



**SPEC-1S-B-XX**  
**April 12, 2011**

**SPECIFICATION FOR ONESuit® Shield**  
**NFPA 1994 CLASS 2, 2007 ED. CERTIFIED FIRST RESPONDER ENSEMBLE**  
**NFPA 1992, 2005 ED. CERTIFIED LIQUID SPLASH ENSEMBLE**

**1. SCOPE**

1.1 Scope. This specification covers requirements for ONESuit® Shield; a non-encapsulating chemical protective suit that provides protection against liquid toxic chemicals and chemical warfare agents.

**2. APPLICABLE DOCUMENTS**

2.1 General. The documents listed in this section are referenced in Section 3 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information as examples. While every effort has been made to ensure that completeness of this list, document users are cautioned that they must meet ALL specified requirement documents cited in Section 3 of this specification, whether or not they are listed.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D747	Standard Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam
D751	Standard Test Method for Testing Coated Fabrics
D1776	Standard Practice for Conditioning and Testing Textiles
D2582	Standard Test Method for Puncture Propagation Tear Resistance of Plastic Film and Thin Sheeting
D4157	Standard Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method)
F392 Materials	Standard Test Method for Flex Durability of Flexible Barrier
F739	Standard Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases under Conditions of Continuous Contact

F903 Standard Test Method for Resistance of Protective Clothing Materials to Penetration by Liquids

F1001 Standard Guide for Chemicals to Evaluate Protective Clothing Materials

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

#### NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 1994 Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents, 2007 Edition.

NFPA 1992 Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies, 2005 Edition.

NFPA 1981 Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services, 2007 Edition.

(Application for copies should be addressed to the National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101)

### 3. REQUIREMENTS

3.1 Qualification. When specified and applicable, ONESuit® Shield suit shall be subjected to qualification inspection.

3.2 First Article. When specified and applicable, a sample shall be subjected to first article inspection.

3.3 Certification. The suit shall be certified as an ensemble to:

NFPA 1994 Class 2, 2007 ed. – Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents.

NFPA 1992, 2005 ed. – Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies.

3.4 Design Requirements.

3.4.1 Description. The ONESuit® Shield chemical protective suit shall be a non-encapsulating suit with integral booties, splash resistant slide fastener closure, glove cuff assembly and a form fitting face seal.

3.4.2 Suit material. Suit body material shall be Coretech™ UniGuard LBV1.0. This material shall be a laminate composite structure utilizing fluoropolymer film technology. Separable garments shall not be used to meet performance requirements.

3.4.2.1 Color. Color shall be royal blue.

3.4.2.2 Weight. Weight shall be 13 oz/sq yd.

3.4.2.3 Thickness. Thickness shall be 16 mil.

3.4.2.4 Chemical Resistance. Cumulative chemical permeation resistance of the suit material to NFPA 1994 specified chemicals shall be less than 6 µg/cm<sup>2</sup> when tested in accordance with ASTM F739 after flexing and abrasion. Chemical penetration resistance of the suit material to NFPA 1992 specified chemicals shall exhibit no penetration for at least 1 hour when tested in accordance with ASTM F903 after flexing and abrasion.

3.4.2.5 Burst Strength. Burst strength in accordance with ASTM D751 shall be greater than 270 lbf.

3.4.2.6 Tear Resistance. Tear resistance in accordance with ASTM D2582 shall be greater than 29 lbf.

3.4.3 Seams. Suit seams shall utilize a stitched construction.

3.4.3.1 Seam Tape. The inside of all suit seams shall be covered with CoreTech™ LBV1 CB white colored weldable seam tape.

3.4.4 Face Seal. The material used for the face seal as part of the facemask interface shall be 60 mil rubber and be permanently integrated into the hood of the protective suit.

3.4.5 Gloves. The suit shall be compatible with two glove configurations. The first configuration shall be the ONEGlove® Hazmat NFPA 1991 / NFPA 1994 certified protective glove and the second configuration shall be a two-layer design with separable components comprised of a North SilverShield® inner liner and a Guardian-MFG CP-25 Butyl rubber outer glove.

3.4.5.1 Glove Attachment. The glove attachment design shall be a ring and clamp system consisting of a 4" diameter ABS ring with a nylon clamp. The glove attachment shall not compromise the overall protection of the suit.

3.4.6 Suit Closure. The suit closure shall consist of a slide fastener with a 36" open length located in the back center of the suit.

3.4.6.1 Slide Fastener. The slide fastener shall be a splash resistant design utilizing a one-side urethane coated polyester tape and a zinc alloy slider.

3.4.6.2 Slide Fastener Attachment. The slide fastener shall be attached to the suit using stitching that is covered by CoreTech™ LBV1 CB white weldable seam tape.

3.4.6.3 Closure Flaps. The closure shall be covered by flaps made from CoreTech™ UniGuard LBV1.0. These shall be designed to close using black colored polyester hook and loop fastener.

3.4.7 Weight. The suit with all of its components shall weigh less than 8 pounds (largest available size).

3.4.8 Sizing. The suit shall be available in 6 sizes (Small – 3XL).

### 3.5 Interface and Interoperability Requirements.

3.5.1 Breathing Apparatus. The ONESuit® Shield protective suit shall be compatible and certified with an Open-Circuit Self-Contained Breathing Apparatus (SCBA) as certified compliant to the NFPA 1981 standard. The respirator shall be certified by the National Institute for Occupational Safety and Health (NIOSH) as compliant with the statement of *Standard for NIOSH CBRN SCBA Testing*.

3.5.1.1 Respirators/ SCBA Units. The suit shall be compatible with a respirator/ SCBA unit for the following Open-Circuit SCBA systems: 1) MSA Ultra Elite® Face Piece with a FireHawk® M7 Air Mask SCBA or a FireHawk® M7 Responder Air Mask SCBA. 2) Scott AV3000 Face Piece with a Scott Air-Pak CBRN SCBA or a Scott Air-Pak NxG7 CBRN SCBA or a Scott Air-Pak 75 CBRN SCBA. 3) Scott AV3000 SureSeal Face Piece with a Scott Air-Pak CBRN SCBA or a Scott Air-Pak NxG7 CBRN SCBA or a Scott Air-Pak 75 CBRN SCBA.

3.5.2 Boots. The ONESuit® Shield protective suit shall be compatible and certified for use with the Onguard Hazmax® and Tingley HazProof® chemical protective boots.

3.5.3 Head Protection: The ONESuit® Shield protective suit shall be compatible with a Type 1, Class G helmet as specified in ANSI Z89.1. The helmet shall be affixed over the hood of the suit.

**3.6 Support requirements.**

3.6.1 Suit Storage Bag. The ONESuit® Shield suit shall be shipped in a storage bag produced of blue colored heavy weight fabric. The bag shall contain carrying straps made of blue webbing.