

Letter of Interpretation: ANSI/NFSI B101.1-2009

Q: What does it mean when the standard says the tribometer must be “approved” or “recognized”? By whom must the tribometer be “approved”? What is the difference between “approved” and “recognized”?

A: An approved tribometer is one that meets the following criteria set forth by NFSI:

- Demonstrate the completion of an American Society for Testing and Materials (ASTM), standard E-691, “Inter-laboratory Study to Determine the Precision of a Test Method” and provide the testing results for review and acceptance.
- The device shall be capable of measuring both the static and dynamic coefficient of friction of walkway surfaces using a scale ranging from a value of 0.0 to 1.0 and shall accurately measure the COF to the hundredths (2 decimal places).
- The accuracy of the device shall be verifiable in the field and the manufacturer shall be capable of providing calibration, repair, maintenance, and all necessary services and upgrades to improve the device’s reliability.
- The device shall be capable of producing both wet and dry COF measurements.
- The device must be portable thus applicable for use in both the laboratory and the field.
- The device shall produce a hard copy printout of its test results to reduce user transcription error. The printout must include: location, date and time of measurement, test method (ie: DCOF, SCOF), the measurement value, and slider material (ie: leather, Neolite, etc.)
- A reference calibration tile is included with the tribometer for calibration of the measurements to a known reference value. See the procedure below.

Currently the BOT 3000 is the only NFSI approved tribometer. For the most current list, please contact the NFSI, www.nfsi.org.

A recognized tribometer is one that may not be approved by NFSI but can measure within the ranges listed in Table 1 of the B101.1 standard, and must be used with a reference calibration tile. The reference calibration tile must be measured before the surface of interest according to the procedure below and a calibration factor determined to calibrate tribometer readings to a known reference value.

The reference calibration tile, available from NFSI or Tile Council of North America, has a known value of 0.52 and the resulting calibration factor must be no more than ± 0.05 .

The calibration procedure is as follows:

1. Follow tribometer manufacturer’s instructions for reconditioning the sensor.
2. Clean the calibration tile surface with de-ionized or distilled water. Wipe dry with a lint free cloth or untreated paper towel.
3. Saturate the calibration tile with de-ionized or distilled water.
4. Make a total of four static measurements, each perpendicular to the previous measurement.

5. Calculate the calibration factor as follows:

$$X_W = 0.52 - C_W$$

Where:

X_W = calibration factor

C_W = average of the four measurements recorded

6. Once measurements of the surface of interest are made use the following equation to calculate static coefficient of friction:

$$F_W = T_W + X_W$$

Where:

F_W = static coefficient of friction

T_W = average of measurements recorded for the test sample

X_W = calibration factor

The following devices are neither recognized or approved because they do not measure wet static coefficient of friction: the English XL, the Brugraber Mark 1, 2, or 3, the Wessex Pendulum, the Sigler Pendulum, the Munro Skid Resistance Tester, and other pendulum-based devices.