WHITE PAPER

Enhanced Safety Standards for Porcelain Tile Transition to ANSI A326.3-2021

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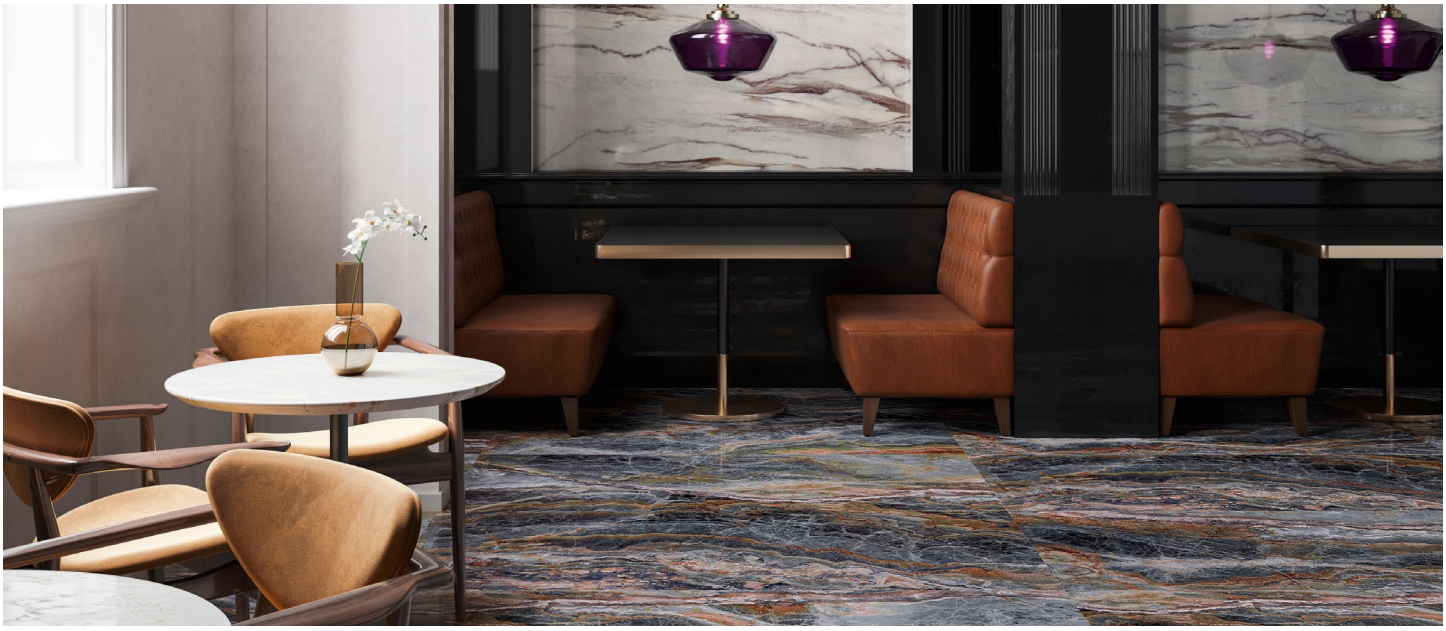
Summary

Porcelain tiles are widely recognized for their durability, aesthetic appeal, and ease of maintenance, making them ideal for indoor and outdoor applications. The importance of ensuring safety in these applications has led to significant advancements in the standards used to measure slip resistance. Historically, the industry utilized the Static Coefficient of Friction (SCOF) measured by ASTM C-1028. However, recognizing the limitations of this method, the industry shifted in 2012 to a more dynamic and realistic assessment through the Dynamic Coefficient of Friction (DCOF), adopting the ANSI A137.1 standard, which was further refined into ANSI A326.3-2021. This white paper discusses the evolution of these standards and their implications for safety and product selection in various environments.

Introduction

The concept of tribology, the study of interacting surfaces in relative motion[1], has become crucial in understanding the slip resistance of porcelain tiles. This field has evolved significantly, from the earlier SCOF methods to the current DCOF standards, to reflect real-world conditions more accurately. This paper outlines the progression from SCOF to DCOF, the introduction of ANSI A326.3-2021, and the practical impacts of these changes on industry practices.



1 Science Direct - Tribology

From SCOF to DCOF: A Shift in Testing Paradigms

The SCOF method involved manual tests that did not adequately simulate the conditions encountered in everyday use. In response to its deficiencies, the DCOF method was developed, employing the BOT-3000 device to emulate accurate movements over a surface. This transition marked a critical step towards improving safety standards, with the initial DCOF threshold at a minimum of 0.42 for wet interior surfaces.[1]

Historical Context of SCOF

Initially, SCOF was utilized as the standard measure of slip resistance for porcelain tiles. The SCOF method, based on the ASTM C-1028 test, measured the force required to start moving a standardized material (typically a neolite block simulating a shoe sole) across a tile surface under wet and dry conditions. Although this method provided a baseline measure of slip resistance, it was limited to static conditions, hence the "Static" Coefficient of Friction. The results often presented an unrealistic scenario where slip resistance was measured in a controlled, unmoving environment.

Limitations of SCOF Testing Method

1. **Unrealistic Test Conditions:** The method measured the frictional resistance at the initiation of movement, which does not typically represent how slips occur in real life. Most slips happen during motion, not from a stationary position.
2. **Inconsistencies and Variabilities:** Different tiles could produce varying results based on their surface texture and the block material used in testing. Additionally, there was no industry-wide standard threshold; the generally accepted value of SCOF >0.60 was not universally mandated.
3. **Lack of Real-World Relevance**: SCOF did not account for factors such as the speed of walking, the angle of contact, or the presence of contaminants other than water, all of which are critical in real-life slip scenarios.

Introduction of DCOF

Recognizing these limitations, the industry sought a more dynamic and practical testing methodology, leading to the adoption of DCOF. Introduced around 2012, DCOF testing involves using a device like the BOT-3000, which simulates a moving shoe contacting the tile surface. This method assesses the slip resistance while the tile is in motion, providing a more accurate representation of real-world conditions.

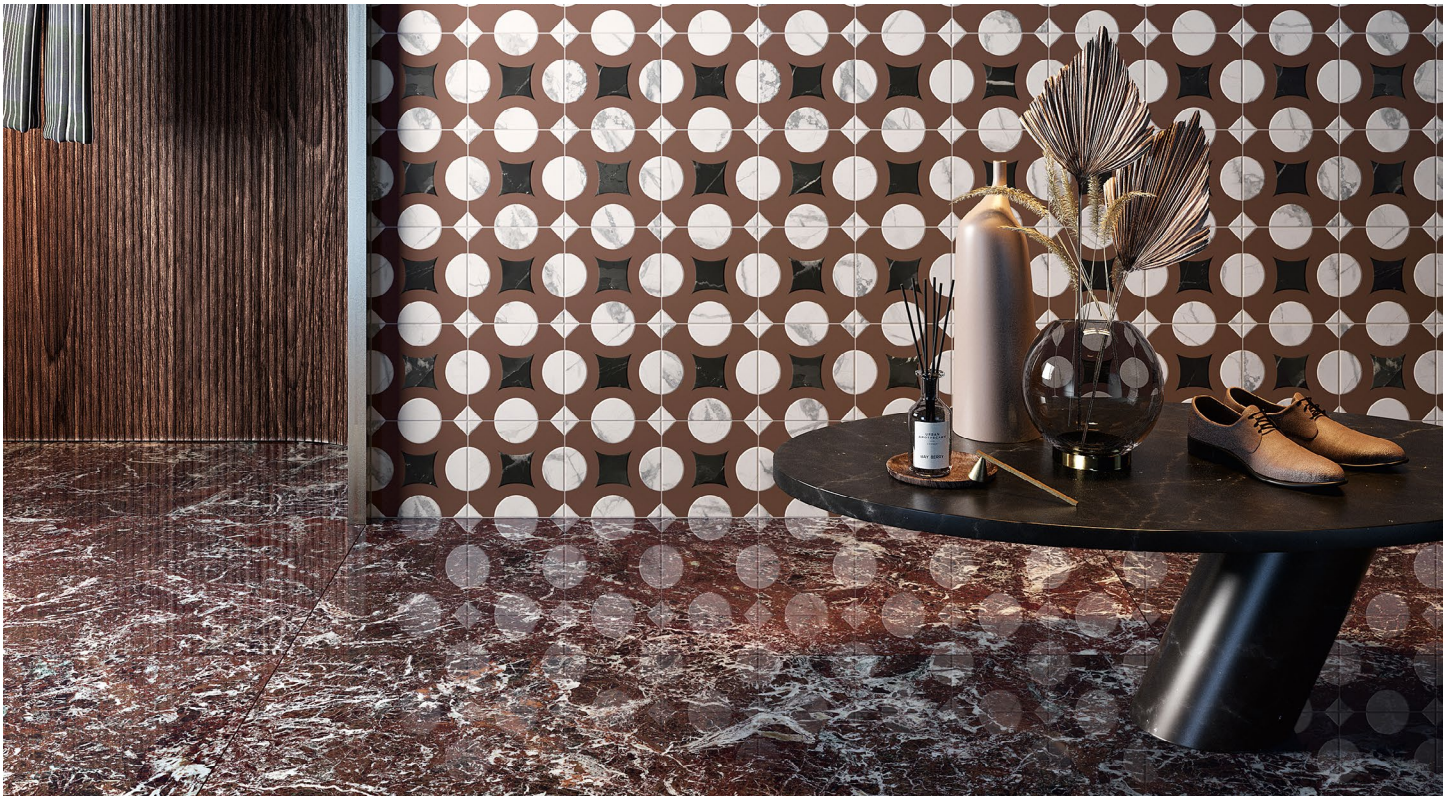
1 TCNA - Tile Intiative

Advantages of DCOF Over SCOF

1. **Dynamic Testing:** By measuring the coefficient of friction during motion, DCOF testing more accurately simulates the conditions under which most real-world slips occur.
2. **Focused on Safety in Wet Conditions:** The DCOF method tests tiles under wet conditions, reflecting the increased risk of slipping in such environments.
3. **Standardization**: The introduction of the ANSI A137.1 standard, which later evolved into ANSI A326.1, set a clear threshold for DCOF (>0.42 for wet conditions), providing a consistent criterion that manufacturers and safety regulators could adhere to.

Transition from Standard DCOF to ANSI A326.3-2021

The evolution from the standard Dynamic Coefficient of Friction (DCOF) testing to the more nuanced ANSI A326.3-2021 standard represents a pivotal shift in the ceramic and porcelain tile industry. This transition not only refines the approach to measuring slip resistance but also categorizes usage based on real-world applications, tailoring safety standards to specific environmental conditions. Below is a detailed description of this transition and the introduction of product use categories.



Implementation of ANSI A326.3-2021

The implementation of ANSI A326.3-2021 broadened the scope of the DCOF standards to encompass varying real-world environments more effectively. This standard categorizes surfaces into five distinct use areas, each with specific DCOF requirements:

- **Interior, Dry:** > 0.42 Dry DCOF
- **Interior, Wet:** > 0.42 Wet DCOF
- **Interior, Wet Plus:** Manufacturer Declared or > 0.50 Wet DCOF
- **Exterior, Wet:** Manufacturer Declared or > 0.55 Wet DCOF
- **Oils/Greases:** Manufacturer Declared or > 0.55 Wet DCOF

This categorization allows for a more nuanced approach to product specification and safety assurance, recognizing the diverse conditions that floors must withstand.

Please refer to our **ANSI A326.3-2021 Technical Bulletin** for additional information.

Challenges and Industry Adoption

While the new standards represent a significant advancement, their adoption is not without challenges. Though improved, the reliance on lab tests still does not capture all variables present in real-world scenarios. Furthermore, the variability in production batches means that even tiles that meet standards at one time may not be in another, necessitating continuous quality monitoring.

Conclusion

The shift to ANSI A326.3-2021 represents a pivotal development in tile manufacturing and safety standards. By incorporating a broader range of testing conditions and allowing for manufacturer declarations, the standard provides a more flexible and realistic framework for assessing the slip resistance of porcelain tiles. Collaboration with manufacturers, architects, and designers is essential to ensure widespread adoption and understanding of these new requirements.

About the Author

Scott joined Creative Materials in 2000, working in national account sales. He progressed to Director of Sales, overseeing major accounts like Five Guys and Starbucks. In 2019, he became Product Category Manager for Ceramics and Glass, and now serves as Senior Director of Product Management, overseeing LVT product category expansion. He is certified as a LEED Green Associate and Well AP.