection.us



Synopsis	RoadRunner is a handheld, battery operated device for the detection of explosives and narcotics. It is a dual-mode detector capable to accept vapor samples and swab samples as well, which increases flexibility.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response; Detection;
Type	Instrument
Availability	Commercially Available: 60 to 90 days for delivery
Readiness Level	9
Market Entry Date	2017
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	No
Tested for ITF25TICTIMs	No
Tested For Explosives	Pentaerythritol tetranitrate (PETN), Cyclotrimethylenetrinitramine / Hexogen (RDX), Trinitrotoluene (TNT), Ammonium Nitrate (NIT), Urea Nitrate (NIT), Triacetone triperoxide (TATP), Hexamethylene triperoxide diamine (HMTD), Nitroglycerine (NG), 2,4,6-Trinitrophenylmethylnitramine / Tetryl (TET), 2,3-dimethyl-2,3-dinitrobutane (DMNB), Black powder (BP), Ethylene glycol dinitrate (EGDN), 2,4-Dinitrotoluene (DNT)
Tested For Narcotics	Cocaine (COC), Methamphetamine (METH), 3,6-Diacetylmorphine (Heroin) (HER), ?9-Tetrahydrocannabinol (THC), 3,4-Methylenedioxyamphetamine (MDA), 3,4-Methylenedioxy-N-methylamphetamine (MDMA), Lysergic acid diethylamide (LSD), fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified

RoadRunner

Customize For New Targets	Yes via manufacturer
Sample Introduction	Vapor/Gas; Solid
Sensitivity Detection Limits	Trace
Known Interferents Inhibitors	Not Specified
Start-Up Time From Cold Start To Sample Ready	< 30 minutes
Response Time Sample Application To Output	10 seconds to 1 minute
Total Run Time	< 2 minutes
Alarm Capability	Audible and visual
Software Control	Yes
Other Operational Parameters	Not Specified

Physical Parameters

Dimensions	13 x 13 x 5 in (330 x 340 x 130 mm)
Weight	7.7 lbs (3.5 kg), including battery
Power Requirements	Li-Ion rechargeable, hot-swappable; 19V DC (±10%) 90W max (4 hours)

Logistical Parameters

Transportability	Handheld
Durability	Rugged; drop sensitive, Etac certification, IP42
Operating Conditions	0 to 40°C (32 to 104°F), < 90% RH, noncondensing
Consumables	Sampling strips, confidence sample, Dust filter, dust filter intake, calibrant
Solvents Reagents	Not Applicable
Calibration Schedule	Automatic continuous self-calibration
Suggested Routine Maintenance	Self-cleans
Shelf Life	10 years
Unit Cost	$30,000
Expected Operational Life	Indefinite
AvailableAccessories	Bruker service contracts; Off-line data analysis packages; Sampling wand; Telescopic extension to sampling wand; Nitrile gloves (pack of 100)
Data Analysis Support Equipment	PC; Bruker acclaimed “Traffic Light” software
Communications Interface	10/100 Base-T, RJ45; USB 2.0, Type A.
Maintenance Cost	< $1,000 per year

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, 1 day at manufacturer facility
Manuals Available	Operator's Manual, Maintenance manual
Warranties	Yes

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	trace amounts
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs
Response Time	< 30 seconds
Customize for New Targets	Manufacturer can add new targets to detector
Portability	7.7 lbs
Ruggedness	No ruggedness testing/claims

RoadRunner

Consumables	Detector cleans itself. Sampling strips, dust filter, calibrant (approx. < $1000/year)
Training Required	1 day at manufacturer facility
Maturity	60 days
User Feedback	MRIGlobal tested Total PBA Score- 104/122

Ion Mobility Spectrometry

PRODUCT NAME

Sabre 5000



TECHNOLOGY CATEGORY

Spectrometry;

Smiths Detection, Inc.
2202 Lakeside Boulevard
Edgewood, MD 21040

www.smithsdetection.com

Warren Mino
+1 203-417-8693
warren.mino@smiths-detection.com



Synopsis	The Sabre 5000 is an ion mobility spectrometer programmed to detect and identify over 40 chemical warfare agents, explosives, narcotics, and TIC/TIM threat substances in approximately 15 seconds. Two sample introduction modes are available: Vapor Mode for real-time monitoring of vapors, and Particle Mode for detection of condensed phase substances on swabs. The vendor claims a cold start time of 10 minutes. The unit weighs approximately 7 lbs, including the 4-hr lithium battery, and is outfitted with a 3.5 in. color TFT display.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response; Gas Analysis; Screening; Trace Analysis; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2009
User Feedback Sources	MRIGlobal Experience, DoD
Number Of Units Fielded	1,000 to 10,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	GA, GB, GD, GF, VX, RVX
Tested for ITF25TICTIMs	Hydrogen cyanide (HCN), phosgene
Tested For Explosives	PETN, TNT, nitroglycerin, RDX, Semtex, TATP, nitroglycerin (NG), ammonium nitrate, hydrogen peroxide, and others
Tested For Narcotics	Cocaine, Heroin, THC, Methamphetamine, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700 and others
Other Chemical Targets	Sulfur dioxide, ammonia, and others
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

Sabre 5000

Library Size	Multiple libraries; each library is specific to a threat category (narcotics, explosives, CWA, etc.)
Customize For New Targets	Yes
Sample Introduction	Vapor/Gas; Solid
Sensitivity Detection Limits	2 to 100ng (explosives); 25 to 500ppb (ASV-explosives); 1 to 50 ng (narcotics); 0.003 to 0.1 mg/m3 (CWAs); 0.1 to 30ppm (TICs)
Known Interferents Inhibitors	Testing at ECBC with the Sabre 2000 showed that the unit is susceptible to false positives in the presence of several tested interferents, including AFFF, bleach, fuels, cleaning products, and smokes. See the ECBC Report (August 2001) for details. The Sabre is also susceptible to overloading by high concentrations of target chemicals or interferents and must be baked out for 1 to 8 hr, depending on the degree of contamination, before it can be returned to service.
Start-Up Time From Cold Start To Sample Ready	< 15 minutes
Response Time Sample Application To Output	15 to 30 seconds, depending on operating mode
Total Run Time	Seconds to minutes. Recovery time following analysis is dependent on the volatility of the analyzed substance and the amount of substance introduced into the sample path.
Alarm Capability	Audible and visual
Software Control	User can select either on-board (stand-alone) or laptop control
Other Operational Parameters	Capable of operating in particle mode and vapor mode for explosives and narcotics. Can be configured in different modes: positive (narcotics), negative (explosives), dual mode (ASV-explosives, explosives and narcotics), tri mode (ASV-explosives, explosives, narcotics, CWAs/TICs)

Physical Parameters

Dimensions	14.5 x 4 x 4.5 in (36.3 x 11 x 13 cm)
Weight	7 lbs (3.2 kg)
Power Requirements	Lithium battery, 120/240 V AC power supply. (4 hours)

Logistical Parameters

Transportability	Handheld
Durability	Rugged
Operating Conditions	0 to 40ºC (32 to 104°F), 0 to 95% RH, non-condensing
Consumables	Air purification cartridges, membrane assembly, Teflon gaskets, vapor sealing gasket, sampling swabs, verification standards.
Solvents Reagents	Not Applicable
Calibration Schedule	Self-diagnostics with maintenance
Suggested Routine Maintenance	Replace Air Purifier Cartridge, replace membrane (annually). APC useful lifetime (2 weeks) dependent on ambient environment, with humid environments requiring more frequent APC replacement. System easily overloads when exposed to high analyte concentrations and may need cleaning and bake out to restore to operational ready condition. User can perform basic maintenance.
Shelf Life	Indefinite
Unit Cost	$25,000
Expected Operational Life	Indefinite
AvailableAccessories	Swabs tri-mode, CW-vapor and NG-vapor standard verification, protective cover with shoulder strap, extra 2 hour battery
Data Analysis Support Equipment	Detector Controller software package (supplied) allows users to view plasmagrams and edit instrument parameters
Data File Type Format	Proprietary datafile format, readable by Detector Controller software package (supplied)
Communications Interface	USB
Maintenance Cost	$2,000 to $3,000 annually

Training, Shipping, And Other Information

Sabre 5000

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Operator’s manual
Reachback Service	Not Specified
Warranties	Full service warranties are available
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	U.S. Nuclear Regulatory Agency regulations due to 63Nickel source. Requires twice-yearly source leak test; must be registered with NRC. 4-hr lithium ion battery exceeds DOT regulation for transport on passenger aircraft.

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	1 - 50 ng (narcotics)
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs, vapor detection for narcotics
Response Time	15 - 30 seconds depending on operating mode
Customize for New Targets	User can add new targets to detector
Portability	7 lbs
Ruggedness	No ruggedness testing/claims
Consumables	User can provide basic maintenance. Swabs, verification standards, air purification cartridges, membranes, other consumables
Training Required	1 - 4 days of training required
Maturity	1-5 units 4 weeks, >5 units 8 weeks
User Feedback	MRIGlobal tested Total PBA Score- 106/122

Ion Mobility Spectrometry

PRODUCT NAME

SPE7000 Portable Explosives Trace Detector

TECHNOLOGY CATEGORY

Spectrometry;

Security Electronic Equipment Co.,Ltd.
1-3#F,Building A, QiFeng Digital Technology Park, NO.26 BaiLi Road,
Xia Li Lang Community
Nan Wan Street, Buji Town,
Longgang District
Shenzhen, 518049





Model Number	SPE7000
Synopsis	SPE7000 is a portable explosives drug detector uses ion mobility spectrometry (IMS) to detect and determine the types of trace explosives and drugs. It has a user-expandable library; giving the user the ability to add new compounds when desired.
Category	Chemical; Explosives
Detection Method	Ion Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested For Explosives	A variety of military , civilian , and homemade explosives: Black powder, AN, TNT, PETN, RDX, nitroglycerin , Aktobe today, Te Quer, dinitrotoluene (DNT), C4, Semtex
Tested For Narcotics	Cocaine hydrochloride, Heroin hydrochloride, Tetrahydrocannabinol, Methamphetamine, Ketamine hydrochloride (K powder), Morphine hydrochloride
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes via user
Sample Introduction	Solid;Vapor/Gas;Liquid;
Sensitivity Detection Limits	ng
False Positive Rates	< 1%
False Negative Rates	< 1%

SPE7000 Portable Explosives Trace Detector

Start-Up Time From Cold Start To Sample Ready	10 minutes
Response Time Sample Application To Output	< 5 seconds
Total Run Time	10 minutes
Alarm Capability	Audible and visual
Software Control	On-board
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	10.63 x 12.60 x 3.07 in (27 x 32 x 7.8 cm)
Weight	6.6 lbs (3 kg)
Power Requirements	Lithium ion battery(12 hours), 220V AC, 50-60Hz

Logistical Parameters

Transportability	Person-Portable
Durability	Rugged
Operating Conditions	-10 to 55°C (14 to 131°F), < 99% RH.
Consumables	Dipstick (can be reused), test strips
Solvents Reagents	Not Applicable
Calibration Schedule	Fully automated internal calibration
Shelf Life	Indefinite
Unit Cost	$12,600
Expected Operational Life	10 years
AvailableAccessories	Wireless keyboard
Data Analysis Support Equipment	Printer, 3 in color display
Communications Interface	USB, Bluetooth

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Yes
Warranties	1 year
Approved Vendors	Guard Spirit, SECUPLUS

PBA Detection

Targets Detected Score	Heroin, Ketamine
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	Trace
Selectivity	Identifies specific targets in simple mixtures
Sample Preparation	Have to apply sample to swab end
Response Time	10 minutes
Customize for New Targets	User can add new targets to detector
Portability	6.6 lbs.
Ruggedness	No ruggedness testing/claims
Consumables	Swabs
Training Required	1 day
Maturity	6-8 weeks
User Feedback	No Feedback Total PBA Score- 65/122

Ion Trap Mass Spectrometry

PRODUCT NAME

Continuity™

TECHNOLOGY CATEGORY

Spectrometry;

Bay Spec
1101 McKay Drive
San Jose, CA 95131

www.bayspec.com

Jeff MacCubbin
+1 505 294 5654
jmaccubbin@bayspec.com





Synopsis	The Continuity has ability to perform MS/MS using dual linear ion traps. It uses a continuous heated gas operation and has TD and SPME sampling options. Detector options include ESI, Plasma discharge (PD) and APCI.
Category	Chemical; Explosives
Detection Method	Ion Trap Mass Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response;Screening;Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2017
User Feedback Sources	DOD
Number Of Units Fielded	< 10
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Compatible with NIST EI Library or user defined library
Customize For New Targets	Yes
Sample Introduction	Vapor/Gas;Liquid;Solid;
Sensitivity Detection Limits	100's ppt
Start-Up Time From Cold Start To Sample Ready	Minutes

Continuity™

Response Time Sample Application To Output	< 1 second
Total Run Time	Minutes
Alarm Capability	Not Applicable
Software Control	On-board, Remote
Other Operational Parameters	Mass range: 110 to 950 m/z (adjustable) Mass Resolution: 0.5 to 1 amu Positive and negative ion detection modes. Thermal Desorption and SPME sampling capabilities.

Physical Parameters

Dimensions	13 x 13 x 17 in (33 x 33 x 43 cm)
Weight	45 lbs (20 kg)
Power Requirements	250 W (Avg) +50 W for TD- ESI; 12 to 36 DCV
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	Rugged; shock and vibration tested
Operating Conditions	5 to 45°C (41 to 113°F)
Consumables	TD swabs
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Source cleaning as needed
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	TD and SPME sampling
Data Analysis Support Equipment	10” Windows® 10 Microsoft Surface (Touchscreen), Remote Control via WiFi
Data File Type Format	mzML , CSV
Communications Interface	Wi-Fi, USB 2.0
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Technical background
Training Available	Yes; 1/2 day video or telephone conferencing;
Manuals Available	Yes
Warranties	1 year parts and labor

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	100's ppt
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Air sampling and Thermal Desorption swabs
Response Time	1 second
Customize for New Targets	User can add new targets to detector
Portability	44 lbs
Ruggedness	Can operate at extreme temps (5-45°C) AND has shock/vibration testing
Consumables	Manufacturer maintenance necessary
Training Required	1/2 day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 101/122

Ion Trap Mass Spectrometry

PRODUCT NAME

Griffin™ G410

TECHNOLOGY CATEGORY

Spectrometry; Chromatography;

FLIR Systems, Inc.
3000 Kent Avenue
West Lafayette, IN 47906

www.flir.com/griffin410

Philip Tackett
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philip.tackett@flir.com





Synopsis	The FLIR Griffin 400-series GC/MS products provide chemical identification and is equipped with a rugged, internal shock isolation system that is tested to MIL-STD-810G standards. They are built to operate in mobile labs, reconnaissance vehicles, deployable lab containers, and other portable platforms. Interchangeable sampling tools differentiate each GC/MS model. The Griffin G410 model, contains an integrated standard injection port. It accepts sample introduction tools like the PSI-Probe™, syringe, SPME fiber, headspace, and autosampler injections.
Category	Chemical; Explosives
Detection Method	Ion Trap Mass Spectrometry; Gas Chromatography;
Detection Principle	Spectrometry; Chromatography;
Application	Laboratory Analysis; Bulk Analysis; Screening; Forensics;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2015
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Includes volatile and semi-volatile organic compounds; Can detect chemicals with a mass range from 35 to 425 m/z
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	GriffinLib (500 spectra), NIST EPA (10,000 spectra), NIST (240,000 spectra)

Griffin™ G410

Customize For New Targets	Yes
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	ppb; ppm; liquid injection
Start-Up Time From Cold Start To Sample Ready	30 minutes
Response Time Sample Application To Output	3 to 15 minutes
Total Run Time	30 to 45 minutes
Alarm Capability	Visual alarms
Software Control	On-board, PC
Other Operational Parameters	GC programmable 40 to 300 °C; Mass Range & Scan Rate: 35-425 m/z; up to 10,000 m/z per second @ 20 points per m/z

Physical Parameters

Dimensions	19.7 x 20.3 x 17.8 in (50.0 x 51.6 x 45.2 cm)
Weight	80.5 lbs (36.5 kg)
Power Requirements	100 to 240 VAC; 24 VDC (+/- 5%, 25 A, 600 W)

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	MIL-STD-810G, Method 514.6, Table 514.6C0VI category 4. Operates while in moving vehicle. The analytical components of the Griffin 410 are mounted with wire rope isolators, providing resistance to shock and vibration. This shock mounting system is completely self-contained within the instrument. No external shock table or vacuum system required.
Operating Conditions	5 to 40 °C (41 to 104 °F); < 85% RH
Consumables	GC carrier gas; Connection for external gas source (choice of He or H2); available from many vendors; H2 generator available
Solvents Reagents	Solvents needed for sample preparation
Calibration Schedule	Automated mass calibration; no user interaction required
Suggested Routine Maintenance	GC inlet (as needed), Filament (twice per year), Refill calibrant (annually)
Shelf Life	10 years
Unit Cost	$95,000
Expected Operational Life	10+ years
AvailableAccessories	Carrier Gas Accessories: Hydrogen Generator Kit, SPME Kit, Manual Headspace Sampler, Autosampler, PSI-Probe™ Kit with TAG™ and GERSTEL-Twister®, Optional Vehicle Mount Kit, Optional rugged Harding transport case with handle and wheels
Data Analysis Support Equipment	PC, software
Data File Type Format	Proprietary software data file format, exportable to 3rd party software
Communications Interface	Ethernet connection TCP/IP; remote operation and diagnostics
Maintenance Cost	< $1,000 per year

Training, Shipping, And Other Information

Operator Skills Required	Non-technical for system operation, Technical for data analysis
Training Available	1 to 2 days
Manuals Available	Yes
Reachback Service	Yes
Warranties	Extended warranties up to 5 years
ITAR Export Regulations	US Department of Commerce (DOC), Export Administration Regulations (EAR). U.S. Government authorization may be required for export.
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700

Griffin™ G410

Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	ppm; ppb;
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Thermal Desorption swabs
Response Time	4 - 15 minutes for most chemicals
Customize for New Targets	User can add new targets to detector
Portability	80.5 lbs
Ruggedness	Has shock/vibration testing. (mil-spec) (5-40°C)
Consumables	Minor consumables (carrier gas, <$1000/year) and user provided maintenance
Training Required	1 - 2 days depending on level of training desired
Maturity	8 weeks
User Feedback	No Feedback Total PBA Score- 92/122

Ion Trap Mass Spectrometry

PRODUCT NAME

Griffin™ G460

TECHNOLOGY CATEGORY

Spectrometry; Chromatography;

FLIR Systems, Inc.
3000 Kent Avenue
West Lafayette, IN 47906

www.flir.com/griffin460

Philip Tackett
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philip.tackett@flir.com





Synopsis	The FLIR Griffin 400-series GC/MS products provide lab-quality chemical identification and is equipped with a rugged, internal shock isolation system that is tested to MIL-STD-810G standards. They are built to operate in mobile labs, reconnaissance vehicles, deployable lab containers, and other portable platforms. Interchangeable sampling tools differentiate each GC/MS model. Every Griffin 400-series GC/MS contains an industry standard injector port. The Griffin G460 model includes an additional integrated universal sampling port, providing direct air sampling capability, while also accepting plug-and-play samplers like the Griffin X-Sorber and Purge and Trap. Griffin GC/MS systems detect and identify explosives, drugs, CWAs, TICs, environmental pollutants, and other chemicals.
Category	Chemical; Explosives
Detection Method	Ion Trap Mass Spectrometry; Gas Chromatography;
Detection Principle	Spectrometry; Chromatography;
Application	Laboratory Analysis; Bulk Analysis; Screening; Forensics;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2011
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Includes volatile and semi-volatile organic compounds; Can detect chemicals with a mass range from 35 to 425 m/z
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

Griffin™ G460

Library Size	GriffinLib (500 spectra), NIST EPA (10,000 spectra), NIST (240,000 spectra)
Customize For New Targets	Yes
Sample Introduction	Liquid; Solid; Vapor/Gas
Sensitivity Detection Limits	Liquid injection; ppm; ppb; Vapor; ppt; ppm; ppb
Start-Up Time From Cold Start To Sample Ready	< 30 minutes
Response Time Sample Application To Output	3 to 15 minutes
Total Run Time	30 to 45 minutes
Alarm Capability	Visual
Software Control	On-board, PC
Other Operational Parameters	Direct air intake for near real-time air monitoring capability; GC programmable 40 to 300 °C; Mass Range & Scan Rate: 35-425 m/z; up to 10,000 m/z per second @ 20 points per m/z

Physical Parameters

Dimensions	19.2 x 19.2 x 21.1 in (48 x 48 x 53.6 cm)
Weight	98 lbs (44.5 kg)
Power Requirements	100 to 240 VAC; 24 VDC (+/- 5%, 25 A, 600 W)

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	Rugged, shock and vibration resistant, vehicle use. MIL-STD-810G, Method 514.6, Table 514.6C0VI category 4 testing.
Operating Conditions	5 to 40 °C (41 to 104 °F); < 85% RH
Consumables	GC carrier gas; Connection for external gas source (choice of He or H2); available from many vendors; H2 generator available
Solvents Reagents	Carrier gas
Calibration Schedule	Automated mass calibration; no user interaction required
Suggested Routine Maintenance	Change sorbent tubes (annually), GC inlet (as needed), Filament Replacement (bi-annually), Refill calibrant (annually)
Shelf Life	10 years
Unit Cost	$125,000
Expected Operational Life	10+ years
AvailableAccessories	Carrier Gas Accessories: Hydrogen Generator Kit, Griffin X-Sorber, Griffin Purge & Trap, SPME Kit, Manual Headspace Sampler, Autosampler, PSI-Probe™ Kit with TAG™ and GERSTEL-Twister® Optional Vehicle Mount Kit Optional Harding transport case
Data Analysis Support Equipment	PC, Software
Data File Type Format	Proprietary software data file format, exportable to 3rd party software
Communications Interface	Ethernet connection TCP/IP; remote operation and diagnostics
Maintenance Cost	< $1,000 per year

Training, Shipping, And Other Information

Operator Skills Required	Non-technical for system operation, Technical background for data analysis
Training Available	1 to 2 days
Manuals Available	Yes
Reachback Service	Yes
Warranties	Extended warranties up to 5 years
ITAR Export Regulations	These products are controlled for export under US Department of Commerce (DOC), Export Administration Regulations (EAR). U.S. Government authorization may be required for export.

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700

Griffin™ G460

Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	ppm; ppb;
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Thermal Desorption swabs
Response Time	4 - 15 minutes for most chemicals
Customize for New Targets	User can add new targets to detector
Portability	98 lbs
Ruggedness	Has shock/vibration testing. (5-40°C)
Consumables	Minor consumables (carrier gas, <$1000/year) and user provided maintenance
Training Required	1 - 2 days depending on level of training desired
Maturity	8 weeks
User Feedback	No Feedback Total PBA Score- 92/122

Ion Trap Mass Spectrometry

PRODUCT NAME

Griffin™ G465

TECHNOLOGY CATEGORY

Spectrometry;Chromatography;

FLIR Systems, Inc.
27700 SW Parkway Ave
Wilsonville, OR 97070

www.flir.com/g465

Philip Tackett
1 877 692 2120
detection@flir.com





Model Number	Multiple Based on Selected Options - Contact FLIR POC For Details
Synopsis	The FLIR Griffin G465 is the most flexible transportable GC/MS (Gas Chromatograph/Mass Spectrometer) system available for mobile and forward deployed labs, reconnaissance vehicles, and other portable platforms. Like the Griffin G460, the G465 features an integrated split/splitless injector and universal sampling port. The addition of a heated sampling line enables survey mode for near real-time vapor threat identification. Industry-leading chemical matching techniques provide high-confidence results in complex environments and eliminate data interpretation in the field. Intuitive user controls, on-screen guidance, and simple data presentation expedite decision making for field operators. The Griffin G465 provides the ease of use and intelligence needed to perform real-time countermeasures that protect public safety.
Category	Chemical; Explosives
Detection Method	Ion Trap Mass Spectrometry;Gas Chromatography;
Detection Principle	Spectrometry;Chromatography;
Application	Bulk Analysis;Forensics;Laboratory Analysis;Screening;
Type	Instrument
Availability	Commercially Available: 60 to 90 days for delivery
Readiness Level	9
Market Entry Date	2016
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Volatile and semi-volatile organic compounds
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable

Griffin™ G465

Radiological Targets	Not Applicable
Library Size	GriffinLib (500 spectra), NIST EPA (10,000 spectra), NIST (240,000 spectra)
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;Vapor/Gas;
Sensitivity Detection Limits	For liquid injection: parts per billion (ppb) to parts per million (ppm). For vapor samples: parts per trillion (ppt) - parts per million (ppm)
Start-Up Time From Cold Start To Sample Ready	30 to 45 minutes
Response Time Sample Application To Output	4 to 15 minutes
Total Run Time	Seconds to minutes
Alarm Capability	Visual
Software Control	On-board, PC, remote
Other Operational Parameters	Direct air intake for near real-time air monitoring capability; GC programmable 40 to 300 °C; Mass Range & Scan Rate: 35 to 425 m/z; up to 10,000 m/z per second @ 20 points per m/z

Physical Parameters

Dimensions	19.2 x 19.2 x 21.1 in (48.8 x 48.8 x 53.6 cm)
Weight	99.5 lbs (45.0 kg)
Power Requirements	100 to 240 VAC; 24 VDC (+/- 5%, 25 A, 1000 W)

Logistical Parameters

Transportability	Mounted
Durability	Rugged, shock and vibration resistant, vehicle use
Operating Conditions	41 to 104°F (5 to 40°C); <85% relative humidity
Consumables	GC carrier gas
Solvents Reagents	Carrier Gas (H2 or He), H2 Generator available, Onboard FC-43 (Perfluorotributylamine) calibrant
Calibration Schedule	Automated mass calibration; no user interaction required
Suggested Routine Maintenance	Change sorbent tubes (annually), Injector/Guard Column Maintenance (as needed), Filament Replacement (twice per year), Refill calibrant (annually).
Shelf Life	10+ years
Expected Operational Life	10+ years
AvailableAccessories	Optional: Vehicle mount kit, Hardigg transport case, SPME fiber, Manual headspace sampler, Autosampler, PSI-Probe™ thermal separation via TAG™, PSI-Probe thermal separation via GERSTEL-Twister®, Universal Sampling Port with standard Tenax TA and Carboxen 1017 dual bed preconcentration tubes accepts, Direct air intake onto precon tubes (adaptor included), Griffin Purge and Trap for water analysis, Griffin X-Sorber handheld vapor sampler.
Data Analysis Support Equipment	PC, software
Data File Type Format	Proprietary software data file format, exportable to 3rd party software.
Communications Interface	Ethernet connection TCP/IP; remote operation and diagnostics
Maintenance Cost	< $1,000 per year

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background for system operation after training certification. Technical background for data analysis if using developer level interface.
Training Available	1 to 2 days depending on level of training desired; Operator, Developer, and Full System certifications available.
Manuals Available	Yes
Reachback Service	Phone, email, and web-based support. Custom support packages available.
Warranties	Extended warranties available up to 5 years.
ITAR Export Regulations	These products are controlled for export under US Department of Commerce (DOC), Export Administration Regulations (EAR). U.S. Government authorization may be required for export.

Griffin™ G465

IATA Shipping Restrictions	N/A

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	ppb - ppm
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Thermal Desorption swabs
Response Time	4 - 15 minutes for most chemicals
Customize for New Targets	User can add new targets to detector
Portability	99.5 lbs
Ruggedness	Has shock/vibration testing. (5-40°C)
Consumables	Minor consumables (carrier gas, <$1000/year) and user provided maintenance
Training Required	1 - 2 days depending on level of training desired
Maturity	8 weeks
User Feedback	No Feedback Total PBA Score- 92/122

Ion Trap Mass Spectrometry

PRODUCT NAME

GUARDION

TECHNOLOGY CATEGORY

Chromatography;Spectrometry;

Smiths Detection, Inc.
2202 Lakeside Boulevard
Edgewood, MD 21040

www.smithsdetection.com

Michael Burrows
+1 410 612 2625
Michael.burrows@smiths-





Synopsis	[Note: this product is sold under license from Torion Technologies, Inc.] The GUARDION features a low thermal mass capillary GC with high speed temperature programming (>2 ºC/sec) and a miniature toroidal ion trap mass spectrometer (TMS) with a nominal unit mass resolution over a mass range of 50 to 500 Daltons. The system is totally self-contained, weighs ~ 32 pounds with all accessories, is battery operated (30 V Lithium Ion), has an on-board helium GC carrier gas supply cartridge (2500 psig, 90 cc), and is person portable. The system is packaged in a decon-ready, hardened enclosure. The GUARDION features electronic pressure control (EPC) of the helium GC carrier gas and an on-board rechargeable battery system for renewable power. New additions to the GUARDION include expanded on-board library search capabilities, calibration and performance validation routines, NIOSH database, and quantitative results, and the addition of two new sampling accessories.
Category	Chemical; Explosives
Detection Method	Ion Trap Mass Spectrometry; Gas Chromatography;
Detection Principle	Chromatography;Spectrometry;
Application	Emergency Response; Gas Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2012
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes - most organic explosives
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes

GUARDION

Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	NIST/EPA/NIH library included
Customize For New Targets	Yes
Sample Introduction	Vapor/Gas;Liquid;Solid;
Sensitivity Detection Limits	ng; ppm; ppb; ppt
Known Interferents Inhibitors	GC/MS is highly selective for volatile and semi volatile organic compounds when used by a skilled operator. Low false positive/negative rates for target analytes. False IDs are more likely for unknowns (nontargets) since GC retention times cannot be compared to reference RTs.
False Positive Rates	Low
False Negative Rates	Low
Start-Up Time From Cold Start To Sample Ready	< 5 minutes
Response Time Sample Application To Output	Based upon chemical retention time. 3 min chromatographic run, 6 minute cycle time.
Total Run Time	Method dependent, typically < 3 minutes
Alarm Capability	Visual
Software Control	Color touch screen; Chromion-1 software for method and library development. Operates under Windows CE operating system.
Other Operational Parameters	Low thermal mass column MXT-5, 5 m × 0.1 mm × 0.4 mm; electronic pressure programming.

Physical Parameters

Dimensions	15.5 x 15 x 9 in (39 x 38 x 22 cm) excluding handle
Weight	32 lbs (14.6 kg)
Power Requirements	Removable, rechargeable Li-ion battery (2 to 3hours) External power supply 24-V vehicle power adaptor

Logistical Parameters

Transportability	Person-Portable
Durability	Rugged; MIL-STD-810G
Operating Conditions	0 to 45°C (32 to 113°F)
Consumables	Ultra-high purity helium, SPME fibers, LTM GC column
Solvents Reagents	Helium carrier gas
Calibration Schedule	Yes, for quantitative data
Suggested Routine Maintenance	Ion trap (~750 runs). User can perform basic maintenance.
Shelf Life	Indefinite
Unit Cost	$115,895
Expected Operational Life	10 years
AvailableAccessories	Thermal desorber unit, SPME holders, SPME fibers, computer
Data Analysis Support Equipment	Touchscreen and keypad interfaces; CHROMION™ advanced GC/MS software for PC for method and library development. Operates under Windows CE operating system; PEAC chemical hazards database.
Data File Type Format	CDF, RES
Communications Interface	USB, ethernet, Bluetooth
Maintenance Cost	Not Specified

Training, Shipping, And Other Information

Operator Skills Required	Technical background
Training Available	Operator and advanced maintenance courses available
Manuals Available	Yes
Reachback Service	Phone support
Warranties	1 year

GUARDION

ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Carrier gas subject to IATA transport of dangerous goods regulations
Approved Vendors	Smiths Detection, Inc. (Licensed from Torion Technologies)

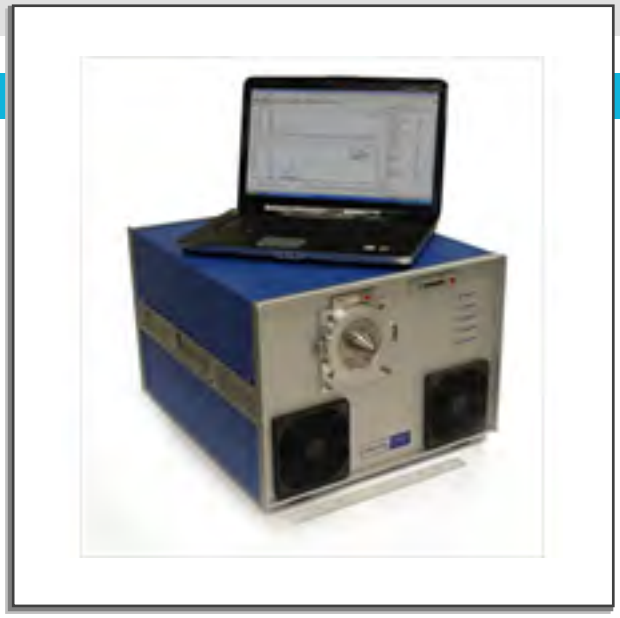
PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, caffeine, ephedrine, aspirin, and others
Sensitivity	ng; ppm; ppb; ppt (some samples)
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Syringe, or other methods. Need to manipulate sample.
Response Time	< 5 minutes
Customize for New Targets	User can add new targets to detector
Portability	32 lbs
Ruggedness	Can operate at extreme temps (0-45°C) AND has shock/vibration testing (MIL-STD-810G)
Consumables	User can provide basic maintenance. Carrier gas, septa, performance verific, SPME fibers
Training Required	3 or 4 days of training required
Maturity	16 weeks
User Feedback	MRIGlobal tested Total PBA Score- 97/122

Ion Trap Mass Spectrometry

PRODUCT NAME

MT Explorer 50



TECHNOLOGY CATEGORY

Spectrometry;

MassTech
6992 Columbia Gateway Drive, Suite 160
Columbia, MD 21046

www.apmaldi.com

Vladimir Doroshenko, Ph.D.
+1 443 539 1758



Model Number	MT50
Synopsis	The MT Explorer 50 (MT50) is a portable, field deployable 3-D ion trap mass spectrometer, developed to provide laboratory-level analysis in the field and designed for easy disassembly.Its atmospheric pressure inlet makes it easy to switch between a variety of sources such as ESI, AP MALDI, Direct Sampling (DS)-APCI (Atmospheric Pressure Chemical Ionization) and (DS)-sESI (Secondary electrospray) ion sources.
Category	Chemical; Biological; Explosives
Detection Method	Ion Trap Mass Spectrometry;
Detection Principle	Spectrometry;
Application	Laboratory Analysis; Trace Analysis; Screening; Emergency Response;
Type	Instrument
Availability	Commercially Available: 60 to 90 days for delivery
Readiness Level	9
Market Entry Date	May 2012
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Amenable by technology
Tested For Biological Agents	Bacillus Globigii spores
Other Biological Targets	Amenable by technology
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Not Specified
Sample Introduction	Vapor/Gas

MT Explorer 50

Sensitivity Detection Limits	Not Specified
Known Interferents Inhibitors	Not Specified
Start-Up Time From Cold Start To Sample Ready	Minutes
Response Time Sample Application To Output	5 to 30 seconds
Total Run Time	Minutes
Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	Mass Range: 35-2000 Da Scan rate: 1,000 to 8,000 Da/sec Resolution: <0.5 Da @ 2,000 Da & 4,000 Da/sec Mass Accuracy: <0.25 Da; Runs in both positive and negative ion modes. Sampling: Air intake, Thermal desorption port (with DART ion source)

Physical Parameters

Dimensions	12 x 17 x 20 in (30 x 43 x 51 cm)
Weight	77 lbs (35 kg)
Power Requirements	115, 220 V AC and/or 28 V DC

Logistical Parameters

Transportability	Person-portable
Durability	Field Deployable; No shock/vibration testing.
Operating Conditions	15 to 30 °C (59 to 86°F)
Consumables	Metal Hydride (MH) cartriges
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	MH cartridge needs to be recharged with water every 3 to 4 weeks. User can perform all necessary maintenance.
Shelf Life	10 years
Unit Cost	$100,000
Expected Operational Life	Indefinite
AvailableAccessories	Ion Sources available: ESI, nanoESI, APCI, secondary ESI, AP-MALDI, DART
Data Analysis Support Equipment	Laptop, Modas software
Data File Type Format	ASCII, mzML, Proprietary MTD format
Communications Interface	Ethernet
Maintenance Cost	Not Specified

Training, Shipping, And Other Information

Operator Skills Required	Minimal technical background
Training Available	Yes, 1 day
Manuals Available	Operator's manual
Reachback Service	Not Specified
Warranties	1 year limited
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	pg; ng;
Selectivity	Identifies all targets in simple mixtures

MT Explorer 50

Sample Preparation	Requires analysis of sample without containment
Response Time	5 - 30 seconds
Customize for New Targets	User can add new targets to detector
Portability	77 lbs
Ruggedness	No shock/vibration testing though it is designed for non-laboratory settings.
Consumables	User can perform all necessary maintenance. Metal hydride cartridges.
Training Required	1 day of training required
Maturity	10 weeks
User Feedback	No Feedback Total PBA Score- 96/122

Ion Trap Mass Spectrometry

PRODUCT NAME

MX908

TECHNOLOGY CATEGORY

Spectrometry;



908 Devices, Inc.
27 Drydock Avenue
Boston, MA 02210

www.908devices.com

John Kenneweg
+1 857 254 1500
john.kenneweg@908devices.com



Model Number	MX908
Synopsis	MX908™ leverages high-pressure mass spectrometry™ (HPMS) to deliver enhanced sensitivity and threat category coverage. This second-generation tool increases mission support with flexibility and trace detection power for responders in chemical, explosive, drug and priority hazmat scenarios. Sensitivity levels are comparable to ion mobility mass spectrometry (IMS) and significantly enhanced selectivity, MX908 can detect trace quantities (low - mid ppb) of priority threats amongst the myriad of interferents that hinder other less selective technologies.
Category	Chemical; Explosives
Detection Method	Ion Trap Mass Spectrometry;High-Pressure Mass Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response;Forensics;Screening;Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 15 to 30 days for delivery
Readiness Level	9
Market Entry Date	2017
User Feedback Sources	MRIGlobal hands-on experience, DOD
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	VX, HD, GA, GB, GD, GF
Tested for ITF25TICTIMs	DEEP, DIMP, TEP, GD acid, TMP, dimethyl sulfate, carbon disulfide, allyl amine, allyl alcohol
Tested For Explosives	ETN, HMTD, HMX, MEKP, PETN, RDX, TNT, TATP, nitrobenzene, etc.
Tested For Narcotics	Fentanyl, fentanyl analogs, U-47700, hydrocodone, oxycodone, heroin, morphine, cocaine, amphetamines, captagon, ephedrine, MDMA, methadone, methamphetamine, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate
Other Chemical Targets	Any solid organic material

MX908

Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	> 200
Customize For New Targets	Yes via manufacturer
Sample Introduction	Vapor/Gas;Solid;Liquid;
Sensitivity Detection Limits	ppt to ppb (vapor); ng to µg (trace)
Known Interferents Inhibitors	None
False Positive Rates	1%
Start-Up Time From Cold Start To Sample Ready	< 5 minutes
Response Time Sample Application To Output	seconds (vapor) to 60 seconds (trace)
Total Run Time	< 5 minutes
Alarm Capability	Audible and visual
Software Control	On-board
Other Operational Parameters	User collects solid samples with thermal desorption swabs, Mass Range 55 to 470 Da

Physical Parameters

Dimensions	11.8 x 8.5 x 4.8 in (29.8 x 21.6 x 12.2 cm)
Weight	8.7 lbs (3.9 kg)
Power Requirements	Replaceable, hot swappable batteries (2 spare batteries included) > 2 hour continuous use
Noise Produced	Negligible

Logistical Parameters

Transportability	Handheld
Durability	Rugged; IP54. Rubber boot.Shock and vibration testing.
Operating Conditions	0 to 40°C (32 to 110°F)
Consumables	Thermal desorption swabs
Solvents Reagents	Not Applicable
Calibration Schedule	None required
Suggested Routine Maintenance	Minimal; designed for non-technical users
Shelf Life	Indefinite (Li-ion battery pack has a lifetime of 3 years)
Unit Cost	$65,000
Expected Operational Life	Indefinite
AvailableAccessories	Sampling probe
Data Analysis Support Equipment	PC, BETX Software
Data File Type Format	PDF, CSV, JPEG
Communications Interface	USB
Maintenance Cost	$95 for 100 TD swabs. About $300 per year depending on frequency of use.

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, 4 hour on-site
Manuals Available	Yes
Reachback Service	Yes
Warranties	1 year, up to 5 years as additional $6,500 per year.
ITAR Export Regulations	None
IATA Shipping Restrictions	Li-ion battery
Approved Vendors	Federal Resources

PBA Detection

MX908

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	ng - ug
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Thermal Desorption swabs
Response Time	seconds (vapor) to 60 seconds (trace)
Customize for New Targets	Manufacturer can add new targets to detector
Portability	8.7 lbs
Ruggedness	Has shock/vibration testing. (0-40°C)
Consumables	Minimal user maintenance. TD swabs (est. $300/yr)
Training Required	4 hour onsite training
Maturity	14 - 21 days
User Feedback	MRIGlobal tested for targets Total PBA Score- 104/122

Ion Trap Mass Spectrometry

PRODUCT NAME

Portability™ Transportable Mass Spectrometer

TECHNOLOGY CATEGORY

Spectrometry;

Bay Spec
1101 McKay Drive
San Jose, CA 95131

www.bayspec.com

+1 408 512 5928
sales@bayspec.com.





Synopsis	The Portability is a portable ion trap mass spectrometer that can be combined with different sample collection systems. The Portability can detect explosives, narcotics, CWAs, TICs, pesticides, etc. The Portability's size and power consumption allows for use of mass spectrometry on industrial production lines, as continuous monitors in waste sites, at airport checkpoints, physicians' offices, and even in the office or family homes.
Category	Chemical; Explosives
Detection Method	Ion Trap Mass Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2016
Number Of Units Fielded	< 10
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Compatible with NIST EI library or user defined library
Customize For New Targets	Yes
Sample Introduction	Liquid;Vapor/Gas;Solid;
Sensitivity Detection Limits	ppb

Portability™ Transportable Mass Spectrometer

Known Interferents Inhibitors	Successful identification of an unknown is dependent on the presence of the corresponding reference spectrum in the library. Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself.
Start-Up Time From Cold Start To Sample Ready	Not Specified
Response Time Sample Application To Output	1 second
Total Run Time	< 1 minute
Alarm Capability	Not Applicable
Software Control	On-board, Remote
Other Operational Parameters	Mass range: 70 to 650 m/z (adjustable) Mass Resolution: 0.5 to 1 amu Positive and negative ion detection modes

Physical Parameters

Dimensions	15 x 13 x 9 in (38 x 33 x 23 cm)
Weight	22 lbs (10.9 kg)
Power Requirements	24 VDC/7A or 110 to 240VAC 50/60 Hz thru adapter. LiPolymer battery (4 hours)
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Rugged; shock and vibration testing performed by manufacturer.
Operating Conditions	5 to 45°C (41 to 113°F)
Consumables	TD swabs
Solvents Reagents	Not Applicable
Calibration Schedule	Not Specified
Suggested Routine Maintenance	Maintenance needs to be performed by a trained technician from manufacturer
Shelf Life	10 years
Unit Cost	$109,960
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Remote control, 7” Touchscreen, with Windows® Embedded system
Data File Type Format	mzML, CSV
Communications Interface	USB 2.0, Wi-Fi, RS232
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Technical Background
Training Available	Yes, either through video or telephone conferencing; Training takes 1/2 day
Manuals Available	Yes
Reachback Service	No
Warranties	1 year parts and labor
ITAR Export Regulations	None
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	ppb

Portability™ Transportable Mass Spectrometer

Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Air sampling and Thermal Desorption swabs
Response Time	1 second
Customize for New Targets	User can add new targets to detector
Portability	22 lbs
Ruggedness	Can operate at extreme temps (5-45°C) AND has shock/vibration testing
Consumables	Manufacturer maintenance necessary
Training Required	1/2 day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 102/122

Ion Trap Mass Spectrometry

PRODUCT NAME

Torion T-9

TECHNOLOGY CATEGORY

Spectrometry; Chromatography;



Perkin Elmer
796 East Utah Valley Drive Suite 200
American Fork, UT 84003

www.torion.com

Chris Bowerbank
+1 801 705 6613



Model Number	NTSST090500
Synopsis	The Torion T-9 GC-TMS features a low thermal mass capillary gas chromatograph (GC) with high speed temperature programming (>2 ºC/sec) and a miniature toroidal ion trap mass spectrometer (TMS) with a nominal unit mass resolution over a mass range of 50 to 500 Daltons. The system is totally self-contained and has an on-board helium GC carrier gas supply cartridge (2500 psig, 90 cc). The Torion T-9 GC-TMS features electronic pressure control (EPC) of the helium GC carrier gas. New additions to the Torion T-9 include expanded on-board library search capabilities, calibration and performance validation routines, addition of the NIOSH database, quantitative results, and the addition of two new sampling accessories. (Note: this product is nearly identical to the GUARDION, which Torion OEMs to Smith Detection.)
Category	Chemical; Explosives
Detection Method	Ion Trap Mass Spectrometry; Gas Chromatography;
Detection Principle	Spectrometry; Chromatography;
Application	Emergency Response; Gas Analysis;
Type	Instrument
Availability	Commercially available
Readiness Level	9
Market Entry Date	2015
User Feedback Sources	MRIGlobal hands-on experience
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes - most organic explosives
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

Torion T-9

Library Size	NIST library
Customize For New Targets	Yes
Sample Introduction	Vapor/Gas;Liquid;
Sensitivity Detection Limits	ppb
Known Interferents Inhibitors	GC/MS is highly selective for volatile and semivolatile organic compounds when used by a skilled operator. Low false positive/negative rates for target analytes. False IDs are more likely for unknowns (nontargets) since GC retention times cannot be compared to reference RTs.
Start-Up Time From Cold Start To Sample Ready	< 5 minutes
Response Time Sample Application To Output	> 5 minutes, based upon chemical retention time
Total Run Time	Not Specified
Alarm Capability	Not Applicable
Software Control	On-board, PC
Other Operational Parameters	Mass Range: 41 - 500 amu; GC Oven programmable from 50° - 300°C; Low thermal mass column MXT-5, 5 m × 0.1 mm × 0.4 mm; electronic pressure programming.

Physical Parameters

Dimensions	18.5 x 14 x 7 in (47 × 36 × 18 cm)
Weight	32 lbs (14.5 kg)
Power Requirements	Disposable LiSO2 batteries AC converter (100 -120 V/220-240 V, 50/60 Hz, 2.2 A). 120 W peak power; 60 W average power.
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Rugged; Pelican case, drop sensitive
Operating Conditions	5 to 45°C (41 to 113°F), 0 to 85% RH
Consumables	Ultra-high purity helium, SPME fibers, LTM GC column
Solvents Reagents	Carrier gas (helium)
Calibration Schedule	Yes, for quantitative data
Suggested Routine Maintenance	Ion trap (~200 runs)
Shelf Life	10 years
Unit Cost	$83,000
Expected Operational Life	Indefinite
AvailableAccessories	Consumables supply kit, CUSTODIAN-NT needle trap and the FUZION-3 two-stage sample transfer station
Data Analysis Support Equipment	Color touchscreen interface; Chromion-1 software for method and library development. Windows CE operating system.
Data File Type Format	net.CDF or .d compatible software
Communications Interface	Ethernet, RF modem, Bluetooth
Maintenance Cost	Not Specified

Training, Shipping, And Other Information

Operator Skills Required	Gas chromatography and mass spectrometry background.
Training Available	Operator and advanced maintenance courses available
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Carrier gas, Lithium ion battery

PBA Detection

Torion T-9

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, caffeine, ephedrine, aspirin
Sensitivity	ppb
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Must manipulate sample
Response Time	< 5 minutes
Customize for New Targets	User can add new targets to detector
Portability	32 lbs
Ruggedness	Can operate at extreme temps (5-45°C) and is ruggedized for harsh environments.
Consumables	Minimal maintenance. Carrier gas, solvents for analysis of solids.
Training Required	2 - 4 hours of training required
Maturity	4 - 6 weeks
User Feedback	MRIGlobal tested Total PBA Score- 101/122

Ion Trap Mass Spectrometry

PRODUCT NAME

TRACER 1000 MS-ETDTM

TECHNOLOGY CATEGORY

Spectrometry;

1st Detect
555 Forge River Road, Suite 100
Webster, TX 77598

www.1stdetect.com

Nicholas Roach
+1 512 485 9539
nroach@astrotechcorp.com





Synopsis	1ST Detect's TRACER 1000 MS-ETDTM is an Explosives Trace Detection solution representing a linear ion trap mass spectrometer with a swab-based thermal desorption sample inlet system. The system is designed to be capable of detecting a wide range of compounds which are semi-volatile and/or nonvolatile, including explosives, drugs of abuse, and chemical warfare agents. The instrument uses chemical ionization. MS/MS capabilities allow verification of any positive results
Category	Chemical; Explosives
Detection Method	Ion Trap Mass Spectrometry;
Detection Principle	Spectrometry;
Application	Trace Analysis;Emergency Response;Forensics;
Type	Instrument
Availability	Commercially Available: 30 to 90 days for delivery
Readiness Level	9
Market Entry Date	January 2018
Number Of Units Fielded	< 10
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Military, commercial-grade and home-made explosives (HMEs) such as TNT, RDX, Picric acid, R-salt, smokeless powders, PETN, NG, AN, UN, HMTD, TATP, EGDN and others; as well as peroxides and formulated threats
Tested For Narcotics	A broad range of narcotics, pharmaceutical drugs and controlled substances including fentanyl, fentanyl analogs, amphetamines, cocaine, heroin, and others (carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Any solid organic material
Radiological Targets	Not Applicable
Library Size	Unlimited

TRACER 1000 MS-ETDTM

Customize For New Targets	Yes via manufacturer
Sample Introduction	Vapor/Gas;Solid;Liquid;
Sensitivity Detection Limits	pg to µg
Known Interferents Inhibitors	Able to Identify targets in mixtures as long as the components of the mixture are in the library.
False Positive Rates	1.8%
Start-Up Time From Cold Start To Sample Ready	20 minutes
Response Time Sample Application To Output	10 seconds (library dependent)
Total Run Time	20 minutes
Alarm Capability	Audible and Visual
Software Control	On-board
Other Operational Parameters	Mass Range: 45 to 520 amu Resolution: 0.6 amu FWHM at 131 amu, 0.85 amu FWHM at 502 amu

Physical Parameters

Dimensions	14.3 x 18.1 x 21 in (36 x 45 x 53 cm)
Weight	54 lbs (24 kg)
Power Requirements	110 VAC / 230 VAC, 50 Hz / 60 Hz

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	Field deployable; no military testing
Operating Conditions	0 to 40°C (32 to 104°F); < 95% RH, non-condensing
Consumables	TD Swabs, Air filters, calibrant tube, verific pen
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Change out calibrant tube, air filter, ionizer detector annually
Shelf Life	Indefinite
Unit Cost	$50,000
Expected Operational Life	Indefinite
AvailableAccessories	Printer
Data Analysis Support Equipment	PC, software
Communications Interface	USB 2.0, ethernet
Maintenance Cost	< $100

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, 1 day
Manuals Available	Yes
Warranties	1 year
ITAR Export Regulations	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	ng
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Thermal Desorption swabs, wand collection
Response Time	10 seconds
Customize for New Targets	Manufacturer can add new targets to detector
Portability	54 lbs

TRACER 1000 MS-ETDTM

Ruggedness	No
Consumables	Manufacturer maintenance necessary
Training Required	1 day of training required
Maturity	30 - 90 days lead time
User Feedback	No Feedback Total PBA Score- 90/122

Ion Trap Mobility Spectrometry

PRODUCT NAME

Hardened MobileTrace (HMT)

TECHNOLOGY CATEGORY

Spectrometry;

Rapiscan Systems
2805 Columbia Street
Torrance, CA 90503

www.rapiscansystems.com

Medardo Austria
+1 310 978 1457
maustria@rapiscansystems.com





Synopsis	The Hardened MobileTrace® is a hand-held Ion Trap Mobility Spectrometer (ITMS) for detection of chemical warfare agents, narcotics, explosives, and other threat agents. Two sampling modes are available: direct vapor sampling and swab/wipe sampling. Sensitivity is in ppb range and results are qualitative. Identification is achieved via comparison of ITMS plasmagrams to on-board reference libraries. The unit can be operated in either stand-alone mode or via personal computer.
Category	Chemical; Explosives
Detection Method	Ion Trap Mobility Spectrometry ;
Detection Principle	Spectrometry;
Application	Emergency Response; Gas Analysis; Screening; Trace Analysis; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
User Feedback Sources	MRIGlobal hands-on experience
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	TATP, peroxides, nitro-based compounds
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Cocaine, heroin, THC, methamphetamine, ephedrine, MDMA, MDA, morphine, L-amphetamine, and EME
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Yes
Sample Introduction	Vapor/Gas; Solid

Hardened MobileTrace (HMT)

Sensitivity Detection Limits	ppb
Known Interferents Inhibitors	Not Specified
False Positive Rates	< 2%
False Negative Rates	< 2%
Start-Up Time From Cold Start To Sample Ready	Initial: 24 hours; daily: 30 minutes
Response Time Sample Application To Output	< 12 seconds
Total Run Time	Not Specified
Alarm Capability	Audible and visual
Software Control	On-board, PC
Other Operational Parameters	Basic through expert level passwords allow greater access to onboard programs.

Physical Parameters

Dimensions	17.25 x 6.25 x 12.75 in (43.8 x 16 x 32.4 cm)
Weight	12 lbs (5.44 kg)
Power Requirements	115/230 V AC, 50/60 Hz 12 V DC, vehicle adaptor (cable included) Two rechargeable Li-Ion batteries, up to 6 hr; charger included Internal back-up batteries to maintain power while swapping batteries

Logistical Parameters

Transportability	Person-Portable
Durability	MIL-STD-810-G, IP54 Rated
Operating Conditions	-20 to 55°C (-4 to 131°F); < 95% RH, non-condensing
Consumables	Positive and negative dopants, batteries, sample traps (swabs), canned air containing 1,1,1,2-tetrafluoroethane.
Solvents Reagents	Not Applicable
Calibration Schedule	Every 8 hours
Suggested Routine Maintenance	Semi-permeable membrane and dryer material must be replaced periodically.
Shelf Life	10 years
Unit Cost	$32,000
Expected Operational Life	Indefinite
AvailableAccessories	Battery charger, storage case
Data Analysis Support Equipment	Not Specified
Data File Type Format	Not Specified
Communications Interface	USB
Maintenance Cost	$850

Training, Shipping, And Other Information

Operator Skills Required	Non-technical skill required to operate the unit. Advanced skill for in-depth instrument operation.
Training Available	Operator, Maintenance, Administrator, and “Train the Trainer”
Manuals Available	Operator manual
Reachback Service	Not Specified
Warranties	1 year parts and labor, extended warranties are available
ITAR Export Regulations	63Ni, 10 millicurie (370 MBq) radioactive source. U.S. Nuclear Regulatory Agency regulations apply. Lithium ion batteries should be shipped in accordance with local regulations.
IATA Shipping Restrictions	63Ni, 10 millicurie (370 MBq) radioactive source. U.S. Nuclear Regulatory Agency regulations apply. Lithium ion batteries should be shipped in accordance with local regulations.

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700

Hardened MobileTrace (HMT)

Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, caffeine, ephedrine, aspirin, and others
Sensitivity	ppb
Selectivity	Identifies specific targets in complex mixtures
Sample Preparation	Swabs
Response Time	< 12 seconds
Customize for New Targets	User can add new targets to detector
Portability	12 lbs
Ruggedness	Can operate at extreme temps (-20-55°C) AND has shock/vibration testing (MIL-STD-810G)
Consumables	Dopants, batteries, swabs, canned air.
Training Required	2 - 4 hours of training required
Maturity	Several months?
User Feedback	No Feedback Total PBA Score- 102/122

Ion Trap Mobility Spectrometry

PRODUCT NAME

Itemiser® 3 Enhanced



TECHNOLOGY CATEGORY

Spectrometry;

Rapiscan Systems
2805 Columbia Street
Torrance, CA 90503

www.rapiscansystems.com

+1 310 978 1457



Synopsis	The Itemiser® 3 Enhanced is a desktop detector that simultaneously analyzes positive and negative ions allowing for trace detection of explosives and narcotics. The Itemiser utilizes patented Ion Trap Mobility Spectrometry (ITMS®) technology. The ITMS technology incorporates a switching system that allows for millisecond alternating from positive to negative ion mode. Detection limits are in the picogram range. The Itemiser is fully portable and includes an on-board printer.
Category	Chemical; Explosives
Detection Method	Ion Trap Mobility Spectrometry ;
Detection Principle	Spectrometry;
Application	Emergency Response; Gas Analysis; Screening; Trace Analysis; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable based on technology
Tested for ITF25TICTIMs	Amenable based on technology
Tested For Explosives	TATP, peroxides, nitro-based compounds
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Not Specified
Sample Introduction	Solid;Liquid;
Sensitivity Detection Limits	pg

Itemiser® 3 Enhanced

Known Interferents Inhibitors	Surface Swab: False positive rate typically < 1% Air Samples: False positive rate typically < 0.11%
Start-Up Time From Cold Start To Sample Ready	30 minutes
Response Time Sample Application To Output	8 seconds
Total Run Time	Not Specified
Alarm Capability	Yes
Software Control	On-board
Other Operational Parameters	Vendor claims sensitivity and selectivity of ITMS is approximately 10 to 100X better than IMS.

Physical Parameters

Dimensions	Display Opened: 19.8 x 18.9 x 14.9 in (50 x 48 x 37 cm) Display Closed: 18 x 18.9 x 7.1 in (46 x 48 x 18 cm)
Weight	26.5 lbs (12 kg)
Power Requirements	100 to 120 V AC, 200 to 240 V AC, 47 to 63 Hz, 150 W max, 65W nominal. 11 to 18 V DC, 10 A max (cigarette lighter adapter included). Back-up battery: up to 60 minutes run-time daily.
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	Rugged
Operating Conditions	0 to 40°C (32 to 104°F)
Consumables	Swabs
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Specified
Shelf Life	Indefinite
Unit Cost	$45,200
Expected Operational Life	Indefinite
AvailableAccessories	Not Specified
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Specified
Communications Interface	2 USB 2.0 ports and Ethernet port.
Maintenance Cost	Estimate 10% of purchase price per year; + $850 for a 3 month consumable kit

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background
Training Available	On-site training included in purchase. Other training at manufacturer’s facility also available.
Manuals Available	Operator’s manual
Reachback Service	Not Specified
Warranties	1 year
ITAR Export Regulations	U.S. Nuclear Regulatory Agency regulations due to 63Nickel source.
IATA Shipping Restrictions	U.S. Nuclear Regulatory Agency regulations due to 63Nickel source.

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, caffeine, ephedrine, aspirin, and others
Sensitivity	pg
Selectivity	Identifies all targets in complex mixtures

Itemiser® 3 Enhanced

Sample Preparation	Swabs
Response Time	8 seconds
Customize for New Targets	User can add new targets to detector
Portability	26.5 lbs
Ruggedness	No ruggedness testing/claims
Consumables	swabs
Training Required	1 day of training required
Maturity	Several months
User Feedback	No Feedback Total PBA Score- 101/122

Ion Trap Mobility Spectrometry

PRODUCT NAME

Itemiser® DX Series



TECHNOLOGY CATEGORY

Spectrometry;

Rapiscan Systems
2805 Columbia Street
Torrance, CA 90503

www.rapiscansystems.com

Medardo Austria
+1 310 978 1457
maustria@rapiscansystems.com



Model Number	DX and 4DX
Synopsis	The Itemiser® DX will simultaneously detect positive and negative ions. Simultaneous detection enables the Itemiser DX to detect a broad range of explosives. It delivers fast, simultaneous explosives and narcotics detection in a portable package.The Itemiser® 4DX has a non-radioactive-based explosives and narcotics detector.
Category	Chemical; Explosives
Detection Method	Ion Trap Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response; Gas Analysis; Screening; Trace Analysis; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable based on technology
Tested for ITF25TICTIMs	Amenable based on technology
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	No, but the product can be setup to simultaneously look for narcotics and explosives
Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	ng

Itemiser® DX Series

Known Interferents Inhibitors	Not Specified
Start-Up Time From Cold Start To Sample Ready	30 minutes
Response Time Sample Application To Output	8 seconds
Total Run Time	30 minutes
Alarm Capability	Audible and visual
Software Control	Remote
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	19.8 x 18.9 x 14.9 in (5 x 4.8 x 3.8 cm) Display Clearance 16.3in (41cm)
Weight	26.5 lbs (12 kg)
Power Requirements	-Standard AC Input: 100 to 120 VAC, 200 to 240 VAC, 47 to 63 Hz, 150 W - DC Input: 11 to 18 VDC input, 10 A (150 W) max

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	ISTA Procedure 2 which is drop and vibration
Operating Conditions	0 to 40°C (32 to 104°F) ; 0 to 95%RH, non-condensing
Consumables	Calibration traps, sample traps, dopants, mesh screens
Solvents Reagents	Not Applicable
Calibration Schedule	Once per shift or every 8 to10 hours
Suggested Routine Maintenance	10 minutes per week
Shelf Life	10 years
Unit Cost	$48,200
Expected Operational Life	Indefinite
AvailableAccessories	Vacuum wand
Data Analysis Support Equipment	PC
Data File Type Format	Not Specified
Communications Interface	Two USB 2.0 ports, Ethernet port
Maintenance Cost	$2,000 to $2,500 per year

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background
Training Available	Yes
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	IATA regulations may apply

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, caffeine, ephedrine, aspirin, and others
Sensitivity	pg
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Swabs
Response Time	8 seconds
Customize for New Targets	User can add new targets to detector
Portability	26.5 lbs
Ruggedness	No ruggedness testing/claims

Itemiser® DX Series

Consumables	swabs
Training Required	1 day of training required
Maturity	Several months?
User Feedback	No Feedback Total PBA Score- 101/122

Ion Trap Mobility Spectrometry

PRODUCT NAME

MobileTrace®

TECHNOLOGY CATEGORY

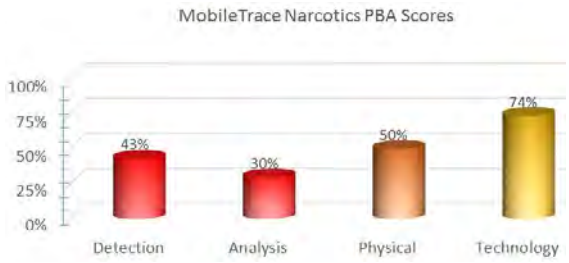
Spectrometry;



Rapiscan Systems
2805 Columbia Street
Torrance, CA 90503

www.rapiscansystems.com/en/

Tom Dunn
+1 636 273 9729



Synopsis	MobileTrace®, is a dual-mode detector, for narcotics and explosives. Rapiscan® Systems patented Ion Trap Mobility Spectrometry (ITMS™) technology offers the detection, sensitivity and reliability proven at military bases, border crossings, airports, and other critical security checkpoints around the world. For particle sampling, uses standard Rapiscan® Systems sample traps. The Teflon®-coated traps are swiped across a surface and inserted into the system for analysis. Typical sampling objects include clothing, skin, baggage, cargo, vehicles, containers, tickets and ID cards. Vapor sampling: Vapors are drawn through a nozzle directly into the system for analysis. Typical sampling objects.
Category	Chemical; Explosives
Detection Method	Ion Trap Mobility Spectrometry;
Detection Principle	Spectrometry;
Application	Emergency Response;Gas Analysis;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Vapor/Gas;Particle;

MobileTrace®

Start-Up Time From Cold Start To Sample Ready	30 minutes
Response Time Sample Application To Output	8 seconds
Total Run Time	31 minutes
Alarm Capability	Yes
Software Control	On-board, PC, remote
Other Operational Parameters	Output to five different display types including substance listing, time-of-flight plasmagram and tabular displays, 3-D and Intensity Map.1 GB or greater file storage capacity

Physical Parameters

Dimensions	6 x 16.1 x 12.4 in (15.2 x 40.9 x 31.5 cm)
Weight	Net: 9.4 lbs (4.3 Kg) with battery. 0.875 lbs (0.065 Kg) handwand
Power Requirements	115/230 VAC, 50/60 Hz 12 VDC, vehicle adaptor (cable included) Two rechargeable Li-Ion batteries (4 hours) Internal back-up batteries to maintain power while swapping batteries

Logistical Parameters

Transportability	Handheld
Durability	Rugged
Operating Conditions	-10 to 55°C (14 to 131°F), up to 95% RH (non-condensing)
Consumables	Sample traps
Solvents Reagents	Not Applicable
Shelf Life	Indefinite
Expected Operational Life	10 years
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	ITMS™ desktop software , 3-D view and Intensity Map for analytical interpretation, 800 NIT 3.5 in. (8.9 cm) color screen using five display options
Communications Interface	USB, ethernet

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Yes
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	Heroin
Associated Compounds Detected	None
Common Cutting Agents Detected	None
Sensitivity	Trace
Selectivity	Identifies specific targets in simple mixtures
Sample Preparation	Have to apply sample to swab end
Response Time	31 minutes
Customize for New Targets	Cannot detect or add new targets
Portability	9.4 lbs.
Ruggedness	No ruggedness testing/claims
Consumables	Swabs
Training Required	1 day
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 56/122

Mid-infrared Spectroscopy

PRODUCT NAME

4100 ExoScan Series

TECHNOLOGY CATEGORY

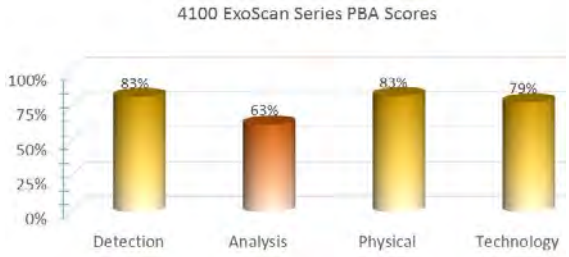
Molecular Spectroscopy;



Agilent Technologies
5301 Stevens Creek Boulevard
Santa Clara, CA 95051

www.agilent.com

Heidi Kijenski
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Heidi.Kijenski@agilent.com



Synopsis	The 4100 ExoScan™ is a portable, hand-held, battery operated FTIR analyzer designed to measure a wide variety of solid and liquid samples. The instrument contains interchangeable ATR and external reflectance sample interfaces, a PDA based control panel that wirelessly links to a laptop for upload and download of data, methods etc, multi-level software and user interfaces, and a docking station allows the Exoscan to be used in a lab similar to a benchtop FTIR.
Category	Chemical; Explosives;
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	July 2013
User Feedback Sources	MRIGlobal hands-on experience
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Infrared active compounds
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Yes
Sample Introduction	Solid; Liquid

4100 ExoScan Series

Sensitivity Detection Limits	Neat/mixtures; mg; g
Known Interferents Inhibitors	Successful identification of an unknown is dependent on the presence of the corresponding reference spectrum in the library. Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself.
Start-Up Time From Cold Start To Sample Ready	5 minutes (30 minutes prior to performance tests)
Response Time Sample Application To Output	Sample dependent
Total Run Time	Not Specified
Alarm Capability	Not Applicable
Software Control	On-board software
Other Operational Parameters	Michelson interferometer, 4 cm–1 resolution; Frequency range: 650 to 4,000 cm-1

Physical Parameters

Dimensions	Infrared Module: 6.75 × 4.69 × 8.81 in (171.5 × 118.9 × 223.8 mm); PDA: 5.00 × 2.94 × 0.81 in (127 × 74.60 × 20.6 mm)
Weight	Infrared Module: 7 lbs (3.18 kg); PDA: 6.3 oz (178.60 g)
Power Requirements	Lithium ion rechargeable (3.2 hours Infrared module, 8 hours PDA module)
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Withstands 40G on each axis (in shipping case); Withstands 60 Hz vibration for 30 minutes ; Water resistant
Operating Conditions	0 to 50°C (32 to 122°F)
Consumables	Dessicant cartridges
Solvents Reagents	Not Applicable
Calibration Schedule	Quarterly performance verification
Suggested Routine Maintenance	Minimal; external cleaning, software updates
Shelf Life	Indefinite
Unit Cost	$46,000
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Specified
Data File Type Format	Not Specified
Communications Interface	Wireless LAN IEEE® 802.11 b/g Antenna: Internal; Bluetooth v2.0 +EDR Class 2 Supported; USB
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background, spectroscopy background
Training Available	Yes, 1 day
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year
ITAR Export Regulations	None
IATA Shipping Restrictions	Li-ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	Neat/mixtures; mg; g

4100 ExoScan Series

Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Need to manipulate sample. Samples without containment.
Response Time	2 minutes
Customize for New Targets	User can add new targets to detector
Portability	7 lbs
Ruggedness	Can operate at extreme temps (0-50°C) AND has shock/vibration testing
Consumables	Minimal user maintenance. Dessicant cartriges, vials
Training Required	1 day of training required
Maturity	45 days
User Feedback	Positive Feedback Total PBA Score- 95/122

Mid-infrared Spectroscopy

PRODUCT NAME

4300 Handheld FTIR Spectrometer

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Agilent Technologies
5301 Stevens Creek Boulevard
Santa Clara, CA 95051

www.agilent.com

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Synopsis	The 4300 Handheld FTIR with DTGS or MCT detectors offers a variety of sampling interfaces: Diffuse Reflectance, External Reflectance, Grazing Angle, Diamond ATR, Ge ATR, and allows an operator to transition from one sample type to another with no alignment or adjustments necessary. The 4300 is water resistant and designed for field use. The thermoelectrically cooled MCT detector is best for applications that require speed and focused libraries.
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	July 2015
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Infrared active compounds
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Yes
Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	%

4300 Handheld FTIR Spectrometer

Known Interferents Inhibitors	As a technique, IR is very resistant to interferences, it is not good for deconvoluting complex mixtures.
Start-Up Time From Cold Start To Sample Ready	10 minutes
Response Time Sample Application To Output	2 minutes
Total Run Time	12 minutes
Alarm Capability	Not Applicable
Software Control	Controller: Integrated CPU with Microsoft Windows CE 6.0 Edition; Software: Can be operated by Agilent MicroLab PC or by Mobile software
Other Operational Parameters	Spectral range: 4500 to 650 cm-1; Resolution: 4 to 16 cm-1

Physical Parameters

Dimensions	4 x 7.5 x 13.6 in (102 x 191 x 346 mm)
Weight	4.15 lbs (1.88 kg)
Power Requirements	Two 3 hour batteries with hot swap capability; Standard AC: 100/120/240 V AC, 50/60 Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Rugged; Shock and vibration testing
Operating Conditions	0 to 50 °C (32 to 122°F); 95%RH non-condensing
Consumables	Sample vials, dessicant cartridges
Solvents Reagents	Not Applicable
Calibration Schedule	Not Specified
Suggested Routine Maintenance	Minimal; external cleaning, software updates
Shelf Life	10 years
Unit Cost	$45,000
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Not Applicable
Data File Type Format	Not Specified
Communications Interface	Not Applicable
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Training at vendor facility or customer facility
Manuals Available	Operator's Manual
Reachback Service	Not Specified
Warranties	1 year
ITAR Export Regulations	None
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	Neat/mixtrues; mg; g; %
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	ATR, Requires analysis of samples without containment
Response Time	2 minutes

4300 Handheld FTIR Spectrometer

Customize for New Targets	User can add new targets to detector
Portability	4.15 lbs
Ruggedness	Can operate at extreme temps (0-50°C) AND has shock/vibration testing
Consumables	Minimal user maintenance. Dessicant cartridges
Training Required	1 day of training required
Maturity	45 days
User Feedback	Positive Feedback Total PBA Score- 95/122

Mid-infrared Spectroscopy

PRODUCT NAME

4500 Series Portable FTIR



TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Agilent Technologies
5301 Stevens Creek Boulevard
Santa Clara, CA 95051

www.agilent.com

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Model Number	4500a (ATR sampling) 4500t (TumblIR sampling) 4500 DialPath (DialPath sampling)
Synopsis	The Agilent 4500 Series Portable FTIR Spectrometers are small sized, mid-infrared (IR) region spectrometer platforms specifically designed for portable, on-site chemical analysis outside the laboratory environment. The systems are packaged in a weather resistant enclosure suitable for outdoor use. They come standard with internal battery power for operation of up to 4 hours or can be operated with 110/220 volt AC power for extended use. [Note: this product replaces the MLp from A2 Technologies.]
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	July 2013
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	cocaine hydrochloride, cocaine base, diacetylmorphine, morphine hydrochloride, ketamine, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Other Chemical Targets	Infrared active compounds
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Yes

4500 Series Portable FTIR

Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Successful identification of an unknown is dependent on the presence of the corresponding reference spectrum in the library. Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself.
False Positive Rates	PDA with Microsoft® Windows Mobile® 5.0 Premium Edition
Start-Up Time From Cold Start To Sample Ready	10 minutes
Response Time Sample Application To Output	2 minutes
Total Run Time	12 minutes
Alarm Capability	Not Applicable
Software Control	On-board, PC
Other Operational Parameters	Can be operated by both Agilent software and Thermo Electrons Grams® suite; 2 to 32 cm–1 resolution; Frequency range: 650 to 4,000 cm–1

Physical Parameters

Dimensions	8.5 × 11.5 × 7.5 in (203 x 292 x 191 mm)
Weight	15 lbs (6.8 kg)
Power Requirements	Internal battery (4 hours), 100/120/240 V AC, 50/60 Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Rugged; Shock and vibration testing
Operating Conditions	0 to 50°C (32 to 122°F)
Consumables	Desiccant cartridges
Solvents Reagents	Not Applicable
Calibration Schedule	Pre-use performance check
Suggested Routine Maintenance	Cleaning and software updates
Shelf Life	10 years
Unit Cost	$24,000
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	PDA with Microsoft® Windows Mobile® 5.0 Premium Edition
Data File Type Format	Not Specified
Communications Interface	USB
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background, spectroscopy background
Training Available	Yes
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year
ITAR Export Regulations	None
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	Neat/mixtrues; mg; g; %

4500 Series Portable FTIR

Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Need to manipulate sample. Samples without containment.
Response Time	2 minutes
Customize for New Targets	User can add new targets to detector
Portability	15 lbs.
Ruggedness	Can operate at extreme temps (0-50°C) AND has shock/vibration testing
Consumables	Minimal user maintenance. Dessicant cartriges, vials
Training Required	1 day of training required
Maturity	45 days
User Feedback	No Feedback Total PBA Score- 92/122

Mid-infrared Spectroscopy

PRODUCT NAME

5500 Series Compact FTIR

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Agilent Technologies
5301 Stevens Creek Boulevard
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Model Number	5500a (1,3, and 5 diamond ATR sample stage); 5500t (1 ATR sampling); 5500 DialPath (DialPath sampling)
Synopsis	The 5500 series portable mid-IR spectrometers specifically designed for on-site oil and lubricant analysis. Three configurations are offered: 5500t (shown): Basic unit with 1 diamond ATR; 5500a: 1,3, and 5 diamond ATR sample stage; 5500 Dialpath: longer pathlength
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	July 2013
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Infrared active compounds, specifically for lubricants
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%

5500 Series Compact FTIR

Known Interferents Inhibitors	Successful identification of an unknown is dependent on the presence of the corresponding reference spectrum in the library. Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself.
Start-Up Time From Cold Start To Sample Ready	10 minutes
Response Time Sample Application To Output	2 minutes
Total Run Time	< 12 minutes
Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	4 to 32 cm–1 resolution; Frequency range: 650 to 4,000 cm–1

Physical Parameters

Dimensions	8.5 x 11.5 x 7.5 in (22 x 29 x 19 cm)
Weight	15 lbs (6.8 kg)
Power Requirements	Internal battery (4 hours), 100/120/240 V AC, 50/60 Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Not militarized, drop sensitive; Water resistant
Operating Conditions	0 to 50°C (32 to 122°F)
Consumables	Surfactant kit for cleaning, desiccant cartridges
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Source replacement
Shelf Life	10 years
Unit Cost	$23,000
Expected Operational Life	Indefinite
AvailableAccessories	Not Specified
Data Analysis Support Equipment	Agilent MicroLab PC; Mobile device with Microlab Mobile software
Data File Type Format	Not Specified
Communications Interface	USB
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background, spectroscopy background
Training Available	Yes, 1 day
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year
ITAR Export Regulations	None
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	Neat/mixtrues; mg; g; %
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	ATR, Requires analysis of samples without containment
Response Time	2 minutes

5500 Series Compact FTIR

Customize for New Targets	User can add new targets to detector
Portability	15 lbs
Ruggedness	Can operate at extreme temps (0-50°C)
Consumables	Minimal user maintenance. Desicant cartridges
Training Required	1 day of training required
Maturity	60 days
User Feedback	No Feedback Total PBA Score- 90/122

Mid-infrared Spectroscopy

PRODUCT NAME

Cary 630 FTIR

TECHNOLOGY CATEGORY

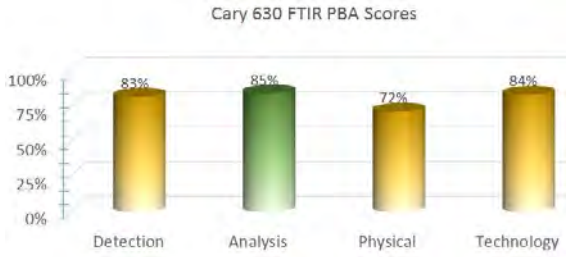
Molecular Spectroscopy;



Agilent Technologies
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Synopsis	The Agilent Cary 630 FTIR spectrometer has permanently aligned optics to decrease uptime, has snap and go modules to increase testing, and has easy-to-use technology that reduces training. Interchangeable sampling accessories including transmission, DialPath, TumblIR, diamond ATR, germanium ATR, ZnSe multi-bounce ATR, specular reflectance and diffuse reflectance.
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy;Near Infrared (NIR);
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Forensics;
Type	Instrument
Availability	Commercially Available: 15 to 30 days for delivery
Readiness Level	9
Market Entry Date	2011
User Feedback Sources	MRIGlobal hands-on experience
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Amenable by technology
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	> 10,000. Continuously updated libraries are available including a narcotics library
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;

Cary 630 FTIR

Sensitivity Detection Limits	10%
Known Interferents Inhibitors	Successful identification of an unknown is dependent on the presence of the corresponding reference spectrum in the library. Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself.
Start-Up Time From Cold Start To Sample Ready	20 minutes
Response Time Sample Application To Output	Seconds
Total Run Time	20 minutes
Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	25 mm optical aperture, fixed pathlengths between 30 and 1000 microns

Physical Parameters

Dimensions	6 x 5 x 12 in (15 x 12.7 x 30.5 cm)
Weight	3.6 kg (8 lb)
Power Requirements	110 to 240 V AC
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	Field deployable
Operating Conditions	0 to 50°C (32 to 122°F)
Consumables	Dessicant
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Routine cleaning, replacement of dessicant as needed
Shelf Life	10 years
Unit Cost	$26,332
Expected Operational Life	Indefinite
AvailableAccessories	DialPath, TumblIR, diamond ATR, germanium ATR, ZnSe multi-bounce ATR, specular reflectance and diffuse reflectance.
Data Analysis Support Equipment	PC, MicroLab software
Data File Type Format	A2M, ASP, SPC
Communications Interface	USB 2.0
Maintenance Cost	$250 dessicant pack, Few thousand dollars for new laser source (approximately every 10 years)

Training, Shipping, And Other Information

Operator Skills Required	Some technical background
Training Available	Yes, 1/2 day
Manuals Available	Yes
Warranties	1 year standard, extended warranties also available
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	%
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	ATR, Requires analysis of samples without containment

Cary 630 FTIR

Response Time	seconds
Customize for New Targets	User can add new targets to detector
Portability	3.6 lbs
Ruggedness	Can operate at extreme temps (0-50°C)
Consumables	Minimal user maintenance. Dessicant cartridges
Training Required	1/2 day of training required
Maturity	2 - 3 weeks
User Feedback	MRIGlobal tested Total PBA Score- 100/122

Mid-infrared Spectroscopy

PRODUCT NAME

ChiralIR-2X™

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Bio Tools
17546 Bee Line Highway
Jupiter, Florida 33458

www.btools.com

Rina Dukor
+1 561 625 0133
info@btools.com





Synopsis	The ChiralIR-2X is a dedicated commercial instrument for the measurement of Vibrational Circular Dichroism (VCD). This system has been updated to incorporate all digital processing, DualPEM integration for improved stability and suppression of artifacts, simultaneous monitoring of IR and VCD signals, and a large detector dewar for 36-48-hour continuous measurements.
Category	Chemical; Biological
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis; Laboratory Analysis; Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable via technology
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Amenable by technology
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	%
Start-Up Time From Cold Start To Sample Ready	Not Applicable
Response Time Sample Application To Output	Not Applicable
Total Run Time	Continuous

ChiralIR-2X™

Software Control	On-board, PC
Other Operational Parameters	Spectral Range: 4000 to 850 cm-1; Simultaneous collection of IR & VCD spectra (AC & DC)

Logistical Parameters

Transportability	Benchtop/Fixed
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Optional: MANTIS™ Dual PEM, BioCell™ (CaF2 cell), TempCon™(Temperature Control Unit), SyncRoCell™(Rotating stage)
Data Analysis Support Equipment	ChiralIR-2X™ Software Optional: Compute VOA™ Software and Compare VOA™ Software
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes
Warranties	1 year

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	ATR, Requires analysis of samples without containment
Response Time	seconds to minutes depending on sample
Customize for New Targets	User can add new targets to detector
Portability	Over 30 pounds
Ruggedness	No ruggedness testing/claims
Consumables	Minimal user maintenance. Dessicant cartriges, vials
Training Required	1 day of training required
Maturity	8 - 12 weeks
User Feedback	No Feedback Total PBA Score- 98/122

Mid-infrared Spectroscopy

PRODUCT NAME

Gemini

TECHNOLOGY CATEGORY

Molecular Spectroscopy;



Thermo Fisher Scientific, Inc.
2 Radcliff Road
Tewksbury, MA 01876

www.thermoscientific.com

Bob Messier
+1 443 262 9536
robert.messier@thermofisher.com



Synopsis	The Gemini by Thermo Fisher Scientific is a handheld, combination FTIR/Raman spectrometer designed to analyze and identify unknown chemical substances directly in a hazard zone. A motorized pressure arm and diamond ATR is built in for FTIR analysis. A wand and separate vial compartment is built in for Raman analysis. The instrument is sealed and protected against dust and moisture; making it easy to clean.
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy; Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Bulk Analysis; Forensics;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	March, 2015
User Feedback Sources	MRIGlobal hands-on experience, DoD
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes, GA, GB, GD, HD, HNs, VX, RVX, others
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes, Fentanyls, Opiates, others (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Most covalently bonded organic compounds
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	13,000
Customize For New Targets	Yes
Sample Introduction	Liquid; Solid;

Gemini

Sensitivity Detection Limits	Neat/mixtures; mg; g
Known Interferents Inhibitors	Fluorescent materials (Raman only)
Start-Up Time From Cold Start To Sample Ready	2 minutes
Response Time Sample Application To Output	< 40 seconds
Total Run Time	0 to 20 minutes
Alarm Capability	Yes
Software Control	On-board only
Other Operational Parameters	Spectral Range: 4000 cm-1-650 cm-1 (FTIR), 2875 cm-1-250 cm-1 (Raman) Spectral Resolution: 4 cm-1 (FTIR), 7-10.5 cm-1 (Raman)

Physical Parameters

Dimensions	10.1 x 5.7 x 2.4 in (26 x 14.5 x 6 cm)
Weight	4 lbs (1.81 kg)
Power Requirements	Rechargeable lithium ion battery, SureFire disposable batteries, Standard AC power
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	IP-67 rated for decontamination and MIL-810-G for survivability
Operating Conditions	–20 to 50°C (-4 to 122°F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Calibration Schedule	Self-calibrating
Suggested Routine Maintenance	No user-accessible internal components
Shelf Life	10 years
Unit Cost	$90,000
Expected Operational Life	Indefinite
AvailableAccessories	AC battery charger and AC adaptor with cord, travel case
Data Analysis Support Equipment	(add-on) HazMasterG3® decision support software (English GUI only); requires Gemini v1.6 or later software
Data File Type Format	SPC, TXT, JPG
Communications Interface	MiniSD card/reader
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Training at customer or vendor facility
Manuals Available	Operator’s Manual and Quick Start Guide
Reachback Service	Vendor reachback service available
Warranties	1 year standard with additional years available for purchase
ITAR Export Regulations	None
IATA Shipping Restrictions	Lithium ion batteries

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	ATR (FTIR mode), Sampling wand and vials (Raman mode)

Gemini

Response Time	< 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	4.2 lbs
Ruggedness	Can operate at extreme temps (-20-50°C) AND has shock/vibration testing (MIL-STD-810G)
Consumables	No consumables or scheduled maintenance necessary.
Training Required	1 day of training required
Maturity	6 - 8 weeks
User Feedback	MRIGlobal tested Total PBA Score- 108/122

Mid-infrared Spectroscopy

PRODUCT NAME

HazMatID Elite

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Smiths Detection, Inc.
2202 Lakeside Boulevard
Edgewood, MD 21040

www.smithsdetection.com

Warren Mino
+1 203-417-8693
warren.mino@smiths-detection.com





Synopsis	HazMatID Elite is a handheld FTIR that performs an analysis in 1 minute or less. Its optical engine provides vibration immunity and resistance to mechanical disturbances seen during vehicle or human transport. RF XBee radio allows data to be transmitted up to 1 km line-of-site with optional encryption.
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Bulk Analysis; Laboratory Analysis; Screening;
Type	Instrument
Availability	Commercially Available: >90 days for delivery
Readiness Level	9
Market Entry Date	2012
User Feedback Sources	MRIGlobal hands-on experience, DoD
Number Of Units Fielded	501 to 1,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	10,000 spectra of chemical warfare agents, explosives, narcotics, TICs, pesticides, white powder, and other chemical classes. User-defined libraries transferable from the HazMatID.
Customize For New Targets	Yes

HazMatID Elite

Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	Neat/mixtures; mg; g; > 10% for most substances in water
Known Interferents Inhibitors	Comes with a mixture analysis algorithm to automatically de-convolute up to three components of a mixture sample spectrum.
Start-Up Time From Cold Start To Sample Ready	60 seconds
Response Time Sample Application To Output	< 1 minute
Total Run Time	60 seconds
Alarm Capability	Visual
Software Control	Advanced software package for data management and spectral reprocessing against upgraded databases (up to 35,000 spectra)
Other Operational Parameters	RF repeater for extending the wireless data transfer range.

Physical Parameters

Dimensions	10.63 x 5.63 x 3.13 in (27 x 14 x 33 cm)
Weight	5.05 lbs (2.29 kg)
Power Requirements	Rechargeable lithium-ion battery (4 hours) or disposable 123A battery compatible
Noise Produced	None

Logistical Parameters

Transportability	Handheld
Durability	Rugged, IP67 rated and sealed for immersion
Operating Conditions	-20 to 50° C (-4 to 122°F) 0 to 100% RH
Consumables	Alcohol wipes, spatulas
Solvents Reagents	Not Applicable
Calibration Schedule	Self-calibrating
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Unit Cost	$45,000
Expected Operational Life	Indefinite
AvailableAccessories	Volatile Liquid Cover, Priority Alert Libraries, ClearSampler Sampling Refills, Auto Cigarette Lighter Power Adapter, Large Transit Case, CR123A battery holder, extra batteries
Data Analysis Support Equipment	4.3 inches internally-bonded LCD color display for high visibility in direct sunlight conditions. Individually-lit keypad and instructional graphics guide users through the operation of the device
Data File Type Format	SPC, IRR, RTF
Communications Interface	USB,Wireless: Embedded RF modem for 1 km line-of-sight data transfer. FIPS 140-2 compliant encryption. GPS included
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Operator's Manual
Reachback Service	Phone support
Warranties	1 year
ITAR Export Regulations	None
IATA Shipping Restrictions	Lithium-ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others

HazMatID Elite

Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	> 10% for most substances in water; mg;
Selectivity	Comes with a mixture analysis algorithm to automatically deconvolve up to three components of a mixture sample spectrum.
Sample Preparation	ATR, Requires analysis of samples without containment
Response Time	< 1 minute
Customize for New Targets	User can add new targets to detector
Portability	5.05 lbs
Ruggedness	Can operate at extreme temps (-20-50°C) AND has shock/vibration testing (MIL-STD-810G)
Consumables	No consumables or scheduled maintenance necessary
Training Required	8 hours of training required
Maturity	16 weeks
User Feedback	MRIGlobal tested Total PBA Score- 105/122

Mid-infrared Spectroscopy

PRODUCT NAME

Nicolet™ iS™5

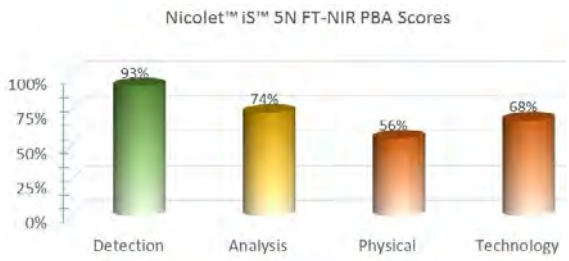
TECHNOLOGY CATEGORY

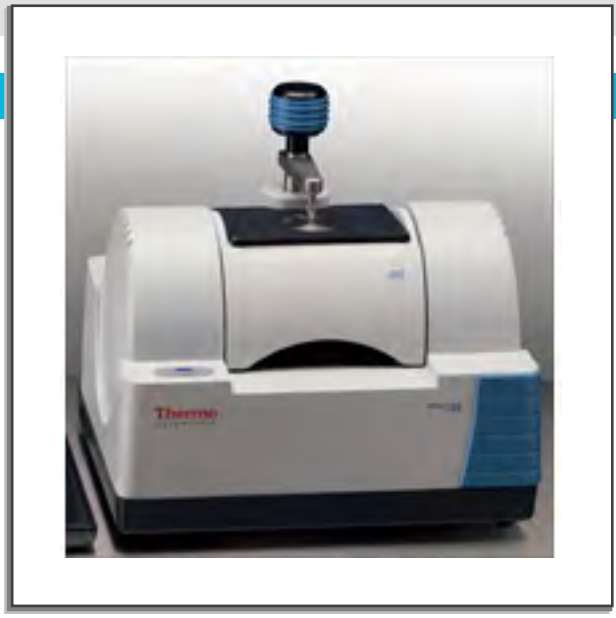
Molecular Spectroscopy;

Thermo Fisher Scientific, Inc.
46 Jonspin Road
Wilmington, MA 01887

www.thermoscientific.com

+1 978 642 1132





Model Number	IQLAADGAAGFAJAMBFN
Synopsis	The Thermo Scientific Nicolet™ iS™5 FT-IR spectrometer is optimized for product assurance testing and material identification. This spectrometer implements the same FT-IR technology found on other Thermo Scientific Nicolet FT-IR models.
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Laboratory Analysis; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2010
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes; reference spectral library is included with purchase
Tested for ITF25TICTIMs	Yes; reference spectral library is included with purchase
Tested For Explosives	Yes; reference spectral library is included with purchase
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes; reference spectral library is included with purchase
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid; Solid; Vapor/Gas
Sensitivity Detection Limits	Neat/mixtures; mg; g; %

Nicolet™ iS™5

Known Interferents Inhibitors	Successful identification of an unknown is dependent on the presence of the corresponding reference spectrum in the library. Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself.
Start-Up Time From Cold Start To Sample Ready	20 to 30 minutes
Response Time Sample Application To Output	10 seconds to a couple minutes depending on library size
Total Run Time	Minutes
Alarm Capability	Audible
Software Control	PC
Other Operational Parameters	Thermally-controlled dye laser; Spectral Range: 400 - 78 cm-1 Sampling: Liquid samples are placed in cuvettes, solid samples are placed on diamond for ATR measurements.

Physical Parameters

Dimensions	10.9 x 13.5 x 10.2 in (28 x 35 x 26cm)
Weight	22 lbs (10 kg)
Power Requirements	12v DC wall adapter (100 to 240 v AC, 50/60 Hz)
Noise Produced	None

Logistical Parameters

Transportability	Benchtop/Fixed
Durability	Not militarized, drop sensitive.
Consumables	Spatulas, cleaning wipes, Cuvettes, Desiccant
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	User-replaceable: source, desiccant (every 2 to 3 years), power supply, sample compartment windows
Shelf Life	Indefinite
Unit Cost	$50,000
Expected Operational Life	Indefinite
AvailableAccessories	iD1 Transmission Accessory, iD5 and iD7 Single-Bounce ATR Accessories, iD Base and iD Foundation
Data Analysis Support Equipment	Computer, OMNIC Spectra software
Data File Type Format	SPA, XLS
Communications Interface	USB 2.0
Maintenance Cost	$500 every 3 to 5 years

Training, Shipping, And Other Information

Operator Skills Required	Technical background
Training Available	Yes
Manuals Available	Yes
Warranties	1 year parts and labor, 10 year warranty on interferometer and laser

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g; %
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Need to manipulate sample
Response Time	10 seconds - couple of minutes depending on library size
Customize for New Targets	User can add new targets to detector
Portability	22 lbs

Nicolet™ iS™5

Ruggedness	No ruggedness testing/claims
Consumables	User can provide basic maintenance. Cuvettes, desiccant.
Training Required	2 hours of training required
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 98/122

Mid-infrared Spectroscopy

PRODUCT NAME

Spectrum Two FT-IR Spectrometer

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Perkin Elmer
www.perkinelmer.com

Jeffrey Foster
jeffrey.foster@perkinelmer.com





Model Number	L160000A (LiTaO3 Detector); L160000F (DTGS Detector)
Synopsis	The Spectrum Two has a LiTaO3 (lithium tantalate) NIR detector, suitable for a wide range of applications and can be configured to the needed level of performance.
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Laboratory Analysis;Forensics;Trace Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2011
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;Vapor/Gas;
Sensitivity Detection Limits	%
Start-Up Time From Cold Start To Sample Ready	Minutes
Response Time Sample Application To Output	5 seconds to 1 minute

Spectrum Two FT-IR Spectrometer

Total Run Time	Minutes
Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	Wavelength Range: 8300 - 350 cm-1 Spectral Resolution: 0.5 cm-1

Physical Parameters

Dimensions	17.7 x 11.8 x 8.3 in (45 x 30 x 21 cm)
Weight	28 lbs (13 kg)
Power Requirements	Universal voltage power supply. Optional battery pack.
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed
Durability	Field deployable
Operating Conditions	5 to 45°C (41 to 113°F); < 90% RH
Consumables	Source, laser, desiccants (replace approximately every 5 years)
Solvents Reagents	Not Applicable
Calibration Schedule	Daily
Suggested Routine Maintenance	Minimal, user can perform basic maintenance.
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	UATR, HATR, Diffuse Reflectance, and Specular Reflectance accessories; Portability Pack (carrying case, battery pack, and 12V car auxiliary port adapter)
Data Analysis Support Equipment	Touchscreen interface, Spectrum 10 software suite, Spectrum 10 ES software (optional); Also Spectrum Touch™ software. Assure ID is availabe for material identification.
Data File Type Format	Any excel type format such as .xls, .csv
Communications Interface	USB, wireless and TCP/IP interface
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Technical background
Training Available	Yes
Manuals Available	Yes
Warranties	1 year

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Must manipulate sample
Response Time	5 seconds - 1 minute
Customize for New Targets	User can add new targets to detector
Portability	28 lbs
Ruggedness	Can operate at extreme temps (5-45°C)
Consumables	User can provide basic maintenance. Source, laser, dessicants (replace approx. every 5 years).
Training Required	2 - 4 hours of training required
Maturity	4 weeks

Spectrum Two FT-IR Spectrometer

User Feedback	No Feedback Total PBA Score- 102/122

Mid-infrared Spectroscopy

PRODUCT NAME

Target-ID

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Smiths Detection, Inc.
2202 Lakeside Boulevard
Edgewood, MD 21040

www.smithsdetection.com

Warren Mino
+1 203-417-8693
warren.mino@smiths-detection.com





Synopsis	Target-ID is a Fourier Transform Infrared (FTIR) spectroscopy identification system developed to support narcotics interdiction efforts. The Target-ID has a library of 2,500 narcotics, precursors, cutting agents and common chemicals. Target-ID is also capable of identifying emerging designer drugs and local variants can be added to the expandable user library. In addition, personnel of varying skill levels will find the software interface intuitive and easy to navigate. Smiths Detection has leveraged a best-in-class infrared spectroscopy platform to develop Target-ID, a product as advanced as it is cost effective. Target-ID provides hours of operation on a single battery charge and also accepts commercially available disposable batteries or line power if needed.
Category	Chemical
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: >90 days for delivery
Readiness Level	9
Market Entry Date	2014
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Cocaine, Heroin, THC, Methamphetamine, Cathiones, Cannabanoids, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700 and 400 others
Other Chemical Targets	Up to 2,500 narcotics and related materials
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

Target-ID

Library Size	1,000 to 2,500 narcotics and other materials
Customize For New Targets	Yes
Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	Neat/mixtures; mg; g, > 10% for most substances in water
Known Interferents Inhibitors	Not Specified
Start-Up Time From Cold Start To Sample Ready	< 40 seconds
Response Time Sample Application To Output	< 60 seconds
Total Run Time	60 seconds
Alarm Capability	Not Specified
Software Control	Not Specified
Other Operational Parameters	Can be upgraded to use a mixture analysis algorithm to automatically de-convolute up to three components of a mixture sample spectrum.

Physical Parameters

Dimensions	10.05 x 6.15 x 3.87 in (25.5 x 15.62 x 9.83 cm)
Weight	5.4 lbs (2.45 kg)
Power Requirements	Rechargeable lithium-ion battery (4 hours). Optional 123A style battery adapter, AC power: 47-63Hz, 100/240VAC. Optional DC power adaptor: 11-16VDC, 12A

Logistical Parameters

Transportability	Handheld
Durability	Rugged
Operating Conditions	-10 to 46º C (14 to 115º F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Self-Calibrating
Suggested Routine Maintenance	Not Applicable
Shelf Life	5 years
Unit Cost	$25,000
Expected Operational Life	10 years
AvailableAccessories	Library upgrade (1,5000 extra spectra), Mixture Analysis software upgrade (HazMatID Elite-type searching), Volatile Liquid Cover, ClearSampler Sampling Refills, Auto Cigarette Lighter Power Adapter, CR123A battery holder, extra batteries
Data Analysis Support Equipment	Not Specified
Data File Type Format	IRR, SPC, RTF
Communications Interface	USB thumb drive export
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Operator’s Manual
Reachback Service	Yes
Warranties	1 year
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others

Target-ID

Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	> 10% for most substances in water; mg;
Selectivity	Can be upgraded to use a mixture analysis algorithm to automatically deconvolve up to three components of a mixture sample spectrum.
Sample Preparation	ATR, Requires analysis of samples without containment
Response Time	< 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	5.4 lbs
Ruggedness	Can operate at extreme temps (-10-46°C)
Consumables	No consumables or scheduled maintenance necessary
Training Required	8 hours of training required
Maturity	16 weeks
User Feedback	No Feedback Total PBA Score- 101/122

Mid-infrared Spectroscopy

PRODUCT NAME

TruDefender FT

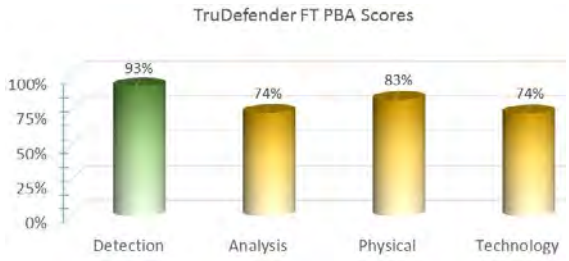
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Thermo Fisher Scientific, Inc.
2 Radcliff Road
Tewksbury, MA 01876

www.thermoscientific.com

Bob Messier
+1 443 262 9536
robert.messier@thermofisher.com





Model Number	TRUDEFENDERFTCHEM
Synopsis	TruDefender FT is a hand-held FTIR system designed to identify unknown chemicals directly in the hot zone. TruDefender™ FT weighs less than 3 lbs and is rugged enough to withstand field use. Using industry-proven FTIR technology, TruDefender FT complements Defender RM to maximize in-the-field coverage of unknown chemicals. Fti model is also available that incorporates wireless communication abilities including sms texting, email, and sending reachback files.
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Bulk Analysis; Forensics;
Type	Instrument
Availability	Commercially Available: 60 to 90 days for delivery
Readiness Level	9
User Feedback Sources	MRIGlobal hands-on experience, DoD
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes, GA, GB, GD, HD, HNs, VX, RVX, others
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes, Fentanyls, Opiates, others (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	All IR active organic compounds
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	> 12,000
Customize For New Targets	Yes
Sample Introduction	Solid; Liquid

TruDefender FT

Sensitivity Detection Limits	Neat/mixtures; mg; g
Known Interferents Inhibitors	None - complex/multi-component mixtures can be difficult to deconvolute
Start-Up Time From Cold Start To Sample Ready	< 1 minute
Response Time Sample Application To Output	1 minute
Total Run Time	< 5 minutes
Alarm Capability	Not Applicable
Software Control	On-board only
Other Operational Parameters	Spectral Range: 4,000 cm-1 to 650 cm-1 -Spectral Resolution: 4 cm-1

Physical Parameters

Dimensions	7.7 × 4.4 × 2.1 in (19.6 x 11.2 x 5.4 cm)
Weight	FT: 2.9 lbs (1.3 kg) FTi: 3.4 lbs (1.54 kg)
Power Requirements	Rechargeable lithium ion battery or standard AC power
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	TruDefender FT/FTi: Independently tested for IP67 certification and MIL-STD-810G ruggedness specifications including shock, vibration, immersion and operation in extreme temperatures.
Operating Conditions	-20 to 50°C (-4 to 122°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	No user-accessible internal components
Shelf Life	Indefinite
Unit Cost	$45,000
Expected Operational Life	Indefinite
AvailableAccessories	Sample crusher for solids
Data Analysis Support Equipment	Not Applicable
Data File Type Format	.spc, .lrd
Communications Interface	SD card, no direct connection to PC
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Non-technical skill required to operate the unit. Moderate skills needed to assess quality of acquired spectra and perform library searches. Advanced skills needed to perform manual interpretation of spectra.
Training Available	Yes
Manuals Available	Operator’s manuals
Reachback Service	Yes
Warranties	1 to 5 year warranty, depending on purchase
ITAR Export Regulations	Not Applicable
IATA Shipping Restrictions	Lithium ion batteries

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g
Selectivity	Identifies all targets in complex mixtures

TruDefender FT

Sample Preparation	ATR, Requires analysis of samples without containment
Response Time	< 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	2.9 lbs (FT); 3.4 lbs (Fti)
Ruggedness	Has had shock/vibration testings (MIL-STD-810G)
Consumables	No consumables or scheduled maintenance necessary.
Training Required	1 day of training required
Maturity	60 - 90 days
User Feedback	MRIGlobal tested Total PBA Score- 103/122

Mid-infrared Spectroscopy

PRODUCT NAME

TruDefender FTX/FTXi



TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Thermo Fisher Scientific, Inc.
2 Radcliff Road
Tewksbury, MA 01876

www.thermoscientific.com

Bob Messier
+1 443 262 9536
robert.messier@thermofisher.com



Model Number	FTX and FTXi
Synopsis	Thermo Scientific TruDefender FTX is an upgraded model of the TruDefender FT, a handheld FTIR system designed to analyze and identify unknown chemical substances directly in the hazard zone. The pressure arm is built in on this model. This upgrade makes sample analysis and cleanup much simpler than with the original model. Lightweight and easy to use, TruDefender devices were designed to meet the needs of first responders and the rigors of field use. The TruDefender FTXi model features embedded mobile phone technology to link directly to incident command or reachback support.
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Bulk Analysis; Screening; Forensics;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	Early 2013
User Feedback Sources	MRIGlobal hands-on experience, DoD
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes, GA, GB, GD, HD, HNs, VX, RVX, others
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes, Fentanyls, Opiates, others (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	All IR active organic compounds
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable

TruDefender FTX/FTXi

Radiological Targets	Not Applicable
Library Size	>12,000
Customize For New Targets	Yes
Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	Neat/mixtures; mg; g
Known Interferents Inhibitors	None - complex/multi-component mixtures can be difficult to deconvolute
Start-Up Time From Cold Start To Sample Ready	< 2 minutes
Response Time Sample Application To Output	< 2 minutes
Total Run Time	< 2 minutes
Alarm Capability	Visual
Software Control	On-Board
Other Operational Parameters	Spectral Range: 4,000 cm-1 to 650 cm-1 -Spectral Resolution: 4 cm-1

Physical Parameters

Dimensions	8.9 × 4.5 × 2.1 in (22.61 x 11.42 x 5.33 cm)
Weight	3.12 lbs (1.41 kg)
Power Requirements	Rechargeable lithium ion battery or standard AC power (> 4 hours)
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Independently tested for MIL-STD-810G and IP67 certification
Operating Conditions	-20 to 40°C (-4 to 105°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	No user-accessible internal components
Shelf Life	10 years
Unit Cost	$50,000
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Able to send reports through SMS text, email, or direct to reachback
Data File Type Format	.spc, .lrd
Communications Interface	Mini and Micro SD card, mini USB, SPC file, text file or JPEG report; FTXi-send via SMS text, e-mail or direct to reachback over Quad band GSM - 850, 900, 1800, 1900MHz
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, onsite training at customer location
Manuals Available	Operator's Manual, Quick Start Guide
Reachback Service	Yes
Warranties	1 year, multi-year
ITAR Export Regulations	Not Applicable
IATA Shipping Restrictions	Lithium ion batteries

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others

TruDefender FTX/FTXi

Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	ATR, Requires analysis of samples without containment
Response Time	< 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	3.12 lbs (FTX); 3.6 lbs (FTXi)
Ruggedness	Has had shock/vibration testings (MIL-STD-810G)
Consumables	No consumables or scheduled maintenance necessary.
Training Required	1 day of training required
Maturity	6 - 8 weeks
User Feedback	MRIGlobal tested Total PBA Score- 104/122

Mid-infrared Spectroscopy

PRODUCT NAME

VIR-100/200/300 Multi-purpose FT-IR

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Jasco, Inc.
28600 Mary's Court
Easton, MD 21601

www.jascoinc.com

+1 410 822 1220





Model Number	VIR-100, VIR-200, VIR-300
Synopsis	VIR series are spectrometers designed to be used in laboratory, field and as built-in FTIR systems. A user can select among three measurement modes from transmittance, ATR, and DRIFTS in one attachment. Several other attachments are available to customize a model to user preference.
Category	Chemical; Explosives
Detection Method	Mid-infrared Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Laboratory Analysis; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	No
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	10,000+
Customize For New Targets	Yes
Sample Introduction	Solid;Liquid;
Sensitivity Detection Limits	Not Specified
Known Interferents Inhibitors	Not Specified
Start-Up Time From Cold Start To Sample Ready	Not Specified

VIR-100/200/300 Multi-purpose FT-IR

Response Time Sample Application To Output	> 5 minutes
Total Run Time	< 5 minutes
Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	Wavenumber range: 7800 - 350 cm-1 (VIR-100, VIR-200), 15,000 - 2200 (VIR-300) Resolution: 0.9 - 16 cm-1 (VIR-100), 0.4 - 16 cm-1 (VIR-200), 0.4 - 16 cm-1 (VIR-300) Options can be added for increased sensitivity, optional spectral ranges including NIR, and battery operation.

Physical Parameters

Dimensions	10.7 x 9.4 x 9.7 in (27 x 23.7 x 24.5 cm)
Weight	32.0 lbs (14.5 kg)
Power Requirements	Battery and/or AC power, depending on configuration
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	May be used indoors or outdoors, depending on configuration
Operating Conditions	Not Specified
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Not Specified
Suggested Routine Maintenance	Routine cleaning
Shelf Life	10 years
Unit Cost	$32,090
Expected Operational Life	Indefinite
AvailableAccessories	Three measurement modes attachment: (Transmittance/reflectance, diffusive reflectance and ATR) -SmartTech attachment -Fiber interface attachment -Long path gas cell attachment -Single reflectance ATR attachment -NIR Specular reflectance attachment -IRT-1000 micro IR attachment -Autosampler attachment -Transmission measurement attachment -MultiChambIR attachment
Data Analysis Support Equipment	Spectra Manager II Windows-based multifunctional software
Data File Type Format	Not Specified
Communications Interface	USB 2.0
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Owner's Manual
Reachback Service	Not Specified
Warranties	1 year
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures

VIR-100/200/300 Multi-purpose FT-IR

Sample Preparation	ATR, Requires analysis of samples without containment
Response Time	< 1 minute
Customize for New Targets	User can add new targets to detector
Portability	32 lbs
Ruggedness	No ruggedness testing/claims
Consumables	Minimal user maintenance. Dessicant cartridges
Training Required	1 - 2 days depending on level of training desired
Maturity	8 - 12 weeks
User Feedback	No Feedback Total PBA Score- 92/122

Near Infrared

PRODUCT NAME

Breeze™

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Bay Spec
155 Wyoming NE
Albuquerque, NM 87123

www.bayspec.com

Jeff MacCubbin
+1 505 294 5654
jmaccubbin@bayspec.com





Synopsis	Breeze™ is a palm-size spectrometer for 400-1700nm equipped with an internal broadband light source, internal battery, the ability for Bluetooth connectivity and the LightSpec smartphone application.
Category	Chemical; Biological; Explosives
Detection Method	Near Infrared;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response;Gas Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	May 2018
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes, including BZ
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Fentanyl and analogs, heroin, ketamine, lorazepam
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	30
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;Vapor/Gas;
Sensitivity Detection Limits	ppm, ppth
Start-Up Time From Cold Start To Sample Ready	1 minute
Response Time Sample Application To Output	1 second
Total Run Time	1 to 2 minutes

Breeze™

Alarm Capability	Visual
Software Control	Laptop, remote
Other Operational Parameters	Wavelength Range: 400 to 1000 nm or 900 to 1700 nm; Broadband light source

Physical Parameters

Dimensions	1.1 x 2.0 x 3.7 in (2.9 x 5.2 x 9.3 cm)
Weight	0.29 lbs (0.133 kg)
Power Requirements	Li-ion battery (2 hours continuous use), rechargable
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Rugged
Operating Conditions	-20 to 45°C (-4 to 113°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	None; fixed calibration
Suggested Routine Maintenance	Software updates
Shelf Life	5 to 10 years
Unit Cost	$7,900
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Smartphone, laptop
Communications Interface	Bluetooth, USB 2.0
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	On-site, 1 day
Manuals Available	Yes
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	Fentanyl, Heroin, Ketamine, Lorazepam
Associated Compounds Detected	4-piperidine, Pyridine
Common Cutting Agents Detected	Caffeine, Ephedrine
Sensitivity	%
Selectivity	Identifies specific targets in simple mixtures
Sample Preparation	Have to put sample into cell
Response Time	< 1 minute
Customize for New Targets	User can add new targets to detector
Portability	< 1 lb.
Ruggedness	No ruggedness testing/claims
Consumables	Minor - cells
Training Required	1 day
Maturity	6-8 weeks
User Feedback	No Feedback Total PBA Score- 78/122

Near Infrared (NIR)

PRODUCT NAME

microPHAZIR

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Thermo Fisher Scientific, Inc.
46 Jonspin Road
Wilmington, MA 01887

www.thermoscientific.com

+1 978 642 1132





Model Number	MICROPHAZIRRX
Synopsis	The microPHAZIR ™ RX analyzer provides pharmaceutical manufacturers with a portable tool to analyze products directly on the manufacturing line in order to meet regulatory requirements, improve product quality, and reduce manufacturing costs.
Category	Chemical; Explosives
Detection Method	Near Infrared (NIR);
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis; Laboratory Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Not Applicable
Other Chemical Targets	Pharmaceutical impurities, excipients, APIs
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Yes
Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Successful identification of an unknown is dependent on the presence of the corresponding reference spectrum in the library.
Start-Up Time From Cold Start To Sample Ready	10 minutes

microPHAZIR

Response Time Sample Application To Output	3 seconds
Total Run Time	1 minute
Alarm Capability	Visual
Software Control	On-board software
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	9.6 x 9.1 x 3.8 in (24.4 x 23.2 x 9.7 cm)
Weight	2.75 lbs (1.25 kg)
Power Requirements	Interchangeable, rechargeable 5+ hours lithium ion battery pack AC battery charger
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Not militarized, drop sensitive.
Operating Conditions	Not Specified
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Factory tested, includes certificate of compliance
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Unit Cost	$41,000
Expected Operational Life	Indefinite
AvailableAccessories	Holster with battery compartment, Spare battery, Polychromix Method Generation software, Validation support services
Data Analysis Support Equipment	PC, software
Data File Type Format	Not Specified
Communications Interface	USB
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	THEORETICALLY
Associated Compounds Detected	THEORETICALLY
Common Cutting Agents Detected	THEORETICALLY
Sensitivity	Neat/mixtures; mg; g
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot
Response Time	3 seconds
Customize for New Targets	User can add new targets to detector
Portability	2.75 lbs
Ruggedness	No ruggedness testing/claims
Consumables	No consumables or scheduled maintenance necessary.
Training Required	1 day of training required

microPHAZIR

Maturity	6 - 8 weeks
User Feedback	No Feedback Total PBA Score- 91/122

Near Infrared (NIR)

PRODUCT NAME

Nicolet™ iS™5N FT-NIR

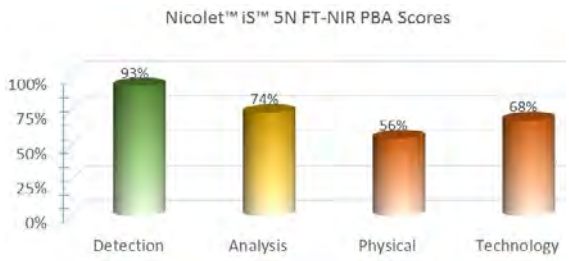


TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Thermo Fisher Scientific, Inc.
www.thermofisher.com

King Chambers
+1 501 765 2985
king.chambers@thermofisher.com



Model Number	IQLAADGAAGFAPEMBIE
Synopsis	The Thermo Scientific™ Nicolet™ iS™5N FT-NIR uses the OMNIC™ software suite and is built on the same rugged platform as the Nicolet™ iS™5 spectrometer. The Nicolet iS5N spectrometer provides FT-NIR capability in a compact package designed to meet the needs of quality assurance laboratories. The large, open sample compartment of the Nicolet iS5N FT-NIR spectrometer is designed to accommodate a wide range of samples and sampling accessories. Its large sample compartment accommodates many third-party accessories, enabling analysis of a broad range of solid and liquid samples.
Category	Chemical; Explosives
Detection Method	Near Infrared (NIR);
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Laboratory Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Amenable by technology
Tested For Narcotics	Yes
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	Neat/mixtures; mg; g; %

Nicolet™ iS™5N FT-NIR

Known Interferents Inhibitors	Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself.
Start-Up Time From Cold Start To Sample Ready	Minutes
Response Time Sample Application To Output	10 seconds to a couple minutes depending on library size
Total Run Time	Minutes
Alarm Capability	Not Applicable
Software Control	On-board, PC
Other Operational Parameters	Spectral Range: 11,000–3800 cm-1 optimized, CaF2 beam splitter; Capable of automatic accessory recognition as well as temperature and humidity self diagnostics.

Physical Parameters

Dimensions	10.2 x 13.8 x 11.0 in (26 x 35 x 28 cm)
Weight	22 lbs (10 kg)
Power Requirements	USB 2.0 high-speed bidirectional communication to PC
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed
Durability	Not militarized, drop sensitive. Vibration resistant.
Consumables	Cuvettes, desiccant
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	User-replaceable: source, desiccant (every 2 to 3 years), power supply, sample compartment windows
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	iD1 Transmission Accessory, iD5 and iD7 Single-Bounce ATR Accesssories, iD Base and iD Foundation
Data Analysis Support Equipment	OMNIC Spectra software External Computer (needs): Microsoft® Windows 7 or 8 OS, 2 GB RAM, 3 GHz processor, 160 GB HDD
Data File Type Format	SPA, XLS
Communications Interface	USB 2.0/3.0

Training, Shipping, And Other Information

Operator Skills Required	Technical background
Training Available	Yes, onsite or a manufacturer's facility (advanced classes). Training takes about 2 hours.
Manuals Available	Yes
Warranties	1 year parts and labor

PBA Detection

Targets Detected Score	THEORETICALLY
Associated Compounds Detected	THEORETICALLY
Common Cutting Agents Detected	THEORETICALLY
Sensitivity	Neat/mixtures; mg; g; %
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Need to manipulate sample
Response Time	10 seconds - couple of minutes depending on library size
Customize for New Targets	User can add new targets to detector
Portability	22 lbs
Ruggedness	No ruggedness testing/claims
Consumables	User can provide basic maintenance. Cuvettes, desiccant.
Training Required	2 hours of training required

Nicolet™ iS™5N FT-NIR

Maturity	6 - 8 weeks
User Feedback	No Feedback Total PBA Score- 97/122

Near Infrared (NIR)

PRODUCT NAME

SuperGamut™ Series

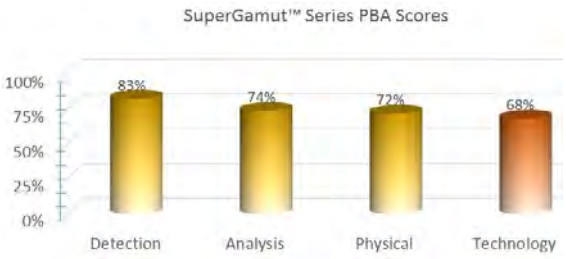
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Bay Spec
1101 McKay Drive
San Jose, CA 95131

www.bayspec.com

+1 408 512 5928
sales@bayspec.com.





Synopsis	BaySpec's SuperGamut™ series near-infrared - shortwave-infrared (NIR-SWIR), ultra-violet—near-infrared (UV-NIR), UV-SWIR, and visible—near-infrared (VIS-NIR) are spectral engines designed to meet real-world challenges for performance, long-term reliability, compact size and low power consumption.
Category	Chemical; Explosives
Detection Method	Near Infrared (NIR);
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Other Chemical Targets	NIR and SWIR active compounds
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Not Specified
Sample Introduction	; Liquid; Solid; Vapor/Gas
Sensitivity Detection Limits	Not Applicable
Known Interferents Inhibitors	Not Specified
Start-Up Time From Cold Start To Sample Ready	Seconds

SuperGamut™ Series

Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	Yes
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	6.4 x 4.1 x 2.4 in (16.2 x 10.5 x 6 cm)
Weight	0.02 to 1.4 lbs (8 to 650 g)
Power Requirements	1A at 12V, USB
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Rugged
Operating Conditions	-10 to 60°C (14 to 140°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Factory calibrated
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Unit Cost	$35,000 to $50,000
Expected Operational Life	Indefinite
AvailableAccessories	Fiber bundle, light source, OEM integration
Data Analysis Support Equipment	Windows 2000/XP or later, BaySpec's "Spec 2020" software
Data File Type Format	Not Specified
Communications Interface	USB
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-Technical Background
Training Available	Yes
Manuals Available	Yes
Reachback Service	No
Warranties	Not Specified
ITAR Export Regulations	None
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	%
Selectivity	No library for detection of targets
Sample Preparation	Sample cells/cuvettes
Response Time	milliseconds
Customize for New Targets	No library for detection of targets
Portability	Depends on model (< 11 lbs)
Ruggedness	Has had (in house) shock/vibration testing
Consumables	User can do basic maintenance. Sample vials and cuvettes.
Training Required	1/2 day of training required

SuperGamut™ Series

Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 94/122

Nuclear Magnetic Resonance

PRODUCT NAME

iSpin-NMR

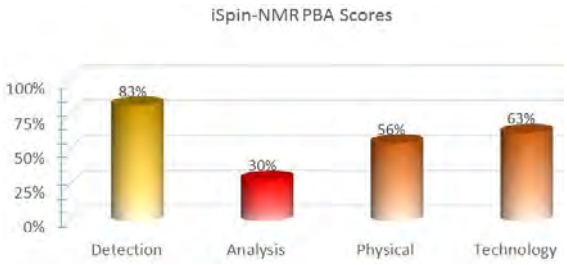
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

SpinCore Technologies, Inc.
4631 NW 53rd Avenue, Suite 103
Gainesville, FL 32653

www.spincore.com

Marta Walsh
+1 352 271 7383
sp@spincore.com





Synopsis	The iSpin-NMRTM can serve as a complete console for NMR or NQR with spectrometer frequencies from 0 to 100 MHz. NMR experiments can be performed once connected to a probe placed in a magnetic field. SpinCore Technologies, Inc. also markets permanent magnets, probes, and BNC connections specific to the frequency of interest. The iSpin-NMR console is simply the radio-frequency generation and amplification electronics.
Category	Chemical
Detection Method	Nuclear Magnetic Resonance ;
Detection Principle	Molecular Spectroscopy;
Application	Laboratory Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2007
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Chemical agents that have protons (1H) can be detected
Tested for ITF25TICTIMs	TIC/TIM that have protons (1H) can be detected
Tested For Explosives	Explosives (nitroaromatics, organic peroxides) that have protons (1H) can be detected
Tested For Narcotics	Narcotics that have protons (1H) can be detected (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Chemicals that have protons (1H) can be detected
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable
Customize For New Targets	No
Sample Introduction	Liquid

iSpin-NMR

Sensitivity Detection Limits	ppm; ppth
Known Interferents Inhibitors	Mixtures containing molecules each with protons will lead to spectra that will need some expert interpretation
Start-Up Time From Cold Start To Sample Ready	< 1 hour
Response Time Sample Application To Output	1 min to hours
Total Run Time	1 hour
Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	Comes with any customer specified frequency from 1 - 100 MHz. Can also be configured to analyze for other NMR-active nuclei (e.g. 29Si, 31P, 13C).

Physical Parameters

Dimensions	19 x 11 x 4 in (48 x 28 x 10 cm)
Weight	10 lbs (4.5 kg)
Power Requirements	Universal AC input power supply (90 to 240 VAC)

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	Due to the tuned components of the internal sample probe dropping equipment is not recommended.
Operating Conditions	15 to 28°C (59 to 82°F) ;35 to 70%RH non-condensing
Consumables	Glass NMR tubes, deuterated solvents
Solvents Reagents	Deuterated solvents
Calibration Schedule	Application dependent
Suggested Routine Maintenance	User may need to shim the magnet
Shelf Life	10 years
Unit Cost	$12,995
Expected Operational Life	Indefinite
AvailableAccessories	Requires probe, magnet, and associated cables for excitation and detection wavelengths
Data Analysis Support Equipment	Microsoft Windows 7, Vista, XP
Data File Type Format	ASCII, JCAMP-DX, and Felix (binary)
Communications Interface	USB
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Technical
Training Available	Not available, the systems are designed to be customizable for expert spectroscopists
Manuals Available	Yes
Reachback Service	Yes, free 20 hours telephone/email support in the first 3 months after purchase date.
Warranties	One year from the invoice date, 30-day money back guarantee
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	mM, ppth
Selectivity	Identifies all targets in simple mixtures

iSpin-NMR

Sample Preparation	Need to dissolve sample in deuterated solvent and transfer to NMR tube.
Response Time	1 minute to hours
Customize for New Targets	No library for detection of targets
Portability	10 lbs
Ruggedness	No ruggedness testing/claims
Consumables	User can provide basic maintenance. Deuterated solvents and NMR tubes.
Training Required	Designed for spectroscopists. No training available.
Maturity	< 1 week if in stock, 1 -2 months otherwise
User Feedback	MRIGlobal tested Total PBA Score- 78/122

Nuclear Magnetic Resonance

PRODUCT NAME

NMReady 60

TECHNOLOGY CATEGORY

Molecular Spectroscopy;



Nanalysis
Bay 4, 4500-5 Street NE
Calgary, Alberta T2E 7C3

www.nanalysis.com

Juan Araneda
+1 403 769 9499
juan.araneda@nanalysis.com



Model Number	NMReady-60e, NMReady-60PRO
Synopsis	The NMReady 60 is a 60 MHz proton (1H) NMR spectrometer. The permanent magnet design provides a high performance, compact and robust instrument that can fit on a typical chemistry workbench. The magnet does not require expensive cryogens. The instrument has a touch screen and does not require a separate laptop.
Category	Chemical
Detection Method	Nuclear Magnetic Resonance ;
Detection Principle	Molecular Spectroscopy;
Application	Laboratory Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2011
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Chemical agents that have protons or fluorine (1H, 19F) can be detected with same system configuration
Tested for ITF25TICTIMs	TIC/TIM that have protons or fluorine (1H, 19F) can be detected with same system configuration
Tested For Explosives	Explosives (nitroaromatics, organic peroxides) that have protons (1H) can be detected
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Chemicals that have protons or fluorine (1H, 19F) can be detected with same system configuration
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

NMReady 60

Library Size	Library is currently in development (as of March 2018)
Customize For New Targets	Any chemical with protons or fluorine (1H, 19F) can be detected with same system configuration
Sample Introduction	Liquid
Sensitivity Detection Limits	mM; 100's ppm
Known Interferents Inhibitors	Mixtures containing molecules each with protons will lead to spectra that will need some expert interpretation
Start-Up Time From Cold Start To Sample Ready	< 1 hour
Response Time Sample Application To Output	10 seconds to hours
Alarm Capability	Not Specified
Software Control	1 year license for Mestrelab Mnova software for advanced data analysis capability
Other Operational Parameters	Operating Frequency: 60 MHz 1H, 19F nuclei (60e) 1H and one of the following: 13C, 31P, 19F, 11B, 7Li, others (60-PRO); 2 - 3 Hz resolution

Physical Parameters

Dimensions	11.8 x 11.0 x 19.2 in (30 x 28 x 49 cm)
Weight	55 lbs (25 kg)
Power Requirements	100-240 VAC, 50-60 Hz

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	Vulnerable to impact or dropping; Splash resistant
Operating Conditions	18 to 26°C (64 to 79°F)
Consumables	Solvents (deuterated), Standard glass, 5mm, NMR tubes
Solvents Reagents	Deuterated solvents
Calibration Schedule	Not Specified
Suggested Routine Maintenance	User may need to shim the magnet and clean the filter
Shelf Life	10 years
Unit Cost	~$45,000
Expected Operational Life	Indefinite
AvailableAccessories	Kinetics package capabilities for reaction monitoring; Sample warmer, reference samples
Data Analysis Support Equipment	PC, smartphone or tablet
Data File Type Format	JCAMP, PDF, CSV (optional). Files compatible with all 3rd party NMR software such as Spinworks and Mestre Lab Mnova
Communications Interface	USB, Ethernet, Wi-Fi, RS232, HDMI
Maintenance Cost	Not Specified

Training, Shipping, And Other Information

Operator Skills Required	Technical background
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes, troubleshooting and diagnostics via Remote Connect. Tech support.
Warranties	1 year standard, extended warranties up to 3 years
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others

NMReady 60

Sensitivity	mM; 100's ppm
Selectivity	Only detects specific targets, in complex mixture
Sample Preparation	Dissolve sample in deuterated solvent
Response Time	10 seconds to hours
Customize for New Targets	Cannot add new targets
Portability	55 lbs
Ruggedness	No ruggedness testing/claims
Consumables	User can provide basic maintenance. Deuterated solvents and NMR tubes.
Training Required	1 - 2 days of training required
Maturity	2 weeks
User Feedback	MRIGlobal tested Total PBA Score- 85/122

Nuclear Magnetic Resonance

PRODUCT NAME

picoSpin 45/80 MHz

TECHNOLOGY CATEGORY

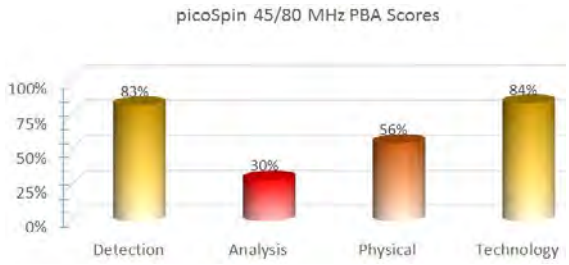
Molecular Spectroscopy;



Thermo Fisher Scientific, Inc.
46 Jonspin Road
Wilmington, MA 01887

www.thermoscientific.com

King Chambers
+1 501 765 2985
king.chambers@thermofisher.com



Model Number	912A0813 / 912A0813
Synopsis	The picoSpin systems come with a 45 or 80 MHz proton (1H) NMR spectrometer. Liquid samples are simply injected into an internal capillary via front-panel fittings. Only 30 microliters of sample fluid is needed to obtain a spectrum. A highly stable, temperature-controlled permanent magnet to ensure easy maintenance-free operation without the need for liquid cryogens.
Category	Chemical
Detection Method	Nuclear Magnetic Resonance ;
Detection Principle	Molecular Spectroscopy;
Application	Laboratory Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2011
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	501 to 1,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Chemical agents that have protons (1H) can be detected
Tested for ITF25TICTIMs	TIC/TIM that have protons (1H) can be detected
Tested For Explosives	Explosives (nitroaromatics, organic peroxides) that have protons (1H) can be detected
Tested For Narcotics	Narcotics that have protons (1H) can be detected (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Chemicals that have protons (1H) can be detected
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Applicable

picoSpin 45/80 MHz

Customize For New Targets	Not Applicable
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	ppm; ppb
Known Interferents Inhibitors	Mixtures containing molecules each with protons will lead to spectra that will need some expert interpretation
Start-Up Time From Cold Start To Sample Ready	< 1 hour
Response Time Sample Application To Output	1 minute to hours
Total Run Time	1 minute to hours
Alarm Capability	Not Applicable
Software Control	Laptop
Other Operational Parameters	Larmor Frequency 82 +/- 1 MHz Proton, 45 +/- 1 MHz Proton, Chemical Shift Resolution < 20 ppb FWHM (80 MHz), < 40 ppb FWHM (45 MHz)

Physical Parameters

Dimensions	8 x 5.75 x 11.5 in (20.4 x 14.5 x 29.3 cm) (45 MHz) 14.3 x 10 x 17 in (36.4 x 25.4 x 43.2 cm) (80 MHz)
Weight	10.5 lbs (4.5 kg) (45 MHz), 43 lbs (19.5 kg) (80 MHz)
Power Requirements	115/230 VAC, 50/60 Hz, 150 W, no battery operation
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Due to the tuned components of the internal sample probe dropping equipment is not recommended.
Operating Conditions	Indoor use only
Consumables	Solvents Syringes, Capillary cartridges custom from Thermo
Solvents Reagents	Deuterated solvents
Calibration Schedule	Application dependent
Suggested Routine Maintenance	User may need to shim magnet and occasionally clean out capillary tube
Shelf Life	Indefinite
Unit Cost	$31,245
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Needs external computer, Metrelab Mnova™ NMR software
Data File Type Format	JCAMP DX
Communications Interface	USB
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Technical Background
Training Available	Yes
Manuals Available	Yes
Reachback Service	No
Warranties	5 year
ITAR Export Regulations	None
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	ppth; 0.1 - 0.2 M

picoSpin 45/80 MHz

Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Need to inject sample into capillary
Response Time	1 minute to hours
Customize for New Targets	No library for detection of targets
Portability	10.5 lbs (45 MHz); 43 lbs (80 MHz)
Ruggedness	No ruggedness testing/claims
Consumables	User can provide basic maintenance. Syringes, capillary cartridges, deuterated solvents.
Training Required	Couple of hours of training required
Maturity	3 - 4 weeks
User Feedback	MRIGlobal tested Total PBA Score- 82/122

Quadrupole Mass Spectrometry (MS)

PRODUCT NAME

4000 MiD

TECHNOLOGY CATEGORY

Spectrometry;



Microsaic Systems
GMS House, Boundary Road
Woking, Surrey, GU21 5BX

www.microsaic.com

Jeremy Reddish
+44 780 864 5810
JReddish@microsaic.com



Model Number	4000 MiD
Synopsis	The 4000 MiD core technologies are chip-scale, ‘plug and play’ versions of traditional mass spectrometry components which can be interchanged rapidly by the user. Its integration, low operating cost and small footprint make the 4000 MiD deployable in a wide range of applications where mass spectrometry has not been able to reach.
Category	Chemical; Explosives;
Detection Method	Quadrupole Mass Spectrometry (MS); Liquid Chromatography (LC); Micro Electro Mechanical Systems (MEMS);
Detection Principle	Spectrometry;
Application	Laboratory Analysis; Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2013
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid
Sensitivity Detection Limits	ppb, pg

4000 MiD

Start-Up Time From Cold Start To Sample Ready	20 min
Response Time Sample Application To Output	Seconds to minutes
Total Run Time	Seconds to minutes
Alarm Capability	Not Applicable
Software Control	Provided via built-in PC. Standalone Data Analysis package also available
Other Operational Parameters	Positive and negative ESI mode. Full scan with live EICs. SIM mode. Mass Range: 50 - 800 Da, 0.7 Da resolution

Physical Parameters

Dimensions	22 x 14 x 10 in (55 x 36 x 25 cm)
Weight	66 lbs (32 Kg)
Power Requirements	Power: 250 W (operating) and 300 W (peak) Line voltage: 100-240 V AC Line frequency: 50/60 Hz

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	Not militarized, drop sensitive
Operating Conditions	15 to 30 °C (59 to 86°F), 40 to 80% RH
Consumables	Spraychip and Vachip
Solvents Reagents	Nitrogen gas, 99.5% purity
Calibration Schedule	Calibrated at manufacturer
Suggested Routine Maintenance	The chip-based MS components are replaceble by users, avoiding the expense and delay of requiring a skilled technician
Shelf Life	5 years
Unit Cost	$50,000
Expected Operational Life	10 years
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Masscape analysis software package included
Data File Type Format	Masscape software in a variety of formats compatible with software platforms from many other vendors
Communications Interface	Ethernet, USB, Digital In/Out, Analog In/Out, RS232

Training, Shipping, And Other Information

Operator Skills Required	Minimal technical experience
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes
Warranties	Yes

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	pg, ppb
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Must manipulate sample
Response Time	5 - 10 minutes
Customize for New Targets	User can add new targets to detector
Portability	66 lbs.
Ruggedness	No ruggedness testing/claims
Consumables	User can provide basic maintenance. Spraychip and vachip.
Training Required	1 - 2 days depending on level of training desired

4000 MiD

Maturity	8 - 12 weeks
User Feedback	No Feedback Total PBA Score- 90/122

Quadrupole Mass Spectrometry (MS)

PRODUCT NAME

E^2 M / MM2

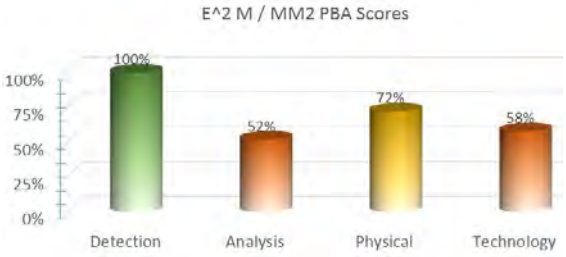
TECHNOLOGY CATEGORY

Chromatography; Spectrometry;

Bruker Corporation
40 Manning Road
Billerica, MA 01821

www.bruker.com

Frank Thibodeaux
+1 978 663 3660
frank.thibodeau@brukerdetection.us





Synopsis	The E2M is a conventional quadrupole GC/MS with 70 eV ionization, which produces NIST-searchable mass spectra.The E2M can operate in both full-scan and SIM mode, and up to 8 SIM masses for up to 20 target analytes can be simultaneously monitored. The E2M uses an ion pump as its sole vacuum source, which is silent and has no moving parts. The E2M must be maintained at vacuum at all times. If vacuum is lost, the E2M must be attached to a turbo pump to restore vacuum. This operation cannot be performed by the user, so the unit must be returned to the vendor or serviced on-site by a Bruker field service engineer. Samples are introduced via a vapor/surface probe connected to the E2M analytical module. The working end of the probe contains a semi-permeable silicone membrane approximately 2 in. in diameter, protected by a fine stainless steel mesh screen. In operation, condensed phase samples are applied to the screen via a wipe transfer. The GC uses room air as a carrier gas.The MM2 is similar to the E2M in capabilities but is ruggedized for use in harsh environments.
Category	Chemical; Explosives
Detection Method	Quadrupole Mass Spectrometry (MS); Gas Chromatography;
Detection Principle	Chromatography; Spectrometry;
Application	Laboratory Analysis; Bulk Analysis; Screening; Trace Analysis; Gas Analysis;
Type	Instrument
Availability	Commercially Available: >90 days for delivery
Readiness Level	9
Market Entry Date	2004
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	GB, HD, SIM GB, VX, SIM VX
Tested for ITF25TICTIMs	VOCs
Tested For Explosives	Amenably by technology
Tested For Narcotics	Amenably by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Volatile compounds and gases

E^2 M / MM2

Tested For Biological Agents	Not applicable; limited to compounds that can be easily volatilzed.
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	NIST MS library for identification of unknowns; Spectral libraries of up to 150,000 different compounds
Customize For New Targets	Yes. Users can create custom search libraries.
Sample Introduction	Solid; Liquid; Vapor/Gas
Sensitivity Detection Limits	ppm; ppb
Known Interferents Inhibitors	GC/MS is highly selective for volatile and semivolatile organic compounds when used by a skilled operator. Low false positive/negative rates for target analytes. False positive IDs are more frequent for unknowns (nontargets).
Start-Up Time From Cold Start To Sample Ready	10 to 15 minutes (getter pump)
Response Time Sample Application To Output	< 1 minute for real-time analysis, 10 to 15 minutes for GC/MS analysis
Total Run Time	Varies depending on analysis mode
Alarm Capability	Visual only; presence of a target chemical is indicated as a color change in a signal bar plot (yellow to red).
Software Control	Laptop control
Other Operational Parameters	1 to 520 amu mass range Selected ion monitoring (SIM) 10 Mbit/s Ethernet interface

Physical Parameters

Dimensions	15 x 15 x 11 in (39 × 39 × 28 cm)
Weight	83.1 lbs (37.7 kg)
Power Requirements	Input 18V DC to 32V DC Power consumption 250W (max. 400W)

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	MM2 MIL-STD 810F. Shock/vibration specs not available.
Operating Conditions	–32 to 49°C (-26 to 120°F)
Consumables	Calibration cartridge ($400), cleaning filter ($400), sampling wipes, GC column (infrequent
Solvents Reagents	Solvents typically used for preparation of samples for GC/MS analysis
Calibration Schedule	Calibration using internal calibrant
Suggested Routine Maintenance	Replace calibrant cartridge and sampler membrane as needed. MTBF = 4,000 hours. Restore vacuum and replace filter as needed. Can be done by user.
Shelf Life	5 years
Unit Cost	$240,000
Expected Operational Life	Indefinite. Requires periodic routine maintenance to ensure operating vacuum.
AvailableAccessories	MM2 Mount, probe table mounts, sampling tubes
Data Analysis Support Equipment	Software
Communications Interface	Ethernet 10/100 interface
Maintenance Cost	$1,000

Training, Shipping, And Other Information

Operator Skills Required	Technical background
Training Available	Yes
Manuals Available	Yes
Reachback Service	No
Warranties	1 year
ITAR Export Regulations	No
IATA Shipping Restrictions	Calibrant must be shipped according to IATA restrictions.

E^2 M / MM2

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	ppm; ppb;
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	swabs
Response Time	10 - 15 minutes
Customize for New Targets	User can add new targets to detector
Portability	83.1 lbs
Ruggedness	Can operate at extreme temps (-32-49°C) AND has had shock/vibration testing (mil-spec testing)
Consumables	User can perform basic maintenance. Calibration cartriged ($400), cleaning filter ($400), sampling wipes, GC column
Training Required	Few days of training required
Maturity	3 months
User Feedback	MRIGlobal tested Total PBA Score- 96/122

Quadrupole Mass Spectrometry (MS)

PRODUCT NAME

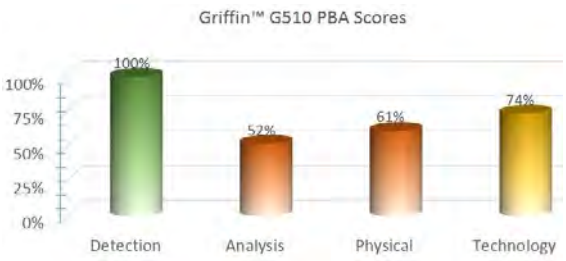
Griffin™ G510

TECHNOLOGY CATEGORY

Spectrometry;Chromatography;

FLIR Systems, Inc.
3000 Kent Avenue
West Lafayette, IN 47906
www.flir.com/g510

Philip Tackett
+1 765 775 1701
philip.tackett@flir.com





Synopsis	The FLIR Griffin™ G510 GC/MS is a versatile, person-portable chemical identifier. It can analyze all phases of matter (liquid, solid, vapor). The integrated heated sample probe enables hot zone operators to identify vapor-phase chemical threats within seconds when operated in Survey Mode. The integrated split/splitless injector allows for environmental, forensic, and hazardous material sampling via syringe injection of organic liquids. The 9” touchscreen can be operated while wearing full PPE downrange. It is built with an IP65-rated enclosure.
Category	Chemical; Explosives
Detection Method	Quadrupole Mass Spectrometry (MS);Gas Chromatography;
Detection Principle	Spectrometry;Chromatography;
Application	Trace Analysis;Emergency Response;Forensics;Laboratory Analysis;Sample Collection;
Type	Instrument
Availability	Commercially Available: 60 to 90 days for delivery
Readiness Level	9
Market Entry Date	June 5, 2017
User Feedback Sources	MRIGlobal Hands-on experience
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	GriffinLib (500 spectra), NIST EPA (10,000 spectra), NIST (240,000 spectra)

Griffin™ G510

Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;Vapor/Gas;
Sensitivity Detection Limits	ppm; ppt
Known Interferents Inhibitors	None
False Positive Rates	0
False Negative Rates	0
Start-Up Time From Cold Start To Sample Ready	15 minutes
Response Time Sample Application To Output	4 to 15 minutes
Total Run Time	19 to 30 minutes
Alarm Capability	Audible and Visual
Software Control	GSS Touch; multiple user levels
Other Operational Parameters	Programmable 40 to 300 °C; ramping of 100 °C/min; Mass Range and Resolution: 15-515 m/z; 0.7 amu @ FWHM

Physical Parameters

Dimensions	13.25 x 13.25 x 15.75 in (33.7 x 33.7 x 40 cm) - includes batteries, carrier gas, and vacuum system
Weight	36 lbs (16.3 kg) - includes batteries, carrier gas, and vacuum system
Power Requirements	100-240V 50-60Hz (220 W max); 19V (DC); 2 x #2590 @ 15V Li Ion batteries (1 included) 4 hours in Survey Mode, 2 hours in Confirmation Mode; hot swappable

Logistical Parameters

Transportability	Person-Portable
Durability	Sealed for Survey Mode operation in hot-zone; IP65-rated enclosure is dust-tight and spray-resistant; Scheduled for shock/vibration, temperature, and humidity testing.
Operating Conditions	0 to 40 °C (32 to 104 °F), 95% RH
Consumables	On-board helium; external helium connector, automatic switching (Hydrogen capable)
Solvents Reagents	Carrier gas, On-board FC-43 (Perfluorotributylamine) calibrant
Calibration Schedule	Daily; autotune
Suggested Routine Maintenance	GC inlet (as needed), Filament replacement (twice per year), Refill calibrant (annually)
Shelf Life	10 years
Unit Cost	$125,000
Expected Operational Life	Indefinite
AvailableAccessories	Liquid extraction via SPME fiber or PSI-Probe w/ Gerstel Twister™, Solid PSI-Probe™ thermal separation via TAG™
Data Analysis Support Equipment	9 inch on-board touchscreen
Data File Type Format	Proprietary software data file format, exportable to 3rd party software
Communications Interface	2 x USB 2.0, Bluetooth 4.0, WiFi 802.11n, Ethernet via USB, integrated GPS
Maintenance Cost	< $1,000 annually

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	2 hours basic operation; 8 hours expert user
Manuals Available	Yes
Reachback Service	Yes
Warranties	Yes
ITAR Export Regulations	Yes
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Griffin™ G510

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	ppm - ppt
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Thermal Desorption swabs
Response Time	4 - 15 minutes for most chemicals
Customize for New Targets	User can add new targets to detector
Portability	36 lbs
Ruggedness	Has shock/vibration testing. (0-40°C)
Consumables	Minor consumables (carrier gas, <$1000/year) and user provided maintenance
Training Required	2 hours for basic operation, 8 hours for expert user
Maturity	12 weeks
User Feedback	MRIGlobal tested Total PBA Score- 97/122

Raman Spectroscopy

PRODUCT NAME

ACE-ID

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Smiths Detection, Inc.
2202 Lakeside Boulevard
Edgewood, MD 21040

www.smithsdetection.com

Michael Burrows
+1 410 612 2625
michael.burrows@smiths-





Synopsis	The ACE-ID is a handheld Raman identifier for solid & liquid explosives, precursors, narcotics and toxic chemicals. ACE-ID is ruggedized for use in severe climates and terrains. It is lightweight and can be operated with one hand. An intuitive software interface guides users through the identification process, making it easy-to-use. The ACE-ID is marketed to serve military explosive ordinance disposal technicians, civilian bomb squads and hazmat teams.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2014
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	500
Customize For New Targets	Yes

ACE-ID

Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	Neat/mixtures; mg; g; > 3% for most substances in water; > 5 % for most solid mixtures
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	< 20 seconds
Response Time Sample Application To Output	< 20 seconds
Total Run Time	1 to 2 minutes
Alarm Capability	Not Applicable
Software Control	External Command Software used for advanced data processing and library management
Other Operational Parameters	Employs Raster Orbital Scanning (ROS) sampling technology

Physical Parameters

Dimensions	5.0 x 3.5 x 2.2 in (12.7 x 8.9 x 5.6 cm)
Weight	1 lb (0.45 kg)
Power Requirements	One lithium battery (SureFire or CR123A) or USB power source
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Pocket Size
Durability	Ruggedized to MIL-810-G standard
Operating Conditions	-10° to 50°C (14 to 122°F), < 95 % RH
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	Indefinite
Unit Cost	$25,995
Expected Operational Life	Indefinite
AvailableAccessories	Clear Sampler Starter Kit
Data Analysis Support Equipment	Command software available for extended data analysis capabilities
Data File Type Format	RMR, SPC, RTF
Communications Interface	Micro USB
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, Operator training takes about 8 hours. Trainer training classes are also available.
Manuals Available	Operator’s Manual
Reachback Service	Yes
Warranties	1 year
ITAR Export Regulations	None
IATA Shipping Restrictions	Lithium-ion batteries

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	> 3% for most substances in water; > 5 % for most solid mixtures; mg
Selectivity	Can identify up to 2 components in a sample

ACE-ID

Sample Preparation	Point and shoot, adapter for ClearSampler Discs
Response Time	< 20 seconds
Customize for New Targets	User can add new targets to detector
Portability	1 lb
Ruggedness	Can operate at extreme temps (-10-50°C) AND has shock/vibration testing (MIL-STD-810G)
Consumables	No consumables or scheduled maintenance necessary
Training Required	8 hours of training required
Maturity	4 weeks
User Feedback	MRIGlobal tested Total PBA Score- 106/122

Raman Spectroscopy

PRODUCT NAME

AnywhereRaman™

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Horiba Scientific
3880 Park Avenue
Edison, NJ 08820

www.horiba.com

Michael O'Weimrin
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Synopsis	AnywhereRaman™ all-in-one unit combines a spectrometer, a laser, a TouchRaman™ BallProbe®, and an onboard computer to obtain Raman measurements. It contains a laser excitation wavelength of 785 nm, with a spectral range of 150 to 3150 cm-1, and a Class 3B laser.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2017
Number Of Units Fielded	1,000 to 10,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	> 200. BioRat Know-it-All Library, few hundred entries in narcotics library
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Flourescence

AnywhereRaman™

Start-Up Time From Cold Start To Sample Ready	< 20 minutes
Response Time Sample Application To Output	< 1 second
Alarm Capability	Not Applicable
Software Control	On-board, PC
Other Operational Parameters	Laser excitation wavelength is 785 nm, with a spectral range of 150 to 3150 cm-1. Class 3B laser.

Physical Parameters

Dimensions	3 x 9.8 x 9.8 in (7.7 x 25 x 25 cm)
Weight	8 lbs (3.6 kg)
Power Requirements	90 to 264 VAC 50 to 60Hz Operating voltage: 12VDC, 2A

Logistical Parameters

Transportability	Person-Portable
Durability	Field Deployable, Shock and vibration testing
Operating Conditions	5 to 35°C (41 to 95°F)
Consumables	Lasers, light bulbs, sample vials (as needed)
Solvents Reagents	Not Applicable
Calibration Schedule	Auto-calibration
Suggested Routine Maintenance	No maintenance necessary. However, service contracts for 1 to 2 visits per year are recommended.
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Wireless keyboard, mouse and printer. External fiber optic sampling probe.
Data Analysis Support Equipment	EZ-GO Raman™ Suite, Integrated PC (Windows 10 OS)
Data File Type Format	ASCII, SPC
Communications Interface	RJ-45 Ethernet, USB 3.0 (2), 1 Display Port 1.1 (VGA, DVI or HDMI with Adaptor)
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes
Warranties	1 year
ITAR Export Regulations	Only available in North America

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Ball probe, requires analysis of sample without containment
Response Time	< 1 second
Customize for New Targets	User can add new targets to detector
Portability	8 lbs
Ruggedness	Has had shock/vibration testing
Consumables	Minimal user provided maintenance. Lasers, light bulbs, sample vials (as needed)

AnywhereRaman™

Training Required	2 - 3 days of training required
Maturity	< 4 weeks
User Feedback	No Feedback Total PBA Score- 101/122

Raman Spectroscopy

PRODUCT NAME

ASSURx

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

TSI, Inc.
500 Cardigan Road
Shoreview, MN 55126

www.tsi.com

Amy Bauer, Ph.D.
+1 800 874 2811
amy.bauer@tsi.com





Synopsis	The ASSURx is a handheld Raman analyzer with a gun-style, point and shoot design. It weighs about 5 lbs, uses a daily polystyrene check standard, and has a spectral range of 250 to 2350 cm-1.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Emergency Response;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	< 5 minutes
Response Time Sample Application To Output	5 to 20 seconds
Total Run Time	Varies by sample

ASSURx

Alarm Capability	Not Applicable
Software Control	On-board, PC
Other Operational Parameters	Laser wavelength: 785 nm, line width , 0.15 nm. Spectral range: 250 to 2350 cm-1

Physical Parameters

Dimensions	9.21 x 4 x 8.77 in (23.4 x 10 x 22.3 cm)
Weight	5.25 lbs (2.4 kg)
Power Requirements	Li-ion battery (> 3 hours); DC Wall Adapter, 100/220 VAC 50/60 Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Field deployable
Operating Conditions	0 to 40°C (32 to 104°F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Calibration Schedule	Polystyrene PQ check standard daily
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Unit Cost	$32,500
Expected Operational Life	10,000 hours (laser source)/ 5 years
AvailableAccessories	Battery charging stand, tablet holder, vial holder, 7mm focusing lens for thicker glass/packaging, polystyrene PQ check standard, acetaminophen, acetylsalicyclic acid check samples. Optional: immersion probe
Data Analysis Support Equipment	PC, software
Data File Type Format	SPC, TXT, EPT, PDF
Communications Interface	USB, ethernet
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Minimal technical background
Training Available	Yes
Manuals Available	Yes
Warranties	1 year parts and labor. Extended warranties also available.
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Point and shoot, sample vials
Response Time	5 - 20 seconds
Customize for New Targets	User can add new targets to detector
Portability	5.25 lbs
Ruggedness	No ruggedness testing/claims
Consumables	No maintenance necessary. Sample vials.
Training Required	Couple of hours of training required depending on level of understanding needed by user
Maturity	3 - 4 weeks

ASSURx

User Feedback	No Feedback Total PBA Score- 98/122

Raman Spectroscopy

PRODUCT NAME

Bravo

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Bruker Corporation
40 Manning Road
Billerica, MA 01821

www.bruker.com

Frank Thibodeau
+1 978 663 3660
frank.thibodeau@brukerdetection.us





Synopsis	A hand-held Raman spectrometer with patented fluorescence mitigation SSE™(Sequentially Shifted Excitation) now enables measurements of a wide range of materials, compared to first-generation systems. Specifically designed for raw material verification, BRAVO's user interface and touchscreen provide a guided workflow. BRAVO features Duo LASER™ excitation using two lasers with different wavelengths resulting in high sensitivity across the largest spectral range. Additional features include automated wavenumber calibration for highly precise measurements and the automated measuring tip recognition IntelliTip™, which ensures that the proper measuring tip is used.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 60 to 90 days for delivery
Readiness Level	9
Market Entry Date	2015
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

Bravo

Library Size	Not Specified
Customize For New Targets	Yes
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	< 2 minutes
Response Time Sample Application To Output	< 30 seconds
Total Run Time	< 5 minutes
Alarm Capability	Visual
Software Control	On-board, PC
Other Operational Parameters	Spectral range: 3.200 - 300 cm-1 Spectral resolution: 10 - 12 cm-1 LASER excitation wavelength: 700 - 1100 nm (Duo LASERTM) LASER power / output: low laser power, < 100 mW for both LASERs

Physical Parameters

Dimensions	10.6 x 6 x 2.4 in (27 x 15.6 x 6.2 cm)
Weight	3.3 lbs (1.5 kg)
Power Requirements	100 to 240 VAC, 50/60 Hz (for docking station and battery charger)

Logistical Parameters

Transportability	Handheld
Durability	Hardened for field operations in harsh and rugged environments. IP64
Operating Conditions	5 to 35°C (41 to 95°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Integrated
Suggested Routine Maintenance	Not Applicable
Shelf Life	Indefinite
Unit Cost	$60,000
Expected Operational Life	5 years
AvailableAccessories	IntelliTip (Automated measuring tip recognition); Optional Docking Station
Data Analysis Support Equipment	Touchscreen inteface; Opus Software
Data File Type Format	Not Specified
Communications Interface	Wi-Fi, ethernet
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Operator’s manual
Reachback Service	Not Specified
Warranties	1 year parts and labor
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	%

Bravo

Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot
Response Time	< 30 sconds
Customize for New Targets	User can add new targets to detector
Portability	3.3 lbs
Ruggedness	Hardened for field operations in harsh environments
Consumables	No consumables or scheduled maintenance necessary
Training Required	Minimal training required
Maturity	8 weeks
User Feedback	MRIGlobal tested Total PBA Score- 108/122

Raman Spectroscopy

PRODUCT NAME

Chem 500

TECHNOLOGY CATEGORY

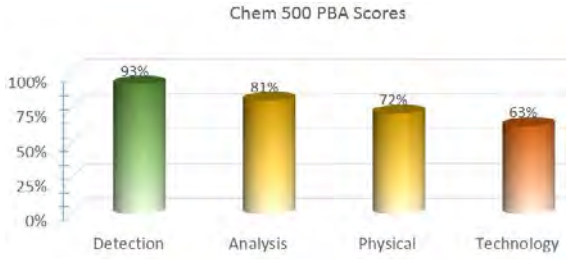
Molecular Spectroscopy;



SciAps, Inc.
2 Constitution Way
Woburn, MA 01801

http://sciaps.com/chem-500/

Don Sackett
+1 339 927 9455
sales@sciaps.com



Synopsis	The Chem-500 is a contact Raman for military and law enforcement. It features continuous and preset adjustable laser focus. The 1030 nm laser is focused on the sample holder rather than the sample material itself.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis; Forensics;
Type	Instrument
Availability	Commercially Available: >90 days for delivery
Readiness Level	9
Market Entry Date	2018
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Yes
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	Neat/mixtures; mg; g
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	Seconds

Chem 500

Response Time Sample Application To Output	Seconds
Total Run Time	Continuous
Alarm Capability	Visual
Software Control	On board, 5.5" color touch screen
Other Operational Parameters	1030nm Laser. On-board HazMasterG3 software, fits standard 15mL and 8mL vials in single holder.

Physical Parameters

Dimensions	Not Specified
Weight	Not Specified
Power Requirements	Surefire 123A or Li-ion batteries
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Rugged, MIL SPEC 810G and IP67 rated
Operating Conditions	Not Specified
Consumables	Sample vials
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Unit Cost	$20,000
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	HazmasterG3 software; android platform.
Data File Type Format	Not Specified
Communications Interface	Wi-Fi, Bluetooth, GPS, (can be disabled)
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	No
Warranties	1 year
ITAR Export Regulations	ITAR regulations may apply
IATA Shipping Restrictions	Li-ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot
Response Time	30 - 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	< 10 lbs
Ruggedness	Has shock/vibration testing (MIL-STD-810G)
Consumables	Minimal maintenance and consumables, sample vials.
Training Required	1 day of training required

Chem 500

Maturity	3 - 6 months (Coming 2018)
User Feedback	No Feedback Total PBA Score- 101/122

Raman Spectroscopy

PRODUCT NAME

Cora 5X00

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Anton Paar USA, Inc.
10215 Timber Ridge Drive
Ashland, VA 23005

www.anton-paar.com

Dr. Richard Larson
+1 804 550 1051
richard.larson@anton-paar.com





Model Number	5100, 5200, 5300, 5500, 5600, 5700
Synopsis	The Cora 5X00 is a transportable single or dual-wavelength benchtop Raman spectrometer. Single-wavelength models (Cora 5100, Cora 5200, or Cora 5300) or dual-wavelength models (Cora 5500, Cora 5600, or Cora 5700).The spectrometer can be directly operated as a space-saving stand-alone instrument via embedded PC and touchscreen or, alternatively, via an external tablet or PC.
Category	Chemical
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Forensics;Screening;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2017
User Feedback Sources	3rd party software for more advanced analyses
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable based on technology
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Amenable based on technology
Tested For Narcotics	Yes, fentanyl related and others (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Factory library; user-defined; 3rd party options
Customize For New Targets	Yes

Cora 5X00

Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	< 1%
Known Interferents Inhibitors	Flourescent light, common Raman inhibitors; Cannot pick out target in an unknown mixture
Start-Up Time From Cold Start To Sample Ready	< 5 minutes
Response Time Sample Application To Output	Seconds
Alarm Capability	Not Applicable
Software Control	On-board, PC
Other Operational Parameters	Excitation wavelength 532 nm (models 5100, 5500,5600), 785 nm (5200, 5600,5700), or 1064 nm (5300, 5500, 5700)

Physical Parameters

Dimensions	12 x 15 x 6.6 in (30.5 x 38 x 16.8 cm)
Weight	Models 5100, 5200, 5300: 14 lbs (6.4 kg) Models 5500, 5600, 5700: 16 lbs (7.3 kg)
Power Requirements	110 / 230 V AC Optional: Li-ion battery

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	No moving parts except the fan. It is mounted in a robust housing protecting the optical setup.
Operating Conditions	0 to 40 °C (32 to 104°F) 0 to 80% RH
Consumables	Sample vials and cuvettes
Solvents Reagents	Not Applicable
Calibration Schedule	Wavelength Calibration: Automatic via software
Suggested Routine Maintenance	Annual maintenance via vendor technician.
Shelf Life	10 years
Unit Cost	$33,000 to $45,000
Expected Operational Life	Indefinite
AvailableAccessories	Fiber optic probe, magnetic sample holder, pill holder
Data Analysis Support Equipment	PC, tablet; windows based
Data File Type Format	CSV
Communications Interface	USB 2.0, Ethernet, Wi-Fi
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Minimal Technical background
Training Available	Yes
Manuals Available	Yes
Warranties	1 year parts and labor
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	< 1% depending on strength of Raman signal
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Fiber optic probe; sample vials
Response Time	ms - seconds
Customize for New Targets	User can add new targets to detector

Cora 5X00

Portability	< 16 lbs
Ruggedness	No ruggedness testing/claims
Consumables	Manufacturer maintenance necessary, sample vials
Training Required	1/2 day to full day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 96/122

Raman Spectroscopy

PRODUCT NAME

Cora 7X00

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Anton Paar USA, Inc.
10215 Timber Ridge Drive
Ashland, VA 23005

www.anton-paar.com

Dr. Richard Larson
+1 804 550 1051
richard.larson@anton-paar.com





Model Number	7100, 7200, 7300
Synopsis	The Cora 7X00 series delivers spectral information without internal algorithms processing spectra or suppressing disturbances. Single wavelength models: 7100 (532 nm), 7200 (785 nm), 7300 (1064 nm). The instrument is operated from external PC via USB. The Cora 7X00 is higher in precision and characterization than the 5X00 models.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response;Forensics;Screening;Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2017
User Feedback Sources	Users requested 3rd party software for more advanced analyses
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable based on technology
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Amenable based on technology
Tested For Narcotics	Yes, fentanyl related and others (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Factory library. 3rd party options.
Customize For New Targets	Yes

Cora 7X00

Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	< 1%
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	< 5 minutes
Response Time Sample Application To Output	Seconds
Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	Resolution: 4 to 5 cm-1

Physical Parameters

Dimensions	16 x 17 x 6 in (41.1 x 42.6 x 15.1 cm)
Weight	Models 7100, 7200: 28.6 lbs (13 kg) Model 7300: 33 lbs (15 kg)
Power Requirements	110 / 230 V AC
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	No moving parts except the fan. It is mounted in a robust housing protecting the optical setup.
Operating Conditions	0 to 40 °C (32 to 104 °F); 0 to 80% RH
Consumables	Sample vials and cuvettes
Solvents Reagents	Not Applicable
Calibration Schedule	Wavelength Calibration: Automatic via software
Suggested Routine Maintenance	Annual maintenance via vendor technician
Shelf Life	10 years
Unit Cost	$54,500
Expected Operational Life	Indefinite
AvailableAccessories	Fiber-optic probes, Optional Software Development kit: DLL and sample code for C/C++
Data Analysis Support Equipment	External Windows based PC, Cora 7000 Software
Data File Type Format	CSV
Communications Interface	USB 2.0
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Minimal technical background
Training Available	Yes
Manuals Available	Yes
Warranties	Yes

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	< 1% depending on strength of Raman signal
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Fiber optic probe; sample vials
Response Time	ms - seconds
Customize for New Targets	User can add new targets to detector
Portability	28.6 lbs (7100, 7200), 33 lbs (7300)

Cora 7X00

Ruggedness	No ruggedness testing/claims
Consumables	Manufacturer maintenance necessary, sample vials
Training Required	1/2 day to full day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 96/122

Raman Spectroscopy

PRODUCT NAME

EZRaman-I



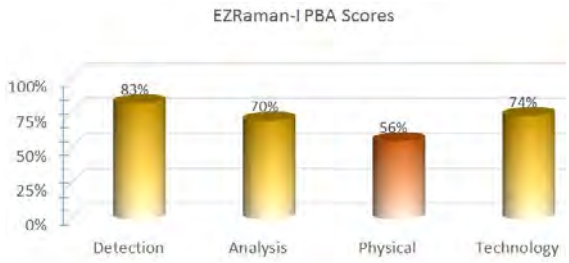
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

TSI, Inc.
500 Cardigan Road
Shoreview, MN 55126

www.tsi.com

Amy Bauer, Ph.D.
+1 800 874 2811
amy.bauer@tsi.com



Synopsis	The EZRaman-I Series are field portable Raman instruments suitable for laboratory and/or field analysis. The EZRaman-I instrument features a spectrograph with CCD cooled to -50ºC, and a high throughput laboratory fiber optics probe. The available laser excitation wavelengths are: 532nm,785nm, and NIR.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Screening;Forensics;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Start-Up Time From Cold Start To Sample Ready	Minutes
Response Time Sample Application To Output	Seconds

EZRaman-I

Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	On-board, PC
Other Operational Parameters	Laser wavelength: 532 nm

Physical Parameters

Dimensions	17 x 13 x 7 in (43 x 33 x 18 cm)
Weight	25 lbs (11 kg)
Power Requirements	Li-ion battery (> 4 hours)
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Field deployable
Operating Conditions	10 to 40°C (50 to 104°F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	5 years
Unit Cost	$37,000
Expected Operational Life	10,000 hour laser lifetime
AvailableAccessories	Inlcudes a high performance fiber optics probe (O.D. > 8) Optional: Microviewer microscope Mviewer-532MRA
Data Analysis Support Equipment	PC, software
Data File Type Format	TXT, SPC, DAT, BMP
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Minimal technical experience
Training Available	yes
Manuals Available	Yes
Warranties	1 year

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Fiber optic probe, sample vials
Response Time	0.2 - 200 seconds depending on sample
Customize for New Targets	User can add new targets to detector
Portability	25 lbs
Ruggedness	No ruggedness testing/claims
Consumables	No maintenance necessary. Sample vials.
Training Required	Couple of hours of training required depending on level of understanding needed by user
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 91/122

Raman Spectroscopy

PRODUCT NAME

EZRaman-N



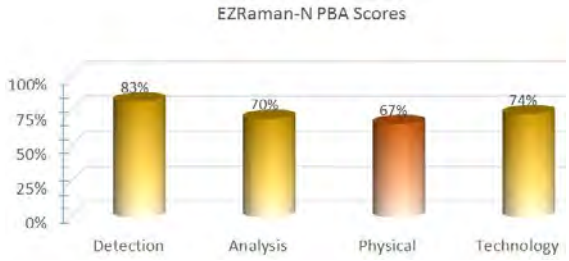
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

TSI, Inc.
500 Cardigan Road
Shoreview, MN 55126

www.tsi.com

Amy Bauer, Ph.D.
+1 800 874 2811
amy.bauer@tsi.com



Synopsis	The EZRaman-N system features a narrow linewidth frequency stabilized laser, high throughput fiber optics probe, and a spectrograph with TE cooled CCD detector. This system can be used with the RamanReader software and requires minimal maintenance.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Screening;Forensics;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable based on technology
Tested for ITF25TICTIMs	Amenable based on technology
Tested For Explosives	Amenable based on technology
Tested For Narcotics	Amenable based on technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	Minutes

EZRaman-N

Response Time Sample Application To Output	Seconds
Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	Laser wavelength: 785 nm

Physical Parameters

Dimensions	11.25 x 8.6 x 7 in (28.5 x 21.8 x 18 cm)
Weight	0.4 lbs (0.19 kg)
Power Requirements	19VDC power supply, 100 to 220 VAC 50/60 Hz input
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Rugged
Operating Conditions	10 to 40°C (50 to 105°F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	5 years
Unit Cost	$20,000
Expected Operational Life	10,000 hour laser lifetime
AvailableAccessories	Microscope adaptor, sample holder
Data Analysis Support Equipment	PC
Data File Type Format	TXT, SPC, DAT, XLS, BMP
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Manuals Available	Yes
Warranties	1 year

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Fiber optic probe, sample vials
Response Time	0.2 - 200 seconds depending on sample
Customize for New Targets	User can add new targets to detector
Portability	0.5 lb
Ruggedness	No ruggedness testing/claims
Consumables	No maintenance necessary. Sample vials.
Training Required	Couple of hours of training required depending on level of understanding needed by user
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 93/122

Raman Spectroscopy

PRODUCT NAME

FirstDefender RM

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Thermo Fisher Scientific, Inc.
2 Radcliff Road
Tewksbury, MA 01876

www.thermoscientific.com

Bob Messier
+1 443 262 9536
robert.messier@thermofisher.com





Model Number	FIRSTDEFENDERRM
Synopsis	FirstDefender® RM is an upgraded version of the FirstDefender. The FirstDefender RM is a hand-held Raman spectrometer designed for onsite identification of unknown solids and liquids. The RM model has the following advantages: faster analysis time, smaller and lighter package, and better mixture analysis.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis; Forensics;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
User Feedback Sources	MRIGlobal hands-on experience, DoD
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes, GA, GB, GD, HD, HNs, VX, RVX, others
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes, Fentanyls, Opiates, others (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	12,000
Customize For New Targets	Yes; users can create custom searchable spectral libraries. Most organic chemicals are capable of producing a searchable Raman spectrum, with the exception of materials that fluoresce when exposed to 785 nm light.
Sample Introduction	Solid; Liquid

FirstDefender RM

Sensitivity Detection Limits	Neat/mixtures; mg; g
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	< 1 minute
Response Time Sample Application To Output	1 minute
Total Run Time	Sample dependent
Alarm Capability	Visual
Software Control	On-board software
Other Operational Parameters	785 nm laser adjustable 75 – 250 mW Raman Spectral Range: 250 – 2875 cm-1, Direct viewing of laser beam or reflected beam is hazardous to the eye. Operators should follow ANSI Z136.1 laser safety guidelines

Physical Parameters

Dimensions	7.6 x 4.2 x 1.75 in (19.3 x 10.7 x 4.4 cm)
Weight	1.8 lbs (800 g)
Power Requirements	Rechargeable internal lithium ion battery SureFire disposable batteries (4 hours operation)
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Independently tested for MIL-STD-810F and IP67 certification
Operating Conditions	–20 to 50°C (-4 to 122°F)
Consumables	4 mL sample vials
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	No user-accessible internal components
Shelf Life	Indefinite
Unit Cost	$50,000
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Software
Data File Type Format	SPC, LRD
Communications Interface	mini SD card, no direct connection to PC
Maintenance Cost	No routine maintenance required

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background
Training Available	Yes
Manuals Available	Yes
Reachback Service	Vendor reachback service available
Warranties	1 year standard, additional years available
ITAR Export Regulations	None
IATA Shipping Restrictions	Lithium ion batteries

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot, integrated vial holder
Response Time	< 40 seconds

FirstDefender RM

Customize for New Targets	User can add new targets to detector
Portability	1.8 lbs
Ruggedness	Can operate at extreme temps (-20-50°C) AND has shock/vibration testing (MIL-STD-810G)
Consumables	No maintenance necessary. Sample vials (as needed).
Training Required	1 day of training required
Maturity	6 - 8 weeks
User Feedback	MRIGlobal tested Total PBA Score- 109/122

Raman Spectroscopy

PRODUCT NAME

FirstDefender RMX

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Thermo Fisher Scientific, Inc.
2 Radcliff Road
Tewksbury, MA 01876

www.thermoscientific.com

Bob Messier
+1 443 262 9536
robert.messier@thermofisher.com





Model Number	FIRSTDEFENDERRMX
Synopsis	The FirstDefender RMX is a hand-held Raman spectrometer designed for onsite identification of unknown solids and liquids. The RMX can be used with the fixed probe, through an integrated vial mode, or mounted to select tactical robots via an integration kit.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis; Forensics;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
User Feedback Sources	MRIGlobal hands-on experience, DoD
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes, GA, GB, GD, HD, HNs, VX, RVX, others
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes, Fentanyls, Opiates, others (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	12,000
Customize For New Targets	Yes; users can create custom searchable spectral libraries. Most organic chemicals are capable of producing a searchable Raman spectrum, with the exception of materials that fluoresce when exposed to 785 nm light.
Sample Introduction	Solid; Liquid

FirstDefender RMX

Sensitivity Detection Limits	Neat/mixtures; mg; g
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	< 1 minute
Response Time Sample Application To Output	1 minute
Total Run Time	Sample dependent
Alarm Capability	Visual
Software Control	On-board software
Other Operational Parameters	785 nm laser adjustable 75 – 250 mW Raman Spectral Range: 250 – 2875 cm-1, Direct viewing of laser beam or reflected beam is hazardous to the eye. Operators should follow ANSI Z136.1 laser safety guidelines

Physical Parameters

Dimensions	7.7. x 4.5 x 2.4 in (19.6 x 11.4 x 6.1 cm)
Weight	2 lbs (919 g)
Power Requirements	Removable and rechargeable lithium ion battery or 123a batteries (> 4 hour operation), DC Wall adapter, 12 V 1.25 A
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	MIL-STD-810-G and IP67 rated
Operating Conditions	–20 to 50°C (-4 to 122°F)
Consumables	4 mL sample vials
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	No user-accessible internal components
Shelf Life	Indefinite
Unit Cost	$56,800
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	mini SD card
Data File Type Format	SPC
Communications Interface	mini SD card, no direct connection to PC
Maintenance Cost	No routine maintenance required

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background
Training Available	Yes
Manuals Available	Yes
Reachback Service	Vendor reachback service available
Warranties	1 year standard, additional years available
ITAR Export Regulations	None
IATA Shipping Restrictions	Lithium ion batteries

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot, integrated vial holder

FirstDefender RMX

Response Time	< 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	2 lbs
Ruggedness	Can operate at extreme temps (-20-50°C) AND has shock/vibration testing (MIL-STD-810G)
Consumables	No maintenance necessary. Sample vials (as needed).
Training Required	1 day of training required
Maturity	6 - 8 weeks
User Feedback	MRIGlobal tested Total PBA Score- 108/122

Raman Spectroscopy

PRODUCT NAME

HandyRam II™

TECHNOLOGY CATEGORY

Molecular Spectroscopy;



Field Forensics, Inc.
1601 3rd Street South
Saint Petersburg, FL 33701

www.fieldforensics.com

Craig Johnson
+1 877 809 4253
cjohnson@fieldforensics.com



Synopsis	The HandyRam II is a handheld Raman spectrometer with point-and-shoot capability. It is able to identify illicit narcotics, controlled drugs, explosives materials, pharmaceutical ingredients and a wide range of unknown substances in seconds. It also analyzes and reports the components of mixtures. The HandyRam™ II features a durable and waterproof construction yet can also be connected to a PC for detailed spectral analysis, library and record management. It also includes a vial-measurement receptacle in which the HandyRam™ II analyzes the contents of a vial.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Screening;Forensics;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2018
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	>1,000
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%, µg

HandyRam II™

Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	Seconds
Response Time Sample Application To Output	10 seconds to 5 minutes depending on sample and mode of detection
Alarm Capability	Visual
Software Control	On-board, PC
Other Operational Parameters	Can detect and identify up to 5 components in a mixture. Laser Excitation : 785 nm, 300 mW adjustable; Spectral Range: 400 to 2300 cm-1, 10 cm-1 resolution

Physical Parameters

Dimensions	6.2 x 4.0 x 1.1 in (15.8 x 10.1 x 2.9 cm)
Weight	1.4 lbs (650 g)
Power Requirements	Rechargeable Li-ion battery (4 to 8 hours)

Logistical Parameters

Transportability	Pocket Size
Durability	MIL-STD-810G (shock and vibration tested); IP67
Operating Conditions	-20 to 50°C (-4 to 122 °F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Calibration Schedule	Daily. Lens cap has built in calibration standard.
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Pouch, shoulder strap, laser aperture cap with polystyrene target, sample vials, point-and-shoot adapter, vial holder, 90° angle adapter, tripod attachment point.
Data Analysis Support Equipment	PC, software
Data File Type Format	TXT, CSV, JCAMP
Communications Interface	USB, Wi-Fi, ethernet
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Warranties	Yes
IATA Shipping Restrictions	Li-ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%, High ug
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot, vials
Response Time	10 seconds to 5 minutes depending on sample and mode
Customize for New Targets	User can add new targets to detector
Portability	1.4 lbs
Ruggedness	Can operate at extreme temps (-20-50°C) AND has had shock/vibration testing (MIL-STD-810G).
Consumables	No maintenance needed. Sample vials (as needed)

HandyRam II™

Training Required	Less than 4 hours of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 107/122

Raman Spectroscopy

PRODUCT NAME

IM-52

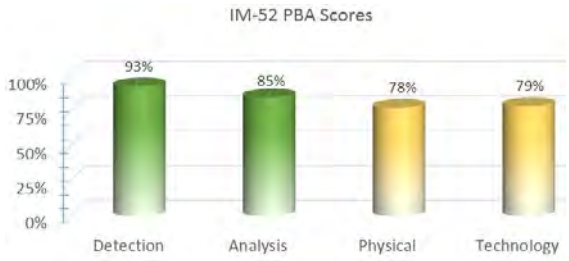
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Metrohm
407 South 2nd Street
Laramie, WY 82070

www.metrohm.com

Bryan Ray, Ph.D.
+1 307 399 0408
bryan.ray@metrohm.com





Synopsis	The IM-52 is a compact, portable785 nm laser Raman microscope that provides spatial imaging for exact location of the interrogation laser. Includes a 3 megapixel imager with epi-illumination for both opaque and transparent samples. Capable of sampling micron to macroscopic sample sizes, as well as vial/cuvette. The IM-52 is available in two versions: high resolution (4 cm-1), and low resolution (8 cm-1).
Category	Chemical; Explosives;
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2013
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Allows creation of user libraries
Sample Introduction	Liquid; solid
Sensitivity Detection Limits	%

IM-52

Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	20 seconds
Response Time Sample Application To Output	< 20 seconds
Total Run Time	< 1 minute
Alarm Capability	Not Applicable
Software Control	Yes
Other Operational Parameters	532 nm version: 50mW power, 2048 pixel detector, 200 - 3200 cm-1 spectral range, 7 cm-1 resolution. 785 nm version: 100mW power, 2048 pixel detector TE cooled to -10C, 200-2000cm-1 (or 200-3200cm-1) spectral range, 4 cm-1 (or 8 cm-1) resolution.

Physical Parameters

Dimensions	532nm: 10.5 x 15.5 x 13 in (26.7 x 39.4 x 33.0 cm) 785nm: 10 x 15 x 14.5 in (25.4 x 38.1 x 36.8 cm)
Weight	532nm: 24 lbs (10.9 kg) 785nm: 21.4 lbs (9.7 kg)
Power Requirements	AC operation only; no battery
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Field deployable, in-house shock and vibration tested
Operating Conditions	-20 to 40° C (-4 to 104°F)
Consumables	2 mL vial
Solvents Reagents	Not Applicable
Calibration Schedule	Automatic internal calibration
Suggested Routine Maintenance	Not Applicable
Shelf Life	5 years
Unit Cost	$40,000
Expected Operational Life	10,000 hours (laser source)
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Instrument control and library build capability via laptop software
Data File Type Format	PDF, SPC, ASCII x,y table, LIB (proprietary format)
Communications Interface	Not Specified
Maintenance Cost	No routine maintenace required

Training, Shipping, And Other Information

Operator Skills Required	No technical experience for operation, moderate technical experience for library development.
Training Available	Yes
Manuals Available	Yes
Reachback Service	No
Warranties	1 year parts and labor
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures

IM-52

Sample Preparation	Vials. Need to manipulate sample.
Response Time	< 20 seconds
Customize for New Targets	User can add new targets to detector
Portability	24 lbs
Ruggedness	Has had (in house) vibration testing
Consumables	No maintenance necessary. Sample vials (as needed).
Training Required	1 day of training required
Maturity	2 - 6 weeks
User Feedback	MRIGlobal tested Total PBA Score- 106/122

Raman Spectroscopy

PRODUCT NAME

InPhochelle

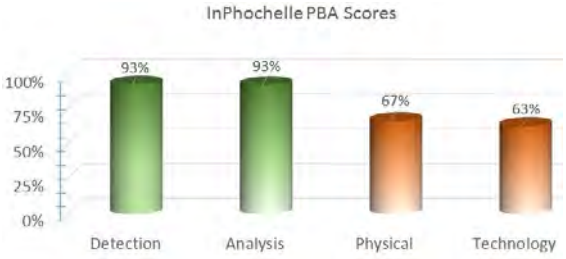
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

InPhotonics, Inc.
111 Downey Street
Norwood, MA 02062

www.inphotonics.com

Rob Forney
+1 781 440 0202
rob.forney@inphotonics.com





Model Number	InPhochelle 670, InPhochelle 785
Synopsis	A Raman instrument, which uses one of two laser options a 670 nm excitation and a 785 nm excitation, to measure a sample. A probe is either placed in the sample or up to the sample.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 60 to 90 days for delivery
Readiness Level	9
Market Entry Date	2014
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	243
Customize For New Targets	Yes
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	%

InPhochelle

Known Interferents Inhibitors	Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself. However, it is still capable of detecting a target in the presence of an unknown mixture. Fluorescence, either from the unknown, or a component or interferent in the unknown, can produce intense interference. The technique is sensitive to ambient infrared radiation.
Start-Up Time From Cold Start To Sample Ready	5 minutes
Response Time Sample Application To Output	1 to 10 seconds
Total Run Time	5 minutes
Alarm Capability	Not Applicable
Software Control	On-board, PC
Other Operational Parameters	Spectral range: 100 to 3500 cm-1 measured in a single exposure; TE cooled detector (-55°C); Excitation wavelength: 670 nm or 785 nm

Physical Parameters

Dimensions	21 x 10.5 x 5 in (53 x 27 x 13 cm)
Weight	17 lbs (7.7 kg)
Power Requirements	AC Power

Logistical Parameters

Transportability	Person-Portable
Durability	Rugged
Operating Conditions	0 to 45°C (32 to 113°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Fixed optics provide permanent calibration under normal operating conditions. Intensity correction performed automatically through software.
Suggested Routine Maintenance	User can perform basic cleaning; Replace laser every 4 to 5 years
Shelf Life	10 years
Unit Cost	$45,000
Expected Operational Life	Indefinite
AvailableAccessories	Extra libraries available ($1000 each), RamanProbeTM, Class I sample holder
Data Analysis Support Equipment	Basic system includes data acquisition software for control of spectrometer. GRAMS AI manipulation software, PC data station running Windows XP or Windows 7 required for operation.
Data File Type Format	SPC, JPEG
Communications Interface	USB
Maintenance Cost	Extra libraries $1000 each

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year parts and labor
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%

InPhochelle

Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Fiber optic probe
Response Time	1 - 10 seconds
Customize for New Targets	User can add new targets to detector
Portability	17 lbs
Ruggedness	Can operate in extreme temps (0-45°C)
Consumables	User can perform bsic cleaning. Replace laser every 4-5 years. Sample containers as needed.
Training Required	1 - 6 hours of training required depending on level of user
Maturity	8 weeks
User Feedback	No Feedback Total PBA Score- 103/122

Raman Spectroscopy

PRODUCT NAME

InPhotote

TECHNOLOGY CATEGORY

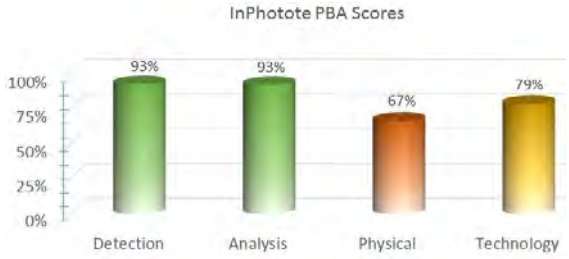
Molecular Spectroscopy;



InPhotonics, Inc.
111 Downey Street
Norwood, MA 02062

www.inphotonics.com

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Synopsis	The InPhotote is a Raman spectrometer system packaged in a portable carrying case. A frequency-stabilized laser, spectrograph, and TE-cooled CCD detector are integrated into the case. Most samples can be measured through packaging materials (i.e., glass and plastic) with the RamanProbe. The probe is compact and lightweight for hand-held use. Raman spectral data files are stored in Grams AI format and can be searched against reference libraries using SpecID. Two models are available: SR (short range): 250 to 1800 cm–1, 4 to 6 cm–1 resolution LR (long range): 250 to 2300 cm–1, 8 to 10 cm–1 resolution. The spectrometer is operated via separate laptop computer (supplied).
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2003
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not applicable; spectra of biological materials may be collected but may not be characteristic of a specific agent.
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

InPhotote

Library Size	Supplied with a library of 243 Raman spectra. Additional Raman libraries may be purchased from InPhotonics and other sources.
Customize For New Targets	Yes; users can create custom libraries using Grams/Spectral ID software package.
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself. Fluorescence, either from the unknown, or a component or interferent in the unknown, can produce intense interference. The technique is sensitive to ambient infrared radiation.
Start-Up Time From Cold Start To Sample Ready	15 minutes
Response Time Sample Application To Output	1 to 10 seconds
Total Run Time	1 to 5 minutes, including library search
Alarm Capability	Not Applicable
Software Control	InPhotote acquisition software, GRAMS AI spectral display software (from Thermo Electron) operating under Windows XP on an ultra-thin notebook computer. Chemical identification software, quantitative analysis software, and Forensic Raman Spectral Library of 243 materials.
Other Operational Parameters	Optional fiber optic probe extends sampling point up to 200 m from the spectrometer Stabilized 785 nm diode laser with 0.1 nm linewidth, 300 m W output. CLASS IIIB LASER.

Physical Parameters

Dimensions	16 x 10 x 9 in (41 x 25 x 23 cm)
Weight	22 lbs (10 kg)
Power Requirements	110 to 240 V AC using external AC/DC adapter (included), 12 V DC, or external battery pack
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Optical components are shock-mounted in a rugged, water-resistant case.
Operating Conditions	0 to 30°C (32 to 86°F); 0 to 95% RH
Consumables	Sample containers, as needed
Solvents Reagents	Not Applicable
Calibration Schedule	Yes
Suggested Routine Maintenance	Replace laser after 4 years of use
Shelf Life	10 years
Unit Cost	$28,000
Expected Operational Life	Indefinite
AvailableAccessories	Sample light box to eliminate interference from ambient light (optional), PC
Data Analysis Support Equipment	Laptop computer
Data File Type Format	SPC, JPEG, SDC
Communications Interface	PC/laptop
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Technical background needed to operate the unit, assess the quality of acquired spectra, and perform library searches. Advanced skills needed to perform manual interpretation of spectra.
Training Available	Available from vendor at additional cost
Manuals Available	Operator’s manual
Reachback Service	Not Specified
Warranties	1 year parts and labor

InPhotote

ITAR Export Regulations	Direct viewing of laser beam or reflected beam is hazardous to the eye. Operators should follow ANSI Z136.1 laser safety guidelines.
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Fiber optic probe
Response Time	1 - 10 seconds
Customize for New Targets	User can add new targets to detector
Portability	22 lbs
Ruggedness	Has had shock/vibration testing
Consumables	User can perform bsic cleaning. Replace laser every 4-5 years. Sample containers as needed.
Training Required	1 - 6 hours of training required depending on level of user
Maturity	6 weeks
User Feedback	MRIGlobal tested Total PBA Score- 106/122

Raman Spectroscopy

PRODUCT NAME

Insight200M Liquid Explosion Detection System

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Agilent Technologies
www.agilent.com

Matthew Bloomfield, Ph.D.
+1 703 251 4865
matthew.bloomfield@agilent.com





Synopsis	The Insight200M Liquid Explosion Detection System is a Raman/SORS device that screens all container types, including metals. The instrument scans the contents of the container and gives a yes or no confirmation as to whether it identified anything in its library.
Category	Chemical;Explosives;
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Type	Instrument;
Availability	Commercially Available: 60 to 90 days for delivery
Readiness Level	9
Market Entry Date	2016
Number Of Units Fielded	>500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Small library
Customize For New Targets	Yes via manufacturer
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	g
Known Interferents Inhibitors	Fluorescence
False Positive Rates	< 1% False Alarm Rate for Non-metallic containers, 1.5% False Alarm Rate for all containers

Insight200M Liquid Explosion Detection System

False Negative Rates	< 1% False Alarm Rate for Non-metallic containers, 1.5% False Alarm Rate for all containers
Start-Up Time From Cold Start To Sample Ready	Seconds
Response Time Sample Application To Output	< 5 seconds
Total Run Time	Seconds
Alarm Capability	Audible and visual
Software Control	On-board, PC
Other Operational Parameters	Class 1 laser system interlocked, CE marked, Spectral Range: 3 - 1800 cm-1

Physical Parameters

Dimensions	22 x 21 x 16.4 in (562 x 536 x 417 mm)
Weight	< 55 lbs (25 kg)
Power Requirements	90 to 264VAC 50 to 60Hz < 200W continuous

Logistical Parameters

Transportability	Benchtop/Fixed;
Durability	Rugged
Operating Conditions	5 to 50°C (41° to 122°F); up to 95% RH, non-condensing
Consumables	Sample vials
Solvents Reagents	Not Applicable
Calibration Schedule	Auto-calibration
Suggested Routine Maintenance	Recommended biannual preventative maintenance performed by manufacturer
Shelf Life	5 years
Expected Operational Life	5 years
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	PC, software
Communications Interface	Ethernet, USB 2.0
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Warranties	Yes

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Place sample in detection compartment
Response Time	< 5 seconds
Customize for New Targets	Manufacturer can add new targets to detector
Portability	55 lbs
Ruggedness	Can operate at extreme temps (5-50°C)
Consumables	Manufacturer maintenance necessary
Training Required	Less than 4 hours
Maturity	8 - 12 weeks
User Feedback	No Feedback Total PBA Score- 87/122

Raman Spectroscopy

PRODUCT NAME

Inspector Series (300, 500)

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

SciAps, Inc.
2 Constitution Way
Woburn, MA 01801

www.sciaps.com

Don Sackett
+1 339 927 9455
sales@sciaps.com





Synopsis	The Inspector series of Raman analyzers are designed for in-field operation. They feature an ergonomically designed shape and a comfortable hand-strap. They are rugged, field hardened and wide-ranging. The Inspector 300 and 500 are very similar, but have differing lasers and detectors. The 300 model is marketed for speed and range of compounds. The 500 model specializes in the analysis of highly fluorescent samples.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	CWC (Chemical Warfare Agents, TICS, TIMS), Law Enforcement (Narcotics, Explosives), Chemical Library, Pharmaceutical, Plastics
Customize For New Targets	Yes
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	%

Inspector Series (300, 500)

Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	10 seconds
Response Time Sample Application To Output	5 to 10 seconds
Total Run Time	15 to 30 seconds
Alarm Capability	Not Applicable
Software Control	On-board
Other Operational Parameters	Excitation Wavelenghth: 1030 nm (500 model), 785 nm (300 model) Laser: 300 mW 1030 nm, Class III B. Spectral Range: 150 - 2450 cm-1

Physical Parameters

Dimensions	7.5 x 6.9 x 1.7 in (19 x 17.6 x 4.4 cm)
Weight	3.75 lbs (1.7 kg)
Power Requirements	4 hour batteries

Logistical Parameters

Transportability	Handheld
Durability	Rugged, MIL SPEC 810G and IP67 rated
Operating Conditions	-20 to 40°C (-4 to 105°F)
Consumables	Desiccants and vials
Solvents Reagents	Not Applicable
Calibration Schedule	Can perform a self-test at regular intervals which are typically performed once a month
Suggested Routine Maintenance	Replace desiccants every 3 months
Shelf Life	10 years
Unit Cost	$28,000
Expected Operational Life	Indefinite
AvailableAccessories	Point-and-shoot adapter allowing for analysis of thick or double-bagged samples, or sample bottles, Right-Angle Adapter, Barcode Data Entry.
Data Analysis Support Equipment	NuSpec or NuSpec Pro software
Data File Type Format	Not Specified
Communications Interface	Wi-Fi, USB, Bluetooth
Maintenance Cost	Additional libraries: $1,000 to $2,000

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	No
Warranties	1 year
ITAR Export Regulations	ITAR regulations may apply
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot, sample vials
Response Time	30 - 40 seconds

Inspector Series (300, 500)

Customize for New Targets	User can add new targets to detector
Portability	3.75 lbs
Ruggedness	Has shock/vibration testing (MIL-STD-810G)
Consumables	Minimal maintenance and consumables, sample vials.
Training Required	1 day of training required
Maturity	3 - 6 weeks
User Feedback	MRIGlobal tested Total PBA Score- 104/122

Raman Spectroscopy

PRODUCT NAME

i-Raman® Series



TECHNOLOGY CATEGORY

Molecular Spectroscopy;

B&W Tek
19 Shea Way
Newark, DE 19713

www.bwtek.com

+1 302 368 7824
marketing@bwtek.com



Model Number	i-Raman, i-Raman Plus, i-Raman Pro, i-Raman EX
Synopsis	The i-Raman offers 532nm and 785nm excitation wavelength standard and high resolution configurations measuring from 65 cm-1 to 4000 cm-1. All i-Raman systems feature a TE-cooled CCD detector. The i-Raman Plus Using a high quantum efficiency CCD array detector with deeper cooling and high dynamic range. The i-Raman Pro is a fully integrated system with a touchscreen tablet computer and a battery option for portability. The i-Raman EX features a 1064nm version of CleanLaze® excitation laser which minimizes the effect of fluorescence. It provides spectral resolution of 9.5 cm-1 and a spectral coverage range from 100 to 2500 cm-1
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;Surface Enhanced Raman Spectroscopy (SERS);
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response;Forensics;Screening;
Type	Instrument
Availability	Commercially Available: 15 to 30 days for delivery
Readiness Level	9
Market Entry Date	2003
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;

i-Raman® Series

Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence
Response Time Sample Application To Output	Seconds
Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	TE Cooling Temperature: 10°C Excitation wavelength: 532nm and 785nm Spectral Range: 150-4000 cm-1 (532S), 150-3300 cm-1 (532H), 150-3200 cm-1 (785S), 150-2700 cm-1(785H)

Physical Parameters

Dimensions	6.7 x 13.4 x 9.2 in (17 x 34 x 23.4 cm)
Weight	~6.6 lbs (3 kg)
Power Requirements	5V DC at 8 Amps
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Field deployable
Operating Conditions	10 to 35°C (50 to 95°F) 10 to 85% RH
Consumables	Sample vials
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Fiber-optic raman probe, cuvette holder, probe holder, flow cells
Data Analysis Support Equipment	PC, Software BWIQ
Data File Type Format	TXT, CSV, SPC, PDF, B&W Tek proprietary data format
Communications Interface	USB 2.0
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Minimal technical background
Training Available	Yes
Manuals Available	Yes
Warranties	1 year

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Fiber optic probe (immersion and trigger); cuvettes
Response Time	seconds
Customize for New Targets	User can add new targets to detector
Portability	6.6 lbs
Ruggedness	No ruggedness testing/claims
Consumables	Manufacturer maintenance necessary
Training Required	1 day of training required
Maturity	4 weeks
User Feedback	No Feedback Total PBA Score- 99/122

Raman Spectroscopy

PRODUCT NAME

iXR Raman Spectrometer

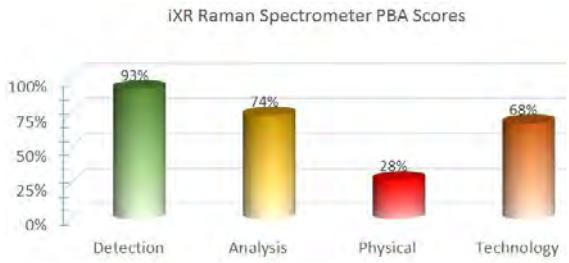
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Thermo Fisher Scientific, Inc.
www.thermofisher.com

King Chambers
+1 501 765 2985
king.chambers@thermofisher.com





Model Number	IQLAADGABFFAHCMBJH
Synopsis	The Thermo Scientific™ iXR Raman Spectrometer offers performance comparable to laboratory research grade Raman spectrometers, and it is suitable for demanding research, product development, and manufacturing needs. It is made specifically for hyphenated techniques. Configurable excitation laser wavelengths and spectral resolution allow for maximizing the performance of particular materials. The iXR Raman spectrometer can be coupled with rheology, hot melt extrusion, lab and manufacturing scale processing equipment.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Laboratory Analysis;
Type	Instrument
Availability	Commercially Available: 30 to 60 days for delivery
Readiness Level	9
Market Entry Date	2017
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	Neat/mixtures; mg; g; %

iXR Raman Spectrometer

Known Interferents Inhibitors	Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself.
Start-Up Time From Cold Start To Sample Ready	Minutes
Response Time Sample Application To Output	10 seconds to a couple minutes depending on library size
Total Run Time	Minutes
Software Control	PC
Other Operational Parameters	Supported excitation lasers: 455 nm, 532 nm, 785 nm, Spectral Range (variable): 50 - 3500 cm-1, 50 - 6000 cm-1 (for extended range)

Physical Parameters

Dimensions	14.6 x 11.4 x 17.3 in (37 x 29 x 44 cm)
Weight	55 lbs (25 kg)
Power Requirements	100-240 VAC 47-63 Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed
Durability	Not militarized, drop sensitive.
Operating Conditions	16 to 27°C (61 to 81°F), 20 to 80% RH
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Preventative maintenance performed via manufacturer
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Thermo Scientific OMNIC software suite
Data File Type Format	SPA, XLS
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Technical background
Training Available	Yes. 2 hour on-site or at manufacturer facility for advanced classes.
Manuals Available	Yes
Reachback Service	Yes
Warranties	1 year, extended warranties also available
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g; %
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Need to manipulate sample
Response Time	10 seconds - couple of minutes depending on library size
Customize for New Targets	User can add new targets to detector
Portability	55 lbs
Ruggedness	No ruggedness testing/claims
Consumables	Manufacturer maintenance necessary
Training Required	2 hours of training required
Maturity	6 - 8 weeks

iXR Raman Spectrometer

User Feedback	No Feedback Total PBA Score- 92/122

Raman Spectroscopy

PRODUCT NAME

MacroRAM™

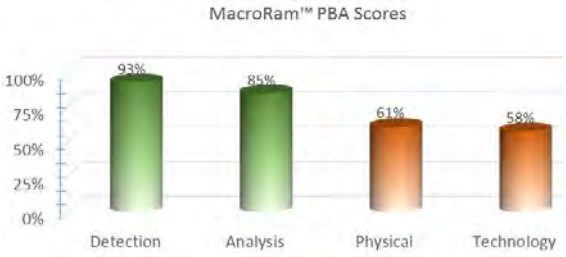
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Horiba Scientific
3880 Park Avenue
Edison, NJ 08820

www.horiba.com

Michael O'Weimrin
+1 908 209 6762
michael.oweimrin@horiba.com





Synopsis	The MacroRam™ is a Raman spectrometer that irradiates its sample with a 785 nm diode-pumped solid-state laser, with tunable output power from 7 mW to 450 mW. It is capable of operating in Stokes or Stokes/anti-stokes modes. It has the ability to be equipped with an external probe for remote sample measurements.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Laboratory Analysis;Screening;Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2017
Number Of Units Fielded	1,000 to 10,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	BioRat Know-it-All Library, few hundred entries in narcotics library
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence

MacroRAM™

Start-Up Time From Cold Start To Sample Ready	Seconds
Response Time Sample Application To Output	< 1 second
Total Run Time	Seconds
Alarm Capability	Not Applicable
Software Control	On-board, PC, Remote
Other Operational Parameters	Excitation wavelength: 785 nm; Class 1, internal sample compartment Class 3b, external probe, 7mW to 450 mW Spectral Range: 100 to 3400 cm-1 (Stokes), 1700 to 1700 cm-1 (Stokes/anti-Stokes), Detector cooled to -50°C; Capable of photoluminescence detection.

Physical Parameters

Dimensions	17 x 17 x 15 in (43 x 43 x 38 cm)
Weight	45 lbs (20.4 kg)
Power Requirements	Universal AC single-phase input power; 100 to 240 V AC; line frequency 50 to 60 Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed
Durability	Shock and vibration tested
Operating Conditions	15 to 30°C (59 to 86°F); < 75% RH
Consumables	Lasers, light bulbs, sample vials
Solvents Reagents	Not Applicable
Calibration Schedule	Auto-calibration
Suggested Routine Maintenance	No maintenance necessary. Service contracts for 1 to 2 visits per year are recommended.
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	External fiber optic sampling probe, different sample cells (quartz, flow cell in line, temperature controlled, etc.)
Data Analysis Support Equipment	LabSpec 6 Spectroscopy software; Windows 7 OS
Data File Type Format	ASCII, SPC
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Technical background
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes
Warranties	1 year

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Need to manipulate sample. Samples without containment.
Response Time	< 1 second
Customize for New Targets	User can add new targets to detector
Portability	45 lbs
Ruggedness	Has had shock/vibration testing

MacroRAM™

Consumables	Minimal user provided maintenance. Lasers, light bulbs, sample vials (as needed)
Training Required	2 - 3 days of training required
Maturity	< 4 weeks
User Feedback	No Feedback Total PBA Score- 99/122

Raman Spectroscopy

PRODUCT NAME

Mira DS



TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Metrohm
407 South 2nd Street
Laramie, WY 82070

www.metrohm.com

Bryan H Ray, PH.D.
+1 307 399 0408
bryan.ray@metrohm.com



Synopsis	The Mira DS is a handheld Raman device designed for illicit substances and explosives identification. A stand-off attachment and a contact ball probe attachment are available and is compatible with SERS substrates.
Category	Chemical; Explosives;
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2018
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Yes
Tested For Explosives	RDX, TNT, Urea, Ammonium nitrate, Commerical blasting compounds, others
Tested For Narcotics	Methamphetamine, coaine, designer drugs, cannabinoids, fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700, others
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Optional libraries available for purchase such as the complete collection of Raman spectra with >8,690 entries
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence

Mira DS

Start-Up Time From Cold Start To Sample Ready	Seconds
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds to minutes
Alarm Capability	Visual
Software Control	On-board, PC
Other Operational Parameters	Laser wavelength 785 nm ± 0.5 nm. Wavelength range 400 to 2 300 cm–1 with resolution 8 to 10 cm–1 (FWHM) across range. Class 3B laser.

Physical Parameters

Dimensions	3.5 x 5 x 1.8 in (8.8 x 12.7 x 4.5 cm)
Weight	1.6 lbs (0.75 kg)
Power Requirements	2 AA Batteries, Lithium ion (>4+ hours)
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Rugged. Military Spec 810G, IP67.
Operating Conditions	-20 to 50°C (-4 to 122°F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Calibration Schedule	Yes
Suggested Routine Maintenance	Not Applicable
Shelf Life	5 years
Expected Operational Life	10,000 hours (laser source)
AvailableAccessories	Stand-off and contact ball probe sampling attachments. right angle adapter, Cal Standard
Data Analysis Support Equipment	HAZMASTERG3 Software App
Communications Interface	USB, Bluetooth to an Android device
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes
Warranties	16 months
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Standoff attachment
Response Time	seconds
Customize for New Targets	User can add new targets to detector
Portability	1.6 lbs
Ruggedness	Can operate at extreme temps (-20-50°C) AND has shock/vibration testing (mil-spec 810G)
Consumables	No consumables or scheduled maintenance necessary.

Mira DS

Training Required	1 day of training required
Maturity	2 - 6 weeks
User Feedback	No Feedback Total PBA Score- 112/122

Raman Spectroscopy

PRODUCT NAME

Mobile µ-Raman and µ-BioRaman

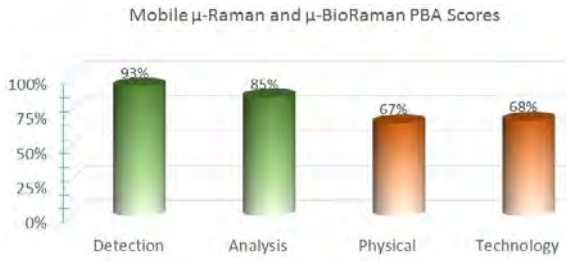
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Bio Tools
17546 Bee Line Highway
Jupiter, Florida 33458

www.btools.com

Rina Dukor
+1 561 625 0133
info@btools.com





Model Number	ER (Extended Range) and HR (High Resolution)
Synopsis	The Mobile µ-Raman is a lab-quality portable Raman microscope. It comes as two models: Extended Range (200 - 2300 cm-1) and High Resolution (4 cm-1).
Category	Chemical; Biological
Detection Method	Raman Spectroscopy;Surface Enhanced Raman Spectroscopy (SERS);
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Forensics;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2015
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Yes
Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	Not Specified

Mobile µ-Raman and µ-BioRaman

Response Time Sample Application To Output	Minutes
Total Run Time	Minutes
Alarm Capability	Not Applicable
Software Control	On-board
Other Operational Parameters	785nm laser, 0 to 100mW adjustable. Objectives 20x to 100x. P2T stage, SERS.Spectral Range: 200-2300 cm-1 (ER); 200-2000 cm-1 (HR), Resolution: 8 cm-1 (ER); 4 cm-1 (HR)

Physical Parameters

Dimensions	11.4 x 25.4 x 19 in (29 x 64.6 x 48.3 cm)
Weight	11 lbs (5 kg)
Power Requirements	Rechargeable battery pack (4 hours); External power supply: 24 V DC, 4 A Output, 110-220 VAC

Logistical Parameters

Transportability	Person-portable
Durability	Rugged
Operating Conditions	Not Specified
Consumables	Vials, Cuvettes, microscope slides
Solvents Reagents	Not Applicable
Calibration Schedule	Not Specified
Suggested Routine Maintenance	Replace laser (10,000 hour lifetime)
Shelf Life	Indefinite
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	BioRad KnowItAll for Fibers, Powders, General Raman; BioTools world class. Protein Library for both solids & liquids; Bacteria – Proprietary bacterial reference library
Data File Type Format	Not Specified
Communications Interface	USB
Maintenance Cost	Not Specified

Training, Shipping, And Other Information

Operator Skills Required	Technical background
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes
Warranties	1 year
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	cuvettes/vials, slides
Response Time	seconds to minutes depending on sample
Customize for New Targets	User can add new targets to detector
Portability	11 lbs
Ruggedness	No ruggedness testing/claims
Consumables	No required maintenance, vial/cuvette and slide consumables

Mobile µ-Raman and µ-BioRaman

Training Required	1 day of training required
Maturity	4 weeks
User Feedback	No Feedback Total PBA Score- 102/122

Raman Spectroscopy

PRODUCT NAME

NanoRam

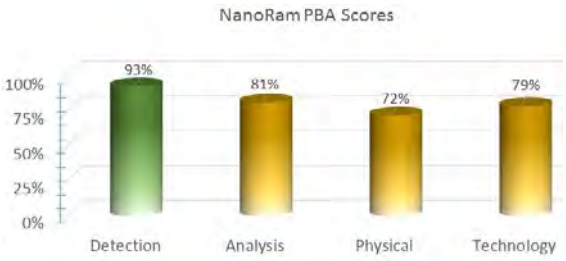
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

B&W Tek
19 Shea Way
Newark, DE 19713

www.bwtek.com

+1 302 368 7824
marketing@bwtek.com





Synopsis	The NanoRam is a handheld Raman instrument for nondestructive identification and verification of materials. The NanoRam comes standard with proprietary NanoRam OS embedded software, which allows for identification and verification, library and method development, and data storage/ transfer as well as NanoRam ID PC software for data and methods management, allowing customers to export data and generate reports.
Category	Chemical
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response;Forensics;Screening;
Type	Instrument
Availability	Commercially Available: 15 to 30 days for delivery
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable based on technology
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Amenable based on technology
Tested For Narcotics	Amenable based on technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	110 USP standard pharmaceuticals
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence

NanoRam

Response Time Sample Application To Output	Seconds
Alarm Capability	Visual
Software Control	PC
Other Operational Parameters	Excitation Wavelength 785 nm. Spectral range 176cm-1 to 2900cm-1

Physical Parameters

Dimensions	8.8 x 3.9 x 2.0 in (22 x 10 x 5 cm)
Weight	2.5 lbs (1.2 kg)
Power Requirements	Rechargeable Li-ion, >5 hours Continuous Operation; AC Adapter: Output: DC 12V, 2A Minimum
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	IP64
Operating Conditions	-20 to 45 °C (-4 to 133°F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Maintenance needs to be performed by a trained technician.
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Point & Shoot, Vial Holder, Polystyrene Validation Cap, Immersion Probe, Large Bottle Adapter, right angle adapter, tablet holder, shoulder bag
Data Analysis Support Equipment	NOS (Embedded), NID (PC), Touchscreen Interface
Data File Type Format	TXT, CSV, SPC
Communications Interface	Ethernet, Wi-Fi
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes, on-site
Manuals Available	Yes
Warranties	1 year
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot; cuvettes
Response Time	< 1 minute
Customize for New Targets	User can add new targets to detector
Portability	2.5 lbs
Ruggedness	Can operate at exteme temps (-20-45°C)
Consumables	Minimal user maintenance. Sample vials
Training Required	1 day of training required
Maturity	4 weeks
User Feedback	Positive Feedback

Raman Spectroscopy

PRODUCT NAME

PeakSeeker

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Agiltron
www.ramansystems.com

+1 781 935 1200
sales@ramansystems.com





Model Number	PEK-785, PRO-785, PRO-785E, PRO-532
Synopsis	The PeakSeeker is a portable desktop Raman spectrometer. Sampling accessories include a vial holder for liquids and powders, and a fiber optic probe for remote sample access. The PeakSeeker Pro spectrometers offer either a 532 nm or 785 nm excitation laser.
Category	Chemical
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Laboratory Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Amenable by technology
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	Seconds

PeakSeeker

Response Time Sample Application To Output	Seconds
Total Run Time	Seconds to minutes
Alarm Capability	Not Applicable
Software Control	On-board, PC
Other Operational Parameters	Excitation Wavelength: 785 cm-1 Spectral Range: 200 to 3000 cm-1 Spectral Resolution: 9 cm-1 Laser spot size = 0.1 to 0.3 mm

Physical Parameters

Dimensions	14.2 x 7.5 x 4.3 in (36 x 29 x 11 cm)
Weight	< 8 lbs (3.6 Kg)
Power Requirements	12VDC from power adapter input, 100/240 VAC at 50/60 Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed
Durability	Rugged
Operating Conditions	-25 to 45°C (-13 to °113F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	RSIQ-QUANT is a multivariate analysis tool and RSIQ-CFR supports 21 CFR Part 11 compliance for cGMP electronic records and signatures.
Data Analysis Support Equipment	RSIQ software
Communications Interface	USB
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	Neat/mixtrues; mg; g; %
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot; sample vials
Response Time	seconds
Customize for New Targets	User can add new targets to detector
Portability	< 8 lbs
Ruggedness	Can operate at extreme temps (-25-45°C)
Consumables	Minimal user maintenance. Sample vials
Training Required	1 day of training required
Maturity	8 - 12 weeks
User Feedback	No Feedback Total PBA Score- 104/122

Raman Spectroscopy

PRODUCT NAME

PGR-1064

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Chemring Detection Systems
4205 Westinghouse Commons Drive
Charlotte, NC 28273

www.chemringds.com

Mirela Popa
+1 980 235 2326
mpopa@chemringsensors.com





Synopsis	The PGR-1064™ device is a handheld Raman chemical identifier that provides laboratory quality measurements for screening unknown substances. It delivers reliable results in seconds. It is ruggedized to withstand rough handling in the field or everyday life usage.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2015
User Feedback Sources	MRIGlobal hands-on experience
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes, including fentanyl and 6 of its analogues. (carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	5,000+
Customize For New Targets	Yes
Sample Introduction	Particle
Sensitivity Detection Limits	Neat/mixtures; mg; g
Known Interferents Inhibitors	Not Specified

PGR-1064

Start-Up Time From Cold Start To Sample Ready	< 10 seconds
Response Time Sample Application To Output	< 10 seconds
Total Run Time	1 minute
Alarm Capability	Not Specified
Software Control	On board via color transflective LCD
Other Operational Parameters	Spectral Resolution: 8 cm-1 full-width at half-maximum (FWHM) across range; Laser (excitation wavelength):1064 nm +/- 0.5 nm, 2 cm-1 line with stability <0.1 cm-1

Physical Parameters

Dimensions	2.5 x 7.5 x 6.6 in (6.4 x 19 x 16.7 cm)
Weight	2.25 lbs (1.0 kg)
Power Requirements	Rechargeable Lithium Ion 3-cell pack, charger integrated into handheld; 10+ hours during typical operation at 25°C; Wall plug transformer 110-240 VAC 50/60 Hz

Logistical Parameters

Transportability	Handheld
Durability	Rugged; MIL-STD 810G Method 514.6 Category 24 vibration testing
Operating Conditions	-20 to 40°C (-4 to 104°F)
Consumables	Sample vials, Sampling utensils
Solvents Reagents	Not Applicable
Calibration Schedule	No field calibration required
Suggested Routine Maintenance	Not Applicable
Shelf Life	8 years
Unit Cost	$32,500
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	Onboard; color transflective LCD screen; Joystick and trigger operation.
Data File Type Format	Not Specified
Communications Interface	Not Specified
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical, laser safety training required
Training Available	Training at customer or vendor facility
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year parts and labor, extended warranties available up to 2 additional years.
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot
Response Time	< 10 seconds
Customize for New Targets	User can add new targets to detector

PGR-1064

Portability	2.25 lbs
Ruggedness	Has had shock/vibration testing (mil-spec testing)
Consumables	No consumables or scheduled maintenance necessary
Training Required	4 hours of training required
Maturity	2 weeks if stocked, otherwise 3 - 6 months
User Feedback	MRIGlobal tested Total PBA Score- 108/122

Raman Spectroscopy

PRODUCT NAME

PinPointer™

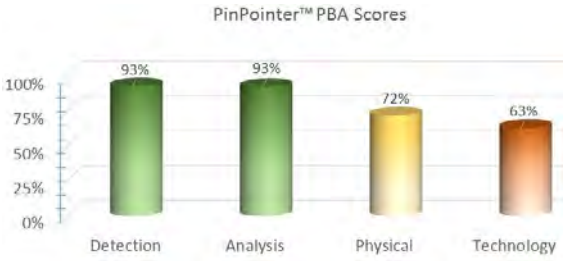
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Agiltron
15 Cabot Road
Woburn, MA 01801

www.ramansystems.com

+1 781 935 1200
sales@ramansystems.com





Synopsis	The PinPointer™ is a handheld Raman detection device designed to be used in the field. Searchable libraries of > 10,000 and able to customize user library. Analyses solids and liquids via 8 mm vials.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Forensics;Emergency Response;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable based on technology
Tested for ITF25TICTIMs	Amenable based on technology
Tested For Explosives	Amenable based on technology
Tested For Narcotics	Amenable based on technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	> 10,000
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence
Response Time Sample Application To Output	Seconds to minutes
Total Run Time	Minutes

PinPointer™

Alarm Capability	Not Applicable
Software Control	On-board
Other Operational Parameters	Spectral range 200 to 3000 cm-1, wavelength 785 nm, Spectral Resolution 12 cm-1, Laser Power: 5-3000 mW

Physical Parameters

Dimensions	8.5 x 4.3 x 2.5 in (21.5 x 11 x 6.4 cm)
Weight	3 lbs (1.4 kg)
Power Requirements	Rechargeable battery, > 4 hour charge
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Field deployable
Operating Conditions	-25 to 45°C (-13 to 113°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Liquid sample holder, travel case
Data Analysis Support Equipment	Software, windows based
Data File Type Format	Not Applicable
Communications Interface	Not Applicable
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background
Training Available	Yes
Manuals Available	Yes
Warranties	Yes

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	Neat/mixtrues; mg; g; %
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot; sample vials
Response Time	seconds
Customize for New Targets	User can add new targets to detector
Portability	3 lbs
Ruggedness	Can operate at extreme temperatures (-25-45°C)
Consumables	Minimal user maintenance. Sample vials
Training Required	Less than 4 hours
Maturity	8 - 12 weeks
User Feedback	No Feedback Total PBA Score- 104/122

Raman Spectroscopy

PRODUCT NAME

PRIED

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Alakai Defense Systems
www.alakaidefensesystems.com

Rob Waterbury
+1 727 541 1600
rob.waterbury@alakaidefense.com





Synopsis	The Portable Raman Improvised Explosive Detector (PRIED) can detect explosives, homemade explosives, CWA, nuclear weapons processing chemicals, narcotics, TICs/TIMs and hazardous material. The device can be used as a standoff instrument, or worn as a backpack.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Forensics;Emergency Response;Screening;
Type	Instrument
Availability	Commercially Available: >90 days for delivery
Readiness Level	9
Market Entry Date	2015
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	< 10
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Heroin, cocaine, methamphetamine, fentanyl
Other Chemical Targets	HAZMAT, sugar, sodium bicarbonate, acetaminophen
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Yes
Library Size	50+
Customize For New Targets	Yes via manufacturer
Sample Introduction	Liquid;Solid;Vapor/Gas;
Sensitivity Detection Limits	Bulk
Start-Up Time From Cold Start To Sample Ready	4 minutes

PRIED

Response Time Sample Application To Output	1 to 30 seconds
Alarm Capability	Audible and visual
Software Control	Remote
Other Operational Parameters	Detection Range: 1 - 10 meters (up to 50 meters for some explosives); 262 nm UV excitation laser; Spectral Range: 400 - 2000 cm-1; Spectrometer Resolution: <20cm-1; Onboard camera saves image with each data file.

Physical Parameters

Dimensions	Backpack 17 x 12 x 17 in (43 x 30.5 x 43 cm) plus chiller. Wand 5 x 7 x 15 in (12.7 x 17.8 x 38.1 cm) plus handle
Weight	Backpack 31 lbs (14 kg) Wand 6.5 lbs (2.9 kg)
Power Requirements	2 UBI 2590 batteries (6 hours continuous use). Batteries are hot swappable.

Logistical Parameters

Transportability	Person-Portable
Durability	Waterproof, Ruggedized for Field Use
Operating Conditions	-17 to 49°C (0 to 120°F)
Consumables	None
Solvents Reagents	Water (for cooling system)
Suggested Routine Maintenance	Preventative maintenance such as cleaning windows, changing filters for the liquids cooling system, off-loading the data all can be done in the field by the user.
Shelf Life	10 years
Expected Operational Life	Limited by laser lifetime (>1,000 hours or 360,000 engagements)
AvailableAccessories	Sampling wand
Data Analysis Support Equipment	Smartphone or tablet
Communications Interface	Wireless or wired-capable
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background
Training Available	Yes
Manuals Available	Yes
Warranties	1 year. The laser is warranted for 1,000 hours and can be refurbished
ITAR Export Regulations	None
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl and heroin listed - others THEORETICALLY
Associated Compounds Detected	THEORETICALLY
Common Cutting Agents Detected	sugar, and others?
Sensitivity	Bulk
Selectivity	Identifies specific targets in simple mixtures
Sample Preparation	Point and shoot
Response Time	1 - 30 seconds
Customize for New Targets	Manufacturer can add new targets to detector
Portability	31 lbs (Backpack); 6.5 lbs (Wand)
Ruggedness	Can operate at extreme temps (-17-49°C)
Consumables	Water chiller and user maintenance
Training Required	Less than 1 hour
Maturity	4 - 6 months
User Feedback	MRIGlobal tested Total PBA Score- 89/122

Raman Spectroscopy

PRODUCT NAME

Progeny ResQ Series



TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Rigaku Analytical Devices
30 Upton Drive, Suite 2
Wilmington, MA 01887

www.rigakuanalytical.com

Alicia Kimsey
+1 855 785 1064
alicia.kimsey@rigaku.com



Model Number	Progeny ResQ, Progeny ResQ FLX
Synopsis	The Progeny ResQ is a handheld Raman spectrometer. The Progeny ResQ is a MIL-SPEC 810G tested system and has a standard library of over 12,000 common materials. The ResQ Flex has a 1064 nm wavelength and is a narcotics specific detector.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2014 (ResQ), 2018 (ResQ FLX)
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	13,000+ explosives and narcotics; other libraries available for purchase
Customize For New Targets	Yes
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	3 to 5% pure, 5 to 10% "dirty"
Known Interferents Inhibitors	Fluorescence

Progeny ResQ Series

Start-Up Time From Cold Start To Sample Ready	40 seconds
Response Time Sample Application To Output	30 to 40 seconds
Total Run Time	< 5 minutes
Alarm Capability	Visual
Software Control	On-board, PC
Other Operational Parameters	Excitation wavelength: 1064 nm, 490 mW, Spectral Range: 200 to 2500 cm-1 Sampling: Point and Shoot, Sample vials, ResQ FLX has a delay timer mode

Physical Parameters

Dimensions	11.8 x 3.2 x 2.9 in (30 x 8.2 x 7.4 cm)
Weight	ResQ, ResQ FLX: 3.5 lbs (1.6 kg)
Power Requirements	Rechargeable 14.4V Li-ion, 3100mAH; 100~240VAC, 50-60Hz, +18V DC, 2.5A (5 hours)

Logistical Parameters

Transportability	Handheld
Durability	MIL-STD 810G, IP-68 Testing
Operating Conditions	-20 to 50°C (-4 to 122°F)
Consumables	Sample vials, Sampling utensils
Solvents Reagents	Not Applicable
Calibration Schedule	Annually at the factory
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Unit Cost	$46,000 (ResQ); $30,000 (ResQ FLX)
Expected Operational Life	Indefinite
AvailableAccessories	Docking Station, rubber boot, universal sample holder; Onboard 5 MP Camera for documentation of evidence.
Data Analysis Support Equipment	Touchscreen interface, QUICKDETECT™ SOFTWARE; Remote operation by PC or tablet
Data File Type Format	XML, PDF, TXT
Communications Interface	Smart-phone interface, USB, Wi-Fi
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Training at customer’s facility when purchased in the U.S.
Manuals Available	Operator’s Manual
Reachback Service	Not Specified
Warranties	2 years, extended warranties available up to 5 years
ITAR Export Regulations	None
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot, sample vials
Response Time	30 - 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	3.5 lbs

Progeny ResQ Series

Ruggedness	Can operate at extreme temps (-20-50°C) AND has shock/vibration testing (MIL-STD-810G)
Consumables	Annual calibration at factory. Sample vials and sampling utensils.
Training Required	2 - 3 hours of training required
Maturity	1 week (ResQ), ResQ FLX has yet to be released. (Coming 2018)
User Feedback	MRIGlobal tested Total PBA Score- 103/122

Raman Spectroscopy

PRODUCT NAME

ProRaman- W Series

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

TSI, Inc.
www.tsi.com

Amy Bauer, Ph.D.
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amy.bauer@tsi.com





Model Number	PRO-W-5B2X, PRO-W-5C2X, PRO-W-7B1X-10
Synopsis	The ProRaman-W features a stabilized laser, high-sensitivity CCD spectrograph. The CCD cools to -60ºC and includes a high throughput immersion fiber optics probe (O.D. > 8). The ProRaman-W series is ideal for on-line process monitoring and for any academic, research, industrial applications requiring an affordable, high performance Raman instrument. Features a quick scan setting that optimizes the number of scans to get well resolved data.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Screening;Forensics;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Libraries available for purchase including ST Japan libraries, Thermo Spectral ID is available for purchase along with multiple 3rd party libraries including ST Japan libraries.
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	>30 ppm (in water)

ProRaman- W Series

Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	Minutes
Response Time Sample Application To Output	0.2 to 200 seconds, depending on sample
Total Run Time	Minutes
Software Control	On-board, PC
Other Operational Parameters	Excitation wavelengths: 532 nm, 785 nm, Spectral Ranges (variable): 250 - 4400 cm-1 (532 nm), 250 - 3200 cm-1 (785 nm), Adjustable Laser Power: 0 - 100mW (532 nm), 0 - 450mW (785 nm), CCD Detector cooled to -60°C.

Physical Parameters

Dimensions	17.25 x 17 x 7 in (43.8 x 43.2 x 17.8 cm)
Weight	30 lbs (13.6 kg)
Power Requirements	110/220 V DC
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Operating Conditions	10 to 40°C (50 to 104°F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Calibration Schedule	Daily
Suggested Routine Maintenance	Not Applicable
Shelf Life	5 years
Expected Operational Life	10,000 hour laser lifetime
AvailableAccessories	Microviewer Microscope Mviewer-532MRA
Data Analysis Support Equipment	PC, software
Data File Type Format	.txt, .spc, .dat, .xls, .bmp
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Minimal technical experience
Training Available	Yes
Manuals Available	Yes
Warranties	1 year for parts and labor
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	> 30 ppm (in water)
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Fiber optic probe, sample vials
Response Time	0.2 - 200 seconds depending on sample
Customize for New Targets	User can add new targets to detector
Portability	30 lbs
Ruggedness	No ruggedness testing/claims
Consumables	No maintenance necessary. Sample vials.
Training Required	Couple of hours of training required depending on level of understanding needed by user
Maturity	3 - 4 weeks

ProRaman- W Series

User Feedback	No Feedback Total PBA Score- 94/122

Raman Spectroscopy

PRODUCT NAME

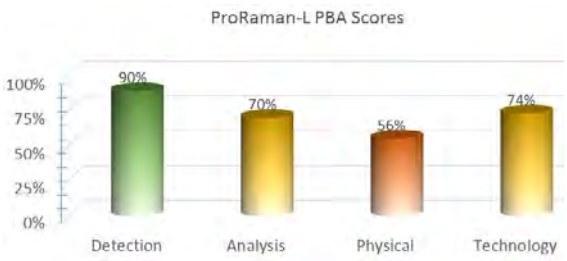
ProRaman-L

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

TSI, Inc.

Amy Bauer, Ph.D.
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amy.bauer@tsi.com





Model Number	PRO-L-5B1S, PRO-L-5C1X, PRO-L-7A1S, PRO-L-7A2S-10-112, PRO-L-7A3H, PRO-L-7B1S-10-112, PRO-L-DUAL-G
Synopsis	The ProRaman-L features a high sensitivity CCD spectrograph with CCD cooling temperature to -60º C. It features high-throughput laboratory fiber optics probes. Each ProRaman-L system includes a notebook computer pre-loaded with RamanReader software for operation. The excitation laser is available at 532 nm and 785 nm. Comes with a fiber optic probe (O.D. > 8) for flexible sampling configuration. Features a quick scan setting that optimizes the number of scans to get well resolved data.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Forensics;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Libraries available for purchase including ST Japan libraries, Thermo Spectral ID is available for purchase along with multiple 3rd party libraries including ST Japan libraries.
Customize For New Targets	Yes

ProRaman-L

Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	>30 ppm (in water)
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	Seconds
Response Time Sample Application To Output	0.2 to 200 seconds, depending on sample
Total Run Time	Minutes
Software Control	On-board, PC
Other Operational Parameters	Excitation wavelengths: 532 nm, 785 nm, Spectral Ranges (variable): 100 - 4000 cm-1 (532 nm), 100 - 3300 cm-1 (785 nm), Adjustable Laser Power: 0 - 50mW (532 nm), 0 - 350mW (785 nm) CCD Detector cooled to -60°C.

Physical Parameters

Dimensions	9.5 x 7.3 x 5.3 in (24.1 x 18.5 x 13.5 cm)
Weight	15 lbs (6.8 kg)
Power Requirements	110/220 V DC

Logistical Parameters

Transportability	Person-Portable
Durability	Rugged
Operating Conditions	10 to 40°C (50 to 104°F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Calibration Schedule	Daily
Suggested Routine Maintenance	Not Applicable
Shelf Life	5 years
Expected Operational Life	10,000 hours laser lifetime
AvailableAccessories	Optional: Microviewer Microscope Mviewer-532MRA, sample holder for liquid samples in vials or cuvette, probe holder-XYZ precision stage, pre-aligned lens tube for measurement on contact for solid samples, safety goggles, spectral ID for spectral search and database building Raman library.
Data Analysis Support Equipment	RamanReader™ ENP7A2 instrument control and data collection; Direct Export/Link to GRAMS for post processing and modeling
Data File Type Format	.txt, .spc, .dat, .xls, .bmp
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Minimal technical background
Training Available	Yes
Manuals Available	Yes
Warranties	1 year for parts and labor

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	> 30 ppm (in water)
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Fiber optic probe, sample vials
Response Time	0.2 - 200 seconds depending on sample
Customize for New Targets	User can add new targets to detector
Portability	15 lbs
Ruggedness	No ruggedness testing/claims

ProRaman-L

Consumables	No maintenance necessary. Sample vials.
Training Required	Couple of hours of training required depending on level of understanding needed by user
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 95/122

Raman Spectroscopy

PRODUCT NAME

Resolve Handheld SORS

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Agilent Technologies
11951 Freedom Drive, Suite 1319
Reston, VA 20190

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info@cobaltlight.com





Synopsis	Resolve™ uses Cobalt's Spatially Offset Raman Spectroscopy (SORS™) technology, which is a Raman technique for non-invasive analysis of materials through packaging. Can detect through colored and opaque plastic, dark glass, paper, cardboard, sacks and fabrics
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy; Spatially Offset Raman Spectroscopy (SORS) ;
Detection Principle	Molecular Spectroscopy;
Application	Laboratory Analysis;
Type	Instrument
Availability	Commercially Available: >90 days for delivery
Readiness Level	9
Market Entry Date	March 2016
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	100 to 500
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Specified
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Amenable by technology
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Continuously updated libraries are available including a narcotics library
Customize For New Targets	Yes
Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	Neat/mixtures; mg; g; %
Known Interferents Inhibitors	Not Specified

Resolve Handheld SORS

Start-Up Time From Cold Start To Sample Ready	Minutes
Response Time Sample Application To Output	Seconds to minutes
Total Run Time	Seconds to minutes
Alarm Capability	Not Applicable
Software Control	On-board
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	6.1 x 11.4 x 2.9 in (15.5 x 29 x 7.3 cm)
Weight	4.9 lb (2.2 Kg)
Power Requirements	Rechargeable Lithium ion Battery (4 hours)
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Independently tested to international and military standards, IP67; shock drop and vibration tested
Operating Conditions	-20 to 50°C (-4 to 122°F)
Consumables	Glass vials
Solvents Reagents	Not Applicable
Calibration Schedule	Not Specified
Suggested Routine Maintenance	Minimal
Shelf Life	10 years
Unit Cost	$60,000
Expected Operational Life	Indefinite
AvailableAccessories	Vial holder, remote trigger, shoulder strap, carrying case
Data Analysis Support Equipment	Not Applicable
Data File Type Format	CSV, SPC, PDF
Communications Interface	USB 2.0
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-Technical Background
Training Available	Yes, 1 day
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 year standard, extended warranties also available
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Li-ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	Neat/mixtrues; mg; g; %
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot
Response Time	30 - 75 seconds depending on mode
Customize for New Targets	User can add new targets to detector
Portability	4.9 lbs

Resolve Handheld SORS

Ruggedness	Can operate at extreme temps (-20-50°C) AND has shock/vibration testing (mil-spec)
Consumables	Minimal user maintenance. Vials (not necessary)
Training Required	1 day of training required
Maturity	12 - 16 weeks
User Feedback	MRIGlobal tested Total PBA Score- 107/122

Raman Spectroscopy

PRODUCT NAME

Resource Effective BioIdentification System (REBS)

TECHNOLOGY CATEGORY

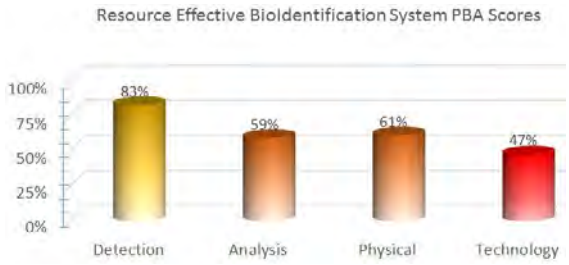
Microscopy;



Battelle
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Columbus, Ohio 43201

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solutions@battelle.org



Synopsis	REBS is a rugged, battery-powered system capable of autonomous and continuous use with operating costs of less than $1 per day per unit and assay costs of just $0.04 per sample. REBS relies on a combination of patented aerosol collection and optical spectroscopy to detect hundreds of threats ranging from bacteria, viruses and toxins to aerosolized chemicals, and even mixed threats.
Category	Chemical; Biological
Detection Method	Raman Spectroscopy;
Detection Principle	Microscopy;
Application	Detection; Emergency Response; Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2014
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Unknown
Tested For Narcotics	Yes
Other Chemical Targets	Yes
Tested For Biological Agents	Bacillus anthracis-Ames, Sterne; Bacillus globigii; Bacillus thuringiensis-Kurstaki and ATCC 9727; Bacillus cereus-ATCC 14579; Brucella suis; Burkholderia mallei; Burkholderia pseudomallei; Yersinia pestis- Kim, Nairobi, CO92; Erwinia herbicola
Other Biological Targets	Escherichia coli; Francisella tularensis; Botulinum toxoid; Ovalbumin grade III and V; Bovine serum albumin; MS2 bacteriophage; T3 bacteriophage; Venezuelan Equine Encephalitis-Trinidad; Vaccinia
Radiological Targets	Not Applicable
Library Size	100+ biological
Customize For New Targets	Yes

Resource Effective BioIdentification System (REBS)

Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	cfu/mL
Known Interferents Inhibitors	Demonstrated zero False Alarm Rates in actual environmental testing
False Positive Rates	0.001%
False Negative Rates	Low
Start-Up Time From Cold Start To Sample Ready	< 15 minutes
Response Time Sample Application To Output	15 minutes
Total Run Time	20 to 30 minutes
Alarm Capability	Audible and Visual
Software Control	Yes
Other Operational Parameters	Operating cost ~$1 per day. Sensitivity of under 25 ACPL.

Physical Parameters

Dimensions	18 x 12 x 12 in (46 x 30 x 30 cm)
Weight	35 lbs (15.9 kg)
Power Requirements	Batteries BA-2590 (internal), BA-5590 (external) for 30 days of autonomous operation; Voltage input 24–28 VDC, 110–240 VAC 50–60 Hz

Logistical Parameters

Transportability	Mounted
Durability	Rugged
Operating Conditions	0 to 50°C (32 to 122°F)
Consumables	Yes
Expected Operational Life	18 hour battery life
AvailableAccessories	Optional liquid-sample processing mode is available for analysis of aqueous solutions. GPS (MGRS, Lat/Long optional)
Communications Interface	RJ-45 Ethernet 900MHz RF wireless; Ethernet bridge frequency hopping; 903.xx MHz; 128-bit AES encryption; GPS; Meteorological sensor (wind speed, temperature, humidity)
Maintenance Cost	$20 per month in consumables

Training, Shipping, And Other Information

Operator Skills Required	Non-Technical background
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes

PBA Detection

Targets Detected Score	THEORETICALLY
Associated Compounds Detected	THEORETICALLY
Common Cutting Agents Detected	THEORETICALLY
Sensitivity	%
Selectivity	Identifies all targets in simple mixtures
Sample Preparation	Vapor collection of particles
Response Time	15 minutes
Customize for New Targets	User can add new targets to detector
Portability	35 lbs
Ruggedness	Can operate at extreme temps (0-50°C)
Consumables	$20/month in consumables
Training Required	1 - 2 days at manufacturer facility
Maturity	8 - 12 weeks
User Feedback	No Feedback Total PBA Score- 84/122

Raman Spectroscopy

PRODUCT NAME

ResQ CQL

TECHNOLOGY CATEGORY

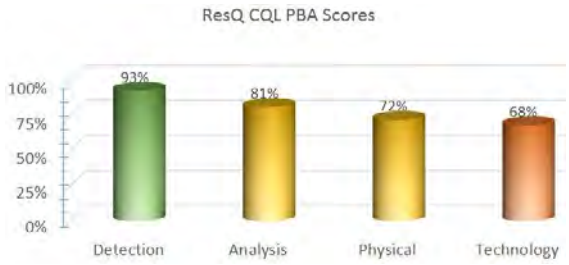
Molecular Spectroscopy;



Rigaku Analytical Devices
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Melanie Fuller
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Model Number	ResQ CQL
Synopsis	The ResQ CQL handheld Raman offers first responders, border protection, and law enforcement with a method for identifying potential threats – such as explosives, precursors, hazardous chemicals and narcotics. It integrates 1064 nm Raman for the identification of unknown bulk compounds with a technique for detecting trace amounts of a potential deadly hazard. It contains a LED flashlight for sample visibility.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response;Trace Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	Sept 2018
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	SWGDRUG Category A for presumptive testing SWGDRUG Category C for confirmatory testing (with QuickDetect)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	13,000 +
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	>5 to 10% concentration

ResQ CQL

Known Interferents Inhibitors	Can detect targets in an unknown mixture
Start-Up Time From Cold Start To Sample Ready	30 to 35 seconds
Response Time Sample Application To Output	< 10 seconds
Total Run Time	30 to 35 seconds
Alarm Capability	Visual
Software Control	On-board, remote through PC or tablet
Other Operational Parameters	1064 nm. Up to 490mW adjustable laser excitation power. LED flashlight for optimal sample visibility.

Physical Parameters

Dimensions	7.28 x 5.9 x 3.11 in (18.5 x 15 x 7.9 cm)
Weight	3 lbs (1.4 kg)
Power Requirements	7.4 Li-Po, Rechargeable or (six) CR123A
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	MIL-STD 810-G, IP-68
Operating Conditions	-20 to 50°C (-4 to 122°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Calibration Schedule	Daily performance verification. Calibrate upon failure or every 3 to 4 months.
Suggested Routine Maintenance	None
Shelf Life	Indefinite
Unit Cost	$46,000
Expected Operational Life	7 years
AvailableAccessories	Adjustable nose, vial adaptor, bottle adaptor, tablet adaptor, periscope adaptor, sampling test stand
Data Analysis Support Equipment	PC, Laptop, Tablet, touch screen, camera, QuickDetect software
Communications Interface	Wi-Fi, USB
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes 4 hours on-site
Manuals Available	Yes
Reachback Service	24//7 Reachback support
Warranties	24 month
ITAR Export Regulations	None
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	Fentanyl, Carfentanil, Sufentanil, Alfentanil, Remifentanil, Heroin, Ketamine, Lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, Norfentanyl, Pyridine, Aniline
Common Cutting Agents Detected	Sucrose, Lactose, Caffeine, Ephedrine, Aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot
Response Time	< 1 minute
Customize for New Targets	User can add new targets to detector
Portability	3 lbs.

ResQ CQL

Ruggedness	No ruggedness testing/claims
Consumables	No maintenance necessary. Sample vials (as needed)
Training Required	1 day
Maturity	6-8 weeks
User Feedback	No Feedback Total PBA Score- 102/122

Raman Spectroscopy

PRODUCT NAME

RMP-510



TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Jasco, Inc.
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Easton, MD 21601

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Model Number	RMP-510, RMP-520, RMP-530
Synopsis	JASCO's new RMP-510 has been developed to meet the needs of Material Science, Manufacturing and Biochemistry by combining the flexibility of a fiber optic probe with a portable Raman Microspectrometer. The RMP-510 is easy to use, offers a broad spectral range, and comes standard with 2.0 cm resolution. An additional automated grating offers high resolution to 0.5 cm . Image capture and a manual stage are included for Raman Microscopic Analysis. Fiber optic cables allow the probe to be removed from the stage for analyzing larger samples.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Solid;Liquid
Sensitivity Detection Limits	Neat/mixtures; mg; g

RMP-510

Known Interferents Inhibitors	Successful identification of an unknown is dependent on the presence of the corresponding reference spectrum in the library. Analysis of mixtures can produce erroneous search results unless the library contains a reference spectrum of the mixture itself.
Start-Up Time From Cold Start To Sample Ready	10 minutes
Response Time Sample Application To Output	< 1 minutes
Total Run Time	Minutes
Alarm Capability	Not Applicable
Software Control	Spectrum measurement/analysis JASCO canvas Wavenumber correction Sadtler Know-It-All Search software Optional program: Interval Measurement Analysis
Other Operational Parameters	Excitation wavelength: 532 nm (RMP-510), 785 nm (RMP-520), 1064 nm (RMP-530); 100 – 8000 cm-1 wavelength range, 2.0 cm-1 resolution; XYZ Manual Stage

Physical Parameters

Dimensions	19.7 x 14.2 x 11.5 in (500 x 360 x 290 mm)
Weight	66 lbs (30 kg)
Power Requirements	AC 100V +/- 10V, 200V A
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Benchtop/Fixed
Durability	Not militarized; drop sensitive
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Minimal
Shelf Life	10 years
Unit Cost	$99,480
Expected Operational Life	Indefinite
AvailableAccessories	Test sample Video capture unit for sample observation, USB cable, USB hub, AC cable, CCD power supply, Instruction Manual, Software backup, CD Wrenches and screw drivers, Dust cover
Data Analysis Support Equipment	Spectrum measurement/analysis JASCO canvas Wavenumber correction, Sadtler Know-It-All Search software Optional program: Interval measurement Analysis
Communications Interface	USB
Maintenance Cost	Minimal

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Warranties	1 year

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Fiber Optic probe
Response Time	< 1 minute
Customize for New Targets	User can add new targets to detector

RMP-510

Portability	66 lbs
Ruggedness	No ruggedness testing/claims
Consumables	Manufacturer maintenance necessary
Training Required	1 - 2 days depending on level of training desired
Maturity	8 - 12 weeks
User Feedback	No Feedback Total PBA Score- 90/122

Raman Spectroscopy

PRODUCT NAME

RT Series

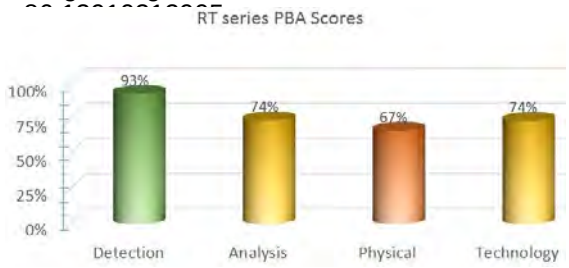
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

NucTech Company Limited
2/F Block A, Tongfang Building,Shuangqinglu, Haidian District,
Beijing 100084, P.R.China

www.nuctech.com

Wang Zheng





Model Number	RT2000, RT3000, RT6000
Synopsis	The RT series handheld Raman spectrometers detect solid and liquid chemical targets including narcotics and explosives. Unknowns can be identified via libraries. Multiple instrument models are available.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Trace Analysis;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Yes
Tested For Explosives	TNT, RDX, Nitramine Explosive, C3, HMX, Composition B, TATP, PETN
Tested For Narcotics	Ketamine, cocaine, morphine
Other Chemical Targets	Toluene, acetic anhyride
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes via user
Sample Introduction	Liquid;Solid;
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	< 60 seconds
Response Time Sample Application To Output	5 seconds
Alarm Capability	Visual and audible
Software Control	On-board

RT Series

Other Operational Parameters	RT3000 fiber length: 1m(Up to 5m on request).

Physical Parameters

Weight	RT2000: 22 lbs (10 kg) RT3000: 14 lbs (6.4 kg) RT6000: 1.68 lbs (0.76 kg)
Power Requirements	110-220 V AC, 50-60Hz. Li-ion battery (6 hours)
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Operating Conditions	0 to 40°C (32 to 104°F)
Consumables	Not Applicable
Solvents Reagents	Not Applicable
Shelf Life	10 years
Unit Cost	$18,000 to $22,000
AvailableAccessories	Not Applicable
Data Analysis Support Equipment	RT2000, RT3000: 7” touch-screen LCD RT6000: camera
Communications Interface	USB and Ethernet RT6000: Wi-Fi and GPS

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Yes
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	Fentanyl, Carfentanil, Sufentanil, alfentanil, Remifentanil, Heroin, Ketamine, Lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, Norfentanyl, Pyridine, Aniline
Common Cutting Agents Detected	Sucrose, Lactose, Caffeine, Ephedrine, Aspirin
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Have to put sample into cell
Response Time	< 1 minute
Customize for New Targets	User can add new targets to detector
Ruggedness	No ruggedness testing/claims
Consumables	No maintenance necessary. Sample vials (as needed).
Training Required	1 day
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 100/122

Raman Spectroscopy

PRODUCT NAME

Serstech 100 Indicator

TECHNOLOGY CATEGORY

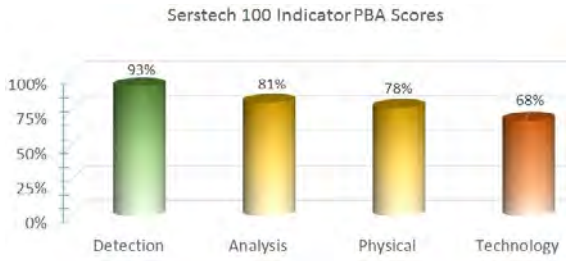
Molecular Spectroscopy;



Serstech
Ideon Science Park
Scheelevägen 27, SE-223 70 Lund

www.serstech.com

Peter Hojerback
+46 46 255 112
ph@serstech.com



Synopsis	Serstech 100 Indicator, handheld Raman spectrometer, is made for measuring chemicals: Explosives, Narcotics, Hazardous substances and Chemical Warfare Agents.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Detection; Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Explosives, Narcotics, Chemical Warfare Agents, and Hazardous Databases
Customize For New Targets	Yes, user can add to library himself or from ChemDash Spec Store
Sample Introduction	Liquid; Solid
Sensitivity Detection Limits	%
Start-Up Time From Cold Start To Sample Ready	< 30 seconds
Response Time Sample Application To Output	Seconds
Total Run Time	Seconds

Serstech 100 Indicator

Software Control	On-board, PC
Other Operational Parameters	Laser: 785nm, 300mW (max) Spectral Range: 400 - 2300 cm-1 Linear CCD Array detector. 11 Different languages

Physical Parameters

Dimensions	6.2 x 4.0 x 1.1 in (15.8 x 10.1 x 2.9 cm)
Weight	1.4 lbs (650 g)
Power Requirements	Li-ion battery (>4 hours continuous operation), non-user replaceable

Logistical Parameters

Transportability	Handheld
Durability	MIL-STD-810G 514.6 (vibration), MIL-STD-810G 516.6 (functional shock), IP67
Operating Conditions	-20 to 40 °C (-4 to 104 °F), 5 to 90% RH
Consumables	Sample vials
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Unit Cost	$25,580
Expected Operational Life	Indefinite
AvailableAccessories	Watertight case, shoulder strap, USB cable, laser aperture cap with polystyrene target, sample vials, point-and-shoot adapter, vial holder, 90° angle adapter, attachment point, connection kit ethernet and Wi-Fi, AC Adapter 5 VDC/1 A USB for Charging
Data Analysis Support Equipment	PC, ChemDash chemical intelligence software
Data File Type Format	TXT, CSV, JCAMP
Communications Interface	USB 2.0
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Manuals Available	Yes
Warranties	1 year standard, 2 additional year optional

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot
Response Time	30 - 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	1.4 lbs
Ruggedness	Has shock/vibration testing (MIL-STD-810G)
Consumables	Minimal maintenance and consumables, sample vials.
Training Required	1 day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 103/122

Raman Spectroscopy

PRODUCT NAME

Sierra

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Metrohm
407 South 2nd Street
Laramie, WY 82070

www.metrohm.com

Bryan Ray, Ph.D.
+1 307 399 0408
bryan.ray@metrohm.com





Synopsis	The Sierra Series of research grade Raman spectrometers are compact spectroscopic readers for analysis of liquids, gel, powders, and solids. The sampling system on the Sierra allows interrogation from the side or bottom of a vial, or a point-and-shoot optoin permits the user to analyze materials using Orbital Raster Scanning (ORS), in which the excitation laser scans over a wide sample area. The vendor claims that ORS improves spectral quality from inhomogeneous and irregularly shaped samples, and minimizes heating and potential detonation of energetic materials. Systems are available in a variety of excitation frequencies and powers, from 532 nm/50 mW to 830 nm/100 mW. A high resolution 4 cm-1 spectrometer is available for the 785 nm system only. Sierra Series spectrometers do not have on-board instrument controls or displays and must be operated via laptop or PC computer.
Category	Chemical; Explosives;
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response; Screening; Bulk analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2012
Number Of Units Fielded	10 to 100
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

Sierra

Library Size	Not Specified
Customize For New Targets	Yes
Sample Introduction	Liquid; solid
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Materials that fluoresce; 1064 nm excitation laser greatly reduces fluorescence interference versus 785 nm Raman spectrometer systems.
Start-Up Time From Cold Start To Sample Ready	20 seconds
Response Time Sample Application To Output	< 20 seconds
Total Run Time	< 1 minute
Alarm Capability	Visual
Software Control	PC
Other Operational Parameters	532 nm laser: 50 mW; 200 to 3200 cm-1; 7 cm-1 638, 785, 808, or 830 nm laser: 35, 100, 100, 100 mW; 200 to 2000 cm-1, 200 – 3200 cm-1; 4 cm-1, 8 cm-1 resolution Detector: 2048 pixel, TE Cooled to –10 °C

Physical Parameters

Dimensions	532 nm: 12 x 8 x 3in (30.5 x 20.3 x 7.6 cm) All others: 9 x 5.5 x 2.5 in (229 x 140 x 63.5 mm)
Weight	532 nm version: 6 lbs (2.7 kg) All other versions: 8 lbs (3.6 kg)
Power Requirements	AC only; no battery capability
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Field deployable, in-house shock and vibration tested
Operating Conditions	-20 to 40 °C (-4 to 104 °F)
Consumables	2 mL vials
Solvents Reagents	Not Applicable
Calibration Schedule	Automatic internal calibration
Suggested Routine Maintenance	Not Applicable
Shelf Life	5 years
Unit Cost	$35,000 to $40,000
Expected Operational Life	5 years, 10,000 hours for laser source
AvailableAccessories	Point-and-Shoot accessory for solid sampling
Data Analysis Support Equipment	Instrument control and library build capability via laptop software
Data File Type Format	PDF, SPC, ASCII x,y table, LIB (proprietary format)
Communications Interface	microUSB
Maintenance Cost	No routine maintenance required

Training, Shipping, And Other Information

Operator Skills Required	No technical experience for operation, moderate technical experience for library development
Training Available	Yes
Manuals Available	Yes
Reachback Service	No
Warranties	1 year parts and labor
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	Not Specified

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700

Sierra

Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot, vials
Response Time	< 20 seconds
Customize for New Targets	User can add new targets to detector
Portability	8 lbs
Ruggedness	Has had (in house) vibration testing
Consumables	No maintenance necessary. Sample vials (as needed).
Training Required	1 day of training required
Maturity	2 - 6 weeks
User Feedback	MRIGlobal tested Total PBA Score- 109/122

Raman Spectroscopy

PRODUCT NAME

TacticID

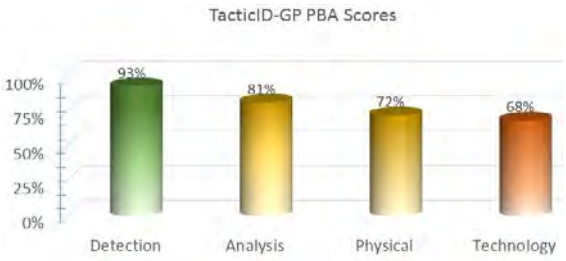
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

B&W Tek
19 Shea Way
Newark, DE 19713

www.tacticid.com

+1 302 368 7824
marketing@bwtek.com





Model Number	GP, N, 1064
Synopsis	The TacticID is a field ready handheld spectral analysis instrument designed for non-contact forensic analysis of hazardous and common chemicals, explosives, narcotics, precursors, cutting agents, and much more. Designed from the ground up for a variety of first responders including hazardous material technicians, EOD/bomb squad, customs and border patrol, law enforcement agents, military and more, TacticID utilizes lab-proven Raman spectroscopy, allowing users to get real time actionable identification of unknown samples directly through transparent packing materials in the field or in the lab. The N model detects narcotics and the 1064 model has the option for 1064 nm wavelength.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;Surface Enhanced Raman Spectroscopy (SERS);
Detection Principle	Molecular Spectroscopy;
Application	Laboratory Analysis; Forensics; Bulk Analysis; Screening;Emergency Response;
Type	Instrument
Availability	Commercially Available: 15 to 30 days for delivery
Readiness Level	9
Market Entry Date	2015
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Yes
Tested for ITF25TICTIMs	10,000+ explosives, toxic and common chemicals, precursors
Tested For Explosives	Yes
Tested For Narcotics	1,000+ including heroin, fentanyl, cocaine, meth, THC, pills, carfentanil, sufentanil, alfentanil, remifentanil, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700, etc.
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable

TacticID

Library Size	10,000+, Customizable libraries, 12,000+ expanded library available
Customize For New Targets	Yes
Sample Introduction	Solid; Liquid;
Sensitivity Detection Limits	mg; %; As low as 1% with TacPac SERS
Known Interferents Inhibitors	Fluorescence
False Positive Rates	< 1%
False Negative Rates	< 1%
Start-Up Time From Cold Start To Sample Ready	< 1 min
Response Time Sample Application To Output	Seconds
Total Run Time	1 min
Alarm Capability	Visual and Audible
Software Control	On-board TOS, TOS Remote™ for remote tablet operation
Other Operational Parameters	Excitation Wavelength 785nm or 1064nm, Laser Output Power 300 mW +/- 10%, adjustable in 10% increments, Spectral Range 179cm-1 to 2900cm-1 Spectral Resolution ~9cm-1 (FWHW), Detector Type Linear CCD Array

Physical Parameters

Dimensions	7.5 x 3.9 x 2.0 in (19 x 10 x 5 cm)
Weight	2 lbs (0.9 kg)
Power Requirements	Rechargeable Li-ion Battery, 18VDC, CR123a disposable battery cartridge option
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	IP65, MIL-STD810G for drop testing
Operating Conditions	-20 to 50°C (-4 to 122°F)
Consumables	TacPac kit for certain low concentration samples
Solvents Reagents	Not Applicable
Calibration Schedule	Not Applicable
Suggested Routine Maintenance	Maintenance needs to be performed by a trained technician.
Shelf Life	Indefinite
Expected Operational Life	> 7 years
AvailableAccessories	Point & Shoot Adaptor, Vial Holder, Polystyrene Validation Cap, Right Angle Adaptor, TacPac Adaptor
Data Analysis Support Equipment	PC or Tablet
Data File Type Format	TXT, CSV, SPC, PDF
Communications Interface	Ethernet, Wi-Fi, USB
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical background
Training Available	Yes, on-site
Manuals Available	Yes
Reachback Service	Yes, TacticOne Response™ 24/7/365
Warranties	1 year
ITAR Export Regulations	Yes
IATA Shipping Restrictions	Lithium ion battery
Approved Vendors	Safeware, Inc.

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700

TacticID

Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin
Sensitivity	mg; %; As low as 1%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot
Response Time	< 1 minute
Customize for New Targets	User can add new targets to detector
Portability	2 lbs
Ruggedness	Can operate at extreme temps (-20-50°C)
Consumables	Minimal user maintenance. Sample vials
Training Required	1 day of training required
Maturity	4 weeks
User Feedback	No Feedback

Raman Spectroscopy

PRODUCT NAME

TruNarc™

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Thermo Fisher Scientific, Inc.
2 Radcliff Road
Tewksbury, MA 01876

www.thermoscientific.com

Bob Messier
+1 443 262 9536
robert.messier@thermofisher.com





Synopsis	Thermo Scientific™ TruNarc™ Handheld Narcotics Analyzer enables officers, customs, border control, and other personnel to scan more than 415 suspected illicit substances in a single, definitive test using Raman technology.
Category	Chemical
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response;Forensics;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Opioids, fentanyls, carfentanil, alfentanil, sufentanil, ketamine, U-47700, lorazepam, remifentanil, heroin, 3-quinuclidinyl benzilate, common street fentanyl analogues, ANPP, NPP, methamphetamine, others
Other Chemical Targets	Aspirin, ephedrine, sugar, lactose, caffeine, ibuprofen, others
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	415+ entries, Controlled substances, cutting agents, and precursors including: heroin, synthetic drugs on leaf materials or blotter paper
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Start-Up Time From Cold Start To Sample Ready	Minutes

TruNarc™

Response Time Sample Application To Output	Seconds
Total Run Time	Minutes
Alarm Capability	Yes
Software Control	On-board, PC
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	6.4 x 4.1 x 2.0 in (16.26 x 10.41 x 5.10 cm)
Weight	1.25 lbs (0.57 kg)
Power Requirements	Rechargeable internal 3.7V battery pack (10 hours); DC wall adapter, 5V DC, 1.5A; optional car charger
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Rugged
Operating Conditions	-10 to 50°C (14 to 122°F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Car charger
Data Analysis Support Equipment	PC, software
Data File Type Format	CSV, XLS, SPC, PDF
Communications Interface	micro USB
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes
Warranties	Yes
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot
Response Time	< 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	1.25 lbs
Ruggedness	Can operate under extreme temps (-10-50°C).
Consumables	No consumables or schedule maintenance
Training Required	1 day of training required
Maturity	6 - 8 weeks
User Feedback	MRIGlobal tested Total PBA Score- 107/122

Raman Spectroscopy

PRODUCT NAME

TruScan RM

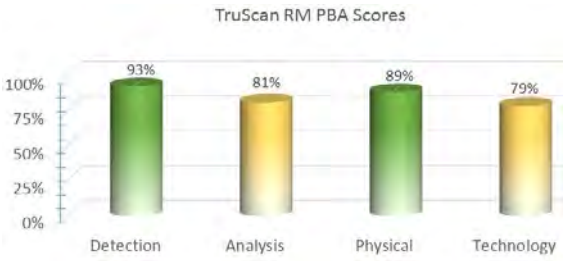
TECHNOLOGY CATEGORY

Molecular Spectroscopy;

Thermo Fisher Scientific, Inc.
2 Radcliff Road
Tewksbury, MA 01876

www.thermofisher.com

Bob Messier
+1 443 262 9536
robert.messier@thermofisher.com





Synopsis	The TruScan RM analyzer includes optics paired with a patented multivariate residual analysis that offers an effective chemometric solution for material identification, with two spectral pre-processing options. The analyzer's non-destructive point-and-shoot sampling principle facilitates rapid verification of a broad range of chemical compounds, including cellulose-based products.
Category	Chemical; Explosives
Detection Method	Raman Spectroscopy;
Detection Principle	Molecular Spectroscopy;
Application	Bulk Analysis;Screening;Emergency Response;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable based on technology
Tested for ITF25TICTIMs	Amenable based on technology
Tested For Explosives	Amenable based on technology
Tested For Narcotics	Amenable based on technology (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Sensitivity Detection Limits	%
Known Interferents Inhibitors	Fluorescence
Start-Up Time From Cold Start To Sample Ready	< 5 minutes
Response Time Sample Application To Output	< 5 minutes

TruScan RM

Total Run Time	< 5 minutes
Software Control	On-board, PC
Other Operational Parameters	Spectrum range: 250 to 2875 cm-1, 785nm

Physical Parameters

Dimensions	8.2 x 4.2 x 1.7 in (20.8 x 10.7 x 4.3 cm)
Weight	< 2 lbs (0.9 kg)
Power Requirements	Li-ion battery, DC (> 4 hours); DC Wall Adapter, 100-240VAC 50/60Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Handheld
Durability	Rugged; chemical and drop resistant
Operating Conditions	-20 to 40°C (-4 to 104°F)
Consumables	Sample vials
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Vial holder, universal tablet holder, cuvette holder
Data Analysis Support Equipment	Microsoft Windows 7,8,10, Internet Explorer 11, Edge 25; Google Chrome 51
Communications Interface	Ethernet
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Yes
Warranties	Yes
IATA Shipping Restrictions	Lithium ion battery

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4-piperidone, 4ANPP, norfentanyl, pyridine, aniline, and others
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	Neat/mixtures; mg; g
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Point and shoot
Response Time	< 40 seconds
Customize for New Targets	User can add new targets to detector
Portability	< 2 lbs
Ruggedness	Chemical and drop resistant.
Consumables	Maintenance? Sample vials.
Training Required	1 day of training required
Maturity	6 - 8 weeks
User Feedback	MRIGlobal tested Total PBA Score- 107/122

Spectral Fluorescence Signatures

PRODUCT NAME

NTX2000 Analyzer

TECHNOLOGY CATEGORY

Molecular Spectroscopy;

NarTest
Kopliranna 49
11713 Tallinn, Estonia

www.nartest.com

Kaisa Uibo
'+372 6064 200
kaisa.uibo@nartest.com





Model Number	NTX2000
Synopsis	NarTest NTX2000 embodies a “lab-in-a-box” concept, that combines the features of analytical lab equipment and portable sensor, for out-of-lab and on-site use. The whole system can be deployed in minutes at almost any location for out of lab and on-site operation.Initial identification of a drug in seized substance (solid or herbal) is provided in minutes. Electively, a confirmatory measurement adding designated reagents could be conducted. The product is based on patented technology which combines the methods of Spectral Fluorescence Signatures (SFS) and pattern recognition for detection of illicit drugs in seized street samples. Ability to differentiate Cocaine Salt (hydrochloride) and Cocaine Base.
Category	Chemical
Detection Method	Spectral Fluorescence Signatures;
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Not Applicable
Tested For Narcotics	Cocaine hydrochloride, cocaine base, heroin, methamphetamine, marijuana, amphetamine, ecstasy, MDVP, fentanyl, 3-methylfentanyl, piperazines, and opium.
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Customize For New Targets	Yes
Sample Introduction	Liquid;Solid;

NTX2000 Analyzer

Sensitivity Detection Limits	5% (w/w)
False Positive Rates	zero false positive results in 200 samples of heroin
False Negative Rates	99.4% accuracy
Start-Up Time From Cold Start To Sample Ready	Minutes
Response Time Sample Application To Output	Minutes
Total Run Time	5 to 15 minutes
Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	Pulsed Xenon lamp, 5 Watt light source. 230 to 350 nm excitation; 250 to 565 nm emission.

Physical Parameters

Dimensions	5.8 x 9.4 x 15.6 in (15 x 24 x 40 cm)
Weight	11 lbs (5 kg)
Power Requirements	100 VAC / 240 VAC, 50 Hz / 60 Hz
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Operating Conditions	10 to 40°C (50 to 104°F)
Consumables	Single use cell with quartz window
Solvents Reagents	Not Applicable
Calibration Schedule	Automatic, based on internal standard sample
Shelf Life	Indefinite
Expected Operational Life	10 years
AvailableAccessories	Accessories for conducting 50 analysis.
Data Analysis Support Equipment	Laptop with Windows 2000 or newer
Communications Interface	USB

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	<1 day to train operator
Manuals Available	Yes

PBA Detection

Targets Detected Score	Heroin, Fentanyl
Associated Compounds Detected	None
Common Cutting Agents Detected	Caffeine
Sensitivity	5%
Selectivity	Identifies specific targets in simple mixtures
Sample Preparation	Have to put sample into cell
Response Time	5 - 15 minutes
Customize for New Targets	User can add new targets to detector
Portability	Portable 11 lbs.
Ruggedness	No ruggedness testing/claims
Consumables	Minor - cells
Training Required	1 day
Maturity	3 - 4 weeks
User Feedback	No Feedback Total PBA Score- 63/122

Surface Acoustic Wave Detection

PRODUCT NAME

Biosens

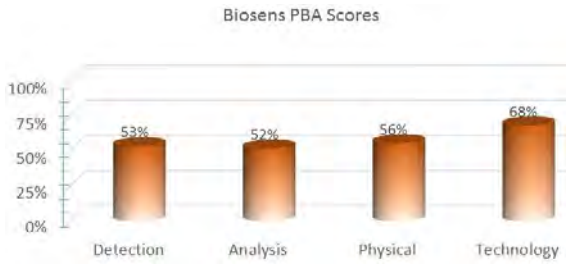
TECHNOLOGY CATEGORY

Sensors;Immunological;

Biosensor Applications Sweden AB
11207 Single Oak Road
Fredericksburg, VA 22407

www.goqpi.com

Doug Baggett
+1 540 548 4050 ext 19





Model Number	BIOSENS®300; BIOSENS®600
Synopsis	Biosens instruments are based on an immunoassay combined with Surface Acoustic Wave (SAW) detection technology. The 300 model detects both drugs and explosives, the 600 model detects drugs only. The instrument can be used to analyze solids or liquids and provides specific compound information upon identification.
Category	Chemical; Biological; Explosives
Detection Method	Surface Acoustic Wave Detection;Surface Acoustic Wave;
Detection Principle	Sensors;Immunological;
Application	Emergency Response; Screening; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Yes
Tested For Explosives	TNT, DNT, Tetryl, RDX, PETN and NG
Tested For Narcotics	Meth-amphetamine, amphetamine, cocaine, heroin/opiates, MDMA, MDA, MDEA, THC ephedrine, pseudo ephedrine, ketamine, flunitrazepam, diazepam, alprazolam, desmethylflunitrazepam, temazepam, nordiazepam,klonazepam, triazolam, midazolam,nitrazepam,7-aminoflunitrazepam, lorazepam, oxazepam
Other Chemical Targets	Yes
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Not Specified
Customize For New Targets	Not Specified
Sample Introduction	Solid; Liquid
Sensitivity Detection Limits	ng

Biosens

Known Interferents Inhibitors	Not Specified
False Positive Rates	Field-proven low false alarm rate
Start-Up Time From Cold Start To Sample Ready	10 minutes
Response Time Sample Application To Output	30 to 60 seconds
Total Run Time	10 minutes
Alarm Capability	Not Applicable
Software Control	On-board
Other Operational Parameters	Not Applicable

Physical Parameters

Dimensions	16 x 9 x 14 in (406 x 229 x 356 mm)
Weight	30 lbs (13.6 kg)
Power Requirements	AC and 12/24VDC for vehicle powered operation
Noise Produced	Not Applicable

Logistical Parameters

Transportability	Person-Portable
Durability	Not militarized, drop sensitive
Operating Conditions	10 to 40°C (50 to 105°F); 95%RH non-condensing
Consumables	Reagents; Collection Pads; Maintenance and cleaning kits
Solvents Reagents	Yes
Calibration Schedule	Yes
Suggested Routine Maintenance	Cleaning when needed, annual maintenance
Shelf Life	10 years
Unit Cost	$50,000
Expected Operational Life	Indefinite
AvailableAccessories	Oral collectors
Data Analysis Support Equipment	datalogging software
Data File Type Format	Not Specified
Communications Interface	USB and CAT5
Maintenance Cost	Not Specified

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Yes
Reachback Service	Not Specified
Warranties	1 to 3 years
ITAR Export Regulations	Not Specified
IATA Shipping Restrictions	None

PBA Detection

Targets Detected Score	heroin, ketamine, lorazepam
Associated Compounds Detected	None
Common Cutting Agents Detected	ephedrine
Sensitivity	ng?
Selectivity	Identifies specific targets in simple mixtures
Sample Preparation	Collection pads, oral collectors
Response Time	30 - 60 seconds
Customize for New Targets	Cannot detect or add new targets
Portability	30 lbs

Biosens

Ruggedness	No ruggedness testing/claims
Consumables	Annual maintenance; reagents, collection pads, maintenance and cleaning kits
Training Required	1/2 day of training required
Maturity	4 - 6 weeks
User Feedback	No Feedback Total PBA Score- 68/122

Ultraviolet-Visible

PRODUCT NAME

i-Spec® Series



TECHNOLOGY CATEGORY

Molecular Spectroscopy;

B&W Tek
19 Shea Way
Newark, DE 19713

www.bwtek.com

+1 302 368 7824
marketing@bwtek.com



Model Number	i-Spec 17, i-Spec 17B, i-Spec 22
Synopsis	The i-Spec® series is a group of portable broadband fiber-optic coupled spectrometer systems for field, laboratory, and at-line use. The spectrometers cover 350 – 2200 nm and employ CCD, Si Array, InGaAs array, and/or extended InGaAs array detectors for optimal sensitivity and dynamic range in the Vis and NIR range. The i-Spec features a standard external triggering port with flexible fiber optic coupling of eflectance/transmittance fiber optic probes (standard) or other sampling accessories. Optimal transmittance or reflectance measurements are taken using 5 or 20 watt tungsten halogen sources. High speed detection systems enable fast spectral capturing of 20 to >100 spectra per second.
Category	Chemical; Explosives
Detection Method	Ultraviolet-Visible;Near Infrared (NIR);
Detection Principle	Molecular Spectroscopy;
Application	Emergency Response;Forensics;Screening;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Amenable by technology
Tested for ITF25TICTIMs	Amenable by technology
Tested For Explosives	Amenable by technology
Tested For Narcotics	Amenable by technology
Other Chemical Targets	Not Applicable
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Sample Introduction	Liquid;Solid;
Start-Up Time From Cold Start To Sample Ready	40 minutes

i-Spec® Series

Alarm Capability	Not Applicable
Software Control	PC
Other Operational Parameters	Spectral output range: 350 to > 2200 nm, Tungsten Halogen 5 or 20 W

Physical Parameters

Dimensions	9.5 x 6.7 x 13.7 in (24 x 17 x 3.5 cm)
Weight	7.9 to 10.8 lbs (3.6 to 4.9 kg)
Power Requirements	12V DC at 10.8 Amps, Battery Option Available

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	Field deployable
Operating Conditions	0 to 35°C (32 to 95°F)
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Not Applicable
Shelf Life	10 years
Expected Operational Life	Indefinite
AvailableAccessories	Fiber-optic probe, cuvette holder, sapphire ball probe
Data Analysis Support Equipment	PC, iSpec 4 software
Communications Interface	USB 2.0
Maintenance Cost	Not Applicable

Training, Shipping, And Other Information

Operator Skills Required	Minimal technical background
Training Available	Yes
Manuals Available	Yes

PBA Detection

Targets Detected Score	THEORETICALLY
Associated Compounds Detected	THEORETICALLY
Common Cutting Agents Detected	THEORETICALLY
Sensitivity	%
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Fiber optic probe; cuvettes
Response Time	< 1 second
Customize for New Targets	User can add new targets to detector
Portability	7.9 to 10.8 lbs
Ruggedness	No ruggedness testing/claims
Consumables	Manufacturer maintenance necessary
Training Required	1 day of training required
Maturity	8 - 12 weeks
User Feedback	No Feedback Total PBA Score- 92/122

X-ray Diffraction (XRD)

PRODUCT NAME

BTX-II

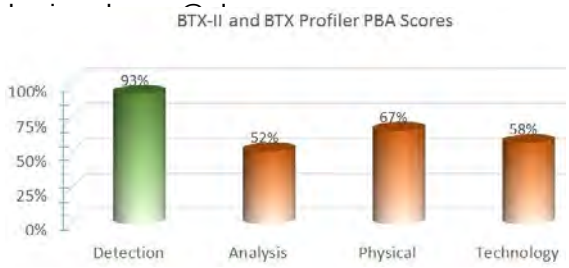
TECHNOLOGY CATEGORY

Elemental Analysis;

Olympus Scientific Solutions America
48 Woerd Avenue
Waltham, MA 02453

www.olympus-ims.com

Kevin Coleman
312-520-2974





Synopsis	The BTX-II has the full XRD mineralogical analysis capabilities of the BTX Profiler, but only rudimentary XRF information gleaned from the CCD detector; it essentially aids in the XRD mineralogical identification and analysis as opposed to providing the full, rigorous elemental ED-XRF analysis found in the BTX Profiler. The BTX Profiler combines full XRD and full XRF capabilities. It uses single sample measurement or unattended multi-sample measurements with an integrated autosampler. Applications include: counterfeit drug screening, pharmaceutical discovery library building, and fire or explosives forensics.
Category	Chemical; Explosives
Detection Method	X-ray Diffraction (XRD); X-ray Fluorescence (XRF) ;
Detection Principle	Elemental Analysis;
Application	Laboratory Analysis; Bulk Analysis;
Type	Instrument
Availability	Commercially Available: 60 to 90 days for delivery
Readiness Level	9
Market Entry Date	2008
Number Of Units Fielded	501 to 1,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Yes
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Elemental Analysis
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Commercial databases available
Customize For New Targets	Yes

BTX-II

Sample Introduction	Solid
Sensitivity Detection Limits	100's ppm to %
Start-Up Time From Cold Start To Sample Ready	2 minutes
Response Time Sample Application To Output	5 to 15 minutes
Total Run Time	5 to 15 minutes
Software Control	On-board
Other Operational Parameters	XRD range: 5 to 55°, 0.25° resolution, XRF Energy Range: 3 to 25 keV, 200 eV resolution, Sample Size: 15 mg; X-Ray tube voltage: 30kV, X-ray tube power: 10W, X-ray target material: Cu or Co (Cu standard), Sampling: Dry powder is placed into a small chamber.

Physical Parameters

Dimensions	BTX-II: Single sample unit 11.75 x 6.9 x 18.5 in (29.9 x 17.6 x 49.6 cm) BTX Profiler: Single sample unit -19.41 x 15.66 x 13.55 in (49.4 x 39.8 x 34.5 cm) Multi-Sample unit 26.57 x 15.66 x 13.55 (67.5 x 39.8 x 34.5 cm)
Weight	BTX-II: 27.5 lbs (12.5 kg) BTX Profiler: 51 lbs (23.2 kg) BTX Profiler Multi-Sample: 72 lbs (32.7 kg)
Power Requirements	110 to 220 VAC

Logistical Parameters

Transportability	Benchtop/Fixed; Small Footprint
Durability	Shock and vibration tested
Operating Conditions	-10 to 35 °C (14 to 95 °F)
Consumables	Sample cells for the both XRD and for XRF, Mylar windows ($100/set of 10)
Solvents Reagents	Not Applicable
Suggested Routine Maintenance	Mylar window needs to be replaced approximately every 6 months. User can perform basic preventative maintenance; however, major repair work needs to be done by manufacturer.
Shelf Life	10 years
Unit Cost	$53,750
Expected Operational Life	Indefinite
AvailableAccessories	Not Applicable
Data File Type Format	TXT
Communications Interface	Ethernet or Wireless(802.11b/g)
Maintenance Cost	$100

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Operator’s Manual
Reachback Service	No
Warranties	1 year, extended warranty
ITAR Export Regulations	None

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4ANPP, norfentanyl
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	100's ppm to %
Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Place sample in a small chamber.
Response Time	5 - 15 minutes

BTX-II

Customize for New Targets	User can add new targets to detector
Portability	27.5 lbs
Ruggedness	Has had shock/vibration testing (performed by MRIGlobal)
Consumables	User can provide basic preventative maintenance. Mylar windows ($100/set of 10)
Training Required	2 1/2 days of training required
Maturity	8 weeks
User Feedback	MRIGlobal tested Total PBA Score- 91/122

X-ray Diffraction (XRD)

PRODUCT NAME

Terra Portable XRD/XRF



TECHNOLOGY CATEGORY

Elemental Analysis;

Olympus Scientific Solutions America
48 Woerd Avenue
Waltham, MA 02453

www.olympus-ims.com

Kevin Coleman
+1 312 520 2974



Synopsis	The Terra system is a rugged, portable field instrument which uses dual XRD and qualitative XRF technology for earthbound applications. Using a specifically developed direct excitation charge coupled device (CCD) “camera”, Terra is able to collect X-ray photon data for both X-ray diffraction and X-ray fluorescence simultaneously. Typical uses include: Rapid ID of dangerous hazardous materials, explosives, fusing materials & accelerants; non-destructive fingerprinting of drug formulations & precursors; and testing for presence and quantity of foreign or substitute ingredients.
Category	Chemical; Explosives
Detection Method	X-ray Diffraction (XRD); X-ray Fluorescence (XRF) ;
Detection Principle	Elemental Analysis;
Application	Laboratory Analysis; Bulk Analysis;
Type	Instrument
Availability	Commercially Available
Readiness Level	9
Market Entry Date	2008
User Feedback Sources	MRIGlobal hands-on experience
Number Of Units Fielded	501 to 1,000
Support Documents	Available

Operational Parameters

Tested for Chemical Agents	Not Applicable
Tested for ITF25TICTIMs	Not Applicable
Tested For Explosives	Yes
Tested For Narcotics	Yes (fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700)
Other Chemical Targets	Modes available include: Soil, Mining, Alloy, Fluids and Consumer Goods
Tested For Biological Agents	Not Applicable
Other Biological Targets	Not Applicable
Radiological Targets	Not Applicable
Library Size	Several commercial libraries available
Customize For New Targets	Yes

Terra Portable XRD/XRF

Sample Introduction	Solid
Sensitivity Detection Limits	ppm; %
Known Interferents Inhibitors	Not Specified
Start-Up Time From Cold Start To Sample Ready	1.5 minutes
Response Time Sample Application To Output	5 to 15 minutes
Total Run Time	Minutes
Alarm Capability	No
Software Control	Remote, Onboard, PC
Other Operational Parameters	XRD range: 5 - 55°, XRF Energy Range: 3 - 25 keV, 250 eV resolution, Sample Size: 15 mg; X-Ray tube voltage: 30kV, X-ray tube power: 10W, X-ray target material: Cu or Co (Cu standard), Sampling: Dry powder is placed into a small chamber.

Physical Parameters

Dimensions	19.1 x 15.4 x 7.6 in (48.6 x 39.2 x 19.4 cm)
Weight	32 lbs (14.5 kg)
Power Requirements	110 to 220 VAC, 50 to 60 Hz, 70 W max 4 hr rechargeable batteries

Logistical Parameters

Transportability	Person-Portable
Durability	Rugged, shock and vibration tested
Operating Conditions	-10 to 35°C (14 to 95°F), 10 to 90%, RH noncondensing
Consumables	Mylar windows ($100/set of 10)
Solvents Reagents	Not Applicable
Calibration Schedule	Standardization and test samples are included in the kit for use before sampling
Suggested Routine Maintenance	Mylar window needs to be replaced approximately every 6 months. User can perform basic preventative maintenance; however, major repair work needs to be done by manufacturer.
Shelf Life	10 years
Unit Cost	$75,800
Expected Operational Life	Indefinite
AvailableAccessories	Spinner sample holder, sample preparation accessories
Data Analysis Support Equipment	Windows XP, X-Powder software
Data File Type Format	TXT
Communications Interface	USB, Bluetooth, 802.11b/g for remote control from web browser
Maintenance Cost	$100

Training, Shipping, And Other Information

Operator Skills Required	Non-technical
Training Available	Yes
Manuals Available	Operators Manual, Quick Start Guide
Reachback Service	No
Warranties	1 year all inclusive
ITAR Export Regulations	No
IATA Shipping Restrictions	No

PBA Detection

Targets Detected Score	fentanyl, carfentanil, sufentanil, alfentanil, remifentanil, heroin, ketamine, lorazepam, 3-quinuclidinyl benzilate, U-47700
Associated Compounds Detected	4ANPP, norfentanyl
Common Cutting Agents Detected	sucrose, lactose, caffeine, ephedrine, aspirin, and others
Sensitivity	100's ppm to %

Terra Portable XRD/XRF

Selectivity	Identifies all targets in complex mixtures
Sample Preparation	Place sample in a small chamber.
Response Time	5 - 15 minutes
Customize for New Targets	User can add new targets to detector
Portability	32 lbs
Ruggedness	Has had shock/vibration testing (performed by MRIGlobal)
Consumables	User can provide basic preventative maintenance. Mylar windows ($100/set of 10)
Training Required	2 1/2 days of training required
Maturity	8 weeks
User Feedback	MRIGlobal tested Total PBA Score- 90/122