

# 2019 | Slip Resistance Specification Guide

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# A Guide to New Slip Resistance Specifications

*New standards in floor safety based on traction levels, required versus recommended*

For years, national safety standards for slip resistance on floors and flooring surfaces have been determined by recommended test procedures set forth by the American Society for Testing and Materials (ASTM). However, in January of 2014, one of ASTM's long-standing and most notable recommended standards, ASTM-C1028, was withdrawn.<sup>1</sup>

*No matter your role in the graphics industry – but, especially if you specialize in floor graphic installation or the selling of floor graphics to property owners – equipping yourself with the knowledge needed to properly understand and comply with the new specification will bring numerous benefits to your business.*

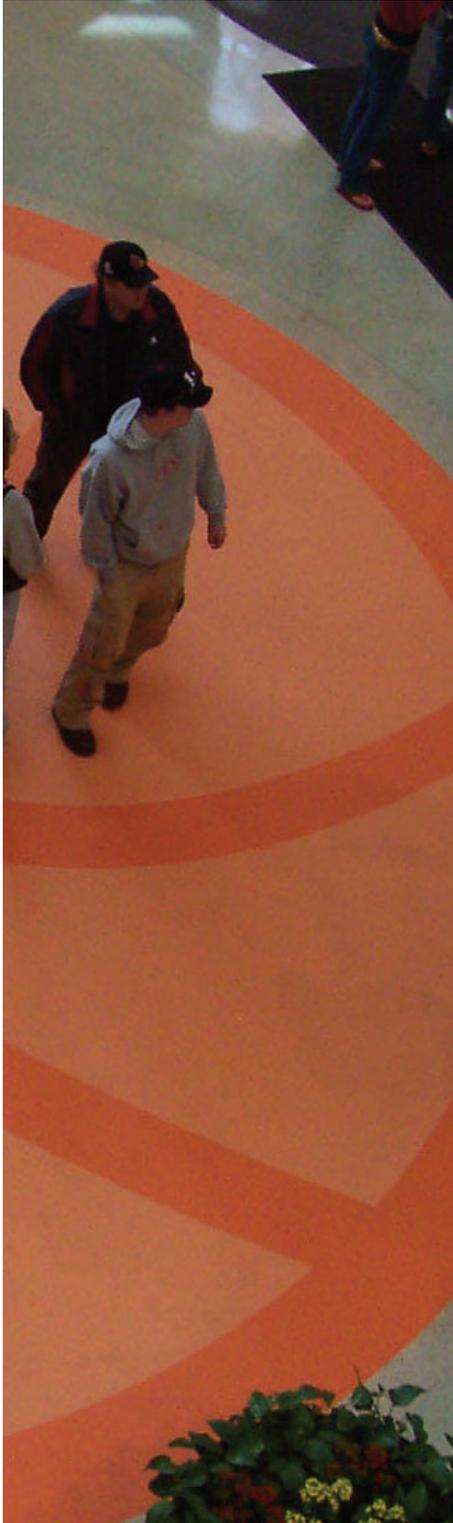
**Jump ahead to learn more about Mactac's newest custom-engineered overlaminating film for floor graphics, which fully meets ANSI/NFSI B101.3.**

- Key points and implications surrounding the new requirements – Page 2
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## Important to Know: Key Points of ANSI/NFSI B101.3

After following ASTM's recommendations for floor safety slip resistance for so many years, everyone in the graphics industry – from floor graphics installers to materials distributors – has been wondering, what now? To garner a better understanding of ANSI/NFSI B101.3 and all it entails, the following further outlines the specification's key points.

### 1. Measures DCOF versus SCOF

ANSI/NFSI B101.3 is the first-ever floor safety specification for slip resistance in the U.S. to measure the wet dynamic coefficient of friction (DCOF), as opposed to static coefficient of friction (SCOF). Historically in the U.S., slip resistance has most commonly been determined by measuring SCOF. Globally, however, measuring DCOF is more popular and becoming increasingly recognized as a more true and accurate measurement for predicting 'slip and fall' risks.

**According to the Consumer Product Safety Commission (CPSC), floors and flooring materials contribute directly to more than two million fall injuries per year.<sup>2</sup>**

#### *The difference between DCOF and SCOF*

When comparing DCOF and SCOF, the primary difference is between people or objects already in motion versus those in a static position. DCOF measures the force needed to keep a surface in motion sliding over another; whereas, SCOF relates to the force required for a surface to begin sliding over another. As far as slip resistance is concerned, it's challenging to directly compare DCOF and SCOF methods.

For example, as referenced in a 2013 *Interiors+Sources* article, the measurement of SCOF under wet conditions using the now outdated ASTM C1028 test utilized deionized water. However, the DCOF test method uses slightly soapy water that contains sodium lauryl sulfate (SLS), which is commonly found in floor-cleaning agents. SLS can leave a residual film that can re-emulsify when water is spilled or tracked in, creating slippery conditions that are more likely to occur in real-life applications.<sup>3</sup>

Additionally, it is also important to note that neither DCOF nor SCOF is a property of the flooring alone, but rather a relationship between the shoe sole and the flooring surface.

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## 2. Based on traction ranges

Another key point of ANSI/NFSI B101.3 is that it determines slip resistance by evaluating levels of traction – a methodology that has never before been applied in the U.S. when testing slip resistance. Traditionally, floor safety specifications have focused solely on measuring slip resistance. With ANSI/NFSI B101.3, the focus is intended to define walkway traction by evaluating three traction ranges: high, moderate and low.

### *Defining traction*

ANSI/NFSI B101.3 is tested in a laboratory and/or field setting using an NFSI-approved tribometer, such as the GS-1 (Gold Standard) or the BOT-3000 (Binary Output Tribometer). Tribometers are designed to accurately measure wet DCOF or wet SCOF and test to the new specification using hard rubber sliders, or test feet.



*An example of the BOT-3000 Tribometer, one of the primary test methods used for measuring ANSI/NFSI B101.3. Source: Tile Council of North America.*

During the testing of a floor surface, if the results return a high DCOF score, the surface would be deemed high in terms of traction, thus equating to the surface having high slip resistance. For example, according to NFSI, walkways with a wet DCOF equal to, or greater than, 0.42 constitute a high-traction surface. As reported in a 2012 NFSI press release, high-traction floors have been clinically proven to reduce ‘slip and fall’ claims by as much as 90 percent.<sup>4</sup>

Walkways with values between 0.30 and 0.42 are considered ‘moderate traction’ and those with values below 0.30 are considered ‘low traction.’ A walkway with a low traction range would indicate the walkway is more slippery and presents a higher risk of a ‘slip and fall’ event.



### 3. Required versus recommended

Finally, ANSI/NFSI B101.3 is a required specification versus the now obsolete ASTM procedures, which were simply recommendations. This is quite possibly the most important point to note about ANSI/NFSI B101.3 as failure to comply can have implications reaching beyond defining what constitutes a high-traction, and thus safer, floor.

#### *Litigation implications*

Today, ANSI/NFSI B101.3 is the only standard most likely to be accepted by the courts because of the minimal human intervention in the testing process. In 'slip and fall' cases, property owners in compliance with ANSI/NFSI B101.3 are more likely to come out on top, as courts tend to deem ANSI/NFSI B101.3-compliant walkway surfaces as reasonably safe. Those who are non-compliant face a greater chance of losing potential lawsuits.

#### *Insurance implications*

Additionally, failure to meet ANSI/NFSI B101.3 can also have insurance-related implications. Company insurance premiums are based, in part, on assumed and predictable risk. Insurance companies may offer discounts to clients taking proactive steps to prevent slips, trips and falls. You may want to check with your insurance company to see if these discounts can apply to your policies.

#### *OSHA maintenance implications*

Lastly, to avoid implications from the U.S. Department of Labor Occupational Safety and Health Administration (OSHA), updated guidelines say floors should be inspected by "qualified persons"<sup>5</sup>. Since the coefficient of friction of installed tiles can change over time due to wear and surface contaminants – deep cleaning, degreasing or traction-enhancing maintenance may be needed to maintain proper wet SCOF or wet DCOF values. In extreme cases, replacement of the affected walkway surface may also be required.



## Out with the Old, In with the New

To create B101.3 and several other floor safety standards, ANSI and NFSI have been collaborating for the past 15 years. Currently, per the NFSI website, there are roughly 10 ANSI/NFSI B101 standards that are either active or in development. In addition to B101.3, these include standards like:

- ANSI/NFSI B101.0, which specifies the process by which walking surfaces are audited for slip resistance by measuring the coefficient of friction of walkway surfaces; and,
- ANSI/NFSI B101.1, which specifies the process for measuring the wet SCOF of common hard surface floor materials.

A dedicated ANSI/NFSI B101 committee oversees all standard development. ANSI considers itself the voice of the U.S. standards and conformity assessment system<sup>6</sup> and serves as the governing body of the joint partnership, while NFSI refers to itself as a non-profit organization with a mission to, ‘aid in the prevention of slips, trips, and falls through education, research and standards development,’<sup>7</sup> primarily serving as the testing body.

*Other standards are outdated and unreliable*

Those still using specifications like ASTM-C1028 or ASTM-D2047 should begin following the new ANSI/NFSI B101 specification, as all previous specifications are now considered outdated or unreliable.

For example, ASTM-C1028 attempted to determine slip resistance by measuring the SCOF of ceramic tile or other surfaces under both wet and dry conditions by using a Horizontal Pull Dynamometer. Essentially, the test determined if a surface was reasonably safe to walk on and the assumption was that the more force required to pull the weight, the more slip resistance on the surface of the flooring material. However, ASTM, the Ceramic Tile Institute of America and the Tile Council of North America, have all deemed ASTM-C1028 inadequate for assessing slip safety, noting it an unreliable measure of slip resistance.

Similarly, although many floor coverings are still classified under ASTM-D2047 as slip-resistant, these tests are not the best replication of real-world environments. ASTM-D2047 is intended to measure the SCOF of dry polish-coated floor surfaces and requires a James Machine. Wet surfaces can’t be tested with this machine because its sensor pads may hydroplane or in reverse, create suction and lead to skewed results, applying ‘safe’ ratings to some flooring samples that are actually slippery when wet. Additionally, the test doesn’t apply to floor coverings so it’s inappropriate for floor graphic testing.

**It’s important to note that any testing previously conducted to meet specifications prior to ANSI/NFSI B101.3 is obsolete and flooring materials, including floor graphics, need to be re-tested per the new specification.**

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**Additional features include:**

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- High traction matte finish that is also designed to help eliminate glare
- Protection from abrasion and moisture and reduced color fade caused by UV light

## Meet Specifications with Approved Floor Materials

To minimize business risk, ensure protection from potential failure to comply implications and improve pedestrian safety, those in the graphics industry should choose to stock, specify, sell and install floor graphic materials that have been tested and approved by NFSI per the new ANSI/NFSI B101.3 standard.

NFSI conveniently publishes a list of approved and certified 'high traction' products on its website, NFSI.org (select "Product Testing," "List of Certified Products"). By choosing a material from this list, one can be reassured that they are following the latest requirements. should any floor safety issues arise.



With very few industry floor graphics materials certified to date, Mactac<sup>®</sup> is one of the leading pressure-sensitive materials suppliers to manufacture and test its products specifically to the new ANSI/NFSI B101.3 standard. This includes Mactac's latest floor graphic overlamine, PERMACOLOR<sup>®</sup> FloorGRIP<sup>™</sup> PF6600, which successfully received approval as a high-traction product.

In addition to meeting the new U.S. high-traction specifications for floor safety, PERMACOLOR FloorGRIP PF6600 also meets German National Standard test methods commonly used in Europe, such as DIN 51130. While different, the ANSI/NFSI B101.3 and German National Standard testing platforms are known to correlate well with one another.

This paper constitutes Mactac's interpretation of the requirements discussed.

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### Additional Information

For more information, visit [www.mactac.com/graphics](http://www.mactac.com/graphics), call 866-622-8223, or email [mactac.americas@mactac.com](mailto:mactac.americas@mactac.com).

### References

<sup>1</sup> ASTM International (American Society for Testing and Materials). Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method (Withdrawn 2014), (<http://www.astm.org/Standards/C1028.htm>).

<sup>2</sup> Consumer Products Safety Commission via the National Floor Safety Institute. Quick Facts, (<http://nfsi.org/nfsi-research/quick-facts/>).

<sup>3</sup> Interiors+Sources. Stranger than Friction. Nov. 1, 2013. (<http://www.interiorsandsources.com/article-details/articleid/16571/title/stranger-than-friction.aspx>).

<sup>4</sup> National Floor Safety Institute via PR Web. (December 2, 2009). Slip-and-Fall Accidents Could Be a Thing of The Past! (<http://www.prweb.com/releases/2009/12/prweb3258564.htm>).

<sup>5</sup> U.S. Department of Labor Occupational Safety and Health Administration (OSHA) via Cleaning & Maintenance Management. (August 14, 2013). New OSHA Rules For Floor Safety, (<http://www.cmmonline.com/articles/print/231611-new-osha-rules-for-floor-safety>).

<sup>6</sup> American National Standards Institute. About ANSI, ([https://www.ansi.org/about\\_ansi/overview/overview.aspx?menuid=1](https://www.ansi.org/about_ansi/overview/overview.aspx?menuid=1)).

<sup>7</sup> National Floor Safety Institute. About Us, (<https://nfsi.org/about-us/>).