



Designation: E3003 – 20

## Standard Practice for Body Armor Wearer Measurement and Fitting of Armor<sup>1</sup>

This standard is issued under the fixed designation E3003; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This practice provides measurement and fit guidance for soft ballistic-resistant or stab-resistant body armor, or both, covering the torso. Proper measurement of the wearer and fitting of armor to that individual are necessary to obtain sufficient coverage of the torso and vital organs while allowing the full range of motion required for officer operations.

1.2 This practice is primarily directed toward law enforcement and corrections officers and addresses measurements for and fit of concealable (normal duty) body armor worn under or over the uniform for both male and female wearers. This practice addresses only body armor composed of front and back protective panels contained within a carrier that positions and holds the panels on the torso.

1.3 This practice can be used to train individuals on proper measurement techniques and to train wearers on proper fitting of body armor.

1.4 Measurement guidance is provided in Section 5 of this practice.

1.5 Guidance for use of a tape measure is provided in Section 6 of this practice.

1.6 Guidance for use of sizing vests is provided in Section 7 of this practice.

1.7 A personal armor fit assessment is provided in Section 8 for use by wearers.

1.8 *Units*—English units are specified in this practice to be consistent with measurement units used in the United States body armor community. Approximate values in SI units are given in parentheses.

1.9 *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.*

<sup>1</sup> This practice 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).

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1.10 *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*:<sup>2</sup>

D5219 Terminology Relating to Body Dimensions for Apparel Sizing

E3005 Terminology for Body Armor

F1731 Practice for Body Measurements and Sizing of Fire and Rescue Services Uniforms and Other Thermal Hazard Protective Clothing

### 3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *armhole, n*—in garment construction, the area of a garment through which the arm passes or into which a sleeve is fitted (Practice F1731 – 96 (2013)).

3.1.2 *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 (Terminology E3005).

3.1.2.1 *Discussion*—Law enforcement and corrections officers typically refer to body armor as a *vest*.

3.1.3 *cervicale, n*—the superior palpable point of the spine of the seventh cervical (C7) vertebra. (2012 Anthropometric Survey of U.S. Army Personnel: Methods and Summary Statistics (ANSUR II))<sup>3</sup>; the most protruding vertebrae at the back of the base of the neck. Refer to Fig. 1 and Fig. 2.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Gordon CC, Blackwell, C.L., Bradtmiller B, Parham, J.L., Barrientos, P., Paquette, S.P., Corner, B.D., Carson, J.M., Venezia, J.C., Rockwell, B.M., Mucher, M., and Kristensen, S. "2012 Anthropometric Survey of U.S. Army Personnel: Methods and Summary Statistics (ANSUR II)" NATICK/TR-15/007. U.S. Army Natick Soldier Research, Development, and Engineering Center, Natick, MA., Final Report October 2010 – April 2012, published December 2014. Available from DTIC ADA611869 (<https://apps.dtic.mil/dtic/tr/fulltext/u2/a611869.pdf>).

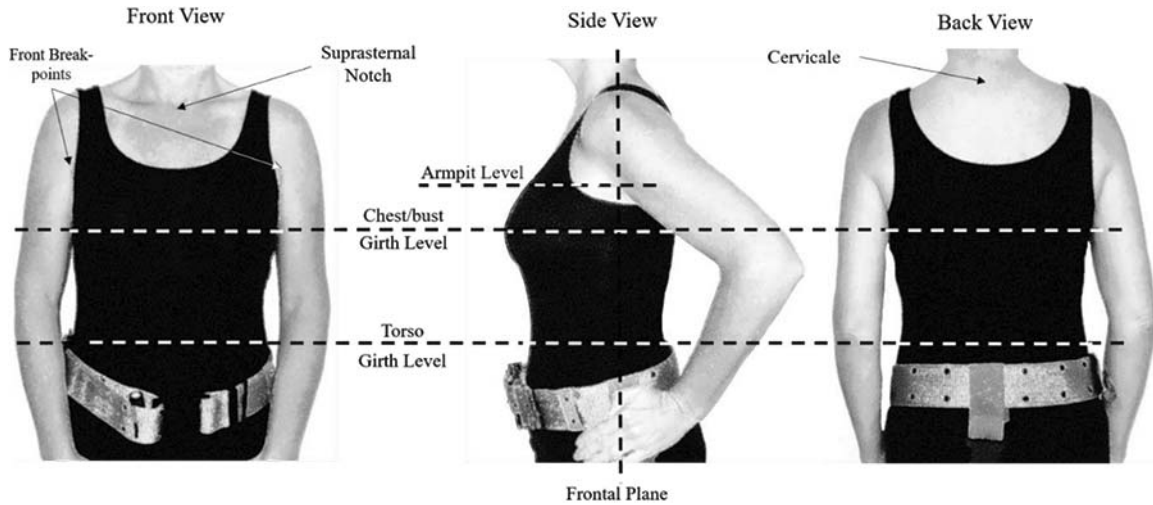


FIG. 1 Female Torso Body Landmarks

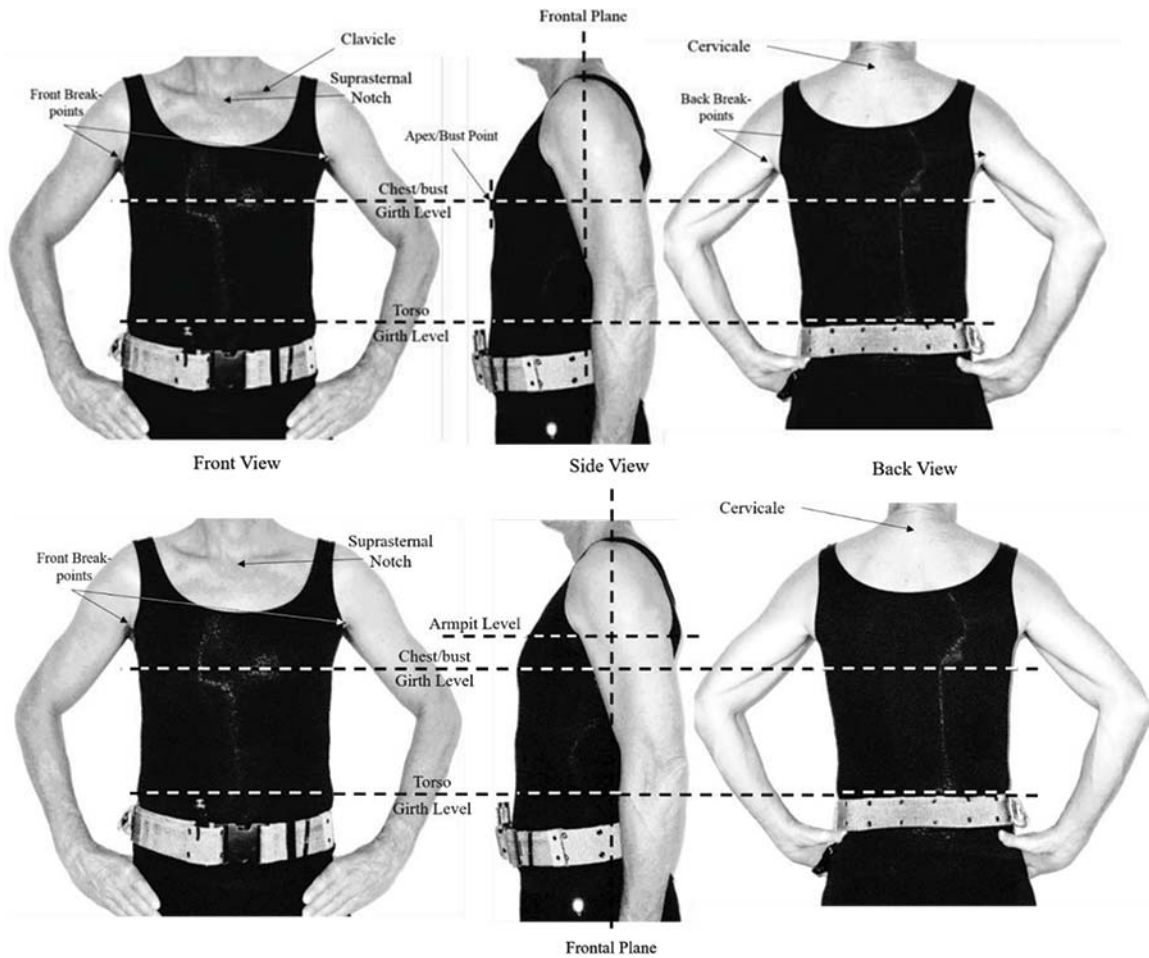


FIG. 2 Male Torso Body Landmarks

3.1.4 *chest/bust girth, n*—the horizontal circumference around the torso, taken under the arms and at the level of the apex (Terminology D5219). See Fig. 1 and Fig. 2 showing the location of this measurement.

3.1.5 *chest width, n*—the horizontal distance straight across the chest between the front break-points. Refer to Fig. 3 for the location of this measurement.

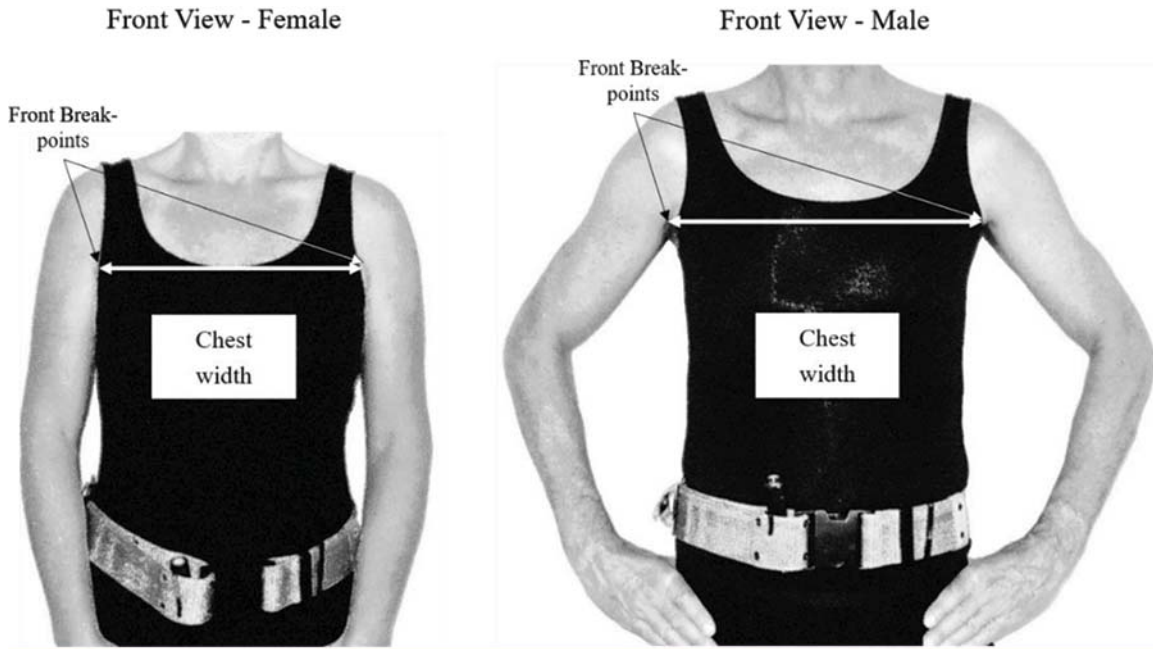


FIG. 3 Chest Width

3.1.6 *chest width, shooting stance, n*—the horizontal distance straight across the chest between the front break-points, taken while the wearer is in the shooting stance. See *shooting stance*.

3.1.7 *concealable armor, n*—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 (Terminology E3005).

3.1.8 *duty belt, n*—a belt worn around the waist by law enforcement and corrections personnel to which essential equipment is attached.

3.1.9 *fit, n*—the quality, state, or manner in which the length and closeness of clothing, when worn, relates to the human body (Practice F1731 – 96 (2013)); a characteristic of an

individual body armor relative to the wearer that encompasses coverage, comfort, and functionality.

3.1.10 *front break-point, n*—the location on the front of the torso where the arm separates from the torso (Terminology D5219). Refer to Fig. 1 and Fig. 2.

3.1.11 *front center length, n*—the vertical distance from the bottom of the suprasternal notch to the top of the duty belt. See Fig. 4 and Fig. 5 for the location of this measurement.

3.1.12 *shooting stance, n*—body and arm positioning of a shooter relative to the target when preparing to fire a handgun. For this standard, the shooting stance shall be hands together with both arms extended and parallel to the ground.

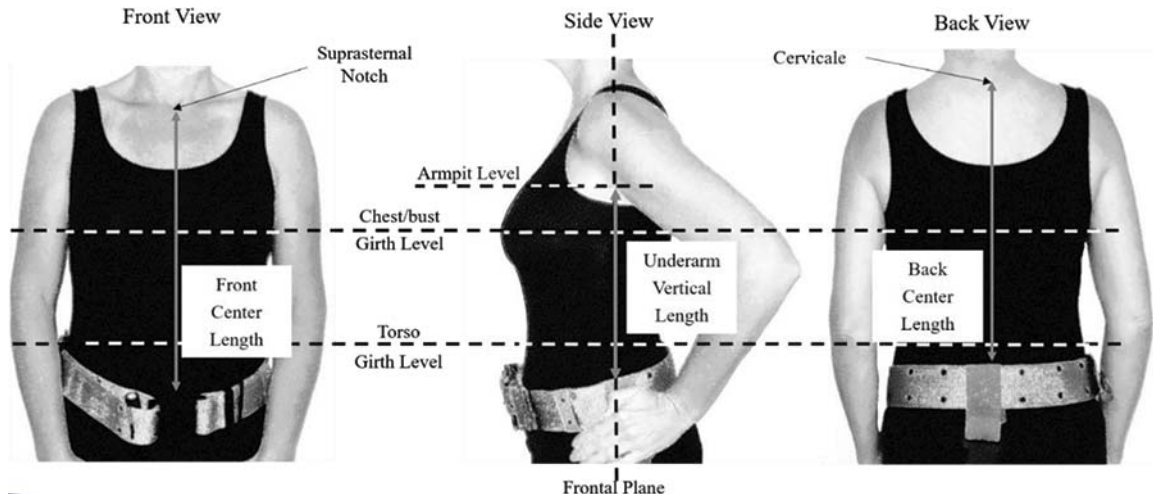


FIG. 4 Female Torso Vertical Measurements