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System Assessment and Validation for Emergency Responders

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions. Located within the Science and Technology Directorate (S&T) of DHS, the SAVER Program conducts objective assessments and validations on commercially available equipment and systems, and develops knowledge products that provide relevant equipment information to the emergency responder community.

SAVER Program knowledge products provide information on equipment that falls under the categories listed in the DHS Authorized Equipment List (AEL), focusing primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?" These knowledge products are shared nationally with the responder community, providing a life- and cost-saving asset to DHS, as well as to Federal, state, and local responders.

The SAVER Program is managed by the National Urban Security Technology Laboratory (NUSTL), which also prepared this TechNote.

For more information on this and other technologies, contact the SAVER Program by e-mail or visit the SAVER website.

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# TechNote

## Ballistic-Resistant Body Armor for Women

*Ballistic-resistant body armor is often worn by law enforcement officers to increase their safety while in the field or during special operations. Body armor is designed to provide law enforcement officers with a layer of personal protection against specific ballistic threats within its coverage area during incidents involving firearms. With women's presence in law enforcement steadily increasing, body armor is being optimized specifically for the female physique.*

### Introduction

Law enforcement officers are in inherent danger while on tour and when responding to emergency situations. Ballistic-resistant body armor is used to help combat some of the dangers posed by firearms that officers may encounter. Ballistic-resistant body armor has traditionally been developed for the male physique, but as women continue to join the law enforcement community it has become essential to design body armor for the female physique as well. The features of body armor optimized specifically for women, primarily focus on modifications to the chest and hip areas, enabling women to be as protected and comfortable as men while wearing body armor.

### Types of Body Armor

There are five levels of protection for body armor that are typically used, levels IIA, II, IIIA, III and IV. Each level is designed to protect against a specific type of ammunition. Body armor can be further categorized as flexible armor, rigid armor, concealable armor (Figure 1) and external armor (Figure 2).



**Figure 1. Concealable Armor**

*Figure courtesy of Safariland*

Flexible armor, also known as soft armor, is constructed of pliable, textile-based materials that allow the entire system to be flexed, and is more breathable and therefore more comfortable than other types of body armor. Flexible armor is generally used to provide protection against handguns and typically provides greater coverage than rigid armor.

Rigid armor, also known as hard armor, is comprised of rigid plates, inserts and accessories that are typically designed to provide protection against rifles.

Concealable armor is designed to be worn under uniforms while external armor is designed to be worn over uniforms and provide full torso coverage. External armor typically provides increased protection around the armpit, neck and stomach.



**Figure 2. External Body Armor**

*Figure courtesy of Safariland*

## Design and Testing Methodologies

Flexible armor, which is most frequently used by the law enforcement community, is comprised of separate front and back panels. When this armor is designed for either male or gender neutral physiques, it is comprised of two planar panels. When flexible armor is designed for the female physique there are typically two different panels used, planar for the back and non-planar for the front. Non-planar panels are comprised of the same materials as planar panels but are enhanced with additional stitching and folds to conform to the female physique.

The National Institute of Justice (NIJ) Ballistic Resistance of Body Armor Standard 0101.06 was approved in 2008. This document specifies the minimum performance requirements that equipment must meet to satisfy the specifications of criminal justice agencies and the methods that should be used to test the armor's performance. In 2015, the NIJ National Law Enforcement and Corrections Technology Center's Body Armor Compliance Testing Program released an Administration Clarification document focusing on flexible ballistic-resistant body armor containing two panel designs typically used in body armor optimized for women. This document is intended to improve the assessment process for this type of equipment without changing the test methods and standard mentioned above, while clarifying that body armor designed with two different panels will be required to undergo two sets of testing to ensure compliance with Standard 0101.06.



**Figure 3. Law Enforcement Donning Body Armor Optimized for Females**

*Figure courtesy of Safariland*

## Future Developments

The NIJ affirms that further research is required to identify appropriate testing and standards for body armor designed for females. To address these gaps, the NIJ has initiated the revision process for Standard 0101.06 to ensure that female-designated body armor provide adequate protection. This includes putting together a Special Technical Committee, comprised of law enforcement, corrections practitioners and technical experts, to provide guidance and personal experiences with body armor.

Additionally, the NIJ is seeking a research assistant to focus on *Research, Testing, and Standards for Body Armor Designed for Women Law Enforcement Officers*. This position is slated to be filled for the 2017 – 2018 academic year and will include participating in data collection activities at ballistic laboratories that are testing female body armor, conducting independent research, and drafting publications on test methods, findings and recommendations.

## References

- U.S. Department of Justice, Office of Justice Programs, National Institute of Justice. [\*Topic: Flexible Ballistic-resistant Body Armor Containing Two Panel Designs \(such as Planar and Non-planar Panels\)\*](#). Accessed October 2, 2016.
- U.S. Department of Justice, Office of Justice Programs, National Institute of Justice. [\*Ballistic Resistance of Body Armor NIJ Standard-0101.06\*](#). Accessed October 2, 2016.