National Institute of Justice
Bomb Suit Standard for Public Safety

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Bomb Suit Standard - Background

• Standard requested by NBSCAB ~ 5 years ago

• Research for standard performed by the US Army Natick Soldier RD&E Center with funding from:
  – National Institute of Justice
  – National Institute of Standards and Technology/Office of Law Enforcement Standards
  – Department of Homeland Security
Background

Threat Analysis:

- Most prevalent threat to bomb technicians identified as metal pipe bomb filled with black or smokeless powder
- NBSCAB agreed with the threat

Research Performed into 6 Key Areas:

- Blast overpressure
- Fragmentation
- Impact
- Flame
- Optics
- Ergonomics

Hazards

Impacts to functionality

Pipe bomb fragments
Background

- Live fire testing of 34 12” x 2” pipe bombs
- Tested 12 bomb suits for resistance to fragmentation, penetration, blast overpressure
Background (Continued)

- NIJ developed draft standard in August 2008 based on Natick research

- NIJ formed panel of experienced practitioners, stakeholders, and technical experts to finalize standard and to develop:
  - Certification Program Requirements
  - Selection and Application Guide

- Held panel and manufacturer review of draft in September 2008

Panel Participants

- Practitioner Lead: Martin Hutchings
- Certified Bomb Squad Commanders selected from the NBSCAB volunteer list:
  - Chris Ennis, Delaware State Police
  - Al Wessel, Allegheny County Police
  - Tom Sharkey, Washington DC Metro Transit Police
  - Ursula Wiebusch, Hartford Police Department
- Bureau of Alcohol, Tobacco, Firearms, and Explosives
- DHS Office of Science and Technology
- DHS Office of Bombing Prevention
- US Army Natick Soldier RD&E Center

* Practitioners in red
Panel Participants (continued)

- FBI Hazardous Devices School
- Safety Equipment Institute (certification body)
- Intertek Testing Laboratory (testing)
- National Institute of Justice
- National Law Enforcement and Corrections Technology Center
- National Institute of Standards and Technology

** Additional Contributor: Allen-Vanguard/Med-Eng (manufacturer).

** Public review and comment period held in December 2008.
Bomb Suit Standard and Related Documents

NIJ Bomb Suit Standard for Public Safety

NIJ Bomb Suit Selection and Application Guide

NIJ Bomb Suit Certification Program Requirements
Standard

- Defines minimum design and performance requirements and test methods to assess performance
- Primary users: Manufacturers and test labs
- Contents:
  - Chapter 1: Purpose, Scope, and Application
  - Chapter 2: References
  - Chapter 3: Definitions
  - Chapter 4: Design Requirements
  - Chapter 5: Performance Requirements
  - Chapter 6: Test Methods
  - Chapter 7: Labeling and Information

NIJ Bomb Suit Standard for Public Safety

2009
Scope

- Scope of the Standard: Shall establish the minimum requirements for the design, performance, testing, and labeling of PPE designed to protect bomb technicians from fragmentation, impact, some blast overpressure, and flame associated with the explosion of an improvised explosive device (IED).

- Bomb Suit - intended to provide protection primarily to the head, face, neck, thorax/abdomen, pelvis, arms, and legs.
Scope (continued)

Standard does not include requirements for:

- Protection for hands, wrists, or ankles
- CBRN protection
- All aspects of blast overpressure
- Accessories

Foot Protection:

- Addressed as optional component of the bomb suit
Definitions: 7 Primary Protection Areas

1. Head
2. Face
3. Neck
4. Thorax/Abdomen
5. Pelvis
6. Arms
7. Legs
Design Requirements

• Shall be available in a minimum of 3 unique and different sizes

• Shall have means for securing the sleeve at the wrist

• Shall include spine protection with defined minimum coverage area

• Shall have a grounding strap to prevent static charge buildup

• Shall have at least one drag rescue device

• Weight limits:
  – Smallest size = 68.0 lbs, mid-range size = 76.0 lbs, largest size = 85.0 lbs

• Foot protection, if provided, shall meet performance requirements
Performance Requirements and Test Methods

Functionality:

• Ergonomics: Donning/doffing, body mobility, coin recovery, lie on back and stand up, test course, field of view

• Optical performance of face shields: Distortion, transmittance, prismatic deviation, refractive power, haze/abrasion resistance, anti-fogging
Performance Requirements and Test Methods (continued)

Protection from Hazards:

• Flammability: Outer shell materials and helmets

• Electrostatic discharge: Grounding strap resistance

• Head protection: Impact, perforation resistance, and retention system

• Spine protection: Impact attenuation

• Fragmentation: Perforation resistance

• Blast Overpressure: Suit integrity

• Drag Rescue Handles
Labeling and User Information

Labels:

- Each component, except face shield, shall have a product label including:
  - Manufacturer’s name, date of manufacturer, model and serial number, size.
  - Optional components and accessories tested with the bomb suit.
  - Critical information explicitly indicated (e.g., strike face, wear face)

- Face shield label shall have the model number and serial number linking the face shield to the suit with which it has been tested.
Labeling and User Information (continued)

User Information:

• Instructions for proper use as intended by the manufacturer, including safety considerations.

• Recommended undergarments.

• Warranty information.

• Donning and doffing procedures, including sizing and adjustment.

• Proper care instructions (maintenance, cleaning, inspection guidelines and frequency, storage practices, storage life).

• Accessories tested with the bomb suit.

• Retirement and disposal criteria and considerations.
Ensuring Products Meet the Standard

Certification Program Requirements

- An independent, third-party ensures products are tested to meet the standard

- Manufacturer’s declaration of conformity is not allowed

NIJ Bomb Certification Program Requirements

2009

Independent Oversight: Trust but Verify
Bomb Suit Certification Program

Includes:

- Initial testing of the product to the standard (type testing)
- Initial and annual assessment of manufacturer’s quality system
- Limited follow-up testing:
  - Bomb Suit Integrity
  - Flammability
  - Fragmentation
  - Head Protection - Impact
  - Spine Protection - Impact
Purpose:

- To provide information to assist law enforcement agency decision-makers, procurement officials, and end users.

Contents include:

- Non-technical description of the NIJ standard and certification program requirements.
- Guidance on procurement, selection, use, maintenance, care and disposal of equipment.
- Frequently asked questions.
Path Forward

• Publish Standard, Certification Program Requirements, and Selection and Application Guide
  • Documents currently under review by NIJ
  • Publication will be announced via Federal Register Notice
  • Anticipate publication by the end of CY09
• Begin testing bomb suits to new standard for certification

• FY10 and Beyond:
  • Continue blast overpressure research
  • Add CBRN protection requirements and test methods when available to eliminate need to fit CB suits and SCBA components into and around the bomb suit
Project Sponsors & Supporters

NIJ Contacts

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