



Standard Test Method for Determining the Longitudinal Load Required to Detach High Heels from Footwear¹

This standard is issued under the fixed designation F 2232; 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 This method covers the determination of the force required to detach the heel from footwear through the application of longitudinal tensile force at a constant displacement rate. The longitudinal test force simulates the most common heel failure mode. Heel height of 20 mm ($1\frac{3}{16}$ in.) or larger is needed to perform this test method properly. Most women's medium and high heeled footwear meets this requirement.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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

2. Referenced Documents

2.1 ASTM Standards:

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications²

E 105 Practice for Probability Sampling of Materials²

E 122 Practice for Calculating Sample Size to Estimate, With a Specified Tolerable Error, the Average for Characteristic of a Lot or Process²

E 456 Terminology for Relating to Quality and Statistics²

2.2 European Standard:

EN 12785 Footwear, Test Method for Whole Shoes—Heel Attachment³

2.3 ANSI Standard:

ANSI Z41-1999 American National Standard for Personal Protection—Protective Footwear⁴

3. Terminology

3.1 Definitions:

3.1.1 *forefoot*—the portion of the shoe extending forward from the break of the joint to the toe, also called forepart.

3.1.2 *heel attachment strength*—the force in pounds measured under the testing conditions of Test Method F 2232 required to detach the heel from the sole/insole assembly.

3.1.3 *heel breast*—the front face of the shoe heel.

3.1.4 *heel height*—the vertical distance from the top back edge of the heel to the plane of the tread (wear) surface of the heel.

3.1.5 *insole*—the part of the shoe that is a structural anchor to which the upper and heel are fastened during manufacture. It may or may not be covered on the foot side by material referred to as a socklining.

3.1.6 *outsole*—the bottom (sole) of the shoe: including the surface which is exposed to wear.

3.1.7 *seatboard*—a reinforcement (if used) of the insole where the heel is attached.

3.1.8 *shank*—a reinforcement in the arch (instep) of the shoe between the insole and outsole made from steel, wood, fiberboard or plastic (individually or in combination).

3.1.9 *shankboard*—the back part of the insole which is fabricated from a firm fiberboard. It is contoured to the arch of the foot for support.

3.1.10 *top piece (toplift)*—the bottom layer of a heel (wear surface) usually made of leather, rubber, plastic, steel, or elastomers.

3.2 For definitions of other terms relating to footwear, refer to the Footwear Products Glossary.⁵

4. Significance and Use

4.1 Since the heel is an integral support element of the shoe, the heel-attaching strength is a significant factor in ensuring the wearer's safety, as well as the longevity and serviceability of the shoe.

4.2 This test should be performed on each new style shoe and when any changes are made in the design, material or

¹ This test method is under the jurisdiction of ASTM Committee F13 on Safety and Traction for Footwear and is the direct responsibility of Subcommittee F13.20 on Biomechanics and Footwear Construction.

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² *Annual Book of ASTM Standards*, Vol 14.02.

³ Orders for all BSI, International and foreign standards publications should be addressed to Customer Service.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

⁵ Available from American Apparel & Footwear Assoc. (AAFA), 1601 N. Kent St., Suite 1200, Arlington, VA 22209.