CNA

Tribometry Slip-Resistance Testing

Slip and Fall Prevention

The science of tribometry, or slip-resistance testing, is the measure of friction on a surface, carried out with a tribometer. Tribometry measures a floor's coefficient of friction (COF), which is the presence of traction between an individual's feet and a surface that allows the person to maintain an upright position.

Industry Standards for Slip Resistance

The industry method for measuring COF changed in 2012, shifting from a focus on resting objects (static) to the preferred dynamic coefficient of friction (DCOF), which measures the resistance force while an object is in motion. ANSI A137.1-2012 is a well-recognized DCOF testing method that measures common, hard-surface floor materials. ANSI A137.1-2012 supplanted the ASTM international test method C 1028 because the latter is unable to measure resistance when people are in motion, and individuals are generally moving when they lose their balance.

The Tile Council of North America (TCNA) published a new standard, ANSI A326.3, on April 20, 2017. This standard provides consumers, insurers and building owners a method to measure the DCOF of hard-surface floors. The standard reflects years of collaboration among various professional floor representatives, resulting in the adoption of the practice supported in the A137.1 tile standard. The new standard is available for free download on the TCNA website.

In 2021, the standard was again updated to assign the following specific DCOF thresholds:

ANSI 326.3-21 uses the Binary Output Tribometer (BOT) – 3000E, which employs the self-propelled drag sled principle originally defined by prominent safety researchers and scientists in Germany.

CNA elects to perform wet tests, as most slips do not happen on dry floors. When moisture is introduced, the likelihood of a slip increases significantly because moisture creates a microscopic separation between the pedestrian's feet and the floor.

Why Slip-Resistance Testing Is Needed

By conducting routine slip-resistance testing, your business will be prepared to comply with flooring manufacturers' specifications and address the level of contaminants on walkway surfaces. Testing further enables better selection of cleaning agents, finishes and sealants that help maintain the surface's original COF. Surface testing may strengthen the defense of fall-related personal injury claims by creating a record of slip-resistance testing measurements.

When Is Slip-Resistance Testing Needed?

Testing slip resistance is critical to a slip and fall program for hard-surface flooring. New data should be compared to baseline and previous data to assess trends. A program should always consider the following scenarios as a need for testing:

- Establishing a baseline assessment
- Flooring that feels slippery when walked upon
- Evaluation of walkway surface contamination
- Traffic patterns, use and/or change of walkway function occur
- Changes to flooring, treatments or cleaning methods/frequency occur
- Areas where incidents and near misses take place

Testing Considerations

Consider the benefits of contracting out tribometry testing versus performing it in-house.

Although hiring a third-party vendor can require additional expenses, there is a legal benefit to having a qualified independent party perform the testing. For example, if a slip and fall incident finds its way to court, tribometry might show a history of testing that illustrates the efforts of floor care and attention to slip and fall prevention. It may also show that the floors were in accordance with the applicable industry standard threshold DCOF.

In addition, if slip-resistance testing is performed by in-house staff, testing data may not be considered by the courts because of potential bias. A qualified independent tester may, in theory, be more admissible as court evidence.

When Testing Discovers Slippery Floors

Not all floors will meet the required DCOF standard. This could be caused by a combination of the flooring material, environmental conditions, cleaning materials used over time and current cleanliness. Even so, immediate action should be taken to control those slippery areas if the slip resistance cannot be improved to meet or exceed the the applicable standard DCOF threshold for the given floor classification. Basic controls are outlined in *Table 1*.

Table 1 – Controls for Floors Not Achieving Favorable Test Results

Both Prevailing and Post-Cleaned Test Failures	Additional Controls for Prevailing Test Failures

• These areas should not be open to foot traffic when wet. Access should only be allowed when dry.
• During cleaning and inclement weather or when other moisture can be introduced, proper safety measures should be taken to prevent the area(s) from being walked upon when wet.
• Place proper safety signage in this area, warning pedestrians of the potential slip and fall hazards.
• Use stanchions and barrier tape to restrict pedestrian access to the wet areas.
• If pedestrian traffic cannot be restricted during wet conditions, other slip-resistance options should be taken:
  • Use anti-slip matting in those areas.
  • Implement a slip-resistant footwear policy for employees. This will not be possible for the general public.
	• Regular cleaning, deep cleaning and traction-enhancing maintenance should be performed, as these measures may raise the wet DCOF value for the specific floor classification DCOF.
	• After cleaning, conduct slip-resistance testing to check effectiveness of improvements and monitoring to ensure the specific floor classifcation action limit is maintained, according to the ANSI 326.3-21 standard.

Learn more about managing slip and fall risks at cna.com/riskcontrol (US) or cnacanada.ca (Canada).