



System Assessment and Validation for Emergency Responders (SAVER)

Subsistence and Sanitation Systems Market Survey Report

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System Assessment and Validation for Emergency Responders

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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 of emergency responder equipment; and
- Providing information, in the form of knowledge products, 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 U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC) has been tasked to provide expertise and analysis on key subject areas, such as personal protective equipment, rapid deployment shelters, and shelf stable food. In support of this tasking, NSRDEC conducted a market survey of commercially available subsistence and sanitation systems, which fall under the AEL reference number 19GN-00-HSSF. The following report presents the survey’s findings.

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 subsistence and sanitation systems or other technologies.

POINTS OF CONTACT

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1. INTRODUCTION

The System Assessment and Validation for Emergency Responders (SAVER) Program conducted a market survey to provide equipment information on currently available subsistence and sanitation systems (Authorized Equipment List [AEL] reference number 19GN-00-HSSF).

The emergency response community utilizes subsistence and sanitation systems to support response and recovery operations in areas without basic infrastructure. These systems include field kitchens, showers, restrooms, and laundry systems that allow continued operations in areas where such systems are unavailable, either because they did not previously exist due to remote location or because they have been compromised as a result of an emergency.

This market survey report is based on information gathered between January and August 2012 from Internet searches, a government-issued Request for Information (RFI) accessible from the Federal Business Opportunities (FedBizOpps) website, and subject matter experts.

For inclusion in this report, subsistence and sanitation systems had to meet the following criteria:

- All subsistence and sanitation systems (i.e., kitchens, restrooms, showers, and laundry) must have the capacity to support 20 or more people;
- Mobile kitchens must have full-service food storage, preparation, and cooking capabilities;
- Laundry systems must have both washing and drying capabilities;
- Shower systems must have the capability to provide hot and cold showers; and
- Restrooms must provide the capability for hand washing with hot and cold water.

Due diligence was performed to develop a report that is representative of products in the marketplace.

2. RESEARCH METHODOLOGY

The market research methods used in this survey comply with the SAVER Program guidelines for market surveys. In addition, these market research procedures comply with the Federal Acquisition Regulation; specifically, section 10, Market Research.

Three methodologies, identified in Figure 2-1, were used in the market research for subsistence and sanitation systems.



Figure 2-1. Research Methodologies

2.1 Internet Research

The Internet was used to identify specific product information, including manufacturers, features, specifications, and equipment options. When necessary, manufacturers were contacted for additional details concerning their products.

2.2 Request for Information (RFI)

An RFI was posted on the FedBizOpps website, <http://www.fbo.gov>, in March 2012, inviting manufacturers to provide information on currently available subsistence and sanitation systems. Manufacturers were asked to identify and describe their products, to provide pertinent information regarding their products, and to provide contact information. The RFI was for information and planning purposes only, not a request for proposal.

2.3 Subject Matter Experts

Subject matter experts from the U.S. Army Natick Soldier Research, Development and Engineering Center, as well as other government agencies, provided technical expertise in the review of information and development of this report.

3. SUBSISTENCE AND SANITATION SYSTEMS OVERVIEW

Subsistence and sanitation systems allow emergency responders to continue extended operations when local food service and/or sanitation system infrastructure is unavailable.

A subsistence system consists of a mobile or modular kitchen that provides the ability to store, prepare, and cook food, while sanitation systems consist of mobile units that provide restroom, shower, and/or laundry facilities.

Most systems run on electricity that is provided by a generator, which uses either diesel fuel or liquid propane gas. Alternatively, some systems may be plugged into an existing electrical power source to eliminate the need for a generator. Systems are road, air, or rail transportable. Over the road systems are trailer-mounted, self-driven, or semi-truck towable.

3.1 Procurement Options

Most companies offer the options of purchase, rental, and long- and short-term lease. A variety of services may be offered, such as a food service plan, a health department liaison, a site planner to confirm utility requirements and site readiness, delivery and set-up, system maintenance, and staff to train personnel on equipment.

3.2 Capacity

In choosing the appropriate system, one of the primary decision-making criteria is capacity, which refers to the number of people that the system may support during any given time period. Subsistence systems are measured by the number of meals served per hour, while sanitation systems are measured by the number of toilets, shower stalls, and/or washers and dryers contained in the system.

Some systems are expandable, modular, or can be connected, which may be achieved by moving walls or internal parts in a single unit or by combining multiple units of the same system into a single, larger system, therefore increasing the overall capacity.

In order to increase the feeding capacity to serve large groups, many subsistence systems are intended to be connected together to form a single system supporting multiple serving lines. The menu may be limited to enable food preparation in larger quantities, while providing full balanced nutrition and hot food items for larger groups. It is important to discuss the specific details related to capacity with the vendor before making a purchase decision. Capacity claims provided by vendors in Section 4 have not been independently evaluated. It is also important to understand how long capacity can be sustained as some systems rely on advance food preparation to feed large groups for short periods of time and may not have the ability to prepare large quantities of food continuously to keep up with high demand.

3.3 Equipment

Standard equipment varies by manufacturer, but most subsistence systems include full-size appliances, sinks, storage space, preparation areas, and fire suppression systems. The systems may also include generators; wastewater tanks; fuel tanks; water heaters; and heating, ventilation, and air conditioning (HVAC). Additional cooking and preparation appliances, such as griddles, fryers, and mixers, are customarily optional and generally available from the vendor for an additional cost.

Sanitation systems generally provide integrated lighting, hot and cold water systems, non-slip flooring, and privacy stalls to accommodate both male and female personnel. In addition, systems may include HVAC, wastewater storage, and potable water tanks and may have the ability to connect to municipal water and sewer systems. Vendors primarily offer flushing toilets for restroom systems, and some may offer a backup battery to provide power without the use of a generator, optional hands-free faucets, or a solar package.

For a detailed listing of equipment, please refer to Appendix A.

3.4 Capabilities and Considerations

There are a variety of criteria to consider when determining the appropriate subsistence and/or sanitation system to best meet the needs of the mission. Some of the key considerations are listed below:

- Capacity;
- System cost and options of renting, leasing, or purchasing;
- Resource consumption and cost;
- Waste disposal;
- Equipment;
- Location;
- Time and personnel;
- Technology options; and
- Emerging technologies.

For more detailed information on the associated capabilities and considerations, please refer to the SAVER *Subsistence and Sanitation Systems Technical Guide* available in the SAVER section of the Responder Knowledge Base (RKB) website at <https://www.rkb.us/saver>.

3.5 Standards/Regulations

Mobile subsistence and sanitation systems are required to meet numerous safety and sanitation requirements that include, but are not limited to, electrical, health, materials, transportation, and ventilation. The manufacturers and/or the manufacturer websites for the systems included in this report state that they conform to the applicable standards.

4. SAMPLE OF AVAILABLE SYSTEMS

There are multiple subsistence and sanitation systems available, and agencies should research various options when considering the appropriate system for procurement. Suggested considerations include intended uses, performance capabilities, maintenance requirements, and manufacturer recommendations. Because there are a number of procurement options as well as criteria to consider, it is recommended that research be conducted well in advance of an actual emergency.

This market survey report provides information on eight manufacturers that offer a variety of systems. Many have extensive experience working with emergency response and disaster relief organizations, and a few offer full-service capabilities, including equipment maintenance and site replenishment.

The data below is in alphabetical order by manufacturer and indicates the available systems.

Table 4-1. Vendor Comparison Matrix

Manufacturer	Systems Available			
	Kitchen	Restrooms	Showers	Laundry
Carlin Manufacturing LLC	✓			
Comforts of Home Services Inc.		✓	✓	✓
Deployed Resources LLC	✓	✓	✓	✓
Emergency Mobile Kitchens	✓		✓	
JAG Mobile Solutions Inc.	✓	✓	✓	✓
Karcher Futuretech	✓	✓	✓	✓
Kitchen Corps Inc.	✓	✓		
U.S. Mobile Kitchens	✓	✓	✓	✓

Manufacturers offer a range of sizes for their mobile kitchens to fit a variety of needs. Table 4-2 provides information for 14 models from 5 manufacturers to give an overall perspective of the features and costs. Manufacturers represented in Table 4-2 provided the information in response to the RFI. The information is not meant to be all inclusive of the products available, nor is it a full list of the manufacturers. The data below is in order by smallest to largest feeding capacity and then alphabetical by manufacturer.

Table 4-2. Kitchen Product Comparison Matrix

Manufacturer	Model	Feeding Capacity (persons per hour)	System Purchase Price	Dimensions (L×W×H) (in feet)	Weight (in pounds)	Expandable, Modular, or Stackable	Set-Up/Tear-Down Time (in hours)	Operational Temperature Range (°F)	Integrated Refrigeration	Integrated Environmental Control
Emergency Mobile Kitchens	EMK 16 Step Van	100	\$130K	20×8.5×11	NP	No	1-2	50° to 130°	Yes	Yes
Karcher Futuretech	Trailer Field Kitchen	125	\$134K	13.5×7.2×8.6	5,511	Yes	.5	-26.5° to 120°	No	No
Karcher Futuretech	Modular Field Kitchen	125	\$75K-\$151K*	14.5×6.9×8.6	4,410	Yes	.5	-25° to 120°	No	No
Carlin Manufacturing LLC	18' Step Van	200	\$155K	26×8×12	16,000	No	.5	40° to 100°	Yes	Yes
Emergency Mobile Kitchens	EMK ISO 20	200	\$75K	20×8.5×8.5	15,000	Yes	2-4	50° to 130°	Yes	Yes
Emergency Mobile Kitchens	EMK 30 Kitchen	200-250	\$150K	35×8.5×11	16,000	Yes	2	50° to 130°	Yes	Yes
Emergency Mobile Kitchens	EMK 28 Kitchen	200-250	\$125K	33×8.5×11	15,000	Yes	2	50° to 130°	Yes	Yes
Emergency Mobile Kitchens	EMK ISO 40	300	\$125K	40×8.5×9.5	18,000	Yes	2-4	50° to 130°	Yes	Yes
Emergency Mobile Kitchens	EMK 53 Kitchen	300-350	\$250K	53×8.5×11	20,000	Yes	2	50° to 130°	Yes	Yes

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Manufacturer	Model	Feeding Capacity (persons per hour)	System Purchase Price	Dimensions (L×W×H) (in feet)	Weight (in pounds)	Expandable, Modular, or Stackable	Set-Up/Tear-Down Time (in hours)	Operational Temperature Range (°F)	Integrated Refrigeration	Integrated Environmental Control
Deployed Resources LLC	CKU-ABC1C2	300-600	\$232K	8×20	7,200-10,500	Yes	1.5	-20° to 120°	Yes	Yes
Carlin Manufacturing LLC	20' PAC Kitchen	500	\$236K	20×8×10	20,000	Yes	1	40° to 100°	No	No
Carlin Manufacturing LLC	40' PAC Kitchen	1,000	\$436K	40×8×10	35,000	Yes	1	40° to 100°	No	No
Kitchen Corps Inc.	KCKXX	1,000	\$150K to \$250K*	53×8.5×13	29,000	No	1	40° to 90°	Yes	Yes
Carlin Manufacturing LLC	53' Semi Trailer Kitchen	5,000	\$450K	56×8.5×12	40,000	No	1	40° to 100°	Yes	Yes

* = Large Variety of Options

° = Degrees

F = Fahrenheit

K = Thousand. The system purchase price is rounded to the nearest thousand.

L×W×H = Length by Width by Height

NP = Information Not Provided

The systems below are in alphabetical order by manufacturer. Information listed about the subsistence and sanitation systems was provided by manufacturers and/or obtained from various Internet sources and has not been independently verified by the SAVER Program. Information should be verified with each respective manufacturer or applicable distributor when making procurement decisions.

4.1 Carlin Manufacturing LLC

Carlin Manufacturing LLC offers a wide selection of mobile and modular kitchens and provides purchase options for long-term needs, as well as lease options through its sister company, Kitchens To Go. Carlin Manufacturing LLC has experience with disaster relief. The fleet for quick response includes a commercial kitchen built into an International Organization for Standardization (ISO) container for ease of transportability.



*Image courtesy of
Carlin Manufacturing LLC*

Capacity:

- Kitchen – Units are available in a range of sizes and configurations with a maximum feeding capacity of up to 5,000 people per hour.

4.2 Comforts of Home Services Inc.

Comforts of Home Services Inc. provides mobile restroom, shower, and laundry trailers. Combination trailers are also available in a variety of configurations. Units are available for purchase or for rent. Comforts of Home Inc. has in-house engineering, design, production, and quality control capabilities.



*Image courtesy of
Comforts of Home Services Inc.*

Capacity:

- Restroom – Units are available in capacities ranging from 1 to 12 stations;
- Shower – Units are available in capacities ranging from 2 to 20 stalls;
- Laundry – Units are available with either 4 or 10 laundry stations; and
- Combination – Units are available in a variety of configurations.

4.3 Deployed Resources LLC

Deployed Resources LLC specializes in design, construction, operation, and management of temporary subsistence and sanitation facilities. Deployed Resources LLC has turn-key services with the capability to provide comprehensive support services, field kitchens, mobile laundries, mobile showers, and mobile restrooms, along with temporary water, power, and sewer systems. Deployed Resources LLC has the ability to respond quickly in emergency situations. Individual units are contained inside ISO containers for ease of transportability and modularity.



*Image courtesy of
Deployed Resources LLC*

Capacity:

- Kitchen – Units are capable of feeding 300 to 600 people per hour. A 4-unit configuration is capable of feeding 2,000 persons per hour;
- Restroom – Units contain 6 individual restroom stalls, separated by gender;
- Shower – Units contain 6 individual shower stalls and sinks; and
- Laundry – Units contain 6 washing machines and 6 dryers.

4.4 Emergency Mobile Kitchens

Emergency Mobile Kitchens offers short-term rental, long-term lease, lease-purchase, and sales of a wide variety of mobile kitchens and shower trailers that are custom manufactured. Emergency Mobile Kitchens can provide highly trained staff consisting of logistics coordinators, chefs, caterers, commercial licensed drivers, fabricators, electricians, and engineers. They also have an emergency response team available to process orders and start delivery within the same day if necessary.



*Image courtesy of
Emergency Mobile Kitchens*

Capacity:

- Kitchen – Standard units are available in 6 configurations with feeding capacities ranging from 100 to 350 people per hour; and
- Shower – Units are custom built with 10 to 12 showers.

4.5 JAG Mobile Solutions Inc.

JAG Mobile Solutions Inc. focuses on manufacturing a wide variety of mobile restrooms, but also produces shower, laundry, and kitchen trailers. They sell both new and used inventory. In addition to separate trailers for each facility, JAG Mobile Solutions Inc. also manufactures combination shower and restroom trailers, as well as customizable 8 to 40 foot trailers in any combination of available options in each category.

Capacity:

- Kitchen – Units are specifically customized for each application;
- Restroom – Standard units contain 2 to 8 stations;
- Shower – Units contain 1 to 20 stations housed in trailers ranging from 8 to 53 feet;
- Laundry – Laundry units and mobile laundry stations range in size from 8 to 53 feet; and
- Combination – Units are available in a variety of configurations.

4.6 Karcher Futuretech

Karcher Futuretech specializes in mobile catering systems and field camp systems and services including mobile kitchens, restrooms, showers, laundry, and restroom/shower combination modules. Karcher Futuretech has experience with disaster relief operations.



*Image courtesy of
Karcher Futuretech*

Capacity:

- Kitchen – Units have a range of feeding capacities from approximately 50 to 125 people per hour;
- Restroom – Units contain 6 toilets, 4 urinals, and 2 hand washing areas;
- Shower – Units contain 6 showers and 4 hand washing areas;
- Restroom/Shower Combination – Units contain 3 showers, 3 toilets, 2 urinals, and 2 hand washing areas; and
- Laundry – Units contain 1 washer and 1 dryer.

4.7 Kitchen Corps Inc.

Kitchen Corps Inc. provides rentals, long- and short-term leases, and sales of a wide range of customizable, temporary full-service kitchens, as well as individual modular units for dishwashing, refrigeration/freezing, dry storage, dining, and restrooms. Kitchen Corps Inc. is prepared for disaster relief situations and can provide an on-site project manager for set-up and removal, as well as training of staff on the equipment and facility.



*Image courtesy of
Kitchen Corp Inc.*

Capacity:

- Kitchen – Units have an approximate feeding capacity of 1,000 people per hour, and individual units can be connected with covered walkways to form a single facility; and
- Restroom – Units contain 4 women’s stalls, including 1 that complies with the American Disabilities Act (ADA); and 2 men’s stalls, including 1 ADA compliant stall; 2 urinals; and 2 sinks in each section.

4.8 U.S. Mobile Kitchens

U.S. Mobile Kitchens provides rentals, long- and short-term leases, and sales of temporary kitchen and dining facilities, as well as restrooms, showers, and laundry units. The units can be customized and are available in sizes ranging from 20 to 53 feet. Also available are specialty units for food preparation, dishwashing, refrigeration, and freezing. U.S. Mobile Kitchens has units stationed in all regions of the country, allowing them to mobilize quickly and provide services anywhere in the contiguous 48 states.

Capacity:

- Kitchen – Mobile and modular kitchens are customized.
- Restroom – Units contain 2 - 7 restroom stalls and up to 3 urinals. Some are separated by gender and other units are designed with completely private and self-contained restrooms within the trailer;
- Shower – A 24 foot unit contains 6 stalls and a 44 foot unit contains 12 stalls; and
- Laundry – A 24 foot unit contains 5 washers and 5 dryers and a 44 foot unit contains 10 washers and 10 dryers.

5. VENDOR CONTACT INFORMATION

Information on the products included in this market survey report can be obtained from the vendors listed in Table 5-1. Information is listed in alphabetical order by vendor.

Table 5-1. Vendor Contact Information

Vendor	Address and Phone Number	Website
Carlin Manufacturing LLC	131 West Jefferson Avenue Suite 223 Naperville, IL 60540 888-212-8011	http://www.carlinmfg.com/
Comforts of Home Services Inc.	1551 Aucutt Road Montgomery, IL 60538 847-856-8002	http://www.cohsi.com/
Deployed Resources LLC	164 McPike Road Rome, NY 13411 315-281-0039	http://www.deployedresources.com/
Emergency Mobile Kitchens	5750 West Roosevelt Street Suite 1 Phoenix, AZ 85043 866-442-0787	http://www.emergencymobilekitchens.com/
JAG Mobile Solutions Inc.	0770 East State Road 120 Howe, IN 46746 800-815-2557	http://www.jagmobilesolutions.com/
Karcher Futuretech	1979 Tower Bridge Terrace St. Louis, MO 63146 314-556-0932	http://www.karcher-futuretech.com/
Kitchen Corps Inc.	3724 Cook Boulevard Chesapeake, VA 23323 866-452-6777	http://www.kitchencorps.com/
U.S. Mobile Kitchens	P.O. Box 266 Finksburg, MD 21048 888-211-6636	http://www.usmobilekitchens.com/

6. SUMMARY

Commercially available subsistence and sanitation systems come in a wide range of sizes, prices, equipment, and arrangements to meet a variety of needs. In addition, there are options available for purchase, rental, and long- and short-term lease. Depending on the option chosen, a variety of services may be offered, such as a food service plan, a health department liaison, a site planner to confirm utility requirements and site readiness, delivery and set-up, system maintenance, and staff to train personnel on equipment. One of the primary decision-making criteria when choosing a system is capacity, meaning the number of people the system can support during any given time period. Because there are a variety of criteria and options to consider when determining the appropriate subsistence and/or sanitation systems, advance planning is recommended.

Appendix A. EQUIPMENT MATRIX

The data in the equipment matrix provides a range of equipment that may come standard or be available as an option. The data is intended to provide a broad base of equipment; however, it is not intended to be all inclusive. The data is sorted by system, then by equipment category, with the equipment in each category listed in alphabetical order.

Subsistence and Sanitation		
System		
Battery backup	HVAC	Vent fan
Electrical outlets	Interior lighting (integrated)	Wastewater tank
Exterior lighting (integrated)	Non-slip floor	Water and fuel hoses
Fresh water tank	Portable lighting	Water heater
Fuel tank	Solar package	Water pump
Generator	Storage space	
Mobile Kitchen		
Appliances		
Blender	Garbage disposal	Pressure cooker
Coffee maker	Griddle	Refrigerator
Dishwasher	Ice maker	Steamer
Food processor	Microwave	Stove
Freezer	Mixer	Toaster
Fryer	Oven	Trash compactor
Cooking and Preparation		
Can opener	Grater	Storage containers
Colander	Mixing bowls	Serving containers
Cooking utensils	Oven mitts	Tea kettle
Cutlery	Pots and pans	Vegetable sink
Cutting boards	Salt and pepper shakers	Work space
Safety		
Fire extinguisher	Safety mats	Smoke detectors
Fire suppression system		
Sanitation		
Dish strainer	Kitchen towels	Soap dispenser
Grease trap	Paper towel holder	Sponges
Hand washing sinks	Sanitation sinks	Trash barrel

Restroom		
Accessories		
Clothes hooks	Mirrors	
Safety		
Fire extinguisher	Safety mats	Smoke detectors
Sanitation		
Flush toilets	Hand washing sinks	Soap dispenser
Hand dryers	Paper towel dispenser	Toilet paper dispenser
Hands-free faucets	Plunger/toilet brush	Urinals
Hands-free paper towel dispenser	Privacy stalls	Wastebasket
Hands-free soap dispenser		
Shower		
Accessories		
Changing benches	Clothes/towel hooks	Mirrors
Safety		
Fire extinguisher	Safety mats	Smoke detectors
Sanitation		
Hand washing sinks	Shower caddy/shelves	Shower curtains
Privacy stalls	Shower curtain rods	Wastebasket
Laundry		
Accessories		
Chairs	Ironing board/iron	Mirrors
Drying racks	Laundry baskets/carts	Shelving for supplies
Folding tables		
Appliances		
Electric or gas dryer	Front- or top-loading washing machine	
Safety		
Fire extinguisher	Safety mats	Smoke detectors
Sanitation		
Detergent dispenser	Sinks	Wastebasket