



Standard Terminology Relating to Safety and Traction for Footwear¹

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1. Scope

1.1 This terminology standard covers terminology used in safety and traction for footwear and related material.

1.2 Words adequately defined in standard dictionaries are not included. Included are words that are particular to this industry.

NOTE 1—The following standards are currently under the jurisdiction of ASTM Committee F13 on Safety and Traction for Footwear and are included in 2.1: Test Methods F489, F609, and F694; Practices F695 and F1637; and Guides F802 and F1240.

2. Referenced Documents

2.1 ASTM Standards:²

D5859 Test Method for Determining the Traction of Footwear on Painted Surfaces Using the Variable Incidence Tester³

F489 Test Method for Using a James Machine³

F609 Test Method for Using a Horizontal Pull Slipmeter (HPS)

F694 Test Method for Heel-Attaching Strength of Women's Shoes³

F695 Practice for Ranking of Test Data Obtained for Measurement of Slip Resistance of Footwear Sole, Heel, and Related Materials

F802 Guide for Selection of Certain Walkway Surfaces When Considering Footwear Traction³

F1240 Guide for Ranking Footwear Bottom Materials on Contaminated Walkway Surfaces According to Slip Resistance Test Results

F1637 Practice for Safe Walking Surfaces

F1694 Guide for Composing Walkway Surface Investigation, Evaluation and Incident Report Forms for Slips,

Stumbles, Trips, and Falls

F2508 Practice for Validation and Calibration of Walkway Tribometers Using Reference Surfaces

3. Terminology

adhesion, *n*—the tendency of one surface to adhere to another surface prior to movement due to dwell time, as well as other factors.

arch, *n*—the bony framework of the foot extending from the heel to the toes and sustained by the muscles and ligaments in the form of an arch. Also, the bottom curve of a shoe last from heel to ball.

barefoot, *adv or adj*—with the feet uncovered or unclothed; without shoes or stockings.

bollard, *n*—a thick, low, short, post, often of iron or steel and usually used in series, provided for the purpose of excluding or diverting motor vehicles from a road, lawn, or path.

F1637

breast, *n*—the forward or front face of a shoe heel.

calibration, *n*—the set of operations that establishes, under specified conditions, the relationship between the values obtained by a walkway tribometer and the corresponding supplier reference values.

F2508

carpet, *n*—permanently secured fibrous floor covering.

DISCUSSION—Area rugs, mats, and runners are not considered to be carpet for the purpose of this practice.

F1637

clean, *n*—free from visible or tactile contamination.

coating, *n*—a layer of any substance intentionally applied to a surface to modify its functional or decorative characteristics.

coefficient-of-friction (COF or μ), *n*—a dimensionless number: the ratio of two forces acting at the interface of two contacting solid bodies. The force used in the numerator is parallel to the surfaces and the force used in the denominator is perpendicular (normal) to the surfaces. See also *dynamic coefficient of friction*.

coefficient of friction (COF), *n*—the ratio of the horizontal component of force (parallel to the walkway surface and passing through the tester center of gravity) required to overcome the friction to the normal component of the vertical force (weight) of the object.

D5859

coefficient of friction, *n*—the ratio of the frictional force to the force, usually gravitational, acting perpendicular to the two surfaces in contact. This coefficient is a measure of the

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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 Withdrawn. The last approved version of this historical standard is referenced on www.astm.org.

relative difficulty with which the surface of one material will slide over an adjoining surface of itself, or of another material. The static or starting coefficient of friction (μ_s) is related to the force measured to begin movement of the surfaces relative to each other. The kinetic or sliding coefficient of friction (μ_k) is related to the force measured in sustaining this movement. **F489**

contaminant, *n*—any substance between and not a part of either of the two surfaces; *contaminant*, *contaminating*, *contamination*.

contamination, *n*—any undesirable solid or liquid material that rests upon a surface or exists between two mating surfaces; *contaminant*, *contaminating*.

contra lateral, *adj*—located, occurring, or acting on the opposite side of the body.

cross slope, *n*—the slope of a pedestrian walkway that is perpendicular to the direction of travel. **F1637**

dwelt time, *n*—the duration of time beginning at the instant a tribometer's test foot is placed upon the surface to be tested, and ending at the instant a shear force is applied to the sensor.

dynamic coefficient of friction (DCOF), *n*—a coefficient of friction, μ_d , obtained during relative translation between two contacting solid bodies; used interchangeably with *kinetic coefficient of friction*.

element, *n*—an identifiable part of an architectural component, for example, a stair handrail, tread, riser, or landing. **F1637**

fair, *adj*—a smooth transition between adjacent surfaces. **F1637**

fall, *n*—undesirable descent due to the force of gravity, usually from a standing posture or during ambulation, to a lower level, usually the ground or floor.

fit, *n*—the ability of the shoe or hosiery to conform to the size, width, shape, and proportion of the foot.

floor surface, *n*—See *walkway surface*.

footwear, *n*—wearing apparel for the feet (such as shoes, boots, slippers, or overshoes), excluding hosiery.

footwear, *n*—shoes, including boots, sandals, slippers, or foul weather gear such as overshoes and rubbers, or a combination thereof. **F1637**

foreseeable pedestrian path, *n*—any place where a pedestrian could reasonably be expected to walk. **F1637**

foxing, *n*—a piece of material applied to the upper or extending around the outsole of a boot or shoe.

friction, *n*—resistance to the relative motion of one body sliding, rolling, or flowing over another with which it is in contact.

friction, *n*—the resistance developed between the physically contacting surfaces of two bodies when there is a movement or attempted movement of one body relative to the other parallel to the plane of contact. **D5859**

friction, *n*—the resisting force that arises when a surface of one substance slides, or tends to slide, over an adjoining surface of itself or another substance. Between surfaces of solids in contact there may be two kinds of friction: (1) the resistance opposing the force required to start to move one surface over another, and (2) the resistance opposing the

force required to move one surface over another at a variable, fixed, or predetermined speed. **F489**

heel, *n*—a solid part of a shoe or boot projecting downward and attached to or forming the back part of the sole under the heel of the foot.

heel breast, *n*—the forward or front face of a shoe heel.

heel seat, *n*—the part of a shoe to which the heel is attached.

hosiery, *n*—any covering of the foot not intended for ground contact during ambulation, such as socks, stockings, etc.

insole, *n*—that part of the shoe which is between the foot and the outsole, and to which the upper is fastened during manufacture. It may or may not be covered on the foot side by an aesthetic material referred to as a socklining. **F694**

ipsilateral, *adj*—located, occurring, or acting on the same side of the body.

mudguard, *n*—a strip of material applied to a shoe upper just above the sole intended as a protection against dampness or as an ornament.

outsole, *n*—the bottom sole of the shoe, the surface of which is exposed to wear. **F694**

paired t-test, *n*—a test of statistical significance based on the use of student's t-distribution and used to compare two sample means. **F2508**

pedestrian, *n*—a person using legs or leg surrogates (for example, prosthetic limbs, crutches, etc.) as the principal mechanism for locomotion.

planar, *adj*—flat. **F1637**

pricker points, *n*—in testing footwear, a modification of the foot form in which needle points of steel $\frac{1}{8}$ in. (3.2 mm) long are used to prevent vertical movement of the test specimen. **F694**

quarter, *n*—one side of the upper of a shoe or boot from heel to vamp.

ramp, *n*—a walkway surface that has a slope steeper than 1:20 (5 %). **F1637**

reference surfaces (RS's), *n*—specified materials, identified in Section 7 of Practice **F2508**, that have experimentally demonstrated slip properties for a select population of pedestrians and serve as references for walkway tribometer measurements. **F2508**

shank, *n*—the steel or wood piece inserted in the arch of the shoe for reinforcement. **F694**

shankboard, *n*—the back part of the insole which is fabricated from a firm fibreboard. It is contoured to the arch of the foot for support. **F694**

SIC, *n*—Standard Industrial Classification, as referenced in *Standard Industrial Classification*, Office of Statistical Standards, Executive Office of the President, Office of Management and Budget, U.S. Department of Commerce. **F1694**

sidewalk, *n*—a paved surface, such as concrete or asphalt, usually parallel and adjacent to streets. **F1637**

slip, *n*—a term denoting lubricity of two surfaces sliding in contact with each other. In a sense, it is the antithesis of friction in that high coefficient of friction denotes low slip and low coefficient of friction high slip. **F489**

slip resistance, *n*—the relative force that resists the tendency of the shoe or foot to slide along the walkway surface. Slip resistance is related to a combination of factors including the

walkway surface, the footwear bottom, and the presence of foreign materials between them.

DISCUSSION—Slip resistance is dependent upon many factors, such as material and condition of the walkway surface, material and condition of the shoe sole or heel material, the physical abilities of the user, the attempted or proposed activities of the user, the presence of any contaminants on any or both of the surfaces, and other factors.

F1637

slip resistant, *n*—the provision of adequate slip resistance to reduce the likelihood of slip for pedestrians using reasonable care on the walking surface under expected use conditions.

F1637

static slip resistance, *n*—the force required to cause one body in contact with another to begin to move. This force is generally proportional to the perpendicular force between the surfaces; the ratio of the former to the latter is called the coefficient of friction. The ratio (with the decimal point moved one place to the right) is used to designate slip index as measured by the Horizontal Pull Slipmeter.

F609

supplier, *n*—any individual, agent, company, manufacturer, or organization responsible for the walkway tribometer prior to receipt by the user.

F2508

surface characteristics, *n*—a set of terms considered to be the minimum needed to precisely describe the condition of a surface especially regarding slip resistance (material, contamination, slope, texture, hardness, coating, temperature).

test foot, *n*—shoe bottom material or surrogate mounted on the

walkway tribometer that comes into contact with the surface being tested.

F2508

top lift, *n*—the top or outer layer or wearing surface of leather, rubber, plastic, or composition on the heel of a shoe.

F694

upper, *n*—the parts of a shoe or boot that are above the sole.

validation, *n*—the set of operations that establishes, under specified conditions, the proper ranking and differentiation of reference surfaces by a walkway tribometer.

F2508

walkway, *n*—walking surfaces constructed for pedestrian usage including floors, ramps, walks, sidewalks, stair treads, parking lots and similar paved areas that may be reasonably foreseeable as pedestrian paths. Natural surfaces such as fields, playing fields, paths, walks, or footpaths, or a combination thereof, are not included.

F1637

walkway surface, *n*—a structure intended to be used by a person attempting to walk.

walkway surface hardware, *n*—includes manhole covers, cellar doors used as walking surfaces, junction box covers, cleanout covers, hatches, sidewalk elevator covers, sewer grates, utility covers, and similar elements that pedestrians can reasonably be expected to walk on.

F1637

4. Acronyms

COF—coefficient of friction

DCOF—dynamic coefficient of friction

SCOF—static coefficient of friction

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