

## **SICIS'S PRODUCTS & THE AMERICAN STANDARDS ON ANTI-SLIP PROPERTIES OF HARD FLOORING SURFACES**



### **Abstract**

Anti-slip properties are a fundamental criterion to consider when foreseeing a surface designed to be walked upon, especially when wet. Having confidence in the fact that the surface foreseen in the framework of a project will be safe for those who will be walking on it is a priority for whomever chooses the materials to be used to realize a project. To this end, standards and norms are created, adopted and complied with by the industry. Different standards, drafted in dissimilar ways and based on heterogeneous principles, are complied with in different markets. In the North American market, the standard the industry tends to comply with are the ANSI A326.3 and the ANSI 137.1. Being SICIS very active in the North American market, a wide range of SICIS products do comply with this standard. This document serves the purpose of presenting the reader with a comprehensive overview on SICIS products that comply with the ANSI A326.3 standard, as well as making the reader understand that the ANSI A326.3 standard appears to have several limitations.

Indeed, complying with a standard and actually granting the safety of those who walk onto a surface are two different things that do not necessarily coincide.

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## Standards on hard surface flooring materials' properties: ANSI A326.3

The ceramic tile industry in North America tends to adhere to the voluntary standards dealing with anti-slip properties of ceramic tiles and other hard flooring surfaces as currently outlined by ANSI 137.1 and ANSI A326.3.

ANSI 137.1 includes various voluntary standard specifications (including that on anti-slip properties) that apply to the field of ceramic tiles. ANSI A326.3 is an extension of ANSI 137.1 that specifically deals with the Dynamic Coefficient of Friction (DCOF) demanded for hard surface flooring materials (which is a broader field than that of ceramic tiles covered by ANSI 137.1). This means that, at the time of the writing on this paper, the main American standard to comply with in the field of hard surface flooring materials is ANSI A326.3.

Both ANSI 137.1 and ANSI A326.3 require, for a surface to be suitable to be walked upon when wet, a DCOF of at least 0,42.

## The Dynamic Coefficient of Friction (DCOF)

Dynamic Coefficient of Friction (DCOF) of a surface expresses the mathematical ratio of the tangential force of an object to the normal force of the same object moving upon a surface, as measured when the object is already in motion<sup>1</sup>.



*Picture 1: The BOT 3000 test foreseen by the ANSI A326.3 standard*

The DCOF of a surface is tested in the same way for both ANSI 137.1 and ANSI A326.3. The test performed is the one involving the BOT 3000 produced by Regan Scientific Instruments. The test is performed on samples measuring at least 25x25 cm (10"x10") (see picture 1). Prior to performing the test, a 0.05% solution of Sodium-Lauryl Sulfate is applied to the tested surface. This allows for the simulation of a wet slippery surface. The BOT 3000 is a device that moves over the tested surface dragging its 27 mm (1,06") wide sensor over a wet portion of the sample's surface. The

BOT 3000's sensor is made of styrene-butadiene rubber (SBR) and has a thickness of  $4.0 \text{ mm} \pm 0.2$  and a Shore A hardness of  $95 \pm 3$ . The BOT 3000 crosses the surface of each sample in 4 different orthogonal directions. The arithmetic average of the data collected this way determines the overall DCOF for that surface.

Although DCOF and the 0,42 benchmark are conventionally accepted criteria to determine the compliance of a surface with the ANSI A326.3 standard, they are not necessarily a perfect tool to determine whether somebody walking in specific conditions on a surface with a given DCOF will slip or not.

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<sup>1</sup> *Testing Frictional Properties of Natural Stone Walking Surfaces* released by the Natural Stone Institute in January 2018, p. 1.



Picture 2: the ramp-style test foreseen by the DIN 51097 standard

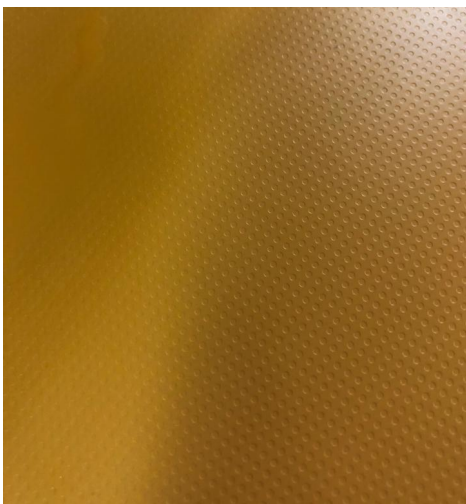
On this matter, the text of the norm states “[DCOF] *can provide a useful comparison of surfaces, but it does not predict the likelihood a person will or will not slip on a hard surface flooring material*”. While several standards adopted worldwide (i.e. DIN 51097 and DIN 51130, widely accepted in Europe) predict the likelihood that somebody walking on that surface in given conditions will slip, by simulating such scenario (see picture 2), DCOF only expresses a physical feature of surface, as resulting from a merely mathematical ratio. Thus, it is to be kept in mind that the fact that a given

material reports a given DCOF does not mean that somebody walking on that surface when wet will actually slip or not.

## The 0,42 benchmark

Both ANSI 137.1 and ANSI A326.3 require a DCOF of at least 0,42.

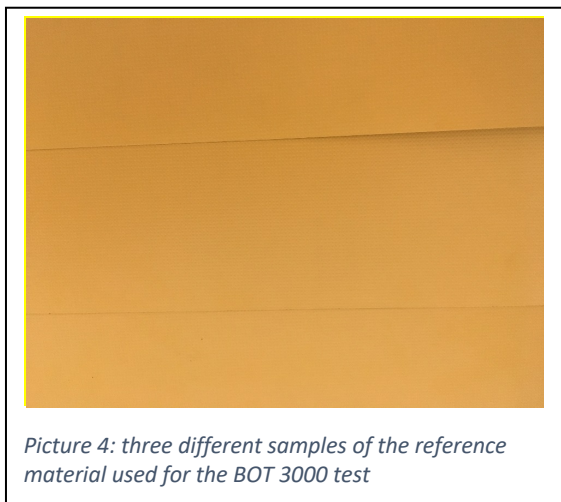
It is important to contextualize the value of the 0,42 benchmark. While the ANSI A326.3 standard points to 0,42 as the DCOF above which a surface is suitable to be walked on when wet, it is to be pointed out that according to the very text of the ANSI A326.3 standard “*hard surface flooring materials with a wet DCOF less than 0,42 are often used in areas such as shopping malls (outside the food court), hotel lobbies, office buildings, etc. where appearance and ease of cleaning are highly desired and measures are in place to keep the floor dry when walked upon*”. It is the norm itself that suggests that a DCOF of 0,42 is not a necessary condition in any environment and at anytime.



Picture 3: the reference material's surface

Prior to the performing of the test, the BOT 3000 is calibrated using a reference material also provided by Regan Scientific Instruments. The test is run once on the reference material (a piece of *Formica* with a surface filled with dots having the effect of slightly altering the overall planarity of the material's surface; see picture 3). This preliminary step's purpose is to make sure that the BOT 3000 is properly working by assessing whether it detects or not the right DCOF associated with the reference material.





Picture 4: three different samples of the reference material used for the BOT 3000 test

Now, it appears that there is not a precise DCOF associated with the material. The very same material may, as shown by the data reported by sets of reference material purchasable directly from Regan Scientific Instruments, be assessed by the BOT 3000 to have a DCOF that may vary, even in a very relevant way. For instance, purchasing 3 samples of the reference material (see picture 4) it is possible to notice that, despite being all the same material, they all present technical data showing that they have been assessed to have different DCOFs: in this case 0,46, 0,48 and 0,51 (see picture 5). Moreover, as reported by the technical data in the back of the reference material samples themselves, such measurements are subject to a +/- 0,03 tolerance. This means that,

the reference material has a DCOF susceptible of varying, just considering the different DCOFs associated with the samples and the foreseen tolerance, from 0,43 to 0,54 (thus, a variation of 0,11). The fact that the DCOF as assessed in the framework of this standard may vary so much in a standard and homogeneous surface (even used as reference material for the test) makes wonder how big such variation might be in a surface (like, for instance, mosaic) featuring several variables, such as chips' size, gaps and grout. It is natural to wonder whether performing this kind of test on an inherently non-homogeneous surface such as mosaic is really meaningful.

It is therefore evident that the BOT 3000's test is indeed susceptible of giving different (if not very different) outcomes every time the test is performed, even though the material is the same. As consequence, it is easy to assume that testing a given material that reports a DCOF of, say, 0,42 in a different occasion could result in the BOT 3000's detecting an insufficient DCOF. Still, such insufficient result could very well be result of the contingent situation in which the test is performed, as the same test could also easily result in a DCOF of 0,42 or higher. It is thus suggestable to always take the BOT 3000 test's results "with a pinch of salt", as they show to be rather susceptible to varying from case to case.

ANSI A326.3 is currently a very widespread and used standard; therefore, we developed this paper in order to provide guidelines face to the request for SICIS products in compliance with the ANSI A326.3 standard. Nonetheless, although ANSI A326.3 is indeed a very practical method of comparison of the friction of different surfaces, different test and evaluation methods may be developed in the future that prove to be more fitting than ANSI 326.3 to assessing a material's actual anti-slip properties.



Picture 5: technical data reported on the back of the reference material samples showing different DCOFs for each sample

## SICIS products' performance in the BOT 3000 test

In order to assess the performance SICIS's products in the framework of the test foreseen by ANSI A326.3 and ANSI 137.1, several tests have been carried out at Centro Ceramico in Bologna. This allows us to provide a comprehensive overview on what DCOF to expect from all SICIS's products designed to be used as flooring surface: marble mosaic (such as *The One Marble* Collection), marble slabs (such as *SiciStone* and *Cosmati*), glass mosaic (like all mosaic included in the *SicisColors* program and *Colibri*, *Neoglass* etc.) and glass slabs (*Vetrite* and *Vetrite Tile*).

### Marble surfaces

SICIS marble mosaics in several sizes and finishes report a DCOF equal or superior to 0,42, meaning that many of SICIS marble mosaics comply with the ANSI A326.3 standard.

Marble mosaics with *ancient*-finish surfaces predictably perform well in the BOT 3000 test. Marble with **honed** finish (meaning, with a matte surface) presents DCOF rates exceeding 0,42 in a multitude of different formats, ranging from slabs without gaps and grout to mosaic having chips of several sizes: 48x48 mm (1,89"x1,89"), 23x23 mm (0,91"x0,91"), 15x15 mm (0,59"x0,59") and 10x10 mm (0,39"x0,39") (test report # [4573/19](#)). The variation in reported DCOF varies depending on those elements that, as we will be discussing at further ahead in this paper, influence its outcome.

As it stands to reason, marble mosaic with the finish called **pietre romane**, in which mosaic chips not only have a matte surface but also undergo a production process that leads to their edges being slightly rounded, reports an even higher DCOF (test report # [4572/19](#)). Although all the elements that influence the BOT 3000 test's results depending on the dimension of the mosaic chips are at play, the DCOF for all the different types of marble mosaic with this kind of finish is abundantly above 0,42 (even reaching as high as over 0,60 in some cases).

Marble mosaic with **polished** finish is the kind of marble mosaic that, as reason would suggest, presents the lower degree of anti-slip properties, due to the completely smooth surface of the mosaic chips. It is true that polished marble mosaic does not perform as high as marble mosaics having rougher finishes, but the 15x15 mm (0,59"x0,59") chips mosaic still achieves a DCOF of 0,42 (test report # [4574/19](#)). For this kind of test outcome, it is particularly important to take into consideration what written above in the paragraph dealing with **the 0,42 benchmark**.

### Glass surfaces

For its glass mosaic, SICIS has developed a specific technology with the purpose of granting compliance with the anti-slip related standards required in the North American market. **SICIS Grip NA Plus** is a permanent treatment of mosaic chips specifically designed to enhance their anti-slip properties and their performance in the framework of the BOT 3000 test.

Mosaics completely treated with SICIS Grip NA Plus report a high DCOF, testifying how this permanent treatment designed for the North American market leads to compliance with the ANSI A326.3 standard.

**15x15 mm (0,59"x0,59")** square chips mosaic completely treated with SICIS Grip NA Plus have a DCOF exceeding 0,42 both in case they are mesh-mounted or paper-faced (see test report # [3100/19](#) for mesh-mounted mosaic and # [3099/19](#) for paper-faced mosaic). Mounting method of mosaic does indeed have an effect on the mosaic's DCOF (as we will be discussing at a later stage of this paper), but test reports show that by providing a completely SICIS Grip NA Plus-treated

mosaic the mounting method does not compromise the test's outcome. It is to be noticed that the mosaics these test reports refer to include chips of different colors belonging to different collection (some of them also having slightly different thicknesses), meaning that these test results apply not only to monochrome mosaics but also to blends and pixel mosaics, insofar as they are entirely composed of SICIS Grip NA Plus-treated chips.

**23x23 mm (0,91"x0,91")** square chips mosaic (*NeoGlass Cubes*) tends to score significantly higher in the BOT 3000 test (test report # [2071/16](#)) than their smaller chips counterparts. DCOF of 0.42 or higher is achieved for blends featuring as little as 25% of SICIS Grip NA Plus-treated chips (test report # [2721/16](#)). More specifically, blends in which only 25% of the chips is SICIS Grip NA Plus-treated report a DCOF of 0,42. For this kind of test outcome, it is particularly important to take into consideration what written above in the paragraph dealing with **the 0,42 benchmark**. Blends with a higher concentration of treated chips achieve a higher DCOF. It is important to remember that mosaics in which only a part of the 23x23 mm (0,91"x0,91") chips are SICIS Grip NA Plus-treated lead to a sufficient DCOF only insofar as blends (where chips having different characteristics are distributed according to given percentages but in a random fashion) are concerned. The same does not apply for mosaics realized using the pixel technique. In such mosaics, the whole composition follows a given pattern and each mosaic sheet is a part of the pattern. Therefore, the chips are distributed not randomly but according to such pattern. For this reason, the concentration of treated and non-treated chips might vary from sheet to sheet, or from sheet section to sheet section, depending on the pattern of the mosaic. Thus, regardless of the percentage of treated and non-treated chips in the whole composition, there might be area in which the percentage of non-treated chips is very high and/or areas in which it is very low (resulting, in this case, in a low DCOF for that area of the composition).

For **Vetrite** (SICIS's collection of large size glass slabs) and **Vetrite Tile** (SICIS's collection of glass tiles), **satin finish** has, besides its aesthetic purpose, the effect of making *Vetrite* achieve a high DCOF. Satin finish gives *Vetrite* a matte surface similar to that of the mosaic chips that have undergone SICIS Grip NA Plus treatment. *Vetrite* slabs and tiles treated with satin finish report a very high DCOF, in some cases even exceeding 0,60, although the DCOF may vary also depending on the production lot (test report # [4577/19](#)). The satin finish treatment gives *Vetrite* a very high DCOF also in formats and sizes other than the large size slab and the tile. For instance, *Vetrite* may be used as mosaic in all the above mentioned chip sizes (48x48 mm (1,89"x1,89"), 23x23 mm (0,91"x0,91"), 15x15 mm (0,59"x0,59") and 10x10 mm (0,39"x0,39")), presenting a DCOF of more than 0,42 for all the formats (test report # [4578/19](#)). Besides the satin finish, *Vetrite* and *Vetrite Tile* are also available with the **SICIS Grip** treatment, a permanent treatment specifically engineered to enhance *Vetrite*'s anti-slip properties. This technology, although initially developed for glass mosaic having in mind the DIN 51097 standard, successfully gives *Vetrite* a DCOF well above the 0,42 benchmark (test report # [4575/19](#)).

## Factors influencing the BOT 3000 test's results

By closely examining the various test reports, it is evident that the BOT 3000 test is not completely successful in assessing the actual anti-slip properties of mosaic. Mosaic is a peculiar kind of flooring material: the presence of gaps between tiles and grout filling those gaps is, for mosaic, particularly significant and ends by highly influencing the mosaic surface's performance in the BOT 3000 test.

The following factors play an important role in determining a mosaic's DCOF as detected by the BOT 3000:

- Finishing;
- Chips' shape;
- Chips' size;
- Chips' thickness;
- Mounting method (mesh mounted vs paper faced);
- Arrangement of chips / presence of patterns.

In this paper, by "mosaic" we mean the ensemble composed of several chips (or tesserae) plus the gaps between chips; by "chips" we mean each individual unit composing the overall mosaic.

### **Finishing**

SICIS's glass mosaic chips come in a standard glossy finish resulting from the manufacture of glass mosaic. Such finish, together with laying operations properly carried out, is enough to guarantee compliance of SICIS's mosaic with the European standard DIN 51097. Still, in light of the different standards commonly accepted in North America that require a minimum DCOF of 0,42, SICIS has developed a permanent superficial treatment, called SICIS Grip NA Plus, specifically engineered to increase mosaic's DCOF. SICIS Grip NA Plus treatment is made necessary by the fact that, in light of the test's peculiarities, standard finish might not achieve a DCOF of 0,42.

The tests performed at Centro Ceramico show that monochrome mosaic entirely made of 15x15 mm (0,59"x0,59") SICIS Grip NA Plus-treated chips do achieve a high DCOF, proof of the fact that this treatment serves its purpose of giving mosaic chips a high DCOF (test report # 3099/19 and 3100/19).

### **Chips' shape**

While square 15x15 mm (0,59"x0,59") chips are the most versatile kind of mosaic in terms of possibilities of interpretation and customization of the product, SICIS's mosaic is available in a multitude of shapes and sizes. Chips of different shapes have different characteristics, resulting in DCOF to vary depending on the chips' shape. Part of this is attributable to orthogonal anisotropy of some varieties of chips (i.e. "*Domes*", "*Diamond*", "*Crystal*", etc.). Including mosaic chips of a shape different than square would introduce uncountable further variables. In this paper, we focus on square mosaic chips only.

### **Chips' size**

It is evident, from the results of several tests performed on different kinds of mosaic, that when testing mosaic of a given material in a multitude of formats there is a direct correlation between chips' size and the mosaic's detected DCOF (see test reports # 4578/19, 4573/19 and 4572/19).

Given how big of a portion of the surface gaps occupy in mosaic, the DCOF for the single mosaic chip will inevitably be substantially different from the DCOF of a larger mosaic surface, which is a set of several chips and several gaps. The BOT 3000 has a sensor 27 mm (1,06") wide that glides over the tested surface in order to assess the surface's DCOF. The fact that the BOT 3000's sensor touches the grout has an impact on the test's outcome. This is most likely attributable to the fact that, even if the grout is not per se slippery at all, the gaps among chips are perceived by the BOT 3000 as a void that produces no friction, which affects the DCOF. For a clear example of the importance

of the gaps in the determination of a surface's DCOF, see samples n. 3 and n. 6 of test report # [4572/19](#), in which *pietre romane*-finished marble mosaic with chips of the same dimensions reports a higher DCOF in case no gap is left among chips.

For instance, when focusing on glass mosaic, the following happens.

When 23x23 mm (0,91"x0,91") mosaic chips ("Cubes") are tested (test report # [2721/16](#)), even the presence of a relatively low amount (25%) of 23x23 mm (0,91"x0,91") chips with the anti-slip treatment in a blend is enough to guarantee a DCOF of 0,42 or higher. It thus happens that when 23x23 mm (0,91"x0,91") mosaic chips ("Cubes") are tested, the DCOF of each chip is highly influential (if compared to what happens with smaller chips) on the overall DCOF for the tested mosaic. This results in the performance of each chip strongly contributing to determining the outcome of the test for that area of the mosaic.

When 15x15 mm (0,59"x0,59") chips are tested, the 27 mm (1,06") wide sensor that goes over the mosaic's surface always touches more than 1 chip at a time (2 or 3 chips). Furthermore, the sensor will touch at least 1 grouted gap, possibly 2, bringing DCOF furtherly down. This results in the outcome of the test for the 15x15 mm (0,59"x0,59") chips mosaic to be determined by the performance of an area of the mosaic composed of several chips and at least one grouted gap. Given the higher fragmentation into chips of the mosaic as a whole, compared to 23x23 mm (0,91"x0,91") chips mosaic, the void of the gaps will have a higher influence on the test's outcome.

What written above is even more so for the 10x10 mm (0,39"x0,39") chips mosaic. In this case, mosaic chips are even smaller and the BOT 3000 touches every time several grouted gaps, perceived by its sensor as "voids". As highlighted by the fact that the smaller mosaic chips are the more sealant is consumed to grout the gaps<sup>2</sup>, the smaller mosaic chips are the more preponderant gaps will be. 10x10 mm (0,39"x0,39") chips, even if all SICIS Grip NA Plus-treated, are too small to compensate for the preponderance of the gaps, and the DCOF will necessarily be lower than that detected for mosaics composed of bigger chips.

The dimensions of the BOT 3000's sensor, irrelevant as far as bigger tiles are tested, are a crucial factor in the determination of mosaic's DCOF. In other words: similarly to the effect known in physics as *observer effect*, when the tool used to measure a system has comparable dimensions to those of what is measured, the tool through which the measurement is carried out ends by interfering with the test's outcome.

### **Chips' thickness**

SICIS' mosaic collections include 4 mm thick chips and 3 mm thick chips. Moreover, thickness of mosaic chips might slightly differ depending on the production lot. Combining chips having different thicknesses in the same mosaic blend does not make the mosaic more slippery, but accentuates the alteration of the mosaic's planarity as detected by the BOT 3000, influencing the DCOF. Similarly to what happens with the gaps between the tiles (see paragraph above), the BOT 3000's sensor perceives the difference in thickness as a void in which no friction is produced, affecting the assessed DCOF.

Alterations of the overall planarity of the surface, hence the presence of what the BOT 3000's sensor perceives as "void", affect the test's result, regardless of how deep that "void" is. In other words, what appears to affect the detected DCOF is not the magnitude of the alterations of planarity but rather

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<sup>2</sup> See the chart about sealant consumption included in the installation manual for SICIS's mosaic.



how many of such alterations, if big enough not to be compensated for by the hardness of the sensor's rubber, are present on the tested surface, regardless of how big or small they are.

SICIS Grip NA Plus consists of the removal of a portion (although a very small one) of material from the surface of the chips. Therefore, treated chips tend to be slightly thinner than non-treated chips. The result is that when the BOT3000's sensor goes over a mix of treated and non-treated chips, the non-treated ones (because of the fact that they are slightly thicker) will have a higher degree of influence on the test's result than the treated (and slightly thinner) chips. This happens because at any moment it is more likely that the BOT 3000's sensor will touch a non-treated (thicker) chip than a treated (thinner) chip. This, together with the reduced size of the chips, is possibly the reason why a 15x15 mm (0,59"x0,59") mosaic surface in which not all chips are SICIS Grip NA Plus-treated might not achieve a DCOF as high as that detected for a 23x23 mm (0,91"x0,91") chips mosaic.

### **Mounting method (mesh mounted vs paper faced)**

When testing the same material both mesh mounted and paper faced, it might happen that the paper faced version of that material reports a higher DCOF.

In mesh mounted mosaic all the chips adhere to the underlying mesh, exacerbating the difference in thickness among chips at surface-level, as well as the wedge-like shape of the chips (a characteristic of mosaic chips that gives dynamism to SICIS's mosaic and makes it a unique and beautiful product). This does not alter the anti-slip properties of the mosaic anyhow, but it could result in the BOT 3000's sensor to detect a lower DCOF. Opposite dynamics are at play when paper faced mosaic is concerned. In paper faced mosaic, disparities in chips' thickness and the chips' wedge-like shape are mostly hidden by the glue used for the laying operations. While all the disparities in thickness between chips concentrate on the non-visible surface of the laid mosaic sheets, planarity is maintained at surface level, making the mosaic's surface result overall flatter. This might determine a higher DCOF. In this scenario (insofar as laying operations are carried out correctly), all the factors that in mesh mounted mosaic determine a partial loss of planarity, and in turn a lower DCOF, lose their influence on the test's outcome, increasing the detected DCOF.

### **Arrangement of chips / presence of patterns**

It is understood that the tests and the criteria mentioned and described above are meaningful only as far as monochrome mosaic and blends (when distribution of different chips is random) are concerned. For mosaics that follow a decorative pattern (that lack in blends' element of randomness in the arrangement of chips) and artistic mosaic (that is realized by manually cutting each chip in order to create a unique decoration impossible to repeat using standard mosaic), the non-random orientation of chips is a key element. The anisotropy of these mosaics as a whole deprives the test, that is performed in 4 orthogonal directions, of its meaningfulness. This does not mean that mosaics that follow a decorative pattern or artistic mosaics are more slippery than monochrome mosaics or blends, it just means that the non-randomness in how chips are arranged makes it so that the mosaic's DCOF will be determined solely by the characteristics of the limited area of the mosaic's surface that is tested.

## Conclusions

In this paper, we have analyzed the several factors that influence the outcome of the test foreseen by the ANSI A326.3 standard when performed on a variety of SICIS's products. In the specific case of mosaic, several factors linked to the mosaic's surface planarity that experience shows to have the effect of increasing the mosaic's anti-slip properties end by decreasing the DCOF detected for that surface. Such factors (i.e. the grout, the presence of SICIS Grip NA Plus-treated chips, chips' size, etc.) contribute to making mosaic an extremely safe surface to walk upon when wet, even though they tend to be perceived by the BOT 3000 as elements influencing the DCOF.



*Picture 6: comparison between the reference material for the BOT 3000 test and a mosaic sheet*

A rather intuitive way to catch the meaning of the concept we mean to convey is to directly compare mosaic and the reference material used for calibrating the BOT 3000 device prior to the performance of the test (see picture 6). Such reference material is used as reference of a surface having a DCOF that tends to vary but is in any case significantly higher than the 0,42 benchmark. This is a higher result than that detected for many of the mosaic samples we have tested.

We hold to be a self-evident truth the fact that many of the tested SICIS's products are a much more anti-slip flooring material than the reference material used for the purposes of the test.

## List of test reports

Test report # 4573/19: DCOF of marble mosaic and marble slabs (honed finish) .....
Test report # 4572/19: DCOF of marble mosaic (ancient finish) .....
Test report # 4574/19: DCOF of marble mosaic (polished finish) .....
Test report # 3100/19: DCOF of 100% Sicis Grip NA Plus-treated glass mosaic (mesh mounted) .....
Test report # 3099/19: DCOF of 100% Sicis Grip NA Plus-treated glass mosaic (paper faced) .....
Test report # 2071/16: DCOF of 100% SICIS Grip NA Plus-treated NeoGlass Cubes .....
Test report # 2721/16: DCOF of NeoGlass Cubes (different blends) .....
Test report # 4577/19: DCOF of Vetrite with satin finish .....
Test report # 4578/19: DCOF of Vetrite with satin finish (including mosaic formats) .....
Test report # 4575/19: DCOF of Vetrite with SICIS Grip treatment .....



CENTRO DI RICERCA E SPERIMENTAZIONE  
PER L'INDUSTRIA CERAMICA

Bologna, 17/05/2019

*SICIS s.r.l.*  
*Via Canala 75/79*  
*48010 RAVENNA*

## TEST LABORATORY

### TEST REPORT No. 4573/19

Requested by:	SICIS s.r.l. Via Canala 75/79 48010 RAVENNA
On (date):	08/05/19
For the sample marked:	As the list.

The results reported relate only to the samples tested.

No responsibility is taken for the accuracy of the sampling unless it is done under our own supervision.

The reproduction of this test report is only authorized in the form of a complete photographic facsimile.

Our written approval is necessary for any partial reproduction.

This test report consists of 4 pages this cover included.



## CENTRO CERAMICO

Test Report No. 4573/19

Date 17/05/2019

Page 2 of 4

Description of the sample:	Multilayer panels 30 x 30 cm made by mosaic tesserae assembled on panel by fixing material, marked: <u>SAMPLE 1</u> : "Sicis Marble Mosaic Collection: Honed finish – sample 105 – chips' size 305x305 mm"; <u>SAMPLE 2</u> : "Sicis Marble Mosaic Collection: Honed finish – sample 111 – chips' size 48x48 mm"; <u>SAMPLE 3</u> : "Sicis Marble Mosaic Collection: Honed finish – sample 114 – chips' size 32x32 mm"; <u>SAMPLE 4</u> : "Sicis Marble Mosaic Collection: Honed finish – sample 126 – chips' size 15x15 mm"; <u>SAMPLE 5</u> : "Sicis Marble Mosaic Collection: Honed finish – sample 132 – chips' size 10x10 mm";
Manufacturer:	-----
Sampling details	
- Where:	-----
- Date:	-----
- By whom:	CUSTOMER
- How (methods):	-----
Date of receipt in laboratory:	08/05/19

### TESTS PERFORMED :

<input checked="" type="checkbox"/>	ANSI A326.3 : Wet Dynamic Coefficient of Friction (DCOF) 2017 § 8	Date of starting 08/05/19	Date of ending 09/05/19
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**ANSI A326.3 : 2017 § 8 - Wet Dynamic Coefficient of Friction (DCOF)**

*Test device:* Bot 3000E – Regan Scientific  
*Sensor material:* SBR  
*Cleaning chemicals used:* Equivalent Renovator #120  
*Wetting solution:* 0.05% SLS water

*Test laboratory conditions:*

*Temperature (°C):* 22 ± 2  
*Relative Humidity (%):* 36 ± 5

*DCOF of Standard Surface:*

*Before the test* 0.50  
*After the test* 0.56

*No. of tested sample:* one ( 1 )

**TEST RESULT:**

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
1	0.44	0.47	0.47	0.46	0.46

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
2	0.49	0.47	0.45	0.44	0.46

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
3	0.45	0.42	0.41	0.40	0.42

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
4	0.49	0.49	0.42	0.46	0.47



## CENTRO CERAMICO

Test Report No. 4573/19

Date 17/05/2019

Page 4 of 4

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
5	0.49	0.42	0.41	0.41	0.43

REQUIREMENTS (ANSI A326.3-2017):  $DCOF \geq 0,42$  for level interior spaces expected to be walked upon when wet  
REQUIREMENTS DCOF of Standard surface:  $0.53 \pm 0.03$

Pietro Bruzzi  
Technical verification



Prof. Maria Chiara Bignozzi  
Director



CENTRO DI RICERCA E SPERIMENTAZIONE  
PER L'INDUSTRIA CERAMICA

Bologna, 17/05/2019

*SICIS s.r.l.*  
*Via Canala 75/79*  
*48010 RAVENNA*

## TEST LABORATORY

### TEST REPORT No. 4572/19

Requested by:	SICIS s.r.l. Via Canala 75/79 48010 RAVENNA
On (date):	08/05/19
For the sample marked:	As the list.

The results reported relate only to the samples tested.

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## CENTRO CERAMICO

Test Report No. 4572/19

Date 17/05/2019

Page 2 of 4

Description of the sample:	Multilayer panels 30 x 30 cm made by mosaic tesserae assembled on panel by fixing material, marked: <u>SAMPLE 1</u> : "Sicis Marble Mosaic Collection: Ancient finish – sample 112 – chips' size 48x48 mm"; <u>SAMPLE 2</u> : "Sicis Marble Mosaic Collection: Ancient finish – sample 115 – chips' size 32x32 mm"; <u>SAMPLE 3</u> : "Sicis Marble Mosaic Collection: Ancient finish – sample 121 – chips' size 23x23 mm"; <u>SAMPLE 4</u> : "Sicis Marble Mosaic Collection: Ancient finish – sample 127 – chips' size 15x15 mm"; <u>SAMPLE 5</u> : "Sicis Marble Mosaic Collection: Ancient finish – sample 133 – chips' size 10x10 mm"; <u>SAMPLE 6</u> : "Sicis Marble Mosaic Collection: Ancient finish – sample 134 Mosaic sheet without gaps among chips – chips' size 23x23 mm";
Manufacturer:	-----
Sampling details	
- Where:	-----
- Date:	-----
- By whom:	CUSTOMER
- How (methods):	-----
Date of receipt in laboratory:	08/05/19

### TESTS PERFORMED :

<input checked="" type="checkbox"/>	ANSI A326.3 : 2017 § 8	Wet Dynamic Coefficient of Friction (DCOF)	Date of starting	Date of ending
			08/05/19	09/05/19

**ANSI A326.3 : 2017 § 8 - Wet Dynamic Coefficient of Friction (DCOF)**

*Test device:* Bot 3000E – Regan Scientific  
*Sensor material:* SBR  
*Cleaning chemicals used:* Equivalent Renovator #120  
*Wetting solution:* 0.05% SLS water

*Test laboratory conditions:*

*Temperature (°C):* 22 ± 2  
*Relative Humidity (%):* 36 ± 5

*DCOF of Standard Surface:*

*Before the test* 0.50  
*After the test* 0.56

*No. of tested sample:* one ( 1 )

**TEST RESULT:**

DCOF Values					
<b>SAMPLE</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>1</b>	0.61	0.61	0.62	0.62	<b>0.62</b>

DCOF Values					
<b>SAMPLE</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>2</b>	0.61	0.60	0.61	0.61	<b>0.61</b>

DCOF Values					
<b>SAMPLE</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>3</b>	0.59	0.60	0.59	0.60	<b>0.60</b>

DCOF Values					
<b>SAMPLE</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>4</b>	0.54	0.56	0.55	0.55	<b>0.55</b>





## CENTRO CERAMICO

Test Report No. 4572/19

Date 17/05/2019

Page 4 of 4

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
5	0.60	0.60	0.58	0.56	0.59

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
6	0.64	0.64	0.64	0.64	0.64

REQUIREMENTS (ANSI A326.3-2017):  $DCOF \geq 0,42$  for level interior spaces expected to be walked upon when wet  
REQUIREMENTS DCOF of Standard surface:  $0.53 \pm 0.03$

Pietro Bruzzi  
Technical verification



Prof. Maria Chiara Bignozzi  
Director



CENTRO DI RICERCA E SPERIMENTAZIONE  
PER L'INDUSTRIA CERAMICA

Bologna, 17/05/2019

*SICIS s.r.l.*  
*Via Canala 75/79*  
*48010 RAVENNA*

## TEST LABORATORY

### TEST REPORT No. 4574/19

Requested by:	SICIS s.r.l. Via Canala 75/79 48010 RAVENNA
On (date):	08/05/19
For the sample marked:	As the list.

The results reported relate only to the samples tested.

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## CENTRO CERAMICO

Test Report No. 4574/19

Date 17/05/2019

Page 2 of 3

Description of the sample:	Multilayer panels made by mosaic tesserae assembled on panel by fixing material, marked "Sicis Marble Mosaic Collection: Polished finish – sample 125 – size 15x15 mm".
Manufacturer:	-----
Sampling details	
- Where:	-----
- Date:	-----
- By whom:	CUSTOMER
- How (methods):	-----
Date of receipt in laboratory:	08/05/19

### TESTS PERFORMED :

		Date of starting	Date of ending
<input checked="" type="checkbox"/>	ANSI A326.3 : Wet Dynamic Coefficient of Friction (DCOF) 2017 § 8	08/05/19	09/05/19

**ANSI A326.3 : 2017 § 8 - Wet Dynamic Coefficient of Friction (DCOF)**

*Test device:* Bot 3000E – Regan Scientific  
*Sensor material:* SBR  
*Cleaning chemicals used:* Equivalent Renovator #120  
*Wetting solution:* 0.05% SLS water

*Test laboratory conditions:*

*Temperature (°C):* 22 ± 2  
*Relative Humidity (%):* 36 ± 5

*DCOF of Standard Surface:*

*Before the test* 0.53  
*After the test* 0.50

*No. of tested sample:* one ( 1 )

**TEST RESULT:**

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
1	0.47	0.41	0.42	0.38	0.42

**REQUIREMENTS (ANSI A326.3-2017):** DCOF  $\geq 0,42$  for level interior spaces expected to be walked upon when wet  
**REQUIREMENTS DCOF of Standard surface:** 0.53  $\pm 0.03$

Pietro Bruzzi  
Technical verification



Prof. Maria Chiara Bignozzi  
Director

Bologna, 28/03/2019

*SICIS s.r.l.*  
*Via Canala 75/79*  
*48010 RAVENNA*

**TEST LABORATORY**  
**TEST REPORT No. 3100/19**

Requested by:	SICIS s.r.l. Via Canala 75/79 48010 RAVENNA
On (date):	19/03/19
For the sample marked:	As the list.

The results reported relate only to the samples tested.

No responsibility is taken for the accuracy of the sampling unless it is done under our own supervision.

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## CENTRO CERAMICO

Test Report No. 3100/19

Date 28/03/2019

Page 2 of 3

Description of the sample:	Multilayer panels 30 x 30 x 1,5 made by mosaic tesserae assembled on panel by fixing material, marked: <u>SAMPLE 1</u> : "Sicis Collection - Sample 30B 100% treated with Sicisgrip NA Plus – mesh mounted - colors: emerald4, indaco, daffodil, bora"see photo 1; <u>SAMPLE 2</u> : "Sicis Collection - Sample 32B 100% treated with Sicisgrip NA Plus – mesh mounted - colors: chestnut4, icewater, deepsea, celestial"see photo 1.
Manufacturer:	-----
Sampling details	
- Where:	-----
- Date:	-----
- By whom:	CUSTOMER
- How (methods):	-----
Date of receipt in laboratory:	02/04/19

### TESTS PERFORMED :

<input checked="" type="checkbox"/>	ANSI A326.3 : 2017 § 8	Wet Dynamic Coefficient of Friction (DCOF)	Date of starting	Date of ending
			03/04/19	03/04/19



Photo No.1

**ANSI A326.3 : 2017 § 8 - Wet Dynamic Coefficient of Friction (DCOF)**

*Test device:* Bot 3000E – Regan Scientific  
*Sensor material:* SBR  
*Cleaning chemicals used:* Equivalent Renovator #120  
*Wetting solution:* 0.05% SLS water

*Test laboratory conditions:*

*Temperature (°C):* 22 ± 2  
*Relative Humidity (%):* 36 ± 5

*DCOF of Standard Surface:*

*Before the test* 0.50  
*After the test* 0.51

*No. of tested sample:* one ( 1 )

**TEST RESULT:**

DCOF Values					
<b>SAMPLE</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>1</b>	0.49	0.46	0.47	0.46	<b>0.47</b>

DCOF Values					
<b>SAMPLE</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>2</b>	0.48	0.46	0.51	0.48	<b>0.48</b>

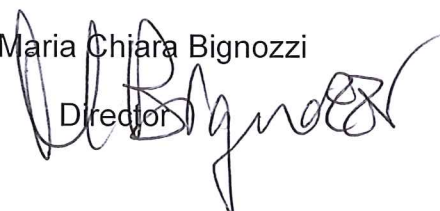
**REQUIREMENTS (ANSI A326.3-2017):** DCOF ≥ 0,42 for level interior spaces expected to be walked upon when wet  
**REQUIREMENTS DCOF of Standard surface:** 0.53 ±0.3

  
Pietro Bruzzi  
Technical verification



Prof. Maria Chiara Bignozzi

Director





CENTRO DI RICERCA E SPERIMENTAZIONE  
PER L'INDUSTRIA CERAMICA

Bologna, 28/03/2019

*SICIS s.r.l.*  
*Via Canala 75/79*  
*48010 RAVENNA*

## TEST LABORATORY

### TEST REPORT No. 3099/19

Requested by:	SICIS s.r.l. Via Canala 75/79 48010 RAVENNA
On (date):	19/03/19
For the sample marked:	As the list.

The results reported relate only to the samples tested.

No responsibility is taken for the accuracy of the sampling unless it is done under our own supervision.

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## CENTRO CERAMICO

Test Report No. 3099/19

Date 28/03/2019

Page 2 of 3

Description of the sample:	Multilayer panels 30 x 30 x 1,5 made by mosaic tesserae assembled on panel by fixing material, marked: <u>SAMPLE 1</u> : "Sicis Collection - Sample 30A 100% treated with Sicisgrip NA Plus – paper faced - colors: emerald4, indaco, daffodil, bora"see photo 1; <u>SAMPLE 2</u> : "Sicis Collection -Sample 32A 100% treated with Sicisgrip NA Plus – paper faced - colors: chestnut4, icewater, deepsea, celestial"see photo 1.
Manufacturer:	-----
Sampling details	
- Where:	-----
- Date:	-----
- By whom:	CUSTOMER
- How (methods):	-----
Date of receipt in laboratory:	02/04/19

### TESTS PERFORMED :

<input checked="" type="checkbox"/>	ANSI A326.3 : 2017 § 8	Wet Dynamic Coefficient of Friction (DCOF)	Date of starting 03/04/19	Date of ending 03/04/19
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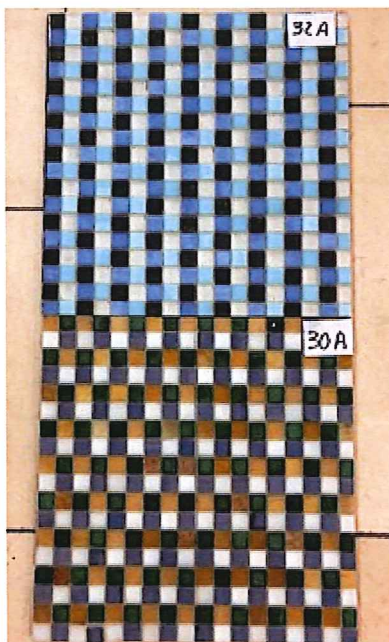


Photo No.1



**ANSI A326.3 : 2017 § 8 - Wet Dynamic Coefficient of Friction (DCOF)**

*Test device:* Bot 3000E – Regan Scientific  
*Sensor material:* SBR  
*Cleaning chemicals used:* Equivalent Renovator #120  
*Wetting solution:* 0.05% SLS water

*Test laboratory conditions:*

*Temperature (°C):* 22 ± 2  
*Relative Humidity (%):* 36 ± 5

*DCOF of Standard Surface:*

*Before the test* 0.50  
*After the test* 0.51

*No. of tested sample:* one ( 1 )

**TEST RESULT:**

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
1	0.49	0.48	0.48	0.48	0.48

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
2	0.49	0.48	0.48	0.48	0.48

**REQUIREMENTS (ANSI A326.3-2017):**  $DCOF \geq 0,42$  for level interior spaces expected to be walked upon when wet  
**REQUIREMENTS DCOF of Standard surface:**  $0.53 \pm 0.03$

Pietro Bruzzi  
Technical verification



Prof. Maria Chiara Bignozzi  
Director

Bologna, 25/01/2016

Messrs

*SICIS s.r.l.*  
*Via Canala 75/79*  
*48010 RAVENNA*

## TEST LABORATORY

### TEST REPORT No. 2071/16

Requested by:	SICIS s.r.l. Via Canala 75/79 48010 RAVENNA
On (date):	11/12/15
For the sample marked:	"NEOGLASS SICIS COLLECTION CON TRATTAMENTO SICISGRIP NA PLUS".

**The results reported relate only to the samples tested.**

**No responsibility is taken for the accuracy of the sampling unless it is done under our own supervision.**

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## CENTRO CERAMICO

Test Report No. 2071/16

Date 25/01/2016

Page 2 of 3

Description of the sample:	Multilayer panel made by mosaic tesserae assembled on panel by fixing material, marked "NEOGLASS SICIS COLLECTION CON TRATTAMENTO SICISGRIP NA PLUS".
Manufacturer:	-----
Sampling details	
- Where:	-----
- Date:	-----
- By whom:	CUSTOMER
- How (methods):	-----
Date of receipt in laboratory:	10/12/15

### TESTS PERFORMED :

		Date of starting	Date of ending
<input checked="" type="checkbox"/>	ANSI A137.1 : Wet Dynamic Coefficient of Friction (DCOF) 2012 § 9.6.1	11/12/15	11/12/15



**ANSI A 137.1:2012 § 9.6.1 - Wet Dynamic Coefficient of Friction (DCOF)**

*Test device:* Bot 3000E – Regan Scientific

*Sensor material:* SBR

*Wetting solution:* 0,05% SLA water

*Test laboratory conditions:*

*Temperature (°C):* 22 ± 2

*Relative Humidity (%):* 45 ± 5

*DCOF of Standard Tile:*

*Before the test* 0,28

*After the test* 0,28

*No. of tested tiles:* One ( 1 )

**TEST RESULT:**

DCOF Values					
<b>Tile number</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>1</b>	0.56	0.58	0.53	0.54	<b>0.55</b>
<b>2</b>	-----	-----	-----	-----	-----
<b>3</b>	-----	-----	-----	-----	-----

**REQUIREMENTS (ANSI A137.1-2012):**  $DCOF \geq 0,42$  for level interior spaces expected to be walked upon when wet

P  
Pietro Bruzzi  
Technical verification  


Prof. Maria Chiara Bignozzi  
Director  




Bologna, 24/02/2016

Messrs

*SICIS s.r.l.*  
*Via Canala 75/79*  
*48010 RAVENNA*

## TEST LABORATORY

### TEST REPORT No. 2721/16

Requested by:	SICIS s.r.l. Via Canala 75/79 48010 RAVENNA
On (date):	12/02/16
For the sample marked:	As the list.

**The results reported relate only to the samples tested.**

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Description of the sample:	Multilayer panel made by mosaic tesserae 2 x 2 cm assembled on panel by fixing material, marked as indicated in the results table in yellow colour.
Manufacturer:	-----
Sampling details	
- Where:	-----
- Date:	-----
- By whom:	CUSTOMER
- How (methods):	-----
Date of receipt in laboratory:	10/12/15

**TESTS PERFORMED :**

		Date of starting	Date of ending
<input checked="" type="checkbox"/>	ANSI A137.1 : Wet Dynamic Coefficient of Friction (DCOF) 2012 § 9.6.1	11/12/15	11/12/15

**ANSI A 137.1:2012 § 9.6.1 - Wet Dynamic Coefficient of Friction (DCOF)**

Test device: Bot 3000E – Regan Scientific

Sensor material: SBR

Wetting solution: 0,05% SLA water

Test laboratory conditions:

Temperature (°C):  $22 \pm 2$

Relative Humidity (%):  $79 \pm 5$

DCOF of Standard Tile:

Before the test 0,29

After the test 0,28

No. of tested tiles: One ( 1 )

**TEST RESULT:**

SAMPLE	TRATTATO 746	TRATTATO 246	DCOF Values				
	% chips treated	% chips without treatment	Direction 1	Direction 2	Direction 3	Direction 4	Average
"A"	75	25	0,48	0,49	0,44	0,47	0,47
"B"	66	34	0,49	0,51	0,50	0,53	0,51
"C"	50	50	0,51	0,50	0,50	0,48	0,50
"D"	34	66	0,44	0,42	0,45	0,44	0,44
"E"	25	75	0,40	0,44	0,40	0,44	0,42

**REQUIREMENTS (ANSI A137.1-2012):**  $DCOF \geq 0,42$  for level interior spaces expected to be walked upon when wet

Pietro Bruzzi

Technical verification

Prof. Maria Chiara Bignozzi

Director

Bologna, 17/05/2019

*SICIS s.r.l.*  
*Via Canala 75/79*  
*48010 RAVENNA*

**TEST LABORATORY**  
**TEST REPORT No. 4577/19**

Requested by:	SICIS s.r.l. Via Canala 75/79 48010 RAVENNA
On (date):	08/05/19
For the sample marked:	As the list.

**The results reported relate only to the samples tested.**

**No responsibility is taken for the accuracy of the sampling unless it is done under our own supervision.**

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## CENTRO CERAMICO

Test Report No. 4577/19

Date 17/05/2019

Page 2 of 3

Description of the sample:	Multilayer panels made by mosaic tesserae assembled on panel by fixing material, marked: <u>SAMPLE 1</u> : "Sicis Vetrite/Gem Glass Collection: Satin finish – sample 103 – size 400x400 mm"; <u>SAMPLE 2</u> : "Sicis Vetrite/Gem Glass Collection: Satin finish – sample 138 – size 600x600 mm"; <u>SAMPLE 3</u> : "Sicis Vetrite/Gem Glass Collection: Satin finish – sample 139 – size 600x600 mm";
Manufacturer:	-----
Sampling details	
- Where:	-----
- Date:	-----
- By whom:	CUSTOMER
- How (methods):	-----
Date of receipt in laboratory:	08/05/19

### TESTS PERFORMED :

<input checked="" type="checkbox"/>	ANSI A326.3 : Wet Dynamic Coefficient of Friction (DCOF) 2017 § 8	Date of starting 08/05/19	Date of ending 09/05/19
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**ANSI A326.3 : 2017 § 8 - Wet Dynamic Coefficient of Friction (DCOF)**

*Test device:* Bot 3000E – Regan Scientific

*Sensor material:* SBR

*Cleaning chemicals used:* Equivalent Renovator #120

*Wetting solution:* 0.05% SLS water

*Test laboratory conditions:*

*Temperature (°C):* 22 ± 2

*Relative Humidity (%):* 36 ± 5

*DCOF of Standard Surface:*

*Before the test* 0.53

*After the test* 0.50

*No. of tested sample:* one ( 1 )

**TEST RESULT:**

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
1	0.64	0.60	0.60	0.62	0.62

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
2	0.51	0.49	0.47	0.46	0.48

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
3	0.53	0.50	0.50	0.49	0.51

**REQUIREMENTS (ANSI A326.3-2017):**  $DCOF \geq 0,42$  for level interior spaces expected to be walked upon when wet  
**REQUIREMENTS DCOF of Standard surface:**  $0.53 \pm 0.03$

Pietro Bruzzi  
Technical verification



Prof. Maria Chiara Bignozzi  
Director





CENTRO DI RICERCA E SPERIMENTAZIONE  
PER L'INDUSTRIA CERAMICA

Bologna, 17/05/2019

*SICIS s.r.l.*  
*Via Canala 75/79*  
*48010 RAVENNA*

## TEST LABORATORY

### TEST REPORT No. 4578/19

Requested by:	SICIS s.r.l. Via Canala 75/79 48010 RAVENNA
On (date):	08/05/19
For the sample marked:	As the list.

**The results reported relate only to the samples tested.**

**No responsibility is taken for the accuracy of the sampling unless it is done under our own supervision.**

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## CENTRO CERAMICO

Test Report No. 4578/19

Date 17/05/2019

Page 2 of 4

Description of the sample:	Multilayer panels made by mosaic tesserae assembled on panel by fixing material, marked: <u>SAMPLE 1</u> : "Sicis Vetrite/Gem Glass Collection: Satin finish – different sizes – sample 103 – size 300x600 mm"; <u>SAMPLE 2</u> : "Sicis Vetrite/Gem Glass Collection: Satin finish – different sizes – sample 109 Assembled as mosaic sheet – size 48x48 mm"; <u>SAMPLE 3</u> : "Sicis Vetrite/Gem Glass Collection: Satin finish – different sizes – sample 118 Assembled as mosaic sheet – size 23x23 mm"; <u>SAMPLE 4</u> : "Sicis Vetrite/Gem Glass Collection: Satin finish – different sizes – sample 124 Assembled as mosaic sheet – size 15x15 mm"; <u>SAMPLE 5</u> : "Sicis Vetrite/Gem Glass Collection: Satin finish – different sizes – sample 130 Assembled as mosaic sheet – size 10x10 mm";
Manufacturer:	-----
Sampling details	
- Where:	-----
- Date:	-----
- By whom:	CUSTOMER
- How (methods):	-----
Date of receipt in laboratory:	08/05/19

### TESTS PERFORMED :

		Date of starting	Date of ending
<input checked="" type="checkbox"/>	ANSI A326.3 : Wet Dynamic Coefficient of Friction (DCOF) 2017 § 8	08/05/19	09/05/19

**ANSI A326.3 : 2017 § 8 - Wet Dynamic Coefficient of Friction (DCOF)**

*Test device:* Bot 3000E – Regan Scientific  
*Sensor material:* SBR  
*Cleaning chemicals used:* Equivalent Renovator #120  
*Wetting solution:* 0.05% SLS water

*Test laboratory conditions:*

*Temperature (°C):* 22 ± 2  
*Relative Humidity (%):* 36 ± 5

*DCOF of Standard Surface:*

*Before the test* 0.53  
*After the test* 0.50

*No. of tested sample:* one ( 1 )

**TEST RESULT:**

DCOF Values					
<b>SAMPLE</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>1</b>	0.64	0.60	0.60	0.62	<b>0.62</b>

DCOF Values					
<b>SAMPLE</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>2</b>	0.56	0.56	0.55	0.52	<b>0.55</b>

DCOF Values					
<b>SAMPLE</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>3</b>	0.61	0.59	0.59	0.55	<b>0.58</b>

DCOF Values					
<b>SAMPLE</b>	<i>Direction 1</i>	<i>Direction 2</i>	<i>Direction 3</i>	<i>Direction 4</i>	<b>Average</b>
<b>4</b>	0.67	0.53	0.57	0.57	<b>0.59</b>



## CENTRO CERAMICO

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DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
5	0.53	0.57	0.60	0.59	0.57

**REQUIREMENTS (ANSI A326.3-2017):**  $DCOF \geq 0,42$  for level interior spaces expected to be walked upon when wet  
**REQUIREMENTS DCOF of Standard surface:**  $0.53 \pm 0.03$

Pietro Bruzzi  
Technical verification



Prof. Maria Chiara Bignozzi  
Director



CENTRO DI RICERCA E SPERIMENTAZIONE  
PER L'INDUSTRIA CERAMICA

Bologna, 17/05/2019

*SICIS s.r.l.*  
*Via Canala 75/79*  
*48010 RAVENNA*

**TEST LABORATORY**  
**TEST REPORT No. 4575/19**

Requested by:	SICIS s.r.l. Via Canala 75/79 48010 RAVENNA
On (date):	08/05/19
For the sample marked:	As the list.

**The results reported relate only to the samples tested.**

**No responsibility is taken for the accuracy of the sampling unless it is done under our own supervision.**

**The reproduction of this test report is only authorized in the form of a complete photographic facsimile.  
Our written approval is necessary for any partial reproduction.**

**This test report consists of 3 pages this cover included.**



## CENTRO CERAMICO

Test Report No. 4575/19

Date 17/05/2019

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Description of the sample:	Multilayer panels made by mosaic tesserae assembled on panel by fixing material, marked: <u>SAMPLE 1</u> : "Sicis Vetrite/Gem Glass Collection with Sicisgrip treatment – sample 135 – size 600x600 mm"; <u>SAMPLE 2</u> : "Sicis Vetrite/Gem Glass Collection with Sicisgrip treatment – sample 136 – size 600x600 mm"; <u>SAMPLE 3</u> : "Sicis Vetrite/Gem Glass Collection with Sicisgrip treatment – sample 137 – size 600x600 mm";
Manufacturer:	-----
Sampling details	
- Where:	-----
- Date:	-----
- By whom:	CUSTOMER
- How (methods):	-----
Date of receipt in laboratory:	08/05/19

### TESTS PERFORMED :

		Date of starting	Date of ending
<input checked="" type="checkbox"/>	ANSI A326.3 : Wet Dynamic Coefficient of Friction (DCOF) 2017 § 8	08/05/19	09/05/19

**ANSI A326.3 : 2017 § 8 - Wet Dynamic Coefficient of Friction (DCOF)**

*Test device:* Bot 3000E – Regan Scientific  
*Sensor material:* SBR  
*Cleaning chemicals used:* Equivalent Renovator #120  
*Wetting solution:* 0.05% SLS water

*Test laboratory conditions:*

*Temperature (°C):* 22 ± 2  
*Relative Humidity (%):* 36 ± 5

*DCOF of Standard Surface:*

*Before the test* 0.53  
*After the test* 0.50

*No. of tested sample:* one ( 1 )

**TEST RESULT:**

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
1	0.49	0.51	0.51	0.53	0.51

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
2	0.52	0.52	0.50	0.51	0.51

DCOF Values					
SAMPLE	Direction 1	Direction 2	Direction 3	Direction 4	Average
3	0.49	0.52	0.49	0.51	0.50

**REQUIREMENTS (ANSI A326.3-2017):**  $DCOF \geq 0,42$  for level interior spaces expected to be walked upon when wet  
**REQUIREMENTS DCOF of Standard surface:**  $0.53 \pm 0.03$

Pietro Bruzzi  
Technical verification



Prof. Maria Chiara Bignozzi  
Director