



Designation: E3453/E3453M – 24

Standard Specification for Ballistic-Resistant Body Armor Accessories¹

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1. Scope

1.1 This specification specifies minimum performance requirements and test methods for the ballistic resistance of body armor accessories used by U.S. public safety officers and intended to protect areas of the body (for example, shoulder, neck, groin, pelvis, lower abdomen, lower back, lower sides, and limbs) not covered by traditional body armor.

1.1.1 This specification addresses accessories that cover a single area of the body (for example, shoulder protector) and accessories that cover multiple areas of the body (for example, body armor cummerbund).

1.2 This specification addresses ballistic performance in terms of resistance to penetration (RTP).

1.3 This specification does not address upper torso side protection.

NOTE 1—Upper torso side protection will be addressed in another standard because backface deformation (BFD) measurements for side protection are required to meet the same performance requirements as body armor.

1.4 This specification is applicable for compliance testing, verification testing, certification testing, or research and development testing.

1.5 This specification is divided into the following sections:

Section	Title
1	Scope
2	Referenced Documents
3	Terminology
4	Significance and Use
5	Test Equipment and Materials
6	Test Item Requirements
7	Procedure for Visual Examination
8	Resistance to Penetration (RTP) Ballistic Protection Levels and Test Threats
9	Shot Requirements
10	Soft Armor Accessory RTP Requirement and Test Procedure
11	Hard Armor Accessory RTP Requirement and Test Procedure
12	Product Documentation Requirements
13	Product Label and Package Label Requirements

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Section	Title
14	Test Report
15	Keywords
Annex A1	ASTM Accessory RTP Ballistic Protection Levels and Associated Test Threats
Annex A2	Ballistic Accessories Testing Summary

1.6 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

- 2.1 *ASTM Standards*:²
- E3004 Specification for Preparation and Verification of Clay Blocks Used in Ballistic-Resistance Testing of Torso Body Armor
 - E3005 Terminology for Body Armor and Ballistic Protection
 - E3062/E3062M Specification for Indoor Ballistic Test Ranges for Small Arms and Fragmentation Testing of Ballistic-resistant Items
 - E3068 Test Method for Contact Measurement of Backface Deformation in Clay Backing During Body Armor Testing
 - E3078/E3078M Practice for Conditioning of Hard Armor Test Items
 - E3107/E3107M Test Method for Resistance to Penetration and Backface Deformation for Ballistic-resistant Torso

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



Body Armor and Shoot Packs

E3192/E3192M Practice for Soft Armor Conditioning by Tumbling

2.2 Other Standards:

ANSI/SAAMI Glossary of Terms³ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories⁴NIJ 0101.07 Ballistic Resistance of Body Armor⁵

3. Terminology

3.1 *Definitions*—The following terms and definitions from Terminology E3005 are applicable.

3.1.1 *accessory*, *n*—a body armor component that is detachable or removable from the body armor and is intended to provide extended area of coverage protection against threats that may include ballistic threats, stabbing, fragmentation, blunt impact, or a combination of threats.

3.1.1.1 *Discussion*—Accessories are typically attachments to tactical body armor providing protection to areas not covered by the vest, such as the shoulders, upper arms, neck, sides, pelvis, and groin. See *tactical body armor*. See *vest*.

3.1.2 *ammunition*, *n*—one or more loaded cartridges consisting of case, primer, propellant, and one or more projectiles.

3.1.3 *applique*, *n*—a three-dimensional item molded from backing material that is shaped and sized for testing or conditioning a nonplanar test item.

3.1.3.1 *Discussion*—Some appliques are designed for the purpose of filling the entire space behind a nonplanar test item; other appliques are designed to assess features of a nonplanar test item.

3.1.4 *backface deformation (BFD)*, *n*—the indentation in the backing material caused by a projectile impact on the test item during testing; synonymous with *backface signature*.

3.1.5 *ballistic layup*, *n*—the layering of ballistic materials through the thickness of the ballistic-resistant item under consideration.

3.1.5.1 *Discussion*—Ballistic materials are typically recorded from strike face to body side.

3.1.6 *ballistic resistance*, *n*—a characteristic of protective equipment or materials describing their ability to provide protection from projectiles.

3.1.7 *carrier*, *n*—a garment whose primary purpose is to retain the armor panel(s) or plate(s) and provide a means of supporting and securing the armor panel(s) or plate(s) to the wearer.

3.1.8 *cartridge*, *n*—a single assembled unit consisting of a bullet, propellant, primer, and the case; synonymous with *round*.

3.1.9 *conditioning*, *n*—a process that exposes an item, prior to testing, to a specified controlled environment or physical stresses, or both.

3.1.10 *fair hit*, *n*—a test threat impact (on a test item) that meets all specified requirements in a particular test method.

3.1.11 *model*, *n*—the manufacturer's design, with unique specifications and characteristics, of a particular item.

3.1.12 *nonplanar*, *adj*—having features that would prevent the test item from making full contact with a flat surface; typically used to describe curved plates and armor designed for female wearers.

3.1.13 *panel cover*, *n*—a covering, typically nonremovable, that encloses the protective materials and protects them from environmental factors, such as moisture, ultraviolet light, debris, and dust.

3.1.14 *partial penetration (PP)*, *n*—any result of a test threat impact that is not a complete penetration; synonymous with *stop*.

3.1.15 *shot-to-edge distance*, *n*—the distance from the center of the projectile impact to the nearest test item edge.

3.1.16 *shot-to-shot distance*, *n*—the distance from the center of the projectile impact to the center of any other projectile impact on the test item.

3.1.17 *supplier*, *n*—the party that is responsible for ensuring that products meet and, if applicable, continue to meet, the requirements of an ASTM specification, a purchase specification, a contract, or an independent, third-party conformity assessment body (for example, certifier, testing laboratory).

3.1.18 *test item*, *n*—a single article intended for testing.

3.1.19 *test threat*, *n*—the projectile, edged blade, spike, or other object that is used in laboratory testing to impact the test item at a specific velocity or energy to assess performance of body armor.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *body armor cummerbund*, *n*—an accessory intended to provide extended area of coverage protection against threats to the lower abdomen, lower back, sides of the torso, or combination of those coverage areas (see Terminology E3005, *accessory*); a cummerbund may have a carrier with built-in ballistic panels/plates or may have a carrier with removable ballistic panels/plates; also referred to as *cummerbund*.

3.3 The following term and definition from NIJ Standard 0101.07 applies:

3.3.1 *complete penetration (CP)*, *n*—the result of a test threat impact if one or more of the following conditions are met:

(1) any portion of a test threat or a fragment of a test threat passes through the wear face of the test item.

(2) the test threat is visible from the wear face of the test item.

(3) a hole is created through the test item by the test threat.

(4) for soft armor, any portion of a test threat or a fragment of a test threat is embedded in or passes into the backing material directly behind the test item.

³ Available from American National Standards Institute (ANSI), 1180 Avenue of the Americas, 10th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from International Organization for Standardization (ISO), ISO Central Secretariat, Chemin de Blandinnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <https://www.iso.org>.

⁵ Available from National Institute of Justice (NIJ), 810 7th St., NW, Washington, DC 20531, <http://nij.gov>.