

# The 2007 Standardized Equipment List (SEL)

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The **Standardized Equipment List (SEL)** is provided to the responder community by the InterAgency Board for Equipment Standardization and Interoperability (IAB). The SEL has traditionally contained a list of generic equipment recommended by the IAB to local, state, and federal government organizations in preparing for and responding to all Weapons of Mass Destruction (WMD) events. However, this edition takes the first steps in transitioning the SEL so that it applies to a broader, “all-hazards” environment, *while maintaining an emphasis on WMD events*. The inclusion of more than 50 new items in the area of swift water and contaminated water operations is representative of this effort.

The SEL is a guideline, and its use is voluntary. The SEL promotes interoperability and standardization across the response community at the local, state, and federal levels by offering a standard reference and a common set of terminology. The IAB does not assume any liability for the performance of the equipment items mentioned in the SEL.

The SEL is now issued twice each year to keep pace with maturing and emerging technologies. The Spring edition is printed and distributed in conjunction with the IAB Annual Report, and is also loaded online for interactive use (see *The On-Line, Interactive SEL*, below). The Fall edition is online only. Government organizations may present suggested changes at any time for consideration.

### *Realignment with the DHS Authorized Equipment List*

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In the Fall 2004 (online) version of the SEL, the IAB accomplished a critical objective for the responder community – it realigned the SEL structure with the Authorized Equipment List (AEL) produced by the DHS Office of State and Local Government Coordination & Preparedness. Originally a subset of the SEL, the AEL is the equipment purchase grant guidance for eleven major grant programs, including the entire DHS Homeland Security Grant Program (HSGP). This realignment was the first step in a 3-year effort to align these lists as closely as possible, so that the responder community could easily obtain grant allowability information from DHS alongside the features and operating consideration information contained in the SEL.

This edition of the SEL is the culmination of that effort. DHS has adopted the numbering scheme used in the SEL and applied it throughout their AEL; now, corresponding items in the two lists will have identical numbers. In return, the IAB agreed to expand the number of sections in the SEL so that the section numbering of the two lists could also be identical. The first 11 sections will remain the same, but the total Spring 2007 SEL will now comprise 21 sections, as follows:

1. Personal Protective Equipment
2. Explosive Device Mitigation and Remediation Equipment
3. CBRNE Operational and Search & Rescue Equipment
4. Information Technology
5. CyberSecurity Enhancement Equipment
6. Interoperable Communications Equipment
7. Detection
8. Decontamination
9. Medical
10. Power
11. CBRNE Reference Materials

12. CBRNE Incident Response Vehicles
13. Terrorism Incident Prevention Equipment
14. Physical Security Enhancement Equipment
15. Inspection and Screening Systems
16. (reserved)
17. CBRNE Prevention and Response Watercraft
18. CBRNE Aviation Equipment
19. CBRNE Logistical Support Equipment
20. Intervention Equipment
21. Other Authorized Equipment

A description of each section is provided in the list. In addition, DHS has given the Responder Knowledge Base permission to implement an “integrated display” that combines elements from the two lists on the same page. This online presentation will be available to the entire emergency responder community. The IAB continues to work closely with the Department of Homeland Security’s Office of Grants and Training (G&T) to ensure the closest possible correlation between the two lists.

### *SEL/AEL Numbering Scheme*

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The Spring 2007 SEL and the new DHS AEL utilize the numbering scheme introduced in the 2003 SEL. Some individual items will have different numbers this year, primarily due to improvements in category headings, but also due to the movement of items into new sections described above.

This scheme allows the IAB to group SEL items into related sets, and is also used in the online interactive version of the SEL (see below). The format for SEL number is 99xx-88-yyyy, where

- 99 is the section number, from 01 through 99 (currently 01 through 11 are used)
- xx is the category. It is alphanumeric and unique within its section. For example, within Personal Protective Equipment, all items associated with the NFPA 1994 standard will have the category “CB”.
- 88 is the numeric subcategory. For example, within the Personal Protective Equipment Section, the NFPA 1994 Class 2 Ensemble has a subcategory code of “02”. This code may be set to “00” when not required.
- yyyy is the item identifier. It is alphanumeric and unique within its section, class, and group. Using an alphanumeric code at this level increases flexibility, and decreases the chance of human error. For example, the Hard Hat in the personal protective equipment section uses the item identifier “HHAT.”

### *The On-Line, Interactive SEL*

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In addition to this printed version, the Spring 2007 SEL is accessible online as part of the Responder Knowledge Base (RKB), developed through the Memorial Institute for the Prevention of Terrorism (MIPT). The web address is [www.rkb.mipt.org](http://www.rkb.mipt.org). The on-line version includes all of the equipment information, and implements interactive selection factors to assist users in determining the IAB’s recommendations. It also provides links to related standards, products, grants, and other equipment-

related information, as well as a new integrated display option that combines elements from the SEL and AEL. The Spring 2007 SEL is also available in PDF format or hard copy from the IAB web site at [www.iab.gov](http://www.iab.gov).

## *Summary*

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The Spring 2007 SEL represents the collective efforts of the InterAgency Board members and several related support organizations. This edition reflects a major realignment with the DHS AEL, and incorporates the first steps toward an all-hazards approach. Like all previous versions, it is intended to provide the best possible information in support of all emergency responders. Suggestions and comments are welcome.



## Section 1 - Personal Protective Equipment

### Overview

The capabilities of and requirements for personal protective equipment continue to evolve rapidly, and this edition of the SEL reflects new editions of six critical standards (described under Changes for 2007, below). This edition also includes the first steps in transitioning the SEL so that it applies to a broader, “all-hazards” environment while maintaining an emphasis on CBRNE events. Readers will notice resulting changes from the Personal Protective and Operational Equipment (PP&OE) SubGroup in Sections 1 (Personal Protective Equipment) and 3 (Operational and Search and Rescue Equipment).

This edition of the SEL also further improves alignment with the DHS Authorized Equipment List (AEL), providing features, operating considerations, and standards information for as many items as possible. In 2007, DHS has changed the AEL to utilize the same numbering scheme as the SEL, so that corresponding items will have identical reference numbers in the SEL and AEL. This allows an integrated online display<sup>1</sup> of the two lists for the first time, so that SEL data and grant allowability data are easily available.

Last year’s printed SEL contained a special document authored by this SubGroup to assist readers in understanding the relationship between the traditional “Level A, B, C” PPE terminology and the standards-based descriptions used in recent years for both the SEL and AEL. That document has been updated and is reprinted below.

### Changes for 2007

Much of this section is unchanged from the previous edition. However, minor edits have been made throughout the section, and substantive changes have been made to items that were impacted by the following events:

- The Statement of Standard for CBRN Powered Air-Purifying Respirators (PAPR) was released in October 2006 and incorporated into the SEL as a mandatory standard.
- The 2007 Edition of *NFPA 1981: Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services* became effective in December 2006, and now includes NIOSH CBRN approval as a mandatory requirement.
- The 2007 Edition of *NFPA 1982: Standard on Personal Alert Safety Systems (PASS)* became effective in December 2006, and has been incorporated into the corresponding SEL item as a mandatory standard.
- The 2007 Edition of *NFPA 1971: Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting* became effective in August 2006 and includes a CBRN Option that can be applied to either structural or proximity fire fighting ensembles. The proximity fire fighting ensemble requirements originally covered by NFPA 1976 are now addressed in this new edition of NFPA 1971.
- The 2007 Edition of *NFPA 1951: Standard on Protective Ensembles for Technical Rescue Operations* became effective in December 2006 and defines three ensemble types: utility, rescue and recovery, and CBRN technical rescue protective ensembles.
- The 2007 Edition of *NFPA 1994: Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents* became effective in August 2006 and defines certification performance requirements for Class 2, 3 and 4 ensembles. Previous NFPA 1994 Class 1 requirements are now covered by *NFPA 1991: Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies, 2005 Edition*.

<sup>1</sup> The online display will be available on the Responder Knowledge Base, [www.rkb.mipt.org](http://www.rkb.mipt.org).

As part of our effort to incorporate more “all-hazards” items, the SubGroup decided to expand both Sections 1 and 3 to provide better coverage for water operations. New categories were added to this section for Water Operations PPE, including breathing equipment (SCUBA and Surface Supplied Air), garments and ensembles (diving, swift water, and contaminated water), and ancillary water operations equipment. It was noted that these categories could also be very relevant to CBRNE response, depending upon the type and location of the event. DHS has agreed to incorporate these new sections into the AEL, which will result in their being allowed under some DHS grant programs. This approach is consistent with the identification of other items in this section that address both all-hazards response and CBRNE requirements, such as structural and proximity fire fighting protective ensembles (NFPA 1971), technical rescue incident ensembles (NFPA 1951), liquid splash protective ensembles and clothing (NFPA 1992), and emergency medical protective clothing (NFPA 1999).

The personal protective equipment specific to bomb squad operations has been moved to Section 2, *Equipment - Explosive Device Mitigation and Remediation*, in order to facilitate reference by bomb squad personnel.

Finally, the following white paper on ensemble terminology and selection has been updated to reflect recent changes in standards.

### *Comments on AEL Personal Protective Clothing and Equipment Section*

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Proper selection of personal protective clothing and equipment (PPE) for individual responders must be based upon a careful assessment of two factors: 1) the hazards anticipated to be present at the scene and, 2) the probable impact of those hazards, based upon the mission role of the individual. Currently, no single PPE ensemble can protect the wearer from exposure to all hazards. Prior to FY2005, Grant Guidance on purchase of PPE used Occupational Safety and Health Administration (OSHA)/Environmental Protection Agency (EPA) Levels A, B, and C to describe recommended PPE ensembles. These levels are defined in the Hazardous Waste Operations and Emergency Response Standard (HAZWOPER), 29 CFR 1910.120, Appendix B, as follows:

Level A – To be selected when the greatest level of skin, respiratory, and eye protection is required.

Level B – The highest level of respiratory protection is necessary but a lesser level of skin protection is needed.

Level C – The concentration(s) and type(s) of airborne substances is known and the criteria for using air-purifying respirators are met.

While these definitions provide guidelines and a framework for discussing PPE, the descriptive narrative in these levels does not set minimum performance criteria required for specific threats, such as chemical permeation resistance and physical property characteristics. Thus the use of these general “levels” of protection does not describe the protective capability of such ensembles, and does not assure that the wearer is adequately protected from any specific hazards. Relying solely on these nomenclatures could result in exposure above acceptable exposure limits, or an unnecessary reduction in operational effectiveness through lack of mobility, decreased dexterity, or reduced operational mission duration.

In preparing Grant Guidance for FY2005 and beyond, the Department of Homeland Security (DHS) aligned the Authorized Equipment List (AEL) with the Standardized Equipment List (SEL) produced by the InterAgency Board for Equipment Standardization and Interoperability (IAB) to the maximum extent possible. The mission of the IAB includes support to the development of hazard-based PPE performance standards. This includes performance standards for respiratory protective equipment, protective ensembles, garments, boots, and gloves for protection against chemical, biological, radiological and nuclear (CBRN) threats. Section 1 of the IAB’s SEL defines the hazard environments for

chemical, biological, radiological, thermal, explosive and ballistic threats. The IAB has also defined emergency responder mission roles in categories of law enforcement, fire department, emergency medical services, follow-on responders and special operations. The SEL provides a table that indicates the Federal, or consensus-based equipment performance standards with which PPE should be compliant to assure appropriate protection against CBRNE hazards.

In accordance with Homeland Security Presidential Directive (HSPD) 8<sup>1</sup>, current Grant Guidance defines eligible PPE in terms of nationally-recognized or U.S. Government standards. These standards require third-party certification, listing, and labeling of products; products may not claim compliance with them unless fully certified by an independent third party in accordance with the standard. For the National Fire Protection Association (NFPA) standards, several commercial entities are able to provide the appropriate testing and certification. For the NIOSH respiratory protection standards, all testing and approval is provided by the NIOSH National Personal Protective Technology Laboratory (NPPTL). Several of these standards have already been officially adopted by DHS, including:

- 1) NFPA 1994, Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents (2007 edition)<sup>2</sup> for chemicals, biological agents, and radioactive particulates hazards during terrorism incidents. Note that certifications under NFPA 1994 are issued only to complete ensembles. Individual elements such as garments or boots are not considered certified unless used as part of a certified ensemble. Thus purchasers of PPE certified under NFPA 1994 should plan to purchase complete ensembles (or certified replacement components for existing ensembles).
- 2) NFPA 1991, Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies (2005 edition), including the now-mandatory requirements for CBRN protection for terrorism incident operations for all vapor-protective ensembles.
- 3) NFPA 1951, Standard on Protective Ensembles for Technical Rescue Operations (2007 edition), for search and rescue or search and recovery operations where exposure to flame and heat is unlikely or nonexistent.
- 4) NFPA 1999, Standard on Protective Clothing for Emergency Medical Operations (2003 edition), for protection from blood and body fluid pathogens for persons providing treatment to victims after decontamination.
- 5) NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services (2007 edition).
- 6) NIOSH Chemical, Biological, Radiological and Nuclear (CBRN) Standard for Open-Circuit Self-Contained Breathing Apparatus.
- 7) NIOSH Standard for Chemical, Biological, Radiological, and Nuclear (CBRN) Full Facepiece Air Purifying Respirator (APR).
- 8) NIOSH Standard for Chemical, Biological, Radiological, and Nuclear (CBRN) Air-Purifying Escape Respirator and CBRN Self-Contained Escape Respirator.

The following information is provided to assist emergency response organizations in transitioning from Level A, B, and C nomenclature to protection-based standards terminology. Because the OSHA/EPA Levels are expressed in more general terms than the standards and do not include testing to determine protection capability, it is not possible to “map” the Levels to specific standards. However, it is possible

<sup>1</sup> Paragraph 15 of HSPD-8 states “To the extent permitted by law, equipment purchased through Federal preparedness assistance for first responders shall conform to equipment standards in place at time of purchase. Other Federal departments and agencies that support the purchase of first responder equipment will coordinate their programs with the Department of Homeland Security and conform to the same standards.”

<sup>2</sup> The new 2007 edition of NFPA 1994 became effective on August 17, 2006. This edition transferred the Class 1 requirements to NFPA 1991, the standard for vapor-protective ensembles. The 2007 edition realigns Class 2 and Class 3 ensembles, and also includes a new Class 4 for protective ensembles for biological and radiological particulate exposures.

to look at specific configurations and infer their OSHA/EPA Level based on the definitions provided above. Some examples of ensembles and conservative interpretations of their corresponding levels are provided in the table below.

Ensemble Description Using Performance-Based Standard(s)	OSHA/EPA Level
NFPA 1991 worn with NIOSH CBRN SCBA	A
NFPA 1994 Class 2 worn with NIOSH CBRN SCBA	B
NFPA 1971 <sup>3</sup> <b>with CBRN Option</b> worn with NIOSH CBRN SCBA	B
NFPA 1994 Class 2 worn with NIOSH CBRN APR	C
NFPA 1994 Class 3 worn with NIOSH CBRN APR	C
NFPA 1994 Class 4 worn with NIOSH CBRN APR	C
NFPA 1951 <sup>4</sup> <b>with CBRN Option</b> worn with NIOSH CBRN PAPER	C

All purchasers of PPE are cautioned to examine their hazard and mission requirements closely, and select appropriate performance standards. All PPE must be employed in accordance with 29 CFR 1910.120, “Hazardous Waste Operations and Emergency Response” (or equivalent EPA/state regulations). 29 CFR 1910.134, “Respiratory Protection” (or an equivalent state regulation) is also applicable in states with OSHA-approved health and safety programs and for all Federal employers.<sup>5</sup> Both include requirements for formal plans, medical evaluation, and training to assure the safety and health of emergency responders. The DHS Homeland Security Grant Program Guidance, the list of allowable equipment, and information on related standards, certifications, and products are all available on the DHS-sponsored Responder Knowledge Base (<http://www.rkb.mipt.org>).

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Personal Protective and Operational Equipment Sub-Group  
InterAgency Board for Equipment Standardization and Interoperability ([www.iab.gov](http://www.iab.gov))

<sup>3</sup> The new 2007 edition of NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting (effective August 17, 2006) includes options for protection from CBRN hazards. Only complete ensembles certified against these additional optional requirements provide this protection. The protection levels set in the NFPA 1971 CBRN option are based on the Class 2 requirements contained in NFPA 1994.

<sup>4</sup> The new 2007 edition of NFPA 1951, Standard on Protective Ensembles for Technical Rescue Operations (effective December 20, 2006) includes options for protection from CBRN hazards. Only complete ensembles certified against these additional optional requirements provide this protection. The protection levels set in the NFPA 1971 CBRN option are based on the Class 2 requirements contained in NFPA 1994.

<sup>5</sup> Under Title I, Section 126 of the Superfund Amendments and Reauthorization Act of 1986, EPA issued enforcement regulations identical to OSHA covering all individuals engaged in hazardous waste operations, including those who were not covered by the OSHA regulations.

The Federal government, including the Occupational Safety & Health Administration (OSHA), the NIOSH National Personal Protection Technology Laboratory (NPPTL), EPA, and the NIST Office of Law Enforcement Standards (OLES) are still working to address this issue by redefining the protection levels to be consistent with the protection provided by such PPE. The IAB hopes to see this effort, led by OSHA, completed during FY2007 and 2008, and is still working diligently to support its earliest possible completion.

### *The Ensemble Selection Process*

In order to select the appropriate PPE ensemble, all sectors of the emergency response community must first complete a thorough threat assessment that at least identifies the most probable scenarios.

Such scenarios should, at a minimum, address two major areas:

- What are the “hazards” likely to be encountered, e.g. chemical (vapors, liquids, particulates), biological, radiological, explosive, etc.?
- What is the likely “mission” (job function) of each responder during the event, and what are the type, level, and likelihood of exposure to potential hazards?

Although the tendency is to try to prepare for every eventuality, that approach is generally neither financially feasible nor appropriate. Thus, the community should determine the most credible and likely threat “scenarios” as a basis for planning. This assessment can only occur through a coordinated communication and planning effort involving emergency response organizations, emergency planning officials, and the intelligence community.

This coordinated planning effort should produce an “inventory” of the most likely scenarios, as well as anticipated responder roles. The results can then be applied using the Hazard/Mission Matrix described below. Completing this organized process of assessing the threat, planning the response, and identifying equipment gaps as a prerequisite to equipment selection is strongly encouraged.

### *Online Selection Factors*

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Like many sections in the 2007 SEL, the online version<sup>2</sup> of the Personal Protective Equipment Section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For this section, the SubGroup chose to use Hazard Environment and Mission Role as the two factors. Every online item is “tagged” for each appropriate combination of factors. Users of the online version can choose any combination of Hazard Environment and Mission Role and the system will provide a list of all items tagged for that combination.

The best way to visualize the interaction of the two selection factors (Hazard and Mission Role) for PPE is to view them as a matrix, as shown on the following page. The hazard or threat, including the likely physical state in which it would manifest itself, forms the “Hazard Environment” (horizontal) axis of the matrix. The vertical axis represents the likelihood of exposure based upon generalized job functions - the “Mission Role” axis of the matrix. Matching a mission role to one or more hazard environments gives a recommended set of equipment items. The values used in each of these two axes are described in detail below. NOTE: Currently, this table only addresses CBRNE hazards. As the SEL continues its transition to an all-hazards scope, the table will be expanded to reflect both additional missions and hazards.

<sup>2</sup> The online version is available on the Responder Knowledge Base, [www.rkb.mipt.org](http://www.rkb.mipt.org).



## *The Hazard Environment Axis*

This axis is based first on general weapon/hazard type, followed by an assessment of the physical state. For example, chemical weapons can exist as particulates, liquids or airborne vapors, gases or aerosols. Based upon credible intelligence and threat assessment information, a community might choose to select PPE designed to protect the responder from an event utilizing common toxic industrial materials in concentrations that are detrimental to the respiratory tract. In that case, the selection of “Chemical Weapon, Vapor/Gas/Aerosol in High Respiratory/Low Dermal concentrations” might be selected. In planning for potential RDD (radiological dispersion device) events, the selection of “Radiological with Penetrating Gamma/X-Ray” would be appropriate. Whatever selection is made will direct the user to the most up-to-date information concerning what, if any, protective ensembles are currently recommended, as well as usage limitations. The table below shows the hazard environment definitions adopted by the PPE Subgroup for use in the SEL:

### HAZARD ENVIRONMENT DEFINITIONS

Category	Environment	Definition
Chemical	Vapor/Gas/Aerosol (High Respiratory, High Dermal) [VH]	A chemical warfare agent or toxic industrial chemical found at the response scene that is present as a gas, a vapor that evaporates from a liquid, or a finely aerosolized low vapor pressure liquid. High Respiratory refers to the airborne concentration present and suggests that the concentration is above respiratory IDLH levels. High Dermal indicates a significant dermal contact or absorption risk for acute/chronic skin toxicity or systemic health effects via skin contact (e.g. carcinogens).
	Vapor/Gas/Aerosol (High Respiratory, Low Dermal) [VR]	A chemical warfare agent or toxic industrial chemical found at the response scene that is present as a gas, a vapor that evaporates from a liquid, or a finely aerosolized low vapor pressure liquid. High Respiratory refers to the airborne concentration present and suggests that the concentration is above respiratory IDLH levels. Low Dermal indicates that vapors or gases are not in a high enough concentration to create a condition that is immediately dangerous to the wearer or conducive to systemic or chronic health effects via skin contact (e.g. carcinogens).
	Vapor/Gas/Aerosol (Low Respiratory, Low Dermal) [VL]	A chemical warfare agent or toxic industrial chemical found at the response scene that is present as a gas, a vapor that evaporates from a liquid, or a finely aerosolized low vapor pressure liquid. Low Respiratory refers to situations where the airborne concentration is anticipated to be below IDLH levels. Low Dermal indicates that vapors or gases are not in a high enough concentration to create a condition that is immediately dangerous to the wearer or conducive to systemic or chronic health effects via skin contact (e.g. carcinogens).
	Liquids (High) [LH]	A chemical warfare agent or toxic industrial chemical found at the response scene that is present as a liquid where the potential exists for contact with that liquid. High indicates conditions where extended contact in the form of splashes is expected.



HAZARD ENVIRONMENT DEFINITIONS - *Continued*

Category	Environment	Definition
Chemical - <i>Continued</i>	Liquids (Low) [LL]	A chemical warfare agent or toxic industrial chemical found at the response scene that is present as a liquid where the potential exists for contact with that liquid. Low indicates conditions where incidental contact could be expected from contaminated surfaces.
	Particulates (High) [PH]	A chemical warfare agent or toxic industrial chemical found at the response scene that is present as solid particles (particulate) or dust. High indicates that the concentration is above respiratory IDLH levels, or that the CBRNE agent is carcinogenic.
	Particulates (Low) [PL]	A chemical warfare agent or toxic industrial chemical found at the response scene that is present as solid particles (particulate) or dust. Low indicates that the concentration is below respiratory IDLH levels, and that the CBRNE agent is non-carcinogenic.
Biological	Airborne [BA]	Microorganisms that can be spread as aerosols or particulates, and are considered airborne threats for respiration and in some cases also through dermal contact.
	Liquid-borne [BL]	Microorganisms that can be spread by contact with blood, body fluids, and other contaminated liquids.
Radiological	Particulate/Liquid (Alpha and Beta) [AB]	Alpha or beta ionizing radiation that is spread by particles suspended in air or liquids. The primary hazard from these materials is through inhalation of particulates; skin contact should also be avoided.
	Penetrating Gamma/ X-Ray [yX]	The threat from gamma/x-ray ionizing radiation consists of both exposure to and contamination by gamma and x-ray-emitting radioactive isotopes. Other than time, distance, and shielding, PPE is limited to minimizing direct contact with or inhalation of contaminated material.
Thermal	Flash Fire [FF]	A relatively short duration fire of 10 seconds or less that involves the ignition and combustion of a flammable atmosphere.
	Sustained Fire [SF]	A fire involving a structure or other source of materials that continues for a period of 1 minute or more until extinguished or through the consumption of the combustible materials present.
Explosive	Pre-Detonation [PR]	The potential for explosion still exists at the emergency scene.
	Post-Detonation [PO]	The device has already exploded and the response scene involves the physical hazards associated with structural collapse and debris.



**HAZARD ENVIRONMENT DEFINITIONS - *Continued***

<b>Category</b>	<b>Environment</b>	<b>Definition</b>
Ballistic	Armed Assaults, Force Protection, Hostage Rescue [AS]	Handgun and rifle fire up to and including .30 Caliber armor piercing rounds.

Protective and operational equipment has been added to the 2007 SEL to address various water operations that include, but are not limited to swiftwater rescue, contaminated surface water operations, and contaminated subsurface water operations (diving). The specific hazard environments will be further defined in the coming year so that specific personal protective and operational equipment can be classified.

*The Mission Role Axis*

For a more detailed risk assessment of responders at CBRNE events, it is necessary to describe each responder's particular mission during the incident. By describing the mission, one can estimate numerous variables that place the individual at either an increased or decreased risk of actual exposure to the hazard. These variables include factors such as proximity to the potential release, potential exposure to IDLH environments, timing of arrival with regard to weapon dispersion, and probability of contact with potentially contaminated victims or surfaces. The mission roles listed in the matrix enable the community to consider a responder's job function during the CBRNE incident in comparison to the hazard. This results in a better matching of protective postures towards actual risk.

The fact that a mission role is listed in a particular duty area is not intended to imply that the role is not applicable to other duty areas. For example, rescue teams may be located in law enforcement, fire department, or emergency medical duty areas depending upon the performance expectations of the community and their Comprehensive Emergency Response Plan. In the interest of keeping the matrix to a manageable size, mission roles are not repeated in every possible duty area.

Additionally, the reader must bear in mind that the mission roles presented in the matrix are based upon their assigned mission after the event occurs. Therefore, those assigned to First Responder roles such as "Patrol Officer", "Firefighter" and "Medical First Receiver" will often be reclassified to another listed mission role once they become involved in the event (e.g. perimeter control, decontamination team, or contaminated patient care).

The table below shows the mission role definitions adopted by the PP&OE Subgroup for use in the SEL:

**MISSION ROLE DEFINITIONS**

<b>Duty Areas</b>	<b>Mission Role</b>	<b>Definition</b>
Law Enforcement	First Responder/ Patrol Officer	Initial response into possible CBRNE incident in law enforcement capacity. Responder would have risk of exposure during the first response and initial phase of the event. Any requirement to work within the hazardous environment beyond the initial recognition phase would generally result in the individual being reclassified into one of the other mission areas identified in this matrix.

**MISSION ROLE DEFINITIONS - *Continued***

<b>Duty Areas</b>	<b>Mission Role</b>	<b>Definition</b>
Law Enforcement - <i>Continued</i>	Force Protection	Force protection at a CBRNE incident scene or at critical supporting infrastructure locations (e.g. medical, communications, logistical support, staging or command and control locations) and access control points for the purpose of ensuring the safety of operating personnel and assets.
	Perimeter Control and Field Force	Scene control, credentialing, perimeter security, and crowd control.
	Evidence Technician	Sample and evidence collection in cold, warm, and hot zones. These technicians may be involved in a variety of investigative processes including criminal investigation and environmental sampling.
	Tactical (SWAT)	Entry into any zone for immediate tactical action, hostage rescue, or assault.
Fire Department	Fire Responder/ Firefighter	Initial response in fire service capacity. Responders would have risk of exposure during the initial stages of the event. Any requirement to work within the hazardous environment beyond the first response and initial recognition phase would generally result in the individual being reclassified into one of the other mission areas identified in this matrix.
	Rescue Team	Response to incident for purpose of rescuing live non-ambulatory casualties.
	Decontamination Team	Decontamination of response personnel or victims.
Emergency Medical Services	First Responder/ Medical First Receiver	Initial response in medical services capacity; responding to a report of an incident or being the first medical person to receive or recognize casualties from a CBRNE event. Responders would have risk of exposure during the initial phases of the event. Any requirement to function in another capacity beyond the first response and initial recognition phase of the event would generally result in the individual being reclassified into one of the other mission areas identified in this matrix.
	Contaminated Patient Care	The medical care provider or allied medical professional (e.g. medical examiner) at any location or level of response who is likely to provide care or service to patients or victims who are likely to pose a significant risk of secondary contamination or exposure. These medical personnel may also be involved in the decontamination process.
	Non-Contaminated Patient Care	The medical care provider or allied medical professional (e.g. medical examiner) at any location or level of response who

**MISSION ROLE DEFINITIONS - *Continued***

<b>Mission</b>	<b>Mission Role</b>	<b>Definition</b>
Emergency Medical Services - <i>Continued</i>	Non-Contaminated Patient Care	is likely to provide care or service to patients or victims who do not pose a significant risk of secondary contamination or exposure. The determination of lack of significant risk may be based upon a wide variety of factors including, but not limited to, the proximal location of the patient/victim at the time of CBRNE release, the physical/chemical properties of the CBRNE, the use of detection equipment or the extent of decontamination already taken.
Follow-On Responders	Administrative/Logistical Support Personnel	Those individuals that would follow-on in the response to assist with the administration and logistical support of the event. These individuals would not normally be subjected to potential exposure provided appropriate force protection and perimeter security measures are in place.
	Technical and Skilled Specialty Personnel - Isolation Area	Those trade personnel called upon to provide a focused specialty function. These functions would likely be carried out in the isolation area of the event and therefore, potential exposures to materials are likely.
	Technical and Skilled Specialty Personnel - Non-Isolation Area	Those trade personnel called upon to provide a focused specialty function. These individuals would not normally be subjected to potential exposure provided appropriate force protection and perimeter security measures are in place.
Special	Hazardous Device Operations	Response to incidents involving a hazardous explosive and/or dispersal device within the isolation area, for the purpose of identification, rendering safe, or removal of such device(s). For operations outside the isolation area, PPE requirements are determined by specific mission role.
	HAZMAT Operations	Response to incidents involving CBRNE or hazardous materials within the isolation area for the purpose of detection, sampling, identification, control, and/or remediation. For operations outside the isolation area, PPE requirements are determined by specific mission role.
	Incident Command Team	Response to incidents for purposes of assuming incident command in the field, including establishment and operation of a field incident command center.
	Urban Search and Rescue (US&R)	Response to events in the isolation area involving collapsed structures for the purpose of locating and rescuing trapped victims, or structural stabilization.
	Environmental/Occupational Health Operations	Response to incidents involving CBRNE or hazardous materials in order to gather data/samples for the purpose of assessing human health risks to responders or the community. These activities generally occur at a secured scene after the completion of initial emergency response activities.

**MISSION ROLE DEFINITIONS - *Continued***

<b>Mission</b>	<b>Mission Role</b>	<b>Definition</b>
Special - <i>Continued</i>	Epidemiology	Conducting interviews and/or investigations for the purpose of gathering epidemiological information.
	Mortuary Operations	DMORT (Disaster Mortuary Operational Response Team) or coroner/medical examiner, law enforcement, morticians. PPE requirements are determined by specific mission role, e.g. sampling, preservation, etc.

Water operations are undertaken by various response organizations including law enforcement organizations, the fire service, emergency medical first responders, and specialized teams. Due to the crossover of responsibility and exercise of these operations, a separate category will be added in the future to address the different types of water operations for which personal and operational protective equipment are classified.

*PPE Standards and Hazard Environments*

In addition to the Hazard/Mission matrix, this edition of the SEL updates the table relating hazards to existing standards. The figure on the following page identifies recognized standards that apply to PPE used for protection from specific types of hazards encountered by responders during a CBRNE incident. Start with the left side of this chart to select the types of hazards that may be potentially encountered (the definitions are the same as those used in the Hazard axis of the Hazard/Mission matrix). Then look across the top of the chart to find the current nationally recognized standard(s) that address the selected hazards.

Exposure/Hazard HIGH = IDLH LOW = STEL/TLV	Respiratory Protection					Personal Protective Clothing														
	NIOSH CBRN-SCBA	NIOSH CBRN-APR [5]	NIOSH CBRN P APR [5]	NIOSH CBRN Escape Respirator (SC) [8]	NIOSH CBRN Escape Respirator (AP) [8]	NFPA 1991	NFPA 1991 w/ Flash Fire Option	NFPA 1994 Class 2	NFPA 1994 Class 3	NFPA 1994 Class 4	NFPA 1992	NFPA 1951 Utility	NFPA 1951 Rescue & Recovery	NFPA 1951 CBRN	NFPA 1999	DoD-Advanced Bomb Suit Performance Specification	NFPA 1971 - Structural	NFPA 1976 - Proximity	NFPA 1971 with CBRN Option	
<b>Unknown Environment</b>	X					X	X	X											E	
<b>Chemical</b>																				
Vapor/Gas/Aerosol (High Respiratory <sup>1</sup> , High Dermal <sup>3</sup> )	X					X	X	X											X	
Vapor/Gas/Aerosol (High Respiratory <sup>1</sup> , Low Dermal <sup>4</sup> )	X					X	X	X											X	
Vapor/Gas/Aerosol (Low Respiratory <sup>2</sup> , Low Dermal <sup>4</sup> )	X	X	X	E	E	X	X	X	X					X					X	
Liquids (High) <sup>6</sup>	X					X	X	X			•								X	
Liquids (Low) <sup>6</sup>	X	X	X	E	E	X	X	X	X		•		•	X				•	•	X
Particulates (High)	X					X	X	X	X	X	•			X					X	
Particulates (Low)	X	X	X	E	E	X	X	X	X	X	•		•	X				•	•	X
<b>Biological</b>																				
Airborne	X	X	X	E	E	X	X	X	X	X				X					X	
Liquid-borne	X	X	X	E	E	X	X	X	X	X	X		X	X	X			X	X	X
<b>Radiological/Nuclear<sup>7</sup></b>																				
Particulate/Liquid (Alpha and Beta)	X	X	X	E	E	X	X	X	X	X	X	•	•	X	•	•	•	•	X	
Penetrating Gamma/X-Ray																				
<b>Thermal</b>																				
Flash Fire	X						X					X	X	X				X	X	X
Sustained Fire	X																	X	X	X
<b>Explosive</b>																				
Pre-Detonation																		X		
Post-Detonation	•	•	•	•	•	•	•	•	•	•			•	•	•	X	X	X	X	
<b>Ballistic</b>																				
Armed Assaults, Force Protection, Hostage Rescue																X				

**Key to Matrix Values:**

- ✓ Provides protection from the indicated CBRNE exposure.
  - E Provides protection from the indicated CBRNE exposure for escape purposes only. Not intended for operations in the indicated hazard environment.
  - Does not provide specific protection from CBRN exposures, but does provide limited protection from collateral exposures such as TICs/TIMs once the CBRNE threat has been mitigated.
- <sup>1</sup> “High Respiratory” indicates that airborne concentrations are anticipated to be at or above IDLH or respirator maximum use concentration levels.
  - <sup>2</sup> “Low Respiratory” indicates that airborne concentration is at or above published Short Term Exposure Limits (STEL) but less than IDLH or respirator maximum use concentration.
  - <sup>3</sup> “High Dermal” indicates a significant dermal contact or absorption risk for acute/chronic skin toxicity, sensitization, corrosiveness, or systemic health effects via skin contact (e.g. carcinogens).
  - <sup>4</sup> “Low Dermal” suggests that vapors or gases are not in a high enough concentration to create a condition that is immediately dangerous to the wearer or conducive to systemic or acute/chronic health effects via skin contact (e.g. carcinogens).
  - <sup>5</sup> Canisters used for APRs and canisters/cartridges used for PAPRs may have significant life limitations in airborne particulate hazards of sufficient quantity to cause filter loading.
  - <sup>6</sup> High/Low with regard to liquid chemical hazards. Although expressed in this matrix in general terms, selection of respiratory levels of protection would be dependent upon the volatility of the material and results of quantitative analysis of airborne concentrations.
  - <sup>7</sup> The specific hazard/exposure indicated is radiological. Nuclear hazard environments will also include thermal and explosive components if detonation occurs.
  - <sup>8</sup> CBRN Escape Respirators are grouped into two categories for this table: Air Purifying (AP), which includes respirators with and without the carbon monoxide (CO) option, and Self Contained (SC), which has its own air supply. Protections are limited to duration required for escape activity.

*Summary*


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Section 1 of the SEL is intended to provide the best possible guidance in selecting personal protective equipment based upon the anticipated hazard environment(s) and the mission role of the user. This guidance is based principally on CBRNE hazards; other hazards must be considered in a thorough hazard and risk assessment, which is required by OSHA for the selection of PPE. However, no guidance can replace the fundamental requirement to examine a community’s most likely exposure to various hazards and mission roles for its personnel prior to PPE selection.

Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<p><b>AR - Respiratory Protection Equipment</b>                      01 - CBRN Self-Contained Breathing Apparatus (SCBA) and Supplied-Air Respirators (SAR)</p>				
01AR-01-SCBA*	CBRN SCBA - Self-Contained Breathing Apparatus certified as compliant with NFPA 1981 and certified by NIOSH as compliant with the CBRN approval criteria. Worn with multiple ensemble configurations.	<p>SCBA consists of a harness, air cylinder, first stage regulator, low pressure hose, second stage regulator, end-of-service-time indicator (EOSTI) and facepiece. SCBA are typically rated for 30, 45, and 60 minutes of usage time, but may be rated for other usage times in accordance with 42 CFR Part 84. Variations exist in harness design, types of cylinders, and facepieces.</p> <p>-----</p> <p>[Note: The new (2007) edition of NFPA 1981 is effective as of December 20, 2006; this edition makes NIOSH CBRN approval mandatory. The “grace period” for products certified to the 2002 edition will end on August 31, 2007.]</p> <p>Worn in conjunction with Incident Commander guidance and NFPA-certified ensemble appropriate for threat.</p> <p>CBRN SCBA are intended for circumstances where the substance involved creates an immediate threat, is unidentified, of unknown concentration, oxygen deficient, or determined to be immediately dangerous to life and health (IDLH). Such situations would occur where there is still an on-going release with likely gas/vapor exposure, the responder is close to the point of release, and most victims in the area appear to be unconscious or dead from exposure. Stay times in the hazard zone are likely to be short and limited by the breathing air available from the CBRN SCBA. Some CBRN agents may not present immediate effects from exposure, but can result in delayed impairment, illness, or death. Direct contact with CBRN agents requires proper handling of the SCBA after each use and between multiple entries during the same use. Decontamination and disposal procedures must be followed. If contaminated with liquid chemical warfare agents, dispose of the SCBA after decontamination.</p> <p>NOTE: SCBA should not be used beyond 6 hours after initial exposure to chemical warfare agents to avoid possibility of agent permeation. →</p>	47, 49, 56, 60, 104, 107, 112	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AR - Respiratory Protection Equipment</b>				
<b>01 - CBRN Self-Contained Breathing Apparatus (SCBA) and Supplied-Air Respirators (SAR) - Continued</b>				
			CBRN SCBA facepieces must be specifically fit tested for individual first responders in accordance with OSHA 29 CFR Part 1910.134. Other use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.134, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, 2002 Edition. Selection, care, and maintenance are covered in NFPA 1852, Standard on Selection, Care and Maintenance of Open-Circuit, Self-Contained Breathing Apparatus, 2002 Edition.	
01AR-01-SCBC*	Cylinders and Valve Assemblies, Spare, and Service/Repair Kits, SCBA	Spare SCBA Cylinders and valve assemblies, and service/repair kits for item 01AR-01-SCBA.	Types of kits vary with specific SCBA. ----- [Note: The new (2007) edition of NFPA 1981 is effective as of December 20, 2006; this edition makes NIOSH CBRN approval mandatory. The “grace period” for products certified to the 2002 edition will end on August 31, 2007.]  Cylinders and service/care kits must be specific to SCBA being used. Individuals using these items must be trained by manufacturer or manufacturer’s representative.	60, 66, 112
01AR-01-SCBR*	Kit, Retrofit, CBRN SCBA	Retrofit kit for existing Self-Contained Breathing Apparatus to bring the unit into CBRN compliance. Kit must be certified as compliant with NFPA 1981 and certified by NIOSH as compliant with the CBRN approval criteria.	Will replace components as necessary for compliance. ----- [Note: The new (2007) edition of NFPA 1981 is effective as of December 20, 2006; this edition makes NIOSH CBRN approval mandatory. The “grace period” for products certified to the 2002 edition will end on August 31, 2007.]  Check manufacturer’s instructions carefully. Kit may require factory trained technician for installation.  Same considerations as 01AR-01-SCBA.	47, 49, 56, 60, 104, 107, 112

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Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
AR - Respiratory Protection Equipment 02 - CBRN Air-Purifying Respirator (APR)				
01AR-02-APR	Respirator, Air-Purifying, Full-Face, Tight-Fitting, Negative Pressure, CBRN	CBRN Air-Purifying Respirator (APR) (certified by NIOSH as compliant with the CBRN approval criteria). Worn with multiple ensemble configurations.	<p>NIOSH has established specific criteria for air-purifying respirators (APRs) with CBRN approval. These criteria include existing tests established in 42 CFR Part 84, supplemented by additional tests for specific performance against selected chemicals and agents and other areas of performance. The APR must be a full facepiece. Manufacturers may offer facepieces in different materials and different designs.</p> <p>The NIOSH standard supports canister interoperability. The canister's NIOSH label is color-coded OD (olive drab) green with black font, and lists the type of agents against which the canister is rated.</p> <p>-----</p> <p>Worn in conjunction with Incident Commander guidance and NFPA-certified ensemble appropriate for threat.</p> <p>NIOSH has listed the following limitations for CBRN APR:</p> <ol style="list-style-type: none"> <li>1. Not for use in atmospheres containing less than 19.5 percent oxygen.</li> <li>2. Not for use in atmospheres immediately dangerous to life and health or where hazards have not been fully characterized.</li> <li>3. When used at defined occupational exposure limits, the rated service time cannot be exceeded. Follow established canister change schedules or observe End of Service Life Indicators to ensure that canisters are replaced before breakthrough occurs.</li> <li>4. Failure to properly use and maintain this product could result in injury or death.</li> <li>5. Follow the manufacturer's User Instructions for changing canisters.</li> <li>6. All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.</li> <li>7. Use replacement parts in the configuration as specified by the applicable regulations and guidance.</li> <li>8. Refer to User Instructions and/or maintenance manuals for information on use and maintenance of these respirators.</li> <li>9. Consult manufacturer's User Instructions for information on the use, storage, and →</li> </ol>	47, 49, 56, 58

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.  
 \* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>AR - Respiratory Protection Equipment  
02 - CBRN Air-Purifying Respirator (APR) - Continued

	<p>maintenance of these respirators at various temperatures.</p> <p>10. This respirator provides respiratory protection against inhalation of radiological and nuclear dust particles. Procedures for monitoring radiation exposure and full radiation protection must be followed.</p> <p>11. If, during use, an unexpected hazard is encountered such as a secondary CBRN device, pockets of entrapped hazard or any unforeseen hazard, immediately leave the area for clean air.</p> <p>12. Use in conjunction with personal protective ensembles that provide appropriate levels of protection against dermal hazard. Failure to do so may result in personal injury even when the respirator is properly fitted, used, and maintained.</p> <p>13. Some CBRN agents may not present immediate effects from exposure, but can result in delayed impairment, illness, or death.</p> <p>14. Direct contact with CBRN agents requires proper handling of the respirator after each use and between multiple entries during the same use. Decontamination and disposal procedures must be followed. If contaminated with liquid chemical warfare agents, dispose of the respirator after decontamination.</p> <p>15. The respirator should not be used beyond eight (8) hours after initial exposure to chemical warfare agents to avoid possibility of agent permeation. If liquid exposure is encountered, the respirator should not be used for more than two (2) hours.</p>	
01AR-02-APRC  Canister, CBRN, APR	<p>NIOSH CBRN-approved canisters provide protection against 139 gas, vapor, and particulate hazards including chemical warfare agents. The canister must incorporate a P100 filter capability and use a special mounting thread that permits interoperability with other manufacturer's respirators when no other cartridges are available. The canister's NIOSH label is color-coded OD (olive drab) green with black font, and lists the type of agents against which the canister is rated.</p> <p>NOTE: The interoperability capability is for emergency use only.</p> <p>-----&gt;</p>	47, 49, 56, 58

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Standards <sup>1</sup>
AR - Respiratory Protection Equipment 02 - CBRN Air-Purifying Respirator (APR) - <i>Continued</i>	<p>NIOSH has listed the following limitations for CBRN APR:</p> <ol style="list-style-type: none"> <li>1. Not for use in atmospheres containing less than 19.5 percent oxygen.</li> <li>2. Not for use in atmospheres immediately dangerous to life and health or where hazards have not been fully characterized.</li> <li>3. When used at defined occupational exposure limits, the rated service time cannot be exceeded. Follow established canister change schedules or observe End of Service Life Indicators to ensure that canisters are replaced before breakthrough occurs.</li> <li>4. Failure to properly use and maintain this product could result in injury or death.</li> <li>5. Follow the manufacturer's User Instructions for changing canisters.</li> <li>6. All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.</li> <li>7. Use replacement parts in the configuration as specified by the applicable regulations and guidance.</li> <li>8. Refer to User Instructions and/or maintenance manuals for information on use and maintenance of these respirators.</li> <li>9. Consult manufacturer's User Instructions for information on the use, storage, and maintenance of these respirators at various temperatures.</li> <li>10. This respirator provides respiratory protection against inhalation of radiological and nuclear dust particles. Procedures for monitoring radiation exposure and full radiation protection must be followed.</li> <li>11. If, during use, an unexpected hazard is encountered such as a secondary CBRN device, pockets of entrapped hazard or any unforeseen hazard, immediately leave the area for clean air.</li> <li>12. Use in conjunction with personal protective ensembles that provide appropriate levels of protection against dermal hazard. Failure to do so may result in personal injury even when the respirator is properly fitted, used, and maintained.</li> <li>13. Some CBRN agents may not present immediate effects from exposure, but can result in delayed impairment, illness, or death.</li> <li>14. Direct contact with CBRN agents requires proper handling of the respirator after →</li> </ol>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Features/Operating Considerations		Standards <sup>1</sup>
<b>AR - Respiratory Protection Equipment</b> 02 - CBRN Air-Purifying Respirator (APR) - <i>Continued</i>		
	<p>each use and between multiple entries during the same use. Decontamination and disposal procedures must be followed. If contaminated with liquid chemical warfare agents, dispose of the respirator after decontamination.</p> <p>15. NOTE: The respirator should not be used beyond eight (8) hours after initial exposure to chemical warfare agents to avoid possibility of agent permeation. If liquid exposure is encountered, the respirator should not be used for more than two (2) hours.</p>	
<b>AR - Respiratory Protection Equipment</b> 03 - CBRN Powered Air-Purifying Respirator (PAPR)		
01AR-03-PAPA* Respirator, Powered, Air-Purifying (PAPR), CBRN	CBRN Powered Air-Purifying Respirator (PAPR) (certified by NIOSH as compliant with CBRN approval criteria). Worn with multiple ensemble configurations.	Powered air-purifying respirators (PAPRs) use a blower in combination with either a loose-fitting respirator inlet cover (such as a hood or helmet) or a tight-fitting facepiece. PAPRs may use different hood, helmet, and facepiece designs. Generally, the blower is belt mounted, but other mounting options are available. The PAPR may use single or multiple canisters or cartridges, and requires a power source.  CBRN PAPRs with loose-fitting facepieces require cartridges approved under NIOSH Schedule 23 (Chemical Cartridge Respirators). CBRN PAPRs with tight-fitting facepieces require canisters approved under NIOSH Schedule 14G (Gas Masks).  ----- Worn in conjunction with Incident Commander guidance and NFPA-certified ensemble appropriate for threat.  Powered air-purifying respirators (PAPR) cannot be used in environments classified as immediately dangerous to life and health (IDLH) and further, cannot be used when the oxygen concentration in the environment is less than 19.5%. PAPRs must be fitted with the appropriate canister or cartridges, and should not be used in a flammable or potentially flammable environment. The length of canister or cartridge use time will depend on concentration of the hazardous substance, the temperature, relative humidity, and breathing (flow) rate through the canister or cartridge. Air-purifying respirator use is predicated →

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AR - Respiratory Protection Equipment</b>				
<b>03 - CBRN Powered Air-Purifying Respirator (PAPR) - Continued</b>				
01AR-03-PAPB	Battery Pack, PAPR	Battery pack for item 01AR-03-PAPA.	<p>on environmental monitoring in order to determine continued protection in accordance with OSHA 29 CFR Part 1910.134.</p> <p>Consider power requirements in addition to protections. Based upon mission requirements, a low battery indicator may be a desirable option. Follow manufacturer's instructions regarding battery type and use.</p> <p>Compact, integrated power source capable of all weather operations.</p> <p>-----</p> <p>Consider power requirements in addition to protections. Based upon mission requirements, a low battery indicator may be a desirable option. Follow manufacturer's instructions regarding battery type and use.</p>	47, 49, 56, 59
01AR-03-PAPC*	Canister, CBRN, PAPR	CBRN Canisters for Item 01AR-03-PAPR	<p>Canisters are single filter/adsorbent elements used with a respirator; cartridges are dual filter/adsorbent elements. Canisters and cartridges are color-coded by the type of agents (chemicals) the canister or cartridge is rated against. Some canisters or cartridges may protect against multiple agents and chemicals. Some canisters and cartridges come with prefilters for particulates.</p> <p>-----</p> <p>Each canister or cartridge must have a NIOSH approval number. CBRN PAPRs with loose-fitting facepieces require cartridges approved under NIOSH Schedule 23 (Chemical Cartridge Respirators). CBRN PAPRs with tight-fitting facepieces require canisters approved under NIOSH Schedule 14G (Gas Masks).</p> <p>Canisters and cartridges are specific to the manufacturer's respirator and may not be interchanged with other respirators. Canisters and cartridges have a limited service life, which depends on the concentration of the hazardous substance, the temperature, relative humidity, and breathing (flow) rate through the canister or cartridge. Air-purifying →</p>	47, 49, 56, 59

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 1 | Personal Protective Equipment

Features/Operating Considerations		Standards <sup>1</sup>
<b>AR - Respiratory Protection Equipment</b> 03 - CBRN Powered Air-Purifying Respirator (DAPR) - <i>Continued</i>	respirator use is predicated on environmental monitoring to determine continued protection in accordance with OSHA 29 CFR Part 1910.134.	
<b>AR - Respiratory Protection Equipment</b> 04 - CBRN Escape Respirator	CBRN air-purifying escape respirator (APER) designed for escape from hazardous environments, including carbon monoxide (certified by NIOSH as compliant with the CBRN approval criteria).	56, 57
01AR-04-APEC Respirator, Escape, Air-Purifying, Single-Use, CBRN, with CO Option	<p>Quick donning, short duration respiratory protection with CBRN protection against chemicals, biological agents, and radiological particles FOR ESCAPE PURPOSES ONLY. Air-purifying respirators operate by filtering, and have no internal air supply.</p> <p>-----</p> <p>NOTE: Not approved for escape from oxygen-deficient (&lt;19.5%) environments.</p> <p>NIOSH has listed the following limitations:</p> <ol style="list-style-type: none"> <li>1. Failure to properly use and maintain this product could result in injury or death.</li> <li>2. All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.</li> <li>3. Refer to User's Instructions and/or maintenance manuals for information on use and maintenance of these respirators.</li> <li>4. Consult manufacturer's User Instructions for information on the use, storage, and maintenance of these respirators at various temperatures.</li> <li>5. This respirator provides respiratory protection against inhalation of radiological and nuclear dust particles. This respirator provides limited dermal protection to the head area and eyes.</li> <li>6. Some CBRN agents may not present immediate effects from exposure, but can result in delayed impairment, illness, or death.</li> <li>7. Direct contact with CBRN agents requires proper handling of the respirator after use. Correct disposal procedures must be followed.</li> </ol> <p>These limitations are not all inclusive. The respirator manufacturer may also identify further cautions and limitations for their respirators. In addition, regulatory agencies may also place a limit on the use of respirators in their standards.</p>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title Description		Features/Operating Considerations	Standards <sup>1</sup>
<b>AR - Respiratory Protection Equipment</b> 04 - CBRN Escape Respirator - <i>Continued</i>			
01AR-04-APER Respirator, Escape, Air-Purifying, Single-Use, CBRN	CBRN air-purifying escape respirator (APER) designed for escape from hazardous environments (certified by NIOSH as compliant with the CBRN approval criteria).	<p>Quick donning, short duration respiratory protection with CBRN protection against chemicals, biological agents, and radiological particles <b>FOR ESCAPE PURPOSES ONLY</b>. Air-purifying respirators operate by filtering, and have no internal air supply.</p> <p>-----            NOTE: Not approved for escape from carbon monoxide (CO) or oxygen-deficient (&lt;19.5%) environments.</p> <p>NIOSH has listed the following limitations:</p> <ol style="list-style-type: none"> <li>1. Failure to properly use and maintain this product could result in injury or death.</li> <li>2. All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.</li> <li>3. Refer to User's Instructions and/or maintenance manuals for information on use and maintenance of these respirators.</li> <li>4. Consult manufacturer's User Instructions for information on the use, storage, and maintenance of these respirators at various temperatures.</li> <li>5. This respirator provides respiratory protection against inhalation of radiological and nuclear dust particles. This respirator provides limited dermal protection to the head area and eyes.</li> <li>6. Some CBRN agents may not present immediate effects from exposure, but can result in delayed impairment, illness, or death.</li> <li>7. Direct contact with CBRN agents requires proper handling of the respirator after use. Correct disposal procedures must be followed.</li> </ol> <p>These limitations are not all inclusive. The respirator manufacturer may also identify further cautions and limitations for their respirators. In addition, regulatory agencies may also place a limit on the use of respirators in their standards.</p>	56, 57
01AR-04-SCER Respirator, Escape,	CBRN Self-contained escape respirator (SCER) designed for escape from	Quick donning, escape supplied-air respiratory protection designed for inhalation protection against chemical or biological agents and radiological (CBRN) particulates <b>FOR ESCAPE PURPOSES ONLY</b> . The SCER offers escape protection for atmospheres →	56, 61

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 1 | Personal Protective Equipment

**Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>**

**AR - Respiratory Protection Equipment  
04 - CBRN Escape Respirator - Continued**

<p>Self-Contained, Single-Use, CBRN</p>	<p>hazardous and oxygen-deficient environments (certified by NIOSH as compliant with the CBRN approval criteria).</p>	<p>containing less than 19.5 percent oxygen, immediately dangerous to life and health (IDLH) conditions, flame effects, or when atmospheric hazards have not been fully characterized.</p> <p>-----                  Escape respirator durations are per NIOSH approval. Use conditions are in accordance with NIOSH cautions and limitations, and Incident Commander guidance. The CBRN SCER is designed as a hooded device. Storage/service use life does not exceed 5 years.</p>
<p>NIOSH has listed the following limitations:</p> <ol style="list-style-type: none"> <li>1. Failure to properly use and maintain this product could result in injury or death.</li> <li>2. All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.</li> <li>3. Refer to User's Instructions and/or maintenance manuals for information on use and maintenance of these respirators.</li> <li>4. Consult manufacturer's User Instructions for information on the use, storage, and maintenance of these respirators at various temperatures.</li> <li>5. This respirator provides respiratory protection against inhalation of radiological and nuclear dust particles. This respirator provides limited dermal protection to the head area and eyes.</li> <li>6. Some CBRN agents may not present immediate effects from exposure, but can result in delayed impairment, illness, or death.</li> <li>7. Direct contact with CBRN agents requires proper handling of the respirator after use. Correct disposal procedures must be followed.</li> </ol> <p>These limitations are not all inclusive. The respirator manufacturer may also identify further cautions and limitations for their respirators. In addition, regulatory agencies may also place a limit on the use of respirators in their standards.</p>		

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
01AR-05-COMB Equipment, Respiratory Protection, Combination		Respiratory protection equipment that performs in multiple modes corresponding to various respirator types, such as a combination of Self Contained Breathing Apparatus (SCBA) and Powered Air Purifying Respirator (PAPR). Must be certified by NIOSH as a compliant combination respirator in accordance with 42 CFR 84. Each mode of operation must comply with the applicable NIOSH CBRN approval criteria. If no CBRN standard is established for a given mode of operation, the equipment must be certified in that mode under 42 CFR 84. Appropriate Cautions and Limitations of Use apply for each respirator type/mode of operation.	<p>Combination equipment combines the advantages of multiple operational modes. For example, an SCBA/PAPR combination allows the user to extend mission time by utilizing the PAPR while ambient air is within tolerances, and switching to SCBA mode when ambient oxygen is not sufficient.</p> <p>-----</p> <p>Worn in conjunction with Incident Commander guidance and an NFPA-certified ensemble appropriate for threat.</p> <p>It is important to note that when these devices are used, only one mode is used at a time. From a user standpoint, when a combination respirator with SCBA capability is used in that mode, it should provide all of the protections and functions expected of an SCBA, including CBRN protection. For some threat environments, only one mode may be appropriate for the exposure conditions (e.g., use of a SCBA/PAPR only in SCBA mode when Immediately Dangerous to Life and Health (IDLH) conditions exist). The capability of operation in alternative modes does not lessen the individual protection requirements in each mode.</p>	47, 49, 58, 59, 60, 104, 107

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AR - Respiratory Protection Equipment</b>				
<b>06 - Disposable Respirator</b>				
01AR-06-DISP*	Respirator, Particulate, Disposable	Respirator certified by NIOSH under 42 CFR 84 and classified as one of nine types of filtering-facepiece disposable particulate respirators (N95, N99, N100; R95, R99, R100; P95, P99, P100).	<p>Manufactured in a variety of shapes and sizes. Classifications are as follows:</p> <p>Prefix: N=Not Resistant to Oil, R=Somewhat Resistant to Oil, P=Strongly Resistant to Oil.</p> <p>Rating: 95 = Filters at least 95% of airborne particles. 99 = Filters at least 99% of airborne particles. 100 = Filters at least 99.97% of airborne particles.</p> <p>----- These respirators are considered “tight-fitting” and therefore fit testing is required under 29 CFR 1910.134.</p> <p>Particulate respirators are known as air-purifying respirators because they protect by filtering particles out of the air as you breathe. These respirators protect only against particles, not gases or vapors. Therefore, they are not effective for use in chemical, firefighting or fire escape applications. These respirators are not suitable for use in IDLH or oxygen-deficient environments. However, since respirable dusts and airborne biological agents such as bacteria or viruses are particles, they can be filtered by particulate respirators.</p> <p>Respirator type should be chosen based upon the anticipated hazard and wearer activity. For example, “N” respirators would be well suited for the medical/airborne pathogen environment, while “P” respirators would be more applicable for industrial settings where aerosolized oils are present.</p>	47, 49, 56
<b>AR - Respiratory Protection Equipment</b>				
<b>07 - Support Equipment</b>				
01AR-07-FTST		A device used for performing fit testing of respirator		49

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AR - Respiratory Protection Equipment</b>				
<b>07 - Support Equipment - Continued</b>				
Tester, Mask Leak/Fit		facepieces to determine quality of face to mask seal.	the substance can be detected once the respirator is donned. Quantitative fit testing devices can use one of two methodologies: the negative pressure device measures the infiltration of air into a facepiece; particulate or ambient aerosol devices use the measurement of particulate or ambient aerosol leakage inside the wearer's breathing zone for determining the protection factor provided by the specific mask on the individual being tested. A protection factor is the ratio of contaminant concentration in the outside environment to contaminant concentration in the breathing zone. ----- The selected mask leak/fit tester should accommodate the types of respirator facemasks used. The tester should be used by a trained individual.	
01AR-07-QUAL*		A system for testing the quality of compressed breathing air used to fill cylinders for air-supplying respirators or self-contained underwater breathing apparatus (SCUBA).	Fit testing should be in accordance with OSHA Title 29 Code of Federal Regulations Part 1910.134.	49, 77, 115
System, Compressed Breathing Air Quality Testing			The system may be fixed equipment, sampling equipment, or kits that measure the quality of compressed breathing air used for filling cylinders. Air quality measurements include the proportions of nitrogen, oxygen, carbon dioxide and argon, as well as contaminants such as particulates and hydrocarbons. ----- The system must allow the determination of the air quality in accordance with the requirements of OSHA 29 CFR 1910.134. Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, or higher standards such NFPA 1989.	
<b>CB - NFPA 1994 CBRN Terrorism Protective Ensembles</b>				
<b>02 - NFPA 1994 Class 2 Ensembles</b>				
01CB-02-ENSM*		NFPA 1994 Class 2 Chemical/Biological Terrorism Protective Ensemble, Chemical/	Ensemble consists of full body one- or multi-piece suit, gloves, and footwear. The ensemble may be designed with the SCBA worn inside or outside the ensemble. The ensemble is designed to minimize the inward leakage of gases or vapors as demonstrated by a man- →	47, 48, 104, 118

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\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CB - NFPA 1994 CBRN Terrorism Protective Ensembles</b>			
<b>02 - NFPA 1994 Class 2 Ensembles - <i>Continued</i></b>			
Biological Protective, NFPA 1994 Class 2	Ensemble, including suit with attached gloves and footwear or booties with outer boots (certified as compliant with NFPA 1994). NFPA 1994 Class 2 certifications specify the suit, glove system, boots, and respiratory protection components by make/model -- using any component other than those specified invalidates the certification. This item should be purchased and used as a complete ensemble.	<p>in-simulant test where performance levels have been set at levels commensurate with protection in an IDLH (Immediately Dangerous to Life and Health) environment. Ensembles are further evaluated for integrity with respect to liquid penetration. Materials are tested for permeation resistance to selected chemical agents and toxic industrial chemicals at concentrations consistent with the same levels used for evaluating CBRN SCBA; materials are also tested for viral penetration resistance, and various physical properties to demonstrate adequate physical hazard resistance and durability for a single use. Ensembles are also tested for functionality.</p> <p>-----</p> <p>NOTE: As of August 17, 2006, NFPA 1994, Standard on Protective Ensembles for Chem/Bio Terrorism Incidents, 2001 Edition, has been superseded by NFPA 1994, Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents, 2007 Edition.</p> <p>The 2007 edition of NFPA 1994 realigns Class 2 and Class 3 ensembles. Significant changes were made to Class 2 ensemble requirements in the 2007 edition; ensembles certified to the 2001 edition may not comply with the 2007 edition. As of August 17, 2006, no new certifications are permitted to the 2001 edition of NFPA 1994. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1994 (2001 Edition) will be permitted through February 28, 2007.</p> <p>Class 2 ensembles are intended for circumstances where the agent or threat may be identified, when the actual release has subsided, or in an area where live victims may be rescued. Conditions of exposure include possible contact with residual vapor or gas and highly contaminated surfaces at the emergency scene. Most victims in the response area are alive and show signs of movement, but are non-ambulatory. For Class 2 ensembles, breathing air from the SCBA may still limit wearing time. However, Class 2 ensembles may also currently be configured with NIOSH-certified CBRN air purifying or powered air-purifying respirators that provide longer duration response time. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, 2002 Edition.</p>	

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\* Item has been moved or changed in the edition.

Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CB - NFPA 1994 CBRN Terrorism Protective Ensembles</b>			
<b>02 - NFPA 1994 Class 2 Ensembles - Continued</b>			
01CB-02-TRST	Training suit based on similar design, but different materials than Item 01CB-02-ENSM.	Encapsulating or non-encapsulating suit that is constructed in similar manner as NFPA 1994, Class 2 ensemble. Suit uses different materials but similar design. Suits will not have same level of integrity or material performance as NFPA 1994, Class 2 ensemble.	
Suit, Training		----- Training suits must never be used in actual operations, and must be clearly marked by the user organization to prevent their misuse.	
<b>CB - NFPA 1994 CBRN Terrorism Protective Ensembles</b>			
<b>03 - NFPA 1994 Class 3 Ensembles</b>			
01CB-03-ENSM*	NFPA 1994 Class 3 Chemical/Biological Terrorism Protective Ensemble, including suit or garment with attached or separate gloves and footwear or booties with outer boots (certified as compliant with NFPA 1994). NFPA 1994 Class 3 certifications specify the garment, glove system, boots, and respiratory protection components by make/model -- using any component other than those specified invalidates the certification. This item should be purchased and used as a complete	Ensemble consists of full body one- or multi-piece suit, gloves, and footwear. The ensemble may be designed for use with SCBA or APR, though APR is consistent with the use of this ensemble. The ensemble is designed for protection against lower exposure levels of gases, vapors, liquids, and particulates (as compared to 1994 Class 2 ensembles). The same man-in-simulant test described for Class 2 ensembles is used to measure the inward leakage of gases or vapors, but lower criteria are set for consistency with exposure levels below IDLH (Immediately Dangerous to Life and Health) levels. Ensembles are evaluated for liquid integrity, but at shorter times compared to Class 2 ensembles. Materials are tested for permeation resistance to selected chemical agents and toxic industrial chemicals at concentrations consistent with the same levels used for evaluating CBRN APR; materials are also tested for viral penetration resistance, and various physical properties to demonstrate adequate physical hazard resistance and durability for a single use. Ensembles are also tested for functionality.	47, 48, 104, 118
Ensemble, Chemical/Biological Protective, NFPA 1994 Class 3		NOTE: As of August 17, 2006, NFPA 1994, Standard on Protective Ensembles for Chem/Bio Terrorism Incidents, 2001 Edition, has been superseded by NFPA 1994, Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents, 2007 Edition. The new 2007 edition of NFPA 1994 realigns Class 2 and Class 3 ensembles. As of August 17, 2006, no new certifications are permitted to the 2001 edition of NFPA 1994. Certifications may now be issued using the new edition. Sale of products with labels indicating →	

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
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<b>CB - NFPA 1994 CBRN Terrorism Protective Ensembles</b>			
03 - NFPA 1994 Class 3 Ensembles - <i>Continued</i>			

	ensemble.	certification to NFPA 1994 (2001 Edition) will be permitted though February 28, 2007.	
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	Class 3 ensembles are intended for use long after the release has occurred, at relatively large distances from the point of release, or in the peripheral zone of the release scene for such functions as decontamination, patient care, crowd control, perimeter control, traffic control, and clean-up. Class 3 ensembles should only be used when there is very little potential for vapor or gas exposure, when exposure to liquids is expected to be incidental through contact with contaminated surfaces, and when dealing with patients or self-evacuating victims. Class 3 ensembles must cover the individual and it is preferred that this clothing also cover the wearer's respirator to limit its potential for contamination. Because these ensembles are intended for longer wearing periods, the use of NIOSH-approved CBRN air-purifying or powered air-purifying respirators with these suits is likely. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, 2002 Edition.
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01CB-03-TRST	Training suit based on similar design, but different materials than Item 01CB-03-ENSM.	Non-encapsulating suit that is constructed in a manner similar to a NFPA 1994, Class 3 suit. Suit uses different materials but similar design. Suits will not have same level of integrity or material performance as NFPA 1994, Class 3 ensemble.	
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Suit, Training		Training suits must never be used in actual operations, and must be clearly marked by the user organization to prevent their misuse.	
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<b>CB - NFPA 1994 CBRN Terrorism Protective Ensembles</b>			
04 - NFPA 1994 Class 4 Ensembles			

01CB-04-ENSM*	NFPA 1994 Class 4 CBRN Particulate Protective Ensemble, including suit with gloves and footwear or booties	Ensemble consists of full body one- or multi-piece garment, gloves, and footwear. The ensemble may be designed for use with SCBA or APR, though APR is consistent with the use of this ensemble. The ensemble is designed to minimize the inward leakage of biological or radiological particulates only by use of a particle-tight integrity test. The suit and component parts do not offer protection from gases, vapors, or aerosols. Limited liquid →	46, 47, 48, 104, 118
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Ensemble, CBRN Particulate Protective, NFPA 1994 Class 4			
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Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<p><b>CB - NFPA 1994 CBRN Terrorism Protective Ensembles</b>                      04 - NFPA 1994 Class 4 Ensembles - <i>Continued</i></p>	<p>with outer boots (certified as compliant with NFPA 1994). Other separate items, such as CBRN APR, are required.</p>	<p>protection is offered, primarily to enable wet decontamination. Materials are tested for viral penetration resistance and various physical properties to ensure adequate single use durability and resistance to physical hazards. Ensembles are tested for functionality.</p> <p>-----                      NOTE: As of August 17, 2006, NFPA 1994, Standard on Protective Ensembles for Chem/Bio Terrorism Incidents, 2001 Edition, has been superseded by NFPA 1994, Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents, 2007 Edition. The new 2007 edition of NFPA 1994 realigns Class 2 and Class 3 ensembles, and establishes new requirements for Class 4 ensembles.</p>	
<p><b>EM - NFPA 1999 Protective Clothing (Emergency Medical Services)</b>                      01 - Items</p> <p>01EM-01-EYEP                      Eye/Face Protection Devices, Emergency Medical, NFPA 1999</p>	<p>Class 4 ensembles are intended for use in situations only involving biological or radiological particulates, where there is no threat for exposure to chemical warfare agents or toxic industrial chemicals. While Class 4 ensemble materials are evaluated for viral penetration resistance for protection against airborne pathogens (OSHA Title 29 CFR 1910.1030), Class 4 ensembles should only be used when there is very little potential for liquid exposure. Class 4 ensembles must cover the individual; however, the respirator certified with the ensemble may cover the face of the wearer. Because these ensembles are intended for longer wearing periods, the use of air-purifying respirators with these suits is likely. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, 2002 Edition.</p>	<p>Eye and face protection devices can include splash-resistant eyewear such as faceshields or goggles, hooded visors, and masks. Only a few requirements exist for emergency medical face protection devices. These include permitting the wearer to pass a visual acuity test while wearing the device, passing a simulated spray test, and utilizing materials that do not allow viral penetration. →</p>	<p>46, 48,                      104, 105,                      119</p>

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.  
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## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## EM - NFPA 1999 Protective Clothing (Emergency Medical Services)

## 01 - Items - Continued

		<p>The selected eye and face protection device should provide protection to the face from direct impingement of blood or body fluids, or subsequent runoff. A combination of eye and face protection devices may be used to meet this level of protection. Eye and face protection devices are not respirators and will not protect against airborne pathogens. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030; NFPA 1500, Standard on Fire Department Occupational Safety and Health Program; and NFPA 1581, Standard on Fire Department Infection Control Program.</p>	46, 48, 104, 105, 119
01EM-01-FTWC Footwear Covers, Emergency Medical, NFPA 1999	Emergency medical protective footwear covers (certified as compliant with NFPA 1999).	<p>Footwear covers are rubber, textile, or plastic-based materials that are shaped into a cover that can be worn over boots. Footwear covers are intended to provide additional protection from contamination and, consequently, are disposable after use. Footwear covers compliant with NFPA 1999 meet all barrier requirements of NFPA 1999-compliant footwear, but rely on physical protection from inner footwear (such as impact and puncture protection).</p> <p>Footwear covers should not interfere with ensemble wearing. The wear surface of the footwear cover should provide some level of traction to prevent slipping. The footwear cover design should not allow penetration of liquids through the top of the cover. Consequently, the footwear cover should be worn on the ensemble in a fashion that will prevent any liquid entry at the top. NFPA 1999-compliant footwear covers may not protect against airborne pathogens. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030; NFPA 1500, Standard on Fire Department Occupational Safety and Health Program; and NFPA 1581, Standard on Fire Department Infection Control Program.</p>	46, 48, 104, 105, 119
01EM-01-FTWR* Footwear, Emergency Medical, NFPA 1999	Emergency medical protective footwear (certified as compliant with NFPA 1999).	<p>NFPA 1999 footwear is likely to be leather footwear that incorporates a barrier as part of the lining system. The barrier layer must provide protection against bloodborne pathogens as demonstrated through a viral penetration resistance test. Footwear must be a minimum of 4 inches high (covering the ankle) and must have minimal toe impact protection and other physical protection features including cut and puncture resistance. →</p>	46, 48, 104, 105, 119

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>EM - NFPA 1999 Protective Clothing (Emergency Medical Services)</b>				
<i>01 - Items - Continued</i>				
01EM-01-GARM*	Emergency medical protective garment (certified as compliant with NFPA 1999).	<p>-----</p> <p>NFPA 1999 footwear should be used whenever the potential for blood or body fluid contact exists. The interface between the footwear and the bottom of the pants or coverall should provide resistance to inward leakage of liquids. NFPA 1999-compliant footwear may not protect against airborne pathogens. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030; NFPA 1500, Standard on Fire Department Occupational Safety and Health Program; and NFPA 1581, Standard on Fire Department Infection Control Program.</p> <p>Under NFPA 1999, garments may be either full body outfits such as coveralls or jacket/pants combinations, or partial body clothing such as smocks, aprons, or sleeve protectors. In either case, the area of the body covered by the garment must afford complete barrier protection. For example, a garment with barrier panels built into the front of the garment, but with non-barrier materials in the back, would be considered unacceptable per NFPA 1999. The standard stipulates that the garments may be either single-use or reusable; however, single-use garments must be labeled “For Single Use Only.” The barrier layer must provide protection against bloodborne pathogens as demonstrated through a viral penetration resistance test. The overall garment composite must also be breathable for improved wearer comfort.</p> <p>-----</p> <p>NFPA 1999 garments should be used whenever the potential for blood or body fluid contact exists. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030; NFPA 1500, Standard on Fire Department Occupational Safety and Health Program; and NFPA 1581, Standard on Fire Department Infection Control Program.</p>	46, 48, 104, 105, 119	
01EM-01-GLCL*	Emergency medical cleaning gloves (certified as compliant with NFPA 1999).	<p>-----</p> <p>Cleaning gloves are relatively thick rubber gloves intended to protect responders' hands from potentially contaminated blood and body fluids with a relatively higher level of physical protection compared to standard examination gloves used in most emergency medical operations. Cleaning gloves must also resist permeation from common disinfectants. →</p>	46, 48, 104, 105, 119	

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## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## EM - NFPA 1999 Protective Clothing (Emergency Medical Services)

## 01 - Items - Continued

NFPA 1999		<p>Cleaning gloves are likely to be constructed of natural rubber, nitrile rubber, or Neoprene. Glove length, cuff design, and grip finishes will vary with different manufacturer products.</p> <p>-----</p> <p>Cleaning gloves should not be lined as the linings may absorb hazardous liquids. Cleaning gloves will not provide protection against all “sharps” or other physical hazards commonly encountered in cleaning following an emergency medical operation. Some wearers may be subject to natural rubber latex allergies and should use synthetic gloves instead. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030; NFPA 1500, Standard on Fire Department Occupational Safety and Health Program; and NFPA 1581, Standard on Fire Department Infection Control Program.</p>	46, 48, 104, 105, 119
01EM-01-GLME* Gloves, Emergency Medical, Examination, NFPA 1999	Emergency medical examination gloves (certified as compliant with NFPA 1999).	<p>NFPA 1999-compliant gloves are standard medical examination gloves that have met specific design and performance criteria established in NFPA 1999. Many standard medical examination gloves fail to meet the more rigorous barrier and physical strength criteria established in NFPA 1999. Most gloves are constructed from natural rubber or nitrile rubber, although some additional polymers are available. These gloves are designed to provide intimate fit on the hand and allow fine dexterity and a high degree of tactility.</p> <p>-----</p> <p>NFPA 1999 gloves should be used in all emergency medical operations unless response conditions dictate the use of cleaning gloves, work gloves, or other gloves with additional protection. NFPA 1999 gloves should be selected that afford the highest degree of tactility while still affording adequate protection. Some wearers may be subject to natural rubber latex allergies and should use synthetic gloves instead. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030; NFPA 1500, Standard on Fire Department Occupational Safety and Health Program; and NFPA 1581, Standard on Fire Department Infection Control Program.</p>	46, 48, 104, 105, 119
01EM-01-GLMW*	Emergency medical work gloves (certified as	NFPA 1999-compliant work gloves combine a rugged shell (leather or synthetic fabric) with a lining that includes a barrier layer. The shell fabric provides resistance to physical →	46, 48, 104, 105,

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>EM - NFPA 1999 Protective Clothing (Emergency Medical Services)</b>			
<i>01 - Items - Continued</i>			
Gloves, Emergency Medical, Work, NFPA 1999	compliant with NFPA 1999).	<p>hazards such as cutting, punctures, and abrasion. The barrier layer provides resistance to penetration by bloodborne pathogens as demonstrated in a viral penetration resistance test.</p> <p>-----</p> <p>Work gloves trade off dexterity and tactility for ruggedness. NFPA 1999-compliant work gloves are intended for emergency medical operations involving significant physical hazards where a high level of dexterity and tactility are not needed. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030; NFPA 1500, Standard on Fire Department Occupational Safety and Health Program; and NFPA 1581, Standard on Fire Department Infection Control Program.</p>	119
<b>LE - Tactical Law Enforcement Protective Equipment</b>			
<i>01 - Ballistic Protection</i>			
01LE-01-ARMR* Armor, Body	<p>Personal body armor intended to protect the torso and extremities against small arms fire. This type of personal protective equipment is recommended for personnel entering into any zone for immediate tactical operations.</p>	<p>Protection up to .30 caliber/7.62mm threat rounds, to include armor piercing.</p> <p>-----</p> <p>100% protection from ballistic threats in all circumstances is impossible. Body armor selection is, to some extent, a tradeoff between ballistic protection and wearability. The selection of appropriate threat levels is important to ensure that wearers have an adequate level of ballistic threat protection for the environment in which they operate. The NIJ standard identifies protection classifications as Type I, IIA, II, IIIA, III and IV. These protection classifications cover threats from hand guns to rifles, including armor piercing rounds. Manufacturer instructions related to the care of the outer shell vest (carrier) must be followed.</p> <p>Note: NIJ intends to release a revised edition of this standard during Calendar Year 2007. Go to <a href="http://www.justnet.org">www.justnet.org</a> for further information.</p>	124, 125
01LE-01-HLMT Helmet, Ballistic	Ballistic helmet intended to protect the wearer against small arms fire and fragmentation threats	Ballistic helmets covered in this standard are classified into three levels of protective performance. Consider ability to attach visors and/or neck protection. Should accommodate full face respirator or SCBA facepieces, night vision devices, and communications equipment. →	126, 127

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
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LE - Tactical Law Enforcement Protective Equipment			
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01 - Ballistic Protection - Continued			
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	during tactical operations.	----- Helmets should be inspected for dents, cracks, crazing, chipped or sharp corners, and other evidence of inferior workmanship before and after use.  Requirements for face shields are not included in NIJ Standard 0106.01. Riot helmets and face shield performance requirements are covered in NIJ Standard 0104.02.	
01LE-01-SHLD Shield, Ballistic	Ballistic shield intended to protect personnel against small arms fire and fragmentation threats while conducting tactical operations.	Ballistic performance to threat level III-A. Ambidextrous handle.	128

LE - Tactical Law Enforcement Protective Equipment			
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02 - Other Items			
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01LE-02-BDUS* Specialized Clothing, NFPA 1975 or NFPA 2112	Battle dress uniforms (BDUs), coveralls and jumpsuits that are worn during tactical operations and are constructed of fabrics that will not contribute to injuries in the event of exposure to heat, spark, or flash fire. Certified as compliant with NFPA 1975 or NFPA 2112.	Constructed of flame-resistant fabric or 100% cotton. ----- Station/work uniforms are NOT protective garments or primary protective garments. Station/work garments serve as normal duty/task clothing for personnel that may, in the course of their duties, be exposed to heat, spark or fire and experience thermal injuries. Personal protective equipment (PPE), selected to protect users from the specific hazards associated with a given incident may be worn in conjunction with station/work uniforms. For example, structural firefighting gear and chemical protective clothing are often worn over station/work uniforms. Even though NFPA 2112 is not intended for emergency response applications, garments certified to this standard are suitable as flame-resistant garments because they are tested to criteria that meet or exceed the flame-resistant garment option requirements in NFPA 1975.	111, 120, 121
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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>LE - Tactical Law Enforcement Protective Equipment</b>			
<i>02 - Other Items - Continued</i>			
01LE-02-BOOT Boots, Protective, Tactical/Climbing	Boots for tactical operations.	----- Boots should be selected to meet mission and special considerations such as weather, terrain, etc.	
01LE-02-PRPD Padding, Protective, Tactical	General protective pads to provide protection for elbows, knees, neck, and shins while conducting tactical law enforcement operations.		
<b>PC - NFPA 1971 Ensembles (Proximity Fire Fighting with Optional CBRN Protection)</b>			
01 - NFPA 1971 CBRN Ensemble	Proximity fire fighting protective ensemble with optional CBRN protection (certified as compliant with NFPA 1971).	Proximity fire fighting protective ensembles are designed with reflective materials and other material properties to offer higher levels of radiant heat protection than found in structural fire fighting protective ensemble. The CBRN protection option applies only to ensembles where the manufacturer has specified garments, gloves, footwear, and a hood together with a specific CBRN-approved SCBA as part of an overall protective system. The helmet may also be specified when it is necessary to demonstrate the overall protection of the ensemble. These ensembles are designed with interface areas or devices to provide overall protection of the wearer against CBRN agents until specific conditions (see Operating Considerations below).	48, 104, 110
01PC-01-ENSM* Ensemble, Protective, Proximity Fire Fighting with Optional CBRN Protection, NFPA 1971		----- NOTE: The 2007 edition of NFPA 1971 became effective on 17 August 2006 and supersedes NFPA 1976-2000. The CBRN option was introduced in the 2007 edition. The protection levels set in the NFPA 1971 CBRN option are based on the Class 2 requirements contained in NFPA 1994-2007. →	

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
PC - NFPA 1971 Ensembles (Proximity Fire Fighting with Optional CBRN Protection)	01 - NFPA 1971 CBRN Ensemble - <i>Continued</i>	<p>Proximity fire fighting is a specialized fire fighting operation that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing high levels of radiant, conductive, and convective heat. Specialized thermal protection is necessary for persons involved in such operations due to the scope of these operations and the proximity to the fire (although direct entry into flame is NOT made). These operations usually are exterior operations, but may be combined with interior operations. Proximity fire fighting is not structural fire fighting but may be combined with structural fire-fighting operations. Proximity fire fighting also is not entry fire fighting. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p> <p>The CBRN protection option is intended to provide firefighters with protection from CBRN agents that include chemical warfare agents, toxic industrial chemicals, biological agents, and radiological and nuclear particulates at IDLH conditions. Specific design and performance criteria are established in this standard to demonstrate limited protection against CBRN terrorism agents to permit fire fighters to escape and provide limited rescue while escaping the contaminated environment when encountering terrorism incidents. The criteria are not intended to provide for reentry of fire fighters into the contaminated environment. Radiological and nuclear protection is limited to the hazards associated with radiological particulates. This standard does not establish specific criteria for protection from ionizing radiation. Moreover, this standard does not establish criteria for protection from all chemical warfare agents, protection from all biological agents, protection from all weapons of mass destruction, or protection from all toxic industrial chemicals. The criteria in the CBRN protection option have been developed to permit this level of protection to remain in place over the service life of the ensemble, provided that the ensemble elements receive adequate care and maintenance. However, users are cautioned that exposure of ensembles to CBRN terrorism agents should require disposal, particularly if the effectiveness of decontamination cannot be assessed.</p>	

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>PF - NFPA 1971 Ensembles (Proximity Fire Fighting)</b>				
<b>01 - Required Elements</b>				
01PF-01-FTWR*	Footwear, Protective, Proximity Fire Fighting, NFPA 1971	Proximity fire fighting protective footwear (certified as compliant with NFPA 1971).	Proximity fire fighting protective footwear is similar to footwear used for structural fire fighting, except that the footwear materials are designed to offer higher levels of radiant heat protection.  ----- NOTE: As of August 17, 2006, NFPA 1976, Standard on Protective Clothing for Proximity Fire Fighting, 2000 Edition, has been canceled and replaced by NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition. Purchase of protective garments, helmet, gloves, footwear, and shrouds certified to the 2000 edition of NFPA 1976 was discontinued after 28 February 2007.  Proximity fire fighting is a specialized fire fighting operation that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing high levels of radiant, conductive, and convective heat. Specialized thermal protection is necessary for persons involved in such operations due to the scope of these operations and the proximity to the fire (although direct entry into flame is NOT made). These are usually exterior operations, but may be combined with interior operations. Proximity fire fighting is not structural fire fighting but may be combined with structural fire fighting operations. Proximity fire fighting also is not entry fire fighting. Structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. Footwear should be chosen to be compatible with selected garments such that a complete protective thermal and moisture envelope is provided for the firefighter. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.	48, 104, 110
01PF-01-GARM*	Garment, Protective, Proximity Fire Fighting, NFPA 1971	Proximity fire fighting protective garment (certified as compliant with NFPA 1971).	Proximity fire fighting protective garments are similar to garments used for structural fire fighting, except that the garment materials are designed to offer higher levels of radiant heat protection. This is accomplished by the use of an aluminized fabric outer shell in place of the conventional textile-based outer shells used for structural fire fighting protective clothing. The aluminized outer shell is evaluated for a number of properties to demonstrate →	48, 104, 110

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## Section 1 | Personal Protective Equipment

Standards<sup>1</sup>

## Features/Operating Considerations

## PF - NFPA 1971 Ensembles (Proximity Fire Fighting)

01 - Required Elements - *Continued*

Item Number/Title	Description	Features/Operating Considerations
01PF-01-GLOV*	Proximity fire fighting protective gloves (certified as compliant with NFPA 1971).	<p>high heat resistance and durability of the reflective surface. Proximity fire fighting protective clothing also does not incorporate trim and other non-reflective materials on the shell outer surface.</p> <p>-----</p> <p>NOTE: As of August 17, 2006, NFPA 1976, Standard on Protective Clothing for Proximity Fire Fighting, 2000 Edition, has been canceled and replaced by NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition. Purchase of protective garments, helmet, gloves, footwear, and shrouds certified to the 2000 edition of NFPA 1976 was discontinued after 28 February 2007.</p> <p>Proximity fire fighting is a specialized fire fighting operation that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing high levels of radiant, conductive, and convective heat. Specialized thermal protection is necessary for persons involved in such operations due to the scope of these operations and the proximity to the fire (although direct entry into flame is NOT made). These are usually exterior operations, but may be combined with interior operations. Proximity fire fighting is not structural fire fighting but may be combined with structural fire fighting operations. Proximity fire fighting also is not entry fire fighting. Structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. The garments should be fit to the individual to provide complete protection in all wearer positions. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p> <p>Proximity fire fighting protective gloves are similar to gloves used for structural fire fighting, except that the materials are designed to offer higher levels of radiant heat protection. Gloves are required to have a highly reflective (aluminized) surface on the back of the hand. The palm is generally leather. Different glove designs are used to achieve this level of performance. Additional lining materials may be included for increased radiant heat insulation.</p> <p>-----&gt;</p>

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
PF - NFPA 1971 Ensembles (Proximity Fire Fighting) 01 - Required Elements - <i>Continued</i>				
01PF-01-HLMT*	Proximity fire fighting protective helmet (certified as compliant with NFPA 1971).  Helmet, Protective, Proximity Fire Fighting, NFPA 1971		<p>NOTE: As of August 17, 2006, NFPA 1976, Standard on Protective Clothing for Proximity Fire Fighting, 2000 Edition, has been canceled and replaced by NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition. Purchase of protective garments, helmet, gloves, footwear, and shrouds certified to the 2000 edition of NFPA 1976 was discontinued after 28 February 2007.</p> <p>Proximity fire fighting is a specialized fire fighting operation that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing high levels of radiant, conductive, and convective heat. Specialized thermal protection is necessary for persons involved in such operations due to the scope of these operations and the proximity to the fire (although direct entry into flame is NOT made). These are usually exterior operations, but may be combined with interior operations. Proximity fire fighting is not structural fire fighting but may be combined with structural fire fighting operations. Proximity fire fighting also is not entry fire fighting. Structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. The type of glove selected to be compatible with the coat sleeve. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	48, 104, 110

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## Section 1 | Personal Protective Equipment

Standards<sup>1</sup>

## Features/Operating Considerations

## PF - NFPA 1971 Ensembles (Proximity Fire Fighting)

01 - Required Elements - *Continued*

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
01PF-01-SHRD*	Shroud, Protective, Proximity Fire Fighting, NFPA 1971	Proximity fire fighting protective shroud (certified as compliant with NFPA 1971).	Proximity fire fighting is a specialized fire fighting operation that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing high levels of radiant, conductive, and convective heat. Specialized thermal protection is necessary for persons involved in such operations due to the scope of these operations and the proximity to the fire (although direct entry into flame is NOT made). These are usually exterior operations, but may be combined with interior operations. Proximity fire fighting is not structural fire fighting but may be combined with structural fire fighting operations. Proximity fire fighting also is not entry fire fighting. Structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. Helmets should be selected so that they are compatible with and fit together with selected SCBA facepieces, shrouds, and garments. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.
		A proximity protective fire fighting shroud is a protective interface component that extends from the helmet to provide protection to the face and neck area not protected by other items. The shroud features the same three-layer construction provided in the clothing to offer a similar level of radiant heat protection. ----- NOTE: As of August 17, 2006, NFPA 1976, Standard on Protective Clothing for Proximity Fire Fighting, 2000 Edition, has been canceled and replaced by NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition. Purchase of protective garments, helmet, gloves, footwear, and shrouds certified to the 2000 edition of NFPA 1976 was discontinued after 28 February 2007.	48, 104, 110
		Proximity fire fighting is a specialized fire fighting operation that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing high levels of radiant, conductive, and convective heat. Specialized thermal protection is necessary for persons involved in such operations due to the scope of these operations and the proximity to the fire (although direct entry into flame is NOT made). These are usually exterior operations, but may be combined with interior operations. Proximity fire fighting is not structural fire fighting but may be combined with structural fire fighting operations. Proximity fire fighting also is not entry fire fighting. Structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. Helmets should be selected so that they are compatible with and fit together with selected SCBA facepieces, shrouds, and garments. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.	

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>PF - NFPA 1971 Ensembles (Proximity Fire Fighting)</b> 01 - Required Elements - <i>Continued</i>		<p>operations and the proximity to the fire (although direct entry into flame is NOT made). These are usually exterior operations, but may be combined with interior operations. Proximity fire fighting is not structural fire fighting but may be combined with structural fire fighting operations. Proximity fire fighting also is not entry fire fighting. Structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. The shroud should be selected to be compatible with the helmet, coat and other elements of the proximity fire fighting protective ensemble. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	
	<b>PF - NFPA 1971 Ensembles (Proximity Fire Fighting)</b> 02 - Optional Elements	Protective radiant heat cover for SCBA.	<p>Some manufacturers of proximity protective clothing or SCBAs provide a protective cover to protect the SCBA from high levels of radiant heat. In general, aluminized fabrics are used as cover materials and configured for specific SCBAs. The aluminized fabric material should meet the same requirements as the garment outer shell specified in the proximity fire fighting requirements of NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition.</p> <p>-----            NOTE: While used in conjunction with NFPA 1971 proximity fire fighting ensembles, the protective radiant heat cover is not part of the 2007 Edition of NFPA 1971, and therefore cannot be certified to the standard.</p> <p>If used, the cover should be specific for the type of SCBA being worn.</p>
<b>SC - NFPA 1971 Ensembles (Structural Fire Fighting with Optional CBRN Protection)</b> 01 - NFPA 1971 CBRN Ensemble 01SC-01-ENSM*	Structural fire fighting protective ensemble with	<p>The CBRN protection option only applies to ensembles where the manufacturer has specified garments, gloves, footwear, and a hood together with a specific CBRN- →</p>	46, 48, 104, 106,

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## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## SC - NFPA 1971 Ensembles (Structural Fire Fighting with Optional CBRN Protection)

## 01 - NFPA 1971 CBRN Ensemble - Continued

Ensemble, Protective, Structural Fire Fighting with Optional CBRN Protection, NFPA 1971	optional CBRN protection (certified as compliant with NFPA 1971).	approved SCBA as part of an overall protective system. The helmet may also be specified when it is necessary to demonstrate the overall protection of the ensemble. These ensembles are designed with interface areas or devices to provide overall protection of the wearer against CBRN agents until specific conditions (see Operating Considerations below). ----- NOTE: This option was introduced into the 2007 edition of NFPA 1971, effective on 17 August 2006. The protection levels set in the NFPA 1971 CBRN option are based on the Class 2 requirements contained in NFPA 1994-2007.	110
		Structural fire fighting includes rescue, fire suppression, and property conservation in buildings, enclosed structures, vehicles, marine vessels, or like properties that are involved in a fire or emergency situation. The garments should be fitted to the individual to provide complete protection in all wearer positions. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. Selection, use, and maintenance requirements are provided in NFPA 1851, Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles.	
		The CBRN protection option is intended to provide firefighters with protection from CBRN agents that include chemical warfare agents, toxic industrial chemicals, biological agents, and radiological and nuclear particulates at IDLH conditions. Specific design and performance criteria are established in this standard to demonstrate limited protection against CBRN terrorism agents to permit fire fighters to escape and provide limited rescue while escaping the contaminated environment when encountering terrorism incidents. The criteria are not intended to provide for reentry of fire fighters into the contaminated environment. Radiological and nuclear protection is limited to the hazards associated with radiological particulates. This standard does not establish specific criteria for protection from ionizing radiation. Moreover, this standard does not establish criteria for protection from all chemical warfare agents, protection from all biological agents, protection from →	

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SC - NFPA 1971 Ensembles (Structural Fire Fighting with Optional CBRN Protection)</b> 01 - NFPA 1971 CBRN Ensemble - <i>Continued</i>		<p>all weapons of mass destruction, or protection from all toxic industrial chemicals. The criteria in the CBRN protection option have been developed to permit this level of protection to remain in place over the service life of the ensemble, provided that the ensemble elements receive adequate care and maintenance. However, users are cautioned that exposure of ensembles to CBRN terrorism agents should require disposal, particularly if the effectiveness of decontamination cannot be assessed.</p>	
<b>SF - NFPA 1971 Ensembles (Structural Fire Fighting)</b> 01 - Required Ensemble Elements	Structural fire fighting protective footwear (certified as compliant with NFPA 1971).	<p>Footwear may be either rubber or leather. Rubber boots use a step-in design, while leather boots can be either step-in or have a gusset with lace or zipper closure option. Other important footwear features include the lining package, type of outer sole, and pull-on loops or tabs. Footwear must include a protective toe cap and puncture resistant plate in the sole. Footwear comes in varying heights, but must be at least 8 inches high when measured from the inside.</p> <p>-----</p> <p>NOTE: As of August 17, 2006, NFPA 1971, Standard on Protective Ensemble for Structural Fire Fighting, 2000 Edition, has been superseded by NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition. The new 2007 edition of NFPA 1971 includes optional protection from CBRN hazards, but only complete structural fire fighting ensembles or proximity fire fighting ensembles can be certified as compliant with these optional requirements. As of August 17, 2006, no new certifications are permitted to any options of NFPA 1976 or any previous editions of NFPA 1971. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1976 or NFPA 1971, 2000 Editions were permitted through February 28, 2007.</p>	46, 48, 104, 106, 110
		<p>Structural fire fighting includes rescue, fire suppression, and property conservation in buildings, enclosed structures, vehicles, marine vessels, or like properties that are →</p>	

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
SF - NFPA 1971 Ensembles (Structural Fire Fighting) 01 - Required Ensemble Elements - <i>Continued</i>				
01SF-01-GARM*	Structural fire fighting protective garment (certified as compliant with NFPA 1971).		involved in a fire or emergency situation. While the primary intent of structural fire fighting protective clothing is to protect against high heat and incidental flame contact while providing adequate thermal insulation in a range of fireground conditions, structural fire fighting protective clothing is also designed to protect against some hazardous liquids, including blood and body fluids, and physical hazards. Nevertheless, structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. Footwear should be chosen to be compatible with selected garments such that a complete protective thermal and moisture envelope is provided for the firefighter. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. Selection, use, and maintenance requirements are provided in NFPA 1851, Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles.	46, 48, 104, 106, 110

involved in a fire or emergency situation. While the primary intent of structural fire fighting protective clothing is to protect against high heat and incidental flame contact while providing adequate thermal insulation in a range of fireground conditions, structural fire fighting protective clothing is also designed to protect against some hazardous liquids, including blood and body fluids, and physical hazards. Nevertheless, structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. Footwear should be chosen to be compatible with selected garments such that a complete protective thermal and moisture envelope is provided for the firefighter. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. Selection, use, and maintenance requirements are provided in NFPA 1851, Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles.

Garments are available in a number of different designs and materials. Garments are generally designed as a coat and pants. The coat may be of standard length with waist high pants, or short with longer bib-style pants. Pants often include suspenders. Different types of closures are used on the front of the coat and in the pants fly to provide overall liquid-tight integrity. Garments must include reflective trim for daytime and nighttime enhanced visibility. Garments are provided with a number of options in pocket placement, types of reinforcements, and other special features for improved wearing comfort and thermal insulation. The garment composite material consists of an outer shell, moisture barrier, and thermal barrier. The industry uses hundreds of combinations of these three layers to achieve different levels of thermal insulation as balanced against comfort and other performance properties.

NOTE: As of August 17, 2006, NFPA 1971, Standard on Protective Ensemble for Structural Fire Fighting, 2000 Edition, has been superseded by NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition. The new 2007 edition of NFPA 1971 includes optional protection from →

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
SF - NFPA 1971 Ensembles (Structural Fire Fighting) 01 - Required Ensemble Elements - <i>Continued</i>		<p>CBRN hazards, but only complete structural fire fighting ensembles or proximity fire fighting ensembles can be certified as compliant with these optional requirements. As of August 17, 2006, no new certifications are permitted to any editions of NFPA 1976 or any previous editions of NFPA 1971. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1976 or NFPA 1971, 2000 Editions were permitted through February 28, 2007.</p> <p>Structural fire fighting includes rescue, fire suppression, and property conservation in buildings, enclosed structures, vehicles, marine vessels, or like properties that are involved in a fire or emergency situation. While the primary intent of structural fire fighting protective clothing is to protect against high heat and incidental flame contact while providing adequate thermal insulation in a range of fireground conditions, structural fire fighting protective clothing is also designed to protect against some hazardous liquids, including blood and body fluids, and physical hazards. Nevertheless, structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. The garments should be fitted to the individual to provide complete protection in all wearer positions. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. Selection, use, and maintenance requirements are provided in NFPA 1851, Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles.</p>	46, 48, 104, 106, 110
01SF-01-GLOV*	Structural fire fighting protective gloves (certified as compliant with NFPA 1971).	<p>Gloves consist of a shell and lining. Most glove shells are heat and flame resistant leather, although some gloves use textile materials. The lining may be separate or an integrated moisture barrier and thermal barrier. Moisture barriers may be coated fabrics or laminates that offer some degree of breathability. Different construction methods are used to make gloves, including the way that the liner is inserted to stay within the glove. Gloves may have a gauntlet or a knit wristlet.</p> <p>----- NOTE: As of August 17, 2006, NFPA 1971, Standard on Protective Ensemble for →</p>	

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## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## SF - NFPA 1971 Ensembles (Structural Fire Fighting)

01 - Required Ensemble Elements - *Continued*

	<p>Structural Fire Fighting, 2000 Edition, has been superseded by NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition. The new 2007 edition of NFPA 1971 includes optional protection from CBRN hazards, but only complete structural fire fighting ensembles or proximity fire fighting ensembles can be certified as compliant with these optional requirements. As of August 17, 2006, no new certifications are permitted with these optional requirements. Sale of editions of NFPA 1971. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1976 or NFPA 1971, 2000 Editions were permitted through February 28, 2007.</p> <p>Structural fire fighting includes rescue, fire suppression, and property conservation in buildings, enclosed structures, vehicles, marine vessels, or like properties that are involved in a fire or emergency situation. While the primary intent of structural fire fighting protective clothing is to protect against high heat and incidental flame contact while providing adequate thermal insulation in a range of fireground conditions, structural fire fighting protective clothing is also designed to protect against some hazardous liquids, including blood and body fluids, and physical hazards. Nevertheless, structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. The type of glove cuff is affected by the wristlet construction used on the protective coat. Gloves should be selected to be compatible with the coat sleeve. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. Selection, use, and maintenance requirements are provided in NFPA 1851, Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles.</p>	
01SF-01-HLMT*	<p>Structural fire fighting protective helmet (certified as compliant with NFPA 1971).</p>	<p>Helmets are required to include the minimum components of a shell; an energy absorption system; a retention system; reflective trim; ear covers; and a face shield, goggles or both. The majority of performance requirements are applied to the complete helmet, including tests for impact/acceleration, physical penetration, heat resistance, flame resistance, electrical →</p>

46, 48,  
104, 106,  
110<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
SF - NFPA 1971 Ensembles (Structural Fire Fighting) 01 - Required Ensemble Elements - <i>Continued</i>	Fighting, NFPA 1971	<p>resistance, and retention/suspension system performance. Other requirements are applied to individual components, such as the textiles used in ear covers. Differences in helmets relate to the shell material, type of suspension (including the method of size adjustment) and use of an impact cap. Helmets are available in a range of weights and styling (including traditional and modern styles).</p> <p>-----</p> <p>NOTE: As of August 17, 2006, NFPA 1971, Standard on Protective Ensemble for Structural Fire Fighting, 2000 Edition, has been superseded by NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition. The new 2007 edition of NFPA 1971 includes optional protection from CBRN hazards, but only complete structural fire fighting ensembles or proximity fire fighting ensembles can be certified as compliant with these optional requirements. As of August 17, 2006, no new certifications are permitted to any editions of NFPA 1976 or any previous editions of NFPA 1971. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1976 or NFPA 1971, 2000 Editions were permitted through February 28, 2007.</p> <p>Structural fire fighting includes rescue, fire suppression, and property conservation in buildings, enclosed structures, vehicles, marine vessels, or like properties that are involved in a fire or emergency situation. While the primary intent of structural fire fighting protective clothing is to protect against high heat and incidental flame contact while providing adequate thermal insulation in a range of fireground conditions, structural fire fighting protective clothing is also designed to protect against some hazardous liquids, including blood and body fluids, and physical hazards. Nevertheless, structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. NFPA 1971 permits the use of goggles in place of or supplemental to the helmet faceshield. However, the type of goggles required by the standard must meet a number of requirements that go beyond the specific performance of primary eye protection in the ANSI Z87.1 standard. NFPA 1971 requires that in order for goggles to be part of the helmet, sample goggles →</p>	

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## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## SF - NFPA 1971 Ensembles (Structural Fire Fighting)

01 - Required Ensemble Elements - *Continued*

01SF-01-HOOD* Hood, Protective, Structural Fire Fighting, NFPA 1971	Structural fire fighting protective hood (certified as compliant with NFPA 1971).	must meet test requirements for oven heat resistance, impact resistance, flame resistance and scratch resistance. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. Selection, use, and maintenance requirements are provided in NFPA 1851, Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles.	46, 48, 104, 106, 110
		The hood is a knit, pull-over clothing interface item intended to protect the wearer's head, face, and neck in areas not protected by the helmet, coat collar, and SCBA facepiece. The hood is designed with a face opening to accommodate the SCBA facepiece and a bib such that the hood stays tucked under the coat collar when in use. Hoods may be made of different flame and heat resistant materials and may be in single or double layers. Some hoods include a ventilated layer at the top (underneath the helmet) which provides additional comfort for heat loss from the wearer.	
		NOTE: As of August 17, 2006, NFPA 1971, Standard on Protective Ensemble for Structural Fire Fighting, 2000 Edition, has been superseded by NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition. The new 2007 edition of NFPA 1971 includes optional protection from CBRN hazards, but only complete structural fire fighting ensembles or proximity fire fighting ensembles can be certified as compliant with these optional requirements. As of August 17, 2006, no new certifications are permitted to any editions of NFPA 1976 or any previous editions of NFPA 1971. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1976 or NFPA 1971, 2000 Editions were permitted through February 28, 2007.	
		Structural fire fighting includes rescue, fire suppression, and property conservation in buildings, enclosed structures, vehicles, marine vessels, or like properties that are involved in a fire or emergency situation. While the primary intent of structural fire fighting →	

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SF - NFPA 1971 Ensembles (Structural Fire Fighting)</b>				
01 - Required Ensemble Elements - <i>Continued</i>			protective clothing is to protect against high heat and incidental flame contact while providing adequate thermal insulation in a range of fireground conditions, structural fire fighting protective clothing is also designed to protect against some hazardous liquids, including blood and body fluids, and physical hazards. Nevertheless, structural fire fighting protective clothing does not protect against chemical agents or toxic industrial chemicals. The hood should be selected to be compatible with the coat and other elements of the structural fire fighting protective ensemble. Use considerations are provided in OSHA Title 29 CFR Sections 1910.132 and 1910.1030, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. Selection, use, and maintenance requirements are provided in NFPA 1851, Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles.	
<b>SP - NFPA 1992 Splash-Protective Ensembles and Items</b>				
01 - Liquid Splash-Protective Ensemble				
01SP-01-ENSE Ensemble, Liquid Splash-Protective, Encapsulating, NFPA 1992	Encapsulating liquid splash-protective ensemble (certified as compliant to NFPA 1992).		Liquid splash ensembles consist of a full-body garment, gloves, and footwear. The liquid splash-protective ensemble is either an encapsulating or non-encapsulating ensemble. Encapsulating ensembles enclose the wearer and his or her breathing apparatus; for non-encapsulating ensembles, the face area of the garment is open but the breathing apparatus covers the wearer's face. Both types of ensembles are evaluated with all components in place (garments, gloves, and footwear) for functionality and liquid-tight integrity. Different design features include the types of interfaces between gloves and footwear, and the type of closure. Liquid splash ensembles incorporate different materials for garments, gloves, and footwear. Some garment materials may be breathable, but still resist penetration by liquids.	47, 48, 104, 117
			----- NFPA 1992 does not address liquid splash protection against chemical warfare agents (CWA); it only addresses industrial chemicals. If CWA liquid splash protection is required, an NFPA 1994 Class 3 ensemble should be selected. An NFPA 1992 ensemble is appropriate for protecting decontamination personnel at an incident involving biological or radiological particulates as defined in the SEL Hazard-Role Matrix. →	

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SP - NFPA 1992 Splash-Protective Ensembles and Items</b>				
<b>01 - Liquid Splash-Protective Ensemble - Continued</b>				
			NFPA 1992 addresses the second tier of hazardous materials response protection. This standard establishes the requirements for chemical liquid splash protection where the chemical vapors that exist during a hazardous material response are no longer a hazard. The liquid splash-protective ensembles are intended for situations where the primary form of chemical exposure is short-term intermittent contact with liquid chemicals that do not produce skin-toxic or carcinogenic vapors. NFPA 1992 further permits the individual certification of garments, gloves, and footwear, which may not be part of an overall ensemble. The primary purpose of NFPA 1992 is to establish requirements for clothing that keeps liquids from contacting the wearer's skin. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.	47, 48, 104, 117

01SP-01-ENSN  
Ensemble, Liquid  
Splash-Protective,  
Non-Encapsulating,  
NFPA 1992

Non-encapsulating liquid splash-protective ensemble (certified as compliant to NFPA 1992).

Liquid splash ensembles consist of a full-body garment, gloves, and footwear. The liquid splash-protective ensemble is either an encapsulating or non-encapsulating ensemble. Encapsulating ensembles enclose the wearer and his or her breathing apparatus; for non-encapsulating ensembles, the face area of the garment is open but the breathing apparatus covers the wearer's face. Both types of ensembles are evaluated with all components in place (garments, gloves, and footwear) for functionality and liquid-tight integrity. Different design features include the types of interfaces between gloves and footwear, and the type of closure. Liquid splash ensembles incorporate different materials for garments, gloves, and footwear. Some garment materials may be breathable, but still resist penetration by liquids.

NFPA 1992 does not address liquid splash protection against chemical warfare agents (CWA); it only addresses industrial chemicals. If CWA liquid splash protection is required, an NFPA 1994 Class 3 ensemble should be selected. An NFPA 1992 ensemble is appropriate for protecting decontamination personnel at an incident involving biological or radiological particulates as defined in the SEL Hazard-Role Matrix.

NFPA 1992 addresses the second tier of hazardous materials response protection. This →

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SP - NFPA 1992 Splash-Protective Ensembles and Items</b>			
01 - Liquid Splash-Protective Ensemble - <i>Continued</i>		<p>standard establishes the requirements for chemical liquid splash protection where the chemical vapors that exist during a hazardous material response are no longer a hazard. The liquid splash-protective ensembles are intended for situations where the primary form of chemical exposure is short-term intermittent contact with liquid chemicals that do not produce skin-toxic or carcinogenic vapors. NFPA 1992 further permits the individual certification of garments, gloves, and footwear, which may not be part of an overall ensemble. The primary purpose of NFPA 1992 is to establish requirements for clothing that keeps liquids from contacting the wearer's skin. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	
<b>SP - NFPA 1992 Splash-Protective Ensembles and Items</b>			
02 - Liquid Splash-Protective Clothing	Liquid splash-protective footwear (certified as compliant to NFPA 1992).	<p>Footwear is an item of clothing or an element of the protective ensemble designed to provide required protection to the foot, ankle, and lower leg. Footwear includes boots or outer boots in conjunction with booties. Boots may use different rubber materials and may or may not include a liner. Footwear must be liquid-tight and provide physical hazard resistance against toe impact, cut, puncture, and abrasion. Soles must provide adequate traction.</p> <p>-----</p> <p>NFPA 1992 does not address liquid splash protection against chemical warfare agents (CWA); it only addresses industrial chemicals. If CWA liquid splash protection is required, an NFPA 1994 Class 3 ensemble should be selected. An NFPA 1992 ensemble is appropriate for protecting decontamination personnel at an incident involving biological or radiological particulates as defined in the SEL Hazard-Role Matrix.</p> <p>NFPA 1992 addresses the second tier of hazardous materials response protection. This standard establishes the requirements for chemical liquid splash protection where the chemical vapors that exist during a hazardous material response are no longer a hazard. The liquid splash-protective ensembles are intended for situations where the primary →</p>	47, 48, 104, 117

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## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## SP - NFPA 1992 Splash-Protective Ensembles and Items

02 - Liquid Splash-Protective Clothing - *Continued*

	<p>form of chemical exposure is short-term intermittent contact with liquid chemicals that do not produce skin-toxic or carcinogenic vapors. NFPA 1992 further permits the individual certification of garments, gloves, and footwear, which may not be part of an overall ensemble. The primary purpose of NFPA 1992 is to establish requirements for clothing that keeps liquids from contacting the wearer's skin. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>		
01SP-02-GLOV Gloves, Liquid Splash-Protective, NFPA 1992	<p>Liquid splash-protective gloves (certified as compliant to NFPA 1992).</p>	<p>Gloves are an element of the liquid splash-protective ensemble or an item of protective clothing designed to provide protection to the hands and wrists. Gloves are generally either supported or unsupported styles with different cuff design and grip finishes. Glove materials must demonstrate resistance to liquid chemical penetration, physical hazard resistance, and adequate hand function (dexterity).</p>	47, 48, 104, 117
	<p>NFPA 1992 does not address liquid splash protection against chemical warfare agents (CWA); it only addresses industrial chemicals. If CWA liquid splash protection is required, an NFPA 1994 Class 3 ensemble should be selected. An NFPA 1992 ensemble is appropriate for protecting decontamination personnel at an incident involving biological or radiological particulates as defined in the SEL Hazard-Role Matrix.</p> <p>NFPA 1992 addresses the second tier of hazardous materials response protection. This standard establishes the requirements for chemical liquid splash protection where the chemical vapors that exist during a hazardous material response are no longer a hazard. The liquid splash-protective ensembles are intended for situations where the primary form of chemical exposure is short-term intermittent contact with liquid chemicals that do not produce skin-toxic or carcinogenic vapors. NFPA 1992 further permits the individual certification of garments, gloves, and footwear, which may not be part of an overall ensemble. The primary purpose of NFPA 1992 is to establish requirements for clothing that keeps liquids from contacting the wearer's skin. Use considerations are provided in OSHA →</p>		

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SP - NFPA 1992 Splash-Protective Ensembles and Items</b> <b>02 - Liquid Splash-Protective Clothing - Continued</b>				
01SP-02-GRMT	Garment, Liquid Splash-Protective, NFPA 1992	Liquid splash-protective garment (certified as compliant to NFPA 1992).	<p>Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p> <p>A garment is an element of the liquid splash-protective ensemble or an item of protective clothing designed to provide protection to the upper and lower torso, arms and legs (excluding the head, hands, and feet when garment hoods, gloves, and footwear are not provided). Garments include one or multi-piece splash suits, coveralls, and encapsulating suits. NFPA 1992 further permits both full body and partial body garments. Different design features include the types of interfaces between gloves and footwear, and the type of closure. Liquid splash ensembles incorporate different materials which may be coated or special laminates. Some garment materials may be breathable, but still resist penetration by liquids.</p> <p>-----</p> <p>NFPA 1992 does not address liquid splash protection against chemical warfare agents (CWA); it only addresses industrial chemicals. If CWA liquid splash protection is required, an NFPA 1994 Class 3 ensemble should be selected. An NFPA 1992 ensemble is appropriate for protecting decontamination personnel at an incident involving biological or radiological particulates as defined in the SEL Hazard-Role Matrix.</p> <p>NFPA 1992 addresses the second tier of hazardous materials response protection. This standard establishes the requirements for chemical liquid splash protection where the chemical vapors that exist during a hazardous material response are no longer a hazard. The liquid splash-protective ensembles are intended for situations where the primary form of chemical exposure is short-term intermittent contact with liquid chemicals that do not produce skin-toxic or carcinogenic vapors. NFPA 1992 further permits the individual certification of garments, gloves, and footwear, which may not be part of an overall ensemble. The primary purpose of NFPA 1992 is to establish requirements for clothing that keeps liquids from contacting the wearer's skin. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	47, 48, 104, 117

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
UC - NFPA 1951 CBRN Technical Rescue Protective Ensemble 01 - Ensemble			

01UC-01-ENSM* Ensemble, CBRN Protective, Technical Rescue Incidents, NFPA 1951	CBRN technical rescue incident protective ensemble (certified as compliant with NFPA 1951).	CBRN protective ensembles for technical rescue incidents consist of garments, gloves, footwear, hoods, and helmets, as appropriate, combined with either a CBRN Air-Purifying Respirator (APR) or CBRN Powered Air-Purifying Respirator (PAPR). The individual elements of the ensembles, including garments, gloves, footwear, and helmets must meet the design and performance criteria for rescue and recovery ensembles. In addition, these elements are evaluated for permeation resistance against chemical warfare agents and toxic industrial chemicals, and viral penetration resistance for bloodborne pathogens. Specific performance levels are consistent with Class 3 requirements established in NFPA 1994 for operations at levels that are lower than immediately dangerous to life and health (IDLH). The ensemble must incorporate special interfaces between key elements. The overall ensemble is subjected to a full integrity test to evaluate resistance to vapor penetration. Only completely specified ensembles can be certified under this option of NFPA 1951.	48, 104, 109
<p>NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as an integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007.</p>			
<p>This equipment is not for use in firefighting situations.</p>			
<p>NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer →</p>			

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>UC - NFPA 1951 CBRN Technical Rescue Protective Ensemble</b> 01 - Ensemble - <i>Continued</i>		<p>limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.</p> <p>The CBRN protective ensemble requirements are based on the Class 3 requirements established in NFPA 1994-2007. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	
<b>UR - NFPA 1951 Rescue and Recovery Technical Rescue Protective Ensemble</b> 01 - Ensemble Elements	Rescue and recovery protective ensemble goggles (certified as compliant with NFPA 1951).	<p>Technical rescue utility goggles in NFPA 1951 are goggles that meet the requirements of ANSI Z87.1, American National Standard for Occupational and Educational Eye Protection, as well as additional heat and flame resistance requirements provided in NFPA 1951. Goggles must be one of five specified types - cover or cup goggles with and without ventilation. Ventilated goggles may offer either direct or indirect ventilation. The ventilation feature is intended to prevent fogging, but may allow particulate and other substances to enter inside the goggles. Straps are generally adjustable to fit different head sizes. Other types of devices that protect the eye may also be used if all of the requirements of NFPA 1951 are met. Rescue and recovery protective ensemble goggles have design and performance criteria identical to utility protective ensemble goggles.</p> <p>-----            NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as an integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007. →</p>	48, 104, 109

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
UR - NFPA 1951 Rescue and Recovery Technical Rescue Protective Ensemble 01 - Ensemble Elements - <i>Continued</i>		<p>This equipment is not for use in firefighting situations.</p> <p>NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.</p> <p>Goggles are principally used in environments where primary eye protection is needed, including but not limited to those where flying debris and particulates may exist. Goggles are not needed if primary eye protection is provided by the full facepiece of a respirator. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	48, 104, 109

## UR - NFPA 1951 Rescue and Recovery Technical Rescue Protective Ensemble

01 - Ensemble Elements - *Continued*

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
01UR-01-FTWR*	Rescue and recovery protective ensemble footwear (certified as compliant with NFPA 1951).	<p>This equipment is not for use in firefighting situations.</p> <p>NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.</p> <p>Goggles are principally used in environments where primary eye protection is needed, including but not limited to those where flying debris and particulates may exist. Goggles are not needed if primary eye protection is provided by the full facepiece of a respirator. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	48, 104, 109
Footwear, Rescue and Recovery, Protective, Technical Rescue Incidents, NFPA 1951		<p>Footwear varies in the type of upper, lining, and sole materials. Footwear may be step-in or use a combination of zippers, eyelets, and stud hooks with laces. Footwear complying with NFPA 1951 must incorporate a barrier material to prevent the inward leakage of liquids, such as emergency scene chemicals and blood or body fluids. Footwear materials must resist puncture, cut, and abrasion physical hazards. Overall footwear must provide thermal insulation from flash fire, toe impact protection, sole puncture and abrasion protection, and overall traction. Rescue and recovery protective ensemble footwear has design and performance criteria identical to utility protective ensemble footwear.</p> <p>-----</p> <p>NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as a →</p>	

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## Section 1 | Personal Protective Equipment

UR - NFPA 1951 Rescue and Recovery Technical Rescue Protective Ensemble		Standards <sup>1</sup>
Item Number/Title	Description	Features/Operating Considerations
01 - Ensemble Elements - <i>Continued</i>		
01UR-01-GARM*	Rescue and recovery protective ensemble garment (certified as compliant with NFPA 1951).	<p>integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007.</p> <p>This equipment is not for use in firefighting situations.</p> <p>NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.</p> <p>Footwear must be rugged and light weight for long-term wearing applications. Structural fire fighting footwear is typically too heavy for most operations covered by NFPA 1951. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p> <p>Garments must cover the entire body through the combination of a coat and pants, or overall. Garment design features will vary with the manufacturer, including the type of closure, reinforcements and pockets. Garment materials may be one or two layers. When two layers garments are used, the outer layer will typically be the shell that provide physical and thermal protection, while the lining material provides a barrier against emergency scene liquids and potentially infectious blood and body fluids. All fabrics must be flame and heat resistant in addition to being durable and resistant to physical hazards. The barrier portions of the garment must demonstrate penetration resistance to liquid →</p>

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 1 | Personal Protective Equipment

Standards<sup>1</sup>

## Features/Operating Considerations

## Item Number/Title Description

## UR - NFPA 1951 Rescue and Recovery Technical Rescue Protective Ensemble

01 - Ensemble Elements - *Continued*

chemical and bloodborne pathogens. The overall fabric system or composite must demonstrate adequate thermal insulation for protection against accidental flash fire. The overall composite must afford a high level of breathability for long-term wearing comfort. Full garments are evaluated for liquid integrity. The level of breathability is much higher for utility garments as compared to rescue and recovery protective ensemble garments.

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 NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as an integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007.

This equipment is not for use in firefighting situations.

NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.

Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
UR - NFPA 1951 Rescue and Recovery Technical Rescue Protective Ensemble 01 - Ensemble Elements - <i>Continued</i>	Rescue and recovery protective ensemble gloves (certified as compliant with NFPA 1951).	<p>NFPA 1951-compliant gloves have a rugged exterior and a liner that provides protection against liquids. The gloves are designed to protect against physical hazards, liquid chemicals and potentially infectious blood/body fluids, and flame and heat contact; however, the gloves offer only limited insulation against high heat sources. Gloves are evaluated for physical hazard resistance, flame and heat resistance, thermal insulation, and penetration resistance to liquid chemicals and bloodborne pathogens. Gloves may use a variety of different construction techniques and materials.</p> <p>-----</p> <p>NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as an integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007.</p> <p>This equipment is not for use in firefighting situations.</p> <p>NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.</p> <p>Gloves should be selected to provide a balance of physical, liquid, and heat protection versus hand function for dexterity, grip, and tactility. Use considerations are provided →</p>	48, 104, 109

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\* Item has been moved or changed in the edition.

Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

UR - NFPA 1951 Rescue and Recovery Technical Rescue Protective Ensemble  
01 - Ensemble Elements - *Continued*

	<p>in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	
<p>01UR-01-HLMT* Helmet, Rescue and Recovery, Protective, Technical Rescue Incidents, NFPA 1951</p>	<p>Rescue and recovery protective ensemble helmet (certified as compliant with NFPA 1951).</p>	<p>Helmets consist of a shell and a suspension system. Helmets may be either hat style with a full brim, or cap style with no brim. The suspension system uses both a chin strap and a nape device that fits to the back of the head. Helmets may use different shell materials and may or may not include padding. Helmets are evaluated for physical protection (impact and penetration), heat and flame protection, and electrical protection. Rescue and recovery protective ensemble helmets have design and performance criteria identical to utility protective ensemble helmets.</p> <p>-----</p> <p>NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as an integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007.</p> <p>This equipment is not for use in firefighting situations.</p> <p>NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings. →</p>

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
UR - NFPA 1951 Rescue and Recovery Technical Rescue Protective Ensemble 01 - Ensemble Elements - <i>Continued</i>		Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.	
UT - NFPA 1951 Utility Technical Rescue Protective Ensemble 01 - Ensemble Elements	Utility protective ensemble goggles (certified as compliant with NFPA 1951).  Goggles, Utility, Technical Rescue Incidents, NFPA 1951	Technical rescue utility goggles in NFPA 1951 are goggles that meet the requirements in ANSI Z87.1, American National Standard for Occupational and Educational Eye Protection, as well as additional heat and flame resistance requirements provided in NFPA 1951. Goggles must be one of five specified types - cover or cup goggles with and without ventilation. Ventilated goggles may offer direct or indirect ventilation. The ventilation feature is intended to prevent fogging, but may allow particulate and other substances to enter inside the goggles. Straps are generally adjustable to fit different head sizes. Other types of devices that protect the eye may also be used if all of the requirements of NFPA 1951 are met. Utility protective ensemble goggles have design and performance criteria identical to rescue and recovery protective ensemble goggles.	48, 104, 109

NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as an integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007.

This equipment is not for use in firefighting situations.

NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined →

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
01 - NFPA 1951 Utility Technical Rescue Protective Ensemble	UT - NFPA 1951 Utility Technical Rescue Protective Ensemble		
01 - Ensemble Elements - <i>Continued</i>			
01UT-01-FTWR*	Utility protective ensemble footwear (certified as compliant with NFPA 1951).	<p>space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.</p> <p>Goggles are principally used in environments where primary eye protection is needed, including but not limited to those where flying debris and particulates may exist. Goggles are not needed if primary eye protection is provided by the full facepiece of a respirator. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p> <p>Footwear varies in the type of upper, lining, and sole materials. Footwear may be step-in or use a combination of zippers, eyelets, and stud hooks with laces. Footwear complying with NFPA 1951 must incorporate a barrier material to prevent the inward leakage of liquids, such as emergency scene chemicals and blood or body fluids. Footwear materials must resist puncture, cut, and abrasion physical hazards. Overall footwear must provide thermal insulation from flash fire, toe impact protection, sole puncture and abrasion protection, and overall traction. Utility protective ensemble footwear have design and performance criteria identical to rescue and recovery protective ensemble footwear.</p> <p>-----            NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as an integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007. →</p>	48, 104, 109

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
01 - Ensemble Elements - <i>Continued</i>				
<b>UT - NFPA 1951 Utility Technical Rescue Protective Ensemble</b>				
01UT-01-GARM*	Garment, Utility, Protective, Technical Rescue Incidents, NFPA 1951	Utility protective ensemble garment (certified as compliant with NFPA 1951).	<p>This equipment is not for use in firefighting situations.</p> <p>NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.</p> <p>Footwear must be rugged and lightweight for long-term wearing applications. Structural fire fighting footwear is typically too heavy for most operations covered by NFPA 1951. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p> <p>Garments must cover the entire body through the combination of a coat and pants, or overall. Garment design features will vary with the manufacturer, including the type of closure, reinforcements and pockets. Garment materials may be one or two layers; however, utility garments will typically be one layer. All fabrics must be flame and heat resistant in addition to being durable and resistant to physical hazards. The overall fabric system or composite must demonstrate adequate thermal insulation for protection against accidental flash fire. The overall composite must afford a high level of breatheability for long-term wearing comfort. The level of breatheability is much higher for utility garments as compared to rescue and recovery protective ensemble garments.</p> <p>-----            NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as →</p>	48, 104, 109

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Standards<sup>1</sup>

## Features/Operating Considerations

## UT - NFPA 1951 Utility Technical Rescue Protective Ensemble

01 - Ensemble Elements - *Continued*

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
01UT-01-GLOV* Gloves, Utility, Protective, Technical Rescue Incidents, NFPA 1951	Utility protective ensemble gloves (certified as compliant with NFPA 1951).	<p>a integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007.</p> <p>This equipment is not for use in firefighting situations.</p> <p>NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.</p> <p>Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p> <p>NFPA 1951-compliant gloves have a rugged exterior and a liner that may or may not have a liner. The gloves are designed to protect against physical hazards, and flame and heat contact; however, the gloves offer only limited insulation against high heat sources. Gloves may use a variety of different construction techniques and materials.</p> <p>----- NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as a integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may →</p>	48, 104, 109

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
UT - NFPA 1951 Utility Technical Rescue Protective Ensemble 01 - Ensemble Elements - <i>Continued</i>			

now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007.

This equipment is not for use in firefighting situations.

NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.

Gloves should be selected to provide a balance of physical, liquid, and heat protection versus hand function for dexterity, grip, and tactility. Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.

01UT-01-HLMT\*  
 Helmet, Utility,  
 Protective,  
 Technical Rescue  
 Incidents, NFPA  
 1951

Helmets consist of a shell and a suspension system. Helmets may be either hat style with a full brim, or cap style with no brim. The suspension system uses both a chin strap and a nape device that fits to the back of the head. Helmets may use different shell materials and may or may not include padding. Helmets are evaluated for physical protection (impact and penetration), heat and flame protection, and electrical protection. Utility helmets have design and performance criteria identical to rescue and recovery protective ensemble helmets.

NOTE: The 2007 edition of NFPA 1951 became effective on December 20, 2006. This new edition contains two sets of ensemble elements (Utility Technical Rescue Protective Ensemble, and Rescue and Recovery Technical Rescue Protective Ensemble) as well as →

48, 104,  
 109

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
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<b>UT - NFPA 1951 Utility Technical Rescue Protective Ensemble</b>			
01 - Ensemble Elements - <i>Continued</i>			

	<p>a integrated CBRN Technical Rescue Protective Ensemble. As of December 20, 2006, no new certifications are permitted to the 2001 edition of NFPA 1951. Certifications may now be issued using the new edition. Sale of products with labels indicating certification to NFPA 1951 (2001 Edition) will be permitted through August 31, 2007.</p>		
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		<p>This equipment is not for use in firefighting situations.</p>	
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	<p>NFPA 1951 covers protective clothing and equipment used in urban technical rescue incidents that include victim search, rescue, body recovery, and site stabilization during operations, such as building/structural collapse, vehicle/person extrication, confined space entry, trench/cave-in rescue, and rope rescue. Three types of ensembles are specified: utility ensembles for operations where liquid hazards are not expected; rescue and recovery ensembles for operations involving liquid hazards; and CBRN ensembles that offer limited protection for first responders from vapor and liquid CBRN hazards. NFPA 1951 does not address personal protective equipment for wilderness or other non-urban settings.</p>		
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		<p>Use considerations are provided in OSHA Title 29 CFR Section 1910.132 and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	
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<b>VF - NFPA 1991 Ensembles with Optional Flash Fire Protection</b>			
01 - Ensemble			

01VF-01-ENSM			47, 48, 104, 116
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Ensemble, Vapor-Pro- tective, with Optional Flash Fire Protection, NFPA 1991	<p>Vapor-protective ensemble with optional flash fire protection, including totally encapsulating suit with attached or separate gloves and footwear or booties with outer boots (certified as compliant</p>	<p>NFPA 1991 defines an ensemble consisting of a suit with attached gloves that totally encapsulates the wearer and his or her breathing apparatus. Ensembles are frequently configured with an overcover, outer gloves, and outer boots in order to meet the requirements of the standard; however, some products can meet the requirements without these extra layers. Suit materials, including visors and seams, are evaluated for permeation resistance against 21 different industrial chemicals and 5 chemical warfare agents. NFPA 1991 also includes optional criteria for liquefied gas protection and flash fire escape protection. Additional criteria are provided for each of the certification options. Product labels →</p>	
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<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
VF - NFPA 1991 Ensembles with Optional Flash Fire Protection 01 - Ensemble - <i>Continued</i>	with NFPA 1991 with flash fire protection option).	<p>must clearly indicate which options apply to the specific ensemble. For flash fire protection, suit materials are assessed for thermal insulation, static charge generation, and as part of the ensemble in a simulated flash fire. The primary purpose of NFPA 1991 is to define requirements that isolate the wearer from a surrounding hazardous chemical environment.</p> <p>-----</p> <p>NFPA 1991 defines the highest level of protection for hazardous material emergencies. NFPA 1991 ensembles are intended for severe chemical exposure skin hazards. The suits are designed to provide protection from gases, vapors, liquids, and particulates. The flash fire option on certified NFPA 1991 ensembles is for escape only. Users should not knowingly enter a flammable or explosive atmosphere. Level A ensembles should not be used without extensive training. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	
VF - NFPA 1991 Ensembles with Optional Flash Fire Protection 02 - Required Ensemble Elements	01VF-02-FTWR Footwear, Vapor-Protective, with Optional Flash Fire Protection, NFPA 1991	<p>Vapor-protective footwear with optional flash fire protection (certified as compliant with NFPA 1991 with flash fire protection option).</p>	47, 48, 104, 116
		<p>Footwear may be attached to suits as part of an overall ensemble. Alternatively, the footwear system may consist of a bootie (sock-like extension of the suit) combined with an outer boot. The footwear system must provide a gas-tight interface with the suit. Footwear are evaluated as part of the ensemble for gas-tight integrity. Materials are evaluated for permeation resistance against 21 different industrial chemicals and 5 chemical warfare agents. Footwear are further evaluated for physical properties (impact, abrasion, cut, puncture, cold temperature performance) and function (traction). For flash fire protection, footwear is assessed for thermal insulation, static charge generation, and as part of the ensemble in a simulated flash fire.</p> <p>-----</p> <p>NFPA 1991 defines the highest level of protection for hazardous material emergencies. NFPA 1991 ensembles are intended for severe chemical exposure skin hazards. The suits are designed to provide protection from gases, vapors, liquids, and particulates. The flash →</p>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
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## VF - NFPA 1991 Ensembles with Optional Flash Fire Protection

02 - Required Ensemble Elements - *Continued*

01VF-02-GARM Garment, Vapor-Protective, with Optional Flash Fire Protection, NFPA 1991	Vapor-protective garment with optional flash fire protection (certified as compliant with NFPA 1991 with flash fire protection option).	<p>fire option on certified NFPA 1991 ensembles is for escape only. Users should not knowingly enter a flammable or explosive atmosphere. Level A ensembles should not be used without extensive training. Selected footwear must be sized accordingly to fit both the individual and interface properly with the ensemble. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p> <p>NFPA 1991 defines an ensemble consisting of a suit with attached gloves that totally encapsulates the wearer and his or her breathing apparatus. Ensembles are frequently configured with an overcover, outer gloves, and outer boots in order to meet the requirements of the standard; however, some products can meet the requirements without these extra layers. Suit materials, including visors and seams, are evaluated for permeation resistance against 21 different industrial chemicals and 5 chemical warfare agents. NFPA 1991 also includes optional criteria for liquefied gas protection and flash fire escape protection. Additional criteria are provided for each of the certification options. Product labels must clearly indicate which options apply to the specific ensemble. For flash fire protection, suit materials are assessed for thermal insulation, static charge generation, and as part of the ensemble in a simulated flash fire. The primary purpose of NFPA 1991 is to define requirements that isolate the wearer from a surrounding hazardous chemical environment.</p> <p>-----</p> <p>NFPA 1991 defines the highest level of protection for hazardous material emergencies. NFPA 1991 ensembles are intended for severe chemical exposure skin hazards. The suits are designed to provide protection from gases, vapors, liquids, and particulates. The flash fire option on certified NFPA 1991 ensembles is for escape only. Users should not knowingly enter a flammable or explosive atmosphere. Level A ensembles should not be used without extensive training. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	47, 48, 104, 116
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<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>VF - NFPA 1991 Ensembles with Optional Flash Fire Protection</b>				
<b>02 - Required Ensemble Elements - Continued</b>				
01VF-02-GLOV	Vapor-protective gloves with optional flash fire protection (certified as compliant with NFPA 1991 with flash fire protection option).		Gloves are attached to suits as part of an overall ensemble. The gloves may be one or more layers (multiple gloves) with a gas-tight interface with the suit sleeve. Gloves are evaluated as part of the ensemble for gas-tight integrity. Materials are evaluated for permeation resistance against 21 different industrial chemicals and 5 chemical warfare agents. Gloves are further evaluated for physical properties (cut, puncture, cold temperature performance) and function (dexterity). For flash fire protection, gloves are assessed for thermal insulation, static charge generation, and as part of the ensemble in a simulated flash fire.	47, 48, 104, 116
Gloves, Vapor-Protective, with Optional Flash Fire Protection, NFPA 1991			----- NFPA 1991 defines the highest level of protection for hazardous material emergencies. NFPA 1991 ensembles are intended for the severe chemical exposure skin hazards. The suits are designed to provide protection from gases, vapors, liquids, and particulates. The flash fire option on certified NFPA 1991 ensembles is for escape only. Users should not knowingly enter a flammable or explosive atmosphere. Level A ensembles should not be used without extensive training. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.	
<b>VF - NFPA 1991 Ensembles with Optional Flash Fire Protection</b>				
<b>03 - Suggested Support Items</b>				
01VF-03-ITST	Inflation testing equipment specific to Item 01VF-01-ENSM.		Inflation testing equipment includes a pump or air source, a pressure gauge, tubing, and fixtures for attachment of tubing to suit. The kit permits the blockage of exhaust valves and inflation of the suit to check gas-tight integrity according to ASTM F 1052-97 (2002), Standard Test Method for Pressure Testing Vapor Protective Ensembles.	84
Equipment, Inflation Testing			----- Inflation testing equipment should work with the selected NFPA 1991 ensemble.	
01VF-03-TRST	Training suit based on similar design, but different materials than		Encapsulating suit that is constructed similarly to NFPA 1991 ensemble, but using different materials. Suits will not have same level of integrity or material performance as NFPA 1991 ensemble. →	
Suit, Training				

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>VF - NFPA 1991 Ensembles with Optional Flash Fire Protection</b>				
<b>03 - Suggested Support Items - Continued</b>				
	Item 01VE-01-ENSM.		----- Training suits must never be used in actual operations and must be clearly marked by the user organization to prevent their misuse.	
<b>VT - NFPA 1991 Ensembles</b>				
<b>01 - Ensemble</b>				
01VT-01-ENSM Ensemble, Vapor-Protective, NFPA 1991	Vapor-protective ensemble, including totally encapsulating suit with attached or separate gloves and footwear or booties with outer boots (certified as compliant with NFPA 1991).		NFPA 1991 defines an ensemble consisting of a suit with attached gloves that totally encapsulates the wearer and his or her breathing apparatus. Ensembles are frequently configured with an overcover, outer gloves, and outer boots in order to meet the requirements of the standard; however, some products can meet the requirements without these extra layers. Suit materials, including visors and seams, are evaluated for permeation resistance against 21 different industrial chemicals and 5 chemical warfare agents. NFPA 1991 also includes optional criteria for liquefied gas protection and flash fire escape protection. Additional criteria are provided for each of the certification options. Product labels must clearly indicate which options apply to the specific ensemble. The primary purpose of NFPA 1991 is to define requirements that isolate the wearer from a surrounding hazardous chemical environment.	47, 48, 104, 116
<b>VT - NFPA 1991 Ensembles</b>				
<b>02 - Required Ensemble Elements</b>				
01VT-02-FTWR	Vapor-protective footwear (certified as compliant)		NFPA 1991 defines the highest level of protection for hazardous material emergencies. NFPA 1991 ensembles are intended for severe chemical exposure skin hazards. The suits are designed to provide protection from gases, vapors, liquids, and particulates. Level A ensembles should not be used without extensive training. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.	47, 48, 104, 116

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
VT - NFPA 1991 Ensembles 02 - Required Ensemble Elements - <i>Continued</i>				
Footwear, Vapor-Protective, NFPA 1991	with NFPA 1991).		<p>outer boot. The footwear system must provide a gas-tight interface with the suit. Footwear is evaluated as part of the ensemble for gas-tight integrity. Materials are evaluated for permeation resistance against 21 different industrial chemicals and 5 chemical warfare agents. Footwear is further evaluated for physical properties (impact, abrasion, cut, puncture, cold temperature performance) and function (traction).</p> <p>-----</p> <p>NFPA 1991 defines the highest level of protection for hazardous material emergencies. NFPA 1991 ensembles are intended for severe chemical exposure skin hazards. The suits are designed to provide protection from gases, vapors, liquids, and particulates. Level A ensembles should not be used without extensive training. Selected footwear must be sized accordingly to fit both the individual and interface properly with the ensemble. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	
01VT-02-GARM	Vapor-protective garment (certified as compliant with NFPA 1991).		<p>NFPA 1991 defines an ensemble consisting of a suit with attached gloves that totally encapsulates the wearer and his or her breathing apparatus. Ensembles are frequently configured with an overcover, outer gloves, and outer boots in order to meet the requirements of the standard; however, some products can meet the requirements without these extra layers. Suit materials, including visors and seams, are evaluated for permeation resistance against 21 different industrial chemicals and 5 chemical warfare agents. NFPA 1991 also includes optional criteria for liquefied gas protection and flash fire escape protection. Additional criteria are provided for each of the certification options. Product labels must clearly indicate which options apply to the specific ensemble. The primary purpose of NFPA 1991 is to define requirements that isolate the wearer from a surrounding hazardous chemical environment.</p> <p>-----</p> <p>NFPA 1991 defines the highest level of protection for hazardous material emergencies. NFPA 1991 ensembles are intended for severe chemical exposure skin hazards. The suits are designed to provide protection from gases, vapors, liquids, and particulates. Level A →</p>	47, 48, 104, 116
Garment, Vapor-Protective, NFPA 1991				

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
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**VT - NFPA 1991 Ensembles**
**02 - Required Ensemble Elements - Continued**

01VT-02-GLOV Gloves, Vapor-Protec- tive, NFPA 1991	Vapor-protective gloves (certified as compliant with NFPA 1991).	ensembles should not be used without extensive training. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, 2002 Edition.  Gloves are attached to suits as part of an overall ensemble. The gloves may be one or more layers (multiple gloves) with a gas-tight interface with the suit sleeve. Gloves are evaluated as part of the ensemble for gas-tight integrity. Materials are evaluated for permeation resistance against 21 different industrial chemicals and 5 chemical warfare agents. Gloves are further evaluated for physical properties (cut, puncture, cold temperature performance) and function (dexterity).  ----- NFPA 1991 defines the highest level of protection for hazardous material emergencies. NFPA 1991 ensembles are intended for severe chemical exposure skin hazards. The suits are designed to provide protection from gases, vapors, liquids, and particulates. Level A ensembles should not be used without extensive training. Selected gloves must be attached to the ensemble to provide a gas-tight interface. Use considerations are provided in OSHA Title 29 CFR Sections 1910.120 and 1910.132, and NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.	47, 48, 104, 116
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**VT - NFPA 1991 Ensembles**
**03 - Suggested Support Items**

01VT-03-ITST Equipment, Inflation Testing	Inflation testing equip- ment specific to Item 01VT-01-ENSM.	Inflation testing equipment includes a pump or air source, a pressure gauge, tubing, and fixtures for attachment of tubing to suit. The kit permits the blockage of exhaust valves and inflation of the suit to check gas-tight integrity according to ASTM F 1052, Standard Test Method for Pressure Testing Vapor Protective Ensembles.  ----- Inflation testing equipment should work with the selected NFPA 1991 ensemble.	84
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<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<p><b>VT - NFPA 1991 Ensembles</b>                      03 - Suggested Support Items - <i>Continued</i></p>			
01VT-03-TRST Suit, Training	Training suit based on similar design, but different materials than Item 01VT-01-ENSM.	Encapsulating suit that is constructed in similar manner as NFPA 1991 ensemble. Suit uses different materials but similar design. Suits will not have same level of integrity or material performance as NFPA 1991 ensemble. ----- Training suits must never be used in actual operations, and must be clearly marked by the user organization to prevent their misuse.	
<p><b>WA - Water Operations PPE</b>                      01 - Equipment, Breathing - SCUBA</p>			
01WA-01-BKUP* System, Water Operations, Emergency Backup Air Supply	Self-contained regulator and small cylinder to provide redundant emergency breathing air supply, containing 30-56 breaths for dive and swiftwater operations.	Small, portable tank capable of a minimum of 3.0 cubic feet of air. The tank should be capable of being filled from SCBA tanks and /or a compressor. Tanks should be brightly marked for easy recognition.	
01WA-01-SCBA* Apparatus, Self-Contained Underwater Breathing (SCUBA)	SCUBA, including tanks and primary/secondary regulator.	May include integrated facepiece/regulators.	
01WA-01-SCBC* Apparatus, Self-Contained Underwater Breathing (SCUBA), Contaminated Water	SCUBA for use in contaminated water diving, including tanks and integrated facepiece/regulator.	The self-contained underwater breathing apparatus (SCUBA) is worn with an ensemble that consists of a dry suit, dry suit gloves or mittens, dry suit boots or booties, dry suit \underwear, and swimming fins. The ensemble is designed to maintain integrity of the breathing air supply, protect against chemical/biological contaminants, insulate against cold water, and protect against physical hazards. The mask must integrate with the dry suit in order to assure protection from contaminants in the outside environment. The system →	

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\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
WA - Water Operations PPE 01 - Equipment, Breathing - SCUBA - <i>Continued</i>				

## Diving

must be further designed to minimize the effects of chemical or biological contaminants that are found in contaminated water.

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The principal hazard encountered during contaminated water diving is exposure to hazardous biological or chemical agents. While some contaminants may be so diluted that the associated risks are small, others such as PCBs may be immediately dangerous even at very low concentrations. Some materials may not dissolve in water; these chemicals could be encountered as pockets of highly concentrated material in bottom sediment or as slicks on the water's surface. Therefore, for maximum safety, the diver must be completely isolated from the water environment. Under certain conditions, when only a moderate biological hazard exists (such that only temporary illness could result), a lesser degree of protection may be sufficient. In general, because not all hazards may be apparent, the prudent decision is to use the equipment giving the highest level of protection. In the absence of specific standard on contaminated water diving protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.

## WA - Water Operations PPE

## 02 - Equipment, Breathing - Surface Supplied

01WA-02-HLMT*	Diving helmet used with surface supplied air systems.	Should be of lightweight durable construction; facepiece should provide a wide field of vision and be scratch resistant. Air line inlets should be a swivel or comparable mount with 360-degree movement for freedom of movement. Inlets should be capable of accommodating hardware communications.	-----
Helmet, Surface Supplied Air, Diving		Note: If this helmet is to be used in contaminated water diving situations, helmet materials and construction should be checked to ensure the helmet's materials are capable of resisting hazardous materials that could be encountered.	
01WA-02-SAIR*	Diving system which utilizes supplied air from	Options to accommodate mixed gases and warm water.	----->

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Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>WA - Water Operations PPE</b>				
<b>03 - Garments and Ensembles, Diving</b>				
System, Surface Supplied Air, Diving		the surface via an umbilical hose.	Check for features compatible with type of diving and diving area of intended use.	
01WA-03-BOOT*		Boots for use as part of diving ensemble, usually in surface supplied air operation.	Weight of the boots will be determined by the operational water temperature. Whether cold or warm water, boots should be constructed of durable, tear-resistant materials, with a pliable, hardened sole able to take everyday punishment. ----- Not for contaminated water diving. See Section 01WA-05 for items used in contaminated water operations.	
01WA-03-GLOV*		Gloves for use in diving operations.	Weight of the gloves will be determined by the operational water temperature. Gloves should be constructed of durable, tear-resistant material, with reinforced palms, but also good flexibility and dexterity. ----- Consider weight/dexterity against mission requirements. Not for contaminated water diving. See Section 01WA-05 for items used in contaminated water operations.	
01WA-03-HOOD*		Diving hood for wetsuit/dry suit operations.	Weight of the hood will be determined by the operational water temperature. Hood should allow for total integration with wetsuit/dry suit. Needs to be constructed of durable, tear-resistant yet flexible materials. ----- Not for contaminated water diving. See Section 01WA-05 for items used in contaminated water operations.	
01WA-03-NDAM*		Neck dam for use with diving ensemble.	Neck dams should keep the diver comfortable during cold water dives. The bib should be cut full enough to be comfortable to the wearer, and provide the ability to tuck under the collar of the wet/dry suit. ----- →	

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>WA - Water Operations PPE</b>				
<b>03 - Garments and Ensembles, Diving - Continued</b>				
01WA-03-SUTD*	Suit, Dry, Diving	Dry suit for diving operations.	<p>Not for contaminated water diving. See Section 01WA-05 for items used in contaminated water operations.</p> <p>Dry suits need to provide a waterproof barrier between wearer and the outside elements. Dry suits should be constructed of durable and tear-resistant materials with reinforced knees, and should allow some clothing underneath without being too tight. Integrated side pockets can be very useful.</p> <p>-----</p> <p>Water temperature will be the determining factor in suit selection.</p> <p>Not for contaminated water diving. See Section 01WA-05 for items used in contaminated water operations.</p>	
01WA-03-SUTW*	Suit, Wet, Diving	Wet suit for diving operations.	<p>Wetsuits should be constructed of durable, tear-resistant materials with reinforced knees. Weight of the suit is personal preference.</p> <p>-----</p> <p>Water temperature will be the determining factor in suit selection.</p> <p>Not for contaminated water diving. See Section 01WA-05 for items used in contaminated water operations.</p>	
01WA-03-UNDR*	Undergarment, Dry Suit, Diving	Undergarment for use with dry suit in diving operations, including contaminated water diving.	<p>Whether in regular or contaminated water operations, dry suit underwear is generally worn with an ensemble that consists of dry suit, dry suit gloves or mittens, dry suit boots or booties, and swimming fins. The ensemble is designed to maintain integrity of the breathing air supply, insulate against cold water, and protect against physical hazards. The dry suit underwear is intended to assist in protecting from exposure to cold temperature water and should demonstrate adequate insulation.</p> <p>-----</p> <p>In contaminated water operations, the undergarment is not part of the barrier protection, and must not interfere with the integrity of the dry suit and other ensemble components.</p>	

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
WA - Water Operations PPE 04 - Garments and Ensembles, Surface / Swift Water Operations				
01WA-04-BTES*	Protective booties worn with swift water rescue ensemble, designed to be worn under swim fins.	Booties are worn with an ensemble that includes garment, gloves, helmet, personal flotation device, and swimming fins. The ensemble is designed to insulate against cold water, protect against physical hazards, limit exposure to chemical and biological contaminants, and provide flotation and visibility for first responders during swift water rescue operations. Booties should cover the wearer's feet to above the ankles, have retention straps that do not become loose in use, have slip resistant soles for working on rocky embankments and accommodate the use of swimming fins. Materials used in booties are required to demonstrate resistance to physical hazards and provide thermal insulation to the foot.		
	Booties, Protective, Swift Water Rescue		<p>The principal danger during swift water rescues is drowning. This means that all persons involved in swift water rescue operations should wear an approved personal flotation device. Other protective clothing and equipment must mitigate drowning exposure hazards. For example, garments should not have loose straps or openings that can create entanglement hazards with floating debris. Regular helmets cannot be worn since they can fill with water and restrict movement. In addition, flood water temperatures can be quite low (near freezing). Exposure to cold water for extended periods of time results in reduced hand and foot function as the body's circulatory system limits blood flow to the extremities. Overexposure to these conditions can result in hypothermia. Lastly, flood water can carry chemical and sewage contamination capable of causing acute or chronic health effects. In the absence of specific standards on swift water protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.</p>	
01WA-04-FINR*	Fins worn with swift water rescue ensemble.	Fins worn with swift water rescue ensemble.		
	Fins, Swift Water Rescue		The swimming fins are worn with an ensemble that includes garment, booties, gloves, helmet, and personal flotation device. The ensemble is designed to insulate against cold water, protect against physical hazards, limit exposure to chemical and biological contaminants, and provide flotation and visibility for first responders during swift water rescue operations. The recommended swimming fins are short, permitting the wearer to walk without removing them, and provide a kicking thrust from the knee. The fins should also be able to accommodate proper swift water rescue foot gear or booties. →	

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## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## WA - Water Operations PPE

04 - Garments and Ensembles, Surface / Swift Water Operations - *Continued*

		<p>The principal danger during swift water rescues is drowning. This means that all persons involved in swift water rescue operations should wear an approved personal flotation device. Other protective clothing and equipment must mitigate drowning exposure hazards. For example, garments should not have loose straps or openings that can create entanglement hazards with floating debris. Regular helmets cannot be worn since they can fill with water and restrict movement. In addition, flood water temperatures can be quite low (near freezing). Exposure to cold water for extended periods of time results in reduced hand and foot function as the body's circulatory system limits blood flow to the extremities. Overexposure to these conditions can result in hypothermia. Lastly, flood water can carry chemical and sewage contamination capable of causing acute or chronic health effects. In the absence of specific standards on swift water protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.</p>
<p>01WA-04-GARM* Suit, Dry, Surface/ Swift Water</p>	<p>Protective garment worn with surface / swift water rescue ensemble. Designed to limit contact of the user's skin with water/contaminants.</p>	<p>The garment is worn with an ensemble that includes booties, gloves, helmet, personal flotation device, and swimming fins. The ensemble is designed to insulate against cold water, protect against physical hazards, limit exposure to chemical and biological contaminants, and provide flotation and visibility of first responders during swift water rescue operations. The recommended garment is a one-piece dry suit that is easily donned, limits water penetration, and is breathable for comfort in shore-based operations. Materials used are required to demonstrate resistance to physical hazards, and barrier effectiveness against chemical and biological contaminants. Placement of high visibility materials on the garment is also recommended. A personal relief zipper on the dry suit also is recommended to facilitate long duration operations without having to disrobe during operations. The dry suit zippers should be rated to a 3 meter depth.</p> <p>The principal danger during swift water rescues is drowning. This means that all persons involved in swift water rescue operations should wear an approved personal flotation device. Other protective clothing and equipment must mitigate drowning exposure hazards. For →</p>

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Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
WA - Water Operations PPE 04 - Garments and Ensembles, Surface / Swift Water Operations - <i>Continued</i>			<p>example, garments should not have loose straps or openings that can create entanglement hazards with floating debris. Regular helmets cannot be worn since they can fill with water and restrict movement.</p> <p>In addition, flood water temperatures can be quite low (near freezing). A one or two piece fleece undergarment is required to afford any thermal insulation to the ensemble. Exposure to cold water for extended periods of time results in reduced hand and foot function as the body's circulatory system limits blood flow to the extremities. Overexposure to these conditions can result in hypothermia. Lastly, flood water can carry chemical and sewage contamination capable of causing acute or chronic health effects. In the absence of specific standards on swift water protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.</p>	
01WA-04-GLOV*	Gloves, Protective, Swift Water Rescue	Protective gloves worn with swift water rescue ensemble.	<p>Gloves are worn with an ensemble that includes garment, booties, helmet, personal flotation device, and swimming fins. The ensemble is designed to insulate against cold water, protect against physical hazards, limit exposure to chemical and biological contaminants, and provide flotation and visibility for first responders during swift water rescue operations. Recommended gloves should use a 5-finger design for normal operations or a 3-finger design for aggressive rescue swimming activities, be available in multiple sizes, have retention straps that remain secure in use, and have a palm that resist abrasions. Materials used are required to demonstrate resistance to physical hazards and provide thermal insulation to the hands.</p> <p>-----</p> <p>The principal danger during swift water rescues is drowning. This means that all persons involved in swift water rescue operations should wear an approved personal flotation device. Other protective clothing and equipment must mitigate drowning exposure hazards. For example, garments should not have loose straps or openings that can create entanglement hazards with floating debris. Regular helmets cannot be worn since they can fill with water and restrict movement. →</p>	

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## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## WA - Water Operations PPE

04 - Garments and Ensembles, Surface / Swift Water Operations - *Continued*

		<p>In addition, flood water temperatures can be quite low (near freezing). Exposure to cold water for extended periods of time results in reduced hand and foot function as the body's circulatory system limits blood flow to the extremities. Overexposure to these conditions can result in hypothermia. Lastly, flood water can carry chemical and sewage contamination capable of causing acute or chronic health effects. In the absence of specific standards on swift water protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.</p>
<p>01WA-04-HLMT* Helmet, Protective, Swift Water Rescue</p>	<p>Protective helmet worn with swift water rescue ensemble.</p>	<p>The helmet is worn with an ensemble that includes garment, booties, gloves, personal flotation device, and swimming fins. The ensemble is designed to insulate against cold water, protect against physical hazards, limit exposure to chemical and biological contaminants, and provide flotation and visibility for first responders during swift water rescue operations. The recommended helmet must be lightweight and tight-fitting with no rear brim, contain drainage holes to allow the passage of moving water, have no loose straps, and utilize high-visibility materials. Helmets are required to demonstrate resistance to impact and possess flotation characteristics. Some helmets are also constructed covering the ears to afford protection against ear trauma and injury.</p> <p>-----</p> <p>The principal danger during swift water rescues is drowning. This means that all persons involved in swift water rescue operations should wear an approved personal flotation device. Other protective clothing and equipment must mitigate drowning exposure hazards. For example, garments should not have loose straps or openings that can create entanglement hazards with floating debris. Regular helmets cannot be worn since they can fill with water and restrict movement.</p> <p>In addition, flood water temperatures can be quite low (near freezing). Exposure to cold water for extended periods of time results in reduced hand and foot function as the body's circulatory system limits blood flow to the extremities. Overexposure to these conditions can result in hypothermia. Lastly, flood water can carry chemical and sewage contam- →</p>

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>WA - Water Operations PPE</b>				
04 - Garments and Ensembles, Surface / Swift Water Operations - <i>Continued</i>				
01WA-04-SPFD*	Device, Personal Flotation, Swift Water Rescue	Personal flotation device (PFD) for swift water rescue operations. PFDs must be approved by the U.S. Coast Guard, Type III or Type V. Includes common accessories such as attached pealless whistle and signaling devices/lights.	<p>ination capable of causing acute or chronic health effects. In the absence of specific standards on swift water protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.</p> <p>The personal flotation device (PFD) is worn with an ensemble that includes garment, booties, gloves, helmet, and swimming fins. The ensemble is designed to insulate against cold water, protect against physical hazards, limit exposure to chemical and biological contaminants, and provide flotation and visibility for first responders during swift water rescue operations. The recommended personal flotation device should be a Type III or V Coast Guard approved personal flotation device that may include corrosion-resistant hardware for attaching a lifeline that is capable of withstanding swift water forces and affording a quick release from the lifeline. This hardware enables the rescuer to be secured to a rope and self-release from the rope if an immediate escape is required. There are numerous categories for PFDs including ground support and rescuer positions. Rescuer PFDs should afford enough flotation for the rescuer and a victim and be able to sustain operations in aerated water. This is usually around 25+ pounds of flotation. They should also possess multiple adjustment straps to secure the PFD to the rescuer to prevent the PFD from dislodging from the rescuer. Some will also contain leg attachment straps for use in extreme water conditions.</p> <p>-----</p> <p>It is necessary to have a proper fitting PFD per rescuer to prevent it from becoming dislodged from the rescuer. The principal danger during swift water rescues is drowning. This means that all persons involved in swift water rescue operations should wear an approved personal flotation device. Other protective clothing and equipment worn must minimize drowning exposure hazards. For example, garments should not have loose straps or openings which can create entanglement hazards with floating debris. Regular helmets cannot be worn, since they can fill with water and restrict movement.</p> <p>In addition, flood water temperatures can be quite low (near freezing). Exposure to cold water for extended periods results in reduced hand and foot function as the body's →</p>	48

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**WA - Water Operations PPE**04 - Garments and Ensembles, Surface / Swift Water Operations - *Continued*

		<p>circulatory system limits blood flow to the extremities. Overexposure to these conditions can result in hypothermia. Lastly, flood water can carry chemical and sewage contamination capable of causing acute or chronic health effects. In the absence of specific standard on swift water protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended. PFDs must be approved by the U.S. Coast Guard using UL standards.</p>	
01WA-04-SUTI*	Completely waterproof ensemble with attached or attachable gloves, boots, and watertight hood.	<p>Personnel utilizing a Rescue PFD with a quick-release harness system should be properly trained and certified in its operation and limitations.</p> <p>Ensemble should afford thermal protection and flotation, and possess abrasion resistant surfaces (especially knees and elbows). Ensemble should also have reflective surfaces. Ensembles are one size fits all.</p> <p>Ensemble contains necessary flotation for the rescuer so a PFD is not needed. The ensemble also contains an integrated chest harness to secure the rescuer to a rope tether. These ensembles are not the preferred ensemble for ice rescue operations in moving water.</p> <p>----- Utilization in static or non-moving water rescue operations only.</p>	
01WA-04-SUTW*	Protective garment worn with surface / swift water rescue ensemble. Designed to hold water against the skin.	<p>The garment is worn with an ensemble that includes booties, gloves, helmet, personal flotation device, and swimming fins. The ensemble is designed to insulate against cold water, protect against physical hazards, and provide supplemental flotation and visibility of first responders during swift water rescue operations in non-contaminated water. The recommended garment is a two-piece (farmer john) or one-piece wet suit that is easily donned for comfort in shore-based operations. The recommended thickness of the suit is based on environment and water temperature. Placement of high-visibility materials on the garment is also recommended.</p> <p>-----&gt;</p>	

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
WA - Water Operations PPE 04 - Garments and Ensembles, Surface / Swift Water Operations - <i>Continued</i>				
01WA-04-UNDR*	Undergarment, Surface/Swift Water	Insulation garment worn under dry suit portion of swift water rescue ensemble.	<p>The principal danger during swift water rescues is drowning. This means that all persons involved in swift water rescue operations should wear an approved personal floatation device. Other protective clothing and equipment must mitigate drowning exposure hazards. For example, garments should not have loose straps or openings that can create entanglement hazards with floating debris. Regular helmets cannot be worn since they can fill with water and restrict movement.</p> <p>In addition, flood water temperatures can be quite low (near freezing). Exposure to cold water for extended periods of time results in reduced hand and foot function as the body's circulatory system limits blood flow to the extremities. Overexposure to these conditions can result in hypothermia. Lastly, flood water can carry chemical and sewage contamination capable of causing acute or chronic health effects. Wetsuits afford no protection from chemical or biological substances in a potentially contaminated environment. In the absence of specific standards on swift water protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.</p> <p>Products:</p> <p>Undergarments are worn with an ensemble that includes garment, booties, helmets, personal floatation device, and swimming fins. The ensemble is designed to insulate against cold water, protect against physical hazards, limit exposure to chemical and biological contaminants, and provide floatation and visibility for first responders during swift water rescue operations. Undergarment should be made of a material that wicks moisture away from the skin and minimize chafing. The undergarment should either assist in cooling or provide insulation, depending upon the environment.</p> <p>-----</p> <p>The principal danger during swift water rescues is drowning. This means that all persons involved in swift water rescue operations should wear an approved personal floatation device. Other protective clothing and equipment must mitigate drowning exposure hazards. For example, garments should not have loose straps or openings that can create entangle →</p>	

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<b>WA - Water Operations PPE</b>			
04 - Garments and Ensembles, Surface / Swift Water Operations - <i>Continued</i>			
		ment hazards with floating debris. Regular helmets cannot be worn since they can fill with water and restrict movement.	
		In addition, flood water temperatures can be quite low (near freezing). Exposure to cold water for extended periods of time results in reduced hand and foot function as the body's circulatory system limits blood flow to the extremities. Overexposure to these conditions can result in hypothermia. Lastly, flood water can carry chemical and sewage contamination capable of causing acute or chronic health effects. In the absence of specific standards on swift water protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.	
<b>WA - Water Operations PPE</b>			
05 - Garments and Ensembles, Contaminated Water Operations			
01WA-05-BTES*	Protective boots or booties worn with ensemble for use in contaminated water diving operations. Designed to be worn with swim fins.	Boots or booties are worn with an ensemble that consists of dry suit, dry suit gloves or mittens, dry suit underwear, and swimming fins. The ensemble is designed to maintain integrity of the breathing air supply, protect against chemical/biological contaminants, insulate against cold water, and protect against physical hazards. Dry suit boots or booties should cover the wearer's feet to above the ankles, directly integrate with the dry suit, have slip resistant soles, and accommodate the use of swimming fins. Materials used in dry suit boots or booties are required to demonstrate resistance to physical hazards, barrier effectiveness against chemical and biological contaminants, and thermal insulation to the foot. The overall dry suit boot or bootie should be tested for leakage integrity.	
Boots or Booties, Diving, Contaminated Water		The principal hazard encountered during contaminated water diving is exposure to hazardous biological or chemical agents. While some contaminants may be so diluted that the associated risks are small, others such as PCBs may be immediately dangerous even at very low concentrations. Some materials may not dissolve in water; these chemicals could be encountered as pockets of highly concentrated material in bottom sediment or as slicks on the water's surface. Therefore, for maximum safety, the diver must be completely →	

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
01WA-05-FINS*		Diving fins worn with ensemble for use in contaminated water diving operations.	Swimming fins are worn with ensemble that consists of dry suit, dry suit gloves or mittens, dry suit boots or booties, dry suit underwear. The ensemble is designed to maintain integrity of the breathing air supply, protect against chemical/biological contaminants, insulate against cold water, and protect against physical hazards. The swimming fins must be wearable with the boots or booties that are part of the dry suit.	
01WA-05-GLOV*		Gloves or mittens worn with ensemble for use in contaminated water	<p>isolated from the water environment. Under certain conditions, when only a moderate biological hazard exists (such that only temporary illness could result), a lesser degree of protection may be sufficient. In general, because not all hazards may be apparent, the prudent decision is to use the equipment giving the highest level of protection. In the absence of specific standard on contaminated water diving protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.</p> <p>-----</p> <p>The principal hazard encountered during contaminated water diving is exposure to hazardous biological or chemical agents. While some contaminants may be so diluted that the associated risks are small, others such as PCBs may be immediately dangerous even at very low concentrations. Some materials may not dissolve in water; these chemicals could be encountered as pockets of highly concentrated material in bottom sediment or as slicks on the water's surface. Therefore, for maximum safety, the diver must be completely isolated from the water environment. Under certain conditions, when only a moderate biological hazard exists (such that only temporary illness could result), a lesser degree of protection may be sufficient. In general, because not all hazards may be apparent, the prudent decision is to use the equipment giving the highest level of protection. In the absence of specific standard on contaminated water diving protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.</p>	
05 - Garments and Ensembles, Contaminated Water Operations - <i>Continued</i>				

isolated from the water environment. Under certain conditions, when only a moderate biological hazard exists (such that only temporary illness could result), a lesser degree of protection may be sufficient. In general, because not all hazards may be apparent, the prudent decision is to use the equipment giving the highest level of protection. In the absence of specific standard on contaminated water diving protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.

Swimming fins are worn with ensemble that consists of dry suit, dry suit gloves or mittens, dry suit boots or booties, dry suit underwear. The ensemble is designed to maintain integrity of the breathing air supply, protect against chemical/biological contaminants, insulate against cold water, and protect against physical hazards. The swimming fins must be wearable with the boots or booties that are part of the dry suit.

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The principal hazard encountered during contaminated water diving is exposure to hazardous biological or chemical agents. While some contaminants may be so diluted that the associated risks are small, others such as PCBs may be immediately dangerous even at very low concentrations. Some materials may not dissolve in water; these chemicals could be encountered as pockets of highly concentrated material in bottom sediment or as slicks on the water's surface. Therefore, for maximum safety, the diver must be completely isolated from the water environment. Under certain conditions, when only a moderate biological hazard exists (such that only temporary illness could result), a lesser degree of protection may be sufficient. In general, because not all hazards may be apparent, the prudent decision is to use the equipment giving the highest level of protection. In the absence of specific standard on contaminated water diving protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.

Dry suit gloves or mittens are worn with an ensemble that consists of a dry suit, dry suit boots or booties, dry suit underwear, and swimming fins. The ensemble is designed to maintain integrity of the breathing air supply, protect against chemical/biological →

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## Section 1 | Personal Protective Equipment

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WA - Water Operations PPE	05 - Garments and Ensembles, Contaminated Water Operations - <i>Continued</i>		
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Dry Suit, Diving, Contaminated Water	diving operations.	<p>contaminants, insulate against cold water, and protect against physical hazards. Dry suit gloves or mittens should cover the wearer's hands to beyond the wrist, directly integrate with the dry suit, and provide suitable grip. Materials used in dry suit gloves or mittens are required to demonstrate resistance to physical hazards, barrier effectiveness against chemical and biological contaminants, and thermal insulation to the hands. The overall dry suit gloves or mittens should be tested for leakage integrity.</p> <p>-----</p> <p>The principal hazard encountered during contaminated water diving is exposure to hazardous biological or chemical agents. While some contaminants may be so diluted that the associated risks are small, others such as PCBs may be immediately dangerous even at very low concentrations. Some materials may not dissolve in water; these chemicals could be encountered as pockets of highly concentrated material in bottom sediment or as slicks on the water's surface. Therefore, for maximum safety, the diver must be completely isolated from the water environment. Under certain conditions, when only a moderate biological hazard exists (such that only temporary illness could result), a lesser degree of protection may be sufficient. In general, because not all hazards may be apparent, the prudent decision is to use the equipment giving the highest level of protection. In the absence of specific standard on contaminated water diving protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.</p>	
01WA-05-SUTD* Suit, Diving, Dry, Protective, Contaminated Water	Protective dry suit for use in contaminated water diving operations.	<p>Dry suits are worn with an ensemble that consists of dry suit gloves or mittens, dry suit boots or booties, dry suit underwear, and swimming fins. The ensemble is designed to maintain integrity of the breathing air supply and against chemical/biological contaminants, insulate against cold water, and protect against physical hazards. The dry suit should include an integrated hood and permit the direct integration of gloves or mittens and boots or booties to minimize potential leakage of external contaminants into the suit interior. Materials used in dry suits are required to demonstrate resistance to physical hazards, barrier effectiveness against chemical and biological contaminants, and thermal insulation to the body. The overall dry suit ensemble should be tested for its leakage integrity. →</p>	

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## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>WA - Water Operations PPE</b> 05 - Garments and Ensembles, Contaminated Water Operations - <i>Continued</i>			

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The principal hazard encountered during contaminated water diving is exposure to hazardous biological or chemical agents. While some contaminants may be so diluted that the associated risks are small, others such as PCBs may be immediately dangerous even at very low concentrations. Some materials may not dissolve in water; these chemicals could be encountered as pockets of highly concentrated material in bottom sediment or as slicks on the water's surface. Therefore, for maximum safety, the diver must be completely isolated from the water environment. Under certain conditions, when only a moderate biological hazard exists (such that only temporary illness could result), a lesser degree of protection may be sufficient. In general, because not all hazards may be apparent, the prudent decision is to use the equipment giving the highest level of protection. In the absence of specific standard on contaminated water diving protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.

For contaminated water diving operations, a diving tether is used with an ensemble that consists of a dry suit, dry suit gloves or mittens, dry suit boots or booties, dry suit underwear, and swimming fins. The ensemble is designed to maintain integrity of the breathing air supply, protect against chemical/biological contaminants, insulate against cold water, and protect against physical hazards. The diving tether must be designed to provide ample mobility while maintaining attachment to the wearer. The tether must be sufficiently strong to prevent breakage under strain or contact with physical hazards, but permit the diver to easily disconnect when entanglement hazards occur.

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The principal hazard encountered during contaminated water diving is exposure to hazardous biological or chemical agents. While some contaminants may be so diluted that the associated risks are small, others such as PCBs may be immediately dangerous even at very low concentrations. Some materials may not dissolve in water; these chemicals could be encountered as pockets of highly concentrated material in bottom sediment or as slicks on the water's surface. Therefore, for maximum safety, the diver must be completely →

01WA-05-TTHR\*  
Tether, Diving,  
Contaminated Water  
Operations

Tether for use in  
contaminated water  
diving operations.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>WA - Water Operations PPE</b> 05 - Garments and Ensembles, Contaminated Water Operations - <i>Continued</i>			
		isolated from the water environment. Under certain conditions, when only a moderate biological hazard exists (such that only temporary illness could result), a lesser degree of protection may be sufficient. In general, because not all hazards may be apparent, the prudent decision is to use the equipment giving the highest level of protection. In the absence of specific standard on contaminated water diving protective clothing and equipment, U.S. Fire Administration Publication FA-136 is recommended.	
<b>WA - Water Operations PPE</b> 06 - Ancillary Equipment			
01WA-06-BAGG* Bag, Gear, Water Operations	Water operations gear bag constructed with mesh or solid materials to transport and store water operations equipment, both wet and dry.	Should be well ventilated to prevent mold build up. Strong bottom to withstand wear and tear as well as weight of equipment. Can be purchased in backpack form. ----- Ensure adequate strength, durability.	
01WA-06-BCMP* Compensators, Buoyancy, Diving	Buoyancy compensators for diving operations.	Buoyancy compensators for first responders must be industrial grade rather than recreational. Metal parts (D-Rings) should be stainless steel.	
01WA-06-CLIM* System, Diving, Climate Control	System for providing heat to divers in cold/deep water diving operations.		
01WA-06-FINS* Fins, Swimming/	Footwear that increases agility and speed during water operations	Can be open or closed fins. Some fins can be worn over standard boots to allow for speed and interoperability. This reduces the number of various sizes that would need to be stocked. Other fins are size specific. →	

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## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
Diving		by increasing mechanical advantages.	----- Consider diver's personal preference on fin size, length.	
01WA-06-HRNS*	Harness for diving operations.	Harness for diving operations.	Diving harnesses for first responder must be heavy-duty industrial grade rather than recreational. Integrated weight belt desirable. Quick-release essential.	
01WA-06-MAIN*	Kits for field maintenance of water operations equipment.	Kits for field maintenance of water operations equipment.	Should include items such as spare O-rings, fin and mask straps, multipurpose tool, anti-fog solutions, zip ties and other items for field expedient repairs.	
01WA-06-MASK*	Mask for use with diving ensemble.	Mask for use with diving ensemble.	Type of mask will be determined based upon the type of diving and wearer preference. Full-face masks need to be positive pressure, with a wide field of vision and scratch resistant. Materials used to secure the full face mask needs to be durable and tear resistant.	
01WA-06-PFDS*	Wearable personal flotation device (PFD) to be utilized by shore or vessel-based operational personnel or personnel operating in non-moving water. PFDs must be approved by the U.S. Coast Guard. Includes common accessories such as attached pealless whistle	Wearable personal flotation device (PFD) to be utilized by shore or vessel-based operational personnel or personnel operating in non-moving water. PFDs must be approved by the U.S. Coast Guard. Includes common accessories such as attached pealless whistle	Bright in color with reflective trim and multiple adjustment straps to ensure a secure fit. May be inflatable. ----- Inflatable PFD is not recommended for primary floatation in moving water.  Air-inflated PFDs can also be utilized during firefighting operations around moving water and in rescue aircraft performing operations over water. →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>WA - Water Operations PPE</b>				
<b>06 - Ancillary Equipment - Continued</b>				
01WA-06-SNRK*	Snorkel, Diving	and signaling devices/lights. A breathing device used by divers and swimmers consisting of a long tube held in the mouth through which the user breathes surface air.	Barrel diameter varies, can be equipped with splash guards and one-way valves to prevent/minimize filling. ----- Depth, psychological limitations of the user.	
01WA-06-WGHT*	Weights, Diving	Weights for creating negative to neutral buoyancy to allow for work in a water environment. Includes weight belts and ankle weights.	Available in both hard and soft weight set-ups, as well as several different size ranges. Weights available in many different denominations. Quick release feature is important, particularly for ankle weights. ----- Belt must be properly sized for the user. Size of the belt determines maximum weight which can be added.	
<b>ZA - PPE Accessories</b>				
<b>01 - Personal Alert Safety Systems</b>				
01ZA-01-PASS*	System, Personal Alert Safety (PASS)	PASS Device - personal alert safety system (certified as compliant with NFPA 1982).	Personal alert safety systems (PASS) provide an alarm whenever the wearer is motionless for 30 seconds or more. PASS provide audible alarms to aid in the location of a downed firefighter or first responder. These devices are built to be relatively small, rugged, and resistant to extreme physical or environmental conditions. PASS may be either separate or integrated into SCBA. All PASS are required to be automatically activated when used. ----- Warning: PASS problems have been discovered in high temperature environments. Users are encouraged to review the NFPA News Item on this subject. A link to this item can be found in the Responder Knowledge Base using a keyword search on "PASS problem" (include quotation marks in search entry).  Note: The new (2007) edition of NFPA 1982 is effective as of December 20, 2006. The →	104, 113

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>ZA - PPE Accessories</b> 01 - Personal Alert Safety Systems - <i>Continued</i>		<p>“grace period” for products certified to the 1998 edition will end on August 31, 2007. PASS should be mounted such that the alarm signal will not be muffled if not part of the SCBA, and such that the device does not interfere with the wearing of other ensemble items. For use, see NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.</p>	
<b>ZA - PPE Accessories</b> 02 - Gloves & Footwear			
01ZA-02-FTWC  Covers, Outer Footwear	Disposable outer footwear covers for contamination hazard protection (no standard currently applies for this item - for certified medical footwear covers, see Item 01EM-01-FTWC).	<p>Footwear covers are rubber, textile, or plastic-based materials that are shaped into a cover that can be worn over boots. Footwear covers are intended to provide additional protection from contamination and, consequently, are disposable after use.</p> <p>-----</p> <p>Footwear covers should not interfere with ensemble wearing. The wear surface of the footwear cover should provide some level of traction to prevent slipping. The footwear cover design should not allow penetration of liquids in through the top of the cover. Consequently, the footwear cover should be worn on the ensemble in a fashion that will prevent any liquid entry at the top.</p>	51, 79
01ZA-02-GLVA*  Gloves, Protective, Abrasion/Puncture-Resistant	Abrasion/puncture-resistant gloves provide protection to the fingers and hands from sharp implements, needle sticks, and abrasive surfaces while providing the wearer with the necessary dexterity to fulfill mission requirements (certified as compliant with ANSI/	<p>Gloves are constructed of puncture-resistant materials and may have additional layers or special surfaces in the palm or back to afford additional physical protection in areas most likely to be subject to abrasion or puncture hazards.</p> <p>-----</p> <p>Gloves should provide a performance level of 3 for cut, puncture, and abrasion resistance when tested and classified in accordance with ANSI/ISEA 105. Gloves should be sized to minimize the impact of the gloves on hand function. Abrasion/puncture resistant gloves are not necessarily flame resistant unless demonstrated by testing. Use gloves in accordance with OSHA 29 CFR 1910.138. →</p>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## ZA - PPE Accessories

## 02 - Gloves &amp; Footwear - Continued

01ZA-02-GLVD* Gloves, Outer, Disposable	Outer disposable gloves for contamination protection (certified as compliant with ANSI/ISEA 105).	<p>Gloves may use a variety of different materials, are provided in different lengths and sizes, and may include other features such as grip finishes and cuff-end designs. Typical outer disposable gloves for NFPA 1994 and other ensembles are heavy rubber gloves that offer some additional permeation and physical hazard resistance.</p> <p>-----</p> <p>Unsupported gloves should be used which provide a performance level of 2 for cut, puncture and abrasion resistance when tested and classified in accordance with ANSI/ISEA 105. Supported gloves should be avoided as fabric inserts will absorb chemicals and other hazardous substances.</p> <p>These gloves should also be free from holes as required when tested and classified in accordance with ANSI/ISEA 105. Gloves should be sized to fit over existing ensemble glove system with minimum bulk to prevent loss of hand function. If rugged physical environment is involved, work gloves should be used in lieu of disposable outer gloves. Use gloves in accordance with OSHA 29 CFR 1910.138.</p>	51, 79
01ZA-02-GLVF* Gloves, Protective, Flame-resistant	Flame-resistant gloves that provide the wearer's fingers, hands, and wrists with protection from flash fires and short duration exposure to high heat, while still providing the wearer with sufficient dexterity to meet mission requirements (certified as compliant with ANSI/	<p>Flame-resistant gloves are constructed of different single-layer or multilayer intrinsically flame resistant materials. The gloves should extend at least 2 inches (50 mm) beyond the wearer's wrist crease and utilize a design that does not inhibit hand function.</p> <p>-----</p> <p>Gloves in this category should be tested, classified, and marked in accordance with ANSI/ISEA 105 for ignition resistance and burning, heat degradation resistance, conductive heat resistance, dexterity, and meet performance level 3 in each performance area. These gloves should not be used for handling hazardous materials or for operations where sustained exposure to high heat or flame may occur, such as fire fighting operations. Other protective clothing worn should also be flame resistant. Use gloves in accordance with OSHA 29 CFR 1910.138. →</p>	51, 79

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\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>ZA - PPE Accessories</b> 02 - Gloves & Footwear - <i>Continued</i>			
	ISEA 105).		
01ZA-02-GLVT* Gloves, Inner, Cotton	Inner cotton gloves (no standard currently applies for this item).	Knit cotton gloves worn under ensemble gloves for increased comfort. Gloves may be one-piece or formed from multiple pieces. ----- Gloves should fit intimately onto wearer's hands. Gloves must be 100% cotton and be relatively lightweight to prevent loss of hand function when worn with other gloves.	
01ZA-02-GLVW* Gloves, Outer, Work	Outer work gloves for physical hazard protection (certified as compliant with ANSI/ISEA 105).	Outer work gloves are made of materials that provide a relatively high degree of physical hazard resistance. Gloves are available in a variety of materials, construction styles, and cuff styles. ----- Work gloves should provide a performance level of 3 for cut, puncture and abrasion resistance when tested and classified in accordance with ANSI/ISEA 105. Outer work gloves are not necessarily flame resistant unless demonstrated by testing. Gloves should be sized to fit over existing ensemble glove system with minimum of bulk to prevent loss of hand function. Use gloves in accordance with OSHA 29 CFR 1910.138.	51, 79
<b>ZA - PPE Accessories</b> 03 - Eye Protection			
01ZA-03-EYEP* Protection, Eye	Eye protection for field operations, including polarized sun protection for water operations.	Personnel should have both shaded and clear lenses for day/night operations.	75

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>ZA - PPE Accessories</b>				
<b>04 - Hearing Protection</b>				
01ZA-04-HEAR	Protection, Hearing	Hearing protection for operations in potentially high noise environments.	Insert or muff style protection. ----- Check Noise Reduction Rating (NRR) for the particular intended use. Generally, ear muffs provide a higher degree of protection than inserts. In high noise areas, both may be worn.	54
<b>ZA - PPE Accessories</b>				
<b>05 - Undergarments</b>				
01ZA-05-UNDR	Undergarment, Non-Flame-Resistant	Non-flame-resistant undergarment for comfort and for contamination control during doffing (no standard currently applies for this item).	Undergarment(s) worn underneath garments will generally be constructed of a non-flame-resistant material with various options for sleeve ends (cut or elasticized), pant cuffs (cut, elasticized, or bootie feet), front closure (zipper or tape or combination), and hood design (open, drawstring, or elasticized). ----- The selected undergarment(s) should be relatively lightweight and not restrict movement. They should be sized for a relatively close fit with the individual to prevent interference with wearing of the ensemble.	104, 111, 120, 121
01ZA-05-UNFR	Undergarment, Flame-Resistant	Flame-resistant undergarment (certified as compliant with NFPA 2112 or the flame-resistant option of NFPA 1975).	Garments are constructed of intrinsically flame-resistant or flame-retardant treated materials of varying weights. Garment designs may include coveralls, or shirt and pant outfits with variations in specific styling features. ----- The selected coverall or pants and shirt should be relatively lightweight and not restrict movement. They should be sized for a relatively close fit with the individual to prevent interference with wearing of the ensemble. Even though NFPA 2112 is not intended for emergency response applications, garments certified to this standard are suitable as flame-resistant garments because they are tested to criteria that meet or exceed the flame-resistant garment option requirements in NFPA 1975 .  Use undergarments as specified in NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, 2007 Edition. Selection, care, use, and maintenance of →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>ZA - PPE Accessories</b> 05 - Undergarments - <i>Continued</i>			
		garments should be per NFPA 2113, Standard for Selection, Care, Use, and Maintenance of Flame Resistant Garments for Protection of Industrial Personnel Against Flash Fire, 2007 Edition.	
<b>ZA - PPE Accessories</b> 06 - Other Accessories			
01ZA-06-COOL  Garment/Vest/Device, Cooling	Cooling garment, vest, or device (no standard currently applies for this item).	Cooling garments may be active or passive, and involve a range of different technologies. Typical designs include vests and garments, though other types of devices such as vortex tubes and umbilical air lines can be used. Passive devices (such as “ice” vests) provide cooling without the ability for user adjustment. Active devices usually involve some form of circulating fluid or air, which may require a power source and peripheral equipment for operation. Devices differ in their cooling capacity, weight, bulk, complexity, operating conditions, and effectiveness.  ----- The efficiency and effectiveness of personal cooling devices are greatly influenced by the type of protective clothing being worn by the user. The effectiveness of a cooling garment worn under a non-permeable, vapor-tight protective ensemble is greatly reduced. The work rate of the user can also reduce effectiveness. Testing has shown that the efficacy of cooling garments is dramatically reduced at high metabolic work rates.  Tradeoffs exist between the additional weight and burden of cooling device versus its cooling performance. Some devices may add complexity to donning efficiency. The effectiveness of the device will vary with the type of technology used for cooling. There are advantages and disadvantages to each type of device. The selected device should work without interfering with the wearing of the selected ensemble, and without creating integrity or protection deficiencies.	87
01ZA-06-HHAT	Hardhat (certified as compliant to ANSI Z89.1).	Hardhat consists of shell with suspension; the suspension generally consists of a chin strap or nape strap (worn behind the head) or both. Some hardhats may contain padding for →	50, 76

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## ZA - PPE Accessories

## 06 - Other Accessories - Continued

Hardhat		additional impact protection. ----- Minimum hardhat should be a Class G (general). Hardhat is worn inside encapsulating suit for head protection. Selected suit must accommodate hardhat; the hardhat should not interfere with head movement or wearing of SCBA. Use of head protection should be in accordance with OSHA 29 CFR 1910.135.	
01ZA-06-HYDR Hydration System, Personal	Personal hydration system.	----- Some systems are not compatible with APRs. If this device is going to be used as and integrated item with respiratory protective equipment, then the device must have been included in the NIOSH approval. Organizations should consult with the NIOSH Approved Equipment List for the CBRN SCBA or CBRN APR. Sanitizing and care of these items must be carried out in accordance with the manufacturer recommendations.	
01ZA-06-PRPD Padding, Protective	General protective pads to provide protection for elbows, knees, neck, and shins while conducting operations, including rescue operations.		
01ZA-06-VEST* Vest or Outer Garment, High- visibility	High-visibility vest or outer garment (certified as compliant with either ANSI/ISEA 107 or ANSI/ISEA 207).	ANSI/ISEA 107 specifies three different visibility classes of apparel based on the intended use and activity of the wearer relative to ambient lighting and traffic speeds. Class 1 is the lowest class, Class 3 is the highest. Differences in the classes are based on the relative amount of background (fluorescent) and retroreflective materials. Fluorescent materials are intended for daytime visibility, while retroreflective materials enhance wearer visibility at night. ANSI/ISEA 107 specifies design requirements for the placement of reflective materials on clothing items. Fluorescent materials may be yellow-green, orange-red, or red. →	80, 81

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>ZA - PPE Accessories</b> 06 - Other Accessories - <i>Continued</i>		<p>ANSI/ISEA 207 specifies similar requirements for high-visibility vests used by public safety workers but establishes only a single level with minimum requirements for background and retroreflective materials.</p> <p>-----</p> <p>If worn, an outer high-visibility garment or vest should be selected so as to not interfere with the wearing of the ensemble. For ANSI/ISEA 107 garments, the appropriate class should be chosen based on the guidance provided in Appendix B.</p> <p>Public safety vests meeting ANSI/ISEA 207 use less background material and retroreflective material compared to Class 3 of ANSI/ISEA 107, which is met by full garments only. If public safety vests are selected, the vests should include a break-away feature, which is included as an option in ANSI/ISEA 207.</p> <p>NOTE: The requirements of the new 23 CFR 634, which become effective on 24 November, 2008, mandate that ANSI/ISEA 107 Class 2 or Class 3 apparel be worn by all workers within the right-of-way of a Federal-aid highway if they are exposed to traffic or construction equipment. ANSI/ISEA 207 is not mentioned in this rule. It is hoped that the rule will be amended to incorporate ANSI/ISEA 207, but purchasers should monitor this situation carefully.</p>	
<b>ZP - Ancillary Equipment</b> 00 - Miscellaneous	01ZP-00-GBAG  Bag/Box, Ensemble Gear Storage	Ensemble gear storage bag or box (no standard currently applies for this item).	Soft or hard container capable of holding ensemble and related equipment.  ----- Bag or box should be sufficiently large to prevent compression and overstuffing of equipment. Bag or box should also be free of sharp edges or rough surfaces that could damage ensemble materials.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 1 | Personal Protective Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
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**ZP - Ancillary Equipment**  
00 - Miscellaneous - *Continued*

01ZP-00-STOL Stool/Table, Portable or Foldable	Backless stool or table for use in donning/doffing protective equipment/garments.	Some stools or tables can be folded for portability. ----- Should be very sturdy and set on flat, even surface.	
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<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 2 – Explosive Device Mitigation and Remediation Equipment

### Overview

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This section was originally created in the Fall 2004 version of the SEL. The use of a separate major section of the SEL (and the DHS Authorized Equipment List) for this equipment underscores the criticality of bomb squad operations and the seriousness of the threat from Improvised Explosive Devices (IEDs) as both primary and secondary devices.

The IAB continues to support much-needed expansion of the bomb squad equipment list and the role of bomb squads in emergency operations. The IAB continues its close collaboration with the National Bomb Squad Commanders Advisory Board (NBSCAB) in identifying essential equipment and advising that the purchase of such equipment be limited to Accredited Bomb Squads. For many of the items in this section, readers will find the notation *“For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians”* in the Operating Considerations. The inclusion of this notation was an important milestone in setting guidelines for the purchase of specific bomb squad equipment.

### Changes for 2007

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This edition includes a set of changes designed to provide the closest possible alignment with the DHS Authorized Equipment List (AEL). Personal protective equipment items formerly in Section 1, such as the Search Suit and Reconnaissance Ensemble have been moved into this section and consolidated with equipment designed for use solely by accredited bomb squads. A new item has been added for blast and overpressure hearing protection. As usual, this edition also contains a number of minor edits and upgrades to existing items.

### Online Selection Factors

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Like most sections in the 2006 SEL, the online<sup>1</sup> version of the Explosive Device Mitigation and Remediation Equipment Section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For this section, the SubGroup chose to use Proficiency Level and Hazard Environment (described below) as the two factors. Every online item is “tagged” for each appropriate combination of factors. Thus users of the online version can choose any combination of Proficiency Level and Hazard Environment, and the system will provide a list of all items tagged for that combination.

The first selection factor is Proficiency Level. In addition to any specific training required to operate an individual piece of equipment, the equipment operator must possess the skills necessary to meet the recommended proficiency level. The factors considered in determining this level include the anticipated location of operation of the equipment (i.e. hot zone, warm zone, or cold zone), the complexity of the equipment, and the necessity of chemical or biological training or expertise. The definitions used for proficiency levels have been adapted using *NFPA 472, Standard for Professional Competence of Responders to Hazardous Materials Incidents*, as a starting point. They are:

- **Awareness Level.** Responders at the awareness level are those persons who, in the course of their normal duties, can be the first on the scene of an incident. First responders at the awareness level are expected to recognize the presence of hazardous materials, protect themselves, call for trained personnel, and secure the area.

<sup>1</sup> The on-line version is available on the Responder Knowledge Base, [www.rkb.mipt.org](http://www.rkb.mipt.org).

- **Operational Level.** Responders at the operational level are those persons who respond to WMD incidents as part of the initial response to the incident for the purpose of protecting nearby persons, the environment, or property.
- **Technician Level.** Technicians are those persons possessing special training who respond to incidents for the purpose of control, active response, or remediation. Technicians are expected to use specialized equipment such as chemical protective clothing and control equipment.
- **Specialist Level.** Specialists are those persons possessing advanced special training who respond to incidents for the purpose of providing specialized assistance in control, active response, or remediation. Specialists are expected to use complex equipment to perform tasks restricted to those with specific advanced training.
- **Command Level.** Command level personnel include the incident commander and other staff members. The incident commander is that person responsible for all decisions relating to the management of the incident and site operations.

The second selection factor is the Hazard Environment(s) for which each item is suitable. The values for this factor address the commonly used CBRNE nomenclature. However, for our purposes it is useful to represent the Nuclear “N” as part Thermal, part Explosive, and part Radiological. Therefore, the values used are:

- Chemical
- Biological
- Radiological
- Thermal
- Explosive

## Section 2 | Explosive Device Mitigation and Remediation Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
EX - Equipment 00 - General				
02EX-00-EXEN	Explosive entry equipment, upgrades. Used for explosive tactical entries.	Explosive entry equipment, upgrades. Used for explosive tactical entries.	----- For use by properly trained individuals only.  For other tactical entry equipment, see Item 20TE-00-NTRY.	
02EX-00-EXMP*	Portable or transportable magazines, Portable or Transportable, Explosive	Portable or transportable magazines for short or long-term storage and transport of explosive materials, possible IEDs, or other suspected CBRNE devices to and from incident scene. Includes any movable magazines, including those requiring crane lift/placement.	----- For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.	
02EX-00-KTFO	Kit, Fiber Optic	Fiber optic kit (inspection or viewing).	----- Potential application both in law enforcement surveillance mode and technical rescue search mode.	
02EX-00-MITA	Mitigation Area, Explosive	Explosive/bomb mitigation areas, explosive training, upgrades.	----- Area in which the bomb technician can safely mitigate/train for Improvised Explosive Devices (IED).  For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 2 | Explosive Device Mitigation and Remediation Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
02EX-00-PBIE* Equipment, Post Blast Investigation	Equipment for post-blast investigation, explosives/Improvised Explosive Device (IED) investigation tools, portable and hand held metal detectors (HHMD), evidence processing equipment, upgrades.	Includes equipment for marking, sampling, collecting, photographing, and processing.	
02EX-00-TCVV* Vessel, Containment	Containment vessels (including vented, total containment (TCV), and transport), for containment, transportation, temporary storage, or destruction of any explosive material, ammunition, or CBRNE device.	----- For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.	
02EX-00-TCVV* Upgrades, Containment Vessel	Upgrades for containment vessels.	Includes items such as ramps for robot accessibility, detection equipment, evidence sampling kits, venting upgrades, containment enhancements, and inspection cameras. ----- For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.	

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Section 2 | Explosive Device Mitigation and Remediation Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<p><b>EX - Equipment</b> 01 - X-Ray Equipment</p> <p>02EX-01-XRAP X-Ray Unit, Portable or Transportable</p>	<p>Portable or Transportable X-Ray Unit, related attachments and equipment, film, image screens, computers for image storing/transmission, upgrades.</p>	<p>----- Ability to remotely x-ray a suspect package and save/transmit images.  For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.</p>	
<p><b>EX - Equipment</b> 02 - Tools</p> <p>02EX-02-RBTL Attachments/Tools, Robot</p>	<p>Attachments and tools for use in the explosive mitigation and remediation mission.</p>	<p>For use with robot platform. See 03OE-07-ROBT.  For accreditation purposes, a robot is defined by the National Bomb Squad Commanders Advisory Board as including the following features:                      1) A remote platform guided by remote control capabilities or a tethered line;                      2) Ability to support a camera and project a working image back to the operator's location and allow the operator to manipulate the robot;                      3) Ability to pick up and manipulate items using a claw-gripper; and                      4) Ability to remotely fire a disrupter.</p> <p>----- Ensure compatibility with selected robotic platform, including additional power requirements.  Test capability for remote imaging and operation in conditions and environments similar to those anticipated for operation, with particular attention to maintaining signal in environments with RF obstructions.</p> <p>For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the →</p>	

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## Section 2 | Explosive Device Mitigation and Remediation Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
02EX-02-TLEX Tools, Explosive Mitigation, Suppression, Deflection	Explosive tools for Improvised Explosive Device (IED) remediation, such as boot bangers, shape charges, explosive/CBRN mitigation tents, bomb blankets, blast suppression.	National Guidelines for Bomb Technicians.  ----- For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.	
02EX-02-TLPB* Tools, Bomb Disabling	Disabling tools, disrupters, disrupter operational attachments, and upgrades for disabling Improvised Explosive Devices (IED), including Vehicle-Borne and Radio-Controlled Improvised Devices.	----- For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.	
02EX-02-TLRO Tools, Remote Opening, Examination, Handling	Remote opening tools such as rigging kits, pulleys, clamps, poles, probes, mirrors, hand, electric, pneumatic, remote opening, stethoscope, IED handling tools, non-sparking tools, etc.	----- For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.	

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## Section 2 | Explosive Device Mitigation and Remediation Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
PE - Protective Ensembles 01 - Ensembles			102
02PE-01-BSUT* Suit, Improvised Explosive Device/ Explosive Ordnance Disposal (IED/EOD) Protective Ensemble	Suit to provide protection from fragmentation, blast overpressure, heat and light flash, and flame generated by an Improvised Explosive Device (IED), explosives, or Unexploded Ordnance (UXO).	<p>This type of protective ensemble is a whole body protective outfit that can be rapidly donned and doffed. The protective ensemble must allow the wearer adequate situational awareness, mobility and comfort when conducting reconnaissance, render safe, or disruption procedures involving an explosive threat device. These types of protective ensembles can offer limited chemical and biological threat protection depending on specific manufacturer designs.</p> <p>-----</p> <p>This type of protective ensemble is not specifically designed to provide protection to the wearer from chemical, biological or radiological threats. However, this ensemble can be worn with protective ensembles designed for these types of threat hazards. Bomb disposal technicians wearing these types of protective ensembles can be subjected to the physiological effects of heat stress. Commercial personal cooling systems are sold as accessory components to these types of ensembles. Additional ensembles may be needed for chemical/biological protection (see NFPA 1994, Class 2 or 3 ensembles).</p> <p>For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.</p>	124, 127, 128
02PE-01-RCON* Ensemble, Reconnaissance, Improvised Explosive Device/ Explosive Ordnance Disposal (IED/EOD)	IED/EOD protective ensemble intended to protect the head and torso from explosive fragmentation and flame. Includes ballistic helmet, ballistic face shield, and ballistic vest.	<p>Should be constructed with flame-resistant and fire-retardant materials. Protection up to .30 caliber / 7.62mm threat rounds, to include armor-piercing.</p> <p>-----</p> <p>Refer to NIJ Guide 100-01, Selection and Application Guide to Personal Body Armor for appropriate selection and use of body armor. 100% protection from ballistic threats in all circumstances is impossible. Body armor selection is, to some extent, a tradeoff between ballistic protection and wearability. The selection of appropriate threat levels is important to ensure that wearers have an adequate level of ballistic threat protection for the environment in which they operate. The NIJ standard identifies protection classifications as Type I, IIA, II, IIIA, III and IV. These protection classifications cover threats from hand guns to rifles, →</p>	

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## Section 2 | Explosive Device Mitigation and Remediation Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>PE - Protective Ensembles</b>				
<i>01 - Ensembles - Continued</i>				
02PE-01-SRCH*	Suit, "Search", Improvised Explosive Device/Explosive Ordnance Disposal (IED/EOD) Protective Ensemble	Suit to provide protection from fragmentation, blast overpressure, heat and light flash, and flame generated by an IED. Suit to be worn in an IED search and location function or with chemical / biological or respiratory protection equipment.	including armor piercing rounds. Manufacturer instructions related to the care of the outer shell vest (carrier) must be followed.  This type of protective ensemble is a whole body protective outfit that can be rapidly donned and doffed. The protective ensemble must allow the wearer adequate situational awareness, mobility and comfort when conducting reconnaissance, render safe, or disruption procedures involving an explosive threat device. ----- This type of protective ensemble is not specifically designed to provide protection to the wearer from chemical, biological or radiological threats. However, this ensemble can be worn with protective ensembles designed for these types of threat hazards. Bomb disposal technicians wearing these types of protective ensembles can be subjected to the physiological effects of heat stress. Commercial personal cooling systems are sold as accessory components to these types of ensembles. Additional ensembles may be needed for chemical/biological protection (see NFPA 1994, Class 2 or 3 ensembles).  For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.	124, 127, 128
<b>PE - Protective Ensembles</b>				
<i>02 - Elements</i>				
02PE-02-BOOT*	Boot, IED/EOD	Heavy-duty, non static-producing footwear for use with IED/EOD ensembles.	Leather preferred, with non-skid soles. Must be non static-producing. ----- Compatibility with ensemble.	
02PE-02-CLTH*	IED/EOD protective outer clothing used in	IED/EOD protective outer clothing used in	Clothing and gear should be constructed with flame-resistant and fire-retardant materials. ----->	102

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 2 | Explosive Device Mitigation and Remediation Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
PE - Protective Ensembles 02 - Elements - <i>Continued</i>			
Clothing, Operational, and Specialized/ Protective Gear IED/ EOD	conjunction with recon ensemble or in lieu of full protective ensemble for known minimum threat situation.	Use only with known minimum threat.	
02PE-02-HAND* Equipment, Hand Protection, IED/EOD	Hand protection component to IED/EOD protective ensemble system; protective gloves and ballistic hand covers.	Protective handwear should be constructed with flame-resistant and fire-retardant materials, but still allow adequate hand dexterity for the wearer to perform explosive device mitigation and disposal operations. ----- Compatibility with ensemble.  For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.	
02PE-02-HEAR* Protection, Ear, Blast and Overpressure Threat	Molded ear plugs or other device to be worn under the ballistic protective helmet.		
02PE-02-HLMT* Equipment, Head and Face Protection, IED/EOD	Helmet Protective System Component of IED/EOD Protective Ensembles. Includes ballistic helmet and face shield compatible with bomb suit or search suit above. Includes face	The protective helmet component provides an easily adjustable, comfortable helmet retention and suspension system that provides maximum stability and retention while facilitating removal during doffing. A washable, flame-resistant head cover, such as a balaclava, should be provided and used with this protective helmet component. The helmet must provide adequate protection against fragmentation and ballistic threats to the neck, head and face. The helmet must also provide appropriate protection against impact from the ground or other stationary objects. →	102

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 2 | Explosive Device Mitigation and Remediation Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
PE - Protective Ensembles	02 - Elements - <i>Continued</i>	shields with vision correction capability (using either a prescription shield or overlay).	<p>-----</p> <p>For operations in a chemical or biological contaminated environment, IED/EOD protective helmet systems can be procured with integrated inhalation protection. These types of helmets can also be used with NIOSH-CBRN certified respiratory protective equipment to provide inhalation protection in the event of a chemical, biological or radiological threat release. Integrated communications (radio) systems are available from manufacturers and vendors.</p> <p>Performance criteria and standards are currently being developed by NIJ and DHS under the management oversight of NIST- Office for Law Enforcement Standards (OLES) with technical support from Army Natick Soldier Center.</p> <p>For use by accredited public safety bomb squads that meet the accreditation standards as defined by the National Bomb Squad Commanders Advisory Board and outlined in the National Guidelines for Bomb Technicians.</p>

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## Section 3 – CBRNE Operational and Search & Rescue Equipment

### Overview

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This section contains equipment needed to sustain operations during operational and search and rescue response operations. This edition incorporates major changes (noted below) in two major areas: first, the initiative by the Personal Protective and Operational Equipment (PP&OE) SubGroup to incorporate water operations equipment into the SEL; and second, further improvements to the alignment between the SEL and the DHS Authorized Equipment List (AEL).

### Changes for 2007

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This section has the most changes of any SEL section in this edition. In addition to routine edits throughout the section, the 2007 edition includes the following major changes:

- 22 new items have been added to a new category within this section called Water Operational & Search/Rescue Equipment.
- 8 items from the vehicles category have been moved to the new Section 12 (CBRNE Incident Response Vehicles).
- The item for Aircraft Mass Casualty Conversion Equipment/Kits has been moved to the new Section 18 (CBRNE Aviation Equipment).
- 21 items from the logistics support equipment category have been moved to the new Section 19 (CBRNE Logistical Support Equipment).
- The item for vehicle and equipment maintenance packages has been moved to the new Section 21 (Other Authorized Equipment).

### Online Selection Factors

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The online<sup>1</sup> version of the CBRNE Operational and Search & Rescue Equipment Section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For this section, the SubGroup chose to use Proficiency Level and Hazard Environment (described below) as the two factors. Every online item is “tagged” for each appropriate combination of factors. Thus users on the online version can choose any combination of Proficiency Level and Hazard Environment, and the system will provide a list of all items tagged for that combination.

The first selection factor is Proficiency Level. In addition to any specific training required to operate an individual piece of equipment, the equipment operator must possess the skills necessary to meet the recommended proficiency level. The factors considered in determining this level include the anticipated location of operation of the equipment (i.e. hot zone, warm zone, or cold zone), the complexity of the equipment, and the necessity of chemical or biological training or expertise. The definitions used for proficiency levels have been adapted using *NFPA 472, Standard for Professional Competence of Responders to Hazardous Materials Incidents*, as a starting point. They are:

- **Awareness Level.** Responders at the awareness level are those persons who, in the course of their normal duties, can be the first on the scene of an incident. First responders at the awareness level are expected to recognize the presence of hazardous materials, protect themselves, call for trained personnel, and secure the area.
- **Operational Level.** Responders at the operational level are those persons who respond to WMD

<sup>1</sup> The on-line version is available on the Responder Knowledge Base, [www.rkb.mipt.org](http://www.rkb.mipt.org).

incidents as part of the initial response to the incident for the purpose of protecting nearby persons, the environment, or property.

- **Technician Level.** Technicians are those persons possessing special training who respond to incidents for the purpose of control, active response, or remediation. Technicians are expected to use specialized equipment such as chemical protective clothing and control equipment.
- **Specialist Level.** Specialists are those persons possessing advanced special training who respond to incidents for the purpose of providing specialized assistance in control, active response, or remediation. Specialists are expected to use complex equipment to perform tasks restricted to those with specific advanced training.
- **Command Level.** Command level personnel include the incident commander and other staff members. The incident commander is that person who is responsible for all decisions relating to the management of the incident and site operations.

The second selection factor is the Hazard Environment(s) for which each item is suitable. The values for this factor address the commonly used CBRNE nomenclature. However, for our purposes it is useful to represent the Nuclear “N” as part Thermal, part Explosive, and part Radiological. Therefore, the values used are:

- Chemical
- Biological
- Radiological
- Thermal
- Explosive

## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>OE - Operational Equipment</b>			
<b>01 - Law Enforcement</b>			
03OE-01-BGEV* Bags / Canisters, Evidence	Bags or canisters for evidence storage and preservation.	Airtight. Ability to be permanently labeled and/or sealed. ----- Chemical compatibility.	
03OE-01-LINE* Line, Linen, Fast Rope	Linen line used for vertical personnel insertion (fast rope) in tactical environments.	Protective collar for attachment. ----- Extensive personnel training required. Consider compatibility with aircraft gantry. Length is generally between 60 and 120 feet.	
03OE-01-LLMN* Equipment, Less Lethal Mitigation	Less lethal mitigation equipment for use in tactical law enforcement operations conducted in critical locations.	----- Specialized needs require a variety of less lethal equipment for situations such as force protection, suspect apprehension, and venues such as refineries, pipelines, aircraft entries, etc.	
03OE-01-SPRS* Suppressors, Flash/ Noise, Tactical	Suppression devices that, when attached to a delivery system, reduce or eliminate flash or noise during discharge.	Quick attach/detach. Lightweight, minimal impact on operation/balance. ----- Consider operating life. Caution: suppression of visible flash does not guarantee safe operation in explosive/combustible environments.	
03OE-01-SSYS* System, Sighting Enhancement, CBRNE PPE	Includes systems such as laser “red dot” sights, infrared, holographic and flat screen displays, and other systems designed	Ability to aim weapon or delivery system without normal “iron sight” sighting techniques. ----- Consider range, accuracy, compatibility with delivery system(s) and compatibility with PPE such as NFPA 1994, 1992 or 1991 ensembles in a tactical environment. →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in this edition.

## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>OE - Operational Equipment</b> 01 - Law Enforcement - <i>Continued</i>	Compatible	to allow sighting/aiming of weapons or less than lethal delivery systems in a CBRNE environment requiring PPE. Also includes mounting hardware and accessories such as rails, risers, etc.	
03OE-01-VSTO	Operational vests; duty gear and modular load bearing systems.	Capable of carrying multiple items such as radio, flashlight, camera, munitions, and antidote/decon kits. ----- Depending upon mission, consideration should be given to high or low visibility vest.	
Vests, Operational			
<b>OE - Operational Equipment</b> 02 - Optics			
03OE-02-BNOC*	Optical systems that permit remote observation during field operations.	Water-resistant, shock-resistant, compact, carrying case, lightweight.	
Binoculars/Scopes			
03OE-02-FIBR*	Fiber optic systems that permit remote observation during field operations.	Should be water-resistant, have integrated illumination and have a carrying case. Articulated or adjustable field of view. ----- May be conductive; consider shock hazard during deployment.	
Systems, Fiber Optic			
03OE-02-LASR	A distance-measuring device capable of in-stantaneously measuring distance to target with	Lightweight, handheld, battery powered. ----- Used for scene evaluation and structural monitoring. Should be ruggedized or drop-resistant. →	
Range Finder, Laser			

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>OE - Operational Equipment</b>			
<b>02 - Optics - Continued</b>			
	accuracy of +/- one yard/meter.		
03OE-02-SCOP Spotting Scopes/ Surveillance Telescopes	Optics capable of use in long-range, sometimes long-term, observation of tactical, structural stability, or rescue operations.	Zoom capable, mount compatible, drop-resistant, water-resistant, lightweight, portable. ----- Normally used in tripod mount configuration.	
03OE-02-TILA* Optics, Thermal Imaging and/or Light Amplification	Thermal imaging and/or light amplification optics, including night vision equipment and Forward Looking Infrared (FLIR) for search operations involving trapped or lost victims or tactical operations.	Video transmission, recording, and overlay; image size. Waterproof; heat-resistant, durable case with interior construction designed to protect screen and other components. ----- No models currently rated as intrinsically safe for use in flammable atmospheres. Battery life, availability, recharge time or time to replace. Usability by personnel wearing heavy gloves.	123
<b>OE - Operational Equipment</b>			
<b>03 - Scene Control</b>			
03OE-03-CACS System, Capture and Containment	Capture and containment system for hazardous material spills.		
03OE-03-GLRL System, Marking,	Marking system, Green Line/Red Line, battery activated or appropriate	LEDs or chemical lights for use in low visibility areas. →	

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>OE - Operational Equipment</b> 03 - Scene Control - <i>Continued</i>				
Green Line/Red Line		substitute.		
03OE-03-KTCL*		Chemical leak control kit.	Plugging and patching kits of varying sizes and configurations. ----- Requires prior identification of material(s) involved, and appropriate PPE for exposed personnel.	
03OE-03-KTFA		Trauma type first aid kit, including bulk dressings and bandages, splints, occlusive dressings and associated supplies for treating trauma patients in a field environment.	Portable, back-pack construction; separate pouches/pockets for organization and rapid access to different materials; water-resistant; decontaminable. ----- Consider durability/resistance to normal decontamination procedures. Should be brightly colored for easy identification during rescue operations, but also available in subdued colors (black, camouflage, etc.) for tactical operations.	
03OE-03-LOTO		Lock Out/Tag Out system to secure, control, or block mechanical, electrical, hydraulic, or pneumatic systems or components to ensure protection of personnel.	Portable kit; reusable. ----- Use is required for confined space entries when systems encroach on workspace and create a potential hazard to entrants.	53
03OE-03-LTPA		Portable area illumination for work areas, rescue sites, and staging areas during night operations or in areas with insufficient ambient light.	Lightweight, portable, externally powered, drop-resistant, extendable or towable mounts. ----- Extendable mounts are useful both for positioning and to extend height.	123

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>OE - Operational Equipment</b>			
<i>03 - Scene Control - Continued</i>			
03OE-03-MEGA System, Public Address, Handheld	Battery powered megaphone / public address system with corded microphone.	Lightweight, portable, handheld; remote microphone feature, variable volume. ----- Useful for crowd control or briefing incident personnel.	
03OE-03-SIGN* Signs	Restricted access and caution warning signs, preprinted or field printable, various colors, sizes, and shapes. Includes traffic cones and other free-standing signage, as well as mountable items.	Wind/weather resistance. Various materials, such as tag board or sheet plastic. ----- Night visibility. Mountable on hard surfaces.	
03OE-03-TIMR Timer	Timer or stopwatch used for monitoring rescuer time on cylinder, entry time/duration, or any other operation requiring accurate time documentation.	Water resistant, drop resistant, digital or analog. ----- Day/night readability, large font/face.	
<b>OE - Operational Equipment</b>			
<i>04 - Safety Equipment</i>			
03OE-04-BALA Balaclava, Fire Resistant	Fire resistant/retardant hood that affords head protection in the event of flash fire.	Nomex or similar fire-resistant material. ----- Compatibility with respiratory protection; may increase rescuer fatigue due to heat retention. Recommend items that meet the protective hood requirements of NFPA 1971 or NFPA 2112.	110, 120

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>OE - Operational Equipment</b>				
<b>04 - Safety Equipment - Continued</b>				
03OE-04-CRNT*	Detectors, Current	Equipment for detecting and/or measuring AC or DC current. Includes non-contact detectors for use in finding “live wiring” in walls or collapsed structures.	Should have both audible and visual alarms/indicators. ----- Must be compact, lightweight, and usable in close quarters.	
03OE-04-EXAC	Extinguisher, Fire, Class ABC	Class ABC fire extinguisher, multi-purpose, handheld, 20 lb capacity.	Non-conductive hose assembly; rechargeable; portable. Mounting brackets for wall or vehicle. ----- Not effective for Class D fires.	103
03OE-04-EXDD	Extinguisher, Fire, Class D	Portable Class D Fire extinguisher.	Pressure operated or manual. ----- For use on small amounts of metals. Not effective on Class A, B, or C fires.	103
03OE-04-GRCA	Cables, Grounding	Grounding cables, point-type clamps on both ends; 1/8” stainless steel (uninsulated) 50’ minimum.	Reducing risk of static electricity discharge in movement of flammable liquids, grounding and bonding operations. ----- During transfer operations involving flammable/combustible liquids, containers should be bonded together and grounded.	122, 123
03OE-04-GRRD	Rod, Copper Grounding	Copper grounding rod, 3/4” x 6’ (minimum length) with slide hammer or driver for demolition hammer.	For use in reducing risk of static electricity discharge during movement of flammable liquids, grounding, and bonding operations. ----- Used for bonding and grounding equipment.	122, 123

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
03OE-04-GRRT* Tester, Ground Resistance	Ground resistance tester.	May be clamp-on style or utilize probes. ----- Electrical resistance (Ohm) measurement device to ensure proper grounding and bonding. Ground resistance checks should be incorporated into critical procedures, such as movement of flammable liquids.  Consider whether 2, 3, or 4-point testing may be required by mission scenarios.  Check usability when wearing PPE.	123
03OE-04-HSMN Monitor, Heat Stress	Heat stress monitor (ambient and personal).	Area monitoring of wet bulb temperatures (WBGT) or personal monitor.	
03OE-04-KTTL Kit, Tool, Miscellaneous, Non-sparking	Non-sparking tool kit, to include bung and spanner wrenches and tool box.	Tool for use with flammable liquids or in Lower Explosive Limit (LEL) environments. ----- Use of non-sparking tools does not eliminate all sources of ignition.	
03OE-04-LTHE* Light, Personal, Intrinsically Safe	Compact, hand-held lights or lights mounted on helmets or equipment, or otherwise worn by the user for use in tactical operations and in potentially flammable atmospheres. Includes high-intensity lights as well as light sticks.	May use conventional bulb, light-emitting diode (LED), or chemical reaction.  Desirable features for electric lights: high intensity, ability to change beam focus, rechargeable, waterproof; drop resistant. Handheld units need wrist strap or other means of securing unit. Picatinny rail attachable if intended for use on law enforcement tactical equipment. ----- Intrinsically safe equipment is defined as “equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited →	123

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>OE - Operational Equipment  
04 - Safety Equipment - *Continued*

		concentration.” (ISA-RP12.6)  Electrical products should be listed in accordance with NFPA 70.  Consider mounting system compatibility with mission requirements, including compatibility with PPE. Also consider battery type, life, and availability, and compatibility with existing batteries or charging systems. For light sticks, consider service life and quantity required.  Two types of personal lighting options should be utilized in SAR operations.
03OE-04-LTHH Light, Hand-Held or Helmet-Mounted Illumination	Hand-held lights or lights mounted on helmets or otherwise worn by the user for use in non-flammable or non- explosive atmospheres.	Waterproof, drop-resistant. ----- Not for use in explosive environments (see 03OE-04-LTHE for intrinsically safe equipment intended for use in explosive environments).  Consider mounting system compatibility with mission requirements. Also consider battery type, life, and availability, and compatibility with existing batteries or charging systems.  Two types of personal lighting options should be utilized in SAR operations.
03OE-04-MMTR* Multi-Meter, Electrical	Intrinsically safe electrical multi-meter, or VOM (Volt Ohm Meter).	Digital or analog. Should include cables, tips, and protective case. ----- Intrinsically safe equipment is defined as “equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration.” (ISA-RP12.6)  Products should be listed in accordance with NFPA 70. →

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Section 3 | CBRNE Operational and Search & Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>OE - Operational Equipment</b> 04 - Safety Equipment - <i>Continued</i>			
Check usability when wearing PPE.			
<b>OE - Operational Equipment</b>			
05 - Rope Safety			
03OE-05-HARN* Harnesses, Life Safety/ Rappelling	Body harnesses used to support a person during rappelling or rope rescue operations (certified as compliant with NFPA 1983).	Various materials and attachment point designs. ----- Durability; number/type of hard attachment points; compatibility with PPE. Personnel need to be properly trained in these functions based upon applicable standards.	114
03OE-05-ROPE* Rope, Life Safety	Rope of various diameters, lengths, and ratings used specifically for human rescue, egress, hoist, or transport (certified as compliant with NFPA 1983).	Not all rope/software used in rescue operations is considered “life safety” rope. Life safety rope should be certified as compliant with NFPA 1983. ----- Consider whether product is certified under “general duty” or “light duty” under NFPA 1983. General duty is recommended for third-party rescue, while light duty is more suited to individual egress.  Consider dynamic vs. static ropes; rescue vs. tactical operations; effects of chemical, heat, and prolonged sunlight exposure. Personnel must be properly trained in accordance with appropriate standards.  High visibility ropes and software should be utilized in water operations. Rope and software utilized in water operations should be used only in water operations and not in life safety situations.	114
03OE-05-ROPH* Hardware, Rappelling	Rappelling/rescue hardware, including ascenders, descenders,	Not all hardware used in rescue operations is covered under NFPA 1983. Check the standard, and use certified equipment where possible. ----- →	114

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>OE - Operational Equipment</b>				
<b>05 - Rope Safety - Continued</b>				
or Rescue Operations, Life Safety		friction devices, hand rope grabs, carabiners, plates, racks, etc. (if covered, certified as compliant with NFPA 1983).	Stainless steel hardware, though heavier, tends to be more durable. Recommend aluminum for use in water operations. Personnel trained in accordance with appropriate standards.	
03OE-05-ROPS*		Includes items such as: Prusik cords, softrope grabs, bags, webbing, rope protection (certified as compliant with NFPA 1983).	Not all rope software used in rescue operations is considered “life safety” software. Life safety rope software should be certified as compliant with NFPA 1983. ----- Compatibility with existing ropes and hardware. High visibility ropes and software should be utilized in water operations. Rope and software utilized in water operations should be used only in water operations and not in life safety situations.	114
Software, Rope, Life Safety				
<b>OE - Operational Equipment</b>				
<b>07 - Robots and Remotely Operated Vehicles</b>				
03OE-07-ROBT		Robotic platforms to support various mission areas such as explosive device remediation, hazardous materials operations, tactical law enforcement operations, search & rescue, and surveillance/detection.	Attachment points for camera, sensors, and other devices. ----- Consider operating time limitations and range for controllability. Robotic software elements should comply with the interoperability standards set by the Joint Architecture for Unmanned Systems (JAUS, see www.jauswg.org). JAUS has been endorsed by the National Bomb Squad Commanders Advisory Board.	
Robots				
03OE-07-RPVS		Remotely piloted vehicles to support various mission	Attachment points for camera, sensors, and other devices. ----- →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in this edition.

## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<p><b>OE - Operational Equipment</b> 07 - Robots and Remotely Operated Vehicles - <i>Continued</i></p> <p>Vehicles, Remotely Piloted</p>	<p>areas such as explosive de-vice remediation, hazardous materials operations, tactical law enforcement operations, search &amp; rescue, and surveillance/detection. Examples include unmanned aerial vehicles (fixed or rotary-wing), submersible vehicles, and remotely-controlled ground vehicles.</p>	<p>Consider operating time limitations and range for controllability.</p> <p>Robotic software elements should comply with the interoperability standards set by the Joint Architecture for Unmanned Systems (JAUS, see <a href="http://www.jauswg.org">www.jauswg.org</a>). JAUS has been endorsed by the National Bomb Squad Commanders Advisory Board.</p>	
<p>03OE-07-UPGD*</p> <p>Upgrades, Robots or Remotely Piloted Vehicles</p>	<p>Upgrades or accessories to basic robot or RPV platforms, including software upgrades, battery/engine upgrades, range extenders, trailers, etc. Mission specific upgrades such as detectors and disrupters are detailed in other sections such as Explosive Tools, Search &amp; Rescue, and Detection.</p>	<p>-----</p> <p>Robotic software elements should comply with the interoperability standards set by the Joint Architecture for Unmanned Systems (JAUS, see <a href="http://www.jauswg.org">www.jauswg.org</a>). JAUS has been endorsed by the National Bomb Squad Commanders Advisory Board.</p>	

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SR - Search &amp; Rescue Equipment</b>				
<b>01 - Pneumatic Equipment</b>				
03SR-01-ABAG*	Airbag, Lifting, Low or High Pressure	Low or high pressure airbag lifting systems, bags, regulators, hoses, controllers, accessories and attachments for lifting heavy objects to extricate trapped victims.	Thin - ability to gain access in small areas. Large lifting capability, rapidly deployable in field. Integrated straps/handles on larger bags to facilitate handling. ----- Must be used in conjunction with shoring or stabilizing systems to provide safety.	
03SR-01-COMP*	Compressor, Industrial Air	Working air compressor, storage systems, accessories and attachments for powering pneumatic tools, systems and equipment. NOT to be utilized for compression of breathing air or supplying breathing air systems.	Gasoline or electric powered, portable or with wheel kit, integrated regulator. Electrical units should meet requirements of NFPA 70. ----- NOT to be utilized for compression of breathing air or supplying breathing air systems.	123
03SR-01-SHOR*	Equipment/System, Shoring	Expandable shoring and raker systems, regulators, controllers, hoses, accessories and attachments for stabilization of unstable loads or structures.	Manual locking vs. auto-locking, high-strength, rapidly deployable in the field, reusable. ----- Personnel utilizing this equipment must have specific training on structural shoring theory and proper implementation.  Pneumatics extend shore only, load supported by locking system. Must be utilized on static load or in conjunction with lifting system.	
03SR-01-TLPN	Tools, Hand,	Pneumatic-powered hand tools, accessories and attachments for cutting,	Lightweight, ability to fit into small spaces. ----- Reduces time to assemble and disassemble machinery. Requires eye, hand and hearing →	

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Section 3 | CBRNE Operational and Search & Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SR - Search &amp; Rescue Equipment</b>			
<b>01 - Pneumatic Equipment - Continued</b>			
Pneumatic	breaking, drilling or chiseling wood, steel, concrete and other materials. Includes tools for applying or removing fasteners.	PPE.	
<b>SR - Search &amp; Rescue Equipment</b>			
<b>02 - Tools</b>			
03SR-02-MARK Tools, Structural Assessment, Marking and Monitoring	Tools, equipment, accessories and attachments for assessing, marking and monitoring damaged structures and their stability.	Provides a means to survey, document, and monitor damaged structures and danger to rescue personnel. ----- Requires additional training beyond rescuer level.	
03SR-02-SPRY Sprayers, Handheld and Backpack	Handheld and backpack spray tanks/bladders and attachments, air pressure or manual pump operated.	Limited volume, limited flow, portable, rapidly deployable in field. ----- Not for application of toxic or combustible materials. Utilized for application of water for fire suppression, controlling dust or cooling of cutting/boring tools.	
03SR-02-TLHN Tools, Hand	Manually operated hand tools, cutting torches, exothermic torches, accessories and attachments for cutting, prying, shoring, stabilizing, moving, applying or removing fasteners where powered tools are	Manually operated, non-powered. ----- Utilization of appropriate PPE for task. →	

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>SR - Search & Rescue Equipment  
02 - Tools - Continued

	not appropriate or safe to use.			
03SR-02-TPEL Tools, Power, Electric	Electrically-powered portable saws, cutters, breakers, drills, pumps, accessories and attachments.	Portable, lightweight, operable by a single operator. ----- Utilization of applicable PPE for task. Not intrinsically safe.	108	
03SR-02-TPGS* Tools, Gasoline-Powered	Internal combustion engine, gasoline-powered portable cutting saws, drills, breakers, coring tools, accessories and attachments for rescue operations.	Lightweight, portable, operable by single operator. ----- Utilization of applicable PPE for task. Not intrinsically safe. Requires ventilation or close monitoring of atmosphere in enclosed areas.	108	
03SR-02-TPHY* Tools, Power, Hydraulic	Portable hydraulically-operated tools and power units, hoses, accessories and attachments for rescue operations. Internal combustion, electric power unit, or manual power unit.	Portable, operable by a single operator. Generally safer to use in areas of limited ventilation. ----- Portable; utilization of appropriate PPE for task; does not generate exhaust at the site where tool is used.	108	
03SR-02-TRIG Tools, Heavy Rigging	Slings, shackles, wire ropes, chains, swivel plates, anchors, hoists	Reusable, large capacity. ----- Use requires training above rescuer level. Used in conjunction with heavy equipment and →		

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SR - Search &amp; Rescue Equipment</b>			
<i>02 - Tools - Continued</i>			
	and accessories for lifting and moving large objects with cranes or other heavy equipment.	qualified operators.	
<b>SR - Search &amp; Rescue Equipment</b>			
<i>03 - Search Equipment</i>			
03SR-03-KMON*	Kits that monitor the atmosphere in confined spaces to detect hazardous environments.	Intrinsically safe. Detection of O <sub>2</sub> level, %LEL, and toxic vapors/gases. ----- Intrinsically safe equipment is defined as “equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration.” (ISA-RP12.6)	52, 123
03SR-03-LSTN	Seismic and acoustic listening devices and accessories for locating trapped and entombed victims not detectable by other means.	Consider usability while wearing full personal protective equipment.  Portable, lightweight, rapidly deployed in the field. ----- Requires prior training. Requires ability to cause cessation of all noise-generating operations during search operations.	
03SR-03-SCAM	Void area video search camera and accessories for inspecting voids and confined spaces with limited physical access.	Lightweight, portable, operable by a single operator; integrated illumination. Some units may have integrated listening devices. ----- Tools are conductive, may present electrocution hazard, not intrinsically safe.	

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SR - Search &amp; Rescue Equipment</b>			
<b>03 - Search Equipment - Continued</b>			
03SR-03-TPBM Tape, Boundary Marking	Boundary marking tape: YELLOW Caution/RED Danger/ Incident specific (i.e., radiological, biological, chemical).	Available in large rolls with handle for marking hot zones, operational areas, etc.	
<b>SR - Search &amp; Rescue Equipment</b>			
<b>04 - Canines</b>			
03SR-04-DOGS Canines, Search & Rescue	Search & rescue canines, related CBRNE training, protective equipment/garments, and handling accessories.	----- Departments should consider and plan for food, kenneling, and veterinary expenses associated with search & rescue canines.	
<b>SR - Search &amp; Rescue Equipment</b>			
<b>05 - Robotic Equipment</b>			
03SR-05-RBTL Attachments/Tools, Search & Rescue Robot or Remotely Piloted Vehicle	Attachments/tools for specialized search & rescue capability such as mountable cameras (including infrared), remote manipulators, listening devices, etc. Includes repeater devices for extended remote operations.	For use with robot or remotely piloted vehicle platforms. See 03OE-07-ROBT and 03OE-07-RPVs.  ----- Ensure compatibility with selected platform, including additional power requirements.	

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
03WA-01-ALRT* Device, Alerting, Water Operations	Plastic, non-corrosive, pealless whistles.	Pealless.	
03WA-01-BAGB* Bag, Body, Underwater	Body bags for recovery operations of bodies and body parts underwater; these bags require holes for drainage as the bag is removed from the water/liquid.	Size and hole placement is important to minimize tissue erosion.	
03WA-01-BAGL* Bag, Lift	Bag capable of holding equipment/items for taking to the surface. Must be durable and capable of being hooked to a lifting device.	Varying size and placement of drain holes. ----- Consider bag drainage characteristics to minimize evidence erosion. Having more than one type would allow choice based on type/condition of item to be lifted. D-rings should be stainless steel or other non-corroding material.	
03WA-01-DCMP* Computer/Gauge, Dive	Dive computers should have at a minimum the following functions: air pressure, depth gauge, time remaining, ascent rate, decompression stops. The computer should be constructed to be durable and easy to read and	Self-illuminating. →	

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>WA - Water Operational &amp; Search/Rescue Equipment</b> 01 - Water Operational Equipment - <i>Continued</i>			
	understand.		
03WA-01-DNIF* Knives, Punches, and Cutting Shears, Diving	Knives and other cutting and punching tools for underwater use.	Knives should be constructed of top-grade stainless steel with a serrated blade. Punches and cutting shears should also be constructed of top-grade stainless steel or non-corrosive materials. ----- Consider flat-point knife design, which allows prying/chiseling without damaging knife.	
03WA-01-KFAD* Kit, Medical First Aid, Dive Specific	First aid kit for dive operations.	Any first aid kit for diving requires oxygen. First aid kit should be comprehensive with specific treatment aids for the operations area. ----- Oxygen should only be administered by personnel with appropriate training.	
03WA-01-LADD* Ladder, Diving	Method of ingress and egress from water onto vessel. Should be durable construction of non-corrosive materials.	Some ladders feature collapsible rungs for operation in shallow water. Others are completely removable while the boat is in operation. ----- Ladder must be removed or collapsed prior to running the boat or damage to the ladder or propeller may occur.	
03WA-01-LINE* Line, Work, Water Operations	Line for use in all water operations.		
03WA-01-LOGD* Log, Dive	Book for logging dives, dive times and locations.		

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>WA - Water Operational &amp; Search/Rescue Equipment</b> 01 - Water Operational Equipment - <i>Continued</i>			
03WA-01-MARK* Device, Marking, Marine	Location marking devices for marine use, including diver-down flags and Alpha flags. Includes anchoring mechanism such as magnetic attachment device or grappling hook.	Multiple types available, including strobe marking devices, chemical light sticks, inflatable markers with weighted strings to mark underwater locations, magnetic devices for attachment to submerged vessels, vehicles etc. ----- Consider strength of attachment mechanism, and effectiveness of floatation device. Strong current can dislodge markers. Also consider visibility in murky water or poor weather conditions.	
03WA-01-PROP* System, Personal Propulsion	Device to assist diver mobility in the water and conserve diver energy.	----- Ensure that range and recharge/refuel time meet operational requirements.	
03WA-01-UCUT* Cutting/Welding Equipment, Underwater	Torches and other equipment used for cutting or welding underwater. Includes both mechanical cutting tools and thermal cutting/welding tools.		
03WA-01-ULHH* Lights, Underwater, Personal	Waterproof, handheld or attached lights designed for individual underwater use.	Lights should be durable and lightweight with scratch-resistant lenses. Power source should have a reserve so light continues to provide some minimum illumination after primary batteries are drained.	
03WA-01-ULIT* Lights, Underwater, not Handheld	Waterproof lights designed for underwater use to provide fixed-site illumination.	Lights should be durable and lightweight with scratch-resistant lenses. Lights must easily mount on poles, tripods and other stanchions. Hard points for lifting or hauling should be corrosive resistant.	

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
03WA-01-UNAV* Equipment, Navigation, Underwater	Navigation board for use by divers.		
03WA-01-USLD* Sled, Towing, Underwater	Sled or other device capable of carrying a body, equipment, or evidence underwater. Can be towed by a diver or moved via an attached underwater conveyance line.	Must include webbing, straps, or other means of securing object(s) to itself for transport.	
03WA-01-UWMD* Detector, Metal, Underwater	Metal detector adapted for or designed for use underwater.	Should have multiple modes of alarm indication (audible, visual, etc.). Should be capable of use in deep water temperatures. ----- Consider compatibility with diving ensembles, particularly for gloved deep water operation.	
03WA-01-UWRT* Slates/Writing Materials, Underwater	A plastic slate with an attached marker capable of being used while completely submerged.	Available in many different sizes, some of which have markers for quick identification at night. ----- Most cannot be erased underwater. Once all the free space on the slate is used up, the diver will have to surface to clear the writing.	
03WA-01-WACC* Housings and Accessories, Underwater/Waterproof	Materials designed to protect equipment such as cameras, sensors, etc. from water penetration during water operations.		

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## Section 3 | CBRNE Operational and Search &amp; Rescue Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
03WA-02-BAGT* Bag, Throw	Rescue device consisting of line in a lightweight bag which can be deployed by securing one end of the line and throwing the entire bag at the target.	Throw bags should be easily deployable and contain at least 75-125 feet of floatable or partially floatable line. ----- Rope diameter is not an issue, as victims when contacted usually slide down the rope to the bag. Consider tensile strength of line and suitability for intended use.	
03WA-02-BORD* Boards/Sleds, Search and Rescue	Specialized, rapidly deployable craft for water/ice rescue operations, such as river rescue boards, ice rescue sleds, etc. Does not include boats, which are covered separately in Section 17.	Wide variety of construction types and materials. ----- The type(s) of potential operating environment(s) should drive the selection of any search and rescue craft. Carefully review planned mission profiles, including weather and water conditions. Each type of SAR water craft has specific limitations and advantages in different environments. Usually, multiple types of watercraft are needed in a jurisdiction for use in different water environments.  See 17WC-00-WCSR for larger search and rescue watercraft.	
03WA-02-SONR* Sonar, Imaging	Underwater imaging device utilizing sound waves to assist in search and rescue operations.	Traditional and sidescan units are available. Varying display formats now include color displays. ----- Consider vertical versus sidescan for anticipated missions. Consider compatibility with recording equipment to obtain record of mission. Consider suitability for use with remotely operated vehicles.  See also Item 14SW-02-SONR for sonar system intended for security.	

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## Section 4 - Information Technology

### Overview

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This section lists equipment, software, and systems that provide information functionality and interoperability between local responders and other agencies working in cooperation to resolve or manage incidents. The items mentioned serve to develop situational awareness and better coordinate response operations for CBRNE terrorism and other 'all-hazard' homeland security operations.

Like the previous edition, the Spring 2007 SEL has divided information technology, cyber security and communications into three distinct sections (Sections 4, 5, and 6 respectively). While there continues to be a close connection among the three (and even some merging of technologies such as voice communications over the Internet and encryption of data), the separation of sections should make it easier to locate desired items. We have continued our efforts to provide information on desirable features, operating limitations, and standards (where applicable). The information provided is by no means exclusive. These fields are designed to enhance the reader's understanding of the defined items and their practical use.

### Changes for 2007

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As described in this year's SEL Introduction, the IAB has realigned the structure of the SEL to match the DHS Authorized Equipment List (AEL). This will enable the Responder Knowledge Base to present all users with the first integrated display of AEL and SEL information. Because DHS is required to manage and report grant expenditures in a specific set of categories, we have worked with them to move some items from the Information Technology (IT) section into areas that reflect their functional use. Items from the 2006 IT section such as Data Fusion, Signals Intelligence Investigative Software, and Facial Recognition Software have moved to a new Section 13, Terrorism Incident Prevention Equipment. Video Security Assessment Systems have been moved to Section 14, Physical Security Enhancement Equipment, while Fingerprint Processing Equipment is now part of Section 20, Intervention Equipment.

The IT section now includes Underwater Cameras (supporting a major initiative in Sections 1 and 3 to incorporate water operations), and Operational Area Personnel Tracking and Accountability Systems. Datasets for Geospatial Information Systems (GIS) were also included as a separate item, recognizing that they are being procured separately from the original systems. Other minor changes and updates are included throughout the section.

### Online Selection Factors

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Like many sections in the 2007 SEL, the online<sup>1</sup> version of the Information Technology Section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For this section, the SubGroup chose User Level and Use Location (described below) as the two factors. Every online item is "tagged" for each appropriate combination of factors. Thus users of the online version can choose any combination of User Level and Use Location, and the system will provide a list of all items tagged for that combination.

<sup>1</sup> The on-line version is available on the Responder Knowledge Base, [www.rkb.mipt.org](http://www.rkb.mipt.org).



**The User Levels for information technology equipment are defined as follows:**

End User	Users who possess no special training or other qualifications with respect to the equipment being utilized. Examples would be personal computer users who are familiar with basic applications but have not received any classroom or advanced training.
IT Technician	Users who possess some specialized training or other qualifications with respect to the equipment being utilized. Examples would be users who have attended classroom training for a Geographic Information System (GIS), or who have received training in hardware installation and setup.
IT Advanced Technician	Users who possess some extensive training or career-level qualifications with respect to the equipment being utilized. Examples would be trained professional network administrators who possess professional qualifications such as MCSE, or computer repair professionals.

**The probable Use Location(s) are defined as follows:**

Rear Information Zone - Strategic	Emergency Operations Center/ Joint Operations Center Intel Support.
Rear Information Zone - Operational	Emergency Operations Center/ Departmental Operations Center Intel Support.
Forward Information Zone - Support [Cold]	Incident Command Post Intel Support; near incident scene, but in cold zone.
Forward Information Zone - Contamination Reduction [Warm]	Operations/Intel Support in warm zone.
Forward Information Zone - Exclusion [Hot]	Operations/Intel Support in hot zone.

The factors described above provide a method for classifying equipment items. For example, a network router might be classified as requiring an IT Advanced Technician to install and configure, and might be used in the Rear Information Zone or the Forward Information Zone - Support [Cold], but would probably not be used in either the Warm or Hot Zone. In the online SEL, if a user selected “IT Advanced Technician” and “Forward Information Zone - Support (Cold)” as the two desired selection factor values, the network router item would appear in the search results along with any other equipment recommended for that combination.

## Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AP - Application Systems and Software</b>				
<b>01 - Computer Aided Dispatch</b>				
04AP-01-CADS*	Computer software system(s) used to track and manage public safety incidents and resources.	----- Subcomponents optimally should include global positioning, space visualization, automated vehicle location, alerting systems, and interface with ANI/ALI (Automatic Number Identification / Automatic Location Identification) databases. See also 04AP-08-SVIS, 04AP-02-ALRT, 04AP-04-GISS, 04AP-03-AVLS.		
<b>AP - Application Systems and Software</b>				
<b>02 - Position Locating Systems</b>				
04AP-02-AVLS*	Automatic Vehicle Locating (AVL) Systems	----- Both GPS (differential correction) and DR (ded reckoning) capability. Inclusion of DR preferred. ----- Procure as package to ensure compatibility. There are several Coordinate Systems and Datum/Projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system and projection. Coordinate Systems may include: Lat/Long, State Plane, UTM, etc. Datum/Projections may include: NAD 27, NAD 83, WGS 84, etc.		
04AP-02-DGPS*	Device, Global Positioning System (GPS).	----- Differential GPS (DGPS) compatible. Wide Area Augmentation System (WAAS) compatible. ----- Required unobstructed line of sight to satellites (not used indoors or underground). There are several Coordinate Systems and Datum/Projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system AND projection. Coordinate Systems may include: Lat/Long, State Plane, UTM, etc. Datum/Projections may include: NAD 27, NAD 83, WGS 84, etc.		
04AP-02-OAPT*	Operations area personnel tracking and accountability systems.	----- Training may be required for operators. →		

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\* Item has been moved or changed in the edition.

## Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AP - Application Systems and Software</b> 02 - Position Locating Systems - <i>Continued</i>			
Area Personnel Tracking and Accountability	Precision Locating Tracking Systems (PLT), indoor capable.	2-D versus 3-D. ----- Emerging technology. Range/penetration, ease of set-up.	
<b>AP - Application Systems and Software</b> 03 - Geographical Information Systems (GIS)			
04AP-03-GISD Data, Geospatial	Data related to positions on the Earth's surface in the form of databases, maps, satellite and other remote-sensing imagery. For use with Geospatial Information Systems (Item 04AP-04-GISS).	----- Consider currency of data in operational Geospatial Information Systems, particularly those including street names. There are several coordinate systems and datum/projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system and projection. Coordinate systems may include: Lat/Long, State Plane, UTM, etc. Datum/projections may include: NAD 27, NAD 83, WGS 84, etc.	
04AP-03-GISS* System, Geospatial Information (GIS)	Geospatial/Geographical Information Systems (GIS), including application software as well as integrated hardware for implementation. GIS systems support the acquisition, integration and dissemination of geospatial data and	Emerging technology - standards and functionality for GIS software are still being developed. Capable of updating database as maps and terrain features change by installing new data set. See 04AP-04-GISSD. ----- Geospatial software should support vector, raster, CAD, and/or spatial file formats. There are several coordinate systems and datum/projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system and projection. Coordinate systems may include: Lat/Long, State Plane, UTM, etc. Datum/projections may include: NAD 27, NAD 83, WGS 84, etc. →	

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## Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
AP - Application Systems and Software 03 - Geographical Information Systems (GIS) - <i>Continued</i>	<p>imagery. GIS systems provide or support multiple CBRNE terrorism prevention and response functions, including (but not limited to):</p> <ul style="list-style-type: none"> <li>- Geospatial Analysis - allows for association of intelligence and location-based information to perform complex analysis and visualization</li> <li>- Decision Support - provides a mechanism to deliver actionable intelligence, supporting strategic and tactical operations</li> <li>- Situational Awareness - supports a common operational picture with near real-time intelligence fused with geospatial information fully describing the area of operations in a spatial context</li> <li>- Navigation</li> <li>- Monitoring (tracking, weather, traffic, assets, environment, damage</li> </ul>		

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Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<p><b>AP - Application Systems and Software</b> 03 - Geographical Information Systems (GIS)</p>	<p>assessments, disease surveillance) - Modeling - combines complex spatial information and applies modeling tools to predict consequences of events in support of planning, mitigation, response and recovery - Mapping - presents fused information in a standard, distributable and easily recognizable format - Reporting (activity, after-action, alert-warning, location, situation, coverage portrayal)</p>		
<p><b>AP - Application Systems and Software</b> 04 - Risk Management Software</p>	<p>04AP-04-RISK* Software, Risk Management</p>	<p>Software or systems that facilitate capture, quantification, and management of risk factors involved in specific tasks or programs.</p>	<p>Should incorporate some form of data visualization capability. Must provide parameters to allow adjustment of weighting factors for risk components. ----- Look for maximum flexibility in defining risk components and weighting that reflect your own requirements in addition to the option of using predefined formulas.</p>

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## Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AP - Application Systems and Software</b>				
<b>05 - Incident Management</b>				
04AP-05-CDSS* Software, ICS	Incident Command System (ICS) software including command/plans and decision-support tools.	----- Emerging technology - standards and functionality are still being developed.		
04AP-05-CRED* System, Credentialing	Software application and associated hardware and material for creating site/event credential badges and controlling scene access.	----- Additional equipment needs may include: digital cameras, laminating equipment, facial recognition software, etc. Also consider mobile/portable versus server-based/attached systems.	95	
04AP-05-SVIS* Software, Operational Space Visualization	Operational space visualization tools.	Mapping. Graphical display of data. Ability to draw from multiple data sources. Data mining. ----- Emerging technology - standards and functionality are still being developed.		
<b>AP - Application Systems and Software</b>				
<b>06 - Analytical Tools</b>				
04AP-06-CBRN* Software, CBRNE/Commercial Chemical/Hazard	CBRNE/commercial chemical/hazard software and response system.	----- Emerging technology - standards and functionality are still being developed.		

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\* Item has been moved or changed in the edition.

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Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AP - Application Systems and Software</b>				
<b>06 - Analytical Tools - Continued</b>				
04AP-06-PMOD*	Software, Plume Modeling	Plume modeling fate and transport software and/or databases capable of real-time linkage to sensors and meteorological monitoring and detection.	----- Emerging technology - standards and functionality are still being developed. There are lot of vendors/researchers offering many differing models of varying quality, many of which are unproven!	
04AP-06-TRAF*	Software, Traffic Modeling	Software designed to depict traffic flow, identify congestion points, and predict impact of accidents or deliberate alterations of traffic patterns such as alterations of signal times, detours, closures, etc.	Must be highly parameterized to allow accurate modeling of specific areas. Should be GIS based for interoperability and detail.  ----- Check ease of use, particularly ease of changing key parameters. If your organization already has GIS software, check for compatibility.	
<b>AP - Application Systems and Software</b>				
<b>07 - Inventory</b>				
04AP-07-INVN*	Software, Equipment Tracking and Inventory	Application software for tracking of tangible equipment, including location and person(s)/organization(s) responsible.	----- Consider interoperability (or at least data compatibility) with related systems such as Automated Vehicle Locator Systems (AVLS).	

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## Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AP - Application Systems and Software</b>				
<b>08 - Simulation</b>				
04AP-08-SIMS*	Simulators	Systems that provide interactive audio-visual simulation of operational situations to support training, planning, or decision making.	Generally computer-based. May require additional projection equipment or a dedicated facility. ----- Need sufficient customization capability to accurately portray mission situations, preferably in the same geographic area. If equipment or weapons are included in the simulation, make sure that they have identical operational characteristics to the real equipment so that participants do not develop habits in the simulator that are detrimental to real-world performance.	
<b>HW - Hardware</b>				
<b>01 - Computers</b>				
04HW-01-DTOP*	Computer, Desktop	Desktop computer, basic.	“>” indicates minimum requirement > Video Graphics Adapter (XVGA) > 16-bit audio > 32MB video memory > 2GHz processor DVD-R / CDRW > 56k modem Network Interface Card (NIC) 10/100 > 80GB hard drive > 4 USB 2.0 ports > 1GB of RAM	
04HW-01-HHCD	Computing Device, Handheld	Handheld computing devices with connectivity. Includes a variety of platforms such as PDAs and Windows compatible devices.	Variety of operating systems available, including Windows CE, Windows PocketPC, Palm OS, Linux, etc. Wireless interface - 802.11x, Bluetooth, or other. ----- Match mission requirements to OS capabilities and compatibilities. Consider battery life and replacement battery availability. →	

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Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>HW - Hardware</b>				
01 - Computers - <i>Continued</i>				

04HW-01-MOBL Computer, Mobile Data	Mobile computer devices, usually mounted permanently in vehicle, operating from DC power supply. Used for data upload and download, as well as local data entry.	<p>Ruggedization, sleeves may offer this capability.</p> <p>Ruggedized (shock, vibration, temperature, humidity, etc.). Ergonomically suited for in-vehicle operation. Touch screen - capacitive versus resistive.</p> <p>-----</p> <p>Connectivity, power supply. Consider possibility of using broadband connection for Voice Over Internet Protocol (VOIP) backup communication.</p>	
04HW-01-NTBK Computer, Portable	Basic notebook or tablet computer.	<p>“&gt;” indicates minimum requirement</p> <ul style="list-style-type: none"> <li>&gt; Video Graphics Adapter (XVGA)</li> <li>&gt; 16-bit audio</li> <li>&gt; 32MB video memory</li> <li>&gt; 1.5GHz processor</li> <li>DVD/CD RW</li> <li>&gt; 56k modem</li> </ul> <p>Network Interface Connection (NIC) 10/100</p> <ul style="list-style-type: none"> <li>&gt; 40GB hard drive (removable)</li> <li>PC MCIA slot</li> <li>&gt; 512MB RAM</li> <li>&gt; 2 USB ports 2.0</li> </ul> <p>-----</p> <p>Comparable processor speeds may be lower if Pentium® M chips are used in the machine. Ruggedization.</p>	
04HW-01-SRVR Computer, Server	Computer used as central host to provide connectivity or data to other	<p>Server operating system, often a Unix variant (Solaris, HP-UX, AIX), Linux, Mac OS X Server, Windows 2000 Server, or Windows Server 2003. Look for a minimum of 1GB of memory, 2GB or more preferred. →</p>	

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## Section 4 | Information Technology

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>**HW - Hardware****01 - Computers - Continued**

systems.

-----  
 Consider fault tolerance in design, such as dual power supplies, dual fans, disk arrays (such as RAID 5 arrays) in which striping and mirroring can be used to create efficient, redundant storage. Additional fault tolerance features include error-correcting memory, and multiple processor architecture in which processing continues in a degraded mode after failure of single processor.

Servers with all of the above features can be extremely expensive. Alternatively, multiple identical servers can be procured and configured as a cluster to provide a desired combination of processing enhancement and redundancy.

**HW - Hardware****02 - Peripherals**

04HW-02-ALL1

Printer/Copier/Fax/  
 Scanner in single device  
 with either inkjet or laser  
 printing capability.

Minimum 600 DPI, high quality would be 1200 DPI.  
 USB connectivity desirable.  
 Network compatibility desirable.

-----  
 Consumable supplies may be critical, particularly for ink-jet devices. Correct toner cartridges critical for laser devices.  
 Consider types of fax traffic (e.g., images) before deciding on print quality requirement.  
 Consider cost of consumables.

04HW-02-BARC

Bar code readers and  
 printers, including devices  
 that have wireless network  
 capabilities.

Tag and readers.  
 -----  
 Ensure compatibility of bar code types.

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## Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
04HW-02-PLOT Plotter	Output device for producing oversize hard-copy output such as maps and visualization graphics.	<p>Minimum 600 DPI, high quality would be 1200 DPI. B/W or color. Large format. USB connectivity desirable. Network compatibility desirable.</p> <p>-----</p> <p>Consumables (ink supplies) can be critical and quickly consumed when printing high resolution full-page color. Consider types of output (e.g., images) before deciding on print quality requirement. Consider cost of consumables.</p>	
04HW-02-PRNT Printer	Printer using laser or ink-jet technology.	<p>Minimum 600 DPI, high quality would be 1200 DPI. B/W or color. USB connectivity desirable. Network compatibility desirable.</p> <p>-----</p> <p>Consumables (toner and ink supplies) can be critical, and quickly consumed when printing high resolution full-page color. Consider types of output (e.g., images) before deciding on print quality requirement. Consider cost of consumables.</p>	
04HW-02-RFID Devices, Radio Frequency Identification	Radio Frequency Identification Devices (RFID) and associated readers.	<p>Passive and/or active. Tag and readers.</p> <p>-----</p> <p>Distance sensitive.</p>	
04HW-02-SCAN Scanner	Scanner, flatbed or portable.	<p>USB connection capability desirable. Network compatibility desirable.</p> <p>----- →</p>	

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## Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>HW - Hardware</b> 02 - Peripherals - <i>Continued</i>				
04HW-02-STOR*	Storage, Portable External	Devices that function as virtual drives for storage and transfer of files. Includes USB memory sticks, flash drives, smart chips, etc.	May want RF capability in contaminated zones, perhaps via connection to handheld device.  Minimum 256MB storage. Drive emulation. Compatibility with digital cameras. USB 2.0 compatibility. ----- Check driver requirements. Some devices may fit cameras but require a reader to interface with PC. Security (device access and content).	
<b>HW - Hardware</b> 03 - Networking Components				
04HW-03-ROUT	Router	Network device that connects two or more networks or computers, providing appropriate addressing and packet handling.	Wide variance in size, capacity, and price. May provide Dynamic Host Configuration Protocol (DHCP) service to provide IP addresses on demand to network hosts. May also function as a switch (see 04HW-03-SWCH) or as a Wireless Access Point (WAP - see 04HW-03-WAP for special issues regarding wireless operation). May have built-in firewall capabilities (see 05NP-00-FWAL for details on firewalls). ----- Since routers provide a path between networks, proper configuration and security implementation is essential. Low-end routers are often used as an access point for DSL or Cable-Modem connections to the Internet. Highly recommend that routers be able to support 10/100Mbps Ethernet operation. If very high bandwidth is required, routers with 10/100/1000 capability should be considered.	99, 100, 137
04HW-03-SSRV	Server, Serial	Device that provides a network (TCP/IP) presence for serial devices.	----- Should offer Dynamic Host Configuration Protocol (DHCP) capability as well as the ability to operate at a static IP address. →	

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Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>HW - Hardware</b>				
<b>03 - Networking Components - Continued</b>				
		Example: printer network adapter.		
04HW-03-SWCH	Switch, Network	Network switching device.	Wide variance in size, capacity, and price. ----- Smaller switches now used in place of hubs, providing better performance.	
04HW-03-WAP	Access Point, Wireless	Wireless Access Point (WAP) for local area networking under 802.11x.	802.11b provides widest compatibility; 802.11g provides improved speed. May be combined with router/switch capability (see 04HW-03-ROUT for details on routers).  NOTE: The newest standard, 802.11n, has not yet been finalized, and users should be extremely cautious about purchasing “pre-n” products until the standard has stabilized and its compatibility with earlier standards is established. ----- Recommend the following minimum settings (in priority order): 1) Enable strongest available encryption. WPA and WPA2 are preferred, use WEP if they are not available. WEP is more vulnerable to attacks, but still far superior to no encryption at all. 2) Disable Service Set Identifier (SSID) broadcasting. It is not essential and advertises the existence of the WAP to unauthorized users. 3) Restrict access to the wireless network to specific hosts by MAC address (a special identifier unique to each network access card). 4) Rotate (change) the network encryption key on a regular basis. Recommend monthly.	99, 100, 137
<b>HW - Hardware</b>				
<b>04 - Miscellaneous Adapter Cables/Connections</b>				
04HW-04-CABL		Miscellaneous adapter cables/connectors.	→	

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Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>HW - Hardware</b>			
04 - Miscellaneous Adapter Cables/Connections			
Adapter Cables/ Connectors			
<b>MD - Media Devices</b>			
01 - Cameras and Surveillance Equipment			
04MD-01-CMRA  Camera, Still	Still camera, digital or film.	Decontaminable/disposable. Intrinsically safe housing. ----- Consider consumables (film cameras) and battery life and memory capacity/medium (digital cameras). Digital images may have legal implications - evidentiary standards for digital imagery are still emerging.	
04MD-01-IRED  Camera, Infrared (IR)	Infrared (IR) a. Thermal b. Forward Looking Infrared Radiation (FLIR), and/or c. Infrared detection	Decontaminable/disposable. Intrinsically safe housing. ----- Note calibration requirements and potential cost.	
04MD-01-IRIL  Equipment, Illumination, IR	Infrared illumination equipment.	Decontaminable/disposable. Intrinsically safe housing. ----- Used as a supplement to IR camera and/or detection equipment.	
04MD-01-LAMP*  Equipment, Light Amplification	Light amplification (night vision enhancement) equipment, including hand-held, helmet	Decontaminable/disposable. Intrinsically safe housing. Interchangeability between hand-held and mounted use is desirable. Visible or infrared, depending upon system. →	

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## Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>MD - Media Devices</b> 01 - Camera and Surveillance Equipment - <i>Continued</i>			
	mounted, or equipment-mounted tactical systems. Includes hardware/accessories necessary for helmet/equipment mounting.	----- Consider battery type and availability. Consider compatibility with PPE.	
04MD-01-UCAM* Camera, Underwater (Still/Video)	Still or video camera adapted or designed for use underwater.	Housings to accommodate film or digital memory. Handheld, tethered, and remote configurations. Optional strobe attachments. ----- Consider depth limitations. Consider lighting requirements, including possible use of infrared. Consider power/battery life, including temperature impact on batteries. Consider type and availability of batteries.	
04MD-01-VCAM Camera, Video	Video camera.	Intrinsically safe housing. Remote operation, including pan, tilt, zoom. ----- Water-resistant housing accessory desirable for hot-zone operations. Decontamination/disposable potential.	
<b>MD - Media Devices</b> 02 - Projectors			
04MD-02-PROJ Projector, Video	Video projector.	XVGA (1024x768) or greater projection capability highly desirable. Remote operation via USB connection desirable. Composite TV signal compatibility desirable. ----- Check lumen and contrast ratings, particularly if operation will be in areas of high →	

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Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>MD - Media Devices</b>			
<i>02 - Projectors - Continued</i>			
		ambient lighting. Check bulb life rating and bulb replacement cost. Operation in high heat environment can impact bulb life.	
<b>MD - Media Devices</b>			
<i>03 - Displays</i>			
04MD-03-DISP Display, Video	Video display - assorted technologies including CRT, Plasma, LCD, etc.	----- Plasma screens are subject to image 'burn-in' and may not be advisable for some applications. Emerging technology - standards and functionality are still being developed.	
<b>SN - Sensor Devices</b>			
<i>01 - Remote Sensors</i>			
04SN-01-PTMS Station, Portable Meteorological	Portable meteorological station that monitors (at a minimum) temperature, wind speed, wind direction, precipitation, and barometric pressure.	----- Considerations: telemetry, greatly affected by placement (micro climates in downtown cores, in buildings, etc.).	
04SN-01-XMIT Transmission Device, Wireless, Remote Sensor	A device which, when attached to a remote sensor such as a video camera or chemical detector, allows wireless transmission of data to a distant base. May use radio frequency (RF) or infrared (IR) transmission.	----- Compatibility with multiple sensor devices desirable. ----- Carefully check effective distance and sensitivity to obstacles and weather. May require line-of-sight. Check effective data rates in marginal conditions, especially if used for live video.	

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## Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SW - System and Networking Software</b>			
<b>01 - Operating Systems</b>			
04SW-01-OSSS System, Server Operating	Operating systems for servers. Examples include Windows, Mac OS X Server, Unix, Linux.	Minimum version should be: Windows: 2000 or 2003 Apple: Mac OS X Server Linux: Varies by distribution - latest kernel version is 2.6.x Unix: Varies with brand - check with vendor for current release ----- Check provided browser for 128-bit encryption and SSL capability.	
04SW-01-OSSW System, Workstation Operating	Operating systems for workstations. Examples include Windows, Mac OS X, Unix, Linux.	Minimum versions should be: Windows: 2000 or XP Apple: Mac OS X Linux: Varies by distribution - latest kernel version is 2.6.x Unix: Varies with brand - check with vendor for current release ----- Check provided browser for 128-bit encryption and SSL capability.	
<b>SW - System and Networking Software</b>			
<b>02 - Application Programs</b>			
04SW-02-EMLC Software, E-mail Client	E-mail client software.	May be integrated into office suite. ----- See NIST SP 800-45 for security guidance.	134
04SW-02-EMLS Software, E-mail Server	E-mail server software.	----- Need to control relay of outbound mail to prevent server from being used as a spam platform.	134

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## Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SW - System and Networking Software</b> 02 - Application Programs - <i>Continued</i>				
04SW-02-IMSG	Software, Instant Messaging	Instant messaging (IM) software.	Logging capability desirable. Enterprise-level systems with encryption are recommended.	
04SW-02-VCSW	Software, Video Teleconferencing	Video teleconferencing software.	Up to 4 participants. ----- Encryption desirable.	
<b>SW - System and Networking Software</b> 03 - Suites				
04SW-03-OFFC	Software, Office Software Suite	Office software suite (spreadsheet, database, word processing and graphics presentation).	----- Document interoperability is critical when moving between suites.	
<b>SW - System and Networking Software</b> 04 - Network Operating and Monitoring Systems				
04SW-04-NETW	Software, Network	Software for networking, monitoring network performance and/or maintaining configuration.	----- Trained personnel required for installation and operation.	
<b>SW - System and Networking Software</b> 05 - Monitoring Software				
04SW-05-SCAD	A software/hardware system designed primarily	Remote monitoring and operation of large numbers of devices. Pre-set control functions such as duty cycling of equipment, or automatic device →		

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## Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SW - System and Networking Software</b> 05 - Monitoring Software - <i>Continued</i>	System, SCADA (Supervisory Control and Data Acquisition) to monitor and control remote sensors and actuators. Uses vary from large-scale examples such as refinery or power grid control to building HVAC systems.	activation or alarms based upon sensor inputs exceeding set limits. ----- Type(s) of communication between remote points and central controller(s), and susceptibility to interference. Architectural structure may involve only a single controller with direct access to all points, or a hierarchical structure with intermediate controllers able to perform some functions autonomously.	

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## Section 5 - Cyber Security Enhancement Equipment

### Overview

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This section lists equipment, software, and systems that contribute to improved information security. Five major functional categories are defined: Authentication Devices, Encryption, Host Level Security, Network Level Security, and Patch/Configuration Management. The items recommended in this section are included in the SEL because of the criticality of responders' information infrastructure in areas ranging from hazard assessment to communications and incident command. The increasing vulnerability of networks impacts both the reliability of this infrastructure and user confidence in the information they receive. Thus, cyber security must be considered in deployment and response operations.

### Changes for 2007

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In February of 2006, the ICIS SubGroup held a small conference at Dartmouth's Thayer School of Engineering. The purpose of the meeting was to bring together end-users (fire, law enforcement, EMS, city IT managers, etc.) and experts within the field of cyber security. The minutes of this conference are available as a publication on the Responder Knowledge Base ([www.rkb.mipt.org](http://www.rkb.mipt.org), search keywords "ICIS Dartmouth"). The document identifies and provides a brief summary of the current cyber security environment, general attacks/attackers, likely vulnerabilities, example modeling and suggested best practices.

The SubGroup also took advantage of the multiple subject matter experts at the conference to review this SEL section. The result was some minor restructuring, and editorial refinements throughout the section.

### Cyber Security Self-Assessment Questions and Resources

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This set of suggestions and questions was introduced last year, and remains extremely relevant to all responder organizations. Agencies and jurisdictions at every level must have appropriate policies in place, understand their vulnerabilities, weigh the risks involved and make informed decisions on how to spend resources to secure systems and data. Thousands of new computer viruses are reported every year, and it now only takes a few minutes to compromise an unprotected computer that is connected to the Internet. A virus or other successful cyber attack can be devastating to networks, to the information contained within systems and, just as importantly, to the confidence of those who depend on these systems to accomplish their mission.

Information security is mission critical to every emergency responder. Every agency and jurisdiction should carefully consider the full scope of these three key components of information security:

- **Confidentiality**, the ability to ensure that only authorized personnel/systems have access to any given data;
- **Integrity**, the ability to ensure that data is not corrupted, and that only authorized personnel/systems can change any given data; and,
- **Availability**, the ability to ensure that authorized personnel have timely and complete access to data whenever and wherever it is required.

The relative importance of these three components will vary among organizations. For example, fire dispatch may place a premium on availability at the expense of confidentiality, while an intelligence sharing center might sacrifice availability to ensure confidentiality. Ultimately, all three must be

achieved to at least a minimal degree in order to meet mission requirements.

Each state and local government entity should develop and execute a comprehensive cyber security plan that demonstrates due diligence in cyber security. The goal of a cyber security plan is to identify the cyber threat environment, and address these threats in order to maintain confidentiality, integrity and availability sufficient for mission performance. The plan must account for factors such as limited staff and resources (and staff turnover), varying size and complexity of the organization, varying cyber security and technology knowledge base within the organization, and a wide variance in technology being used. In addition to developing a comprehensive plan, organizations must periodically test and exercise their plan, using vulnerability assessments to identify gaps in policy and technology, as well as training needs.

This plan must address four main functional areas: Policy, Training, Technology Deployment, and Vulnerability Assessment. Each of these areas supports the others, and together they meet emerging standards of due diligence in information security. The questions below are designed to assist in “self assessment” and identify key issues within each major area. We have used the term “Organization” to represent a wide range of agencies, departments, and jurisdictions.

### **Policy:**

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- Does the Organization have a cyber security plan in place that sets the vision, goals, and objectives for Organization-wide cyber security?
- Has the Organization published a clear policy statement on cyber security to support the plan, including a “permitted use” policy for all Organization-owned cyber assets? Has this policy set been made available to subordinate organizations so that it can be adapted for their use?
- Does the Organization’s policy statement provide a clear mechanism for feedback and use of vulnerability assessment results to refine policies, training, and technology deployment?
- Has the Organization established a certification/accreditation program for information systems?
- Does the Organization have a designated cyber security office/officer whose primary focus is on protecting the Organization’s cyber infrastructure?
- Does the Organization have established cyber security metrics? Does the Organization have a mechanism for rating its cyber security alert level?
- Has the Organization established public, private, or academic partnerships for cyber security collaboration?
- Does the Organization have a capability for internal secure information sharing (Organization-wide secure portal)?
- Does the Organization have a formal connectivity policy covering network connections with external partners (including local government, state-wide intranet, etc.)? Does this policy address protection against intrusions via these connections?
- Does the Organization have a formal connectivity policy covering telecommuters or personnel who require access to internal systems from home or other off-site locations? If so, does this plan address vulnerabilities in off-site computers, such as home computers, that might be connected to the internal network?
- Does the Organization have a cyber operational center that functions 24/7? Does the Organization have an ad hoc 24/7 capability if an operational center does not exist?
- Does the Organization have an organization-wide Computer Security Incident Response Policy (IRP)? Is there a corresponding response plan, and are key personnel aware of their roles and all appropriate notification requirements?

- Does the Organization have a Continuity of Operations (COOP) plan that encompasses both communications and information technology capability?
- Does the Organization maintain a relationship with federal entities such as the United States Computer Emergency Readiness Team (US-CERT)?

**Training:**

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- Does the Organization ensure that all employees have cyber security awareness training both at time of hire and on an annual recurring basis? Does this training include familiarization with permitted use policies? Do employees sign an acknowledgement of their familiarity with the Organization's cyber security policies?
- Are training programs available at multiple levels commensurate with employees' responsibility (e.g., general awareness, system administrator, network administrator, etc.)?
- Does the Organization have an outreach program to ensure the greatest penetration possible for cyber security awareness throughout state and local governments?
- Does the Organization have a web presence that provides cyber security guidance?
- Does the Organization have a program to establish and maintain a set of best practices for cyber security, both for its own use and to share with local jurisdictions?

**Technology Deployment:**

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- Is the technology deployed by the Organization justified in terms of identified cyber security threats and a valid risk management strategy?
- Has the Organization deployed appropriate technology for basic cyber security requirements such as anti-virus protection and firewalls on Internet-facing assets?
- Has the Organization deployed specific technology (including modifications and patches to existing systems and software) to respond to vulnerabilities identified by internal or third-party vulnerability assessments?
- Does the Organization have an asset management system that tracks the number, type, and location of information technology assets? Does the Organization maintain a map of its network that depicts the position of these assets on its network? Does the system track personnel who are authorized access to cyber assets?
- Does the Organization have a system in place for tracking software versions in use, relevant known vulnerabilities and available patches to counter those vulnerabilities?
- Does the Organization have cyber forensics capabilities to serve both civilian and criminal matters for the Organization?
- Does the cyber security technology deployed by the Organization have sufficient capability and capacity to function in both routine and crisis management conditions?
- Has the Organization addressed the physical security requirements of its cyber assets (e.g., physically isolating servers and network equipment, access control for server area, etc.)?

**Vulnerability Assessment:**

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- Does the Organization have a formal program for periodic internal vulnerability assessment and maintain a baseline of cyber threats and vulnerabilities?
- Does the Organization supplement its internal assessment program with third-party vulnerability assessments?
- Is there a formal risk management process by which assessment results are converted into prioritized remedial actions and tracked to completion?

While many of these questions are oriented to larger organizations, smaller entities such as local jurisdictions should review many of the same questions, scaled to their individual needs. *Every organization that owns and operates information technology equipment should have at least a rudimentary cyber security plan, and appoint an Information Security Officer (ISO) or single point of contact for cyber security, including up-to-date 24/7 contact information.* In some cases, smaller organizations may be able to obtain sample policy documents and plans from their parent organization and tailor them. Also, smaller jurisdictions should establish cooperative agreements to obtain access to specialized assistance, such as forensic analysis, when required.

The online version<sup>1</sup> of the SEL ([www.rkb.mipt.org](http://www.rkb.mipt.org)) includes not only the individual items, but links to reference material and related commercial products. Some of the software “products” useful in the cyber security area are “freeware,” i.e., they are available at no cost if certain restrictions are followed. Selected freeware products are identified on the Responder Knowledge Base and linked to appropriate SEL items. Readers are also urged to review the information at the following sites, which provide valuable advice, best practices, and opportunities for support and information sharing:

### **CERT® Program Virtual Training Environment (VTE)**

<http://vte.cert.org>

The Virtual Training Environment (VTE) is a web-based knowledge library for information assurance, computer forensics and incident response, and other IT-related topics. VTE is produced by the CERT® program of the Software Engineering Institute at Carnegie Mellon University. While VTE is used primarily to offer security training, DoD 8570.1 and FISMA training, and CERT® courses to partner organizations and students in an online format, CERT® makes as much of its library as possible available to the public in an effort to create a more knowledgeable information security community.

### **National Institute of Standards and Technology (NIST)**

<http://csrc.nist.gov/>

Founded in 1901, NIST is a non-regulatory federal agency within the U.S. Commerce Department’s Technology Administration. NIST’s mission is to develop and promote measurement, standards, and technology to enhance productivity, facilitate trade, and improve the quality of life. The NIST Information Technology Laboratory, Computer Security Division provides a variety of tips, newsletters, and publications to support cyber security efforts.

### **US Computer Emergency Readiness Team (US CERT)**

<http://www.us-cert.gov/>

Established in 2003 to protect the nation’s Internet infrastructure, US-CERT coordinates defense against and responses to cyber attacks across the nation.

### **Multi-State Information Sharing and Analysis Center (MS-ISAC)**

<http://www.msisac.org/>

A public site identifying what the MS-ISAC is and what its mission, goals and objectives are in improving the nation’s cyber security posture from a state and local perspective. The goal is to have this MS-ISAC include all fifty states, which would provide a valuable centrally-coordinated mechanism for sharing important security intelligence and information between the States. The MS-ISAC can serve as a critical point of contact between the States and the Federal government. A primary goal of the MSISAC is to eliminate duplicative efforts.

### **The SANS™ Institute**

<http://www.sans.org/tr> (reading room) and <http://isc.sans.org> (Internet Storm Center)

SANS is an example of non-government cyber security resources and is one of the largest sources for information security training and certification in the world. It also develops, maintains, and makes available at no cost, the largest collection of research documents about various aspects of information security and operates the Internet’s early warning system - the Internet Storm Center. The SANS

(SysAdmin, Audit, Network, Security) Institute was established in 1989 as a cooperative research and education organization. Its programs now reach more than 165,000 security professionals, auditors, system administrators, network administrators, chief information security officers, and CIOs who share the lessons they are learning and jointly find solutions to the challenges they face.

### **National Security Agency Central Security Service**

<http://www.nsa.gov/snac>

NSA initiatives in enhancing software security cover both proprietary and open source software, and they have successfully used both proprietary and open source models in their research activities. NSA's work to enhance the security of software is motivated by one simple consideration: use their resources as efficiently as possible to give NSA's customers the best possible security options in the most widely employed products. The objective of the NSA research program is to develop technologic advances that can be shared with the software development community through a variety of transfer mechanisms. NSA does not favor or promote any specific software product or business model; rather, NSA is promoting enhanced security.

### *Online Selection Factors*

Like many sections in the 2007 SEL, the online version of the cyber security section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For this section, the SubGroup chose User Level and Use Location (described below) as the two factors. Every online item is "tagged" for each appropriate combination of factors. Thus users on the online version can choose any combination of User Level and Use Location, and the system will provide a list of all items tagged for that combination.

#### **The User Levels for Cyber security equipment are defined as follows:**

End User	Users who possess no special training or other qualifications with respect to the equipment being utilized. Examples would be personal computer users who are familiar with basic applications but have not received any classroom or advanced training.
IT Technician	Users who possess some specialized training or other qualifications with respect to the equipment being utilized. Examples would be users who have attended classroom training for a Geographic Information System, or who have received training in hardware installation and setup.
IT Advanced Technician	Users who possess some extensive training or career-level qualifications with respect to the equipment being utilized. Examples would be trained professional network administrators who possess professional qualifications such as Microsoft Certified Systems Engineer (MCSE), or computer repair professionals.

#### **The probable Use Location(s) are defined as follows:**

Rear Information Zone - Strategic	Emergency Operations Center/ Joint Operations Center Intel Support.
Rear Information Zone - Operational	Emergency Operations Center/ Departmental Operations Center Intel Support.
Forward Information Zone - Support [Cold]	Incident Command Post Intel Support; near incident scene, but in cold zone.
Forward Information Zone - Contamination Reduction [Warm]	Operations/Intel Support in warm zone.



Forward Information Zone - Exclusion [Hot]	Operations/Intel Support in hot zone.
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The two factors provide a method for classifying equipment items. For example, a network firewall might be classified as requiring an IT Advanced Technician to install and configure, and might be used in the Rear Information Zone or even the Forward Information Zone - Support [Cold], but would not be used in either the Warm or Hot Zone. In the online SEL, if a user selected “IT Advanced Technician” and “Rear Information Zone” as the two desired selection factor values, the network firewall would then appear in the search results along with any other equipment recommended for that combination.

## Section 5 | Cyber Security Enhancement Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AU - Authentication Devices</b>				
05AU-00-BIOM	Device, Biometric User Authentication	Devices that utilize biometric characteristics (fingerprints, palm prints, retinal scanning, etc.) to authorize access to facilities and/or systems.	<p>May be implemented as a peripheral device or integrated into other hardware.</p> <p>-----</p> <p>Check both false positive and false negative error rates. False positives are more serious since they validate an unauthorized user.</p> <p>May create conflicts with other software or some operating systems - be sure to test on actual hardware/software configuration before procurement.</p> <p>Should be used as part of a “two-factor” authentication scheme requiring an additional factor such as a password.</p> <p>NIST Special Publication 800-76 (available in draft) provides guidance.</p>	
05AU-00-TOKN	System, Remote Authentication	System used to provide enhanced remote authentication, usually consisting of a server, some synchronization scheme, and a device or token.	<p>May be connected via USB or PCMCIA to remote computer.</p> <p>Some may not be connected, but simply generate a time-based, synchronized password.</p> <p>Provides secure (encrypted) communication to network.</p> <p>-----</p> <p>Battery life is critical for tokens not connected to a machine.</p> <p>Carefully check compatibility with hardware/operating system/software suite to be used.</p> <p>May not be compatible with some applications, so that a different scheme might be necessary for initial login versus access to online application.</p> <p>Will require management of the synchronization process and a process for immediate cancellation of lost/stolen devices.</p>	
<b>EN - Encryption</b>				
05EN-00-ECRP	Software, Encryption	Encryption software for protecting stored data files or email messages.	<p>May integrate as “plug-in” to popular email software such as Outlook or Eudora.</p> <p>May utilize public key cryptography, requiring the establishment of public and private keys for users.</p> <p>-----</p> <p>See NIST Advanced Encryption Standard (AES) for applicable standards. Note that the Data Encryption Standard (which includes DES and 3-DES) is being replaced by AES. →</p>	67, 94, 130

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 5 | Cyber Security Enhancement Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>EN - Encryption</b>				
<i>00 - Continued</i>				
05EN-00-ETRN	Encryption, Data Transmission	A class of network access solutions, usually for remote access, that provide encrypted user access. May be used for remote access, point to point, or link encryption. Includes virtual private networks, and encrypted transmission modes such as SSH and SSL.	See NIST SP 800-36 for guidance. Third-party professional security audit of network recommended. Planning for key management is essential, and should include a key escrow plan if critical data is being stored in encrypted format.  Some solutions will utilize hardware “tokens” in addition to software clients (see 05AU-00-TOKEN). Link encryption will require devices at each end of the link. Centralized management tools may be available for hardware based solutions such as link encryptors. ----- See NIST SP 800-36 for guidance. Third-party professional security audit of network recommended. When utilized on handheld devices, the additional overhead may severely impact data transmission - consider platform(s). Planning for key management is critical.	67, 94, 130
<b>HS - Host Level Security</b>				
<b>00</b>				
05HS-00-FRNS	Software, Forensic	Application suites that allow in-depth analysis of hosts based on operating system and file systems. Software of this type may be used by law enforcement officers, government/corporate investigators and consultants to investigate the	Will support a specific list of operating systems (e.g., Windows, Linux, Solaris). Will support a specific list of file systems, such as FAT12, FAT16, FAT32, NTFS, EXT2/3 (Linux), Reiser (Linux), UFS (Sun Solaris), AIX Journaling File System (JFS and jfs) LVM8. FFS (OpenBSD, NetBSD, and FreeBSD), Palm, HFS, HFS+ (Macintosh), CDFS, ISO 9660, UDF, DVD. Support for evidence collection and chain of custody. Analysis of E-mail, Internet communications, and document files. ----- Some packages may require add-on applications. Some packages may not support all file systems or OS types. →	130

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\* Item has been moved or changed in the edition.

## Section 5 | Cyber Security Enhancement Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
HS - Host Level Security 00 - Continued			
05HS-00-MALW Software, Malware Protection	aftermath of computer-related crimes. Forensics software generally includes disk analysis tools, tools for the recovery of deleted files, and integrated database support to mark files and data of interest to investigators.	May require purchase of additional tools to support analysis of hand-held devices (Palm/Blackberry/etc.).	130, 134, 138
05HS-00-PFWL System, Personal Firewall	Software for protection against viruses, spyware, and malicious code. May be obtained for individual hosts or for entire network segments.	Workstation software should allow both scheduled and “on access” scanning. ----- Must maintain current signature file to operate effectively - usually requires a subscription. Should be deployed at the workstation, server, and firewall level for entire network segments. Third-party professional security audit of network recommended to identify proper deployment and verify the effectiveness of the deployment against known threats. Maintenance of current software versions for operating systems and software throughout the system is critical (including peripheral devices, network devices such as routers, and devices that only access the system periodically).	130, 132, 138

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 5 | Cyber Security Enhancement Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
NP - Network Level Security 00			
05NP-00-FWAL Firewall, Network	Firewall (software or standalone appliance) for use in protecting networks. See also 05HS-00-PFWL.	May implement simple filtering, or may include other functions such as malware protection (e.g., virus scanning) or application proxies. ----- See NIST SP 800-36 and SP 800-41 for guidance. Third-party professional security audit of network recommended to ensure proper deployment. Should reflect organization's written policy on connectivity and permitted traffic. Must be capable of both inbound and outbound filtering.	130, 132, 136, 138
05NP-00-IDS System, Intrusion Detection	Intrusion Detection System (IDS) deployed at either host or network level to detect unauthorized or aberrant behavior on the network. Software and hardware (appliance) solutions exist.	Some IDS systems rely on signatures; others attempt to detect anomalies against baseline usage. ----- Requires trained network security personnel to configure system and interpret warning messages. Prone to false positives. See NIST SP 800-36 for guidance. Professional third-party security audit recommended before deployment. Use of IDS systems is usually appropriate only after more basic defenses such as firewalls have been deployed.	129, 130, 133, 135, 138
05NP-00-SCAN Tools, Network Vulnerability Scanning	Port scanners and other tools designed to identify security vulnerabilities on networks or individual hosts on target networks.	----- Best use of these tools is recurring scans against established vulnerability baseline.  Use with caution - some tools can bring down target hosts. Suggest scanning a small representative subset of the target network first to ensure that the scan is benign. Then scan entire network.  These tools do not simulate an attack. They merely identify known vulnerabilities. The best way to establish a "real" vulnerability baseline is through a third-party vulnerability assessment.	130, 138

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 5 | Cyber Security Enhancement Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>NP - Network Level Security</b> 00 - <i>Continued</i>			
05NP-00-SEIM	Software or appliance that gathers data from multiple security sources such as firewalls, intrusion detection systems, malware protection systems, etc. to provide log file consolidation and event correlation capability in support of network security operations.	Provides agents to interface with existing security applications and devices. Offers centralized management and storage of data from agents. May provide visualization tools such as a graphic representation of enterprise security statistics. ----- Check whether agents are available for all currently-fielded software and devices. Obtain complete pricing for baseline package, all required agents, and add-on software such as report generators before procurement. Implementation of this type of product creates a significant attack target for intruders. Care must be taken to secure the management system against attack.	130
System, Security Event/Incident Management			
<b>PM - Patch and Configuration Management</b> 00			
05PM-00-PTCH	System to manage the update and installation of patches, applications, and/or operating systems utilized by an organization in order to maintain current “version control.”	Record keeping of existing versions on different clients, date of last change, etc. System automatically gathers current versions from assorted vendors for pushing out to clients. ----- May require the installation of client software on all managed devices (workstations, servers, etc.). This can be a significant task, and any required client software should be checked for compatibility with hardware/operating system/software suites in use prior to procurement. Some products may track only operating system software. However, vulnerabilities in applications and network devices such as routers are also important and should be included in any patch management plan. Regular third-party vulnerability assessments should also be performed.	131
System, Patch/Configuration Management			

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 6 - Interoperable Communications Equipment

### Overview

This section lists equipment and systems that provide communications functionality, connectivity, and interoperability between local agencies and other organizations. The items mentioned serve to develop situational awareness and better coordinate response operations for CBRNE terrorism and other 'all-hazard' homeland security operations.

Like the previous edition, the Spring 2007 SEL has divided information technology, cyber security and communications into three distinct sections (Sections 4, 5, and 6 respectively). While there continues to be a close connection among the three (and even some merging of technologies such as voice communications over the Internet), the separation of sections should make it easier to locate desired equipment items. This year's SEL also continues the practice of providing information on desirable features, operating considerations, and standards (where applicable). These fields are designed to enhance the reader's understanding of the defined items and their practical use.

### Changes for 2007

The IT section now includes Underwater Communications Equipment (supporting a major initiative in Sections 1 and 3 to incorporate water operations), and a separate item for Voter Receivers. The latter item was added for clarity so that planners could be certain that this special class of repeater was part of the SEL. In view of the increased emphasis on Communications Security (COMSEC), a separate support equipment section was added containing Safes and Shredders for storage and destruction of COMSEC material, such as encryption keys. Other minor changes and updates are included throughout the section.

### Online Selection Factors

Like most sections in the 2007 SEL, the online version of the Communications Section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For this section, the SubGroup chose User Level and Use Location (described below) as the two factors. Every online item is "tagged" for each appropriate combination of factors. Thus users of the online version can choose any combination of User Level and Use Location, and the system will provide a list of all items tagged for that combination.

#### **The User Levels for communications equipment are defined as follows:**

End User	Users who possess no special training or other qualifications with respect to the equipment being utilized. Examples would be users of cellular telephones or 2-way transceivers.
Communications Technician	Users who possess some specialized training or other qualifications with respect to the equipment being utilized. Examples would be users who have attended classroom training for a telephone switch, or who have received training in hardware installation and setup.
Communications Advanced Technician	Users who possess some extensive training or career-level qualifications with respect to the equipment being utilized. Examples would be trained satellite communications professionals capable of setting up and operating complex base stations.

<sup>1</sup> The on-line version is available on the Responder Knowledge Base, [www.rkb.mipt.org](http://www.rkb.mipt.org).

**The probable Use Location(s) are defined as follows:**

Rear Information Zone - Strategic	Emergency Operations Center/ Joint Operations Center Intel Support.
Rear Information Zone - Operational	Emergency Operations Center/ Departmental Operations Center Intel Support.
Forward Information Zone - Support [Cold]	Incident Command Post Intel Support; near incident scene, but in cold zone.
Forward Information Zone - Contamination Reduction [Warm]	Operations/Intel Support in warm zone.
Forward Information Zone - Exclusion [Hot]	Operations/Intel Support in hot zone.

The factors described above provide a method for classifying equipment items. For example, satellite equipment is classified as requiring at least a Communications Technician to install and configure, and might be used in the Rear Information Zone or the Forward Information Zone - Support [Cold], but would probably not be used in either the Warm or Hot Zone. In the online SEL, if a user selected “Communications Technician” and “Rear Information Zone” as the two desired selection factor values, satellite equipment would then appear in the search results along with any other equipment recommended for that combination.



## Section 6 | Interoperable Communications Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CC - Commercial</b> 01 - Cell, Digital			
06CC-01-CELL Phone, Cellular	Digital cellular phone.	Locator / Phase II compliant. Wireless Priority Service (WPS) enabled. ----- Check coverage area. WPS is only available with GSM. Check availability of digital service in your area. Ongoing service costs. Cell phone cameras do not currently have high enough resolutions for legal purposes. Some brands of phones can be tracked via location software.	
<b>CC - Commercial</b> 02 - Data & Messaging			
06CC-02-2WAY Device, Messaging, 2-Way Text	Text messaging device with 2-way capability.	Some devices have Internet capability. Some devices also function as cell phones and/or wireless modems. ----- Consider service area in vendor selection. Examine billing plan parameters.	
06CC-02-DSAD Device, Data Service Access	PCMCIA card, serial device, or USB device for access to on-line data services.	Multiple protocols available such as General Packet Radio Service (GPRS), CDMA, TDMA. ----- Consider coverage area. Examine billing plan parameters.	
06CC-02-PAGE Paging	Paging services, 1-way text messaging.	Audible or silent alarm. ----- Consider coverage area. Examine billing plan. Consider capacity (number of characters).	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 6 | Interoperable Communications Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CC - Commercial</b>			
<b>03 - Satellite Phone</b>			
06CC-03-SATB Phone, Satellite Base	Satellite communication device, fixed location.	Operation similar to cell phone. Used in a fixed location. ----- Consider cost(s) of service. Line of sight to satellite (outside antenna) required.	
06CC-03-SATM Phone, Satellite Mobile	Satellite communication device, mobile.	Fixed or vehicle configuration. Cell-type service. ----- Line of sight to satellite (outside antenna) required. Consider cost(s) of service.	
06CC-03-SATP Phone, Satellite Portable	Satellite service with handheld device.	Operation similar to cell phone. ----- Line-of-sight to satellite (outside antenna) required. In-building/car kits are available for portable satellite phones. Service costs/fees.	
<b>CC - Commercial</b>			
<b>04 - Satellite Data Services</b>			
06CC-04-EQSD Equipment, Satellite Data	Satellite earth station transmitter and receiver, usually Ku-Band.	Annual or multi-year leased capacity. 50KHz to 70MHz bandwidth. Single audio or low-speed data up to multiple T-1 capacity. ----- 24x7x365 availability. Fixed-site (stationary and transportable). Two end points required. May require FCC license. Service costs questions should be directed to G&T.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 6 | Interoperable Communications Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
06CC-04-INST INMARSAT - B	INMARSAT - B satellite communications equipment	No license necessary. Similar to cell service. Monthly access charges with per minute charges. 64-Kbps channels. ----- Line-of-sight to satellite (outside antenna) required. Supports video phone. Data links should be able to support VOIP.	
06CC-04-SADS Services, Satellite Data	Satellite data services (Internet access via satellite connection). Commercial providers of Internet connectivity via satellite.	Stationary operation, transportable. Includes Ku (most often) and L band. ----- Fixed-site (stationary and transportable). Line-of-sight to satellite (outside antenna) required. Ka satellite service not readily available yet.	
06CC-04-SSBR Services, Satellite, Brokered	Full-service rental/lease of satellite transponder time, including truck and technicians.	Purchase as needed. 50KHz to 70MHz bandwidth. Single audio or low-speed data up to multiple T-1 capacity. ----- Fixed-site (stationary and transportable). Two end points required. Very high bandwidth available.	
06CC-04-SSFT Space Segment, Full-Time, Leased	Satellite transponder time purchased on long-term contracts.	Annual or multi-year leased capacity. 50KHz to 70MHz bandwidth. Single audio or low-speed data up to multiple T-1 capacity. ----- 24x7x365 availability. →	

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## Section 6 | Interoperable Communications Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>**CC - Commercial**04 - Satellite Data Services - *Continued*

		Fixed-site (stationary and transportable). Two end points required. May require FCC license. Service cost questions should be directed to G&T.	
06CC-04-SSHIB Space Segment, Hourly, Brokered	Satellite transponder time purchased by the hour.	Purchase as needed. 50KHz to 70MHz bandwidth. Single audio or low-speed data up to multiple T-1 capacity. ----- Stationary site - transportable service. Two end points required. Service cost questions should be directed to G&T.	

**CC - Commercial**

## 05 - Priority Services

06CC-05-PRTY Priority Services, Communications	Services to ensure priority communication over common carrier media, such as cellular phones or telephone land lines. Includes Government Emergency Telecommunications Service (GETS), NCS Telecommunications Service Priority (TSP) Program, and NCS Wireless Priority Services (WPS).		
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<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 6 | Interoperable Communications Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CP - Private</b>				
<b>01 - Land-Mobile Radios &amp; Bases</b>				
06CP-01-BASE	Radio, Base	Base radio system.	Digital and analog capable. Supports 25KHz and 12.5KHz channels. Supports conventional and/or trunked systems. Project 25 compatible (if within 800 MHz). Project 25 required within 700MHz. ----- Consider installation needs: grounding, location, lightning protection.	62
06CP-01-HFRQ	Radio, High Frequency (HF) Single Sideband	High frequency (HF) single sideband communications equipment.	Deployable antenna systems. Automatic Link Establishment (ALE). Automatic email option available. ----- Long range communication. May require large antenna system (65 feet typical). Special knowledge area - beyond most common user level training.	
06CP-01-MOBL	Radio, Mobile	Mobile radio equipment, deployed in/on vehicles, or can also be deployed as temporary base stations.	Digital and analog capable. Supports 25KHz and 12.5KHz channels. Supports conventional and/or trunked systems. Project 25 compatible (800 MHz). Project 25 required (700 MHz). ----- See 47 CFR 90 FCC for applicable standard. When utilizing as a 'temporary' base station, consider programming needs and capabilities.	62
06CP-01-PORT	Radio, Portable	Individual/portable radio transceivers.	Digital and analog capable. Supports 25KHz and 12.5KHz channels. Supports conventional systems. Project 25 compatible (800 MHz). →	62

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 6 | Interoperable Communications Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>

## CP - Private

01 - Land-Mobile Radios & Bases - *Continued*

		<p>Project 25 required (700MHz). Optional waterproofing to allow use after complete immersion.</p> <p>-----</p> <p>See 47 CFR 90 FCC for applicable standard. Portable radios may not be advisable in EOD operations - consider hard-line or other solutions. Can be intrinsically safe. Consider waterproof models for use in water operations/rescue environments.</p>	
06CP-01-REPT*	An electronic device that receives a weak or low-level signal and retransmits that signal to extend usable range.	<p>Digital or analog capable. Supports 25Khz and 12.5Khz channels. Supports conventional or trunked systems. Project 25 compatible (150-512, 800 MHz). Project 25 required within 700MHz. Portable and/or fixed. Able to pass encryption transparently.</p> <p>-----</p> <p>Could be configured for cross-band operations. Consider installation needs: grounding, location, lightning protection, battery backup. Consider low power configuration for remote sites.</p>	
06CP-01-VOTR*	A device that evaluates the comparative strength and signal/noise ratio from multiple receivers on the same frequency, selects the “best” signal and retransmits.	<p>Digital or analog capable. Supports 25Khz and 12.5Khz channels. Supports conventional or trunked systems. Project 25 compatible (150-512, 800 MHz). Project 25 required within 700MHz. Portable and/or fixed. Able to pass encryption transparently. Able to vote continuously or lock onto first selected receiver. →</p>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 6 | Interoperable Communications Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CP - Private</b> 01 - Land-Mobile Radios & Bases - <i>Continued</i>		Capable of receiver lockout upon loss of connectivity. ----- Could be configured for cross-band operations. Consider installation needs: grounding, location, lightning protection, battery backup.	
<b>CP - Private</b> 02 - Bridging/Patching/Gateway Equipment	Includes a wide range of equipment and software utilized to connect disparate communications networks. Systems range from cords that can patch two radios to interface boxes that can link dozens of radios, phones, computers, etc. in multiple sessions.	Hard-wired and/or software-definable. Connects multiple radios/devices together for voice and/or data. Supports transmit/receive devices (radio, telephone, VoIP). Devices can be as small as a link between two specific devices or as large as infrastructure support systems. ----- Careful consideration must be given to how channels are interconnected. A significant knowledge of the systems to be linked is required. Mistakes in patching or bridging can bring down both systems. There are significant use policy implications with the operation of these systems. Consider licensing issues for individual system, as well as possible licensing implications from linking them.	
<b>CP - Private</b> 03 - Other Land-Mobile Radio Equipment	Bi-directional amplifiers, application defined.	May be passive or active. ----- Used to extend cell phone or radio signals into/out of buildings, tunnels, underground.	

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## Section 6 | Interoperable Communications Equipment

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>CP - Private  
03 - Other Land-Mobile Radio Equipment - *Continued*

06CP-03-ICOM Intercom	System for hands-free (wired or wireless) communication for limited numbers of personnel in close proximity, such as vehicle crew members.	Voice activated, full duplex. May be battery powered or use vehicle power. ----- For battery units, vehicle adapter is useful. Wireless units will have low power and should not be used in lieu of handheld radios over distances beyond their design limits.	
06CP-03-MWAV Radio, Microwave Link	Microwave link for remote control of radio base stations or for temporary links at event sites.	May be either license-free or exclusive use license. ----- Line-of-sight required. Available in licensed and unlicensed bands.	
06CP-03-NRSC Cable, Non Radiation-Shielded Transmission	Non radiation-shielded transmission cable between base/repeater and antenna.		
06CP-03-PRAC Accessories, Portable Radio	Speaker/microphone extensions to portable radios. Sometimes used within encapsulated/partially encapsulated suits, where restricted access to radio equipment impedes normal portable radio operations.	May rely on Push-To-Talk (PTT) or Voice Activation (VOX) for keying microphone. May include bone microphones, throat microphones, etc. ----- May include intrinsically safe equipment.	
06CP-03-TOWR*	Fixed and portable.	May include omnidirectional antennae. ----->	

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\* Item has been moved or changed in the edition.



## Section 6 | Interoperable Communications Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CP - Private</b> 03 - Other Land-Mobile Radio Equipment - <i>Continued</i>	Systems, Antenna and Tower	<p>Should be constructed with consideration for potential hazards (such as hurricanes, floods, tornadoes, forest fires, etc.).</p> <p>All public safety towers must meet current EIA standards for the climates in which they operate. Towers should have engineering inspections to ensure that the tower has not been overloaded with too much equipment for the wind load expected.</p>	
06CP-03-UCOM* Equipment, Communications, Underwater	2-way communications equipment for use in underwater operations.	<p>A communications system that can be worn with an ensemble that consists of dry suit, dry suit gloves or mittens, dry suit boots or booties, dry suit underwear, self-contained underwater breathing apparatus (SCUBA), and swimming fins. This system should be usable in both normal and contaminated water diving operations. The ensemble is designed to maintain integrity of the breathing air supply, protect against chemical/biological contaminants, insulate against cold water, and protect against physical hazards. The communications system must be integrated with the dive ensemble in a manner that does not compromise the integrity of the ensemble against exposure to chemical or biological contaminants. The communications system must also provide effective operation under a variety of diving conditions.</p> <p>-----</p> <p>Consider compatibility with facepiece/regulator equipment. Must not interfere with ensemble integrity, particularly for contaminated water operations.</p>	
<b>CP - Private</b> 04 - Wide Area Networks	06CP-04-WADN Network, Wide Area Digital	<p>Wide area digital network, voice/data capable.</p> <p>&gt;10MBPS data transmission speeds.</p> <p>-----</p> <p>Network security.</p>	

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## Section 6 | Interoperable Communications Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CP - Private</b> 05 - Wire-Line Communication				
06CP-05-BRAC	Bridge, Audio Teleconferencing	Device to connect more than two parties (up to several dozen) into a single audio conference.	----- Encryption needs and impacts on overhead must be considered.	
06CP-05-LPBX	Exchange, Private Branch, Portable	Portable private branch exchange (PBX)	Many modern PBXs are VoIP platforms. ----- Installation may be expedited by Telecommunications Service Prioritization (TSP) through state Emergency Management Office. Required to have pass-through/addressable phone locations for permanent installations.	
06CP-05-VCNB	Bridge, Video Teleconferencing	Device to connect more than four parties (up to several dozen) into a single video conference.	May connect users via ISDN, Internet, dedicated broadband. May be encrypted. ----- Extremely high price (>\$100K). Encryption needs and impacts on overhead must be considered.	
06CP-05-VCON	Teleconferencing, Video	Video teleconferencing over ISDN telephone lines or broadband facilities.	----- Minimum 256KB bi-directional bandwidth required. Encryption needs and impacts on overhead must be considered.	
<b>CP - Private</b> 06 - Communications Security (COMSEC) Support Equipment				
06CP-06-SAFE*	Safe, GSA-Rated	Safe for storing sensitive material and equipment such as encryption keys or encryption key loaders.	----- It is critical to ensure that personnel are familiar with handling requirements for classified and sensitive unclassified information, and that appropriate organizational policies are in place. Information and classroom courses are available from multiple sources, including DHS and the military. →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 6 | Interoperable Communications Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
CP - Private	06 - Communications Security (COMSEC) Support Equipment - <i>Continued</i>	<p>DHS has published “Safeguarding Classified and Sensitive But Unclassified Information - Reference Booklet for State, Local, Tribal, and Private Sector Programs”, May 2005. DoD Regulation 5200.1-R, dated Jan 1997 is also useful in designing an Information Security Program.</p> <p>Check usage restrictions. Safes used for classified or encryption key material are often restricted so that no other materials may share the storage space.</p>	
06CP-06-SHRD*	Shredding or disintegrating device for the destruction of sensitive materials such as reports or encryption key material.	Products evaluated by the National Security Agency can be found in (a) NSA/CSS Evaluated Products List (EPL) for High Security Disintegrators, Annex A to NSA/CSS 02-02-K, dated 31 July 2006; or (b) NSA/CSS Evaluated Products List (EPL) for High Security Crosscut Paper Shredders, Annex A to NSA/CSS 02-01, dated 9 April 2005.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 - Detection Equipment

### Overview

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This section is structured to show detection equipment and recommended technologies based on both the type of expected hazard (Chemical, Biological, Radiological, Explosive) and the anticipated mode of use (Portable, Transportable Lab Equipment, Fixed Site, and Standoff). The description of each item of detection equipment also includes an annotation on capability. It is shown as the “DIQ-Code”, and contains one or more of three codes: D for Detect, I for Identify, and Q for Quantify.

The maturity and types of detection technology vary greatly depending on the level and type of hazard the user is detecting, and therefore the number and sophistication of the detection devices also varies greatly. Radiological detection devices have been commercially available and widely used for decades. Though the military has been using them since World War I, chemical detection devices (especially for traditional chemical warfare agents) have only recently been available to the civilian community. There are numerous types of chemical detection technologies, each of which has different characteristics and operating parameters. Biological warfare agent detection devices have only recently become commercially available, and new technologies continue to emerge.

The Detection and Decontamination (D&D) SubGroup is working to incorporate applicable testing standards and certifications as they become available and approved for all types of detection devices. The SubGroup is also working with the IAB’s Training SubGroup to align the training ratings used in this section with training standards and requirements.

Finally, the SubGroup strongly recommends that a minimum of two different but complementary detection technologies (e.g., infrared, acoustic wave, etc.) be used to validate readings rather than relying upon any single instrument. This procedure will assist responders in interpreting data to better conduct their risk assessment and incident action plan.

### Changes for 2007

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Overall, the changes in this section for 2007 are minimal. In addition to minor edits, the team separated the item for portable Raman infrared chemical detectors into two items: one for Raman, and another for Fourier/Raman. This was motivated in part by the desire to communicate the price range difference between the two technologies.

As part of the last phase of alignment between the SEL and the DHS Authorized Equipment List (AEL), the D&D SubGroup also agreed to move Portal Monitors from Section 7 into a new Section 15, Inspection and Screening Systems. Section 15 groups several items that are likely to be used in personnel and package screening, as opposed to field operations.

### Sub-Section Headings for 2006

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This section structure is organized around likely modes of use. The major groupings are Chemical Detection and Support, Biological Detection and Support, Explosive Detection, Radiological Detection and Support, and Support Equipment. Within these categories, the subcategories used are:

- *Portable*, defined as being human portable for mobile operations in the field. The instrument is light enough to be carried or worn by an emergency responder and operated by one individual.
- *Transportable Lab Equipment*, defined as being human portable for mobile operations in the field but generally requires a trained technical operator as well as extensive labor.

- *Fixed-Site Sampling or Detection Systems*, defined as stand-alone detection systems specifically designed to operate inside a building, fixed-mounted to a vehicle, or set up in a fixed location to monitor an incident perimeter.
- *Standoff Detector Systems*, defined as equipment specifically designed to monitor the presence of chemical/biological agents that may be present in the atmosphere up to three miles away. These systems typically require one or two individuals for monitoring operations. Depending on the technique employed and the environmental conditions, these detectors can have high or low selectivity. Standoff detectors usually require vehicle transport and special setup.

This section of the SEL also has a unique feature within the Operating Considerations field to assist users in determining anticipated costs and training time required for each type of equipment. Rating scales were adopted by the Detection and Decontamination SubGroup to quantify initial equipment costs, recurring operation and maintenance (O&M) costs, and amount of training required to become and remain proficient in the operation of the equipment. *Note: rating scales are used to give a general indication as to the time and costs associated with each type of equipment, and should not be used as the sole determinant in equipment selection.*

The initial cost was based on the estimated average cost of equipment that fit the category, including all necessary (but not extra) components. The O&M costs and training hours were based on estimated average annual requirements. The following scales were set:

#### **Cost Scale (used for initial cost and yearly maintenance costs)**

<\$1K	\$
\$1-10K	\$\$
\$10-50K	\$\$\$
\$50-100K	\$\$\$\$
>\$100K	\$\$\$\$\$

#### **Training Scale (yearly requirement including initial training)**

< 1 day	Minimal
1-2 days	Moderate
> 2 days (or requiring knowledge of chemistry, radiation, explosives or biology, or recurring training more than once a month)	Extensive

### *Online Selection Factors*

Like most sections in the 2007 SEL, the online<sup>1</sup> version of the Detection Section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For the Detection Section, the SubGroup chose to use Proficiency Level and Hazard Environment (described below) as the two factors. Every online item is “tagged” for each appropriate combination of factors. Thus, users on the online version can choose any combination of Proficiency Level and Hazard Environment, and the system will provide a list of all items tagged for that combination.

Proficiency Level is the first factor. In addition to any specific training required to operate an individual piece of equipment, the equipment operator must possess the skills necessary to meet the recommended proficiency level. The considerations in determining this level include the anticipated location of operation (i.e. hot zone, warm zone, or cold zone), the complexity of the equipment, and the necessity for chemical or biological training or expertise. Proficiency Levels have been defined in accordance

<sup>1</sup> The online version of the SEL is available on the Responder Knowledge Base at [www.rkb.mipt.org](http://www.rkb.mipt.org).

with *NFPA 472, Standard for Professional Competence of Responders to Hazardous Materials Incidents*, as follows:

- **Awareness Level.** First responders at the awareness level are those persons who, in the course of their normal duties, can be the first on the scene of an emergency involving hazardous materials. First responders at the awareness level are expected to recognize the presence of hazardous materials, protect themselves, call for trained personnel, and secure the area.
- **Operational Level.** First responders at the operational level are those persons who respond to releases or potential releases of hazardous materials as part of the initial response to the incident for the purpose of protecting nearby persons, the environment, or property from the effects of the release. They should be trained to respond in a defensive fashion to control the release from a safe distance and keep it from spreading.
- **Technician Level<sup>2</sup>.** Hazardous materials technicians are those persons who respond to releases or potential releases of hazardous materials for the purpose of controlling the release. Hazardous materials technicians are expected to use specialized chemical protective clothing and specialized control equipment.
- **Command Level.** The incident commander is that person responsible for all decisions relating to the management of the incident. The incident commander is in charge of the incident site.

The second selection factor is Hazard Environment, which includes the particular CBRNE hazard environment(s) for which each item is suitable. As stated earlier, for our purposes it is useful to represent the Nuclear “N” as part Thermal, part Explosive, and part Radiological. Therefore, the Hazard Environment values used for online selection are:

- Chemical
- Biological
- Radiological
- Thermal
- Explosive

<sup>2</sup> *This level was modified slightly by the SubGroup for this publication. The Technician Level was changed to Technician/Specialist in the online system (the term “specialist” as used here should not be confused with the Private Sector Specialist definition in NFPA 472). A Specialist, for purposes of our matrix, was defined as an equipment operator that possessed extensive technical expertise, but did not possess emergency response HAZMAT experience or knowledge. Generally, a Specialist would be required for a piece of equipment defined as Transportable Lab Equipment.*

## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
07BD-01-KFAS Kit, Field Assay	Field assay kit. DIQCode: [D,I]	<p>Stand alone or with assay reader.</p> <p>-----</p> <p>Test results are presumptive: confirmatory process required.</p> <p>Limited shelf life.</p> <p>Requires temperature-controlled storage.</p> <p>Strict operating procedures.</p> <p>For use with bulk material (visible) point sampling - not for environmental surveys.</p> <p>Limited number of agents.</p> <p>Time sensitive.</p> <p>ICostRating: \$</p> <p>MCostRating: \$</p> <p>Training: minimal</p> <p>Frequent refresher training required.</p>	82
07BD-01-PTST Kit, Protein Test	Protein test kit. DIQCode: [D]	<p>Handheld</p> <p>-----</p> <p>Basic screen for biologicals based on protein detection.</p> <p>Test results are presumptive: confirmatory process required.</p> <p>Non-discriminatory between live or dead cells, harmless or harmful.</p> <p>Reagents have limited shelf life.</p> <p>For use with bulk(visible) material.</p> <p>ICostRating: \$</p> <p>MCostRating: \$</p> <p>Training: minimal</p> <p>Operational competency maintenance required.</p>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>BD - Biological Detection</b> 02 - Transportable Lab Equipment			
07BD-02-DNRRN Analysis, DNA/RNA Detection	DNA/RNA detection analysis (example: PCR, ECL). DIQCode: [D,I]	----- Test results are presumptive under field conditions; confirmatory process required. Reagent quality: continuous refrigeration required, highly perishable. Proper sample preparation critical. Does not discriminate between living and dead organisms. ICostRating: \$\$\$ MCostRating: \$\$ Training: extensive Skill competency maintenance required.	
<b>BS - Biological Support</b> 01 - Portable			
07BS-01-KBBA Kit, Biological Sampling/evidence - Batch	Biological sampling and evidence kit. Collects samples for later analysis.	Sample collector. ----- ICostRating: \$ Maintenance cost: \$ Training: minimal	
07BS-01-KBPA Sampler, Biological, Portable Air	Portable air sampler for biological sampling/ evidence.	Handheld. Portable. Air particulate/aerosol. Collects sample for lab and/or assay analysis. ----- Variable air flow rate. Shelf life consideration. Filter medium ICostRating: \$\$ MCostRating: \$ Training: minimal	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>BS - Biological Support</b>			
03 - Fixed-Site Sampling and/or Detection Systems			
07BS-03-KBAP Kit, Biological Sampling/evidence - Automated Perimeter Sampling Systems	Biological sampling/evidence kit - automated perimeter sampling systems.	Building system mounted. Vehicle mounted/carried. Collects/concentrates air particulates/aerosols only. Deposits sample on filters or collection medium. ----- Does not differentiate particle type. Variable air flow rate. Filter medium ICostRating: \$\$\$ MCostRating: \$ Training: minimal	
<b>CD - Chemical Detection</b>			
01 - Portable			
07CD-01-CLAS Strips, Classifier (pH, Waste Water, Chemical)	Waste water classifier strips, pH and chemical. DIQCode: [D]	Easy to use. Paper indicator. ----- Consider shelf life. ICostRating: \$ MCostRating: N/A Training: minimal	
07CD-01-DPFI Detector, Flame Ionization (FID), Point, VOC	Flame ionization detector (FID) for point detection of volatile organic compounds (VOC). DIQCode: [D]	Handheld. ----- Non-specific. Presence/absence. Combustible fuel source (transportation may be an issue). Caution must be used when operating in explosive atmospheres. ICostRating: \$\$ →	

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\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CD - Chemical Detection</b>				
<b>01 - Portable - Continued</b>				
07CD-01-DPPFP Detector, Flame Photometry, Point, Chemical Agent	Flame photometry detector for point chemical agent detection. DIQCode: [D,I,Q]	MCostRating: \$ Training: minimal	Detects nerve and blister. ----- Prone to false positives (anything containing sulphur and phosphorus). Requires hydrogen fuel (expensive to ship, buy in bulk to reduce cost). ICostRating: \$\$ MCostRating: \$\$ Training: minimal	
07CD-01-DPFR* Detector, Fourier/ Raman Infrared, Point, Chemical Agent	Fourier/Raman Infrared (IR) detector for point chemical agent detection. Includes Fourier Transform Infrared (FT-IR) and FT-IR/Raman devices. DIQCode: [D,I,Q]	Detects liquid, vapor and solid samples. ----- Visible sample size needed for liquid/solid samples. Additional expense in purchasing libraries. Unstable at low temperatures. Spectral interpretation necessary. ICostRating: \$\$\$\$ MCostRating: \$ Training: extensive		
07CD-01-DPIR* Detector, Raman Infrared, Point, Chemical Agent	Raman Infrared (IR) detector for point chemical agent detection. DIQCode: [D,I,Q]	Detects liquid, vapor and solid samples. ----- Visible sample size needed for liquid/solid samples. Additional expense in purchasing libraries. Unstable at low temperatures. Spectral interpretation necessary. ICostRating: \$\$\$ MCostRating: \$ →		

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\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
CD - Chemical Detection 01 - Portable - <i>Continued</i>			
07CD-01-DPMG Detector, Multi-sensor Meter, Point, Chemical	Multi-sensor meter with minimum of O2 and LEL for point chemical detection. DIQCode: [D,I,Q]	<p>Training: extensive</p> <p>Each sensor for different operation: O2, LEL/UEL, Cl2, CO, H2S, etc. Fan or pump operated.</p> <p>-----</p> <p>Requires calibration prior to each use. Calibration gases require special transportation. Shelf life dependent on type of sensor. Moderate sensitivity. ICostRating: \$\$ MCostRating: \$ Training: moderate</p>	
07CD-01-DPPI Detector, Photo-Ionization (PID), Point, Volatile Organic Chemical (VOC)	Photo-ionization detector (PID) for point detection of volatile organic chemicals (VOC). DIQCode: [D]	<p>Handheld. Fan or pump operated. Variable pump speeds. Intrinsically safe.</p> <p>-----</p> <p>Non-selective. Utilizes different lamps to detect the presence of different substances. Requires calibration prior to each use. Problems at high humidity and low temperatures. Calibration gases require special transportation. Service life dependent on type of lamp. Ionization potential must be considered. ICostRating: \$\$ MCostRating: \$ Training: moderate</p>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
07CD-01-DPSI Detector, Spectrometry, Ion Mobility, Point, Chemical Agent	Ion mobility spectrometry (IMS) detector for point chemical agent detection. DIQCode: [D,I]	Handheld. Battery operated. Self-testing. Optional wireless remote displays and data logging. ----- Most equipment of this type must be operated at least weekly to maintain calibration and operational effectiveness. See manufacturer's recommendations. Readout indicates relative concentration, not actual measurement. Non-selective. Prone to false positives. Internal radioactive source requires wipe test and NRC licensing. ICostRating: \$\$ MCostRating: \$\$ Training: minimal	
07CD-01-DPSW Detector, Surface Acoustic Wave (SAW), Point, Chemical Agent	Surface acoustic wave detector for point chemical agent detection. DIQCode: [D,I]	Handheld. Detects chemical warfare agents. Battery operated. ----- Polymers and acoustic wave components subject to degradation over time. Optional wireless remote displays and data logging. Readout may indicate relative concentration or actual measurement. ICostRating: \$\$ MCostRating: \$ Training: minimal	
07CD-01-INPA Paper, Indicating	Indicating paper, chemical warfare agent. DIQCode: [D,I]	Handheld. Will specify type/class of chemical warfare agent (G, VX, H). Easy to use. →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
CD - Chemical Detection 01 - Portable - <i>Continued</i> (M-8)		<p>Response time: 30 seconds</p> <p>-----</p> <p>Liquid agent only. Long shelf life. ICostRating: \$ MCostRating: N/A Training: minimal Prone to false positives.</p>	
07CD-01-INTP Tape, Indicating (M-9)	Indicating tape, chemical warfare agent DIQCode: [D, I]	<p>Will specify type/class of chemical warfare agent (G, VX, H). Easy to use. Response time: 30 seconds Attached to PPE or equipment.</p> <p>-----</p> <p>Liquid agent only. Long shelf life. ICostRating: \$ MCostRating: N/A Training: minimal Prone to false positives.</p>	
07CD-01-KCTC Kit, Colorimetric Tape/Tube/Chip	Colorimetric tape/tube/ chip kit specific for TICs and WMD applications. DIQCode: [D,I,Q]	<p>Chemical specific. User friendly.</p> <p>-----</p> <p>Limited shelf life. Wide variance in detection level. Sensitive to humidity and temperature. ICostRating: \$\$ MCostRating: \$ →</p>	78, 83

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
CD - Chemical Detection 01 - Portable - <i>Continued</i>			
07CD-01-KLSV Kit, Chemical Classifying	Chemical classifying kit for unknown liquids, solids and vapors. DIQCode: [D,I]	Training: minimal  Identifies classes of chemicals. ----- Requires constant refresher training, dedicated technician. Time consuming. Subjective results. Reagent shelf life and replacement costs. ICostRating: \$\$ MCostRating: \$ Training: extensive	
07CD-01-KPCB Kit, PCB Test	PCB test kit. DIQCode: [D, I, Q]	----- Limited shelf life. ICostRating: \$ MCostRating: \$ Training: minimal	
07CD-01-KTHG Kit, Mercury Test/ Mercury Vapor Test	Mercury and mercury vapor test kit. DIQCode: [D,I]	Easy to use. Moderate detection level. ----- ICostRating: \$ MCostRating: \$ Training: minimal	
07CD-01-KWTR Kit, Chemical Agent Water Test	Chemical agent water test kit. DIQCode: [D]	Detects chemical agents in water. Unspecified detection level. ----- ICostRating: \$ →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CD - Chemical Detection</b> 01 - Portable - <i>Continued</i>				
07CD-01-M256 Kit, M-256(A1)	M-256(A1) detection kit for chemical agent (military grade; blister: HD/L; blood: AC/CK; and nerve: GB/VX) detection. DIQCode: [D, I]	M-256(A1) detection kit for chemical agent (military grade; blister: HD/L; blood: AC/CK; and nerve: GB/VX) detection. DIQCode: [D, I]	<p>MCostRating: \$ Training: minimal</p> <p>Detects nerve, blood and blister agents. Self-contained colorimetric kit. Instructions in case. Response time: 15 -25 minutes Training kit available.</p> <p>-----</p> <p>Detects presence/absence, not quantity. Vapor only, except G agents. Must be disposed of as hazardous waste after use. Shelf life considerations. ICostRating: \$ MCostRating: \$ Training: minimal</p>	
07CD-01-MONO Detector, Single Chemical Sensor	Single gas meter with point chemical detection. DIQCode: [D,I,Q]	Single gas meter with point chemical detection. DIQCode: [D,I,Q]	<p>One gas meter. Different sensor for each operation. Fan or pump operated, some passive.</p> <p>-----</p> <p>Different sensors for different gases. Shelf life dependent on sensor type. Moderate sensitivity. ICostRating: \$ MCostRating:\$ Training: minimal</p>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

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## Section 7 | Detection

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CD - Chemical Detection</b> 01 - Portable - <i>Continued</i>				
07CD-01-PNAA Detector, Pulsed Neutron Activation, Non-Invasive	Chemical detector utilizing pulsed neutrons. Non-destructive detec- tion of CWAs in sealed containers. DIQCode: [D,I]	Detection unit combined with computer library of chemical spectrums. ----- Radiological controlled materials requiring swipe tests and NRC license. NRC radiological controls program is required prior to purchasing this equipment. ICostRating: \$\$\$\$ MCostRating: \$\$\$ Training: extensive		
07CD-01-POLY Detector, Reactive Polymer	Reactive polymer point chemical agent detector. DIQCode: [D,I,Q]	Chemical specific polymers. Discrete ID and quantification. ----- Emerging technology. Requires specific chip for chemical(s) being detected. Some polymers degrade with acids. ICostRating: \$\$ MCostRating: \$\$ Training: minimal		
<b>CD - Chemical Detection</b> 02 - Lab Equipment				
07CD-02-DPGC Detector, Gas Chromatograph/Mass Spectrometer, Chemical Agent	Gas chromatograph and/ or mass spectrometer detector for chemical agent detection (GC and/or MS). DIQCode: [D,I]	Identifies specific chemicals. Response time: 5-15 minutes ----- Climate sensitive. High maintenance and recurring training. Reagents and calibration requirements costly. ICostRating: \$\$\$ MCostRating: \$\$ Training: extensive		

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## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CD - Chemical Detection</b> 03 - Fixed-Site Sampling and/or Detection Systems			
07CD-03-IREDDetector, Fixed Site, Chemical, Infrared	Chemical detection devices designed to be mounted in buildings or on fixed exterior mounts that utilize infrared detection technologies such as Fourier Transform Infrared (FT-IR), Raman, FT-IR/Raman, or photo-acoustic infrared (PIR) for chemical detection. DIQCode: [D,I]		
<b>CD - Chemical Detection</b> 04 - Standoff Detectors			
07CD-04-DCSO	Stand-off chemical detector. FTIR system. DIQCode: [D, I]	Cold zone operations. Detects to 3 km. ----- Currently available to military only. Sensitive to atmospheric conditions. Gross level detector - does not provide range information. Requires line-of-sight. ICostRating: \$\$\$\$ MCostRating: \$\$ Training: extensive	
Detector, Stand-Off, Chemical			

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>CS - Chemical Support</b>			
01 - Portable			
07CS-01-KAVC Kit, Air/Vapor Chemical Sampling	Air/vapor chemical sampling/evidence kit.	Commercial sample collection kits. ----- ICostRating: \$ MCostRating: \$ Training: minimal	
07CS-01-KLCS Kit, Liquid Chemical Sampling	Liquid chemical sampling/evidence kit.	Commercial sample collection kits. ----- ICostRating: \$ MCostRating: \$ Training: minimal	
07CS-01-KSCS Kit, Solid Chemical Sampling	Solid chemical sampling/evidence kit.	Commercial sample collection kits. ----- ICostRating: \$ MCostRating: \$ Training: minimal	
07CS-01-LEAK Detectors, Leak	Leak detectors (e.g., soap solution, ammonium hydroxide, ultrasonic, etc.).	----- ICostRating: \$ MCostRating: \$ Training: minimal	
<b>ED - Explosive Detection</b>			
01 - Portable			
07ED-01-DOGS Canines, Explosive Detecting	Explosive detecting canines, related CBRNE training, protective equipment/garments, handling	----- Departments should consider and plan for food, kenneling, transportation, and veterinary expenses associated with explosive detecting canines. ICostRating: \$\$ →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>ED - Explosive Detection</b> 01 - Portable - <i>Continued</i>				
		and training accessories. DIQCode: [D]	MCostRating: \$\$ Training: extensive	
07ED-01-SNIF Air-Sampler, Explosive Detecting, Handheld		Handheld air-sampling explosive detectors. DIQCode: [D,I]	Detects particulates and vapors. Some contain radioactive sources. ----- Wipe test required for equipment with radioactive source. False positives and negatives. ICostRating: \$\$ MCostRating: \$\$ Training: moderate	
<b>ED - Explosive Detection</b> 03 - Fixed-Site Sampling and/or Detection Systems				
07ED-03-PORT Portal, Explosive Detecting		Ion mobility spectrometry (IMS) explosives screening equipment. Two types: walk-through and drive- through (vehicle). DIQCode: [D,I]	Walk-through / Vehicle Drive-through portal monitor. ----- Requires frequent calibration and confidence testing. Subject needs to remain in monitor for several seconds. False positives possible. ICostRating: \$\$\$ MCostRating: \$\$ Training: extensive	
07ED-03-SWPE Swipe Test, Explosive Detecting		A cloth item used to wipe a surface, and placed in a machine that analyzes vapor for identifying the explosive. DIQCode: [D,I]	Fixed-facility screening device. ----- Requires presence of particulate matter. Requires regular calibration by trained technician. Swipes may be proprietary to machine. ICostRating: \$\$\$ →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>ED - Explosive Detection</b> 03 - Fixed-Site Sampling and/or Detection Systems - <i>Continued</i>			
		MCostRating: \$\$\$ Training: moderate	
<b>ED - Explosive Detection</b> 04 - Standoff Detectors			
07ED-04-XRAY X-Ray, Explosive Detecting	X-Ray systems for explosive detection. DIQCode: [D,I]		
<b>RD - Radiological Detection</b> 01 - Portable			
07RD-01-DHPG Detector, High-Purity Germanium	High-purity germanium detector. DIQCode: [D,I,Q]	Portable handheld or laboratory fixed. Gamma isotope characterization. ----- Considerable preparation time. Liquid nitrogen coolant may be required. Limited battery life for portable units, consider power source for prolonged operation. Calibration standards required. ICostRating: \$\$\$ MCostRating: \$\$ Training: extensive	70
07RD-01-DOSE Dosimeter, Electronic	Electronic dosimeter (ED). DIQCode: [D,Q]	Auto range (mR to R)/hour (SI Units also available). Small, lightweight. Beta/Gamma/neutron detection. Audible alarm. ----- Limited battery life. →	71

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>RD - Radiological Detection</b>				
01 - Portable - <i>Continued</i>				
07RD-01-DOSP Dosimeter, Personal	Personal dosimeter, film or thermoluminescence dosimetry (TLD). DIQCode: [D,Q]	Vibralert option. Limited sensitivity. ICostRating: \$ MCostRating: \$ Training: minimal	72, 140	
07RD-01-DOSS Dosimeter, Self-Reading	Self-reading dosimeter (SRD) or pocket ionization chambers (PIC). DIQCode: [D,Q]	Film type detects Gamma, X-Ray, and Neutron. TLD also detects Beta. Records total dose to wearer. ----- Not self-reading. Temperature sensitive. Service costs. ICostRating: \$ MCostRating: \$ Training: minimal		
07RD-01-HHCM	Handheld contamination meter (alpha/beta, beta/	Records total dose to wearer. Detects Gamma only. ----- Shock sensitive. Charging unit [battery operated & non-battery (piezoelectric)]. Difficult to read. ICostRating: \$ MCostRating: \$ Training: minimal		
		Multiple probes, mission dependent. Various scales (CPM, mR, Sv). →	72	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>RD - Radiological Detection</b>			
<i>01 - Portable - Continued</i>			
Meter, Contamination, Handheld	gamma, neutron). DIQCode: [D,I,Q]	----- Limited battery life. Calibration required. Alpha Mylar face prone to damage. ICostRating: \$ MCostRating: \$ Training: moderate	
07RD-01-PDGA Detector, Personal Radiation (Gamma and Neutron)	Personal radiation “detector” (gamma and neutron). DIQCode: [D]	Portable. High sensitivity. Response time: quick Detects gamma and/or neutron. ----- Operator must set alarming levels. No self confidence test built in. ICostRating: \$ to \$\$ MCostRating: \$ Training: moderate	71
<b>RD - Radiological Detection</b>			
<i>02 - Transportable Lab Equipment</i>			
07RD-02-HHSP Spectrometer, Handheld (NaI or CZT) with Nuclide Identification	Handheld spectrometer (NaI or CZT) with nuclide identification. DIQCode: [I,Q]	Fixed or portable. Spectral analysis. Neutron detection capable. ----- Calibration required. Library of isotopes or reachback required to ID. Limited battery life. Temperature sensitive. ICostRating: \$\$ →	73

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>RD - Radiological Detection</b>			
02 - Transportable Lab Equipment - <i>Continued</i>			
		MCostRating: \$ Training: extensive	
<b>RS - Radiological Support</b>			
07RS-01-AFCB Equipment, Air Sampling	Air flow calibrators for samplers. Personal air sampler. Area air sampler (high volume).	Particulate collector. Fixed or portable. ----- Outside analysis of filter medium: costly ICostRating: \$ to \$\$ MCostRating: \$ Training: moderate	
<b>SE - Support Equipment</b>			
07SE-01-IHTS Sensor, Heat, Infrared	Heat sensing device.	Handheld or hands free. High temperature sensitivity. High-quality resolution. ----- Waterproof. Durable. Limited battery life. ICostRating: \$\$ MCostRating: \$ Training: minimal	
07SE-01-THMS Thermometer, Surface	Surface thermometer.	Handheld. Accurate. Precise. →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 7 | Detection

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<p><b>SE - Support Equipment</b> 01 - Portable - <i>Continued</i></p>		<p>Durable.</p> <p>-----</p> <p>ICostRating: \$ MCostRating: \$ Training: minimal</p>	
<p><b>SE - Support Equipment</b> 03 - Fixed-Site Sampling</p> <p>07SE-03-ENVS Equipment, Environmental (Weather) Surveillance</p>	<p>Environmental (weather) surveillance equipment to support CBRNE detectors.</p>	<p>Wind speed/direction. Temperature. Humidity. Barometric pressure.</p> <p>-----</p> <p>Fixed (vehicle mounted) or portable. Information transfer. Software interface. ICostRating: \$\$ MCostRating: \$ Training: minimal</p>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 8 – Decontamination

### Overview

This section contains recommendations for decontamination equipment, and changes from the previous edition are minimal. It is organized into three main categories, as follows:

- **Individual Decontamination**, which contains personal decontamination items.
- **Active Decontamination**, defined as activities or equipment that may be used in removing contamination from individuals and equipment. Active decontamination includes Decontamination Corridor Support, Emergency Decontamination, Technical Decontamination, and Site/Equipment Decontamination.
- **Post-Decontamination**, defined as activities or equipment that may be used after active decontamination.

Successful CBRNE HAZMAT response requires a sound decontamination plan that has been practiced with proper techniques and equipment. In addition to personnel, techniques, and equipment, the plan should address factors such as run-off and hazardous materials disposal, since some CBRNE agents may be neutralized while others may become hydrolyzed or diluted while being physically washed off patients and equipment. Plans should include as many specific procedures as possible - if a hazardous material has been identified through testing, then the decontamination plan should include proper PPE and decontamination equipment appropriate to the hazard. The plan should include multiple stages of decontamination (e.g., field expedient gross decon for personnel and equipment), with appropriate equipment and training required for each stage. The decontamination plan must also interface smoothly with other operating plans, such as medical response (e.g., policies for triage at decontamination stages, transportation of contaminated patients, etc.).

The Detection and Decontamination (D&D) SubGroup is continually working to identify standards and best practices for decontamination, including the establishment of standards for newly available decontamination equipment and technologies. All first responders should also seek advice from their state and local experts on the applicability and practicality of their plans in the context of local laws and practices.

### Changes for 2007

In addition to minor edits, the structure of this section has also been modified to establish categories of active decontamination and place decontamination corridor support within the Active Decontamination category. The new structure is as follows:

- 08D1 Individual Decontamination
  - 01- Personal Decontamination Items
- 08D2 Active Decontamination
  - 01- Decontamination Corridor Support
  - 02- Emergency Decontamination
  - 03- Technical Decontamination
  - 04- Site/Equipment Decontamination
- 08D3 Post-Decontamination
  - 01-Blankets and Clothing
  - 02-Bags

### *Online Selection Factors and Efficacy Matrix*

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Like most sections in the 2007 SEL, the online version<sup>1</sup> of the Decontamination section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For the Decontamination section, the SubGroup chose the same factors used in the Detection section (Section 7): Proficiency Level and Hazard Environment. See the introduction to Section 7 for a detailed description of these two factors. Every online item is “tagged” for each appropriate combination of factors. Thus, users of the online version can choose any combination of Proficiency Level and Hazard Environment, and the system will provide a list of all items tagged for that combination.

The Responder Knowledge Base also contains an additional feature that should prove helpful in decontamination planning. It is called the Decontamination Efficacy Matrix, and provides information about various decontamination methods and their effectiveness against specific threats. The information in this matrix was provided to the RKB by the U.S. Army Edgewood Chemical and Biological Center (ECBC) in Aberdeen, Maryland, and is linked online to applicable items in this section of the SEL.

<sup>1</sup> *The online version of the SEL is available on the Responder Knowledge Base at [www.rkb.mipt.org](http://www.rkb.mipt.org).*

**Section 8 | Decontamination**

<b>Item Number/Title</b>		<b>Description</b>	<b>Features/Operating Considerations</b>	<b>Standards<sup>1</sup></b>
<b>D1 - Individual Decontamination</b>				
<b>01 - Personal Decontamination Items</b>				
08D1-01-KITD*	Kits or Packets, Personal Decontamination	Kits or packets used for emergency personal decontamination.	Handheld. Ability to self-decontaminate from chemical warfare agents. Ability to self-decontaminate from TIMs. Ability to self-decontaminate from biological agents. ----- One time use. Shelf life limitations. Additional decontamination measures are required.	93
08D1-01-RSDL*	Lotion, Decontamination	Alternate solution to neutralize chemical warfare agents.	Easy to use. ----- For use on equipment. For use on humans under FDA approved conditions only in limited quantities. Good against chemical warfare agents and some TICs only.	
<b>D2 - Active Decontamination</b>				
<b>01 - Decontamination Corridor Support</b>				
08D2-01-HTRB*	Heater, Portable Air Blower	Provides climate control for victims during necessary decontamination operations during inclement conditions.	Provides heating and/or drying. ----- Size. Portability. Power supply (electric or fuel). Temperature regulation. Speed controls. Collapsible ductwork.	
08D2-01-HTRW*	Heaters, Water,	Used to heat water for decontamination applications in the field.	Temperature regulation and gauge. May have ability to induct and mix decontamination solutions with water. ----->	139

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 8 | Decontamination

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>D2 - Active Decontamination</b>			
01 - Decontamination Corridor Support - <i>Continued</i>			

Transportable		Inlet water pressure requirements and limitations. GPM output to meet application rate needed / fuel or power needed. Rapid heating of water.	
08D2-01-LDCD* Device, Liquid Decontamination Containment	Containment devices intended for use in the decontamination corridor for decontamination of equipment, people, and vehicles.	Portable. Capture run-off. Non-porous. May be disposable. Low enough for personnel to step into and out of. ----- Various sizes. Decontamination system dependent. Material compatibility. Larger inflatable or collapsible devices for vehicles will require ability to get vehicle into and out of device. Size may limit patient numbers before requiring pump-off capability.	
08D2-01-LITE* Lighting, Decontamination Area	Portable area lighting system suitable for use in active decontamination area.	Moisture resistance. Brightness. Decontaminable. Portable. Intrinsically safe (optional). ----- Power supply. Decontamination system compatible. GFI. Replacement bulbs. Power cords.	123, 142

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 8 | Decontamination

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>D2 - Active Decontamination</b>				
<b>01 - Decontamination Corridor Support - Continued</b>				
08D2-01-LITR* Device, Victim Extrication	Devices such as litters, stretchers, stokes baskets, etc. for moving non-ambulatory victims.	Man-portable. Reusable. Wheeled. NOTE: These items are similar to those described in Item 09ME-05-LITR, but MUST be designed to be decontaminable. ----- Uneven terrain. Labor intensive. Patient maximum weight considerations. Storage/transport considerations. Minimal training.		
08D2-01-PPTS* System, Personal Property Tracking	Personal property tracking system to identify personal effects of decontaminated victims.	Waterproof. Attachable. Writable. ----- Size.		
08D2-01-TDCS* Items, Support, Decontamination Corridor	Signs, signals, traffic cones, lights, hazmat tape, directional signage, strobes, glow sticks, loud-speakers, etc.	Multiple pictures and languages. Industrial grade. GFI equipment. ----- Size. Weight. Deployment time. Collapsible. Water resistant.		123

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 8 | Decontamination

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>D2 - Active Decontamination</b>			
01 - Decontamination Corridor Support - <i>Continued</i>			
08D2-01-WWCD*	Drums or bladders for waste water containment and decontamination shower waste collection. To be used in conjunction with Item 08D2-01-LDCD.	Various sizes. Ability to hold large volumes of liquid hazardous waste product. Disposable or decontaminable. ----- Size. Weight. Transportation. Storage. Empty or full may require vehicles. Pump capability.	65, 123
<b>D2 - Active Decontamination</b>			
02 - Emergency Decontamination			
08D2-02-EDCS*	Equipment or system with the capability to immediately reduce contamination of individuals with potentially life-threatening exposure, with or without the formal establishment of a decontamination corridor.	Man-portable. Freedom to select desirable solutions. Low pressure. Rapidly deployable. Durable. ----- All weather. Hazards of material. Low cost. Minimal training.	
08D2-02-MCDS* Systems, Mass Casualty Decontamination	Mobile or fixed systems capable of delivering water or solutions in varying temperatures and at sufficient flow rates for	Lighting. HEPA filters. Roller systems for dealing with non-ambulatory victims. Flash heater. Pre-plumbed. →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 8 | Decontamination

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>D2 - Active Decontamination</b> 02 - Emergency Decontamination - <i>Continued</i>	the purpose of washing numerous contaminated victims. Suitable systems may be tents, trailers, vehicle mounted, or integrated into building systems.	----- Set up time. Water supply (requires source), temperature, pressure, volume Power supply. Drainage or collection of runoff. Modesty protection.	
<b>D2 - Active Decontamination</b> 03 - Technical Decontamination			
08D2-03-SHWR* Shower, Portable Decontamination	Framework designed to deliver water/decontamination solution at low pressure, low volume.	Stand alone. Collapsible. Rigged. Quick setup. ----- Size. Weight. Runoff control / waste water management. Water supply (source required). Deployment time.	
08D2-03-TDED* Equipment, Technical Decontamination - Dry	Equipment used to decontaminate or remove dry materials.	Portable. ----- Requires power supply. Collected material must be disposed of properly.	
08D2-03-TDEW*	Equipment used in the physical or chemical	Pressure control for people/equipment. Water/solutions. →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 8 | Decontamination

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>D2 - Active Decontamination</b>			
<b>03 - Technical Decontamination - Continued</b>			
Equipment, Technical Decontamination - Wet	process of deliberate decontamination for responders and their equipment using liquids/solutions.	Portable. ----- Climate. Material identification. Runoff control/waste water management.	
<b>D2 - Active Decontamination</b>			
<b>04 - Site/Equipment Decontamination</b>			
08D2-04-SOLN*	Equipment and site decontamination solutions (not approved for humans).	Premixed concentrate. May be stored as a dry powder or liquid. ----- Some require dilution before application. Some may require special applicators. Use may require EPA approval.	
<b>D3 - Post-Decontamination</b>			
<b>01 - Blankets and Clothing</b>			
08D3-01-BLKT*	Disposable blankets.	Low cost. Compact storage. Durable. ----- One time use.	
Blankets, Disposable			
08D3-01-CLOM*	Disposable modesty clothing, with footwear; adult and child sizes.	Compact storage. Durable. Various sizes. Instructions for use should be in multiple languages and/or pictures. ----- Modesty shelter. →	
Clothing, Disposable Modesty			

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 8 | Decontamination

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>D3 - Post-Decontamination</b> 01 - Blankets and Clothing - <i>Continued</i>		No shelf life limitations. Low cost.	
<b>D3 - Post-Decontamination</b> 02 - Bags	08D3-02-BCNT* Bags, Cadaver, Non-transparent	Non-transparent cadaver bags. See also 09MS-01-BAGB ----- Disposable. Ability to be carried. Virtually unlimited shelf-life. ----- Universal precautions may be required. Low cost.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Overview

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The Medical SubGroup provides guidance regarding health and medical aspects of local, state, and federal standardization, interoperability, and first responder/receiver safety to prepare for, respond to, mitigate, and recover from any incident by identifying requirements for an all-hazards incident response with a special emphasis on CBRNE incident response equipment, supplies and pharmaceuticals.

Items in this section are divided into 4 categories:

- Medical Equipment: durable medical equipment
- Medical Supplies: single use, disposable, and generally inexpensive (<\$100 per item)
- Pharmaceuticals: medications and fluids
- Training Equipment and Supplies

Logistical equipment required to support medical operations, but not directly related to patient care or medical support of personnel, such as PPE, communications equipment, generators, etc., can be located in other appropriate SEL sections. The Medical SubGroup has ensured that notes and linkages to non-medical logistical items are included with the SEL items of the Medical Section.

## Changes for 2007

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The role of public health, the concern for medical surge capacity, and the expansion of the SEL continued to influence both the edits and additions in this edition.

The following medical section SEL items were changed or added, as noted:

1. 09ME-05-LITR, Litters/Stretchers – After discussion with the PPO&E SubGroup, “Consider floatation options for water rescue” was added to Operating Considerations.
2. 09ME-07-ISOL, Equipment, Negative Pressure Patient Isolation – The title was changed to “Equipment, Patient Isolation”, and other information was added for features such that the equipment “Can be used during transport and through continuum of medical care.”
3. 09MS-03-DSIN, Supplies, Disinfectant – The title was changed to “Supplies, Disinfectant and Antiseptic”, and the following note was added, “Product should meet recommendations of FDA Topical Antiseptic Review Team (for example, product contains an active ingredient such as 60-95 % alcohol).”
4. 09PH-05-COBL, Hydroxocobalamin, a cyanide antidote, was added to the Antidotes Category under Pharmaceuticals.
5. 09PH-05-CYKT, Kit, Cyanide Antidote - The description was changed to include, “or other FDA-approved products for cyanide poisoning.
6. 09PH-05-NAAK, Nerve Agent Antidote Kit (NAAK) – The description was changed to include “or a combination auto-injector.”
7. 09TR-01-MKIT, Supplies, Moulage was added to the Equipment Category under Training.

The Medical SubGroup decided not to add vaccines to the SEL at this time. Decompression chambers to support diving operations were also considered but not added in this edition; however, these items are still under review. In addition, next year the Medical SubGroup may accept responsibility for a new section in the SEL for agricultural terrorism prevention, response and mitigation equipment.

## Online Selection Factors

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Like many sections in the SEL, the online<sup>1</sup> version of the Medical Section uses a set of selection factors to assist users in quickly identifying appropriate equipment items. For the Medical Section, the SubGroup uses levels within the EMS/Clinical Care delivery system as the first factor, and Hazard Environment as the second. Every online item is “tagged” for each appropriate combination of factors. Thus, users on the online version can choose any combination of EMS/Clinical Care Level and Hazard Environment, and the system will provide a list of all items tagged for that combination. The EMS/Clinical Care Level factor uses the following values:

**Basic Life Support (BLS):** BLS as defined by the standard national BLS curricula and routinely carried on BLS EMS response resources.

**Advanced Life Support (ALS):** ALS as defined by the standard national ALS curricula and routinely carried on ALS EMS response resources.

**Pre-Hospital Mass Casualty:** Items needed specifically to manage pre-hospital mass casualty events but that may not routinely be used by pre-hospital care organizations or carried on BLS/ALS response resources.

**Hospital:** Items routinely used in the hospital environment.

**Public Health:** Items used by public health authorities to protect and treat actual or potential exposure to hazardous agents.

**Disaster:** Items that should be stockpiled for mass casualty/disaster response situations.

The second factor is the Hazard Environment, commonly represented with the CBRNE nomenclature. However, for our purposes it is useful to represent the Nuclear “N” as part Thermal, part Explosive, and part Radiological. Therefore, the values used for this factor are:

- Chemical
- Biological
- Radiological
- Thermal
- Explosive

The Medical SubGroup considers these selection factors to be particularly important in planning the acquisition and utilization of equipment. Therefore, in addition to the standard online facility, this printed version contains representative information on the selection factors. Two additional columns, one for each factor, appear on the right side of each page. These columns, entitled “EMS/CC Level(s)” and “Threat/Incident Type(s)” will contain appropriate codes for each item.

## Using the SEL Medical Section

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The Medical SubGroup has attempted to provide useful information in this section (to include linkages to other SEL sections) to assist local, state, and federal organizations improve the public health, medical, and responder safety aspects of their response plans and procedures. Local and state public health and medical authorities should collaborate with other response partners in the review and modification of these recommendations for use in their organizations and jurisdictions. This collaboration should include protocols, operational procedures, standards of care, and other written documentation governing use of SEL items.

<sup>1</sup> The online version is available on the Responder Knowledge Base, [www.rkb.mipt.org](http://www.rkb.mipt.org).

Community hazard and vulnerability analysis is an integral aspect of planning and procuring equipment, supplies, and pharmaceuticals. Consideration should be given to the full range of issues inherent to the procurement of equipment, pharmaceuticals, and supplies (i.e., interoperability, compatibility, funding limitations, maintenance, training, re-supply, storage, safety, etc). Additional recommendations follow:

- Consider environmental factors during storage and response operations. Exposure to environmental extremes may impact potency, shelf life, and performance.
- Do comprehensive “power planning” to look at the power needs of your total response capability. Consider and plan for the custom batteries/power systems that will be required for most medical diagnostic and monitoring equipment. Pay particular attention to the combination of monitoring/diagnostic equipment and environmental factors such as climate control, lighting, refrigeration, altitude, humidity, airborne dust/particulate matter, and information equipment/computer support. Include storage in facilities that have backup generator power sources, and other requirements to ensure 24/7/365 readiness of the equipment/batteries, etc.
- Be aware that certain supplies are regulated for bulk transportation. If you are moving large amounts of material (especially applicable to the Disaster and Hospital sections of the matrix), consult with a transportation/hazmat professional.
- Don't forget to incorporate federal resources such as Pre-positioned Equipment Program (PEP) Pods, the Strategic National Stockpile (SNS), and the CHEMPACK program into your local planning process. Also coordinate with local resources that receive support from federal funding, such as MMRS, RMRS, hospital councils, etc.
- When selecting durable medical equipment as well as monitoring and diagnostic equipment, consider durability, appropriateness for field use, and whether the item is disposable or can be decontaminated.
- Remember to budget for the routine maintenance of monitoring and diagnostic equipment as specified by the manufacturers.
- Include special needs individuals (i.e., mobility impaired, hearing impaired, visually impaired, cognitively impaired, non-English speaking, pediatrics, elderly, medication dependent, aided by special escorts or animals, etc.), and others with preexisting medical conditions.
- Consider Memoranda of Understanding (MOU)/Agreement (MOA) with hospitals and pharmacies for appropriate storage and management/regulation of medications and perishable items that must be kept in climate-controlled conditions. Consider MOUs with hospitals/biomedical engineering departments for preventive maintenance on biomedical equipment.
- Collaborate with community response partners. Share information and ask questions. Allow time to collect feedback and experiences from other users before purchasing equipment. The Responder Knowledge Base can also be used as a source of user opinion information.
- Consider requirements of regulatory agencies that monitor point-of-care or wave-form testing equipment (e.g., i-STATs (CLIA regulations), some urine tests (wave-form), and a few other point-of-care tests that would be appropriate for extended and protracted disaster care and surge capacity).
- Consider signage (bilingual) and other documentation forms/admission forms/etc, and health and medical screening tools (bilingual).
- Consider supplies and equipment necessary for mass fatalities/mortuary requirements.
- Consider veterinary and agricultural (food supply) requirements.

In 2007, The Medical SubGroup is considering a pilot test in which users may enter pre-defined search terms in the online version of the SEL (within the Responder Knowledge Base website) to obtain lists of recommended equipment for emergency facilities. These pre-defined terms will be included with the

data for each listed item in the printed annual SEL. The Medical SubGroup is very interested in user feedback to improve the quality and usability of the Medical Section of the SEL. Please send comments to [IAB@battelle.org](mailto:IAB@battelle.org), "Attention: IAB Medical SubGroup".

## Section 9 | Medical

Item Number/Title		Description		Features/Operating Considerations		Standards <sup>1</sup>		EMS/ Clinical Care Level <sup>2</sup>		Hazard Environ- ment <sup>3</sup>	
<b>ME - Medical Equipment</b>											
<b>01 - General</b>											
09ME-01-ADMIN	Equipment, Administrative	All-inclusive administrative and durable office support equipment to sustain medical branch operations.	Consider caching this type of equipment in portable vessels/containers to facilitate rapid mobilization and/or relocation. Consider wireless and satellite connectivity for computer-related products. See also 09MS-01-ADMIN.					B, A, P, H, U, D		C, B, R, T, E	
09ME-01-BAGM	Bag/Kit/Pack, Medical	Portable vessel that contains various medical supplies and equipment.	Consider products impervious to infectious fluids; products equipped with reflective surfaces to enable rapid visualization; size versus storage limitations. Consider products that are lightweight and durable. See also 03OE-08-BGEQ, 03OE-08-BKPK.					B, A, P, H, U, D		C, B, R, T, E	
09ME-01-COTS	Cots	Portable, lightweight structures that are easily assembled to accommodate patients in supine position. Typically used in shelter operations.	All structures and related materials should be impervious to infectious fluids. Consider infection control and related maintenance issues; interoperability with other medical equipment (backboards, etc.); storage and transport requirements. Consider products that are lightweight and easy to assemble with minimal personnel. Consider all types of patient sizes/weights. See also 08D3-01-BLKT, 09ME-01-SHEL, 09MS-01-LNEN.					B, A, P, H, U, D		C, B, R, T, E	
09ME-01-MCIK	Equipment/Kits, Multi-Casualty Incident (MCI)	Fully equipped kits that contain all equipment and materials to coordinate multi-casualty incidents, including (but	Consider containers/vessels impervious to infectious fluids; products with reflective surfaces for ease of visualization. See also 09MS-01-TTAG, 01ZA-06-VEST, 03OE-03-MEGA, 01ZA-01-OAPT, 03OE-07-CART, 03OE-03-KTFA. →					B, A, P, H, D		C, B, R, T, E	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

<sup>2</sup> Basic Life Support (B), Advanced Life Support (A), Pre-Hospital Mass Casualty (P), Hospital (H), Public Health (U), Disaster (D)

<sup>3</sup> Chemical (C), Biological (B), Radiological (R), Thermal (T), Explosive (E)

\* Item has been moved or changed in the edition.

## Section 9 | Medical

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>ME - Medical Equipment</b> 01 - General - <i>Continued</i>					
09ME-01-PEDT Tool, Pediatric Patient Assessment and Management	not limited to) triage tags/supplies, clip boards and related forms, color-coded marking tape and tarps for treatment areas, medical branch position vests; field operation guide (FOG) for medical branch/MCI operations and local protocols.  These tools allow for the rapid assessment of pediatric patients using length based assessment to determine equipment size and medication dosages.			B, A, P, H, U, D	C, B, R, T, E
09ME-01-SHEL Shelter, Medical	Easy to assemble structure to provide temporary shelter for patients and medical practitioners. Constructed of lightweight frame and/or inflatable.	----- Structures should be lightweight and easy to assemble with minimal personnel; surfaces should be extremely durable and impervious to infectious fluids. Consider products with multiple access/egress points; products equipped with ventilation features; products that offer optional heating/cooling climate control features; products that offer optional decontamination features; logistical storage and transportation requirements. Consider →		P, H, U, D	C, B, R, T, E

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.<sup>2</sup> Basic Life Support (B), Advanced Life Support (A), Pre-Hospital Mass Casualty (P), Hospital (H), Public Health (U), Disaster (D)<sup>3</sup> Chemical (C), Biological (B), Radiological (R), Thermal (T), Explosive (E)

\* Item has been moved or changed in the edition.

Section 9 | Medical

Features/Operating Considerations		EMS/ Clinical Care Level <sup>1</sup>	Hazard Environ- ment <sup>2</sup>
Item Number/Title	Description	Standards <sup>1</sup>	
<b>ME - Medical Equipment</b>			
01 - General - <i>Continued</i>			
		appropriateness for operating environment. See also 01ZP-00-STOL, 03OE-04-KTTL, 03OE-04-LTHH, 19SS-00-SHEN, 03OE-03-LTPA, 03OE-03-SIGN, 09ME-01-COTS.	
<b>ME - Medical Equipment</b>			
02 - Airway Management			
09ME-02-AWMG Equipment, Airway Management	Basic and advanced durable airway management equipment. Enables basic and advanced access to, and protection of, patient respiratory system.	1, 46, 49 Consider products impervious to infectious fluids; adult and pediatric applications. See also 09MS-02-AWMG and 09MS-02-OXYA.	B, A, P, H, D C, B, R, T, E
09ME-02-ETCO Monitor, End Tidal CO2, Quantitative/ Qualitative	Monitor that allows for the quantitative and qualitative assessment of end tidal CO2 for patients that are breathing and/or being ventilated.	3 Equipment should provide both a numeric and waveform display to allow for accurate evaluation of respiratory and ventilatory status.	A, P, H, D C, B, R, T, E
09ME-02-OXYE Equipment, Oxygen	Durable oxygen equipment (e.g., cylinders, regulators, manifolds, etc.) to facilitate the storage and delivery of medical oxygen.	90, 91, 92 All equipment should be lightweight and easily stored in the intended usage environment. All devices should be intrinsically safe relative to high pressures and flammability. Consider infection control and related maintenance issues, and impact resistance features of gauges and other vulnerable impact points. See also →	B, A, P, H, D C, B, R, T, E

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<sup>3</sup> Chemical (C), Biological (B), Radiological (R), Thermal (T), Explosive (E)

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## Section 9 | Medical

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>ME - Medical Equipment</b>						
<i>02 - Airway Management - Continued</i>						
09ME-02-SUCT Equipment, Suction Units	Negative pressure devices that enable suctioning of patient airway. Airway maintenance device. Various models, both powered and manually operated.	09MS-02-OXYA.  Intrinsically safe equipment is defined as “equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration.” (ISA-RP12.6)  ----- All devices, including carrying/storage cases, should be impervious to infectious fluids. Consider ease of use and disposability of collection vessels, tubing, and related supplies. Products should be easy to use. Consider products with adjustable pressure settings; adult and pediatric applications; storage and transport requirements; battery life and related replacement costs. For powered units 12 volt mobile, apparatus-based power and/or hand-operated power sources need to be considered. See also 09MS-02-SUCT.	23, 49	B, A, P, H, D	C, B, R, T, E	
09ME-02-VENT Ventilators	Positive pressure ventilators that deliver regulated volumes of oxygen to patients requiring invasive respiratory support. Adult and pediatric applications.	Battery and gas powered devices are available.  ----- All devices and carrying cases should be impervious to infectious fluids and should offer adjustable rate and tidal volumes. Consider adult and pediatric applications; disposable adjuncts and related costs; storage and transport requirements. Devices should be easy to use, and offer both audible and visual over-pressure alarms. →	6	A, P, H, D	C, B, R, T, E	

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Features/Operating Considerations		EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
Item Number/Title	Description	Standards <sup>1</sup>	
<b>ME - Medical Equipment</b>			
02 - Airway Management - <i>Continued</i>			
		Device requires special batteries supplied by manufacturers. Note battery life and need for electrical recharging units during protracted incidents. See also 09MS-02-VENT.	
<b>ME - Medical Equipment</b>			
03 - Diagnostic/Monitoring/Defibrillation			
09ME-03-BPSL Equipment, Blood Pressure	Manual and automated blood pressure equipment/products.	9 Consider products impervious to infectious fluids and/or dis- possible adjuncts; various size applications, including adult and pediatric applications; power needs and battery life on automated units.	B, A, P, H, D C, B, R, T, E
09ME-03-DEAE Defibrillator, Auto- mated External	Simple device that enables rapid application, auto- mated assessment, and (when necessary) delivery of corrective electrical impulse for lethal cardiac dysrhythmias. Use of AED by practitioners with minimum or no training.	8, 12 Water resistance, if product will be used in or near water rescue operations. ----- Consider ease of use for practitioners with minimal or no training. Consider products with clear, concise voice prompts; products with automated data storage and download features; products providing interoperability with advanced cardio/ defibrillation devices. Consider adult/pediatric applications; weight and storage requirements; disposal cost of adjuncts/ electrodes. These devices require special batteries supplied by manufacturers. Note battery life and need for electrical recharging units during protracted incidents. See also 09MS-06-PROB.	B, A, P, H, D C, B, R, T, E

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Section 9   Medical		Features/Operating Considerations		EMS/ Clinical Care Level <sup>1</sup>	Hazard Environ- ment <sup>2</sup>
Item Number/Title	Description	Standards <sup>1</sup>			
<b>ME - Medical Equipment</b>					
<b>03 - Diagnostic/Monitoring/Defibrillation - Continued</b>					
09ME-03-DEMP Defibrillator/Cardiac Monitors/Pacing	Advanced cardiac monitoring/defibrillation/pacing devices for use by practitioners with advanced medical training.	----- Consider interoperability with devices both less and more complex. Consider devices equipped with automated dysrhythmia recognition and related alarm features; devices with clear and concise voice prompts; weight and storage requirements; cost of disposal of adjuncts/electrodes. Consider devices engineered to accommodate both basic and advanced trained practitioners.  These devices require special batteries supplied by manufacturers. Note battery life and need for electrical recharging units during protracted incidents. See also 09MS-06-PROB.	11, 12	A, P, H, D	C, B, R, T, E
09ME-03-GLUM Meters, Glucose	Simple device that rapidly analyzes blood glucose levels from capillary blood sample.	----- Devices should provide rapid analysis with minimal operator interface. Consider infection control and related maintenance; costs of strips and related supplies. Select products that self-calibrate or require minimal operator interface calibration, and utilize commercial over the counter batteries. Disposable items may require replacement during protracted incident.	2, 46	B, A, P, H, D	C, B, R, T, E
09ME-03-OTOP Otoscope/ Ophthalmoscope	Devices used during patient assessment to facilitate the examination of the eyes and ears.	----- Consider devices with commercial over the counter batteries. Disposable items may require replacement during protracted incident.	14, 43	H, D	C, B, R, T, E

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Item Number/Title		Description	Features/Operating Considerations		Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>ME - Medical Equipment</b>							
<b>03 - Diagnostic/Monitoring/Defibrillation - Continued</b>							
09ME-03-POXI Oximeter, Pulse	Non-invasive device that monitors oxygen saturation levels in blood.	----- Consider devices constructed as features built into other devices (EKG monitors, etc.). Consider durability of probes; disposable probe accessories and/or infection control and related maintenance issues. Device cases should be impervious to infectious fluids. Certain toxic exposures, as well as environmental conditions, can lead to inaccurate readings. Consider devices with commercial over the counter batteries; disposable items may require replacement during protracted incident.	10	B, A, P, H, D	C, B, R, T, E		
09ME-03-STET Stethoscope	Durable stethoscope to assist in patient care through audible assessments (auscultation). Durable and disposal models available.	----- All products should be impervious to infectious fluids. Consider audible-assist features (Doppler) for high-noise environments. Prices vary greatly - consider replacement costs. Consider acquisition of large quantity of disposable units for MCI/DMAT/USAR deployments.	4	B, A, P, H, D	C, B, R, T, E		
09ME-03-THER Thermometer	Devices that enable assessment of patient temperature.	----- All devices and carrying cases should be impervious to infectious fluids. Consider disposable adjuncts that contact patient surfaces/fluids. Devices should be easy to use with minimal training, and offer large display features. Consider devices built-in as features to other medical devices (EKG monitors, etc.). Should use commercial over the counter batteries; disposable items may require replacement during protracted incident.	26, 27, 28	B, A, P, H, D	B, T		

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Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>ME - Medical Equipment</b>						
<b>04 - Immobilization</b>						
09ME-04-SPIN Equipment, Spinal Immobilization	Adjuncts that enable spinal immobilization of patients encountered in a variety of positions and situations.	Spinal immobilization equipment utilized in water operations should possess inherent flotation. ----- All products should be impervious to infectious fluids. Consider all types of patient sizes and weights. Head immobilization features should enable easy access to patient airway. Products should be lightweight and easily transportable. Consider storage requirements; application in confined space/entrapment environments; horizontal and vertical rescue requirements including movement up and down stairwells and other minimal space environments. Consider products that enable interoperability with other rescue equipment (gurneys, litters, stokes, etc.). Also consider length and width limitations of transport vehicles (ambulances, helicopters, boats, carts, all-terrain vehicles, etc). See also 09MS-08-SPIN.	85	B, A, P, H, D	C, B, R, T, E	
09ME-04-SPLT Splints, Durable	Splints that enable all types of limb immobilization. All types and sizes.	Durable devices should be impervious to infectious fluids. Consider disposable products; all size requirements (including adult and pediatric); storage and transport requirements. Products should be easy to use with minimal training, and should be easy to apply in various rescue environments, including confined space and entrapment rescues. Products should offer interoperability with other medical equipment and rescue devices (backboards, litters, gurneys, etc). See also 09MS-08-SPLT.	18, 19	B, A, P, H, D	C, B, R, T, E	

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Features/Operating Considerations		Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
Item Number/Title	Description			
<b>ME - Medical Equipment</b>				
<b>05 - Patient Movement/Transfer</b>				
09ME-05-GURN  Gurneys	Portable patient movement devices. Adjustable positions both vertical and horizontal. Durable medical equipment.	----- All devices and related accessories should be impervious to infectious fluids. Consider products ease of use with minimal training; full range of vertical and horizontal position adjustments; operations in confined space environments including ascent and descent of stairwells, around corners and other confined spaces. Consider optional accessories to accommodate equipment storage including oxygen, EKG monitors, IV poles, and other surface areas and storage capabilities. Consider operational body mechanics required for all sizes of practitioners; maintenance requirements and related costs; interoperability with other medical equipment (backboards, splints, etc.) and interoperability with various transport vehicles (ambulances, helicopters, boats, carts, all-terrain vehicles, etc.). Consider weight rating requirements. Consider wheel locks and other desirable safety devices. See also 01EM-01-GLMW, 01ZA-02-GLOW, 09MS-07-REST.	B, A, P, H, D	C, B, R, T, E
09ME-05-LITR  Litters/Stretchers	Hand-carried patient transport devices.	Stokes-type baskets considered in this category should be rugged and impact resistant; all surfaces and related accessories should be impervious to infectious fluids. Floation options may be available for water rescue. ----- Consider interoperability with other medical equipment (backboards, splints, etc), and storage and transport requirements.  See also 01EM-01-GLMW, 01ZA-02-GLOW, 09ME-05- →	B, A, P, H, D	C, B, R, T, E

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Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>ME - Medical Equipment</b>					
<i>05 - Patient Movement/Transfer - Continued</i>					
		GURN, 09MS-07-REST, 08D2-01-LITR.			
<b>ME - Medical Equipment</b>					
<i>06 - Intravenous Equipment</i>					
09ME-06-PUMP Pump, Intravenous	A device to deliver accurate rates of IV fluids for both medication administration and volume infusion.	----- Should be battery operated and designed for operations in the field environment. Be aware of battery and power requirements for these items. Additionally, IV pump systems may require special administration tubing. Products that operate using standard IV tubing are preferred. See also 09MS-05-IVSA.	34	A, P, H, D	C, B, R, T, E
<b>ME - Medical Equipment</b>					
<i>07 - Public Health</i>					
09ME-07-ISOL* Equipment, Patient Isolation	Equipment designed to maintain a continuous negative or positive pressure environment to isolate potentially contaminated or contagious patients requiring airborne precautions.	Consider equipment which is portable, easy to set up, operate, and maintain, and includes written instructions and safety considerations/tips.  ----- Can be used during transport and throughout medical care. Backup power source and/or ability to operate using 110 VAC or 12-volt automotive. Consider inclusion of ultraviolet germicidal irradiation (UVGI) for filter systems or equipment which can kill mold and bacteria.	97, 98	H, U, D	B
09ME-07-PCNT Equipment,	Equipment used to count and separate capsule or tablet forms	----- Accurate, efficient, portable. Ability to program quantities for repetitive processing. Ease of use with written instructions. →		H, U, D	B

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Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>ME - Medical Equipment</b>						
<b>07 - Public Health - Continued</b>						
Pharmaceutical Counting		of pharmaceuticals.	Easy to maintain. Easy to clean so that type of pharmaceutical can be quickly changed. Minimum accessories, re-programming or adjustments needed. Compatible and interoperable within local system for rapidly dispensing pharmaceuticals in emergency situations and for ease of training and use. Other considerations: hopper size and pill/tablet exit access, count rate, power requirements, maximum size for capsules or tablets. Single or multiple fill capability. Recommend coordination with pharmacy contacts within local system and with Strategic National Stockpile contacts at State and Federal levels. See also item: 09ME-07-PLBL; Equipment, Pharmaceutical Labeling.			
09ME-07-PLBL Equipment, Pharmaceutical Labeling		Equipment used to prepare and print labels for pharmaceuticals dispensed during emergency situations.	----- Accurate, efficient, portable. Ability to program information for repetitive printing. Ease of use with written instructions. Easy to maintain. Minimum accessories, re-programming or adjustment needed. Compatible and interoperable within local system for rapidly dispensing pharmaceuticals in emergency situations and for ease of training and use. See also item: 09ME-07-PCNT; Equipment, Pharmaceutical Counting. Recommend coordination with pharmacy contacts within local system and with Strategic National Stockpile contacts at State and Federal levels.	H, U, D		B
09ME-07-TRAN Equipment,		Equipment used to communicate emergency medical information	Accurate, efficient, portable. ----- Ease of use with written instructions. Easy to maintain. Mini →		P, H, U, D	C, B, R, T, E

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Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>ME - Medical Equipment</b>						
<b>07 - Public Health - Continued</b>						
Translation		between non-English speaking patients or patient representatives and emergency medical, hospital or public health providers.	num accessories, reprogramming or adjustments needed. Compatible and interoperable within local medical and health system. Ability to rapidly request and receive key information about a cause, symptom, and treatment of a medical condition, and to request and receive key information about potential allergies, adverse effects or counter-indications before providing emergency pharmaceuticals.			
<b>MS - Medical Supplies</b>						
<b>01 - General</b>						
09MS-01-ADMN	Supplies, Administrative	All-inclusive administrative and non-durable office support supplies to sustain medical branch operations.	----- Various supplies including but not limited to paper, pens/pencils, markers, fastening supplies/devices, files, folders, etc. Consider caching this category of equipment in portable vessels/containers to facilitate rapid mobilization and/or relocation. See also 09ME-01-ADMN.		B, A, P, H, D	C, B, R, T, E
09MS-01-ALPP	Pads, Alcohol Prep	Single-use alcohol prep pad to cleanse patient skin surface.	----- Disposable medical supply, single-use application. Consider skin sensitivity and use near open wounds.		B, A, P, H, U, D	C, B, R, T, E
09MS-01-BAGB	Bag, Body, Heavy-Duty	Single-use body bag to contain deceased patients.	----- Single-use, rugged, non-transparent surface; should be impervious to fluids and should contain all bodily fluids within the assembly without leakage. Consider infectious control requirements. See also 08D3-03-BCNT.	46	B, A, P, H, U, D	C, B, R, T, E

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Item Number/Title		Description	Features/Operating Considerations		Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>MS - Medical Supplies</b>							
<b>01 - General - Continued</b>							
09MS-01-KDEB Kit, Debridement, and Supplies	Single-use, disposable kit to clean soft tissue injuries and surfaces.	----- Kits should be self-contained, single-use, disposable.  See also: 01EM-01-EYEP, 01EM-01-GLMP, 09MS-01-SHEY, 09MS-03-GLVS.	46	H, D		C, B, R, T, E	
09MS-01-LNEN Linens	Disposable and non- disposable linen products.	----- Consider disposable products to minimize storage and handling of materials soiled with infectious substances. Consider mainte- nance and storage requirements and related costs for non- disposable products, product durability, and product absorption characteristics. See also: 08D3-01-BLKT, 09ME-01-COTS.	46	A, P, H, D		C, B, R, T, E	
09MS-01-MEDS Supplies, Medication Administration	Various disposable and non-disposable supplies to facilitate the administra- tion of medications.	----- All supplies should be disposable or impervious to infectious substances. Consider all size requirements; interoperability requirements with needleless systems; necessary adapters to enable interoperability; storage and transport requirements.	24, 35, 46	B, A, P, H, U, D		C, B, R, T, E	
09MS-01-NEAG Needles, Assorted	Various size/gauge needles to draw fluids and/or administer medications.	----- Consider all size/gauge requirements for intended uses; needles with safety mechanisms for use in direct patient administration; interoperability with needleless system and any required adapters; storage and transport requirements for various sizes and quanti- ties. All products should be individually packaged.	24, 46	A, P, H, U, D		C, B, R, T, E	

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Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>MS - Medical Supplies</b>						
<i>01 - General - Continued</i>						
09MS-01-POVO	Solutions and Applicators, Povidine Iodine	Various brushes and swabs saturated with Povidine to cleanse skin surface area.	----- Consider skin sensitivity; various size requirements; storage and transport requirements. Products should be individually packaged. Check shelf life.		H, U, D	C, B, R, T, E
09MS-01-SCRN	Screen, Privacy	Portable screen to provide privacy and visual screening during patient examination, triage, treatment, or stabilization.	----- Consider durability, portability, mobility, storage convenience, flame retardant, bacteriostatic, and cleanable components. Ease of use and repair. See also: 09ME-01-SHEL, Shelter, Medical; 030E-08-HSSE, Housing, Subsistence and Sanitation; and 030E-08-SHEL, Shelter Systems, Rapid Deployment.		H, U, D	C, B, R, T, E
09MS-01-SHER	Shears/Scissors, Medical	Standard medical shears to enable cutting of various materials.	----- Consider blunt tip requirements; size and strength requirements for various applications; storage and transport requirements.	40	B, A, P, H, D	C, B, R, T, E
09MS-01-SHEY	Shield, Eye Irrigation Lens	Single-use, disposable eye lens with catheter to facilitate irrigation.	----- Consider various size requirements; port connectivity requirements. Products should be individually packaged. See also: 01EM-01-EYEP, 01EM-01-GLMP, 01EM-01-GARM.	44	B, A, P, H, D	C, B, R, T, E
09MS-01-SUTR	Suture, Various Sizes	Various size absorbable and non-absorbable sutures.	----- Consider all injury size and types; all products should be single-use, disposable. See also 09MS-01-SUTS.	17, 46	H, D	C, B, R, T, E

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Section 9   Medical		Features/Operating Considerations		EMS/ Clinical Care Level <sup>1</sup>	Hazard Environ- ment <sup>2</sup>
Item Number/Title	Description			Standards <sup>1</sup>	
<b>MS - Medical Supplies</b>					
01 - General - Continued					
09MS-01-SUTS Supplies and Materials, Suture	Single-use, disposable supplies or kits to support suturing procedures.	----- See also 09MS-01-SUTR.	17, 46	H, D	C, B, R, T, E
09MS-01-TNDP Depressor, Tongue	Single-use, disposable device used for oral assessment.	----- Single-use, disposable; consider alternate uses.	36	B, A, P, H, D	C, B, R, T, E
09MS-01-TTAG Tags and Supplies, Triage	Single-use, disposable patient marking devices for use during multi-casualty triage management.	----- Consider simple device compatible with standard triage protocol; packaged and stored in bulk. Tags should be impervious to moisture, able to be decontaminated, and consider inclusion of CBRNE criteria and features that allow rapid data capture including patient ID and tracking information. See also 09ME-01-MCIK, 08D2-04-PPTS.		B, A, P, H, U, D	C, B, R, T, E
<b>MS - Medical Supplies</b>					
02 - Airway Management/Ventilation					
09MS-02-AWMG Supplies, Airway Management	Airway management supplies, basic and advanced. Enables basic and advanced access to, and protection of, patient respiratory system. Non- durable supplies.	----- Consider all single-use, disposable products; adult and pediatric applications. See also 09ME-02-AWVG, 09MS-02-OXYA and 09MS-02-SUCT.	1	B, A, P, H, D	C, B, R, T, E

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Section 9   Medical		Features/Operating Considerations			Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
Item Number/Title	Description	MS - Medical Supplies 02 - Airway Management/Ventilation - <i>Continued</i>					
09MS-02-BITE Block, Bite	Disposable device designed for insertion between patient's teeth. Respiratory maintenance device.	----- Consider potential damage to patient's teeth and other potential airway complications caused from use of this product. Consider adult and pediatric applications; disposable, single-use assembly; individually packaged.	15	B, A, P, H, D	C, B, R, T, E		
09MS-02-NATU Tubes, Nasogastric	Single-use, disposable gastric tube.	----- Consider all size/gauge requirements, including adult and pediatric applications; interoperability and any required adapters; storage and transport requirements. All products are single-use, disposable, and should be individually packaged.	16	A, P, H, D	C, B, R, T, E		
09MS-02-NEBU Nebulizer	Nebulizer assembly to facilitate the administration of aerosolized medications and solutions.	----- All products should be single-use, disposable; individually packaged; easy to assemble with minimal training. Consider any required adapters to enable interoperability with other medication components. See also 09MS-02-AWWMG.	5	B, A, P, H, D	C, B, R, T, E		
09MS-02-OXYA Supplies, Oxygen Administration	Oxygen administration supplies, basic and advanced. Enables basic and advanced access to, and protection of, patient respiratory system.	----- Consider all single-use, disposable products; adult and pediatric applications. See also 09ME-02-AWWMG, 09MS-02-AWWMG, 09ME-02-OXYE.	1	B, A, P, H, D	C, B, R, T, E		

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Section 9   Medical		Features/Operating Considerations		EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
Item Number/Title	Description	Features/Operating Considerations		Standards <sup>1</sup>	
<b>MS - Medical Supplies</b>					
<b>02 - Airway Management/Ventilation - Continued</b>					
09MS-02-SUCT Supplies and Adjuncts, Suction	Catheters, tubing, wands and miscellaneous connection devices for use with suction devices.	----- All products should be single-use, disposable; consider connect- ivity requirements with various ports and interoperability with other medical devices and airway equipment. See also 09ME-02- SUCT and 09MS-02-AWVG.		B, A, P, H, D	C, B, R, T, E
09MS-02-THOR Kit, Thoracostomy and Supplies	Self-contained kit to perform and support chest decompression.	----- All products should be single-use, disposable; consider all needle size requirements; consider all necessary adapters and interoper- ability requirements. See also: 01EM-01-GLMP, 09MS-03-GLVS.		H, D	C, B, R, T, E
09MS-02-VENT Ventilator, Disposable	Positive pressure ventila- tors that deliver regulated volumes of oxygen to patients requiring invasive respiratory support. Adult and pediatric applications.	----- All devices and carrying cases should be impervious to infectious fluids. Consider pressure-controlled devices that enable adjustable rate and tidal volumes; consider adult and pediatric applications. Devices should be easy to use. Consider devices that offer both audible and visual over-pressure alarms; consider storage and transport requirements. See also 09ME-02-VENT.		P, H, D	C, B, R, T, E
<b>MS - Medical Supplies</b>					
<b>03 - Infection Control</b>					
09MS-03-BAGH Bag, Biohazard	Variable size, disposable bags to contain materi- als soiled with infectious fluids/products.	----- Consider various size requirements; bag thickness and durability; multi-lingual label requirements. Products should be conspicu- ously colored and labeled with biohazard insignias. Consider products with zip-closures and other ease-of-use features. See →		B, A, P, H, U, D	C, B, R, T, E

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## Section 9 | Medical

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>MS - Medical Supplies</b>						
<b>03 - Infection Control - Continued</b>						
09MS-03-BIOD	Supplies, Biohazard Disposal	Various non-durable vessels to contain and manage materials soiled with biohazards.	also 09MS-03-BIOD. ----- Consider various size requirements; product surface thickness and durability; multi-lingual label requirements; products with non-spill openings and other ease-of-use features. Products should be conspicuously colored and labeled with biohazard insignias. See also: 09MS-03-BAGH.	46	B, A, P, H, U, D	C, B, R, T, E
09MS-03-DSIN	Supplies, Disinfectant and Antiseptic	Commercial disinfectant and antiseptic products to clean skin and other surfaces.	Antiseptics should be broad-spectrum, fast-acting, and persistent. ----- Consider product decontamination features; packaging and application features; storage requirements. Consider various usage applications (human skin versus work surfaces). Product should meet recommendations of FDA Topical Antiseptic Review Team (e.g., product contains an active ingredient such as 60-95% alcohol).	46	B, A, P, H, U, D	C, B, R, T, E
09MS-03-GLVN	Gloves, Biomedical, Non-Sterile	Variable size, single-use examination gloves. Disposable, non-latex. Non-sterile.	----- Consider all size requirements to accommodate practitioners; skin sensitivity; product thickness and durability; textured surfaces for ease of handling instruments. Products should be ambidextrous. See also 09MS-03-GLVS for sterile gloves, and 01EM-01-GLMP;	37, 46, 119	B, A, P, H, U, D	C, B, R, T, E

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Item Number/Title		Description	Features/Operating Considerations		Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>MS - Medical Supplies</b>							
<b>03 - Infection Control - Continued</b>							
09MS-03-GLVS	Gloves, Biomedical, Sterile	Various sizes, sterile biomedical gloves.	----- See also 09MS-03-GLVN for non-sterile gloves, and 01EM-01-GLMP.	----- See also 01EM-01-GLMP.	21, 46	H, U, D	C, B, R, T, E
09MS-03-HYGP	Supplies, Personal Hygiene	Various skin disinfectant and hygiene supplies.	----- Consider skin sensitivity when selecting products. Consider desired application versus product use features and limitations. All products should be single-use, disposable, and individually packaged.	----- Consider skin sensitivity when selecting products. Consider desired application versus product use features and limitations. All products should be single-use, disposable, and individually packaged.		B, A, P, H, U, D	C, B, R, T, E
09MS-03-ISOS	Supplies, Body Substance Isolation	Body substance isolation supplies (masks, gowns, eye protection). Various isolation barriers to protect practitioners from exposure to infectious substances.	----- Consider all size requirements to accommodate practitioners, and skin sensitivity. All products should be impervious to infectious fluids/substances. Consider single-use, disposable products; any non-disposable equipment such as eye protection should be easy to clean/disinfect. Consider storage and transport requirements. See also 01EM-01-EYEP.	----- Consider all size requirements to accommodate practitioners, and skin sensitivity. All products should be impervious to infectious fluids/substances. Consider single-use, disposable products; any non-disposable equipment such as eye protection should be easy to clean/disinfect. Consider storage and transport requirements. See also 01EM-01-EYEP.	20, 46, 49	B, A, P, H, U, D	C, B, R, T, E
<b>MS - Medical Supplies</b>							
<b>04 - Bandages/Dressings/Tapes</b>							
09MS-04-BAND	Bandages and Dressings	Variable size, disposable bandages and dressing to treat all types of soft tissue wounds. Non-durable absorbent products.	----- Consider surface texture requirements for various applications; specialty dressings for burn care, all size requirements; adhesive and non-adhesive requirements. Sterile products should be individually packaged; other non-sterile products can be packaged →	----- Consider surface texture requirements for various applications; specialty dressings for burn care, all size requirements; adhesive and non-adhesive requirements. Sterile products should be individually packaged; other non-sterile products can be packaged →	25, 46	B, A, P, H, D	C, B, R, T, E

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Item Number/Title	Description	Features/Operating Considerations			Standards <sup>1</sup>	Hazard Environ- ment <sup>2</sup>
<b>MS - Medical Supplies</b>						
<i>04 - Bandages/Dressings/Tapes - Continued</i>						
09MS-04-HSBN	Sterile bandages coated or impregnated with substances that enhance suppression of active bleeding, as well as other materials that perform a similar function.	in bulk. See also 09MS-04-HSBN.  ----- See also 09MS-04-BAND.			22	B, A, P, H, E D
09MS-04-TAPE	Various size adhesive medical tape.	----- Consider skin sensitivity; consider length and width requirements; consider absorption qualities for desired application; consider storage and transport requirements to support a selection of various size products.			31	B, A, P, H, C, B, R, T, E U, D
<b>MS - Medical Supplies</b>						
<i>05 - Intravenous Therapy</i>						
09MS-05-IVBG	Pressure infusion device for use with intravenous solution bags to expedite fluid delivery.	----- Consider size requirements for intended applications. All product surfaces should be impervious to infectious substances and puncture resistant. See also 09MS-05-IVSA.			32	A, P, H, D C, B, R, T, E
09MS-05-IVSA	Various intravenous solutions and needle/catheter assemblies.	----- Consider all size/gauge requirements for various applications; all required solution types based upon protocol standards; safety →			29, 30, 33, 46	A, P, H, D C, B, R, T, E

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Item Number/Title		Description		Features/Operating Considerations		Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>MS - Medical Supplies</b> 05 - Intravenous Therapy - <i>Continued</i>								
Administration								
09MS-05-NEJO	Needles, Intraosseous Infusion	Various size/gauges to facilitate fluid/medication administration.	requirements including safety needles and needleless assemblies/systems and any required adapters and conversion accessories. Consider systems that offer ease of use with minimal training, and interoperability with other medical devices/applications. Consider storage and transport requirements. Products should be individually packaged; solutions are perishable. See also 09MIE-06-PUMP.	46	A, P, H, D	C, B, R, T, E		
09MS-05-SYRC	Cartridge Injector, Syringe	Assembly that facilitates syringe use.	Engineered with safety devices to minimize practitioner needle stick injuries. ----- Consider all sizes/gauges required for the prescribed treatment interventions; interoperability with needleless systems and any required adapters; storage and transport required to accommodate various sizes and quantities. Products should be individually packaged. ----- Consider all size requirements; products should be impervious to infectious substances and/or single-use disposable; consider ease of use. See also 09MS-05-SYRG.	13, 46	A, P, H, D	C, B, R, T, E		
09MS-05-SYRG	Syringe	Various size syringes, with and without built-in needles. For use in drawing and administering medications and solu-	----- Consider various size/gauge requirements; consider needleless systems and interoperability requirements and any necessary adapters; consider products engineered with needle safety systems. See also 09MS-05-SYRC. →	35, 46	A, P, H, D	C, B, R, T, E		

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Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>MS - Medical Supplies</b>					
<i>05 - Intravenous Therapy - Continued</i>					
	tions. Also used in injection and aspiration of air from some airway devices.				
<b>MS - Medical Supplies</b>					
<i>06 - Monitoring/Defibrillation</i>					
09MS-06-PROB Electrodes/Probes, Monitoring	Self-adhesive electrodes to facilitate electrical monitoring. Single-use, disposable.	----- Consider adult and pediatric applications; lead requirements for appropriate packaging quantities; diaphoretic tolerant products. Perishable product. See also 09ME-03-DEMP.	45	A, P, H, D	C, B, R, T, E
<b>MS - Medical Supplies</b>					
<i>07 - Patient Movement/Transfer</i>					
09MS-07-REST Supplies/Systems, Patient Restraint	Multi-use patient restraints and systems; easy to apply with minimal training (including limb and torso restraints).	----- Products should be disposable or impervious to infectious substances and able to be decontaminated. Consider ease of use and ease of connectivity; interoperability with various medical devices including gurneys, litters, backboards, etc.; storage and transport requirements. See also: 08D1-03-LITR, 09ME-05-GURN, and 09ME-05-LITR.	39	B, A, P, H, D	C, B, R, T, E
<b>MS - Medical Supplies</b>					
<i>08 - Immobilization</i>					
09MS-08-SPIN Supplies, Spinal	Various devices (e.g., cervical collars, head immobilizers) to immobilize.	----- Consider all types of patient sizes including adult and pediatric applications. Products should be single-use, disposable and/ →		B, A, P, H, D	C, B, R, T, E

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Section 9   Medical		Features/Operating Considerations		EMS/ Clinical Care Level <sup>1</sup>	Hazard Environ- ment <sup>2</sup>
Item Number/Title	Description			Standards <sup>1</sup>	
<b>MS - Medical Supplies</b>					
<b>08 - Immobilization - Continued</b>					
Immobilization	lize/stabilize the neck and spinal region.	or impervious to infectious substances; consider ease of use; ease of application in confined spaces and other entrapment environments; storage and transport requirements. All carrying cases should be impervious to infectious substances. See also 09ME-04-SPIN.			
09MS-08-SPLT Splints, Disposable	Splints that enable all types of limb immobilization. All types and sizes.	----- Products should be easy to apply in various rescue environments including confined space and entrapment rescues; should offer interoperability with other medical equipment and rescue devices (backboards, litters, gurneys, etc.). Consider storage and transport requirements. See also 09ME-04-SPLT.		18, 19, 46 B, A, P, H, D	C, B, R, T, E
<b>MS - Medical Supplies</b>					
<b>09 - Obstetrics</b>					
09MS-09-KTOB Kit, Obstetrical	Self-contained kit with supplies required to support obstetrical procedures.	----- Consider products that are single-use, disposable, self-contained; consider storage and transport requirements. See also 01EM-01-GLMP, 09MS-03-GLVS.		46 B, A, P, H, D	C, B, R, T, E
<b>PH - Pharmaceuticals</b>					
<b>01 - General</b>					
09PH-01-ADEN Adenosine	Anti-dysrhythmic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.		93 A, P, H, D	C, B, R, T, E

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Section 9   Medical		Features/Operating Considerations			Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
Item Number/Title	Description						
<b>PH - Pharmaceuticals</b>							
<i>01 - General - Continued</i>							
09PH-01-ALBU Albuterol	Bronchodilator.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E		
09PH-01-AMIO Amiodarone	Anti-dysrhythmic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E		
09PH-01-ANTA Antacids	Antacid.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, B, R, T, E		
09PH-01-ATVT Ipratropium	Bronchodilator.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E		
09PH-01-BCLM Beclomethasone	Steroid, oral inhalant or nasal spray for respiratory disorders.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, B, R, T, E		
09PH-01-CACL Calcium Chloride	Electrolyte used in resuscitation settings.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. See also 09MS-05-IVSA.	93	A, P, H, D	C, B, R, T, E		
09PH-01-DEXT	Glucose compound for use in hypoglycemia.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	B, A, P, H, D	C, B, R, T, E		

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Item Number/Title	Description	Standards <sup>1</sup>				
<b>PH - Pharmaceuticals</b>						
01 - General - Continued						
Dextrose		ications and side effects; perishable product.				
09PH-01-DIPH	Antihistamine.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E	
Diphenhydramine						
09PH-01-DOPA	Used in emergency s etting to treat acute hypotension.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E	
Dopamine						
09PH-01-ELEC	Crystalloid solutions for Oral Rehydration Therapy (ORT).	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. See also 01ZA-06-HYDR.	93	P, H, D	C, B, R, T, E	
Fluid, Electrolyte Replacement, Oral						
09PH-01-EPIA	Epinephrine packaged in auto-injector.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. Pediatric and adult versions available.	93	B, A, P, U	C, B, R, T, E	
Epinephrine, Auto- Injector						
09PH-01-EPIP	Catecholamine, used in cardiac arrest, as a vaso- constrictor acute hypoten- sion, as a bronchodilator and antispasmodic in bronchial asthma.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E	
Epinephrine						

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<b>PH - Pharmaceuticals</b>					
<i>01 - General - Continued</i>					
09PH-01-FURO Furosemide	Diuretic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E
09PH-01-GLUC Glucagon	Anti-hypoglycemia agent.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E
09PH-01-LIDO Lidocaine, all concentrations	Anti-dysrhythmic as well as analgesic properties.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E
09PH-01-MASU Magnesium Sulfate	Electrolyte replacement, anticonvulsant, bronchodilator, anti-dysrhythmic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E
09PH-01-METP Methylprednisolone	Corticosteroid; bronchodilation and anti-inflammatory characteristics.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E
09PH-01-NTRO Nitroglycerin	Nitrate; vasodilator and smooth muscle relaxant.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E

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<b>PH - Pharmaceuticals</b>							
<i>01 - General - Continued</i>							
09PH-01-OXYG	Oxygen	Oxygen.	----- Consider all dosage requirements; consider all contraindications and side effects; product stored under pressure; product supports combustion; consider storage and transport requirements, including safety considerations. See also 09ME-02-OXYE, 09MS-02-OXYA.	93	B, A, P, H, D	C, B, R, T, E	
09PH-01-POLY	Polysporin Ointment	Antibiotic ointment.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E	
09PH-01-RING	Ringers Solution, Lactated	Crystalloid solution used for fluid replacement.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. See also 09MS-05-IVSA.	93	A, P, H, D	C, B, R, T, E	
09PH-01-SALI	Saline Solution	Crystalloid solution used for fluid replacement.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. Product may also be used as topical irrigation solution. See also 09MS-05-IVSA.	93	B, A, P, H, D	C, B, R, T, E	
09PH-01-SISU	Silver Sulfadiazine Cream	Silver sulfadiazine, a sulfa drug, is used to prevent and treat infections of second- and third-degree burns.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, R, T, E	

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<b>PH - Pharmaceuticals</b>					
<b>01 - General - Continued</b>					
09PH-01-SOBI Sodium Bicarbonate	Electrolyte. Useful in the management of crush syndrome.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E
09PH-01-TCOP Tetracaine Ophthalmic	Ophthalmic anesthetic for use in eye injuries.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, B, R, T, E
09PH-01-THEO Theophylline	Bronchodilator.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, B, R, T, E
09PH-01-THIA Thiamine	Vitamin.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E
09PH-01-WATR Water, Sterile	Fluid solution; topical irrigation.	----- Consider usage requirements including any contraindications and side effects.	93	B, A, P, H, D	C, B, R, T, E
<b>PH - Pharmaceuticals</b>					
<b>02 - Analgesics/Sedatives</b>					
09PH-02-ACET Acetaminophen	Analgesic, anti-pyretic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, U, D	C, B, R, T, E

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Item Number/Title	Description				Standards <sup>1</sup>	
<b>PH - Pharmaceuticals</b>						
<b>02 - Analgesics/Sedatives - Continued</b>						
09PH-02-ASA Acetylsalicylic Acid	Anticoagulant; analgesic, anti-inflammatory; anti-pyretic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, U, D	C, B, R, T, E	
09PH-02-IBUP Ibuprofen	Nonsteroidal anti-inflammatory agent; analgesic, anti-pyretic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, B, R, T, E	
09PH-02-KETO Ketorolac	Nonsteroidal anti-inflammatory agent; analgesic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, B, R, T, E	
09PH-02-MZLM Midazolam	Sedative, anticonvulsant; benzodiazepine.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93, 141	A, P, H, D	C, B, R, T, E	
<b>PH - Pharmaceuticals</b>						
<b>03 - Antibiotics/Antiviral</b>						
09PH-03-ADAM Adamantines	Anti-viral.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. Described in Federal Pandemic Influenza Preparedness and Response Plan: <a href="http://www.hhs.gov/nvpo/pandemicplan">http://www.hhs.gov/nvpo/pandemicplan</a> Sample fact sheets available at: <a href="http://www.niaid.nih.gov/factsheets/fludrugs.htm">http://www.niaid.nih.gov/factsheets/fludrugs.htm</a> <a href="http://hopkins-heic.org/infectious_diseases/influenza/facts.htm">http://hopkins-heic.org/infectious_diseases/influenza/facts.htm</a>	93	H, D	B	

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<sup>2</sup> Basic Life Support (B), Advanced Life Support (A), Pre-Hospital Mass Casualty (P), Hospital (H), Public Health (U), Disaster (D)

<sup>3</sup> Chemical (C), Biological (B), Radiological (R), Thermal (T), Explosive (E)

\* Item has been moved or changed in the edition.

## Section 9 | Medical

Section 9   Medical		Features/Operating Considerations			Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
Item Number/Title	Description						
<b>PH - Pharmaceuticals</b>							
<b>03 - Antibiotics/Antiviral - Continued</b>							
09PH-03-AMOX Amoxicillin	Antibiotic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93		P, H, U, D	B	
09PH-03-CEPH Cephalexin	Antibiotic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. Force Protection item.	93		H, D	B	
09PH-03-CHLO Chloramphenicol	Antibiotic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93		H,D	B	
09PH-03-CPRO Ciprofloxacin	Antibiotic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93		P, H, U, D	B	
09PH-03-DOXY Doxycycline	Antibiotic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93		P, H, U, D	B	
09PH-03-ERYT Erythromycin	Antibiotic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93		P, H, D	B	

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## Section 9 | Medical

Item Number/Title		Description	Features/Operating Considerations			Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>PH - Pharmaceuticals</b>								
<b>03 - Antibiotics/Antiviral - Continued</b>								
09PH-03-GENT		Antibiotic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	B		
Gentamicin								
09PH-03-MZOL		Antibiotic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. Force Protection item.	93	H, D	B		
Methronidazole								
09PH-03-NEUR		Anti-viral.	<a href="http://www.hhs.gov/nvpo/pandemicplan">http://www.hhs.gov/nvpo/pandemicplan</a> Sample fact sheets available at: <a href="http://www.niaid.nih.gov/factsheets/fludrugs.htm">http://www.niaid.nih.gov/factsheets/fludrugs.htm</a> <a href="http://hopkins-heic.org/infectious_diseases/influenza/facts.htm">http://hopkins-heic.org/infectious_diseases/influenza/facts.htm</a> -----	93	H, U, D	B		
Neuraminidase Inhibitors			Consider all dosage requirements; consider all contraindications and side effects; perishable product.					
09PH-03-RIBA		Anti-viral.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, U, D	B		
Ribavirin								
09PH-03-STMY		Antibiotic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	B		
Streptomycin								

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<sup>2</sup> Basic Life Support (B), Advanced Life Support (A), Pre-Hospital Mass Casualty (P), Hospital (H), Public Health (U), Disaster (D)

<sup>3</sup> Chemical (C), Biological (B), Radiological (R), Thermal (T), Explosive (E)

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## Section 9 | Medical

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>PH - Pharmaceuticals</b>					
<b>03 - Antibiotics/Antiviral - Continued</b>					
09PH-03-TRIM	Antibacterial agent.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	B
Trimethoprim/ Sulfamethoxazole					
<b>PH - Pharmaceuticals</b>					
<b>04 - Narcotics/Narcotic Antagonists</b>					
09PH-04-BUTO	Narcotic analgesic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93, 141	H, D	C, B, R, T, E
Butorphanol Injection					
09PH-04-MOSU	Narcotic analgesic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93, 141	A, P, H, D	C, B, R, T, E
Morphine Sulfate					
09PH-04-NALX	Narcotic antagonist.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, U, D	C, B, R, T, E
Naloxone					
<b>PH - Pharmaceuticals</b>					
<b>05 - Antidote</b>					
09PH-05-AMNI	Vasodilator. A component of the Cyanide Antidote Kit.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. See also 09PH-05-CYKT, 09PH-05-SOTH.	93	A, P, H, U, D	C
Amyl Nitrite					

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## Section 9 | Medical

Item Number/Title		Description	Features/Operating Considerations			Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>PH - Pharmaceuticals</b>								
<i>05 - Antidote - Continued</i>								
09PH-05-ATSF	Atropine Sulfate	Anticholinergic. Antidote for organophosphate and nerve agent exposure.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. See also 09PH-05-CANA, 09PH-05-NAAK, 09PH-05-PRAL, 09PH-07-DIAZ.	93	B, A, P, H, U, D	C		
09PH-05-CALG	Calcium Gluconate	Electrolyte used in acute cases for hyperkalemia, hypocalcaemia, or calcium antagonist overdose. A topical preparation is available for use in the treatment of hydrofluoric acid burns.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E		
09PH-05-CANA*	CANA Auto-Injector	Diazepam packaged in an auto-injector. For use in the management of nerve agent and organophosphate exposure.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. See also 09PH-05-ATSF, 09PH-05-NAAK, 09PH-05-PRAL, 09PH-07-DIAZ, 09TR-01-CAIT.	93, 141	B, A, P, H, U, D	C		
09PH-05-CHAR	Charcoal, Activated	Used in emergency setting to treat oral ingestion poisoning/overdoses.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	B, A, P, H, D	C, B, R, T, E		
09PH-05-COBL*		Vitamin analog. Cyanide antidote.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, U, D	C		

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<sup>2</sup> Basic Life Support (B), Advanced Life Support (A), Pre-Hospital Mass Casualty (P), Hospital (H), Public Health (U), Disaster (D)

<sup>3</sup> Chemical (C), Biological (B), Radiological (R), Thermal (T), Explosive (E)

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## Section 9 | Medical

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>PH - Pharmaceuticals</b>						
<i>05 - Antidote - Continued</i>						
Hydroxocobalamin			ications and side effects; perishable product.			
09PH-05-CYKT* Kit, Cyanide Antidote	Kit includes Sodium Nitrite, Sodium Thio-sulfate and Amyl Nitrite inhalant or other FDA-approved products for cyanide poisoning.	Consider all dosage requirements; consider all contraindications and side effects; perishable product. Note shelf life of individual components. See also 09PH-05-AMNI, 09PH-05-SOTH.	93	A, B, H, U, D	C	
09PH-05-DTPC Ca-DTPA, Pentetate Calcium Trisodium Injection	Radiation treatment drug for treating internal contamination from Plutonium, Americium, and Curium.	Http://www.fda.gov/cder/drug/infopage/DTPA/default.htm Consider all dosage requirements; consider all contraindications and side effects; perishable product. See also 09PH-05-DTPZ, 09PH-05-POTI, 09PH-05-PRUS, 09PH-06-GRAN.	93	H, D	R	
09PH-05-DTPZ Zn-DTPA, Pentetate Zinc Trisodium Injection	Radiation treatment drug for treating internal contamination from Plutonium, Americium, and Curium.	Http://www.fda.gov/cder/drug/infopage/DTPA/default.htm Consider all dosage requirements; consider all contraindications and side effects; perishable product. See also 09PH-05-DTPC, 09PH-05-POTI, 09PH-05-PRUS, 09PH-06-GRAN.	93	H, D	R	

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\* Item has been moved or changed in the edition.

## Section 9 | Medical

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>PH - Pharmaceuticals</b>						
<i>05 - Antidote - Continued</i>						
09PH-05-METB Methylene Blue	Used in emergency setting for hemoglobinopathies.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C	
09PH-05-NAAK Nerve Agent Antidote Kit (NAAK)	Pralidoxime chloride autoinjector - 2-PAM; Atropine autoinjector, or a combination autoinjector.	Pre-filled, disposable, self-contained unit designed for self or caregiver administration. Delivers entire contents automatically by the intramuscular (I.M.) route upon activation. ----- Review information on package inserts. Resuscitative equipment (including respiratory support equipment) should be readily available. Should be used by persons with adequate training in the recognition and treatment of nerve agent or insecticide intoxication.  Caution: Primary protection against exposure to chemical nerve agents and insecticide poisoning is the wearing of protective garments, including masks, designed specifically for this use. Individuals should not rely solely upon antidotes to provide complete protection from chemical nerve agents and insecticide poisoning.  Immediate evacuation from the contaminated environment is essential. Decontamination of the poisoned individual should occur as soon as possible.  Consider all dosage requirements; consider all contraindications and side effects; perishable product, review storage require- →	93	B, A, P, H, U, D	C	

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<sup>2</sup> Basic Life Support (B), Advanced Life Support (A), Pre-Hospital Mass Casualty (P), Hospital (H), Public Health (U), Disaster (D)

<sup>3</sup> Chemical (C), Biological (B), Radiological (R), Thermal (T), Explosive (E)

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## Section 9 | Medical

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environment <sup>3</sup>
<b>PH - Pharmaceuticals</b>						
<i>05 - Antidote - Continued</i>						
09PH-05-POTI	Potassium Iodide	Used in radiation emergency - protects the thyroid in a radiation emergency.	ments.  See also 09PH-05-ATSE, 09PH-05-PRAL, 09PH-05-CANA, 09PH-07-DIAZ, 09TR-01-NAIT.  ----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.  See also 09PH-05-DTPC, 09PH-05-DTPZ, 09PH-05-PRUS, 09PH-06-GRAN.	93	B, H, U, D	R
09PH-05-PRAL	Pralidoxime Chloride	Used in nerve agent and organophosphate exposures. Component of Nerve Agent Antidote Kit (NAAK).	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.  See also 09PH-05-ATSE, 09PH-05-NAAK, 09PH-05-CANA, 09PH-07-DIAZ.	93	A, B, H, U, D	C
09PH-05-PRUS	Prussian Blue	Used in emergency setting for radiation exposures, specifically cesium.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.  See also 09PH-05-DTPC, 09PH-05-POTI, 09PH-05-DTPZ, 09PH-06-GRAN.	93	H, D	R

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## Section 9 | Medical

Section 9   Medical		Features/Operating Considerations		EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
Item Number/Title	Description	Features/Operating Considerations		Standards <sup>1</sup>	
<b>PH - Pharmaceuticals</b>					
<b>05 - Antidote - Continued</b>					
09PH-05-SOTH	Used in the treatment of cyanide poisoning; a component of cyanide antidote kits.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.  See also 09PH-05-CYKT, 09PH-05-AMNI.	93	A, P, H, D	C
Sodium Thiosulfate					
<b>PH - Pharmaceuticals</b>					
<b>06 - Gastrointestinal (GI)</b>					
09PH-06-BISM	Anti-emetic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, B, R, T, E
Bismuth Products					
09PH-06-GRAN	Antinauseant and anti-emetic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.  See also 09PH-05-DTPC, 09PH-05-POTI, 09PH-05-PRUS, 09PH-05-DTPZ.	93	H, D	R
Gransetron					
09PH-06-LOPE	Antidiarrheal agent.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, B, R, T, E
Loperamide					
09PH-06-PHING	Antiemetic.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	A, P, H, D	C, B, R, T, E
Phenergan					

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<sup>2</sup> Basic Life Support (B), Advanced Life Support (A), Pre-Hospital Mass Casualty (P), Hospital (H), Public Health (U), Disaster (D)

<sup>3</sup> Chemical (C), Biological (B), Radiological (R), Thermal (T), Explosive (E)

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## Section 9 | Medical

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>	EMS/ Clinical Care Level <sup>2</sup>	Hazard Environ- ment <sup>3</sup>
<b>PH - Pharmaceuticals</b>						
<b>07 - Anticonvulsant</b>						
09PH-07-DIAZ	Diazepam	Anticonvulsant (may be used as part of the treatment for exposure to nerve agents.)	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. See also 09PH-05-ATSF; 09PH-05-NAAK, 09PH-05-PRAL, 09PH-05-CANA.	93, 141	A, P, H, D	C, B, R, T, E
09PH-07-FOSP	Fosphenytoin	Anticonvulsant.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, B, R, T, E
09PH-07-LORA	Lorazepam	Sedative; antianxiety agent; benzodiazepine.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product. Lorazepam injection requires refrigeration. See also 09ME-01-RFGR.	93, 141	A, P, H, D	C, B, R, T, E
09PH-07-PHINT	Phenytoin	Anti-convulsant.	----- Consider all dosage requirements; consider all contraindications and side effects; perishable product.	93	H, D	C, B, R, T, E
<b>TR - Training</b>						
<b>01 - Equipment</b>						
09TR-01-CAIT	Simulator, CANA Auto Injector, Training	Training simulator for CANA auto injector.	----- See also 09PH-05-CANA.		B, A, P, H, U, D	C

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.<sup>2</sup> Basic Life Support (B), Advanced Life Support (A), Pre-Hospital Mass Casualty (P), Hospital (H), Public Health (U), Disaster (D)<sup>3</sup> Chemical (C), Biological (B), Radiological (R), Thermal (T), Explosive (E)

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## Section 9 | Medical

Section 9   Medical		Features/Operating Considerations		EMS/ Clinical Care Level <sup>1</sup>	Hazard Environ- ment <sup>2</sup>
Item Number/Title	Description	Features/Operating Considerations		Standards <sup>1</sup>	Hazard Environ- ment <sup>2</sup>
<b>TR - Training</b>					
<b>01 - Equipment - Continued</b>					
09TR-01-CSIM Equipment, Training/ Casualty Simulation	Life-like human body replicas that enable medical practitioners to train in various scenarios.	----- Consider adult and pediatric applications; ease of cleaning; ease of assembly and disassembly; storage requirements; battery life (as applicable). Consider disposal of accessories and adjuncts (and related costs).		B, A, P, H, D	C, B, R, T, E
09TR-01-MKIT* Supplies, Moulage	Moulage supplies include prosthetics, makeup, and other materials used to simulate wounds/injuries for training/exercise purposes.				
09TR-01-NAIT Simulator, NAAK Auto Injector, Training	Training simulator for NAAK auto injector.	----- See also 09PH-05-NAAK.		B, A, P, H, U, D	C

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## Section 10 - Power

### Overview

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Early editions of the SEL included multiple references to power-related items such as batteries and generators throughout the various sections. This section was created to consolidate those references and eliminate redundancy. By maintaining a unique section for power, the IAB hopes to remind readers that the availability of power is a significant consideration in planning across all areas.

The Power section includes only three sub-sections: Batteries and Power Cells, Generators, and Other Power-Related Equipment. Its inclusion as a separate section should increase awareness of power requirements as the number and type of electronic equipment items continues to increase in virtually every section of the SEL. Readers are encouraged to look across the applicable items in other SEL sections and consider the requirements for batteries (number, type, service life, shelf life, etc.), generators, power filtering equipment, and other power-related items without which critical equipment will cease to function.

In the aftermath of disasters such as Hurricane Katrina and the recent Midwest (Saint Louis) ice/wind storms, one of the salient lessons learned was the difficulty of recharging batteries in an environment characterized by widespread power outages. As a result, many response organizations are mandating that some critical equipment be capable of using commercially available disposable batteries either as a primary or alternate power source (e.g., an alkaline battery pack that can be used in place of a rechargeable NiCad battery). Where applicable, comments regarding the need for special power requirements such as custom batteries will be noted in the Operating Considerations field of equipment in other SEL sections.

One particularly noteworthy issue has been mentioned here in past versions of the SEL, and unfortunately still requires reinforcement. Readers are encouraged to emphasize generator safety and recognize the dangers of carbon monoxide poisoning and electrocution to the general public during disasters that cause power outages. Every year, and despite multiple warnings, many lives are lost due to individuals running generators in or near their homes. Carbon monoxide is an odorless and colorless gas that kills! Also, by inappropriately wiring generators directly into one's house (instead of plugging appliances into the generator), severe injuries/fires/damage can occur when power is restored.

### On-Line Selection Factors

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No online selection factors have been provided for this section. The applicability of the power requirement will be determined by the type and location of the equipment items being powered.

## Section 10 | Power

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>BC - Batteries and Power Cells</b> 00			
10BC-00-BATT Batteries, All Types, Sizes	Batteries for all recommended equipment. Types including, but not limited to Alkaline, Nickel-Cadmium (NICAD), Nickel Metal Hydride (NiMH), Lithium (Li-Ion). Form factors such as AA, AAA, C and D cells, 9-Volt, Clamshell.	Disposable or rechargeable. Inherently safe batteries required for explosive environments. ----- Shelf life. Recharge time if applicable. Disposal requirements. Life (charge/discharge) cycles.	
10BC-00-FCEL Cells, Fuel	Fuel Cells.		
10BC-00-SOLR Chargers	Including but not limited to solar, natural gas, shore power, etc.		
<b>GE - Generators</b> 00			
10GE-00-GENR Generators	Generators, varying types and sizes, including gasoline, diesel, propane, natural gas, alternator, gas turbine powered devices, etc.	Portable or fixed. ----- Examine load capacity. Regular testing. Automatic transfer switch. Carbon monoxide detector. Heavy duty outdoor rated extension cords. Approved fuel storage containers. →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

## Section 10 | Power

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
GE - Generators 00 - <i>Continued</i>		Fuel stabilizer. Run time (fuel capacity, fuel supply, resupply, etc.). Consider need for extended run time (greater than five days).	
<b>PE - Other Power-Related Equipment</b>			
10PE-00-BCON	Battery conditioners.	Indicators showing current battery status. ----- Pulse chargers. Number of charging ports. Ability to keep track of individual batteries.	
Conditioners, Battery			
10PE-00-INVT	Equipment for DC to AC conversion.		
Inverters			
10PE-00-PCDS	Systems that provide protection against power spikes, surges, and momentary drops so that serviced equipment receives “clean” power.		
System, Power Conditioning			
10PE-00-PTSW	Switch for power output transfer to support generator maintenance and fueling.	Employable with generator autostart for continuous operation and uninterrupted power flow.	123
Switch, Power Transfer			

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

Section 10 | Power

**Item Number/Title**    **Description**    **Features/Operating Considerations**    **Standards<sup>1</sup>**

**PE - Other Power-Related Equipment**

**00 - Continued**

10PE-00-RECT Rectifiers	Equipment for AC to DC conversion.		
10PE-00-REEL Reels, Electric Cord	Electric cord reels.	Twist-lock connectors. ----- Twist-lock connectors are advantageous during field operations to prevent accidental disconnection. Length and gauge are relative to expected current load.	123
10PE-00-UPS Supply, Uninterruptible Power (UPS)	Systems that compensate for loss of power to serviced equipment for some period of time. May include short-duration battery devices, or standby generator devices for longer duration.	----- Consider load/time relation.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.



## Section 11 - CBRNE Reference Materials

### Overview

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This section was originally created in the Spring 2004 edition to simplify access to reference documents that were previously included under Operational Equipment. All references are classified in one of three categories: Field Expedient References, Reference Databases, or References. “Field Expedient”, in this context, refers to those items that would be useful to carry to the scene of an incident. Where possible, author, International Standard Book Number (ISBN), and edition information are provided. Comments on the applicability and utility of specific references are also provided.

### Online Selection Factors

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Like most sections in the 2006 SEL, the online<sup>1</sup> version of the References Section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For the References Section, the SubGroup chose to use the Mission Role definitions from Section 1 as the first factor, and the Hazard Environment definitions from Section 2 as the second. The intent is to allow selection of recommended references by detailed mission role (patrol officer, firefighter, hazmat technician, etc.) and general hazard environment (Chemical, Biological, etc.). See the introductions to Sections 1 and 2 for the specific definitions used. Every online item is “tagged” for each appropriate combination of factors. Thus, users of the online version can choose any combination of Mission Role and Hazard Environment, and the system will provide a list of all items tagged for that combination.

<sup>1</sup> The on-line version is available on the Responder Knowledge Base, [www.rkb.mipt.org](http://www.rkb.mipt.org).

## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
11FR-00-CHRS	CHRIS Manual	<p>Resource scene reference.</p> <p>Quantity of chemicals discussed.</p> <p>Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.</p> <p>Particularly suited for toxic industrial chemicals.</p> <p>Does not address military agents.</p>
11FR-00-EAGR	<p>Emergency Action Guides</p> <p>Author: Association of American Railroads ISBN: 9990687420</p>	<p>Resource scene reference.</p> <p>Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.</p>
11FR-00-ECHE	<p>Emergency Care for Hazardous Materials Exposure</p> <p>Author: Bronstein, Curran ISBN13: 978-0323048774 Edition: Third Pages: 896</p>	<p>Resource scene reference.</p> <p>Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.</p>
11FR-00-EETG	<p>Effects of Exposure to Toxic Gases; First Aid and Medical Treatment</p> <p>Author: Matheson ISBN13: 978-9994698608</p>	<p>Limited descriptions of toxicological mechanisms.</p> <p>Quantity of chemicals discussed.</p> <p>Reference resource during preplanning, training, and exercise development.</p>
11FR-00-EHMR	<p>Emergency Handling of Hazardous Materials in Surface Transportation</p> <p>Author: Association of American Railroads ISBN13: 978-9990687002</p>	<p>Resource scene reference.</p> <p>Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.</p>

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title		Description	Features/Operating Considerations
<b>FR - Field Expedient References</b>			
<i>00 - Continued</i>			
11FR-00-EPAP EPA Recognition and Management of Pesticide Poisoning	Author: Reigart, Roberts Edition: Fifth Pages: 238		Descriptions of toxicological mechanisms. Downloadable from <a href="http://www.epa.gov/pesticides/safety/healthcare/handbook/handbook.htm">www.epa.gov/pesticides/safety/healthcare/handbook/handbook.htm</a> ----- Used for preplanning, training, and exercise development.
11FR-00-ERG4* Emergency Response Guidebook 2004	Author: US Department of Transportation, Transport Canada, and the Secretariat of Communications and Transportation of Mexico ISBN13: 978-1590423905 Edition: 2004		Resource scene reference. The Emergency Response Guidebook (ERG2004) was developed jointly by the US Department of Transportation, Transport Canada, and the Secretariat of Communications and Transportation of Mexico (SCT) for use by firefighters, police, and other emergency services personnel who may be the first to arrive at the scene of a transportation incident involving a hazardous material. It is primarily a guide to aid first responders in (1) quickly identifying the specific or generic classification of the material(s) involved in the incident, and (2) protecting themselves and the general public during this initial response phase of the incident. The ERG is updated every three to four years to accommodate new products and technology. The next version is scheduled for 2008. ----- Can be obtained via web at <a href="http://hazmat.dot.gov/pubs/erg/gydebook.htm">http://hazmat.dot.gov/pubs/erg/gydebook.htm</a>  Details of chemicals discussed. Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.
11FR-00-FCHM Farm Chemicals Handbook	Author: Meister ISBN13: 978-9990801064 Edition: 2002		Resource scene reference. ----- Quantity of chemicals discussed. Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development. →

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
11FR-00-GCST	Author: Milne ISBN13: 978-0566081903 Edition: 11th Pages: 1216	Resource scene reference. ----- Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.
11FR-00-GENI	McGraw ISBN13: 978-0071341431 Edition: First	Resource scene reference. ----- Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.
11FR-00-HAZD	Author: Lewis, Richard J. ISBN13: 978-0471441656 Edition: Fifth Pages: 1728	Resource scene reference. ----- Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.
11FR-00-HCCD	Author: Lewis, Hawley ISBN-13: 978-0471768654 Edition: 15th Pages: 1,379	Resource scene reference. ----- Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.
11FR-00-HMFG	Delmar Publishing Author: Bevelacqua, Stulp ISBN13: 978-0766801554 Edition: 1st Pages: 100	Resource scene reference. ----- Quantity of chemicals discussed. Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.
11FR-00-HIMMI	Red Hat Publishing Author: Bevelacqua	Resource scene reference. →

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
Hazardous Materials: Managing the Incident - Field Operations Guide (FOG)	ISBN: 1-9322335-05-1 Edition: 2005 Pages: 176	The FOG includes detailed tactical checklists that follow the Eight Step Process®, a section on identification and recognition of containers, data cards on the top 50 hazardous materials and CBRNE, as well as a matrix of WMD and drug lab precursor chemicals. The FOG is also designed for use in the classroom to support Hazardous Materials Technician and Incident Commander training.
11FR-00-HTCC Handbook of Toxic and Hazardous Chemicals and Carcinogens	Author: Richard P. Pohanish ISBN13: 978-0815514596 Edition: 4th Pages: 2,300	The Field Operations Guide (FOG) is designed to be used at the incident scene as a reference guide to strategic and tactical decision-making.  Resource scene reference.  Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.
11FR-00-HZMI Hazardous Material Injuries	Author: Stuz and Ulin ISBN13: 978-0913079054 Edition: Fourth Pages: 470	Descriptions of toxicological mechanisms.
11FR-00-JCBH Jane's Chemical/Biological Handbook	Author: Sidell ISBN-13: 978-0710627735 Edition: 3rd Spiral Edition, June 2006 Pages: 298	Overviews all of the primary military, chemical and biological materials. Includes differential diagnosis tools for agent identification.
11FR-00-MCWC Management of Chemical	Author: Sidell, DOD	Descriptions of toxicological mechanisms. Field quick reference for treatment of patients. →

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title		Description	Features/Operating Considerations
FR - Field Expedient References 00 - Continued			
Warfare Casualties			
11FR-00-MERK	Author: Chapman, Hall ISBN13: 978-0911910001 Edition: 14th Pages: 2564	Resource scene reference for chemical hazards of technical nature. ----- Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.	The web accessible version of The Merck Index, Fourteenth Edition is co-published by Merck & Co., Inc. and CambridgeSoft. This electronic version contains the text and structures of the monographs, the supplementary tables section and the Organic Name Reactions section. This product features powerful text and substructure searching tools for exploring the database. For subscription information contact:  CambridgeSoft 100 Cambridge Park Drive Cambridge, MA 02140 USA ChemStore.Com (the online store) 800-315-7300 (US & Canada) 617-588-9300 (Local & International) info@cambridgesoft.com (sales department E-mail)
Merck Index			The Merck Index OnlineSM is a text searchable database that contains the monograph section of The Merck Index, Thirteenth Edition. Contact the following licensed vendors for subscription access:  DIALOG The Dialog Corporation 11000 Regency Parkway, Suite 10 Cary, North Carolina 27511 →

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
FR - Field Expedient References 00 - <i>Continued</i>		
11FR-00-MGDB Matheson Gas Data Book	Author: Matheson	Tel: 1-800-3-DIALOG www.dialog.com E-mail: customer@dialog.com  STN International Chemical Abstract Service 2540 Olentangy River Road Columbus, OH 43202 Tel: 1-800-848-6533 www.cas.org E-mail: help@cas.org
11FR-00-MMBC Medical Management of Biological Casualties Handbook	Author: DOD ISBN-13: 978-1588081629 Edition: 4th Pages: 126	Detailed data on chemical gases. ----- Detailed towards industrial gases. Suitable for reference at the scene of an incident and during preplanning, training, or exercise development.
11FR-00-MMCC Medical Management of Chemical Casualties Handbook	Author: DOD ISBN13: 978-1588081681	Descriptions of toxicological mechanisms caused by biological hazard.  Descriptions of toxicological mechanisms caused by chemical weapons.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
11FR-00-MMRC	Medical Management of Radiological Casualties Handbook	Author: DOD ISBN13: 978-1931828239 Edition: 1st Edition Pages: 133
11FR-00-PGCH	NIOSH Pocket Guide to Chemical Hazards	Author: National Institute for Occupational Safety and Health ASIN: B000E8OY8C DHHS NIOSH Publication Number 2005-149. CD-ROM Version also available, DHHS NIOSH Publication Number 2005-151. Edition: September 2005
11FR-00-PHRG	Public Health Emergency Response Guide for State, Local, and Tribal Public Health Directors	Author: CDC available at <a href="http://www.bt.cdc.gov">www.bt.cdc.gov</a> Edition: 1.0 Pages: 65
11FR-00-QGPC	Quick Selection Guide to Chemical Protective Clothing	Author: Forsberg, Mansdorf ISBN-13: 978-0471271055 Edition: 4th Pages: 160

Descriptions of toxicological mechanisms caused by radiological hazards.

Excellent quick reference for toxic industrial chemicals. Also available in CD-ROM and online version.

-----  
Can be obtained by calling 1-800-35-NIOSH.

All-hazards reference tool. Pocket-sized. Durable. Contains checklists, templates, and guidance.

-----  
Designed for public health professionals responsible for initiating response activities during the first 24 hours of an emergency or disaster.

Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.

Resource scene reference.

-----  
Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
<b>FR - Field Expedient References</b>		
00 - <i>Continued</i>		
11FR-00-SAXS	Author: Lewis, Richard J. ISBN13: 978-0471701330 Edition: Eleventh (3 volume set) Pages: 4860	Resource scene reference for chemical hazards. ----- Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.
11FR-00-SYMS	Author: Paul Burns Edition: International Edition ISBN: 095088362X	Resource scene reference. ----- Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.
11FR-00-TLVS	Author: ACGIH	Resource scene reference. ----- Quantity of chemicals discussed. Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.
<b>RD - Reference Databases</b>		
00		
11RD-00-CWCH	Publisher: ChemwatchNA www.chemwatchna.com	Chemical database for first response information including reports on spills, first aid, medical advice, firefighting, physical properties, PPE, exposure, etc. Tools for quick comparisons of chemical characteristics, labeling, and inventory. ----- Available in multiple languages.
11RD-00-GPPS	Author: Keith, Lawrence ISBN: 873717104 Pages: 26	Resource scene reference. ----- Suitable for reference at the scene of an incident and as a reference resource during →
Gloves Plus		

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

## Item Number/Title Description Features/Operating Considerations

RD - Reference Databases  
00 - Continued

11RD-00-HMG3* HazMasterG3®	Author: Alluvium LLC <a href="http://www.alluvium.com">http://www.alluvium.com</a> Software database and modeling system	preplanning, training, and exercise development.  Includes chemical databases and modeling tools. Compatible with Palm, Pocket PC, Windows Mobile, and Windows XP. ----- Allows rapid on-scene calculation of exclusion zones for toxic or flammable vapor clouds, radiological isotopes, and precursors. Used for quick reference during events and preplanning exercises.
11RD-00-PEAC* PEAC-WMD 2007	Author: Aristatek <a href="http://www.aristatek.com">http://www.aristatek.com</a> Edition: 2007 Software database and modeling system.	Includes integrated mapping, GPS connectivity, chemical database, and modeling tools. Compatible with Pocket PC, Windows Mobile, and Windows XP. ----- Allows rapid on-scene calculation of exclusion zones for toxic or flammable vapor clouds, radiological isotopes, and precursors. Used for quick reference during events and preplanning exercises.
11RD-00-PGCH NIOSH Pocket Guide to Chemical Hazards (Electronic)	Author: National Institute for Occupational Safety and Health Electronic version of the pocket guide. Edition: 2005	Free for download from <a href="http://www.cdc.gov/NIOSH/npg/">http://www.cdc.gov/NIOSH/npg/</a> . See publications and databases. Lists physical, chemical and toxicological properties of Toxic Industrial Chemicals (TICs).
11RD-00-TPLS Tomes Plus / Chemical Knowledge Database	Author: Micro Medix Pages: CD-ROM	Resource scene reference. ----- Suitable for reference at the scene of an incident and as a reference resource during preplanning, training, and exercise development.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
<b>RD - Reference Databases</b> 00 - <i>Continued</i>		
11RD-00-TXFX ToxFAQs™ Series, Agency for Toxic Substances and Disease Registry (ATSDR)	The ATSDR ToxFAQs™ is a series of summaries about hazardous substances developed by the ATSDR Division of Toxicology. Information for this series is excerpted from the ATSDR Toxicological Profiles and Public Health Statements.	Each fact sheet serves as a quick and easy to understand guide. Answers are provided to the most frequently asked questions (FAQs) about exposure to hazardous substances found around hazardous waste sites and the effects of exposure on human health. ----- Information on the series can be obtained at <a href="http://www.atsdr.cdc.gov">www.atsdr.cdc.gov</a> .
<b>RE - References</b> 00		
11RE-00-AIRM Air Monitoring Instrumentation: A Manual for Emergency Investigatory and Remedial Responders	Author: Maslansky, Carol J. and Maslansky, Steven P. ISBN13: 978-0471284604 Pages: 304	----- Used for preplanning, training and exercise development.
11RE-00-ATFO* Federal Explosives Law and Regulations, ATF Publication 5400.7	Bureau of Alcohol, Tobacco, and Firearms Edition: 09/2000	Available online at <a href="http://www.atf.treas.gov/explaron/fedexplolaw/index.htm">http://www.atf.treas.gov/explaron/fedexplolaw/index.htm</a> ----- Provides legal framework, questions and answers, and example rulings. Also provides guidance on explosive handling and storage.
11RE-00-BSSP* National Strategic Plan for U.S. Bomb Squads	National Bomb Squad Commanders Advisory Board Edition: December, 2006	Provides “Master Plan” for accredited bomb squads. Shapes bomb squad policy development. Distribution restricted to accredited bomb squads. Further information, as well as an Executive Summary for Industry, is available at <a href="http://www.nbscab.org">www.nbscab.org</a> . →

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
RE - References 00 - Continued		
11RE-00-BTNG* National Guidelines for Bomb Technicians	National Bomb Squad Commanders Advisory Board Edition: April, 2006 Distribution restricted to accredited bomb squads.	----- Addresses alignment and coordination of Federal resources. Builds tactics, techniques, and procedures. ----- Used for preplanning, training, technical selection, certification/accreditation, and equipment requirements.
11RE-00-CCDM Control of Communicable Diseases Manual	American Public Health Association Dr. David Heymann, Editor ISBN13: 978-0875530352 Edition: 18th Edition Pages: 700	The Control of Communicable Diseases Manual is the most widely recognized source-book on infectious diseases. The new 18th edition addresses concerns about the impact of communicable diseases around the globe as they, new and unknown, continue to thrive, kill, maim and surprise the masses. Among the diseases addressed in the new edition is Severe Acute Respiratory Syndrome (SARS).
11RE-00-COMM Common Sense Approach to Hazardous Materials	Pennwell Corporation Author: Fire, Frank L. ISBN13: 978-0912212111 Edition: Second, 1996 Pages: 448	Textbook dealing with the chemistry and effects of hazardous chemicals and radiation.
11RE-00-CTCP Clinical Toxicology of Commercial Products	Author: Gosselin ISBN13: 978-0683036329 Edition: 5th Edition Pages: 2009	Descriptions of toxicological mechanisms of Toxic Industrial Chemicals (TICs). ----- Detail of mechanisms somewhat limited. Reference resource during preplanning. Used for training Hazardous Materials Technicians.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title		Description	Features/Operating Considerations
11RE-00-ERHM	Emergency Medical Response to Hazardous Materials	Delmar Publishing Author: Bevelacqua, Stulp ISBN13: 978-0827378292 Edition: 1st Pages: 544	Descriptions of toxicological mechanisms for the field medical technician. ----- Limitations due to the level of deployment, based upon protocol which the field medical technician can function. Reference resource during training. Used for training Hazardous Materials Technicians.
11RE-00-FGAC	First Responder's Guide to Agricultural Chemicals Accidents	Author: Foden-Weddell ISBN13: 978-0873717991 Pages: 540	Descriptions of toxicological mechanisms for the field medical technician. ----- Limitations due to the level of deployment agricultural chemicals, based upon protocol which the field medical technician can function. Reference resource during training. Used for training Hazardous Materials Technicians.
11RE-00-HAMD	HazMat Air Monitoring and Detection Devices	Hawley ISBN13: 978-1418038311 Pages: 192 (second ed.)	----- Used for preplanning, training and exercise development.
11RE-00-HBMT	Handbook of Medical Toxicology	Viccellio ISBN13: 978-0316902472 Pages 812	Descriptions of toxicological mechanisms. ----- Used for preplanning, training, and exercise development.
11RE-00-HMCD	Hazardous Materials Chemistry	Delmar Publishing Author: Bevelacqua ISBN13: 978-0766814349 Edition: 1st Edition Pages: 240	Basic chemical nomenclature for the responder. Textbook. ----- Detailed chemical mechanisms are not discussed. Reference resource during training. Used for training Hazardous Materials Technicians.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
11RE-00-HIMMI Hazardous Materials: Managing the Incident	Red Hat Publishing Author: Noll, Hildebrand ISBN: 1-932235-04-3 Edition: Third, 2005 Pages: 648	Overviews the management of hazardous materials incidents. Primarily a learning text. The textbook consists of 12 chapters with chapters 1-3 addressing preparing for the incident and chapters 4-12 addressing how to respond safely to a hazardous materials incident. Chapter 4 is written as a “bridge chapter” and provides an overview of the Eight Step Process® which is a systematic way of approaching a hazmat incident. Chapters 5-12 expand on Chapter 4 by dedicating one chapter to each of the Eight Steps. ----- Suitable for preplanning, training, and exercise development.
11RE-00-HIMRH NFPA Hazardous Materials Response Handbook	National Fire Protection Association Author: Jerry Laughlin, David Trebisacci ISBN-13: 978-0877654643 Edition: 4th Pages: 607	The Hazardous Materials Response Handbook includes:  The complete texts of the 2002 editions of NFPA 471, NFPA 472, and NFPA 473; Relevant commentary that provides background information plus hands-on advice based on years of experience in the field; More than 200 illustrations, photos, and worksheets that support key facts so you can understand them more fully and apply requirements correctly; Explanations of how to respond to haz-mat incidents resulting from general criminal/terrorist activities, as well as those involving weapons of mass destruction and radioactive materials; Practical guidance on emergency medical service response to incidents involving weapons of mass destruction and radioactive materials. ----- Reference resource during preplanning, training, and exercise development. Includes relevant NFPA standards.
11RE-00-JFSH Jane’s Facility Security Handbook	Author: Kozlow, Sullivan ISBN13: 978-0710622884 Pages: 320	Descriptions of primary planning issues. ----- Direction with organizational structures. Reference resource during preplanning, training, and exercise development.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
11RE-00-JICM	Joint Information Center (JIC) Manual	Descriptions of primary planning issues. ----- Used at strategic level operations. Reference resource during preplanning, training, and exercise development.
11RE-00-MASS	Mass Casualty and High Impact Incidents - An Operations Guide	Reference for planning and training.
11RE-00-MRSP	Medical Response to Weapons of Mass Destruction	----- Useful for education of first response medical personnel.
11RE-00-NIMS	National Incident Management System; Principles and Practice	Reference for planning and training. ----- Used for preplanning, training, and exercise development.
11RE-00-PODO	Clinical Management of Poisoning and Drug Overdose	Descriptions of toxicological mechanisms. ----- Used for preplanning, training, and exercise development.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
11RE-00-SPOP Special Operations for Terrorism and HazMat Crimes	Red Hat Publishing Author: Hawley, Noll, Hildebrand ISBN: 0965656578 Pages: 192	----- Used for preplanning, training and exercise development.
11RE-00-STRT Street Smart HazMat Response	Red Hat Publishing Author: Callan Edition: First ISBN: 096565656X	----- Used for preplanning, training and exercise development.
11RE-00-TCBH CB FRH (Chem Bio) First Responder Handbook	Tempest Publications Author: Venzke ISBN13: 978-0966543704 Pages: 198	Descriptions of military generated chemicals. ----- Quantity of chemicals discussed. Reference resource during preplanning and exercise development.
11RE-00-TCBQ Chem Bio Frequently Asked Questions (CB FAQ)	Tempest Publications Author: Graves ISBN13: 978-0966543711 Edition: 1st Pages: 175	Descriptions of military generated chemicals. Questions and answers. ----- Quantity of chemicals discussed. Reference resource during preplanning and exercise development.
11RE-00-TERF Terrorism Response: Field Guide for Fire and EMS Organizations	Author: Christen, Henry T. and Maniscalco, Paul M. ISBN13: 978-0131109063 Pages: 179	Reference for planning and training.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 11 | CBRNE Reference Materials

Item Number/Title	Description	Features/Operating Considerations
11RE-00-TERL Terrorism Response: Field Guide for Law Enforcement	Author: Christen, Henry T. and Maniscalco, Paul M. ISBN13: 978-0131107472 Pages: 163 Edition: Third	Reference for planning and training.
11RE-00-THOR Terrorism Handbook for Operational Responders	Thomson Delmar Learning Author: Bevelacqua ISBN13: 978-1401850654 Edition: Second Pages: 160	Reference for planning, and training.
11RE-00-TRMQ Transport of Radiological Materials: Q&A About Incident Response	Author: Berga, Byrd, et al	General discussion on radiological chemicals. ----- Level of information discussed. Reference resource during preplanning, training, and exercise development.
11RE-00-UNDR Understanding Terrorism and Managing the Consequences	Author: Christen, Henry T. and Maniscalco, Paul M. ISBN13: 978-0130212290 Pages: 556	----- Used for preplanning, training and exercise development.

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 12 – CBRNE Incident Response Vehicles

### Overview

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This section was created in the current edition to improve the alignment of the SEL with the DHS Authorized Equipment List (AEL). It contains multiple vehicle types, including trailers for water and equipment. The Personal Protective and Operational Equipment (PP&OE) SubGroup has established this section, and will be responsible for maintaining its content.

### Changes for 2007

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The following items have been moved from Section 3 into this section:

- Vehicle, Command, Mobile
- Vehicle, Commercial
- Vehicle, Specialized Mission, CBRNE
- Vehicle, Specialized Emergency Management
- Vehicle, Mass Casualty Transport
- Movers, Prime, for Equipment/Water Trailers
- Trailers, Water/Source
- Trailers, Equipment

### Online Selection Factors

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No selection matrix has been formulated for this section.

Section 12 | CBRNE Incident Response Vehicles

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
TR - Trailers 00			
12TR-00-H2OT*	Water trailers (potable and non-potable) with distribution system and pump.	Pneumatic or electric brakes; filling and delivery mechanism; trailer hitch or other means of movement by vehicle. ----- Consider operating terrain. Potable and non-potable units are not interchangeable. Consider associated sanitization and stabilization procedures. Potable water sources must meet water quality standards as regulated by EPA.	
12TR-00-MOVR* Mover, Prime, for Equipment/Water Trailers	A vehicle used to tow equipment trailers, such as a semi-trailer tractor. This item is only allowable if purchased for use with other allowable items such as the trailers in Items 12TR-00-TEQP and 12TR-00-H2OT.		
12TR-00-TEQP* Trailer, Equipment	Trailers for transport of equipment to the incident site.		
VE - Vehicles 00			
12VE-00-ABUS* Vehicle, Mass Casualty Transport	Specialized vehicles such as “Ambulance Buses” to transport stretcher-borne patients during a mass-casualty event. Includes retrofit kits to convert	Conversion kits should be easy to store and assemble. ----- Ability to carry and secure patients on litters, and medical supplies and equipment needed during patient transport. Includes mechanism(s) for patient restraint as well as for securing devices that are used for carrying non-ambulatory patients. Ability to communicate with regulating and receiving authorities. Provision of privacy and screening from public view. →	86, 101

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.  
\* Item has been moved or changed in the edition.

## Section 12 | CBRNE Incident Response Vehicles

Item Number/Title Description Features/Operating Considerations Standards<sup>1</sup>VE - Vehicles  
00 - Continued

	existing vehicles into mass casualty transports.	Compatible and interoperable with other local health, medical and transportation system assets.	
12VE-00-CMDV* Vehicle, Command, Mobile	Mobile command vehicles for use at incident scene.		
12VE-00-MISS* Vehicle, Specialized Mission, CBRNE	Specialized vehicles designed to support specific CBRNE mission area include deployment vehicles, tactical intervention vehicles, hazmat units, communications units, bomb response units, mobile morgue units, and special transport units such as all-terrain vehicles (ATVs), 2-wheeled personal transports for fully suited bomb technicians, and robot trailers designed to accommodate special mission equipment and accessories.	Extensive customization available based upon specific mission. Choice of drive system, such as wheeled, tracked, etc. ----- Consider mission requirements, terrain/operating area, and personnel requirements (including personal protective equipment) when selecting vehicle.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 12 | CBRNE Incident Response Vehicles

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<p>VE - Vehicles 00 - Continued</p> <p>12VE-00-SPEC* Vehicle, Specialized Emergency Management</p>	<p>Specialized vehicles for emergency management operations. This category includes special-purpose vehicles for the transport of response equipment and personnel to incident sites which may have limited or restricted access as a result of an emergency or disaster.</p>		
<p>12VE-00-VHCL* Vehicle, Commercial</p>	<p>Commercial vehicles, vans, SUVs, flat bed and panel trucks for personnel transportation and equipment movement.</p>	<p>Run-flat tires; heavy-duty configuration. ----- Vehicle weight, transmission type, drive/braking systems, and size; impact on licensing requirements.</p>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 13 – Terrorism Incident Prevention Equipment

### Overview

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This section was created in the current edition to improve the alignment of the SEL with the DHS Authorized Equipment List (AEL). It also recognizes that although the SEL is response-oriented, several items from the Information Technology Section of the previous edition had substantial utility in the “prevent” mission as well. The Interoperable Communication and Information System (ICIS) SubGroup has established this section, and will be responsible for maintaining its content.

### Changes for 2007

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The following items have been moved from Section 4 into this section:

- System, Alert Notification
- Software, Data Acquisition
- Software, Data Fusion/Synthesis
- Software, Facial Recognition
- Software, Investigative, Signals Intelligence
- Equipment, Law Enforcement Surveillance

### Online Selection Factors

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No selection matrix has been formulated for this section.

Section 13 | Terrorism Incident Prevention Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
13IT-00-ALRT* System, Alert/Notification		Alert and notification equipment that allows for real-time dissemination of information and intelligence among responders via equipment such as cellular phones, pagers, text messaging, etc.	May be standalone or interface with civilian notification systems, or may be incorporated into civilian notification system. ----- Should be operated from multiple redundant locations, with redundant transmission modes and power supplies. Consider privacy and confidentiality. Consider interface with CAD system. Should have some methodology for delivery confirmation / confirmation.	
13IT-00-DACQ* Data Acquisition		Software for data collection and information/intelligence gathering, including data mining and search tools that support inferential analysis, including trend analysis.	Data mining capability, inferential analysis, trend analysis. ----- Need to establish notification “triggers” and operational procedures for such notification.	
13IT-00-DFSN* Data Fusion/Synthesis		Software or system for accepting disparate inputs and producing organized information. May use multiple sensor inputs to develop a situational picture, and/or multiple inputs from different intelligence sources to create a correlated set of accessible data.	May incorporate some form of data visualization and/or pattern detection capability. Should have GIS integration in order to display mapped information. ----- If purchased as software, carefully review platform requirements, including ability to handle varying inputs from sensors, outside systems, etc.  Check compatibility with related add-on software such as pattern recognition, atypical signal analysis, and data mining.  All three aspects of security (confidentiality, integrity, and availability) are extremely important for these systems. In addition to normal precautions such as strong →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 13 | Terrorism Incident Prevention Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>IT - Information Technology</b> 00 - <i>Continued</i>			
13IT-00-FACE* Software, Facial Recognition	Facial recognition software for access control, identification of criminal actors (IFF), etc.	authentication, firewalls, and fault-tolerant hardware, recurring professional third-party vulnerability assessments are recommended for data fusion systems.  ----- Emerging technology. Frequent releases of new and improved products.	69
13IT-00-SGNT* Software, Investigative, Signals Intelligence	Investigative software for collating and analyzing data from signals intelligence such as Pen Registers and wiretap management tools.	----- Consider compatibility with output from data sources such as Pen registers. See Item 13LE-00-SURV.  Use is guided by various statutes at federal and state level.	
<b>LE - Law Enforcement Equipment</b> 00			
13LE-00-SURV* Equipment, Law Enforcement Surveillance	Surveillance equipment, including electronic equipment such as Pen registers (equipment capable of capturing incoming and outgoing phone numbers, along with the duration of calls, without listening to the actual conversations).	----- Use is subject to the prohibitions contained in Title III of the Omnibus Crime and Control and Safe Streets Act of 1968 (the "Wiretap Act"), 18 U.S.C. 2510-2521.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 14 – Physical Security Enhancement Equipment

### Overview

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This section was created in the current edition to improve the alignment of the SEL with the DHS Authorized Equipment List (AEL). It contains items used to enhance the physical security of buildings and other infrastructure assets. These equipment items, when deployed, mitigate either the threat of an incident or its effects, and responders utilize or interact with many of these items in the course of response. The IAB is therefore incorporating these items into a new SEL section, and providing information on features and operating considerations for use by the responder community.

This section consists mainly of new items, with one item moved from Section 4 of the previous edition. The Interoperable Communication and Information System (ICIS) SubGroup and the Personal Protective and Operational Equipment (PP&OE) SubGroup have collaborated in providing support for this new section.

### Changes for 2007

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The following item has been moved from Section 4 into this section:

- System, Video Assessment, Security

The following new items have been added to this section:

- Barrier, Vessel
- Barrier: Fences; Jersey Walls
- System, Building, Blast/Shock/Impact Resistant
- System, Personnel Identification
- System, Vehicle Identification
- System, Fire Extinguisher Monitoring
- System/Sensors, Alarm
- System, Physical Access Control
- System, Radar
- System, Sonar
- Sensors and Alarms, Self-Monitoring
- Equipment, Hull Scanning
- Doors and Gates, Impact Resistant
- Lighting, Area, Fixed
- Receptacle, Trash, Bomb-Resistant

### Online Selection Factors

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No selection matrix has been formulated for this section.

## Section 14 | Physical Security Enhancement Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
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**EX - Explosion Protection**

14EX-00-BCAN* Receptacles, Trash, Bomb-Resistant	Explosive-resistant trash receptacles.	----- Consider direction in which energy will be dissipated in the event of detonation. This is usually vertical, which may not be appropriate for some environments.	
14EX-00-BSIR* Systems, Building, Blast/Shock/Impact Resistant	Systems to mitigate damage from blasts, shocks, or impacts, such as column and surface wraps, breakage/shatter resistant glass, and window wraps.		

**SW - Surveillance, Warning, Access/Intrusion Control**

14SW-01-ALRM* Systems/Sensors, Alarm	Systems and standalone sensors designed to detect access violations or intrusions using sensors such as door/window switches, motion sensors, acoustic sensors, seismic, and thermal sensors. May also include temperature sensors for critical areas.	Includes self-monitoring standalone sensors as well as integrated systems. May be integrated into access control system. ----- Consider backup power requirements.	
14SW-01-DOOR* Doors and Gates, Impact Resistant	Reinforced doors and gates with increased resistance to external impact for increased physical	→	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 14 | Physical Security Enhancement Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<p><b>SW - Surveillance, Warning, Access/Intrusion Control</b>                      01 - General - <i>Continued</i></p>			
14SW-01-EXTM*  System, Fire Extinguisher Monitoring	security.  System for monitoring the presence and inflation pressure of fixed-location fire extinguishers to ensure that they are usable and are not stolen for possible misuse.	May be integrated with alarm systems. See Item 14SW-01-ALRM.	
14SW-01-LITE*  Lighting, Area, Fixed	Fixed high-intensity lighting systems for improved visibility in areas such as building perimeters and surveillance zones.	Wall or pole mounted.	
14SW-01-PACS*  System, Physical Access Control	Locking devices and entry systems for control of physical access to facilities.	May be integrated with alarm system. Access logging. ----- Check that any data such as access logs is collected in a format compatible with other devices such as personal computers that might be used for data mining / analysis.	
14SW-01-SIDP*  Systems, Personnel Identification	Systems for positive identification of personnel as a prerequisite for entering restricted areas or accessing information systems.	May utilize multiple technologies including photo comparison, voiceprint, fingerprint, handprint, retinal scan, and interactive personal identification number (PIN) and cipher/code recognition system. See also Items 05AU-00-BIOM, 04AP-07-CRED. ----- Should include at least “two-factor” identification, e.g., two of the following: →	95

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.  
 \* Item has been moved or changed in the edition.

## Section 14 | Physical Security Enhancement Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
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SW - Surveillance, Warning, Access/Intrusion Control			
01 - General - Continued			

14SW-01-SIDV*	Systems for identification of vehicles, ranging from decals to radio frequency identification (RFID) or other transponder devices.	<p>1) Something you have (an access card)</p> <p>2) Something you know (a PIN number)</p> <p>3) Something you are (fingerprint).</p> <p>Designed for 24/7 unattended operation. Live tracking capability versus store-and-forward reporting. ----- Consider reporting frequency if system “reports” to remote location. Consider battery backup/ battery life.</p>	
14SW-01-SNSR*	Standalone sensors/alarms for use on critical systems or infrastructure items (security systems, power supplies, etc.) to provide warning when these systems fail or are near failure.	<p>May be tied to supervisory monitoring system. ----- If monitored remotely, these sensors should not utilize the same communications path/media as the system(s) being monitored.</p>	
14SW-01-VIDA*	Camera-based security systems utilizing standard, low light, or infrared technology.	<p>May be tape-based or digital. May be integrated with motion detection/alarm systems.</p>	
14SW-01-WALL*	Obstacles designed to channel or halt pedestrian or vehicle-borne traffic in order to protect a physical asset or facility.		

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 14 | Physical Security Enhancement Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<p>SW - Surveillance, Warning, Access/Intrusion Control 02 - Waterfront</p> <p>14SW-02-HSCN* Equipment, Hull Scanning</p>	<p>Devices or systems used to scan ship hulls for attached devices.</p>		
<p>14SW-02-RADR* Systems, Radar</p>	<p>Scanning systems for detection of objects such as vessels, personnel, and other objects.</p>	<p>Multiple display options, including color displays.</p> <p>----- Consider range, definition, and suitability for operating environment. Consider use of Doppler systems where relative movement is important or where environment produces excessive static return.</p>	
<p>14SW-02-SONR* Systems, Sonar</p>	<p>Includes several different types of underwater sound wave imaging:</p> <p>Imaging Sonar: A high-frequency sonar that produces video-like imagery using a narrow field of view. The sonar system can be pole-mounted over the side of a craft or hand-carried by a diver.</p> <p>Scanning Sonar: Consists of smaller sonar systems that can be mounted on tripods and lowered to the bottom of the waterway. →</p>		

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.  
\* Item has been moved or changed in the edition.

Section 14 | Physical Security Enhancement Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
SW - Surveillance, Warning, Access/Intrusion Control 02 - Waterfront	<p>Scanning sonar produces a panoramic view of the surrounding area and can cover up to 360 degrees.</p> <p>Side Scan Sonar: Placed inside of a shell and towed behind a vessel. Side scan sonar produces strip-like images from both sides of the device.</p> <p>3-Dimensional Sonar: Produces 3-dimensional imagery of objects using an array receiver.</p>		
14SW-02-VBAR* Barriers, Vessel	Deployable, modular systems for restricting the movement of vessels.		

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 15 – Inspection and Screening Systems

### Overview

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This section was created in the current edition to improve the alignment of the SEL with the DHS Authorized Equipment List (AEL). It contains detection items used primarily for inspection and screening purposes. While primarily preventive, in some cases these items may be deployed in the course of response (for example, in an attempt to locate and disarm secondary devices). The IAB is therefore incorporating these items into a new SEL section, and providing information on features and operating considerations for use by the responder community.

This section consists mainly of new items, with one item moved from Section 7 of the previous edition. The Detection and Decontamination (D&D) SubGroup has agreed to assist in supporting this section.

### Changes for 2007

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The following item has been moved from Section 7 into this section:

- Monitors, Portal

The following new items have been added to this section:

- Radar, Ground/Wall Penetrating
- Systems, Personnel/Package Screening

### Online Selection Factors

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No selection matrix has been formulated for this section.

## Section 15 | Inspection and Screening Systems

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>IN - Inspection Systems</b>			
15IN-00-RADR*	Radar systems designed to penetrate walls or ground to allow detection of hidden objects.		
Radar, Ground/Wall Penetrating			
<b>SC - Screening Systems</b>			
15SC-00-PMON*	Systems to scan vehicles/cargo for radioactive content. Various sizes for vehicles, packages (large and small) and pedestrians.	Fixed or portable. Beta, gamma and neutron detectors; varied configuration by manufacturer. ----- Require radiation source to verify operation. Calibration requires service contract. Sensitivity requirements. ICostRating: \$\$\$ MCostRating: \$\$ Training: extensive	74
Monitors, Portal			
15SC-00-PPSS*	Fixed systems such as walk-through magnetometers and conveyor-belt x-ray systems used to screen personnel and packages for hazardous materials/devices.		
Systems, Personnel/Package Screening			

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## Section 16 – Reserved

[This section corresponds to the AEL's *Agricultural Terrorism Prevention, Response, and Mitigation Equipment* Section. The Medical SubGroup is evaluating whether to add items from this section into the SEL in a future edition. The section number is reserved to maintain the section number correspondence of the remaining sections.]

## *Section 17 - CBRNE Prevention and Response Watercraft*

### *Overview*

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This section was created in the current edition as part of the Personal Protective and Operational Equipment (PP&OE) SubGroup's water operations initiative. In addition to new items in Sections 1 and 3, watercraft were added to the SEL for the first time. Because the AEL had an existing section for watercraft, the SubGroup placed their new watercraft items in a corresponding Section 17.

### *Changes for 2007*

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The following new items have been added to create this section:

- Watercraft, CBRNE Prevention and Response
- Boat, Dive
- Modifications/Accessories, Watercraft
- Watercraft, Patrol/Surveillance
- Watercraft, Search and Rescue

### *Online Selection Factors*

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No selection matrix has been formulated for this section.

## Section 17 | CBRNE Prevention and Response Watercraft

Item Number/Title WC - Watercraft 00	Description	Features/Operating Considerations	Standards <sup>1</sup>
17WC-00-BOAT* Watercraft, CBRNE Prevention and Response	Surface boats or vessels with appropriate specialized equipment, designed to perform prevention and response missions within port areas, waterways, dams, reservoirs, rivers, lakes, etc.	<p>Variety of types and sizes. See items in Section 17 for features and operating considerations relating to various mission types, such as search and rescue watercraft, dive boats, etc.</p> <p>-----</p> <p>Carefully review planned mission profiles, including expected weather and water conditions, to address key capabilities such as speed, range, load capacity, towing capability, draft, propulsion type(s), and ability to carry specialized tools and equipment.</p>	
17WC-00-DBOT* Boat, Dive	Specialized boat to serve as base for dive operations.	<p>Should facilitate diver egress and recovery. Should maneuver with either prop cages/guards, turbine drive, or jet drive to reduce the risk of diver injury. Hull should have minimum outlets/inlets on the bottom, and any such outlets/inlets should be securable during dive operations.</p> <p>-----</p> <p>Carefully review planned mission profiles, including expected weather and water conditions, to address key capabilities such as speed, range, load capacity, draft, propulsion type(s), and ability to carry specialized tools and equipment.</p>	
17WC-00-WCMA* Modifications/ Accessories, Watercraft	Watercraft modifications such as propeller guards.	<p>Propeller guards protect the propeller from damage and protect victims and rescuers from direct contact with a moving propeller in the water during a rescue. They encircle the propeller and are constructed of plastic or metal. The plastic guards will shatter and break when striking a solid stationary object thus transferring the impact force to the plastic guard and not the lower motor unit. The metal guard will not break and transfers the impact force to the lower motor unit.</p> <p>-----</p> <p>Victims and rescuers can still contact the propeller via an insertion in the front or rear. Only the sides are protected.</p>	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 17 | CBRNE Prevention and Response Watercraft

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
17WC-00-WCPS*	Watercraft, Patrol/Surveillance	Patrol watercraft with surveillance and light interdiction capability.	Hard points for mounting weapons. Consider water monitor 500 GPM for less-lethal method of turning small vessels, persuading swimmers to move, fire mitigation etc. ----- Carefully review planned mission profiles, including expected weather and water conditions, to address key capabilities such as speed, range, load capacity, towing capability, draft, propulsion type(s), and ability to carry specialized tools and equipment.	
17WC-00-WCSR*	Watercraft, Search and Rescue	Watercraft designed for use in search and rescue operations, including both inflatable and rigid designs.	There are numerous types of watercraft available for water-based SAR, including Rigid Hulled Boats, “V” Hulled Boats, Inflatable Boats, Inflatable Rescue Boats (IRB), Rigid Hulled Inflatable Rescue Boats (RHIB), Flat Bottom or Jon Boats, and Wave Runners or Aquatic Rescue Craft (ARC). ----- The type(s) of potential operating environment(s) should drive the selection of a search and rescue water craft. Carefully review planned mission profiles, including weather and water conditions, to address key capabilities such as speed, range, load capacity, towing capability, draft, propulsion type(s), and ability to carry specialized tools and equipment. Each type of SAR water craft has specific limitations and advantages in different water environments. Usually, multiple types of watercraft are needed in a jurisdiction for use in different water environments.  An SAR watercraft should always have at least two types of propulsion: primary and secondary. Types of propulsion include traditional propeller with propeller guard (inboard or outboard motor), jet drive, pump jet or shrouded turbine, paddles, and oars.  See also 03WA-02-BORD for smaller SAR craft such as river rescue boards or ice rescue sleds.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 18 - CBRNE Aviation Equipment

### Overview

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This section was created in the current edition as part of the Personal Protective and Operational Equipment (PP&OE) SubGroup's expansion of operational equipment. Because the AEL had an existing section for aviation equipment, the SubGroup placed their new Aircraft CBRNE Equipment and Upgrades item in a corresponding Section 18. The previous Section 3 item for Aircraft Mass Casualty Conversion Equipment/Kits was updated to include both fixed and rotary-wing aircraft, and moved to this section.

### Changes for 2007

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The following item has been moved from Section 3 into this section:

- Equipment/Kits, Aircraft Mass Casualty Conversion

The following new items have been added to this section:

- Aircraft, CBRNE
- Equipment and Upgrades, Aircraft, CBRNE

### Online Selection Factors

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No selection matrix has been formulated for this section.

## Section 18 | CBRNE Aviation Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
18AC-00-ACFT* Aircraft, CBRNE	Special-purpose fixed-wing aircraft, helicopters, and air-safety containers for CBRNE terrorism prevention, response, mitigation and/or remediation. Includes modifications/upgrades to existing aircraft.	See item 18AC-00-ACUP for features and operating consideration regarding modifications/upgrades to aircraft.	
18AC-00-ACMC* Equipment/Kits, Aircraft Mass Casualty Conversion	Equipment used to convert and use non-medical aircraft (fixed or rotary-wing) for patient transport.	Conversion kits should be easy to store and assemble. ----- Ability to carry and secure patients on litters, and medical supplies and equipment needed during patient transport. Includes mechanism(s) for patient restraint as well as for securing devices that are used for carrying non-ambulatory patients. Ability to communicate with regulating and receiving authorities. Provision of privacy and screening from public view. Compatible and interoperable with other local health, medical and transportation system assets.	88, 89
18AC-00-ACUP* Equipment and Upgrades, Aircraft, CBRNE	Specialized navigational, communications, safety, and operational equipment necessary for CBRNE prevention, response and/or recovery, such as aviation GPS system, air-ground communications system, night vision	----- Consider requirements for FAA Supplemental Type Certificate (STC) when equipment is integrated with aircraft.  Consider mission and performance requirements, as well as weight and balance impact.  Consider compatibility with personal protective equipment to be worn by flight crew / passengers.  →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 18 | CBRNE Aviation Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
AC - Aircraft 00 - <i>Continued</i>	kit, observation platform, fast-rope gantry, etc.		

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.  
\* Item has been moved or changed in the edition.

## Section 19 - CBRNE Logistical Support Equipment

### Overview

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This section was created in the current edition to improve the alignment of the SEL with the DHS Authorized Equipment List (AEL). Because the AEL had an existing section for logistical support equipment, the Personal Protective and Operational Equipment (PP&OE) SubGroup approved separating this equipment from the operational and search and rescue equipment in Section 3. This section also involved collaboration with the Medical SubGroup, which moved the refrigerator/freezer item from Section 9 and consolidated the refrigeration requirements to ensure that the necessary features and operating considerations to support storage of medication and vaccines were included.

### Changes for 2007

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The following items have been moved from Section 3 to create this section:

- Bags/Packs
- Bags, Bivy/Sleeping
- Compressors and Systems, Breathing Air
- Fan, Intrinsically Safe, Exhaust
- Fan, Cooling/Heating/Ventilation
- Container, Fuel Storage
- System, Water Distribution
- System, Water Purification
- Housing, Subsistence and Sanitation
- System, Public Address, Handheld
- Overpack
- Refrigerator/Freezer
- Equipment, Bulk Material Handling
- Cart, Field
- Containers, Hazardous Material Shipping
- Containers, Storage
- Carts, Portable Air Cylinder
- Carts, Portable Compressed Gas Cylinder
- Systems, Shelter, Rapid Deployment
- System, Environmental Control
- System, Collective Protective

The following items have been moved from Section 9 to create this section:

- Refrigerator

The following items have been added in this edition:

- Monitors/Recorders, Temperature and Humidity

### Online Selection Factors

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No selection matrix has been formulated for this section.



## Section 19 | CBRNE Logistical Support Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
19GN-00-BGPK* Bags / Packs	Carry bags or wearable packs for storage and transportation of personal gear and equipment, personal protective equipment, and miscellaneous equipment.	Water and mildew resistant; decontaminable; machine washable; secure closure. ----- Modular construction and configurations to meet varying mission needs. Appropriate size for contents and intended use. Depending upon use, consider protection capability for items to be moved.	
19GN-00-BIVY* Bags, Bivy/Sleeping	Bags and bivys - individual sleeping systems, including storage bag or “stuff sacks”.	Water and mildew resistant; machine washable; zipper closure. ----- Personal bags and bivys may be required to support personnel on extended operations.	49, 115
19GN-00-COMP* Compressors and Systems, Breathing Air	Air compressor or cascade system suitable for refilling self-contained breathing apparatus (SCBA) or self-contained underwater breathing apparatus (SCUBA) cylinders. Output must be compliant with NFPA 1989, Standard on Breathing Air Quality for Fire and Emergency Services and Respiratory Protection.		
19GN-00-FANE* Fans	Intrinsically safe exhaust fan for ventilation of con-	Positive or negative pressure. ----- →	123

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 19 | CBRNE Logistical Support Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
GN - General 00 - Continued				
Fan, Intrinsically Safe, Exhaust	fined spaces or enclosed areas with contaminated atmospheres.	Intrinsically safe equipment is defined as “equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration.” (ISA-RP12.6)	Products should be listed in accordance with NFPA 70.  Concerns regarding discharge air. If exhausting gases and vapors from an enclosed area, consideration should be given to the target discharge area, and possible recirculation of the exhaust gases should be considered.	
19GN-00-FANV*	For personnel and decontamination tent use. Not for use in explosive environments.	-----	For use in rehab and staging areas not requiring personal protective equipment.	
19GN-00-FUEL* Container, Fuel Storage	Portable and transportable containers for various fuels, including gasoline, diesel, etc.	----- CFR Title 49 compliance. Performance Oriented Packaging requirements.		64, 68
19GN-00-H2OD* System, Water Distribution	Mobile systems and equipment for the transport and distribution of potable or non-potable water. Includes pumping systems, piping, and storage containers with spigots or other facilities	----- May be transportable by truck or designed with integral trailer. Systems exist for transport and local distribution. Transport distances will vary with conditions and relative elevation of source and destination. ----- Consider fuel requirements and exhaust limitations (e.g., Clean-Air requirements) for diesel/gasoline powered systems, or electrical requirements as appropriate. Consider throughput capacity against mission requirements. →		

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 19 | CBRNE Logistical Support Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
GN - General 00 - Continued			
19GN-00-H2OP* System, Water Purification	for filling personal containers.	Potable systems must be certified as potable. Systems are not rapidly interchangeable between potable and non-potable. Once a system is used for non-potable, it will require conditioning (at a minimum) before use for potable transport, and may not be reusable for potable at all.	
19GN-00-H2OP* System, Water Purification	Portable system for producing potable water, with integrated pump; battery or AC powered.	Portable; integral pump. Auto-shutoff upon compromise of purification. ----- Minimum desirable output 30-60 GPH. Potable-certified bladders or containers appropriate for potable water will be required for output. Consider distribution system plumbing requirements.	
19GN-00-HSSF* Housing, Subsistence and Sanitation	Housing for response forces (e.g. tents, shelters, rehab trailers), subsistence and sanitation (field support).	Tents and sheltering equipment to allow for the development of a base of operations. This would include shelter, feeding and sanitation, portable HVAC. ----- Consider lighting, plumbing, and electrical support requirements.	
19GN-00-MEGA* System, Public Address, Handheld	Battery powered megaphone / public address system with corded microphone.	Variable volume control.	
19GN-00-OPCK* Overpack	Overpack container, used to consolidate a load or facilitate handling of packages or cargo.	May be plastic or metal with or without liners. ----- Compatible with overpacked product. Not for use as a primary hazardous materials container, but may be used to consolidate or facilitate handling of hazardous materials containers and/or evidence during transport.	55, 65

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 19 | CBRNE Logistical Support Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
GN - General 00 - Continued			
19GN-00-RFGR*  Refrigerator/Freezer	Refrigerator/freezer for maintaining temperature control (cooling) for pharmaceuticals, vaccines, reagents, samples, or evidence.	Frost-free desirable for transporting glass containers of water with evidence or samples. May include temperature monitoring feature with capabilities similar to those described in 19GN-00-RFMN. May use internal battery, external DC, or external AC power. ----- Check capability to maintain and control temperature if used for medications, vaccines or temperature-sensitive reagents. See 19GN-00-RFMN for monitoring devices which should be used for vaccines or other items with critical preservation temperatures.  Some pharmaceuticals, reagents, and evidence may require different storage temperature ranges. In some cases, separate refrigeration areas may be required to avoid cross-contamination or to meet differing storage requirements.  Voltage requirement: 12v, 24v, 110v, 220v. If not battery powered, may require generator for use in remote locations (see 10GE-00-GENR).	123
19GN-00-RFMN*  Monitors/ Recorders, Temperature and Humidity	Devices used to continuously monitor the temperature and/or humidity of a storage area or refrigeration device to ensure that contents do not exceed storage limits.	Available as fixed units or disposable units (for transportation). Various extra features available, such as digital displays, alarms, outputs for remote monitoring, multiple probes, etc. ----- Consider compatibility (fit, power requirements, etc.) with refrigeration unit or storage area of intended use. If battery powered, check type, life, and availability of batteries, and establish strict battery change schedule to prevent gaps in coverage. See also 19GN-00-RFGR.	
<b>MH - Material Handling Equipment</b> 00			
19MH-00-BULK*	Equipment for movement of bulk material, including	----- Suitability for intended use (i.e., pallets must fit into existing trucks, etc.).	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

Section 19 | CBRNE Logistical Support Equipment

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>MH - Material Handling Equipment</b>				
<i>00 - Continued</i>				
Equipment, Bulk Material Handling		pallets, pallet lifting and movement devices such as portable forklifts, dollies, rigging, cargo netting, and loading ramps.	Compatibility of tiedown and material securing devices with platforms. → Compatibility and interoperability with local health and medical supply system.	
19MH-00-CART*		Field cart for transporting tools, equipment, or personnel.	Flat bed; pneumatic tires. ----- Suitability for use on rough ground, pavement or gravel; compatibility with equipment storage/transportation systems. Rough ground may require tie down devices.	
Cart, Field				
19MH-00-CHMS*		Hazardous material shipping containers.	Chemically compatible with shipped materials. CFR Title 49 compliant. ----- May be required for liquids, solids, aerosols, or cylinders.	63, 64
Containers, Hazardous Material Shipping				
19MH-00-CONT*		Storage containers.	Rigid; reusable; stackable, with lifting handles. Removable or hinged lids. ----- At least one lifting handle for each 50 lbs of storage capacity.	
Containers, Storage				
19MH-00-CPAC*		Portable air cylinder carts for carrying spare breathing air cylinders to forward locations.	Chain or brackets to secure cylinders. ----- Consider terrain of intended use. Pneumatic tires may be preferable for certain areas.	
Carts, Portable Air Cylinder				
19MH-00-CPGC*		Portable carts for transporting gas cylinders (not	Pneumatic tires; chain or brackets for securing cylinders; retractable dolly wheels. ----- →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 19 | CBRNE Logistical Support Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>MH - Material Handling Equipment</b> 00 - <i>Continued</i>			
Carts, Portable Compressed Gas Cylinder	breathing air) to forward locations.	Suitable for operation on rough or uneven ground; able to accommodate various diameters and lengths of cylinder.	
<b>SS - Shelter Systems</b> 00			
19SS-00-SHEL* Systems, Shelter, Rapid Deployment	Rapidly deployable shelter systems, hardwall or softwall (command and control, triage, evidence protection, etc.).	May be designed in a wide variety of styles such as inflatable, framed, etc. ----- Time and human resources needed for deployment. Weight, storage requirements, shelf-life, and maintenance are all operational considerations. Consider environmental control (HVAC) requirements based upon environmental factors.	
19SS-00-SHEN* System, Environmental Control	Environmental control system for shelters.	High efficiency particulate and organic vapor filtration. ----- Consider life expectancy of filter system, filtration capacity, maximum operating concentration, and CFM (cubic feet/minute) rating.	
19SS-00-SHEP* System, Collective Protective	An integrated system for providing collective protection against radiological, chemical, and biological threats.	Must include appropriate air filtration and positive pressure. ----- Consider portability, deployment time, and ease/difficulty of deployment.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 20 – Intervention Equipment

### Overview

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This section was created in the current edition to improve the alignment of the SEL with the DHS Authorized Equipment List (AEL). The Personal Protective and Operational Equipment (PP&OE) SubGroup and Interoperable Communications and Information Systems (ICIS) SubGroup each moved an item into this section.

### Changes for 2007

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The following item has been moved from Section 3 to this section:

- Equipment, Tactical Entry

The following item has been moved from Section 4 to this section:

- Equipment, Fingerprint Processing and Identification

### Online Selection Factors

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No selection matrix has been formulated for this section.

## Section 20 | Intervention Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>FP - Fingerprint Processing and Identification</b>			
20FP-00-AFIS* Equipment, Fingerprint Processing and Identification	Equipment for fingerprint processing, including Automated Fingerprint Identification System (AFIS) interface equipment.	Electronic capture. Integration into local, state and/or Federal identification systems. Mobile wireless collection device.	
<b>TE - Tactical Entry Equipment</b>			
20TE-00-NTRY* Equipment, Tactical Entry	Tactical entry equipment. Does not include explosive material or weapons.	----- For explosive tactical entry equipment, see Item 02EX-00-EXEN.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.



## *Section 21 – Other Authorized Equipment*

### *Overview*

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This section was created in the current edition to improve the alignment of the SEL with the DHS Authorized Equipment List (AEL). Even though it is entitled “Other Authorized Equipment”, this section is in fact used by the AEL for items such as consulting services, shipping charges, and sales tax that do not fit in any of the normal equipment categories. Since maintenance packages/contracts are also not “equipment” per se, the Personal Protective and Operational Equipment (PP&OE) SubGroup chose to move the maintenance item from the Operational Equipment section into Section 21. That is currently the only SEL item in this section.

### *Changes for 2007*

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The following item has been moved from Section 3 to this section:

- Maintenance

### *Online Selection Factors*

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No selection matrix has been formulated for this section.

Section 21 | Other Authorized Equipment

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
GN - General 00			
21GN-00-MAIN* Maintenance	Vehicle and equipment maintenance packages.	----- Maintenance packages must be consistent with equipment manufacturer's recommendations.	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Standards List

The list on the following pages is referenced by item number from multiple sections of the SEL. In addition to its number, each item on the list has two annotations:

- Type, which will be either Adopted or “R” for Reference Only. Adopted standards are those that have been formally adopted by the IAB (see discussion in the Standards Coordinating Committee section of the 2003 IAB Annual Report). All other standards are included for reference only.
- Use/Care, which distinguishes standards for the use and care of personal protective equipment, as opposed to product certification standards. Such standards will be identified by “y” in the Use/Care column,

Each standard in this list also has a corresponding record in the Responder Knowledge Base ([www.rkb.mipt.org](http://www.rkb.mipt.org)). The online records contain a summary description of the standard, the promulgating organization, and one or more links through which the standard may be viewed or purchased.

ID	Standard Name	Use/Care <sup>1</sup>	Type <sup>2</sup>
1	21 CFR (Several Standards apply) FDA. Local standards for EMS and facility patient management equipment should be used.		R
2	21 CFR 862.1345 (FDA), Glucose test system		R
3	21 CFR 868.1400 (FDA), Carbon Dioxide Gas Analyzer		R
4	21 CFR 868.1930 (FDA), Stethoscope head		R
5	21 CFR 868.5630 (FDA), Nebulizer		R
6	21 CFR 868.5895 (FDA), Performance Standard for Continuous Ventilator (Respirator)		R
7	21 CFR 868.5915 (FDA), Manual emergency ventilator		R
8	21 CFR 870.1025 (FDA), Arrhythmia detector and alarm		R
9	21 CFR 870.1120 (FDA), Blood pressure cuff		R
10	21 CFR 870.2700 (FDA), Oximeter		R
11	21 CFR 870.2800 (FDA), Medical magnetic tape recorder		R
12	21 CFR 870.5300 (FDA), DC-defibrillator (including paddles)		R
13	21 CFR 872.6770 (FDA), Cartridge syringe		R
14	21 CFR 874.4770 (FDA), Otoscope		R
15	21 CFR 876.1500 (FDA), Endoscope and accessories		R
16	21 CFR 876.5980 (FDA), Gastrointestinal tube and accessories		R
17	21 CFR 878 (FDA) (multiple sections apply)		R
18	21 CFR 878.3900 (FDA), Inflatable extremity splint		R
19	21 CFR 878.3910 (FDA), Non-inflatable extremity splint		R
20	21 CFR 878.4040 (FDA), Surgical apparel		R
21	21 CFR 878.4460 (FDA), Surgeon's glove		R

<sup>1</sup> “Y” indicates standard for the use or care of personal protective equipment - not a certification standard.

<sup>2</sup> IAB [A]dopted Standard or [R]eference Only Standard

## Standards List - Continued

ID	Standard Name	Use/Care <sup>1</sup>	Type <sup>2</sup>
22	21 CFR 878.4490 (FDA), Absorbable hemostatic agent and dressing		R
23	21 CFR 878.4780 (FDA), Powered suction pump		R
24	21 CFR 878.4800 (FDA), Manual surgical instrument for general use		R
25	21 CFR 880 (FDA) (multiple sections apply)		R
26	21 CFR 880.2900 (FDA), Colormetric		R
27	21 CFR 880.2910 (FDA), Electronic		R
28	21 CFR 880.2920 (FDA), Mercury		R
29	21 CFR 880.5025 (FDA), IV Bag Container		R
30	21 CFR 880.5200 (FDA), IV Catheter		R
31	21 CFR 880.5240 (FDA), Medical adhesive tape and adhesive bandage		R
32	21 CFR 880.5420 (FDA), Pressure infusor for an I.V. bag		R
33	21 CFR 880.5440 (FDA), Administration Set (All Components)		R
34	21 CFR 880.5725 (FDA), Infusion pump		R
35	21 CFR 880.5860 (FDA), Piston syringe		R
36	21 CFR 880.6230 (FDA), Tongue depressor		R
37	21 CFR 880.6250 (FDA), Patient examination glove		R
38	21 CFR 880.6740 (FDA), Vacuum-powered body fluid suction apparatus		R
39	21 CFR 880.6760 (FDA), Protective restraint		R
40	21 CFR 880.6820 (FDA), Medical disposable scissors		R
41	21 CFR 880.6900 (FDA), Hand-carried stretcher		R
42	21 CFR 880.6910 (FDA), Wheeled stretcher		R
43	21 CFR 886.1570 (FDA), Ophthalmoscope		R
44	21 CFR 886.4360 (FDA), Ocular surgery irrigation device		R
45	21 CFR 898 (FDA), Performance Standard for Electrode Lead Wires and Patient Cables		R
46	29 CFR 1910.1030 (OSHA), Bloodborne Pathogens		R
47	29 CFR 1910.120 (OSHA), Hazardous Waste Operations and Emergency Response.	Y	R
48	29 CFR 1910.132 (OSHA), General Requirements, PPE	Y	R
49	29 CFR 1910.134 (OSHA), Respiratory Protection	Y	R
50	29 CFR 1910.135 (OSHA), Head Protection	Y	R
51	29 CFR 1910.138 (OSHA), Hand Protection	Y	R

<sup>1</sup> "Y" indicates standard for the use or care of personal protective equipment - not a certification standard.

<sup>2</sup> IAB [A]dopted Standard or [R]eference Only Standard

## Standards List - Continued

ID	Standard Name	Use/Care <sup>1</sup>	Type <sup>2</sup>
52	29 CFR 1910.146 (OSHA), Permit-Required Confined Spaces		
53	29 CFR 1910.147 (OSHA), The Control of Hazardous Energy (Lockout/Tagout)		R
54	29 CFR 1910.95 (OSHA), Occupational Noise Exposure		R
55	40 CFR 264 (EPA), Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities		R
56	42 CFR 84 (NIOSH), Respiratory Protective Devices		R
57	42 CFR 84 (NIOSH), with Air-Purifying Escape Respirator (APER) CBRN Statement of Standard; NPPTL Letter dated October 8, 2003		A
58	42 CFR 84 (NIOSH), with APR CBRN Statement of Standard; NPPTL Letter dated April 4, 2003		A
59	42 CFR 84 (NIOSH), with Powered Air-Purifying Respirator (PAPR) CBRN Statement of Standard dated October 6, 2006		A
60	42 CFR 84 (NIOSH), with SCBA CBRN Statement of Standard; NPPTL Letter dated December 28, 2001		A
61	42 CFR 84 (NIOSH), with Self-Contained Escape Respirator (SCER) CBRN Statement of Standard; NPPTL Letter dated October 8, 2003		A
62	47 CFR 90 (FCC), Private Land Mobile Radio Services		R
63	49 CFR 172.101 (DOT) Purpose and use of hazardous materials table.		R
64	49 CFR 173 (DOT), General Requirements for Shipments and Packages	Y	R
65	49 CFR 173.3 (DOT), Packaging and Exceptions	Y	R
66	49 CFR 178, Specifications for Packaging	Y	R
67	Advanced Encryption Standard (AES), Data Encryption Standard (DES), and Triple Data Encryption (3-DES) (NIST)		R
68	ANSI F852-99e1, Standard Specification for Portable Gasoline Containers for Consumer Use		R
69	ANSI INCITS 385-2004, Face Recognition Format for Data Interchange		R
70	ANSI N42.14, Calibration and Use of Germanium Detectors for the Measurement of Gamma-Ray Emission Rates of Radionuclides.		R
71	ANSI N42.32, Performance Criteria for Alarming Personal Radiation Detectors for Homeland Security		A
72	ANSI N42.33, Portable Radiation Detection Instrumentation for Homeland Security		A
73	ANSI N42.34, Performance Criteria for Hand-held Instruments for the Detection and Identification of Radionuclides		A

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<sup>2</sup> IAB [A]dopted Standard or [R]eference Only Standard

## Standards List - Continued

ID	Standard Name	Use/Care <sup>1</sup>	Type <sup>2</sup>
74	ANSI N42.35, Evaluation and Performance of Radiation Detection Portal Monitors for Use in Homeland Security		A
75	ANSI Z87.1 Occupational and Educational Personal Eye and Face Protection Devices		A
76	ANSI Z89.1, Industrial Head Protection, 2003 Edition		A
77	ANSI/Compressed Gases Association Specification G-7.1, Commodity Specification for Air, Edition 5, 2004		R
78	ANSI/ISEA 102-1990, Gas Detector Tube Units - Short-Term Type for Toxic Gases and Vapors in Working Environments		R
79	ANSI/ISEA 105, Hand Protection Selection Criteria, 2005 Edition		A
80	ANSI/ISEA 107, High Visibility Safety Apparel, 2004 Edition		A
81	ANSI/ISEA 207, High Visibility Public Safety Vests, 2006 Edition		R
82	AOAC Test Methods for Handheld Bio Detectors		A
83	ASTM D4490, Measuring the Concentration of Toxic Gases or Vapors Using Detector Tubes		R
84	ASTM F1052-97 (2002), Standard Test Method for Pressure Testing Vapor Protective Ensembles	Y	R
85	ASTM F1556-94, Standard Guide for Spinal Immobilization and Extrication (Spined) Device Characteristics (2002)		R
86	ASTM F2020-02a, Standard Practice for Design, Construction, and Procurement of Emergency Medical Services Systems (EMSS) Ambulances		R
87	ASTM F2300-05, Standard Test Method for Measuring the Performance of Personal Cooling Systems Using Physiological Testing		R
88	ASTM F2318-04, Standard Specification for Rotary Wing Basic Life Support		R
89	ASTM F2319-04, Standard Specification for Fixed Wing Basic Life Support		R
90	CGA E-4, 4th Edition, Standard for Gas Pressure Regulators, Compressed Gas Association, 2002		R
91	CGA E-7, 2nd Edition, Standard for Medical Gas Regulators and Flowmeters, Compressed Gas Association, 1998		R
92	CGA G-4.1, 5th Edition, Cleaning Equipment for Oxygen Service, Compressed Gas Association, 2004		R
93	Federal Food, Drug and Cosmetic Act		R
94	Federal Information Processing Standard (FIPS) 140-2, Security Requirements for Cryptographic Modules, 2001		R

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<sup>2</sup> IAB [A]dopted Standard or [R]eference Only Standard

## Standards List - Continued

ID	Standard Name	Use/Care <sup>1</sup>	Type <sup>2</sup>
95	Federal Information Processing Standard (FIPS) 201-1, Personal Identity Verification (PIV) of Federal Employees and Contractors, 2006		R
96	Global Justice XML Data Model (DOJ)		A
97	Guidelines for Design and Construction of Hospital and Health Care Facilities, 2001 (American Institute of Architects and the Facilities Guidelines Institute)		R
98	Guidelines for Environmental Infection Control in Health-Care Facilities, 2003 (CDC and the Healthcare Infection Control Practices Advisory Committee)		R
99	IEEE 802.11b-1999 (R2003) Supplement to 802.11-1999, Wireless LAN MAC and PHY specifications: Higher speed Physical Layer (PHY) extension in the 2.4 GHz band.		R
100	IEEE 802.11g-2003 Amendment to IEEE Std 802.11, 1999 Edition (Reaff 2003) IEEE Standard for Information technology.		R
101	KKK-A-1822E, Federal Specification for the Star-of-Life Ambulance		R
102	National Institute for Justice (NIJ) and the Department for Homeland Security (DHS) are currently funding the development of an NIJ Standard for bomb suits. This standards development process is being managed by the NIST-Office for Law Enforcement Standards		R
103	NFPA 10, Standard for Portable Fire Extinguishers, 2002 Edition		R
104	NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, 2007 Edition	Y	R
105	NFPA 1581, Standard on Fire Department Infection Control Program, 2005 Edition	Y	R
106	NFPA 1851, Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles, 2001 Edition	Y	A
107	NFPA 1852, Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus, 2002 Edition	Y	A
108	NFPA 1936, Standard on Powered Rescue Tools, 2005 Edition		A
109	NFPA 1951, Standard on Protective Ensembles for Technical Rescue Operations, 2007 Edition		A
110	NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition		A
111	NFPA 1975, Standard on Station/Work Uniforms for Fire and Emergency Services, 2004 Edition		A
112	NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services, 2007 Edition		A

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<sup>2</sup> IAB [A]dopted Standard or [R]eference Only Standard

## Standards List - Continued

ID	Standard Name	Use/Care <sup>1</sup>	Type <sup>2</sup>
113	NFPA 1982, Standard on Personal Alert Safety Systems (PASS), 2007 Edition		A
114	NFPA 1983, Standard on Life Safety Rope and Equipment for Emergency Services, 2006 Edition		A
115	NFPA 1989, Standard on Breathing Air Quality for Fire and Emergency Services Respiratory Protection, 2003 Edition		R
116	NFPA 1991, Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies, 2005 Edition		A
117	NFPA 1992, Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies, 2005 Edition		A
118	NFPA 1994, Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents, 2007 Edition		A
119	NFPA 1999, Standard on Protective Clothing for Emergency Medical Operations, 2003 Edition		A
120	NFPA 2112, Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire, 2007 Edition		A
121	NFPA 2113, Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire, 2007 Edition	Y	A
122	NFPA 30, Flammable and Combustible Liquids Code, 2003 Edition		R
123	NFPA 70, National Electric Code, 2005 Edition		R
124	NIJ Guide 100-01, Selection and Application Guide to Personal Body Armor, 2001	Y	A
125	NIJ Interim Requirements for Bullet-Resistant Body Armor		A
126	NIJ Standard 0104.02, Riot Helmets and Face Shields		R
127	NIJ Standard 0106.01, Ballistic Helmets, December 1981		R
128	NIJ Standard 0108.01, Ballistic Resistance Protective Materials		R
129	NIST SP 800-31, Intrusion Detection Systems (IDSs)		R
130	NIST SP 800-36, Guide to Selecting Information Security Products		R
131	NIST SP 800-40, Version 2.0, Creating a Patch and Vulnerability Management Program (November, 2005)		R
132	NIST SP 800-41, Guidelines on Firewalls and Firewall Policy		R
133	NIST SP 800-44, Guidelines on Securing Public Web Servers		R
134	NIST SP 800-45, Guidelines on Electronic Mail Security		R

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<sup>2</sup> IAB [A]dopted Standard or [R]eference Only Standard



*Standards List - Continued*

<b>ID</b>	<b>Standard Name</b>	<b>Use/Care<sup>1</sup></b>	<b>Type<sup>2</sup></b>
135	NIST SP 800-46, Security for Telecommuting and Broadband Communications		R
136	NIST SP 800-47, Security Guide for Interconnecting Information Technology Systems		R
137	NIST SP 800-48, Wireless Network Security 802.11, Bluetooth and Handheld Devices		R
138	NIST SP 800-83, Guide to Malware Incident Prevention and Handling (November, 2005)		R
139	NSF/ANSI 5-2000, Water Heater, Hot Water Support Boiler, 2000		A
140	NVLAP program (NIST) currently provides accreditation for several different types of whole body and extremity dosimeters		R
141	Title 21 USC, Controlled Substances Act, Section 812		R
142	UL 913, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations, 2003		A

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<sup>2</sup> IAB [A]dopted Standard or [R]eference Only Standard

