



System Assessment and Validation for Emergency Responders (SAVER)

Portable High Volume Air Samplers for Measuring Radioactivity Market Survey Report

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The *Portable High Volume Air Samplers for Measuring Radioactivity Market Survey Report* was prepared by the National Urban Security Technology Laboratory for the SAVER Program of the U.S. Department of Homeland Security, Science and Technology Directorate.

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FOREWORD

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions. Located within the Science and Technology Directorate (S&T) of DHS, the SAVER Program conducts objective assessments and validations on commercial equipment and systems and provides those results along with other relevant equipment information to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List (AEL). The SAVER Program mission includes:

- Conducting impartial, practitioner-relevant, operationally oriented assessments and validations of emergency responder equipment; and
- Providing information that enables decision-makers and responders to better select, procure, use, and maintain emergency responder equipment.

Information provided by the SAVER Program will be shared nationally with the responder community, providing a life- and cost-saving asset to DHS, as well as to Federal, state, and local responders.

The SAVER Program is supported by a network of Technical Agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: “What equipment is available?” and “How does it perform?”

As a SAVER Program Technical Agent, the National Urban Security Technology Laboratory (NUSTL) has been tasked to provide expertise and analysis on key subject areas, including chemical, biological, radiological, nuclear, and explosive (CBRNE) weapons detection and response, and remediation instruments and techniques. In support of this tasking, NUSTL conducted a market survey of commercially available portable high volume air samplers for measuring radioactivity, which fall under the AEL equipment category “Equipment, Air Sampling,” reference number 07RS-01-AFCB.

Visit the SAVER website at www.dhs.gov/science-and-technology/SAVER for more information on the SAVER Program or to view additional reports on portable high volume air samplers or other technologies.

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1. MARKET SURVEY OBJECTIVES

Federal, state, and local agencies that are tasked with responding to emergencies involving possible atmospheric radioactivity releases may use commercial off-the-shelf portable high volume air samplers to collect samples that are subsequently analyzed to determine atmospheric concentrations of radioactive particles and gases. To provide these agencies with information helpful in making purchasing decisions, the System Assessment and Validation for Emergency Responders (SAVER) Program conducted a market survey on portable high volume air samplers, which fall under Authorized Equipment List reference number 07RS-01-AFCB.

2. RESEARCH METHODOLOGY

This report is based on information gathered between September 2010 and March 2011 from equipment manufacturers in response to a government-issued Request for Information (RFI) posted on the Federal Business Opportunities (FedBizOpps) website (<https://www.fbo.gov>) along with Internet research and correspondence with equipment manufacturers.

A product had to meet the following criteria to be included in this report:

- Commercially available;
- Readily used to collect samples for measuring airborne concentrations of radioactivity;
- Readily carried by a single person; and
- Not designed to be worn.

Due diligence was performed to develop a report that is representative of products in the marketplace; however, this report should not be considered to be a complete catalog of commercially available equipment.

The following sections describe the methods used to obtain the information presented in this report.

2.1 Request for Information

An RFI was posted on the FedBizOpps website on December 6, 2010, inviting air sampling equipment manufacturers to provide information about their portable high volume air samplers. Manufacturers were asked to provide feedback using a Microsoft Excel-based questionnaire form available from NUSTL. Manufacturers were requested to return their completed product questionnaires by December 27, 2010. A copy of this RFI announcement is provided in Appendix A.

2.2 Internet Research

Internet research began prior to the publication of the RFI announcement. Air sampling equipment manufacturers and their points of contact were identified using Internet search

engines and by consulting the SAVER website at www.dhs.gov/science-and-technology/SAVER. Specific portable air samplers that met the criteria for inclusion in this report were identified during this phase of research.

Additional Internet research took place after the closing date of the RFI. Manufacturers of a number of portable high volume air samplers identified in the initial phase of Internet research did not respond to the RFI. In order to include these samplers in this report, NUSTL gathered the pertinent information from product literature obtained from manufacturer websites. Product literature from manufacturer websites was also used to supplement or clarify information in the product questionnaires returned to NUSTL by equipment manufacturers.

2.3 Manufacturer Correspondence

On the publication date of the RFI, manufacturers that had been identified through Internet research were notified by e-mail of the RFI announcement and sent product questionnaires to encourage their participation in the RFI. As the information obtained through the RFI and Internet research was compiled, equipment manufacturers were in some cases contacted to clarify or supplement the information obtained from these sources.

3. PORTABLE HIGH VOLUME AIR SAMPLERS OVERVIEW

Air samplers draw air through a collection medium onto which atmospheric particles or gases are deposited. At the end of the sampling period, the collection medium is removed from the sampler and analyzed at a field or central laboratory to determine the amount of atmospheric particulates or gases in the collection medium. Air concentrations of each species of interest are calculated by dividing the measured amount of each species in the collection medium by the volume of air collected during the sampling period; the latter quantity is the product of the measured air flow rate and sample collection time.

There is no standard that defines a flow rate range that constitutes high volume air sampling. For the purposes of this report, air samplers capable of operating at flow rates of at least 14 liters per minute (lpm), which is equivalent to 0.5 cubic feet per minute (cfm), are considered to be high volume samplers. High volume air samplers will herein be considered to be portable if they can be readily carried by a single person.

While some commercially available portable high volume air samplers are marketed as radiological air samplers, most are marketed as general purpose samplers for non-radiological applications such as airborne asbestos or lead sampling. Air samplers are basically pumps used to draw air through collection media which need to be appropriate for the analysis of interest. There are no technical obstacles to using a general purpose sampler for radiological analyses, nor are there technical obstacles to using a radiological air sampler for non-radiological analyses. General purpose portable high volume air samplers are thus suitable for collecting atmospheric radioactivity, and portable high volume air samplers marketed as radiological samplers are suitable for collecting non-radioactive atmospheric species; purchasing decisions should therefore focus on relative features, capabilities, and price.

3.1 Purchasing Considerations

Purchasers should ensure that the sampler to be purchased can operate at a flow rate that allows collection of a sufficient quantity of atmospheric radioactivity during a sampling interval to attain desired measurement objectives. The amount of airborne radioactivity collected during a sampling interval increases in proportion to the sampler flow rate, and as the amount of radioactivity collected increases, the accuracy of radioactivity measurements performed on the collection medium improves and detection limits decrease. Purchasers should thus be aware of the detection levels and measurement uncertainties of the radioactive analysis techniques that will be used to analyze collected samples so that a sampler with suitable flow rate capabilities is purchased.

It is important to consider whether the sampler to be purchased is intended for grab sampling or for continuous duty sampling. The term “grab sampler” in vendor literature usually implies that the sampler should only be operated continuously for hours rather than days, while continuous duty samplers can be operated for days or weeks at a time.

The availability of electrical power at field sampling sites may be an important purchasing consideration. Portable high volume air samplers are powered by one or more sources including standard 120 or 240 volt alternating current (AC) wall outlets, internal rechargeable batteries, and external direct current (DC) power sources such as automobile power plugs or auto batteries. Samplers that can be powered by rechargeable batteries or automobile power plugs provide the capability to collect air samples at times and places where AC line voltage is unavailable.

Commercially available portable high volume air samplers range from models that are equipped with a few simple manually operated controls (e.g., an on/off switch and flow adjustment knob) to models having some or all of the following automated control and data collection features:

Timed sampling allows the sampler to be set to stop collecting air upon reaching a user selected period of time.

Programmable sampling allows the sampler to undergo a complex series of user-determined starts and stops. This feature is useful in worker safety applications to halt air sampling when workers are not present, for instance during scheduled work breaks.

Constant flow rate controllers automatically maintain a pre-set flow rate regardless of changes in the flow resistance of the collection medium. In the absence of a constant flow rate controller, flow rate can change significantly when sampling dusty or polluted environments. Significant changes in flow rate, unless carefully accounted for, will lead to significant errors when calculating the total volume of air collected, which in turn will propagate into significant errors in the calculated air concentrations of radioactive species of concern. Flow rate variations also lead to a sampling bias (i.e., analysis results will be skewed toward periods of higher than average flow rate because more air was sampled during these periods).

Flow totalization or volume totalization refers to the capability to measure and display the cumulative volume of air collected during a sampling interval. Flow/volume totalization frees the user of the need to manually calculate the cumulative volume of air collected.

Data logging provides the capability to store and export sampling data (e.g., flow rate versus time, cumulative volume of air sampled, sampling start and end times, etc.) to a personal computer via a cable, removable memory card, or other device.

3.2 Applications

Portable high volume air samplers can be used to determine airborne radioactivity concentrations throughout the duration of an emergency involving a potential atmospheric release of radioactivity. In the early stages of an incident involving a potential atmospheric release of radioactivity, they would be used to determine atmospheric radioactivity concentrations in downwind areas so that officials guiding incident response efforts can monitor and minimize the radiological dose received by emergency response workers and the general public. As the incident evolves into the remediation phase, they may be used at clean-up sites to monitor radiological doses to workers via the respiratory pathway and to monitor off-site atmospheric emissions of radioactivity.

Radioactivity may be present as radioactive particulate and/or gases. Portable high volume air samplers can be used for both applications.

Radioactive particulates are most commonly collected using glass fiber or cellulose ester air filters. To determine the radiation dose via the respiratory pathway, many sampler models can be fitted with a particle size selective inlet so that only fine particles that can penetrate deeply into the human respiratory tract are collected for measurement. An alternate approach to particle selective sampling is to use a device called an impactor as the sample collector in place of an air filter. Impactors segregate and separately collect atmospheric particles of different sizes, making it possible to obtain detailed information about the size distribution of radioactive particulates during the sample collection period.

Radioactive gases are collected using porous cartridges or filters containing material that physically adsorbs or chemically reacts with the gaseous species of interest. Sampling for radioactive iodine gases is of particular interest to radiological emergency response agencies because of the potential public health threat posed by radioactive iodine gases in the event of a nuclear power plant accident. Several manufacturers sell radioiodine gas sampling cartridges containing adsorbents such as activated charcoal, silver zeolite, or triethylene di-amine (TEDA) that are specifically designed for use with portable air samplers.

3.3 Related Technologies

The two air sampling technologies listed below are outside the scope of this report but are briefly discussed as they may be of interest to agencies purchasing equipment for measuring radioactivity in air.

Personal air samplers are designed to be worn by an individual in order to sample breathing zone air for particulate or gases. Some personal air sampler models are capable of operating at flow rates that fall within the lower end of the flow rate range of portable high volume air samplers featured in this report. Personal air samplers are typically powered by rechargeable batteries that allow for continuous sample collection for periods of eight or more hours.

Portable air monitors are essentially air samplers that have been equipped with built-in radiation detectors that measure radioactive species as they collect on the sample collection medium. Portable air monitors can therefore provide users with the benefit of real-time data on atmospheric concentrations radioactive species. However, portable air monitors are considerably more expensive than portable high volume air samplers because of the cost of the onboard radiation detectors; furthermore, detection limits and radioisotope identification capabilities of portable air monitors may be inferior to what can be achieved when collection media obtained with high volume air samplers are analyzed at a field or central laboratory facility.

4. PRODUCT INFORMATION

Table 4-1 provides a comparison of the features of a number of portable high volume air samplers produced by six different manufacturers. Additional information about these samplers is provided in sections 4.1 to 4.14. The information presented in table 4-1 and in the following sections was provided by manufacturers in response to a government-issued RFI, product literature obtained from manufacturer websites, and correspondence with equipment manufacturers between September 2010 and March 2011. The information obtained from these sources has not been independently validated by the SAVER Program.

Features in table 4-1 are defined as follows, listed in column order:

Flow Rate Range indicates the minimum and maximum flow rate range in lpm.

Continuous Duty indicates whether the manufacturer states that the sampler is capable of continuous duty sampling. “Y” indicates yes. “N” indicates no.

Constant Flow Rate Controller indicates whether the sampler is equipped with a constant flow rate controller. “Y” denotes that this is a standard feature. “N” denotes this feature is not available. “Opt.” denotes that this is available as an optional feature.

Timer/Programmable Sampling indicates whether the user can pre-set the sampling interval. “Manual” indicates that the sampler must be manually turned on and off at the start and end of the sampling period. “Timer” indicates that sample collection can be set to halt after a user-determined elapsed run time. “Programmable” indicates that a complex series of sampling starts and stops can be pre-programmed. “Volume” indicates that the sampler can be set to halt after a user-determined volume of air is collected.

Total Volume indicates whether the sampler calculates and displays the cumulative volume of air collected during a sampling interval. “Y” denotes that this is a standard feature. “N” denotes this feature is not available. “Opt.” denotes that this is available as an optional feature.

Exportable Sampling Data indicates whether sampling data (e.g., air flow rate, total volume of air collected, start/end times) can be transferred to a personal computer via a cable, memory card, or other device. “Y” indicates yes. “N” indicates no.

AC Power indicates AC voltages the sampler can be operated on. Nominal voltages are given for the sake of clarity; contact the manufacturer for information on the specific voltage range of particular sampler models. “120V” indicates that the sampler is powered by 120 volt power sources only. “120-240V” indicates that the sampler can be powered by either 120 or 240 volt

power sources. “120V, 240V” indicates that there are separate 120 and 240 volt versions. “N” indicates that the sampler cannot be powered by AC sources.

DC Power indicates DC power sources the sampler can be operated on, such as internal batteries or an external 12 volt DC automobile power outlet or 12 volt auto battery. “N” indicates the sampler cannot be powered by DC sources.

Weight indicates the sampler’s weight, in pounds.

Dimensions indicate the sampler’s length, width, and height, in inches.

Price indicates the price of the sampler within the 1,000 dollar ranges indicated; note that sampler prices vary depending on the specific optional features chosen by the purchaser.

Table 4-1. Product Comparison Table

Company Name Model Name	Flow Rate Range (lpm)	Continuous Duty	Constant Flow Rate Controller	Timed/ Programmable Sampling	Total Volume	Exportable Sampling Data	AC Power	DC Power	Weight (pounds)	Dimensions (LxWxH, inches)	Price (\$)
A.P Buck, Inc. LinEair™ 40	5-35	Y	N	Manual	N	N	120V	External 12V via optional adaptor	6	8 x 6 x 8.3	<1,000
F&J Specialty Products, Inc. DF-75L-BL-AC	15-75 ^a	Y	Y	Timer, Volume	Y	Y	120-240V	External 24V	14	11 x 11 x 18	3,000-4,000
F&J Specialty Products, Inc. DF-75L-Li	15-75 ^a	Y	Y	Timer, Volume	Y	Y	120-240V	Internal Li-ion battery; External 12V	15	12 x 8 x 9	2,000-3,000
F&J Specialty Products, Inc. DF-AB-40L	8-35	Y	Y	Timer, Volume	Y	Y	120-240V	Internal NiMH battery; External 12V	13	14.5 x 8 x 10	2,000-3,000
F&J Specialty Products, Inc. DF-AB-40L-Li	8-35	Y	Y	Timer, Volume	Y	Y	120-240V	Internal Li-ion battery; External 12 V	13	14.5 x 8 x 10	2,000-3,000
F&J Specialty Products, Inc. DF-AB-75L-Li	15-75 ^a	Y	Y	Timer, Volume	Y	Y	120-240V	Internal Li-ion battery; External 12V	21	17 x 10.4 x 13	3,000-4,000

Table 4-1. Product Comparison Table, continued

Company Name Model Name	Flow Rate Range (lpm)	Continuous Duty	Constant Flow Rate Controller	Timed/ Programmable Sampling	Total Volume	Exportable Sampling Data	AC Power	DC Power	Weight (pounds)	Dimensions (LxWxH, inches)	Price (\$)
F&J Specialty Products, Inc. DFHV-1	20-360	Y	Y	Timer, Volume	Y	Y	120V	N	12	10.8 x 8 x 10.3	1,000- 2,000
F&J Specialty Products, Inc. DFHV-1S	140-1,700	N	Opt.	Timer, Volume	Y	Y	120V	N	12	10.8 x 8 x 10.3	1,000- 2,000
F&J Specialty Products, Inc. HV-1	20-360	Y	N	Optional Timer	N	N	120V	N	12	9.3 x 8.3 x10	<1,000
F&J Specialty Products, Inc. H8400B	280-2,000	N	N	Optional Timer	N	N	N	External 24V	8.7	9.8 x 9.5 x 10.4	<1,000
F&J Specialty Products, Inc. T8400M	280-2,000	N	N	Optional Timer	N	N	120V, 240V	N	8.7	9.8 x 9.5 x 10.4	<1,000
HI-Q Environmental Products Company CF-5624-WRB	28-120	Y	Y	Timer, Volume	Y	Y	120V	Internal NiMH battery; optional external battery pack to extend battery run times	15	14 x 13 x 21	4,000- 5,000

Table 4-1. Product Comparison Table, continued

Company Name Model Name	Flow Rate Range (lpm)	Continuous Duty	Constant Flow Rate Controller	Timed/ Programmable Sampling	Total Volume	Exportable Sampling Data	AC Power	DC Power	Weight (pounds)	Dimensions (LxWxH, inches)	Price (\$)
HI-Q Environmental Products Company CF-900 Series	30-1,700 ^b	Y	N	Timer	Opt.	N	120V, 240V	N	9.5	8.5 x 9.3 x 12	<1,000
HI-Q Environmental Products Company CF-995B	14-165	Y	N	Programmable	N	N	120V, 240V	Internal 12V, 26 A-h battery	36	10.5 x 10 x 14.5	1,000- 2,000
HI-Q Environmental Products Company CF-1000 BRL Series	30-1,400 ^b	Y	N	Timer	Opt.	N	120V, 240V	N	9.5	9 x 10 x 11.5	1,000- 2,000
Sensidyne, LP Aircon-2	2-30	Y	Y	Programmable	N	N	120-240V	External 12V battery packs ^c	14- 23 ^d	7.5 x 4.3 x 10.3 ^e	2,000- 3,000
SKC, Inc. Flite 2	2-17	Y	N	Programmable	N	N	120-240V	Internal 12V Pb acid battery	5-11 ^f	7 x 4.3 x 7.9	1,000- 2,000
SKC, Inc. QuickTake 30	10-30	Y	Y	Programmable	N	N	120-240V	Internal Li-ion battery pack	4.8- 6.3 ^g	9.3 x 3.5 x 8.4	1,000- 2,000

Table 4-1. Product Comparison Table, continued

Company Name Model Name	Flow Rate Range (lpm)	Continuous Duty	Constant Flow Rate Controller	Timed/ Programmable Sampling	Total Volume	Exportable Sampling Data	AC Power	DC Power	Weight (pounds)	Dimensions (LxWxH, inches)	Price (\$)
The Staplex® Company TFIA-4BC	14-740 ^h	Y	N	Manual	N	N	N	External 12 or 24V	10	8.5 x 7.5 x 7.5	<1,000
The Staplex® Company TFIA-F	14-2,000	Y	Opt.	Optional Timer and Optional Programmable	N	N	120V	N	10	8.5 x 7.5 x 7.5	<1,000
The Staplex® Company TFIA-2F	14-2,000	Y	Opt.	Optional Timer and Optional Programmable	N	N	240V	N	10	8.5 x 7.5 x 7.5	<1,000
The Staplex® Company TFRC-1 ⁱ	60-340	N	N	Optional Programmable	Opt.	N	120V, 240V	N	9.5	11.5 x 8 x 8	1,000- 2,000
The Staplex® Company TFRC-4IB ⁱ	30-175	N	N	Timer	N	N	120V, 240V	Internal rechargeable battery	36	10 x 10 x 14.3	1,000- 2,000
The Staplex® Company TFRC-4NB ⁱ	90-285	N	N	Timer	N	N	N	External 24V	9.5	10 x 9 x 11.5	2,000- 3,000

Notes:

- AC = Alternating current
- A-h = Amp-hour
- DC = Direct current

Li-ion	=	Lithium ion
lpm	=	liters per minute
N	=	No; see feature definitions given above
NiMH	=	Nickel metal hydride
Opt.	=	Optional feature
Pb	=	Lead
V	=	Volt
Y	=	Yes; see feature definitions given above

- a – The manufacturer recommends operation in the 30-75 lpm range although operating below 30 lpm is possible.
- b - Three models cover different portions of this range; see product description for flow rates of individual models.
- c– The Aircon-2 is designed to stack onto external 2-hour or 4-hour 12-volt DC battery packs available from the manufacturer.
- d –Weight of sampler alone is 12 pounds. Sampler is operated connected to one or more of the following: AC power module (2 pounds), 2-hour battery pack (6.5 pounds), 4-hour battery pack (11.5 pounds).
- e –Dimensions of the sampler only. Sampler is operated connected to one or more of the following: AC power module (7.5 x 5.25 x 3 inches), 2-hour battery pack (7.5 x 5.25 x 3.625 inches), 4-hour battery pack (7.5 x 5.25 x 5 inches).
- f –Weight is 5 pounds with no battery, 8 pounds fitted with a 3.2 A-h, 12-volt, Pb acid battery, and 11 pounds fitted with a 7 A-h, 12-volt, Pb acid battery.
- g –Weight of sampler is 4.8 pounds, not including the 1.5 pound internal battery pack.
- h - This is the flow rate range with an 8 x 10 inch air filter as the collection medium and powered by a 24-volt DC source; the flow rate range is 0-500 lpm with the same sampling medium when powered by a 12-volt DC source.
- i – Several other models are available in the TFRC series; see section 4.14.

4.1 A.P. Buck, Inc.: LinEair™ 40

The LinEair™ 40 is a continuous duty linear piston air sampler that operates at flow rates from 5 to 35 lpm, equivalent to about 0.2 to 1.2 cfm. It does not have an automatic flow rate controller or timed or programmable sampling capabilities. Components include a flow meter, flow control valve, and front mounted operating fittings. The LinEair™ 40 can be powered by 120 volt AC power sources or by an external 12 volt DC power source using an optional adapter. Other available optional features include a weather resistant transport case and a tripod for sampling media support. The total weight of the sampler is 6 pounds.



LinEair™ 40

Photo courtesy of A.P. Buck, Inc.

4.2 F&J Specialty Products, Inc.: DF-75L-BL-AC, DF-75L-Li, DF-AB-40L, DF-AB-40L-Li, and DF-AB-75L-Li

This is a group of portable continuous duty air samplers that share many common components and capabilities. Flow rates are 8 to 35 lpm (0.3 to 1.2 cfm) for samplers with a “-40” in the model name and 15 to 75 lpm (0.5 to 2.6 cfm) for samplers with a “-75” in the model name. All models are equipped with automatic constant flow rate controllers. All models can operate on external 120 to 240 volt AC power sources. All models can be powered by 12 volt external DC sources, except the DF-75L-BL-AC, which can be powered by a 24 volt external DC source. All models except the DF-75L-BL-AC are equipped with internal rechargeable lead acid, nickel metal hydride (NiMH), or lithium ion (Li-ion) batteries depending on the model (see table 4-1 for battery type of a specific model).



DF-75L-Li

Photo courtesy of F&J Specialty Products, Inc.

Mechanical and electrical components are housed in either a waterproof “ammo box” enclosure (models with “AB” in their model designation) or a metal “instrument box” enclosure that is suitable for indoor use or outdoor use in good weather. Weights range from 13 to 21 pounds.

Other common components/features include:

- Brushless motor coupled to a dual diaphragm pump;
- Automatic constant flow rate controller;
- Automatic determination of total volume of air sampled;
- Displayed flow rates and total volumes are referenced to one of four factory-set temperature (T) and pressure (P) options: classical Standard T and P (0°C, 1 atmosphere),

Normal T and P (20°C, 1 atmosphere), Modified Normal T and P (70°C, 1 atmosphere), and Standard Ambient T and P (25°C, 1 atmosphere);

- Pre-set sampling intervals based on either elapsed sampling time or total volume of air sampled;
- Built-in battery charging circuitry; and
- Data export capability via an RS-232 communications port to a 2-gigabyte digital memory card (memory card and reader available as optional accessories).

4.3 F&J Specialty Products, Inc.: DFHV-1 and DFHV-1S

The DFHV-1 is a continuous duty sampler that operates at flow rates between 20 and 360 lpm (0.7 to 13 cfm), while the DFHV-1S is a grab sampler that operates at flow rates between 140 and 1,700 lpm (5 to 60 cfm). The DFHV-1 is equipped with an automatic flow rate controller as a standard feature; an automatic flow rate controller is an optional feature on the DFHV-1S.

Both samplers are powered by 120 volt AC sources. They are both equipped with a two-stage bypass type pump and AC electric motor located in a housing that is cooled by an electric fan to avoid thermal overloads.

Both samplers have microprocessor based sampler controls which are accessed via a four button keypad. Flow rate, total volume of air sampled, and other information are indicated by a Light Emitting Diode (LED) display. Sampling intervals are programmable based on elapsed time or cumulative volume of air. Sampling data can be exported via an RS-232 communications port to a 2 gigabyte digital memory card (memory card and reader available as optional accessories). Both samplers weigh approximately 12 pounds.



DFHV-1

Photo courtesy of F&J Specialty Products, Inc.

4.4 F&J Specialty Products, Inc.: HV-1

The HV-1 is a continuous duty air sampler that can operate at flow rates between 20 and 360 lpm (0.7 to 13 cfm). The sampler is not equipped with a constant flow rate controller. Flow rate is adjusted via a motor speed controller; sampling controls are located in a removable module to facilitate maintenance. The built-in flow meter is available in a wide range of flow rate scales depending upon the user's needs. The HV-1 is equipped with a two-stage bypass type pump with an independent cooling system to provide thermal overload protection for the dual ball bearing pump motor. It operates on 120 volt AC power sources only. It can be equipped with a resettable sampling timer at an additional cost. The HV-1 is mounted on a rigid base with non-skid rubber feet. The total weight of the sampler is 12 pounds.



HV-1

Photo courtesy of F&J Specialty Products, Inc.

4.5 F&J Specialty Products, Inc.: H8400B

The H8400B is designed for periodic short term use. It is equipped with a 24 volt DC electric motor driven vacuum blower mounted in a polypropylene plastic housing. Flow rates range from 280 to 2,000 lpm (10 to 70 cfm). It is powered by external DC power sources (e.g., automobile batteries) only; the sampler comes with a 6-foot long battery cable with clamps. The basic model has no flow gauge, but one can be purchased as an optional feature; an elapsed time meter is also available at extra cost. The sampler is mounted on a rigid base plate with non-skid rubber feet and weighs less than 9 pounds.



H8400B
Photo courtesy of F&J Specialty Products, Inc.

4.6 F&J Specialty Products, Inc.: T8400M

The T8400M is designed for periodic short term use. It operates at flow rates in the 280 to 2,000 lpm (10-70 cfm) range; the flow rate is adjusted via a motor speed controller. The basic model does not have a flow rate meter or a sampling timer, but these features are available at additional cost. The T8400M is available as 120 volt and 240 volt AC variants; it has no internal batteries or ports for connecting to external DC power sources. The two-stage thermally protected electric motor and vacuum blower are mounted in a polypropylene housing. The T8400M is mounted on a rigid base plate with non-skid rubber feet and weighs less than 9 pounds.



T8400M
Photo courtesy of F&J Specialty Products, Inc.

4.7 HI-Q Environmental Products Company: CF-5624-WRB

The CF-5624-WRB continuous duty air sampler operates at flow rates between 28 and 120 lpm (1 to 4.2 cfm). It features an automatic flow rate controller and a digital display that indicates flow rate, total volume of air sampled, and elapsed sampling time. A data logger saves sampling data for export to a personal computer. Sampling intervals can be pre-set with a 6-day cyclic timer which also allows for shutoff upon reaching a user-set total volume.

The CF-5624-WRB can be operated on 120 volt AC line or battery power. It is equipped with internal nickel metal hydride batteries and an internal battery charger; the manufacturer states that the CF-5624-WRB can run for 6 hours on fully charged internal batteries. An external battery pack can be purchased at extra cost to further extend sampling time on battery power. Sampler components are mounted in a weatherproof case. The total weight of the sampler is 15 pounds.



CF-5624-WRB
Photo courtesy of HI-Q Environmental Products Company

4.8 HI-Q Environmental Products Company: CF-900 and CF-1000 BRL Series Air Samplers

CF-900 series continuous duty air samplers are equipped with brushed electrical pump motors while CF-1000BRL series samplers are equipped with brushless electrical pump motors. The brushed blower samplers in the -900 series can operate at higher flow rates than corresponding brushless blower equipped samplers in the -1000BRL series but the brushed motors require periodic replacement of worn motor brushes. Both series consist of three models covering different flow rate ranges. Respective flow rate ranges for the CF-901, CF-902, and CF-903 are 30-340, 150-1,000, and 300-1,700 lpm (1-12, 5-35, and 10-60 cfm respectively); for the CF-1001BRL, CF-1002BRL and CF-1003BRL they are 30-230, 250-800, and 400-1,400 lpm (1-8, 9-28, and 14-50 cfm respectively).

Both sampler series operate on AC power sources only; separate 120 volt and 240 volt models are available for each model variant in each series. Basic features included in all model variants are an air flow rate adjuster, an air flow rate meter, and a timer that allows the user to stop the sampler upon reaching a pre-set elapsed run time. An optional feature available for all model variants is a digital display that indicates instantaneous flow rate, total volume of air sampled, and minimum and maximum flow rates during the sampling period. All model variants weigh 9.5 pounds.



CF-900

Photo courtesy of HI-Q Environmental Products Company

4.9 HI-Q Environmental Products Company: CF-995B

The CF-995B continuous duty air sampler operates at flow rates between 14 and 165 lpm (0.5 to 5.8 cfm). It is equipped with a ten function programmable timer that allows users to preset a range of sampling times and cycles. The CF-995B can be powered by 120 volt AC power (a 240 volt AC version is also available) or an internally mounted 12 volt, 26 amp-hour (A-h) battery. It is equipped with an internally mounted battery charger. An internally mounted automatic AC/DC relay switch allows the sampler to run continuously when there are changes in the available power source. HI-Q states that the CF-995B has a typical run time of about 2 hours when operated on internal battery power. The total weight of the sampler is 36 pounds.



CF-995B

Photo courtesy of HI-Q Environmental Products Company

4.10 Sensidyne, LP: Aircon-2

The AirCon-2 is a continuous duty air sampler equipped with a positive displacement air pump. Flow rates are in the range of 2 to 30 lpm (0.1 to 1 cfm). It is equipped with an automatic constant flow rate controller. The Aircon-2 can be powered by an AC power module or 2- or 4-hour battery packs which are designed to stack beneath the sampler. The AC power module can be connected to 120 or 240 volt AC power sources and is capable of charging a depleted battery pack while providing power to run the sampler.

Operating controls employ a touchpad screen and an LCD display. Sampling controls allows users to pre-set sampling start and stop times, delays and holds, and number of sampling cycles. Up to three sample timing programs can be stored in memory for re-use. There is an instant fault function that terminates the sampling run and locks in the time when the unit is operated out of its performance envelope. The Aircon-2 weighs 12 pounds without batteries. The 2-hour battery pack weighs 6.5 pounds, the 4-hour battery pack weighs 11.5 pounds, and the AC power module weighs 2 pounds.

4.11 SKC, Inc.: Flite 2

The Flite 2 continuous duty air sampler operates at flow rates ranging from 2 to 17 lpm (0.1 - 0.6 cfm). It can be powered by 120 to 240 volt AC sources or by an internal 3.2 A-h or 7 A-h lead acid battery available from SKC. The internal battery is recharged using an external charger.

Sampler components are mounted in a steel case with touchpad controls and an LCD display. Sampling controls allow for timed runs, a delayed start, and intermittent sampling. In the case of a flow fault the elapsed run time for the interrupted sampling interval is retained. The Flite 2 weighs approximately 5 pounds without batteries, 8 pounds with the 3.2 A-h internal battery, and 11 pounds with the 7 A-h internal battery.



Flite 2
Photo courtesy of SKC, Inc.

4.12 SKC, Inc.: QuickTake 30

The QuickTake 30 continuous duty sampler operates at flow rates between 10 to 30 lpm (0.3 to 1 cfm). Sampler components include a diaphragm pump, LED display, touchpad controls, closed loop automatic constant flow rate controller, and programmable timer that provides eight run time presets of up to 999 minutes, continuous runs with manual shut off, and intermittent sampling. Sampler components are mounted in a plastic housing.

The QuickTake 30 can be powered by an internal rechargeable Li-ion battery pack or by external 120 to 240 volt AC power sources using an external battery charger/adaptor. The QuickTake 30 weighs 4.8 pounds without the 1.5 pound internal battery pack.



QuickTake 30
Photo courtesy of SKC, Inc.

4.13 The Staplex® Company: TFIA Series

TFIA Series continuous duty air samplers are available in a wide variety of power and sampling control configurations. Model variants include the TFIA-F, which operates on 120 volt AC power, the TFIA-2F, which operates on 240 volt AC power, and the TFIA-4BC which operates on either 12 or 24 volt DC external power. All model variants are equipped with a brushed electrical pump motor; Staplex® recommends changing the motor brushes every 800 to 1,000 hours of run time.

Optional features available with AC powered variants include several types of sampling timers, an elapsed sampling time indicator, an air flow rate recorder, and a constant flow rate controller.

AC powered model variants can operate at flow rates between 28 and 2,000 lpm (1 and 70 cfm). With an 8 x 10 inch air filter as the sampling medium, the TFIA-4BC has a flow rate range of 28 to 740 lpm (1 to 26 cfm) when operated using 24 volt DC power and 28 to 500 lpm (1 to 18 cfm) when operated on 12 volt power. TFIA series samplers weigh approximately 10 pounds.



*TFIA Air Sampler
Photo courtesy of The Staplex®
Company*

4.14 The Staplex® Company: TFRC Series High Volume Radioiodine Air Samplers

Staplex® TFRC Series High Volume Radioiodine Air Samplers are designed for intermittent use and grab sampling. While the name of this sampler emphasizes its use for collecting radioactive iodine gases, it is also suitable for radioactive particulate sampling according to Staplex® product literature. There are separate 120 and 240 volt AC powered variants, each of which can be purchased with brushed or brushless electric motors. There are also separate 12 volt and 24 volt external DC powered models as well as a model powered by an internal rechargeable battery.

Samplers with brushed electrical motors can operate at higher flow rates than equivalent brushless motor versions, but the motor brushes require periodic replacement. Staplex® recommends motor brush replacement after every 800 hours of usage. The AC powered brushed motor models (TFRC-1 and TFRC-2) have a flow rate range of 60 to 340 lpm (2 to 12 cfm); the AC powered brushless motor models (TFRC-1NB and TFRC-2NB) have a flow rate range of 60 to 230 lpm (2 to 8 cfm); the external 24 volt DC powered brushless motor model (TFRC-4NB) has a flow rate range of 90 to 285 lpm (3 and 9.5 cfm); and the internal rechargeable battery model (TFRC-4IB) has a flow rate range of 30 to 175 lpm (1 to 6 cfm) on battery or AC power. AC powered models can be equipped with optional features including a programmable sampling timer and a flow totalizer. The AC and external DC powered models weigh about 9.5 pounds, while the internal battery powered model weighs 36 pounds.



*TFRC Radioiodine Air Sampler
Photo courtesy of The Staplex®
Company*

5. VENDOR CONTACT INFORMATION

Table 5-1. Product and Vendor List

Company	Contact Information	Website
A.P. Buck, Inc.	A. P. Buck, Inc. Suite 110 7101 Presidents Drive Orlando, FL. 32809 Phone: 800-330-2825 Fax: 407-851-8910 E-mail: pkg@apbuck.com	http://www.apbuck.com/shop
F&J Specialty Products, Inc.	F&J Specialty Products, Inc. P.O. Box 2888 Ocala, FL 34478-2888 Phone: 352-680-1177 Fax: 352-680-1454 E-mail: sales@fjspecialty.com	http://www.fjspecialty.com
HI-Q Environmental Products Company	HI-Q Environmental Products Company 7386 Trade Street San Diego, CA 92121 Phone: 858-549-2820 Fax: 858-549-9657 E-mail: info@hi-q.net	http://www.hi-q.net
Sensidyne, LP	Sensidyne, LP 16333 Bay Vista Drive Clearwater, FL 33760 Phone: 800-451-9444 E-mail: info@sensidyne.com	http://www.sensidyne.com/home.php
SKC, Inc.	863 Valley View Road Eighty Four, PA 15330-9613 Phone: 800-752-8472 Fax: 724-941-1369 E-mail: skcinc@skcinc.com	http://www.skcinc.com
The Staplex [®] Company	777 Fifth Avenue Brooklyn, NY 11232-1695 Phone: 1-800-221-0822 Fax: 718-965-0750 E-mail: info@staplex.com	http://www.staplex.com/index.html

6. SUMMARY

Emergency response agencies use portable high volume air samplers to collect samples for subsequent analysis to determine atmospheric concentrations of radioactive particulates and gases. In the early stages of an emergency involving release of radioactivity, portable high volume air samplers can be used to determine atmospheric radioactivity concentrations in potentially affected areas. They can also be used for workplace and environmental air monitoring during site remediation efforts after such an emergency. Commercially available portable high volume air samplers vary considerably in price, features, and capabilities. It would be advantageous for agencies purchasing portable high volume air samplers to research available samplers to find the models that are best suited to their particular needs. This market survey report provides information on currently available samplers that is intended to help emergency response agencies make acquisition decisions. It should be noted that prices, features, and capabilities of portable air samplers may change with time, and therefore agencies should contact equipment manufacturers/vendors to obtain the most up-to-date information before procuring a specific sampler.

APPENDIX A. REQUEST FOR INFORMATION

U. S. Department of Homeland Security
National Urban Security Technology Laboratory
201 Varick Street, 5th floor, New York, NY 10014-7447



Document Type: Special Notice

Title: Market Survey – Personal Air Samplers, Portable High Volume Area Air Samplers and Air Flow Calibrators

Posted Date: December 6, 2010

Contracting Office Address:

Office of the Chief Procurement Officer
Washington, District of Columbia 20528
United States

Description: Request For Information (RFI) - Personal Air Samplers, Portable High Volume Air Samplers and Air Flow Calibrators

Request for Information (RFI) –

DUE: December 27, 2010

The U. S. Department of Homeland Security, National Urban Security Technology Laboratory (NUSTL), 201 Varick St. 5th Floor, New York, NY 10014, is seeking information about personal air samplers, portable high volume area air samplers and air flow calibrators to meet the needs of emergency responders. The Department of Homeland Security (DHS) Authorized Equipment List (AEL) item number for this equipment is 07RS-01-AFCB. The target audience for this information is law enforcement personnel, fire fighters, and emergency medical and public safety providers and their purchasing agents. All submittals should be suited to the target audience's specific needs.

Review of this information is being performed for the DHS, Science and Technology Directorates System Assessment and Validation for Emergency Responders (SAVER) Program. DHS established SAVER to conduct comparative assessments and validation activities that provide the emergency responder community with information on important products and services. For more information on the SAVER Program, visit the SAVER Website at <https://www.rkb.us/saver/>.

All information received will be treated as public knowledge and may be used in SAVER Program documentation; therefore, vendors should not submit proprietary information in response to this RFI. Specific information sought includes:

1. Company information, including name, address, point of contact, URL and the number of employees.

www.dhs.gov

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2. Whether the company is a manufacturer or distributor.
3. A point of contact for follow-up information, and the point of contacts phone number and e-mail address.
4. Product name, brief description and specifications.
5. Cost information such as purchase price and General Services Administration (GSA) schedule information.

The submitted information will be evaluated for inclusion in SAVER projects and reports. Determination as to an individual product's suitability will be made by the National Urban Security Technology Laboratory based on the objectives of this request. Therefore, requests for feedback should not be made through the Federal Business Opportunities posting agency. Vendors may be contacted following submission for more detailed product information. Vendor provided information may be reformatted for publication in SAVER Program documents.

Submittals

Respondents are required to complete a product summary questionnaire for each product. The questionnaire may be obtained, via E-mail, by contacting the technical point of contact John Kada at john.kada@dhs.gov.

This RFI is for information gathering and planning purposes only, and should not be construed as a Request for Proposal (RFP) or solicitation of an offer. The Government does not intend to award a contract on the basis of this RFI or otherwise pay for the information solicited. Submission of vendor information constitutes consent to publication of that information in SAVER Program documentation. E-mail your non-technical questions to Sharon Flowers, DHS Contracting Officer (Sharon.flowers1@dhs.gov, 202-254-6816).