



Designation: F3445 – 21

Standard Specification for Performance Requirements when Evaluating Slip Resistance of Protective (Safety) Footwear using ASTM F2913 Whole Shoe Test Method¹

This standard is issued under the fixed designation F3445; 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 specification covers minimum slip resistance requirements for the performance of protective (safety) footwear and is intended to help reduce potential injuries. Controlled laboratory tests used to determine compliance with this performance specification shall not be deemed as establishing performance levels for all situations to which individuals may be exposed to.

1.2 The cited Test Method F2913 allows for testing of alternative flooring or contaminants, or both. It is suggested that testing those alternatives be considered should specific workplace hazards exist.

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

1.4 *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.*

1.5 *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

F1646 Terminology Relating to Walkway Safety and Footwear

¹ This specification is under the jurisdiction of ASTM Committee F13 on Pedestrian/Walkway Safety and Footwear and is the direct responsibility of Subcommittee F13.30 on Footwear.

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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.

F2413 Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear

F2892 Specification for Performance Requirements for Soft Toe Protective Footwear (Non-Safety / Non-Protective Toe)

F2913 Test Method for Measuring the Coefficient of Friction for Evaluation of Slip Performance of Footwear and Test Surfaces/Flooring Using a Whole Shoe Tester

3. Terminology

3.1 For general definitions of terms, refer to Test Method F2913 along with Terminology F1646.

3.2 Definitions:

3.2.1 *protective footwear, n*—footwear that is designed, constructed, and tested in accordance with noted ASTM standards to protect the wearer from a potential hazard or hazards.

4. Classification

4.1 Protective footwear manufactured to meet a minimum slip performance requirement for a specific hazard or hazards. This standard is intended to be a standalone performance specification for all protective footwear including those noted within Specifications F2413 and F2892.

5. Materials and Manufacture

5.1 US Men's size 9, US Women's size 8, regular or medium width finished footwear. If medium or regular footwear is not produced, testing must be performed on the available width.

5.2 Whole Shoe Slip Tester in compliance with the requirements of Test Method F2913.

5.3 Quarry tile per Test Method F2913 section marked "Calibration and Standardization—Test Surfaces (Floorings) and Lubricants."

5.4 Distilled or deionized water per Test Method F2913 section marked "Calibration and Standardization—Test Surfaces (Floorings) and Lubricants."

6. Workmanship, Finish, and Appearance

6.1 New finished footwear as per Test Method **F2913**.

7. Sampling

7.1 Three half pairs, representing both feet, of each gender intended to be provided for sale, per **5.1**.

8. Number of Tests

8.1 Per Test Method **F2913**, testing to be performed using forward heel and backward forepart slip modes only. Testing shall be performed on both dry and wet quarry tile.

NOTE 1—Test Method **F2913** requires five consecutive results of the measurement that do not show a systematic increase or decrease of more than 10 % of the initial reading: The arithmetic mean COF of the last sequence of five results is calculated and reported to 2 decimal places.

9. Specimen Preparation

9.1 Per Test Method **F2913**.

10. Required Retesting and Recertification

10.1 The following are reasons for retesting and recertification:

10.1.1 A change in the supplier for each of the bottoming components and or production locations of them.

10.1.2 A change in the puncture resistant device, outsole design, compound or hardness, including the midsole.

10.1.3 A change in the footwear construction method i.e. direct attached, cemented, welted, etc.

10.1.4 A change in the footwear manufacturing site.

10.1.5 A change in the last.

NOTE 2—Changes to the upper design and materials used are permitted and do not require retesting and recertification.

11. Performance Requirements

11.1 Each footwear specimen shall have a COF of no less than 0.40 when tested in both heel and forepart modes using wet and dry quarry tile. The COF is the arithmetic mean (average) of five consecutive results for each specimen when tested per Test Method **F2913**.

12. Reporting of Results and Certificate of Conformance (COC)

12.1 With each standard date revision, shoe manufactures/providers are required to re-certify existing styles within one year of the issuing date.

12.2 With the issuance of a revised standard, certification of new product to any prior year date standard is not allowed.

12.3 A test report and a Certificate of Conformance (COC) shall be issued by a 3rd Party laboratory.

12.4 The test report shall include but not be limited to:

12.4.1 Third Party laboratory name, contact information and authorization signature(s).

12.4.2 Reference to Test Method **F2913** and Specification F3445-21.

12.4.3 Full description of the sample footwear, including any manufacturer's reference (Product Category, style, model, SKU etc.), size, width and gender.

12.4.4 For each style and size tested, report the arithmetic mean (average) for each individual specimen.

12.4.5 The atmosphere (temperature and humidity) under which the footwear was conditioned and tested.

12.4.6 Any modification of the test methods.

12.5 The Certificate of Conformance (COC) shall include but not be limited to:

12.5.1 Third Party laboratory name, contact information and authorization signature(s).

12.5.2 Name of company the Certificate of Compliance (COC) is issued to.

12.5.3 Certification issue date.

12.5.4 Report number and issue date associated with this Certificate of Compliance (COC).

13. Product Marking

13.1 Labeling and identification of protective footwear is essential to ensure the wearer that footwear meets the required minimum performance of this specification.

13.2 The label can be either a stitched in, stamped, pressure sensitized label or otherwise permanently incorporated. The identification shall be placed on the inside or outside surface of either the tongue, gusset, shaft or quarter lining in one half pair. It shall be placed above or below any other ASTM standard markings (for example, **F2413** or **F2892**).

13.3 The print size on label shall measure 3.175 mm (0.125 in.) or larger and be clearly visible.

13.4 Line 1 shall identify that the footwear complies with Specification F3445-21.

13.5 Line 2—(SR)—Identifies protection against slip hazards.

14. Keywords

14.1 COF; footwear; forepart; heel; protective footwear; safety footwear; slip resistance; slip tester; sole; soling material; whole shoe