AFSA FS102-26

AMERICAN FLOOR SAFETY ALLIANCE STANDARD METHOD FOR SUSTAINABLE SLIP RESISTANCE TESTING

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FOREWORD

This standard establishes a wear-conditioning protocol for evaluating the durability of slip resistance on pedestrian surface materials. Developed and ratified by the American Floor Safety Alliance (AFSA), the AFSA FS102-26 method extends the measurement framework of AFSA FS101-25 by introducing a controlled abrasion procedure designed to approximate accelerated in-service wear under wet, contaminated conditions.

The AFSA is a coalition of national and international authorities in slip resistance testing, tribometry, forensic engineering, human biomechanics, surface chemistry, and safety compliance auditing. Its members are field practitioners, litigation experts, and standards architects responsible for raising the technical bar on slip-and-fall prevention across commercial, institutional, and public environments.

This method does not measure new-surface slip resistance in isolation; it measures whether that slip resistance is sustainable. A surface that meets the Low Slip Potential threshold of FS101-25 when first installed but fails to retain useful traction after wear, contamination, and cleaning cycles presents a foreseeable hazard. AFSA FS102-26 provides a quantifiable basis for distinguishing initial performance from sustained performance, giving specifiers, owners, and forensic professionals a defensible benchmark for long-term flooring selection.

Consensus approval by the AFSA confirms that this document is the product of technical scrutiny by qualified practitioners. While not every member may agree with every clause, the standard embodies the collective expertise and professional integrity of contributors active in walkway safety.

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Disclaimer

The American Floor Safety Alliance (AFSA) and the contributors to this standard have exercised due diligence in the development of the AFSA FS102-26 Sustainable Slip Resistance Test Method. AFSA makes no warranties, expressed or implied, regarding the accuracy, completeness, or suitability of the information contained herein for any particular purpose. This test method is intended solely to evaluate the sustainability of slip resistance on pedestrian surfaces under controlled laboratory or field conditions using a defined abrasion protocol followed by pendulum measurement per AFSA FS101-25. It assumes normal pedestrian gait by individuals who are not anticipating or attempting to avoid surface contamination. It is not designed to replicate deliberate evasive movements, running, jumping, or movements associated with impairment, distraction, or unusual footwear. Users of this method are solely responsible for interpreting the results in the context of actual site conditions, including traffic patterns, footwear variability, environmental exposures, maintenance practices, and other safety factors. The AFSA disclaims any responsibility or liability for injuries, damages, losses, or legal outcomes arising from the use, misuse, or misinterpretation of this standard or data derived from it. Compliance with this standard does not imply that a surface is "safe" or that all hazards have been eliminated. Slip resistance testing should be one component of a broader risk management program. Use of this document signifies acceptance of these terms and acknowledgment that the AFSA bears no responsibility for decisions made based on the information herein.

1 SCOPE

1.1 This standard specifies a procedure for evaluating the sustainability of slip resistance on pedestrian surface materials. The method consists of an initial wet pendulum test, a controlled wet abrasion conditioning step, and a post-abrasion wet pendulum test, with results compared to evaluate retained slip resistance.

1.2 This method is applicable to:

- Newly manufactured pedestrian surface materials, flooring installed in situ, and floor treatments (anti-slip coatings, etch treatments, applied texturing).
- Hard pedestrian surfaces (porcelain tile, natural stone, concrete, terrazzo) and resilient surfaces (vinyl, laminate, sealed wood, polymer coatings).
- Laboratory specimens and field-installed surfaces, provided the test specimen can be securely held or accessed during abrasion conditioning.

1.3 This method is intended as a comparative wear-conditioning procedure. It does not replicate every real-world pedestrian traffic condition and shall not be interpreted as an exact predictor of in-service life. Refer to Section 10 for guidance on interpretation and limitations.

1.4 Pendulum measurements performed before and after the abrasion procedure described in this standard shall be conducted in accordance with AFSA FS101-25.

2 DEFINITIONS

2.1 Sustainable Slip Resistance: The capacity of a pedestrian surface to retain a defined level of wet slip resistance after exposure to a controlled abrasion procedure intended to approximate accelerated in-service wear.

2.2 Abrasion Cycle: One complete forward-and-return stroke of the abrasion apparatus across the test surface over the prescribed stroke length of approximately 150 mm.

2.3 Abrasion Apparatus: A weighted holder, manual or mechanical, that supports an abrasive pad and applies a defined normal force to the test surface during the abrasion procedure.

2.4 Initial Pendulum Test Value (PTV_0): The wet pendulum test value obtained on the test surface prior to abrasion conditioning, measured per AFSA FS101-25.

2.5 Post-Abrasion Pendulum Test Value (PTV_a): The wet pendulum test value obtained on the same test surface, in the same orientation and at the same location, after completion of the abrasion procedure defined in this standard.

2.6 Retention Ratio: The ratio of PTV_a to PTV_0, expressed as a percentage. The Retention Ratio is a secondary diagnostic indicator and is not, by itself, a pass criterion.

2.7 Pendulum Friction Tester: An instrument compliant with AFSA FS101-25 used to obtain PTV measurements before and after abrasion.

3 APPARATUS

3.1 Pendulum Friction Tester

3.1.1 A pendulum friction tester meeting the requirements of AFSA FS101-25, Section 3.2, including calibration, leveling, and slider hardness verification.

3.1.2 The same pendulum unit and slider shall be used for both the initial and post-abrasion measurements. The slider shall not be reconditioned between the initial and post-abrasion assessments so that the effect of surface wear may be evaluated without introducing additional variability from slider resurfacing.

3.2 Slider

3.2.1 Either the Slider 96 (Four S rubber, IRHD 96 ± 2) or Slider 55 (TRL rubber, IRHD 55 ± 5) may be used, selected according to the intended use environment of the surface under evaluation. Both sliders shall be used where the surface serves both shod and barefoot traffic.

3.3 Abrasion Apparatus

3.3.1 The abrasion apparatus shall consist of either:

- A mechanical reciprocating abrasion device, or
- A manually operated abrasion block or hand trowel capable of maintaining consistent contact with the test surface.

3.3.2 The abrasion surface shall consist of a 100 mm × 100 mm section of 3M Scotch-Brite green scouring pad or an equivalent industrial nonwoven abrasive of comparable grade.

3.3.3 The total downward applied mass of the abrasion apparatus, including the holder, attached weights, fastening materials, and abrasive pad, shall be 1000 ± 10 grams.

3.3.4 The abrasion apparatus shall be configured such that the abrasive pad remains substantially flat and in continuous contact with the test surface throughout the abrasion procedure.

3.3.5 The abrasion stroke length shall be approximately 150 mm.

3.3.6 Abrasion may be conducted manually or mechanically at a moderate and reasonably consistent speed approximating one cycle per second.

3.4 Auxiliary Equipment

3.4.1 Spray bottle with distilled water sufficient to maintain heavy saturation of both the test surface and abrasive pad throughout the abrasion procedure.

3.4.2 Clean microfiber or terry cloth towels for surface drying between phases where required.

3.4.3 Permanent marker, masking tape, or equivalent means to identify the boundaries of the test area on the specimen so that the abrasion zone, the initial test zone, and the post-abrasion test zone coincide.

3.4.4 A balance or scale of suitable resolution to verify the total applied mass of the abrasion apparatus within the tolerance specified in 3.3.3.

4 TEST SURFACE PREPARATION

4.1 Testing shall be conducted in the as-found condition unless a specific cleaning protocol is part of the evaluation scope. Where cleaning is performed, use a neutral pH detergent followed by thorough rinsing with potable water and drying.

4.2 For laboratory specimens, the test surface shall be securely affixed to a stable substrate to prevent any movement during pendulum measurement or abrasion conditioning.

4.3 Identify and mark the test area on the specimen before testing begins. The marked zone shall accommodate the full 125–127 mm pendulum contact path and the approximately 150 mm abrasion stroke length, with sufficient surrounding margin to allow consistent positioning for the post-abrasion pendulum test.

4.4 For profiled, textured, or directional surfaces, the orientation of both the pendulum swing and the abrasion stroke shall be the same in the initial and post-abrasion phases. Orientation should be selected per AFSA FS101-25 to produce the lowest expected PTV (typically diagonal to surface protrusions, or parallel to grain in directional materials).

5 INITIAL PENDULUM TESTING

5.1 Condition the pendulum slider in accordance with AFSA FS101-25, Section 5.

5.2 Set up the pendulum friction tester per AFSA FS101-25, Section 6.2, verifying level, zero return, and a 125–127 mm contact path.

5.3 Conduct wet pendulum testing per AFSA FS101-25, Section 6.3:

- Apply a continuous, uniform film of distilled water across the test area to achieve surface saturation.
- Perform two preliminary warm-up swings.
- Record five consecutive test swings. Calculate the mean of the five values as the Initial Pendulum Test Value (PTV_0).
- If the spread between the highest and lowest of the five recorded values exceeds 5 PTV, continue testing until five consecutive values fall within this range.

5.4 Record PTV_0, the five individual swing values, the slider type, the surface orientation, the test temperature, the relative humidity, and the pendulum calibration due date.

6 ABRASION CONDITIONING PROCEDURE

6.1 Secure the test specimen to prevent movement during abrasion conditioning. The use of a permanent marker, masking tape, or equivalent means is recommended to clearly identify the area of the test surface to be tested, abraded, and then tested again.

6.2 Attach a 100 mm × 100 mm section of 3M Scotch-Brite green scouring pad (or equivalent) to the abrasion apparatus.

6.3 Verify that the total applied mass of the apparatus, including the abrasive pad, is 1000 ± 10 grams.

6.4 Prior to abrasion conditioning, heavily saturate both the abrasive pad and the test surface using distilled water.

6.5 Conduct 500 abrasion cycles across the test surface.

6.5.1 One cycle shall consist of one complete forward-and-return movement across the surface.

6.5.2 The abrasion path shall be approximately 150 mm in length.

6.6 Maintain heavy saturation of both the abrasive pad and the test surface with distilled water throughout the abrasion procedure. Re-wet as needed; the surface and pad shall never be allowed to run dry during conditioning.

6.7 Following completion of the abrasion procedure, remove loose debris from the surface using distilled water and clean towels, if necessary. Do not introduce detergents, solvents, or polishing agents at this stage.

6.8 The pendulum slider shall not be reconditioned between the initial and post-abrasion pendulum assessments so that the effect of surface wear may be evaluated without introducing additional variability from slider resurfacing.

7 POST-ABRASION PENDULUM TESTING

7.1 Following abrasion conditioning, conduct pendulum testing in accordance with AFSA FS101-25 using the same slider type, the same pendulum unit, and the same surface orientation utilized during the initial assessment.

7.2 Apply a continuous, uniform film of distilled water across the test area to achieve surface saturation.

7.3 Perform two preliminary wet pendulum swings prior to recording official test values.

7.4 Record five consecutive wet pendulum readings and calculate the average of those five readings as the Post-Abrasion Pendulum Test Value (PTV_a). If the spread between the highest and lowest values exceeds 5 PTV, continue testing until five consecutive values fall within this range.

8 SUSTAINABLE SLIP RESISTANCE CLASSIFICATION

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SUSTAINABLE SLIP RESISTANCE CLASSIFICATION

High Slip Potential	**0–24**
Moderate Slip Potential	**25–34**
Sustainable Low Slip Potential	**35–54**
Sustainable Very Low Slip Potential	**≥55**

Classification thresholds apply to the Post-Abrasion Pendulum Test Value (PTV_a) only. Initial PTV thresholds remain governed by AFSA FS101-25.

8.1 Sustainability classifications under this standard are defined by the Post-Abrasion Pendulum Test Value (PTV_a) as shown in the classification chart above. Surfaces achieving a PTV_a of 35 or greater are classified as demonstrating Sustainable Low Slip Potential. Surfaces achieving a PTV_a of 55 or greater are classified as demonstrating Sustainable Very Low Slip Potential.

8.2 Consideration shall be given to the intended installation environment. Surfaces installed on steep ramps, pool decks, exterior wet areas, or other locations identified in AFSA FS101-25 Appendix A as requiring elevated minimum PTV thresholds shall meet the higher PTV_a threshold appropriate to that location.

8.3 A surface that meets AFSA FS101-25 Low Slip Potential in the initial test but falls below 35 in the post-abrasion test shall not be classified as Sustainable Low Slip Potential, regardless of its initial value. The post-abrasion result governs the sustainability classification.

8.4 The Retention Ratio defined in Section 7.5 may be reported alongside the classification as a supplemental diagnostic indicator. A Retention Ratio below 70% on a surface that nominally passes $PTV_a \geq 35$ indicates pronounced wear sensitivity and warrants further investigation.

9 TEST REPORT REQUIREMENTS

9.1 A test report prepared under this standard shall include:

- Initial wet Pendulum Test Value (PTV_0), including the five individual swing values used to calculate the mean.
- Post-Abrasion wet Pendulum Test Value (PTV_a), including the five individual swing values used to calculate the mean.
- Retention Ratio expressed as a percentage.
- Sustainable Slip Resistance Classification per Section 8.

- Slider type and hardness (Slider 96 or Slider 55).
- Number of abrasion cycles completed (500 unless otherwise specified and justified).
- Total applied abrasion mass, measured.
- Abrasive pad type, batch (if available), and condition at start of test.
- Test temperature and relative humidity at the time of pendulum measurements.
- Pendulum calibration due date.
- Identification of the test specimen (flooring name, batch, type, manufacturer where available).
- Location of test (laboratory or field site).
- Date of test and unique test number.
- Name of testing agency and relevant contact information.
- Photographs of the test area before and after abrasion conditioning.
- Reference to this standard as “AFSA FS102-26 Sustainable Slip Resistance Test.”

10 CONSIDERATIONS

10.1 This method is a comparative wear-conditioning procedure. It does not replicate every real-world pedestrian traffic condition.

10.2 Actual field performance may vary substantially depending upon:

- Cleaning procedures and frequency.
- Surface maintenance, including resurfacing or recoating.
- Environmental exposure (UV, freeze-thaw, chemical, biological).
- Traffic intensity, including the proportion of carted, wheeled, or heeled traffic.
- Contaminants introduced from inside and outside the facility, including grease, soaps, and particulate matter.
- Footwear conditions, including wear state and outsole compound.
- Surface aging characteristics intrinsic to the flooring material.

10.3 This method was developed in part from abrasion concepts described in published research and field practices associated with sustainable slip resistance evaluation, including work attributed to Carl Strautins of Safe Environments Pty Ltd, Australia.

10.4 This method was originally developed to approximate one to two years of heavy pedestrian traffic exposure in high-use commercial environments such as fast-food restaurants. Higher abrasion cycle counts may approximate additional service wear exposure. The relationship between abrasion cycles and actual field service life will vary substantially depending upon flooring type, maintenance practices, environmental conditions, contaminants, pedestrian traffic, and other variables. This method shall not be interpreted as an exact predictor of real-world service life.

10.5 Where this test is used to compare two or more flooring products or treatments, all specimens shall be conditioned and tested by the same operator, using the same pendulum unit, the same

slider, and the same batch of abrasive pad, to minimize between-specimen variability attributable to apparatus or operator effects.

10.6 Pendulum measurements performed under this standard are not interchangeable with, or directly convertible to, Dynamic Coefficient of Friction (DCOF) values obtained from tribometers such as the BOT-3000E. Refer to AFSA FS101-25 for guidance on the non-equivalence of these methods.

10.7 Where the surface under evaluation is a coating, treatment, or topical product, the test report shall identify the substrate to which it was applied, the application method, the cure time prior to initial testing, and any priming or surface preparation that preceded application. Sustainable slip resistance results for coatings are valid only on the substrate type tested.