Designation: E2739 – 10

Standard Specification for Personnel Decontamination System to be Used During a Chemical Event[1]

This standard is issued under the fixed designation E2739; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification is used to standardize the personnel decontamination systems used by the Homeland Defense Community to ensure the system characteristics are matched to the Homeland Defense Community needs. These personnel decontamination systems are not intended to be used for the decontamination for any other surface or material.

1.2 Also, these personnel decontamination systems are intended to be portable and easy to use by the Homeland Defense Community during a chemical event.

1.3 This specification is based on those issues associated with a chemical event only. It is recognized that personnel decontamination associated with a radiological or a biological event, or both, will be similar, those events have not been considered and issues that may differ with respect to chemical decontamination are outside the scope of this standard specification.

1.4 Personnel processed through decontamination systems certified under this standard may still require medical treatment because of the chemical exposure.

1.5 The amount of processing that personnel will be required to undergo while being decontaminated will be specified by the manufacturer's operating instructions.

1.6 Within the U.S. Homeland Defense Community, the familiarity and use of English units currently prevails. Equipment manufactured under this standard for use in the United States should consider English units for control panels, connections, system interfaces, etc. For this standard specification, the English units are provided as standard with the equivalent SI units in paraentheses.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E1799 Practice for Visual Inspections of Photovoltaic Modules

E2202 Practice for Measurement of Equipment-Generated Continuous Noise for Assessment of Health Hazards

E2411 Specification for Chemical Warfare Vapor Detector (CWVD)

E2542 Specification for Portable Water Heaters Used at Personnel Decontamination Stations

E2543 Specification for Portable Air Heaters Used at Personnel Decontamination Stations and Shelters

2.2 *NFPA Standards:*[3]

NFPA 70 National Electrical Code

2.3 *NIST Standards:*[4]

NIST SP - 960-12 Stopwatch and Timer Calibrations

2.4 *EPA Standards:*[5]

Acute Exposure Guideline Levels (AEGLs)

3. Terminology

3.1 *Definitions:*

3.1.1 *decontamination, n*—process of reducing or eliminating the hazards associated with chemical contamination for personnel to include absorption, neutralization, and physical removal of the chemical contaminant.

3.1.2 *decontamination system, n*—all of the equipment required to reduce the chemical contamination on personnel leaving the contaminated area to below levels that could cause harm to themselves, others, or the environment.

[1] This specification is under the jurisdiction of ASTM Committee E54 on Homeland Security Applications and is the direct responsibility of Subcommittee E54.03 on Decontamination.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, http://www.nfpa.org.

[4] Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, http://www.nist.gov.

[5] Available from United States Environmental Protection Agency (EPA), Ariel Rios Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, http://www.epa.gov.

4. Significance and Use

4.1 This specification describes the information for manufacture and deployment of a personnel decontamination system that is intended to be portable and easy to use during a chemical event recovery.

4.2 The decontamination system based on this specification will meet the requirements for processing personnel at a minimum required rate.

4.3 The decontamination system that addresses the requirements of this specification will be compatible with the medical requirements that may by associated with treatment for chemical exposures.

5. Classification

5.1 Personnel decontamination systems shall be classified by the number of personnel that can be decontaminated per hour by the system under the criteria set by this standard.

5.2 The system shall also be classified as to its primary mode of transport, that is, self-propelled, trailer-mounted, pallet-mounted, on and off-road capable, on-road capable only.

6. Materials and Manufacture

6.1 The materials of construction of the personnel decontamination system shall be easily cleaned of surface mud and grime with no degradation of the unit's ability to perform its function. Additionally, the system components shall be rugged enough to withstand the expected operating environment for the number of operations specified in this standard.

6.2 The preferred fuels for the personnel decontamination system are diesel fuel, gasoline, or bottled propane gas. If electricity is used, the requirement shall be no more than: 120 V, 50 Amps, single phase. Additionally, the equipment shall conform to NFPA 70 for outdoor usage.

7. Mechanical Properties

7.1 The system shall be able to be set-up, operated for a minimum of 12 h (to simulate the amount of time required until additional support arrives under mutual aid agreements) and re-stowed for the next operation a minimum of four times before any system requires more maintenance than end-user maintenance.

7.2 The system that has not been operated shall not be required to have any user maintenance for a period of at least 6 months.

7.3 The system operators shall have the following displays available to them so they can monitor the equipment's operations (the display's units of measure shall be described in the purchase documents, including the equipment specification plates): Operating Temperature for any of the unit's motors; Inlet and Outlet Temperature for the liquids supplied to clean the personnel passing through the system; Operating Pressure for the decontamination fluid supplied to clean the personnel passing through the system; Fluid Level gages; Fuel Level gages. Additionally, if the personnel decontamination system is powered by electricity, the Input and Output Amperage and Voltage shall also be displayed. Each of these displays shall have a user adjustable high level and low level alarms. The alarms will be visual and audible and be able to be silenced by the operator. If the audible alarm has been silenced by the operator, the visual alarm shall remain active until the alarm condition has been corrected.

7.4 All user adjustable operating parameters will be able to have pre-set conditions to facilitate the initial set-up and operation of the personnel decontamination system. The set-points for these operating conditions must be able to be adjusted by the equipment operators during the course of the operation so equipment performance can be matched to the actual operations.

8. Performance Requirements

8.1 Personnel decontamination systems shall be able to process an individual who has been contaminated with chemical material so that once the person has completed processing the person's residual contamination shall be below the following levels:

(a) AEGL-2 (8-h) level of airborne detectable chemical material for mass personnel decontamination

(b) AEGL-1 (8-h) level of airborne detectable chemical material for personnel decontamination prior to entering a medical treatment facility.

(c) If a person has been contaminated with multiple chemical materials, then all chemical materials shall be decontaminated to below the AEGL-1 (8-h) level.

8.2 Once the personnel decontamination system arrives on site, it shall be capable of being fully assembled and ready to receive personnel for decontamination within 20 min.

8.3 When the personnel decontamination system has been placed in a ready to use mode, the system shall decontaminate the first ambulatory individual within 10 min after system start-up. Additionally, the system shall be able to process 10 ambulatory personnel within 30 min of initial start-up. Finally, if required by the purchaser, the system shall be capable of processing 100 ambulatory personnel within 60 min of initial start-up.

8.4 The personnel decontamination systems shall be capable of being operated in ambient temperatures of up to 50°C (120°F). The minimum ambient operating temperature shall be –18°C (0°F) or less. If air heating is utilized, the air heaters used shall meet the requirements of Specification E2543.

9. Other Requirements

9.1 The personnel decontamination system must be capable of being set-up and operated in winds up to 11.2 m/s (25 mph).

9.2 The total noise generated by all components of the personnel decontamination system shall not exceed 70 decibels when measured from a distance the lesser of 7.6 m (25 ft) from the component, or the location of persons being processed through the system.

9.3 If a point detector is used to determine if personnel have been adequately decontaminated, then all personnel measurements shall be taken no more than 2 in. from the person's skin. If using a volume detector the person being measured shall