



## NIJ's Bullet-Resistant Vest Standard Reaches Milestone

It is now 30 years since NIJ introduced the first ballistic-resistant body armor standard. Developed in response to a dramatic rise in fatalities among law enforcement officers during the 1960's, the standard truly is a success story. Vests tested and worn in accordance with the standard are credited with saving more than 2,500 lives. Now recognition and acceptance of the standard has grown worldwide, making it *the* performance benchmark for bullet-resistant vests.

### History of the Standard

Prior to 1972, military flack jackets were the only type of personal protection worn by police officers. But flack jackets only protected against shrapnel and bullet fragments—they did nothing to lessen the direct impact of a bullet.

In 1972, NIJ initiated development of a lightweight body armor that officers could wear on duty. The result was NIJ's funding of the production of 5,000 vests made

### WHAT DOES "BULLET-RESISTANT" MEAN?

Unfortunately, there is no such thing as bulletproof armor. Although body armor can provide protection against a significant number of handguns, officers must keep in mind that the armor was selected on the basis of limited threat protection. Additional protection should be worn for SWAT team, hostage rescue, or Special Operations assignments, when officers may be exposed to a weapon threat greater than the protection provided by regular duty armor.

from Kevlar<sup>®</sup>, a ballistic-resistant fabric. Although the first version of the vest consisted only of square front and back panels with nylon straps, within 6 months this simple design was credited with saving a police officer's life.

## WHAT IS THE STANDARD?

The NIJ bullet-resistant vest standard validates manufacturers' product claims through a performance-based evaluation system. The standard establishes minimum performance levels so that—at the very least—the product should perform as outlined in the standard.

The standard was originally intended to give law enforcement and corrections officials an independent way to test and confirm manufacturers' claims about bullet-resistant body armor. The law enforcement community, however, lacked the budget and expertise to test every body armor product in use. In the early 1970's, NIJ established an independent testing program to ensure that personal body armor met minimum performance levels. Once that program was set up, in 1972, a manufacturer could not label its product as being in compliance until it was tested and approved through the NIJ program.

The NIJ standards development process is cooperative in nature, involving fiber producers, weavers, and manufacturers; law enforcement and corrections personnel; and NIJ.

Production of body armor for law enforcement officers subsequently took off. Currently, more than 90 body armor manufacturers worldwide participate in NIJ's voluntary testing program.

The 1972 ballistic body armor standard has been revised four times. Each revision has made the standard more detailed, addressing increasingly sophisticated technologies, particularly in weaponry and ammunition. The current standard, updated in 2000, upgrades the testing methods for measuring ballistic protection, incorporates current threats from ammunition, and tries to ensure consistent laboratory testing of body armor.

## Purposes of the Standard

**An Educational Process.** Education of the law enforcement community about body armor is an ongoing process, and NIJ's National Law Enforcement and Corrections Technology Center (NLECTC) is a key resource. NLECTC's user-friendly video, *Surviving a Shooting: Your Guide to Personal Body Armor*, explains what body armor is, what it can and cannot protect against, how to select it, and how to wear and care for it properly. The video shows

how NIJ tests and validates body armor and how the Office of Law Enforcement Standards develops its performance levels. An updated publication, *Selection and Application Guide to Police Body Armor*, published by NIJ, explains the selection and use of body armor and discusses common concerns, helps law enforcement and corrections personnel determine the level of protection needed by officers, and details NIJ's recent stab-resistant standard. (See "Stab- and Puncture-Resistant Armor," page 27.)

**A Funding Mechanism.** The Bulletproof Vest Partnership Grant Act of 1998 (BVP) allows most law enforcement and corrections agencies to afford body armor. The Bureau of Justice Assistance and NIJ offer an online application and reimbursement system for law enforcement and corrections agencies seeking BVP funds. The BVP Web page provides a direct link to NLECTC's compliance database as well as to manufacturers and products.

BVP funds can only be used to buy a product that has been tested and approved by NIJ, making it the first law of its kind to tie use of funding under the Act to a product's compliance with a national standard. Agencies

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## WHAT ARE NIJ STANDARDS AND HOW DO THEY HELP?

### How NIJ Standards Benefit Law Enforcement

NIJ's testing and standards program is crucial to law enforcement and corrections agencies, which typically are not set up to either fund or carry out new product research. By developing the standard, putting the testing program together, and encouraging manufacturers to participate, NIJ is able to provide law enforcement and corrections personnel with clear and concise written information that informs purchasing decisions on personal safety products such as body armor. An online *Consumer Product List* identifies specific models that meet the standard and allows potential purchasers—particularly those on limited budgets—to make wise selections. Online databases present all the test data on each product plus the bottom-line performance results. To access these databases, go to <http://www.justnet.org> and click on the "Testing and Evaluation" link.

The *Product List* and online databases benefit two key groups: (1) the law enforcement and corrections communities, by listing products that have been tested; and (2) the manufacturing community, by establishing a benchmark for products that will meet the needs of potential customers.

The standards can help consumers who may be concerned about the performance of a particular product. Law enforcement and corrections agencies can cite the standards when negotiating with manufacturers for the repair or replacement of their products, or if necessary, when litigating a product's lack of compliance with the standards.

### How NIJ Standards Are Developed

Typically, the standard for ballistic body armor—and other NIJ standards as well—is developed as follows:

- NIJ funds and directs the research, based primarily on input from law enforcement and corrections professionals.
- NIJ's standards-setting body, the Office of Law Enforcement Standards, part of the National Institute of Standards and Technology, buys samples of the equipment, identifies minimum performance factors, evaluates current applicable standards, develops and validates test methodologies and protocols, and produces a voluntary performance standard.
- NIJ alerts the National Law Enforcement and Corrections Technology Center (NLECTC) to set up a testing program to support the new standard.
- NLECTC accredits independent laboratories to perform testing in accord with the standard.
- NLECTC introduces the standard to the manufacturing community and asks that products be submitted for testing under the standard.
- Product samples are sent to NLECTC, where they are inspected to ensure that they meet labeling and workmanship requirements of the current standard. The samples are then tested at independent NIJ-certified laboratories.
- NLECTC provides ongoing oversight of the testing program to ensure that the equipment used in the field is safe and reliable and meets users' needs and requirements.

can cite selected information from NIJ's *Consumer Product List* on their applications for BVP funding.

## The Future of Body Armor

Because advances in weapons and ammunition technology constantly pose new threats, the need for research and development of more effective personal body armor is ongoing. Among the next challenges for ballistic-resistant armor is to produce a lighter weight vest that provides maximum comfort as well as optimal protection.

### Multihit Capability of Ballistic-Resistant Armor.

No current standard exists for a vest that can withstand multiple gun shots within a very small target area. To address this need, NIJ is partnering with the Royal Canadian Mounted Police and Canada's Defense Research Establishment Valcartier to develop a testing protocol and specifications for providing multihit testing capability. A revision of the current standard to include this capability is expected in 3–5 years.

**Life Expectancy of Vests.** Armor is typically worn as an undergarment, and if it is not properly cared for, its ballistic capabilities can significantly degrade. Most manufacturers limit their warranties to 5 years. In response to the concerns of public safety advocates about the life cycle of a vest after its 5-year warranty ends, NIJ, through the Technical Support Working Group, is conducting age-regression studies on ballistic panels exposed to simulated aging to measure their protective capabilities.

**Ballistic Helmets.** In response to law enforcement reports that officers increasingly need to wear ballistic helmets, NIJ is updating its 1981 ballistic helmets standard to take into account more current ammunition threats. This testing program is exploring better ways of measuring the blunt trauma and internal damage to the head from a high-velocity bullet striking a helmet. A draft of the revised standard is expected later this year.

**Ballistic Materials.** A general ballistic materials standard update will cover other types of protective equipment, including blankets,

## STAB- AND PUNCTURE-RESISTANT ARMOR

In September 2000, NIJ published the first national minimum performance requirements for stab- and puncture-resistant body armor. This new standard addresses the danger posed to corrections officers from stab wounds from knives, picks, and prison-made shivs (sharp-edged, pointed weapons). The standard is the result of a 3-year collaboration involving the Office of Law Enforcement Standards, the U.S. Secret Service, and the Police Scientific Development Branch of the United Kingdom, where more officers are attacked with knives than with firearms. To date, more than 120 body armor models comply with the new stab standard.

bunkers, and shields, as well as protected facilities, such as the courts, that use bullet-resistant glass and other ballistic-resistant materials such as reinforced concrete.

### NIJ's Leadership Role

NIJ's technology portfolios, which now include a full range of criminal justice issues, trace their beginnings to the introduction of the bullet-resistant vest standard. In fact, NIJ's leadership role in the field has inspired the agency to partner with other countries to establish similar ballistic-resistant armor standards worldwide. In this way the agency contributes daily to the safety of law enforcement and corrections personnel around the globe.

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### For More Information

#### Publications

- *Ballistic Resistance of Personal Body Armor, Revision A, NIJ Standard 0101.04*, June 2001. Available at <http://www.nlectc.org/pdffiles/0101.04RevA.pdf>.
- *Stab Resistance of Personal Body Armor, NIJ Standard 0115.00*, September 2000. Available at <http://www.nlectc.org/pdffiles/0115.00.pdf>.

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- *Selection and Application Guide to Personal Body Armor, NIJ Guide 100-01*, November 2001. Available at <http://www.nlectc.org/pdffiles/selectapp2001.pdf>.
- *Bulletproof Vest Partnership Grant Act of 1998*. Available at <http://vests.ojp.gov/resources/index.html>.
- *Bulletproof Vest Partnership Program*, Bureau of Justice Assistance, March 2002 (NCJ 192166).

#### Videotapes

- *Surviving a Shooting: Your Guide to Personal Body Armor*. Available at <http://www.nlectc.org/videos/justnet.html>.

#### Web Sites

- Bulletproof Vest Grant Partnership Program. Available at <http://www.vests.ojp.gov>.
- NLECTC Virtual Library—Personal Protection, <http://www.nlectc.org/virlib/TopicList.asp?intTopicID=36>.