



Designation: ~~E3005~~—~~20~~ E3005 – 24

Standard Terminology for Body Armor and Ballistic Protection¹

This standard is issued under the fixed designation E3005; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 The scope of this terminology is to provide a standard terminology for body armor providing protection against ballistic threats, stabbing, fragmentation, blunt impact, or a combination of threats.

1.2 The intent of this terminology is to have terms, abbreviations, and formulas that are applicable across federal agencies, law enforcement and corrections agencies, testing and certification bodies, and manufacturers.

1.2.1 The terminology is kept general herein and should be defined more specifically as needed within individual test methods or other standards.

1.3 This terminology is not intended to describe test methods or performance requirements for body armor.

1.4 *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

[E3111/E3111M Test Methods for Ballistic Resistant Head Protection](#)

[E3113 Specification for Ballistic-resistant Vehicle Door Panels Used by Public Safety Agencies](#)

[E3141 Test Method for Ballistic Resistant Shields for Law Enforcement](#)

[E3236/E3236M Specification for Ballistic-resistant Barriers Used in Homeland Security or Public Safety Applications](#)

[E3347/E3347M Specification for Ballistic-Resistant Shields Used by Law Enforcement Officers](#)

2.2 ~~DOD Standard:~~³

[MIL-STD-3027 Method Standard for Performance Requirements and Testing of Body Armor](#)

2.3 ~~NHISO Standard:~~⁴

[NH Standard 0101.06/ISO/IEC 17065 Ballistic Resistance of Body Armor](#)
[Conformity assessment: Requirements for bodies certifying products, processes and services](#)

¹ This terminology is under the jurisdiction of ASTM Committee E54 on Homeland Security Applications and is the direct responsibility of Subcommittee E54.04 on Personal Protective Equipment (PPE) Public Safety Equipment.

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

³ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

⁴ Available from American National Institute of Justice (NIJ), 810 7th St., NW, Washington, DC 20531, <http://nij.gov>. Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

2.4 SAAMI Standard:⁵
 SAAMI Glossary of Industry Terms

3. Terminology

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.

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*.

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

angle of incidence, *n*—the angle between the test threat line of aim and the line normal to a reference plane based on the front surface of the backing assembly or witness panel. See also *obliquity*.

DISCUSSION—

Some standards have used the terms *angle of incidence* and *obliquity* as synonyms, but in this standard, they are defined differently. Fig. 1 provides examples to aid in visualizing the difference between *angle of incidence* and *obliquity*.

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

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.

applique pattern, *n*—a replica of the final product (that is, applique) used for preparing the applique mold cavity.

areal density, *n*—a measure of the mass of the armor panel per unit area, usually expressed in kilograms per square meter (kg/m^2) or pound-mass per square foot (lbm/ft^2).

armor applique, *n*—a removable unit of protective material (soft armor or hard armor) intended to be placed over the strike face of a protective product, such as a ballistic-resistant helmet or shield, to enhance ballistic protection in a localized area.

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armor carrier, *n*—See *carrier*.

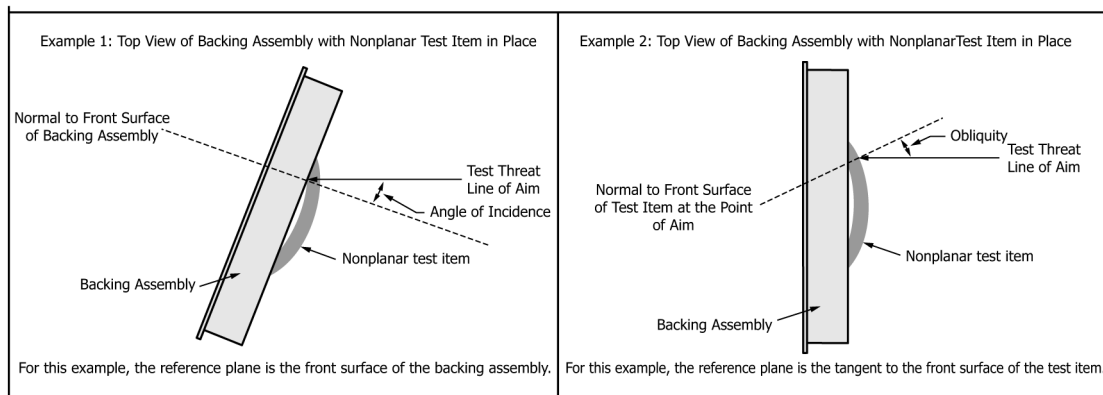


FIG. 1 Examples to Aid in Visualizing the Difference Between Angle of Incidence (Example 1) and Obliquity (Example 2)

⁵ Available from Sporting Arms and Ammunition Manufacturers' Institute, Inc., 11 Mile Hill Rd, Newtown, Connecticut, 06470–2539, www.saami.org.

armor coupon, *n*—a test item prepared with materials, or with materials and construction features, utilized in body armor or other ballistic-resistant products, but not intended to be used as a ballistic-resistant product.

DISCUSSION—

The armor coupon may be either rigid or soft.

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armor panel, *n*—a component of soft body armor consisting of protective materials, typically enclosed in a panel cover. See *ballistic panel*, *blunt impact panel*, *stab panel*. See also *panel cover*.

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*.

DISCUSSION—

Details necessary for making BFD measurements are specified in individual test methods.

backface signature, *n*—See *backface deformation*.

backing assembly, *n*—a backing fixture filled with backing material. For example, a clay block is a type of a backing assembly.

backing fixture, *n*—any apparatus designed to hold the backing material(s) for a specific test.

backing material, *n*—the substance placed behind the test item during testing.

DISCUSSION—

The backing material typically provides support for the test item, and it may act as a witness material and may provide a measurable indication of the test item performance.

ballistic panel layup, *n*—a type of armor panel intended to provide ballistic resistance: the layering and arrangement of ballistic materials through the thickness of a protective product.

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

DISCUSSION—

Ballistic materials are typically recorded from strike face to body side.

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ballistic limit, *n*—a measure of an item's ballistic resistance to complete penetration expressed as a velocity associated with some probability of perforation.

DISCUSSION—

The item may be a test item, material, shoot pack, body armor, or other ballistic-resistant product.

ballistic panel, *n*—a type of armor panel intended to provide ballistic resistance.

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

basic plane, *n*—the plane through the centers of the external ear openings and the lower edges of the eye sockets.

DISCUSSION—

See Fig. 2 for a pictorial representation of the location of the basic plane.

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blunt impact panel, *n*—a type of armor panel intended to provide protection against impact from a blunt object.

blunt impact resistance, *n*—a characteristic of protective equipment or materials describing their ability to provide protection against impact from a blunt object.

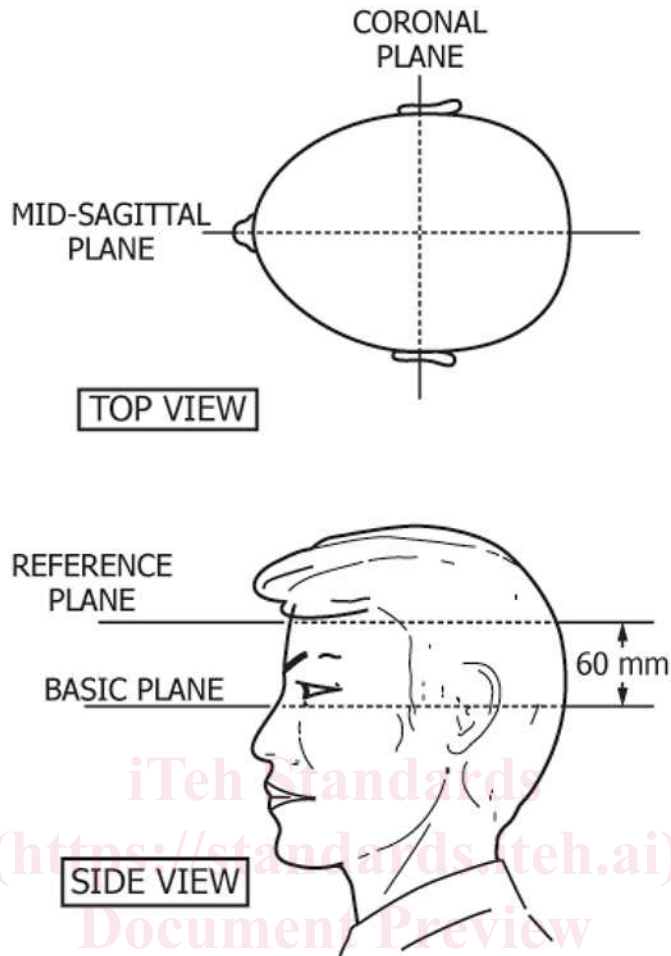


FIG. 2 Head Planes

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body armor, *n*—an item of personal protective equipment intended to protect the wearer from threats that may include ballistic threats, stabbing, fragmentation, or blunt impact.

DISCUSSION—

Law enforcement and corrections officers typically refer to body armor as a vest. See *vest*.

bridge gauge, *n*—an assembly used for measuring that consists of a depth gauge and supports that rest on opposite sides of the backing fixture.

bullet, *n*—a projectile fired from a firearm or testing apparatus.

DISCUSSION—

The SAAMI definition considers bullets to be projectiles fired from rifled barrels, which differentiates bullets from shot, slugs, fragment simulators, and other projectiles.

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.

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

case, *n*—the main body of a single round which the other components (primer, propellant, and the bullet) are inserted into to form a cartridge.

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check standard, *n*—stable, durable artifact that may be used for training, comparing among measuring instruments, and checking instruments prior to and after calibration, maintenance, or normal use to detect changes in the instruments.

clay block, *n*—a type of backing assembly in which the backing material is ROMA Plastilina No. 1[®] modeling clay.

clay package, *n*—the smallest unit of wrapped and labeled clay as received from the supplier.

clay-verification impactor, *n*—a metal object used during verification of clay backing material, having dimensions, weight, and shape specified in relevant standards.

combination armor, *n*—a type of body armor intended to protect the wearer from both ballistic threats and stabbing.

DISCUSSION—

Combination armor is sometimes called dual-threat armor or multiple-threat armor.

complete penetration, *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, a fragment of a test threat, or a fragment of the test item passes through the wear face of the test item; (2) a hole is created through the test item; (3) the presence of a test threat, a fragment of a test threat, or a fragment of the test item is embedded or passes into the backing material; or (4) a hole is created through the witness panel. Synonymous with *perforation*.

DISCUSSION—

The conditions for complete penetration are specified in individual test methods.

complete penetration, *n*—for purposes of Test Method E3141, definition 4 from Terminology E3005 applies: the result of a test threat impact if a hole is created through the witness panel. **E3141 – 23**

concealable body armor, *n*—a vest designed to be worn under the shirt (uniform or undercover) or in a carrier that looks like a uniform shirt so that it is not easily seen.

DISCUSSION—

Concealable body armor is also called concealable armor.

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

controlled ambient, *n*—conditions with temperature of $20.0 \pm 5.6^\circ\text{C}$ [$68 \pm 10^\circ\text{F}$] and $50 \pm 20.0^\circ\text{C} \pm 5.6^\circ\text{C}$ [$68^\circ\text{F} \pm 10^\circ\text{F}$] and $50\% \pm 20\%$ relative humidity (RH).

coronal plane, *n*—the plane, perpendicular to the basic and mid-sagittal planes, which passes through the centers of the external ear openings.

DISCUSSION—

See Fig. 2 for a pictorial representation.

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depth gauge, *n*—instrument (for example, caliper) used to measure the indentations in the backing material caused by the impactor.

door skin, *n*—the metal that comprises the outer surface of a vehicle door.

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

fastener, *n*—a hardware device that mechanically joins or affixes two or more objects together; for helmets, shields, and other protective products, fasteners pass into or through the protective material and include such devices as bolts, anchors, screws, and rivets.

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fastener, *n*—hardware device that mechanically joins or affixes two or more objects together; for helmets, shields, and other protective products, a fastener passes into or through the protective material and includes such devices as bolts, anchors, screws, and rivets.

DISCUSSION—

A primary example of this is a bolt that joins a handle or light to the body of the shield.

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floating gauge, *n*—a depth gauge that rests on the surface of the backing material.

gate, *n*—the lower and upper test threat velocity limits.

hard armor, *n*—an item of personal protective equipment that is constructed of rigid materials and is intended to protect the wearer from threats that may include ballistic threats, stabbing, fragmentation, or blunt impact, or combinations thereof; synonymous with *hard armor plate* and *plate*.

hard armor plate, *n*—See *hard armor*.

head protection, *n*—the ensemble consisting of helmet, face shield, straps, padding, and other accessories designed to protect the user’s head.

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impactor, *n*—cylindrical device, used during verification of the backing material, having specified dimensions and one hemispherical end.

in conjunction, *adj*—intended to be used with another material or item in close proximity to either surface of the protective product.

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in conjunction with armor, *n*—soft or hard armor that is designed to provide a specific level of ballistic protection only when layered with a specified model(s) of body armor.

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in conjunction with armor applique, *n*—an armor applique that is designed to provide a specific level of ballistic protection only when layered with a specified model(s) of ballistic-resistant shield, helmet, or other protective product.

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insert, *n*—a removable unit of protective material (soft armor or hard armor) intended to be placed into a special pocket on a carrier to enhance protection in a localized area.

mid-sagittal plane, *n*—the plane, perpendicular to the basic and coronal planes, which symmetrically bisects the head.

DISCUSSION—

See Fig. 2 for a pictorial representation.

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mold box, *n*—a frame used in creation of the mold to contain and give shape to fluid material while it sets up.

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.

obliquity, *n*—the angle between the test threat line of aim and the line normal to a reference plane based on features of the test item at the point of aim. (Adapted from MIL-STD-3027.) See also *angle of incidence*.

DISCUSSION—

Some standards have used the terms *angle of incidence* and *obliquity* as synonyms, but in this standard, they are defined differently. Fig. 1 provides examples to aid in visualizing the difference between *angle of incidence* and *obliquity*.