



**Homeland
Security**

Science and Technology

Summary

U.S. Department of Homeland Security



System Assessment and Validation for Emergency Responders

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 operational tests 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 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?"

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First Aid Kits

In order to provide emergency responders with information on currently available first aid kit technologies, capabilities, and limitations, Science Applications International Corporation (SAIC) conducted a comparative assessment of trauma-type first aid kits for the SAVER Program in April 2008. Detailed findings are provided in the Assessment Report on First Aid Kits, which is available by request at <https://www.rkb.us/saver>.

Background

Trauma-type first aid kits are typically utilized by first responders with basic medical training (e.g., law enforcement personnel) rather than advanced medical personnel such as paramedics and emergency medical technicians. The kits include commonly used medical supplies and are equipped to treat at least two victims.

Assessment

Prior to the assessment, SAIC conducted a market survey to investigate currently available trauma-type first aid kits. A focus group consisting of eight emergency response practitioners from different jurisdictions met to identify first aid kit selection criteria for the assessment, determine evaluation criteria, and recommend assessment scenarios. Participants possessed backgrounds in fire service, hazardous materials (HAZMAT), emergency medicine, law enforcement, and search and rescue.

The focus group was presented with manufacturers' information on available first aid kits for possible assessment. Participants discussed the broad range of first aid kit configurations and the different supplies offered with each kit. The focus group also recommended specific trauma-type first aid kits representative of the current marketplace. Based on focus group recommendations and market survey research, the following first aid kits were assessed:

- First Responder Kit, Practical Trauma™
- Standard First Aid Trauma Kit, All Things First Aid
- Standard Emergency Medical Kit, Swift First Aid
- Roll Out Responder First Aid Kit, Fieldtex Products, Inc.
- Trauma Kit in Tackle Box, Swift First Aid.

Eight emergency response practitioners served as assessment evaluators. Each first aid kit was used to simulate emergency search and rescue activities requiring the use of first aid kits. Evaluators conducted five rotations, and a different kit was assigned for each rotation. There were six assessment stations within each rotation: (1) vehicle accident, (2) train derailment, (3) woodland area, (4) confined space, (5) building collapse, and (6) maintenance. The first five stations required responders to locate victims and administer first aid for various injuries, and the last station allowed evaluators an opportunity to review their components, inventory their supplies, and assess maintenance issues.

Each first aid kit was evaluated in the same manner, and the assessment conditions were controlled to make the evaluation of each kit as similar as possible. Evaluator teams began the rotation schedule at an assigned station and upon completing the required tasks at that station, the team rotated to the next station. This process continued until each team had completed all of the scenarios and required tasks. Detailed comments were captured by the data collectors during the assessment activities and these comments have been included in the full assessment report.

Assessment Results

Evaluators rated the first aid kits based on the weighted evaluation criteria established by the first aid kit focus group. Each criterion was prioritized within the five SAVER categories and assigned a weighting factor based on a 100-point scale. The SAVER category and composite scores are shown in table 1. Higher scores indicate better performance. To view how each kit scored against each of the evaluation criteria assigned to the SAVER Program categories, see table 2 (on page 7).

The following sections provide a brief summary of evaluator comments and feedback on each first aid kit used during the assessment. The first aid kit models are listed by highest to lowest composite scores. The full report includes a breakdown of evaluator comments by individual criterion.

SAVER Program Category Definitions

Affordability: This category groups criteria related to life-cycle costs of a piece of equipment or system.

Capability: This category groups criteria related to the power, capacity, or features available for a piece of equipment or system to perform or assist the responder in performing one or more responder-relevant tasks.

Deployability: This category groups criteria related to the movement, installation, or implementation of a piece of equipment or system by responders at the site of its intended use.

Maintainability: This category groups criteria related to the maintenance and restoration of a piece of equipment or system to operational conditions by responders.

Usability: This category groups criteria related to the quality of the responders' experience with the operational employment of a piece of equipment or system. This includes the relative ease of use, efficiency, and overall satisfaction of the responders with the equipment or system.

First Responder Kit




The First Responder Kit received the highest composite score as well as the highest evaluator ratings in four of the five SAVER categories: usability, affordability, deployability, and maintainability. The kit includes quality supplies, and the items are well organized and can be easily located for use. In addition, the packages can be easily

Table 1. First Aid Kits Assessment Results¹

First Aid Kit	Composite Score	Affordability (5% Weighting)	Capability (30% Weighting)	Deployability (20% Weighting)	Maintainability (5% Weighting)	Usability (40% Weighting)
First Responder Kit	75	76	75	73	68	77
Standard First Aid Trauma Kit	73	70	78	71	64	73
Standard Emergency Medical Kit	68	62	71	66	66	67
Roll Out Responder First Aid Kit	63	58	55	73	66	63
Trauma Kit in Tackle Box	59	58	63	62	62	54

Note:

¹ Scores contained in the assessment report may be displayed differently. For the purposes of the SAVER Summary, all SAVER category scores are normalized using a 100-point scale and rounded to the nearest whole number.

	 Pros	<ul style="list-style-type: none"> • User-friendly style • Organization of supplies • Accessibility • Quality of supplies • Reflective symbol • Padding for shock absorbency • Shoulder strap/handle • Durability of case • Price/value
	 Cons	<ul style="list-style-type: none"> • Case color • No attachments for side flaps (supplies can fall out of case) • Non-essential items
First Responder Kit	Composite Assessment Score: 75	

opened while wearing responder work gloves. The First Responder Kit carrying case includes a shoulder strap that offers hands-free operations and allows the kit to be comfortably transported to an emergency scene. There is also a reflective Star of Life on the front flap of the case, which increases visibility. The kit's exterior fasteners can be easily disconnected and reconnected while wearing thinner gloves (e.g., latex, nitrile, or vinyl), and both the clips and hook and loop attachments can be easily opened and closed using only one hand.

The First Responder Kit is reasonably priced, and its nonessential items do not seem to affect the initial cost of the kit. Evaluators were unable to locate replenishment cost information but agreed that the kit can be easily restocked with supplies purchased from local vendors or drug stores, and the carrying case could be inexpensively replaced by a local vendor if the case, zipper, or fasteners become damaged during use.

Information describing or detailing storage requirements, operational temperatures, or environmental conditions could not be located. No cleaning requirements were provided, but evaluators agreed that the case should be capable of being washed with soap and water, and air dried. The manufacturer contact information includes a Web site, phone number, and mailing address.

Evaluators raised several concerns about the First Responder Kit. The side flaps of the case tend to bow outward during transport, causing supplies to be exposed within the kit. The exterior fasteners are difficult to use while wearing thicker work gloves (e.g., firefighter or extrication gloves), and the zipper requires the use of two hands. They noted that the

dark color of the case is difficult to see, especially during low-light or nighttime conditions. Also, the kit includes components deemed unnecessary by the evaluators such as a blood pressure cuff, stethoscope, airway devices, and ipecac and does not have an adequate quantity of more frequently used items such as triangular bandages, 4-inch gauze pads (4x4s), and rolled gauze.

Standard First Aid Trauma Kit

The Standard First Aid Trauma Kit received the second highest composite score and the highest evaluator ratings in the capability category. The kit is equipped with a broad variety of first aid supplies, including a good selection of bandages and dressings, and it is supplied to treat 10 to 15 victims.

The compact, lightweight design of this kit is ideal for transport and storage. Both the shoulder strap and dual handles allow the kit to be easily carried, and the shoulder strap provides hands-free operation. Although the carrying case does not include internal compartments for organizing supplies, the contents are organized in zip-lock-style plastic bags. Once removed from the carrying case, the bags can be easily opened while wearing latex or responder work gloves.

Evaluators agreed the Standard First Aid Trauma Kit is initially an expensive kit, but it is well stocked with basic first aid supplies. The manufacturer offers a refill kit for approximately \$30.00 and a backpack configuration carrying case for an additional \$100.00. By deducting the refill expense from the initial cost of the kit, evaluators concluded that the carrying case is too expensive and recommended replacing the duffle

	 Pros	<ul style="list-style-type: none"> • Quantity of supplies (i.e., treat 10–15 victims) • Assortment of supplies (can treat diverse injuries) • Shoulder strap/handles • Exterior pockets • Durable case material • Minimal non-essential items • Refill price
	 Cons	<ul style="list-style-type: none"> • Quality of supplies • Case color • Case opening • Initial price • No internal organizational compartments or features
Standard First Aid Trauma Kit	Composite Assessment Score: 73	




bag carrying case with a less expensive case should it need repairs.

Information on storage requirements, operational temperatures, or environmental conditions could not be located. Although no cleaning requirements were noted, the case should be capable of being washed with soap and water, and allowed to air dry. A manufacturer Web site address and phone number are provided on the exterior of the case.

There were some disadvantages to the Standard First Aid Kit. Evaluators noted issues with the quality of the supplies; for example, the tape does not adhere well, the latex gloves can be allergenic, and the cardiopulmonary resuscitation (CPR) face shield does not appear to provide adequate user protection. The carrying case zippers are hard to locate because both the bag and zippers are dark colored, and the pull tabs are too small to grasp while wearing responder work gloves. Evaluators stated that the case opening is narrow, and the plastic bags are tightly packed into the case, preventing supplies from being easily seen or accessed. They further stated that the plastic storage bags must be removed from the case in order to locate the needed supplies. The dark material of the carrying case created visibility concerns, and evaluators agreed that a brighter color would provide better visibility for low-light conditions. Evaluators also reported that some stitching tore on one case under excessive strain, and one of the zippers ripped when moderate force was applied.

Standard Emergency Medical Kit

The Standard Emergency Medical Kit received the third highest composite score. Evaluators stated that the supplies are neatly organized in a durable, water repellent carrying case.

	 Pros	<ul style="list-style-type: none"> • Water repellency of case • Durability of case • Case color • Organization of supplies
	 Cons	<ul style="list-style-type: none"> • Case design • Access to center compartment • Quality/quantity of supplies • Price
Standard Emergency Medical Kit	Composite Assessment Score: 68	

The zipper on the case is easy to use while wearing latex gloves but challenging to use while wearing firefighter or other responder work gloves. Replenishment cost information could not be located. Evaluators recommended replacing the carrying case with a responder-friendly, economical case in the event that the supplied case becomes damaged and also noted that replenishment items may be readily available from local vendors or drug stores.




Storage requirements, operational temperatures, and environmental conditions for this first aid kit could not be located. The red case provides adequate visibility in a variety of environments, and because it is water-resistant, it should be capable of being washed with soap and water. The manufacturer provides a phone number, Web site address, and email address should questions arise or the user needs assistance with the kit.

Some specific disadvantages of this kit were identified by the evaluators. They noted that the kit does not include enough essential medical supplies such as rolled gauze, triangular bandages, gloves, and 4x4s, and the quality of supplies is poor. The zipper continuously caught on the corners while gaining access to or securing the case,. Evaluators stated that the case design is not conducive to emergency situations and expressed concern that the corners of the case could become worn after extended use. They stated that the Standard Emergency Medical Kit is expensive, and its cost is not justified by the quality of its supplies. Also, although the white interior of the case allows the contents to be easily seen, it is difficult to access supplies because of the center compartment. The handle is large enough for a gloved hand; however, extended transport becomes more difficult and uncomfortable when wearing responder work gloves. In addition, the handle is too small to be placed on the user's arm to allow hands-free operations.

Roll Out Responder First Aid Kit

The Roll Out Responder First Aid Kit supplies are basic first aid components (e.g., triangular bandages, trauma dressings, 4x4s). The kit's roll out design provides good organization, and the individualized compartments allow users to customize the kit. The exterior clip and zipper pulls are easy to use while wearing responder work gloves.

The shoulder strap allows the Roll Out Responder First Aid Kit to be easily carried in several

	 Pros	<ul style="list-style-type: none"> • Roll out design • Carrying strap (i.e., versatile transport configurations) • Individual compartments
	 Cons	<ul style="list-style-type: none"> • Case color • Quantity and quality of supplies • Assortment of supplies • Cost versus value
Roll Out Responder First Aid Kit	Composite Assessment Score: 63	

orientations: over the shoulder, across the chest, by hand, or around the waist, allowing hands-free operation. The case appears durable enough to withstand routine use, but is unable to prevent water from soaking through after prolonged exposure.

Replenishment cost information could not be located, but evaluators agreed that supplies may be readily available from local vendors or drug stores at a minimal cost. They also recommended purchasing a different case rather than trying to repair the carrying case should it become damaged. The manufacturer provides a phone number and Web site information with its kit. Although there were no cleaning requirements noted, evaluators agreed that the dark material of the case appears to be capable of being washed with soap and water. There was no manufacturer information on storage requirements, operational temperatures, or environmental conditions.

Other disadvantages to this kit were identified by the evaluators. The quantity and quality of supplies is poor. The supplies are hard to identify due to being tightly packed into the kit, and supplies must be removed from the kit in order to access needed items. The initial cost of the Roll Out Responder First Aid Kit was described as expensive, especially since the kit does not contain enough of the appropriate supplies.

Trauma Kit in Tackle Box




The Trauma Kit in Tackle Box received the lowest composite score. The kit's hard plastic case is well constructed to withstand stress and prevent water penetration and the orange color provides the best visibility of all the assessed first aid kits.

This kit includes minimal first aid supplies, which limits treatment to one or two victims. Furthermore, the kit does not contain gloves or other personal

protective equipment (PPE) to protect against bloodborne pathogens and/or other risks. Evaluators stated that the Trauma Kit in Tackle Box includes poor quality supplies (e.g., thin gauze, narrow bandages, and nonadhesive tape). The components are neatly stored in the carrying case; however, the boxed supplies are difficult to identify and even more difficult to remove due to the tray handle within the case. In addition, the kit shears were needed to open the plastic packaging.

The latch on the Trauma Kit in Tackle Box case is cumbersome and not easy to use while wearing responder work gloves. The case does not include a shoulder strap, and the handle is too small to comfortably carry the kit for extended periods of time. Evaluators stated that the kit does not permit hands-free use, and it becomes difficult to carry during response tasks such as vertical entry. The cost of the Trauma Kit in Tackle Box is expensive, and evaluators were unable to locate replenishment cost information on the kit. They agreed that replenishment items should be readily available from local vendors or drug stores, and it would be easier to replace the carrying case than to attempt to repair it if the hard plastic casing became damaged.

This kit does not include information on storage requirements, operational temperatures, or environmental conditions. Evaluators expressed concerns that the plastic case of the Trauma Kit in Tackle Box could possibly crack during extreme cold temperatures. There were no cleaning requirements located, but the hard plastic casing should be simple to clean using soap and water. The kit provides a manufacturer Web site address should the user have questions regarding the kit or its components.

	 Pros	<ul style="list-style-type: none"> • Case color • Durability of plastic case • Water repency of case
	 Cons	<ul style="list-style-type: none"> • Quality of supplies • Quantity of supplies • No PPE (e.g., masks, gloves) • Identification of supplies • Packaging of contents • No carrying strap • Extra space required when open • Price
Trauma Kit in Tackle Box	Composite Assessment Score: 59	

Conclusion

The purpose of this comparative assessment was to evaluate the effectiveness of selected first aid kits used in emergency response operations. The assessment was based on a scenario-driven exercise requiring the use of first aid kits.

Evaluators were able to successfully complete the assessment tasks using each of the selected kits, but each kit exhibited different characteristics. An analysis of evaluator comments and scores revealed these common observations concerning the assessed first aid kits:

- Evaluators expressed a strong preference for first aid kits that have durable, water-resistant cases. Kits should be able to withstand routine abuse during emergency response operations. Case materials should be rugged and impermeable, and closure devices should be resilient and capable of withstanding repeated use.
- High value was placed on first aid kits equipped with shoulder straps. Many response operations require the use of both hands, and shoulder straps allow users to perform hands-free operations.
- First aid kits that provide easy access to all supplies are preferred. Restricted openings and faulty closure devices hinder access and slow response times.
- High value was placed on first aid kits with individual compartments and other organizational features. Time is crucial during an emergency; therefore, it is imperative that first aid supplies can be easily located and retrieved by the user.
- Evaluators expressed a strong preference for first aid kits equipped with commonly used medical supplies. Basic trauma supplies correspond to airway, breathing, and circulation emergencies.
- Larger quantities of essential medical supplies are preferred. Responders with basic first aid training primarily need an adequate supply of items such as triangular bandages, 4x4s, and rolled gauze.
- High value was placed on first aid kits equipped with quality supplies. Quality medical supplies include items such as strong adhesives, durable gloves, and thicker bandages and gauze.

QuickLook Snapshot²
















Notes:

² The SAVER QuickLook, available on the SAVER Web site, allows users to select the SAVER categories that are most important to their department and view results according to their specific needs.

³ Scores contained in the assessment report may be displayed differently. For purposes of the QuickLook, all SAVER category scores are normalized using a 100-point scale.

All reports in this series as well as reports on other technologies are available by request at <https://www.rkb.us/saver>.

Table 2. SAVER Category and Criteria Scores

KEY						
Least Favorable		Most Favorable				
						
		First Responder Kit	Standard First Aid Trauma Kit	Standard Emergency Medical Kit	Roll Out Responder First Aid Kit	Trauma Kit in Tackle Box
Assessment Criteria						
Affordability						
Initial cost						
Replacement cost						
Capability						
Versatility of content						
Capacity						
Durability						
Versatility of case						
Deployability						
Ease of transport						
Kit stability						
Characteristics of case						
Maintainability						
Ease of restocking						
Environmental conditions						
Ease of repair						
Customer support						
Cleaning requirements of case						
Usability						
Applicability of content						
Quality of supplies						
Ease of use						
Ease of access						