TRIBOMETER EVIDENCE: A PLAIN-ENGLISH GUIDE FOR ATTORNEYS

What four common floor-friction instruments measure — and what their numbers can and cannot tell a jury

THE TWO QUESTIONS A JURY REALLY NEEDS ANSWERED

1. Can this instrument reliably measure the number it reports?
2. Even if the number is reliable, what does that number actually mean for a pedestrian's risk of slipping?

1. WHAT DOES EACH INSTRUMENT ACTUALLY MEASURE?

Instrument	Plain-English answer
Pendulum	A standardized Pendulum Test Value (PTV/BPN). The rubber slider strikes and moves across the surface, and the instrument measures the energy lost during that sliding contact. The procedure is defined by published standards, including ASTM E303.
BOT-3000E	Dynamic coefficient of friction (DCOF) under the conditions specified by the applicable test procedure. It is a moving/sliding measurement, but the resulting DCOF number is not automatically a prediction of whether a particular person will slip.
Slip-Test Mark IIIB	The manufacturer calls its output "transitional coefficient of friction" (TCOF). The procedure searches for the point where the test foot changes from not slipping to slipping as the instrument geometry is adjusted. Calling that output TCOF does not, by itself, establish TCOF as an independently recognized physical quantity or a pedestrian-safety scale.
English XL	The manufacturer calls the output a Slip Resistance Index (SRI), and its own materials identify the clean, dry measurement with static coefficient of friction (SCOF). The device changes mast angle until the test foot begins to slip — an onset-of-slip measurement.

2. HOW MUCH CONFIDENCE SHOULD WE PLACE IN THE NUMBER?

Instrument	Plain-English answer
Pendulum	The method has a long history of standardization, published precision work, and international use. That does not make every test perfect: operator technique, slider preparation, calibration, and test conditions still matter.
BOT-3000E	It produces a precise-looking DCOF number under a standardized procedure, but attorneys should examine the method's limitations and whether the tested surface and conditions are appropriate for the device. A display with two decimal places does not by itself establish accident-specific accuracy.
Slip-Test Mark IIIB	Published multi-user/multi-unit research reported substantial variability involving the operator, instrument unit, specimen,

	and operator-by-unit interaction. The study reported a minimum 95% uncertainty for a user's mean of about ±0.064.
English XL	The same research reported substantial variability and a minimum 95% uncertainty for a user's mean of about ±0.072. A number reported to two decimal places can therefore look much more exact than the underlying measurement evidence supports.

WHAT DOES ±0.064 MEAN TO A JURY?

Example: If a Mark IIIB mean is reported as 0.29, an uncertainty of ±0.064 corresponds roughly to 0.23–0.35. That is a total span of about 0.13 — even though "0.29" looks highly exact.

Think of a bathroom scale: Suppose the scale displays exactly 180.0 lb, but published testing shows uncertainty of ±10 lb. In plain English, the measurement should be understood as roughly 170–190 lb at that stated uncertainty level — not as proof that the person weighs exactly 180.0 lb. The decimal on the display creates an appearance of precision that the measurement system has not actually earned. The same principle applies when a tribometer reports a value such as 0.29.

Important: This is a plain-English illustration of measurement uncertainty, not a statement that every individual Mark IIIB reading of 0.29 has a literal 95% probability of lying within that interval.

3. DOES THE NUMBER TELL US WHETHER A FLOOR PRESENTS A PEDESTRIAN SLIP HAZARD?

Instrument	Plain-English answer
Pendulum	Yes, when properly performed and interpreted under the applicable PTV guidance. There is an established body of pedestrian-slip research and international guidance connecting PTV results with slip potential.
BOT-3000E	Not by itself. The governing DCOF framework places limits on using the number as a prediction that a person will or will not slip. A DCOF result should not simply be translated for a jury into "safe" or "not slippery."
Slip-Test Mark IIIB	No independently established TCOF-to-pedestrian-risk scale comparable to the PTV framework has been identified in this review. Even a perfectly repeatable TCOF number would still require evidence explaining what that number means for human slipping.
English XL	No independently established SRI/SCOF-to-pedestrian-risk framework comparable to the PTV framework has been identified here for accident-floor interpretation. The expert must establish why the reported number answers the human-safety question.

4. WHAT INDEPENDENT CONSENSUS TEST METHOD GOVERNS THE FIELD MEASUREMENT?

Instrument	Plain-English answer
Pendulum	Yes. ASTM E303-22 is a current U.S. ASTM test method, and pendulum methods are standardized internationally.
BOT-3000E	Yes for specified applications, including ANSI A326.3 DCOF testing. But a standardized measurement procedure and a

	validated pedestrian-risk interpretation are two different things.
Slip-Test Mark IIIB	No current national or international consensus field test method governing the Mark IIIB accident-floor measurement itself has been identified in this review. ASTM F2508 is a validation practice, not a Mark IIIB field test method for determining accident-floor slip risk.
English XL	Its former apparatus-specific ASTM method, F1679, was withdrawn. Attorneys should identify exactly what procedure the expert used and what independent scientific foundation supports interpreting the resulting number.

THE ENGLISH XL: IF WATER IS ADDED, WHY WOULD THE PHYSICAL QUANTITY SUDDENLY CHANGE?

The manufacturer identifies the clean, dry English XL measurement with SCOF. Merely adding water obviously can change the amount of friction, but that does not by itself demonstrate that the apparatus has begun measuring a different physical quantity. The device still searches for the onset of slip by changing mast geometry until the test foot slips. If a proponent contends that the wet output is no longer a static-friction/onset-of-slip measurement but instead a distinct "Slip Resistance Index," the useful scientific questions are: What changed in the measurement principle? What independent source defines the new quantity? And what validation demonstrates that adding water changed what quantity is being measured rather than simply changing the amount of friction? Absent that foundation, attorneys have a legitimate basis to question whether the terminology changed while the underlying onset-of-slip principle did not.

THE BOTTOM LINE

PENDULUM	The strongest of these four for direct pedestrian slip-potential interpretation when properly used: standardized methodology plus an established PTV interpretation framework.
BOT-3000E	Can produce standardized DCOF data, but the expert still must justify turning that DCOF number into an opinion about whether a pedestrian would slip.
MARK IIIB	Ask two separate questions: How reliably does it reproduce the reported TCOF number? And where is the independent science establishing what that TCOF number means for pedestrian safety?
ENGLISH XL	The manufacturer itself connects the clean, dry SRI measurement with SCOF. The expert still must establish why the reported dry or wet number reliably answers the accident-specific pedestrian-safety question.

COMPANION ARTICLE

This handout pairs naturally with Safety Direct America's article: How to Get the Slip and Fall "Expert" Witness Testimony from an English XL VIT and Brungraber Mark IIIB User Thrown Out of Court.

KEY SOURCES

- ASTM E303-22 — British Pendulum Tester
- ASTM F2508-23 — Validation of Walkway Tribometry

- OSHA, 71 Fed. Reg. 2879 (Jan. 18, 2006) — discussion of F1677/F1679 precision issues
- TCNA — DCOF Frequently Asked Questions
- Slip-Test Mark IIIB manufacturer procedure/manual
- English XL manufacturer user guide
- Siegmund et al., Ergonomics 64(3), 396–409 (2021), DOI 10.1080/00140139.2020.1797182

Educational reference only. Admissibility is a legal determination under the governing jurisdiction and rules of evidence.