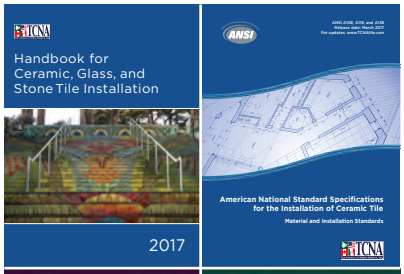
TCNA
TILE INITIATIVE

2017



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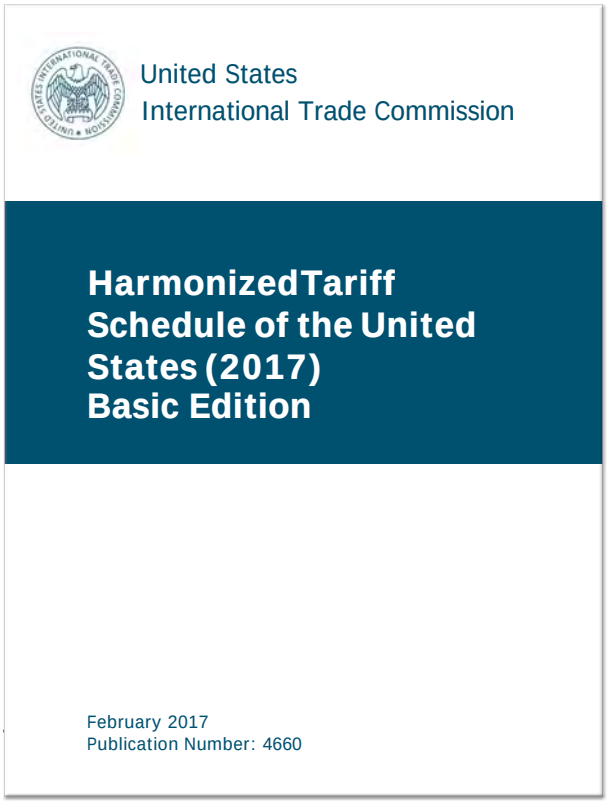
TCNA BULLETIN

CRITICAL CHANGES TO HS AND HTS CODES FOR CERAMIC TILE IMPORTED INTO THE UNITED STATES

Ceramic tile imported into the United States is tariffed, or subject to duty, per the Harmonized Tariff Schedule (HTS) maintained by the United States International Trade Commission (USITC). This schedule provides the applicable tariff rates and statistical categories for all products imported into the United States. For ceramic tile, the HTS classifies tiles based on their water absorption, except for mosaics and finishing pieces, which are classified separately. In each category, further classification is made based on whether the tiles are glazed or unglazed, and according to certain size criteria.

Critical changes to the HTS took effect January 1, 2017 which impact all companies that import ceramic tile into the United States. These changes follow a 2014 decision of the World Customs Organization's (WCO's) Harmonized System Committee, with three years scheduled for implementation. Harmonized System (HS) codes, which are developed and administered by the WCO, are used in nearly two hundred countries by customs officials to classify and track globally traded products.



What Has Changed?

Worldwide, as of January 1, 2017, ceramic tile must be classified under HS heading 6907 as described below. Prior to this change, HS heading 6907 was used for unglazed tile, and HS heading 6908 was used for glazed tile. Under these two headings, tiles were subcategorized based on size—specifically, whether the tile was a mosaic, larger than a mosaic but smaller than a 12" x 12" tile, or larger than 12" x 12."[1]

The 6908 heading is now no longer in use, and at the 6-digit, international level the revised 6907 heading classifies tiles as follows:

6907.21	Of a water absorption coefficient by weight not exceeding 0.5%
6907.22	Of a water absorption coefficient by weight exceeding 0.5% but not exceeding 10%
6907.23	Of a water absorption coefficient by weight exceeding 10%
6907.30	Mosaic cubes and the like, other than those of subheading 6907.40
6907.40	Finishing ceramics

At the national level, four additional digits are allowed (i.e., 10 digit headings) for further subdivision of the categories above.

1 For glazed tiles, there was also further subcategorization of the mosaic category.

What Are Mosaic Tiles and Why Are They Categorized Separately?

This seemingly straightforward question is surprisingly complex. At present, the term "mosaic" is not defined by the WCO or U.S. Customs and Border Protection (CBP). Historically in HS headings, mosaic tiles were specifically defined by size requirements and limited to all tiles less than 49 cm^2. While the new heading 6907.30 does not contain size requirements, presumably CBP will interpret the category in the same fashion.

No distinction is made at the six digit level in category 6907.30 based on water absorption or whether the tiles are glazed or unglazed. As the quantity of mosaics moving between countries is small, and as the properties for such tiles are not internationally defined in the International Standards Organization's (ISO's) ceramic tile standard (13006), mosaics will be tracked separately from tiles in categories 6907.21–6907.23, in which water absorption determines the classification.

What Are Finishing Ceramics and Why Are They Categorized Separately?

Finishing ceramics are classified in the explanatory notes to HS heading 6907 as follows:

> Bordering, capping, skirting, frieze, angle, corner or other fitting tile pieces employed as complementary elements for finishing off the facing, paving, etc., work, with or without rounded edges, non flat or 3-dimensional, which give them the character of finishing pieces; that would be the case, in particular, for bordering, skirting, frieze, corner pieces, decorative inserts and other ceramic accessories. In these cases, these pieces need to match with the other basic tiles, so their proper surface usually has the same shade or finish of the normal tiles. They are generally sold by piece or by linear metre.

These tiles sell at a volume and price very different from the field tiles they complement. As such, greater clarity is achieved in all categories by tracking finishing ceramics separately from field tiles. As with mosaics, finishing ceramics are not distinguished at the six digit level by their water absorption or whether they are glazed or unglazed.

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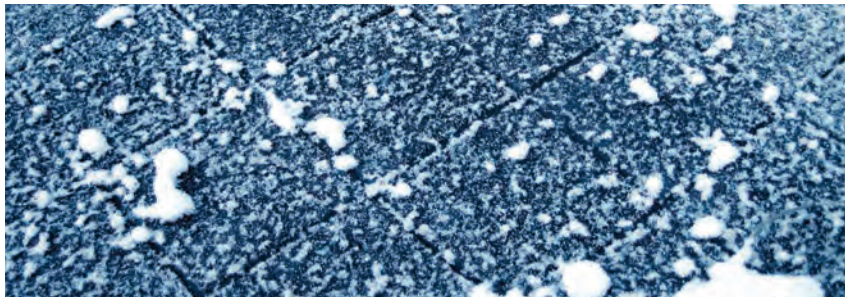
How Is Water Absorption Determined?

A tile's water absorption, or the percentage of weight it gains when water soaks into its body, is indicative of its overall connected porosity. The more water weight a tile gains, the more porous it is.

In the United States, a tile's water absorption is determined using the ASTM C373 standardized test method, which requires the use of a strong vacuum to draw water into a tile's pores. This procedure, updated in 2016 from a previous version which required a 5-hour boil and 24-hour water soak, allows for tile saturation in a much shorter timeframe than the previous boil method.

Similarly, the ISO 10545-3 water absorption test method, which is used more commonly outside the United States, is being updated in 2017 to align with the new ASTM International C373 vacuum procedure.

Given that ASTM C373 and ISO 10545-3 have historically differed procedurally, this recent effort at harmonization allows for increased consistency in water absorption testing and reporting.



Why Is Water Absorption Important?

A tile's water absorption directly affects the way it absorbs moisture, initially from the setting material and subsequently from the environment. This can affect the bond that is established where very high or low water absorption can require the use of specific bonding materials or substrate preparation.

Water absorption also affects freeze/thaw resistance, moisture expansion, breaking strength, and resistance to crazing, which can affect whether tiles are suitable for certain applications and how they should be installed. For example tiles that are highly water absorbent may not be suitable for freeze/thaw conditions, as the greater amount of water may cause the tile to crack in freezing weather.

In addition to freeze/thaw concerns, the unintended use of non-porcelain tile when porcelain tile was specified can cause greater than anticipated moisture-related expansion, possibly leading to tiles popping off the floor or wall due to the resulting compression.[2] Greater moisture absorption can also lead to crazing where the impervious glaze develops micro-cracks due to the underlying tile body expanding.

It is also true, but less well known, that a water-saturated tile has a lower breaking strength than a dry tile. This can be problematic if the tiles are exposed to a high level of point loading or are imperfectly installed.

2 As the tiles expand, they put the surrounding tiles in compression.

Historic Problem with Water Absorption Reporting and False Porcelain

Porcelain tile is defined in the U.S. ceramic tile standard, ANSI A137.1, as an impervious tile with water absorption of 0.5% or less, as measured by the ASTM C373 test method.

There is, however, a large body of foreign-made tiles not meeting this standard, many of which have been advertised and sold as porcelain. In part this has occurred due to the use of a less rigorous method internationally for determining water absorption. In other instances, some overseas manufacturers have made deliberate decisions to sell tiles as porcelain regardless of their actual water absorption value. The same has also been true of less than scrupulous importers who have marketed tiles as porcelain while knowing they did not meet the ANSI A137.1 standard.

In certain instances these products have been called "residential porcelain," but as the products didn't meet porcelain tile criteria, the term misrepresented the true nature of the tiles. Invariably these efforts to sell non-porcelain tile as porcelain were to take advantage of the popularity of the porcelain category, and because producing genuine porcelain is a more costly and higher temperature process than producing non-porcelain ceramic tiles.

Clearly the practice of selling non-porcelain tile as porcelain defrauds the consumer and creates marketplace confusion.

The Porcelain Tile Certification Agency (PTCA) was launched in 2007 to address these issues by providing a way for manufacturers to confirm their products are genuine porcelain. More information on this program can be found at www.ptcaonline.org.

New HS and HTS Codes and Revenue Neutrality

As noted previously, starting January 1, 2017, use of the 6908 heading was discontinued, and the revised 6907 heading classifies all tiles, not otherwise classified as either mosaics or finishing pieces, according to their water absorption.

For tile entering the U.S. market, the USITC further breaks the HS codes down to a 10-digit level (HTS codes) to capture more specific data. These HTS codes differ from HS codes in that they are specifically for imports into, and exports out of, the United States

HTS codes use the same first six digits as HS codes, but the last four digits differ. The 10-digit HTS codes for ceramic tile can be found on the USITC website, hts.usitc.gov.

TCNA BULLETIN

CRITICAL CHANGES TO HS AND HTS CODES FOR CERAMIC TILE IMPORTED INTO THE UNITED STATES

The additional four digits are used to keep the new classification revenue neutral with the old classification and to meet the following criteria:

- "The modification must be consistent with the [Harmonized System] Convention or any amendment thereto recommended for adoption, must be consistent with sound nomenclature principles, and must ensure substantial rate neutrality.
- Any change to a rate of duty must be consequent to, or necessitated by, nomenclature modifications that are recommended under this section.
- The modification must not alter existing conditions of competition for the affected United States industry, labor, or trade."

To maintain revenue neutrality, and to adhere to all existing trade agreements and rates of duty, the new codes must preserve the distinction between glazed and unglazed tiles, with unglazed tiles generally at 10% duty and most glazed tiles at 8.5% duty (excepting if imported from North Korea or Cuba with much higher duties). Similarly, the new codes also preserve the size distinctions in the prior HTS codes.

In total there are 40 separate 10-digit HTS codes for ceramic tile importers and exporters under the new system, compared to the eight in the prior system and the five listed in the new HS system.

As an example, the prior system classified glazed ceramic tiles larger than 30 cm x 30 cm (approximately 12" x 12") under heading 6908.90.00.51.

Under the new system, whether the tile is porcelain, non-porcelain floor tile, or wall tile is relevant; glazed porcelain floor tiles larger than 30 cm x 30 cm are classified under heading 6907.21.90.51, with the duty being the same in the prior system under 6908.90.00.51.

Glazed non-porcelain floor tiles larger than 30 cm x 30 cm are classified under heading 6907.22.90.51, and similar tiles for walls only (i.e., with water absorption over 10%) are classified under heading 6907.23.90.51.

A Necessary Solution

To comply with the changes from the WCO, as discussed above, USITC had no choice as a matter of law but to recommend the changes to the HTS discussed herein. It is worth clarifying that neither U.S. industry nor U.S. importers can simplify or change the tariff schedule when it affects government revenue; it literally takes an act of Congress to change the tariff system if revenue neutrality is not maintained.

Overlap in the HTS Codes

Further complicating the new HTS codes, as noted previously, the category 6907.30 for mosaics was created in the HS system by the WCO without defining the term "mosaics". This category overlaps with the mosaic sizes in the HTS codes starting with 6907.21 through 6907.23.

As an example, the pre-2017 system classified an unglazed mosaic tile under heading 6907.10.00.00 with a duty of 10% (excluding those countries with special duty provisions). Under the new system, depending on its water absorption, an unglazed mosaic tile could meet the criteria of heading 6907.21.10.05 (porcelain tile), heading 6907.22.10.05 (non-porcelain floor tile), or heading 6907.23.10.05 (wall tile), and regardless

of water absorption, heading 6907.30.10.05 (mosaic cubes and the like), and if also a trim tile, heading 6907.40.10.05 (finishing ceramics). All carry the same 10% duty.

Just as the six digit categories 6907.21 through 6907.23 in the HTS codes contain mosaic sizes, the mosaic category (6907.30) in the HTS codes contains sizes outside the mosaic range, specifically 6907.30.90.11 (30 cm x 30 cm or less) and 6907.30.90.51 (greater than 30 cm x 30 cm).

We fully expect CBP will clarify which categories to use given that some size-based subdivisions within the 10 digit HTS codes conflict with the intent of the 6907.30 category. As a matter of law, CBP is the only agency that can provide legally binding advice or rulings on classification of imports. They should be contacted with any questions about how potential imports would be classified.

Impact on the U.S. Market

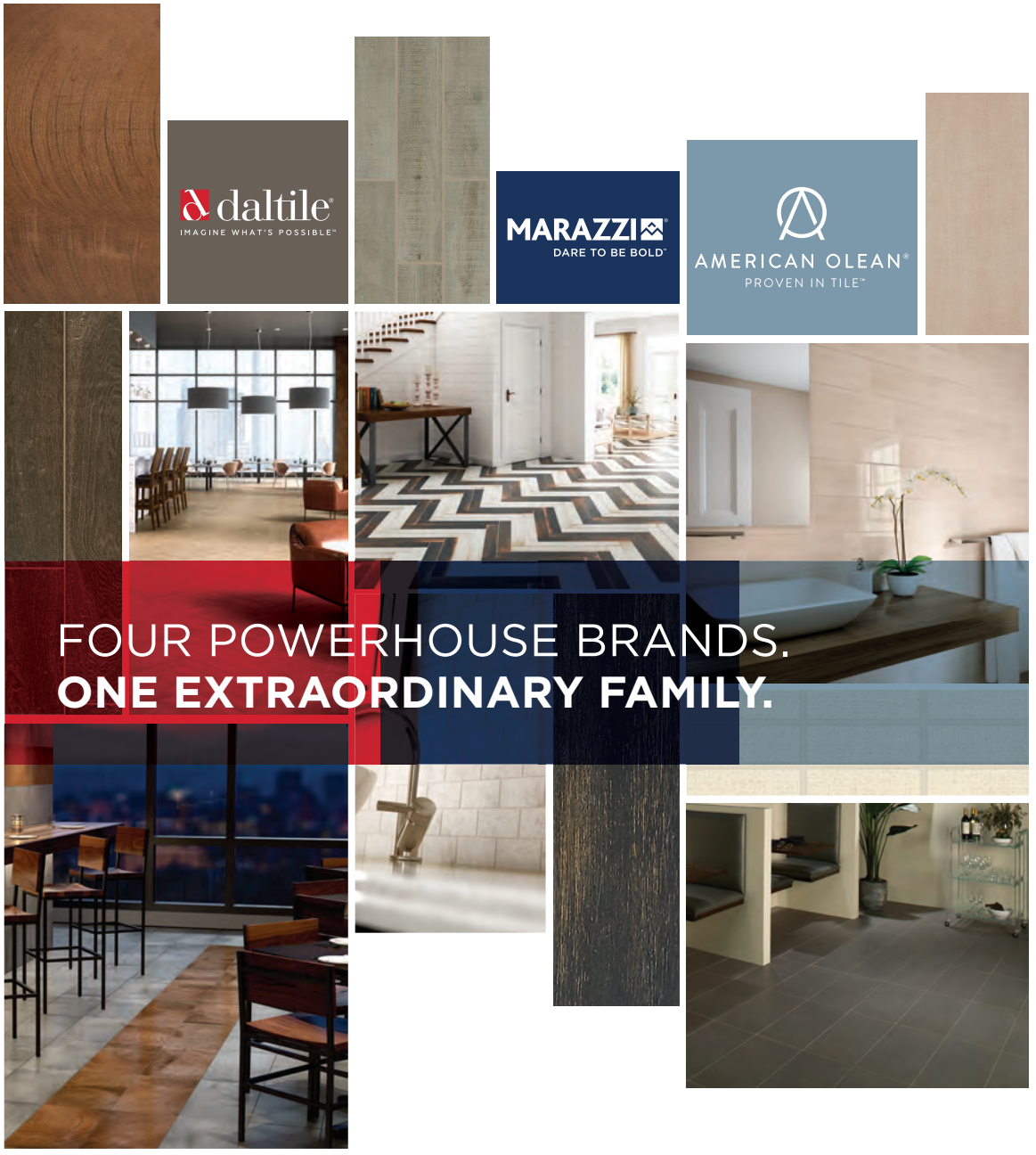
While PTCA has been effective as a voluntary path for porcelain tile manufacturers to demonstrate their compliance with porcelain water absorption criteria, it

does not prevent manufacturers that do not participate from false labeling. With the HTS codes in effect as of January 1, 2017 requiring water absorption to be declared, importers will more carefully require that information from their suppliers and more carefully report it. If failing to report it correctly, U.S. CBP can issue fines and potentially hold importers criminally liable for making false declarations. Presumably the risk of such will help reduce the amount of mislabeled tile entering the market.

Given the problems potentially occurring when non-porcelain tiles are unknowingly substituted for porcelain tiles (excessive expansion, loss of freeze/thaw resistance, moisture-related crazing, and reduced breaking strength), greater clarity in reporting water absorption will result in fewer installation failures and greater end-user satisfaction.

With the current worldwide effort to harmonize water absorption testing methods well underway, which should be completed in 2017, and federal laws now in force as described, we fully expect these changes to benefit consumers and help level the playing field for all porcelain producers abiding by accepted water absorption criteria.

That's a win-win for consumers and manufacturers alike!



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What is the Ceramic Tile Education Foundation?
The Ceramic Tile Education Foundation (CTEF) provides education and installer certification for professionals working in the ceramic tile and stone industry.

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PORCELAIN TILE CERTIFICATION
AND THE PORCELAIN TILE CERTIFICATION AGENCY (PTCA)

In 2008 Tile Council of North America (TCNA) partnered with the Ceramic Tile Distributors Association (CTDA) to create the Porcelain Tile Certification Agency (PTCA) to certify porcelain tile. This program was formed at the initiative of distributors and manufacturers who were concerned with the amount of tile being sold in the United States that was marked as porcelain but which was in fact not porcelain.

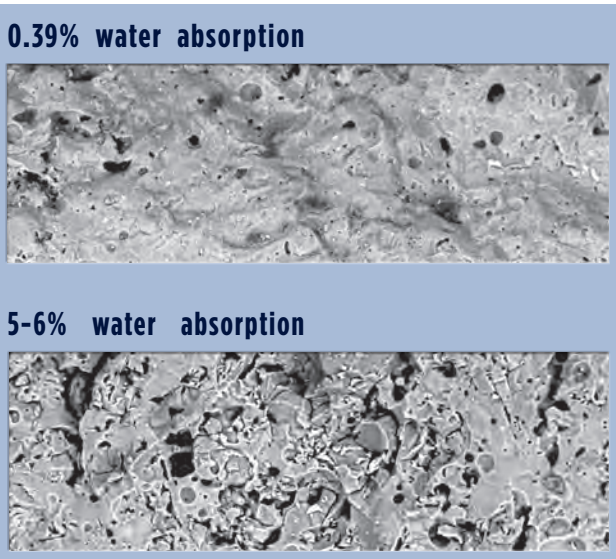
What is porcelain tile, and why does it matter whether a tile is porcelain?

As defined by the ANSI A137.1 ceramic tile standard, porcelain tile is a ceramic tile with a very low water absorption (0.5% or less), as tested per ASTM C373. Porcelain tile is denser and has a lower water absorption than other types of ceramic tile. When non-porcelain tiles are unknowingly substituted, freeze/thaw and expansion failures can result from unexpected moisture absorption.

Why was this porcelain tile certification program created?

It is well known that some non-porcelain tiles made overseas are knowingly mislabeled as porcelain, with exporters and importers choosing to ignore the relevant North American standard (ANSI A137.1). While the criteria for porcelain tiles have been well-defined for several decades in North America, this practice of mislabeling tiles began when the term porcelain was undefined in international standards.

Today the term is well defined, but historically the method used internationally for measuring water absorption was less rigorous than the ASTM C373 method used in North America. Efforts are underway internationally to harmonize the ISO and ASTM methods; how this plays out in the U.S. marketplace remains to be seen.



Simply stated, this means that some tiles classified as porcelain overseas haven't met the stricter and more demanding water absorption criteria used in North America. In freeze/thaw and wet environments, that can be important. Given that approximately 70% of the tiles sold in the United States are imported, PTCA certification was developed to protect the consumer from tiles either intentionally mislabeled or mislabeled due to differences in testing.

Through the PTCA program the need for porcelain certification has become even more evident, as 336 tile series out of 1,466 tested (23%) failed, as of third quarter 2016.

Can only manufacturers sign up for PTCA certification?

No. The program is open to both manufacturers and sellers of porcelain tiles. Either can be a program participant.

PTCA certification: What does it mean?

Recognizing that the extent of this false labeling issue only applies to whether or not tiles meet the water absorption criteria of the ANSI A137.1 standard, PTCA certification was developed only to independently evaluate if the program participant understands North American water absorption criteria and can meet such. Tiles are not checked to see whether or not they meet all the other relevant properties for porcelain tiles in the ANSI A137.1 standard; variance from those properties has not been an issue in general, and the criteria are well understood. For each series being evaluated, five commercially available samples (selected by the participant) are sent once every three years by manufacturing participants and annually by non-manufacturing participants.

Passing the initial testing establishes that the participant understands and can meet North American water absorption criteria. For more details on the PTCA program, the PTCA Program Participation Agreement is publicly-available and can be found at www.ptcaonline.org/PTCA_Participation_Agreement.pdf.

PORCELAIN TILE CERTIFICATION
AND THE PORCELAIN TILE CERTIFICATION AGENCY (PTCA)

If a box of tiles has the PTCA certification mark on it, is PTCA stating that those tiles meet ANSI A137.1 water absorption criteria?

No. PTCA establishes that the program participant understands North American water absorption criteria and is able to meet such.

The quality of the tiles being sold is exclusively controlled by the actual manufacturer.

If a box of tiles has the PTCA certification mark on it, is the program participant stating that those tiles meet all ANSI A137.1 criteria?

While the program participant may independently claim compliance with all ANSI A137.1 porcelain tile criteria, that is not required by PTCA of program participants.

By participating in the PTCA certification program, the program participant (i.e., the manufacturer and/or seller) is stating that the tiles it produces or sells labeled with the PTCA mark meet the ANSI A137.1 porcelain tile water absorption requirements.

Non-manufacturing participants are further required to obtain a written assurance from the actual manufacturer that it will immediately notify the participant of any changes in the conforming porcelain tiles or any manufacturing variances that may affect the certification.

To further ensure the program's effectiveness, participants have agreed not to use the PTCA mark in any way misleading or confusing to buyers, including displaying the certification mark in a way that would imply non-certified products are certified. Participants also are not allowed to transfer use of the mark to any other person or entity.

As noted above, PTCA certification does not mean the tiles tested met all ANSI A137.1 or ISO 13006 criteria, which would require testing for other physical properties such as dimensions, warpage, breaking strength, etc. That assurance would need to come from the manufacturer or via a third-party lab.

If a box of tiles has the PTCA certification mark on it, can those tiles be used in freeze/thaw and wet environments without concern?

While the tiles may be perfectly appropriate for such use, the PTCA certification mark does not suggest that. The suitability of any tiles for specific applications requires an analysis of the project conditions by a qualified individual and proper installation. The certification mark does not assure fitness for any particular purpose.

What are the benefits of the PTCA program?

The PTCA program is designed to directly benefit consumers purchasing porcelain tiles and, indirectly, everyone involved in the supply chain.

Participants benefit by being able to independently confirm to customers that what they are producing or selling is truly porcelain, and by being able to differentiate their products from falsely labeled porcelain products.

Producing porcelain tiles can be a more intensive and costly process than producing non-porcelain tiles, so certification is a good way for manufacturers and sellers to confirm that investment to the market.

For distributors PTCA certification helps differentiate real porcelain tiles from those that are falsely labeled as porcelain.

Who polices PTCA-certified tile?

The marketplace does. If a question arises about whether a tile sold as PTCA-certified truly meets the water absorption criteria for porcelain tiles, PTCA is authorized to acquire further samples and test such for compliance. The board of PTCA then reviews the available data and relevant actions taken by the program participant to decide whether to withdraw PTCA certification and use of the mark.

Anyone who suspects a non-porcelain tile is being sold as PTCA-certified tile is encouraged to notify PTCA at 630-942-6588 or info@ptcaonline.org.

TCNA BULLETIN

WHAT IS TRUE PORCELAIN?

CERTIFIED PORCELAIN TILE
0.5% or less water absorption

The difference between real and false porcelain cannot be detected by eye.... Suppliers of falsely-labeled porcelain are defrauding the consumer and benefitting from the popularity and market value of genuine porcelain.

Porcelain tile has become increasingly popular over the past decade. The American National Standard Specifications for Ceramic Tile (ANSI A137.1) require tile to have a water absorption of 0.5% or less, to be classified as porcelain, when tested per ASTM C373, the most stringent test for measuring water absorption.

Manufacturing tile that meets this standard—true porcelain—requires porcelain-grade clays and other unique raw materials, plus precision milling processes and kilns set to extremely high firing temperatures (2100˚F to 2500˚F). The required raw materials, energy, and manufacturing equipment needed to produce such low porosity, high density tile are why real porcelain is typically more expensive than non-porcelain tile.

The difference between real and false porcelain cannot be detected by eye—the only way to know is to have a laboratory verify the tile's water absorption is 0.5% or less. Through its lab, Tile Council has identified 336 series (out of 1,466 total tested) of falsely-labeled "porcelain" tiles with a water absorption well over 0.5%—sometimes as high as 3%.

Suppliers of falsely-labeled porcelain are defrauding the consumer and benefitting from the popularity and market value of genuine porcelain. This is particularly true for imported tile, and, considering that approximately 70 percent of the tile sold in the United States is imported, much of the "porcelain" being sold may be falsely labeled.

ASTM C373 Water Absorption Test

For ceramic tile, water absorption refers to the maximum amount of water that a tile can be made to absorb. In the lab test ASTM C373, water is drawn into the deepest pores of the tile by a strong vacuum.

So, measuring water absorption can also be looked at as measuring available tile porosity—the more water that can be absorbed, the more porous (less dense) the tile.

STEP 1

Tile sample is dried in an oven to ensure accurate dry weight.

STEP 2

Dried tile sample is weighed using a digital scale accurate to 0.001 gram.

STEP 3

Water is drawn into the tile sample by a vacuum and soaking it.

STEP 4

Saturated tile sample is weighed to determine the amount of weight gain due to absorption of water.

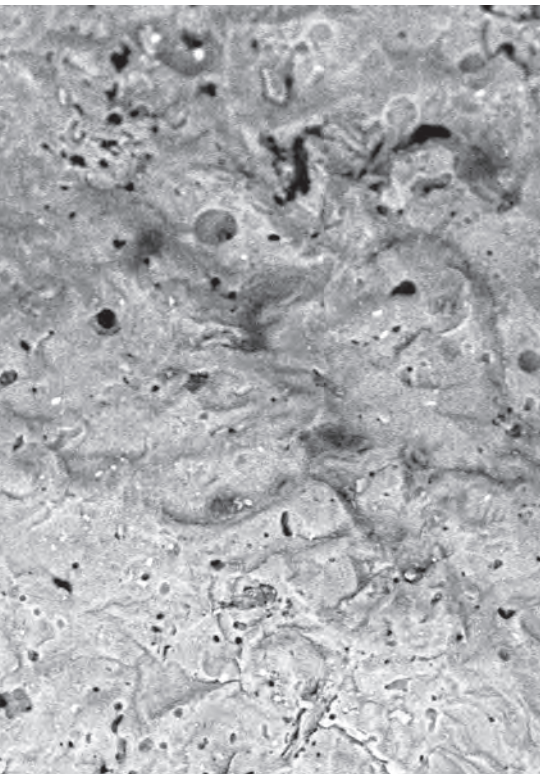
STEP 5

Water absorption is calculated.

The change in weight is expressed as the percentage of the tile's dry weight.

BE SURE.

The Certified Porcelain Tile logo means the tile tested met the requirement of 0.5% or less water absorption for porcelain tile of the American National Standards Institute's A137.1 standard.



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RESEARCH SUPPORTING **AN ANSI AMERICAN NATIONAL STANDARD FOR SLIP RESISTANCE**

By Eric Astrachan

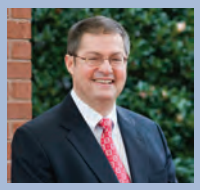
The method for measuring the coefficient of friction (COF) of ceramic tiles is specified in Section 9.6 of the American National Standard Specifications for Ceramic Tile, ANSI A137.1. The method changed in 2012 from the ASTM International test method C1028, which measured static coefficient of friction (SCOF), to the test protocol described in Section 9.6, which measures dynamic coefficient of friction (DCOF).

The transition from SCOF to DCOF has been well documented[1, 2] in previous articles by TCNA noting extensive research done in Germany and at TCNA. This article explains that research in detail. While some articles are referenced that are only available in German, the major research components from Germany are also available in English.

Although the test method described in Section 9.6 was originally written for ceramic tiles, the same general method and the same research underpinning the method are equally applicable to all hard surfaces.

German Research and Safety Standards

German safety research is a cooperative effort between the government, in the form of the German Social Accident Insurance [Deutsche Gesetzliche Unfallversicherung (DGUV)], and a host of universities, each focused on a particular area of public safety. In the field of pedestrian floor safety, the University of Wuppertal (Bergische Universität Wuppertal) has many decades of cooperation with the main DGUV research and testing laboratory at the German Institute for Occupational Safety and Health [Institut für Arbeitsschutz (IFA)] in Sankt Augustin, Germany. Their joint efforts led to the creation of German national standards—commonly referred to as DIN (Deutsches Institut für Normung e.V.) standards—for testing and certifying footwear and flooring in the laboratory. These methods, DIN 51130 ("German Ramp Test") and DIN EN 13287 ("Floor-Shoe Tester") have been widely used in their respective industries. In the case of the ramp test, the method has been used to make laboratory measurements of flooring for more than 20 years.[3]



Eric Astrachan is Executive Director of the Tile Council of North America (TCNA).

He is the present Chairman of the TCNA Handbook Committee, Co-Secretary of the ANSI Accredited Standards Committee A108 for ceramic tile and stone standards, and Head of Delegation for the ANSI vote on ISO TC-189, the International Organization for Standardization Technical Committee on ceramic tiles.

He is the Convener of ISO TC-189 Working Group 2 on ceramic tile standards, an elected officer of ASTM's F13 Committee on Pedestrian/Walkway Safety and Footwear, and active on several other industry technical committees.

He is an Executive Committee member of the Board of the Ceramic Tile Education Foundation, serves on the Board of the Porcelain Tile Certification Agency, and is on the Board of Governors of the international trade show Coverings. He is also a recognized industry consultant and keynote speaker for a broad range of industry topics, including product standards, installation, international trade, and slip/fall litigation.

Following the development of the German ramp test, research was conducted titled "Experimental Investigation to Determine the Standardized Limit of the Coefficient of Friction for Slip Resistance During Walking," which was the doctoral thesis of Dr. Stefan Bönig, then a graduate student in Safety Engineering at Wuppertal.

Dr. Bönig's Research: Eight Walking Conditions

Using force plates[4] Bönig set out to empirically determine the friction necessary for safely traversing eight walking conditions:

- Walking in a straight line on a level surface
- Walking while turning
- Ascending stairs
- Descending stairs
- Walking across a ramp
- Ascending a ramp
- Descending a ramp
- Coming to a stop

Through statistical analysis of the empirical data he collected, he confirmed a normal distribution of the data and developed confidence limits for each walking condition.

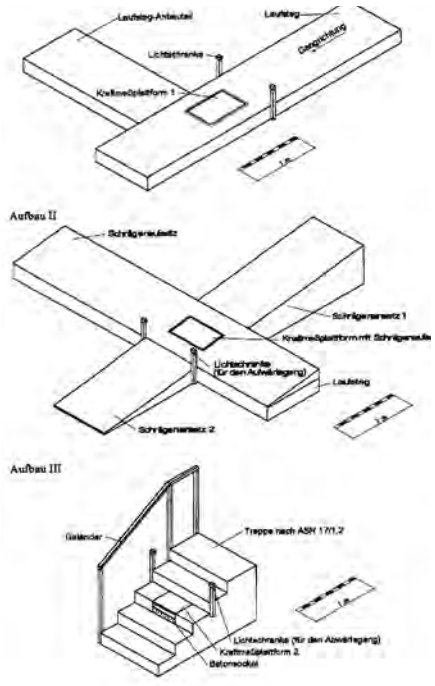
This allowed three important determinations:

1. The necessary friction for each walking condition as a function of DCOF and statistical confidence.
2. A comparison to existing accident statistics to determine the DCOF limit values for each walking condition at which accidents would be reduced for the population as a whole.
3. An evaluation of limit values for each walking condition to meet a conservative assessment of socially acceptable risk.

Preliminary Tests

Bönig conducted a series of preliminary tests to determine essential and non-essential influencing variables for this study of necessary friction.

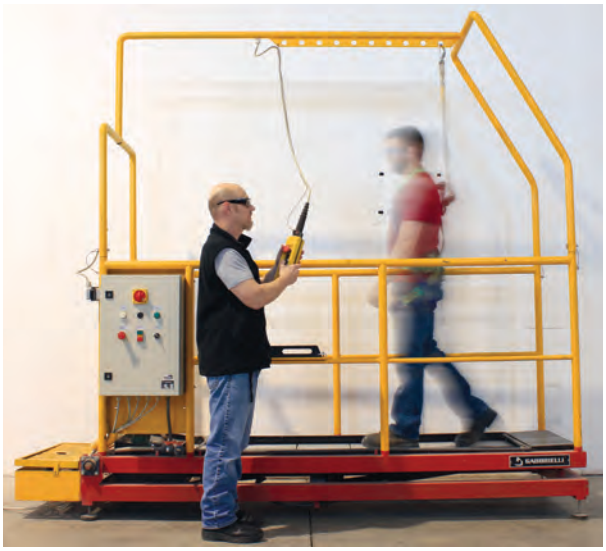
He first looked at the relative significance of different surfaces and shoes. Two measurements were performed for each property combination of eight people, eight floor coverings, and eight shoes. This resulted in 1,024 measurements from which he determined the standard deviations of repeatability and reproducibility per DIN ISO 5725 and the relative impact of each influencing variable. Variability between the test subjects had the largest impact at 97%. The influence of the shoe and floor covering variables was 59% and 43% respectively.



Force plates were embedded into a level surface, a ramp, and on stairs to determine the friction necessary to safely traverse these conditions.

Figure: Dr. S. Bönig, Journal of Work Safety, *2/1997.*

RESEARCH SUPPORTING **AN ANSI AMERICAN NATIONAL STANDARD FOR SLIP RESISTANCE**



A German Ramp, similar to the one depicted above, is used in DIN 51130, and in much of the foundational research of Dr. Jens Sebald which underlies the ANSI A137.1 standard. The ramp shown is currently being used for research in the TCNA Laboratory.

Next he studied the influence of step length and step frequency. Five different step lengths were studied at three different speeds for five subjects with one repeat: a total of 150 measurements. Walking speed was determined to be an influencing variable so the main study was conducted with attention paid to the test subjects walking at their normal personal walking speed.

Böning next studied load carrying options, specifically the following:

- Walking without load
- Combined lifting and pushing (wheelbarrow)
- Carrying with both arms behind the body with a partner
- Carrying with both arms in front of the body with a partner
- Pushing an object with both arms (cart)
- Carrying with both arms in front of the body
- Carrying on one side to the right of the body
- Carrying on one shoulder

The results showed that the transport operations involving carrying in front of the body with both arms in conjunction with a partner, combined lifting and pushing, and pushing a manual cart with both arms differed significantly from walking without load in terms of the maximum COF requirement. For all other transport operations, no significant differences were observed. However, examination of the mean values showed that the transport operations that differed significantly from walking without load also exhibited a lower mean maximum friction requirement than the friction requirement from walking without load, and thus were also associated with a lower risk of slipping. Therefore, Bönig determined, in comparison to walking without load, the objective risk of slipping was not higher during manual transport operations.

Continuing his preliminary assessment of critical variables for his main study, Bönig determined eight gait models for making a turn with four combinations for stopping to determine the condition requiring the greatest friction.

Determining a Test Cohort

Since age, gender, and body height are correlated with slipping according to Skiba (1983), Skiba, Drapp, and Weider (1988), and James (1983), Bönig created a cohort of fifty test subjects based on random sampling into subsets matching the German population for age, gender, and body height.

He fixed six age and four body height categories and chose the number of test subjects based on the male/female proportion in the general population for each of the six age categories and four body height categories. As an example, he selected six females aged 20 to 30 years and seven males aged 40 to 50 years; he had four females shorter than 1.59 meters and six males taller than 1.84 meters.

Force Plate Measurements

After constructing three force plate assemblies—one for level walking, one for stairs, and one for ramps—Bönig took 2,700 force plate readings to evaluate the eight walking conditions, including a repeat of the level walking surface using the test subjects' own shoes. Three measurements per surface and per subject were made landing on the right foot and three landing on the left foot for a total of nine surfaces x 50 subjects x 6 measurements, or 2,700 total measurements.

This quantitative assessment was evaluated using Chi-Squared and Kolmogoroff Goodness of Fit tests to confirm that a normal distribution was represented in the data. This was necessary to allow a statistical analysis and an assessment of risk.

For the eight walking conditions, Bönig determined the maximum necessary friction values within a 95% confidence interval. The required friction for walking in a straight line on a level walkway was 0.31 and the required friction for traversing a ramp was 0.35. The ascend/descend stairs numbers were 0.23 and 0.26 respectively. He compared his findings, in detail, with many previously published studies and found the mean results to be in line with the ranges of the other studies. For example, a much-cited study in Britain by Harper, Warlow, and Clarke (1961) found the friction requirements for walking in a straight line, with a probability of slipping of 1 per 10^6, to be 0.36.

The figure below presents the risk of slipping for each walking condition, except stopping, as a function of COF. The values with 95% confidence are marked and the values for a 99% confidence interval can be seen at the intersection with the 1:100 axis.

Accident Statistics and Social Acceptability

To determine DCOF limit values for each walking condition at which safer conditions would be achieved, Bönig utilized accident data published by the German Federal Government and the Federation of German Statutory Accident Insurance Institutions [Hauptverband

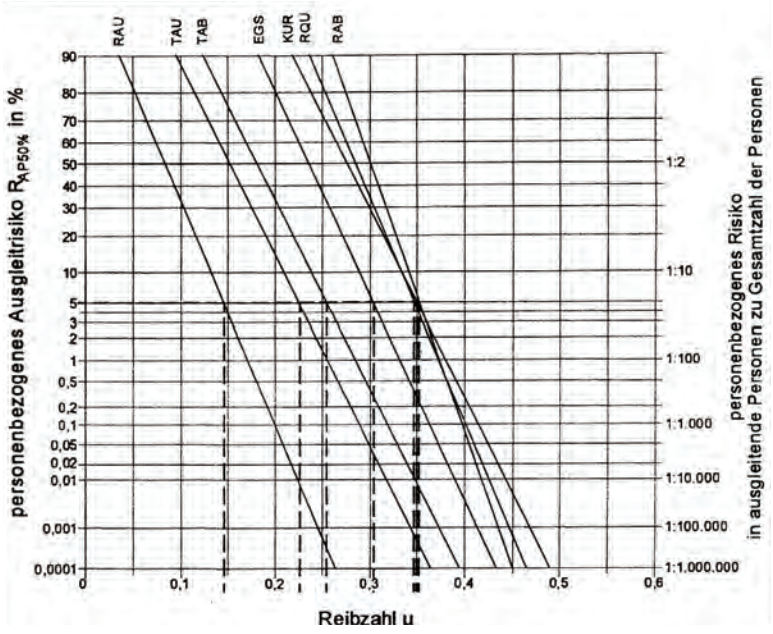
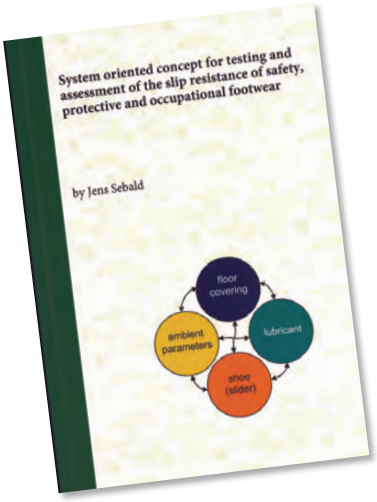


***Figure 9.3 from the doctoral thesis of Dr. Stefan Bönig**:*
Determining coefficient of friction from the person-specific risk of slipping as an ergonomic threshold in the form of the 95th percentile.

personen-bezogenes Ausgleitrisiko R_{AP} in %	Person-specific risk of slipping R_{AP} in %
Reibzahl μ	Coefficient of friction μ
personen-bezogenes Risiko in ausgleitende Personen zu Gesamtzahl der Personen	Person-specific risk in number of persons slipping as a function of the total number of persons
RAU	Ascending a ramp
TAU	Ascending stairs
TAB	Descending stairs
EGS	Walking in a straight line on a level surface
KUR	Walking while turning
RQU	Walking across a ramp
RAB	Descending a ramp

RESEARCH SUPPORTING **AN ANSI AMERICAN NATIONAL STANDARD FOR SLIP RESISTANCE**



Cover of Dr. Sebald's 2007 PhD dissertation, published by Pro Business in 2009.

der Gewerblichen Berufsgenossenschaften (HVBG)] that provided data on all accidents in commercial companies in Germany in 1993. This data pool covered 29,688,426 German workers who walked an average of 460,000 straight line steps during the 230 working days that year. An additional 202,400 steps were estimated to have been taken by the average worker over all other walkway geometries for a total 662,400 steps per worker per year.

Based on actual statistics and some assumptions previously validated by Skiba, Drapp, and Wieder (1988), 238,800 slip accidents occurred in 1993. Of those, 47 were fatalities, 7,458 led to disability pensions, and 23,880,000 near accidents were estimated. Using the worst-case statistical models already developed, and assuming a slip could result in an accident or near accident, that number of near accidents would occur with a straight line walking DCOF of 0.30, a descent of stairs value of 0.31, and a cross ramp value of 0.36.

Simply stated, if the friction available to German workers (i.e., that combination of shoes and flooring) should be greater than the values determined, slip events would decrease.

To determine a measure of social acceptability, Bönig assumed a conservative social acceptance risk factor per Rowe (1977) of 1 x 10^{-6} fatalities per year (one chance in a million), and a safe walking criteria per person of ten years. Using the accident statistics already described, Bönig calculated the necessary friction pairings to meet this social acceptability criteria: a straight line walking DCOF of 0.39, a descent of stairs value of 0.41, and a turning while walking value of 0.42.

Bönig's study was published in 1996 and was quickly adopted by his academic colleagues at Bergische Universität Wuppertal. It became known as the "Wuppertal Scale" and was subsequently added to the "Bible" of German workplace safety titled "Handbook of Commercial Safety Technology." Bönig's substantial research, subsequent research by Dr. Jens Sebald of Wuppertal, and later research by TCNA together form the basis of Section 9.6 in the ANSI A137.1 standard.[5]

Research of Dr. Jens Sebald

In 2007, Dr. Jens Sebald completed his research titled "System Oriented Concept for Testing and Assessment of the Slip Resistance of Safety, Protective, and Occupational Footwear." He studied five means of measuring COF, twenty floor coverings, three slider materials, 54 shoes, and three lubricants. The devices included in the study were the following: German Ramp, BST shoe tester, GMG 100, BOT 3000, and the British Pendulum. The floor coverings studied were ceramic and porcelain tile, quarry tile, granite, cast stone, and PVC. The sliders chosen were SBR rubber, Four-S rubber, and Picasso shoe material. The lubricants were motor oil (as used in the DIN 51130 ramp test), water with SLS surfactant, and glycerin.

While the majority of Dr. Sebald's work concerned footwear, including the measurement of footwear slip resistance and relative comparisons of footwear, Dr. Sebald also assessed the validity of the different friction measurement methods and their suitability for transfer to devices making mobile measurements.

Simply stated, Sebald evaluated the correlation between devices under the large variety of conditions described above.

Comparing the German-engineered/U.S.-made BOT 3000 to the German Ramp, making measurements with an SBR (styrene butadiene rubber) test foot, with motor oil as the lubricant on 12 tile surfaces, Sebald determined a correlation coefficient between the methods of 0.989. Using a water and sodium lauryl sulfate (SLS) solution with an SBR test foot, he found a correlation coefficient between the German Ramp and the BOT 3000 of 0.879. The correlation between the BOT 3000 and the GMG 100 (used in DIN 51131) was 0.926, using water and SLS with an SBR test foot. These correlation coefficients mean the BOT 3000, GMG 100, and German Ramp are tightly correlated.

The same was not true for the British Pendulum, which Sebald demonstrated had a correlation coefficient with the German ramp of 0.687, when tested with SBR on 12 tile surfaces using water with SLS as the lubricant.

TCNA's Contributions to Measuring COF

In research at TCNA over a five-year period, TCNA studied the following parameters to improve the measurement of COF versus the C1028 method previously referenced in ANSI A137.1 and to assess and improve the repeatability and reproducibility of a BOT 3000 method, leading to its inclusion in Section 9.6 of the A137.1 standard:

- Static vs. dynamic COF
- Deionized water vs. SLS water
- BOT 3000 method vs. C1028 method
- BOT 3000 method vs. British Pendulum method
- BOT 3000 sensor preparation using a TCNA-developed sanding device to eliminate variation from sanding
- Measurement of 300 tile surfaces for SCOF and DCOF, concluding that 0.60 wet SCOF correlated on average with 0.38 wet DCOF[6]
- Inter-laboratory testing of the method in Section 9.6 using seven different tile surfaces, six laboratories, and three repeats to determine and report the method's reproducibility and repeatability as detailed in the standard

The BOT 3000E, shown here, is used for ANSI A137.1, Section 9.6, DCOF testing.

RESEARCH SUPPORTING **AN ANSI AMERICAN NATIONAL STANDARD FOR SLIP RESISTANCE**

Adoption into Standards

In January 2011, the DGUV in Germany issued its Rule Number 8687 mandating the use of DIN 51131 in combination with a wet DCOF target derived from the Bönig research.

Following the research from Germany, and the research conducted by TCNA, the ANSI accredited A108 standards committee voted to adopt the recommendation from Bönig's research for level interior spaces into the ANSI A137.1–2012 standard. Specifically, the standard sets a required minimum DCOF threshold of 0.42 for surfaces expected to be walked upon when wet, as measured according to Section 9.6. By requiring a value higher than 0.38, the standard provides an additional measure of safety over the previously widely-used ASTM C1028 wet SCOF value of 0.60 (per research at TCNA on 300 tile surfaces)[6].

After a 15-year wait, Dr. Bönig's work, and the work that preceded and followed, has borne fruit, not only in Germany, but also in the United States and potentially in many tile consuming countries of the world.

Notes

1. *TCNA Tile Initiative,* 2013, Tile Council of North America; included in 2013 *TCNA Handbook for Ceramic, Glass, and Stone Tile Installation,* and available separately from TCNA as a free download at www.TCNAtile.com.

2. *TCNA Tile Initiative,* 2012, Tile Council of North America; included in 2012 *TCNA Handbook for Ceramic, Glass, and Stone Tile Installation,* and available separately from TCNA as a free download at www.TCNAtile.com.

3. In the German Ramp test, developed by Skiba, Scheil, and Windhövel of the Bergische Universität Wuppertal, a trained evaluator, wearing standardized footwear, walks on a flooring sample evenly coated with oil. Starting with the ramp in a horizontal position, the evaluator increases the angle of the ramp until a slip occurs. The angle at which the slip occurred is used to express the degree of slip resistance per the table below.

Slip Resistance	Acceptance Angle
R9	From 6° to 10°
R10	From 10° to 19°
R11	From 19° to 27°
R12	From 27° to 35°
R13	Over 35°

4. In order to determine the force components from which the friction requirement can be calculated, multi-component force platforms ("force plates") were employed to measure forces perpendicular to the surface (Fz) and tensile and pressure forces in both tangential axes (Fy and Fx).

5. Dr. Bönig's work preceded the development of a standard for making in situ measurements, and he subsequently moved on to other areas of endeavor. He is recognized today as one of the world's leading designers of industrial fastener technology with over 20 patents to his credit. Further research by Sebald and others led to the development of standards for making field measurements (ANSI A137.1 and DIN 51131) allowing Bönig's research to be applied in all hard surface flooring applications.

6. While the 300 tiles chosen were selected to represent a wide spectrum of surfaces, no claim is made or offered that this represented the entire spectrum of available tile surfaces nor can any inference be made regarding any individual tile surface. ASTM C1028 SCOF measurements and DCOF measurements cannot be directly compared or correlated on a per-tile basis, as different sensors, test conditions, and measurement physics are employed.

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TCNA BULLETIN

COEFFICIENT OF FRICTION (COF) STANDARD FOR CERAMIC TILE

Don't Slip Up When It Comes to Safety!

Be sure your tile specs are in accordance with the COF requirements of ANSI A137.1, including "Unless otherwise specified, tiles suitable for level interior spaces expected to be walked upon when wet shall have a wet DCOF of 0.42 or greater," when tested per the DCOF AcuTest®.

The ANSI A137.1 standard for ceramic tiles also states, "The specifier shall determine tiles appropriate for specific project conditions, considering by way of example, but not in limitation, type of use, traffic, expected contaminants, expected maintenance, expected wear, and manufacturers' guidelines and recommendations."

If you're specifying, selling, manufacturing, installing, or maintaining ceramic tile floors, it's important to know about these 2012 changes to ANSI A137.1. Project plans and specifications, maintenance programs, etc., referencing only a static COF of 0.6 per ASTM C1028 (the old COF test method) do not meet the requirements of the current standard.

To meet the current DCOF AcuTest criteria, you cannot use COF values from C1028 measurements. The test methodologies are different, and accordingly, there is no direct correlation between specific C1028 COF values and the values measured by the DCOF AcuTest. Additionally, ASTM C1028 was withdrawn in 2014.

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Visit TCNAtile.com for the full text of the COF standard and additional information.

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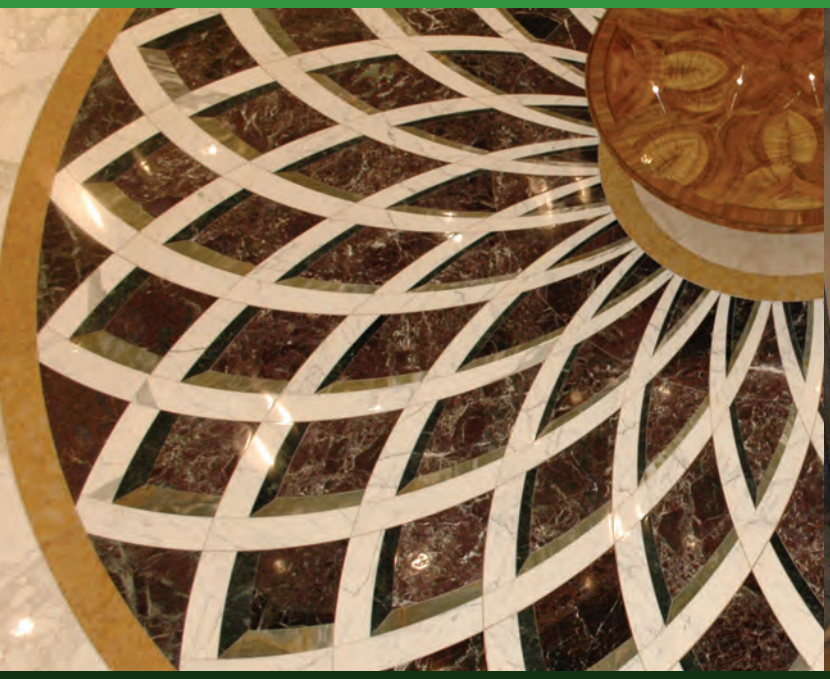

The Tile Council of North America Handbook strongly recommends using installers who have demonstrated their commitment to their craft.

Because tile is a permanent finish, the lowest bid should not be the driving factor, but rather who is the most qualified to perform the scope of the work specified.

TCAA Trowel of Excellence and NTCA Five Star Contractors have a proven track record of success for both residential and commercial installations. These companies have demonstrated their commitment to professionalism by passing rigorous review of their training, management and safety practices and enjoy strong support from peers, customers and suppliers.

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WHEN QUALITY IS THE BOTTOM LINE
MATCH ACT-CERTIFIED INSTALLERS TO THE JOB AT HAND

ACT
ADVANCED CERTIFICATIONS FOR TILE INSTALLERS

Tile setting has become a more and more specialized trade, yet it remains largely unregulated when it comes to requirements for installers, whether for training or for proven adherence to best practices and industry standards. The easy entry into tile setting means a contractor may have seasoned, skilled craftworkers or untrained installers with little experience under their belts. And, without an established skills baseline, the contractors that don't invest in installer training and education have a competitive edge, if the only consideration for choosing from a pool of tile contractors is which one has submitted the lowest bid, the norm for the vast majority of commercial work today.

This is the system for awarding tile jobs—too often to unqualified companies—that ACT (Advanced Certifications for Tile Installers) seeks to improve by establishing a skills baseline that allows consumers to compare costs and qualifications.

Launched in 2014, ACT is a program of written and hands-on testing for defined skill sets, like large format tile installation. While other training and certification programs are available to tile installers, ACT has garnered wide support from the tile industry because it is standards-based and highly demanding.

Construction and building design professionals are encouraged to integrate installer qualifications as requirements for bidding contractors, under "quality assurance" sections of their specs.

Requiring evidence of program completion or certifications under "submittals" is also recommended to help ensure the specified requirements for installers are met.

For ready-to-use boilerplate spec language, see the Installer and Contractor Qualifications Guide in the 2017 TCNA Handbook, or, for easy copy and paste, visit TCNAtile.com.

ACT tests are not show-up-for-a-demonstration-and-get-your-certificate events. A percentage of installers fail, which differentiates ACT as a meaningful certification, not an educational session. The tests have strictly enforced time limits, and installers' hands-on work is evaluated and scored in-person, by approved evaluators only. Upon completion of the hands-on component by the installer, the evaluator literally tears it apart. By prying up tiles and probing fresh mortar beds, ACT evaluators judge what's below the surface, a crucial component of the program, as so much of what is required for a successful tile installation lies below the finished tile work.

ACT tests are administered by the Ceramic Tile Education Foundation (CTEF) and the International Masonry Institute (IMI), which collaborated to develop the program, with support from product manufacturers and industry organizations including the National Tile Contractors Association (NTCA), Tile Contractors Association of America (TCAA), Tile Council of North America (TCNA), and the International Union of Bricklayers and Allied Craftworkers (IUBAC).

ACT Certification: GROUTS

Specify ACT GROUTS certification on every job where cementitious grout, epoxy grout, or modified epoxy emulsion grout will be used.

Critical Installation Skills Tested: Proper mixing, installation, and curing of cementitious grout, epoxy grout, and modified epoxy emulsion grout

ACT Certification: LARGE FORMAT TILE / SUBSTRATE PREP

Specify ACT LARGE FORMAT TILE certification when tile larger than 15" long will be installed by a thin-bed method.

Critical Installation Skills Tested: Flattening a substrate to receive large tile and installing large tile within industry tolerances for coverage, flatness, and lippage

ACT Certification: MEMBRANES

Specify ACT MEMBRANES certification when a sheet or liquid membrane will be used for waterproofing or crack isolation.

Critical Installation Skills Tested: Application of sheet and liquid membranes with emphasis on avoiding installation errors that affect waterproofness

ACT Certification: SHOWERS

Specify ACT SHOWERS certification when designing showers with a mortar bed and tile floor over a shower-pan membrane.

Critical Installation Skills Tested: Creating a watertight (leak-proof) shower base that effectively evacuates water

ACT Certification: MUD WALLS

Specify ACT MUD WALLS certification when a mortar bed has been selected as the substrate for tiling walls.

Critical Installation Skills Tested: Installing wall mud to ANSI standards, with emphasis on proper materials and precision of finished work (flat, plumb, level, square)

ACT Certification: MUD FLOORS

Specify ACT MUD FLOORS certification when a mortar bed has been selected as the substrate for tiling floors.

Critical Installation Skills Tested: Installing floor mud to ANSI standards, with emphasis on proper materials and precision of finished work (flat, level)

TCNA BULLETIN
CHOOSING YOUR TILE CONTRACTOR

TILE. It's the go-to finish when you're looking for high fashion and high function. But you might not get either if you leave it to just anyone to install. Unlike plumbing, electrical, and structural masonry trades, tile installers and the tile contractors that employ them are not generally required to meet minimum trade craft criteria to be in business.

The difference between trained, experienced installers and inexperienced installers is noticeably reflected in their work, and the difference between a quality contractor and a deficient one is reflected in their service and business operations.

Together, contractor and installer transform your concept into reality. Whether you're a design/build professional selecting tile contractors on a regular basis or a homeowner with a single tile project, it's just not possible to overestimate the importance of finding qualified contractors and installers.

The Reputable Tile Contractor

- ☑ **Operates a legitimate business,** with responsible business practices and a policy of standing behind their work.
- ☑ **Invests in continuing education** necessary to stay up-to-date on current building codes, regulations, standards, and best practices. On-the-job training is the most popular way to learn a construction trade, but formalized training is a must for ensuring correct installation methods are being taught to and used by installers on your project.
- ☑ **Carries all required business licenses and insurances,** and doesn't push liabilities for property damages or worker injuries onto others.
- ☑ **Does not misclassify workers** to avoid paying into social security, unemployment, workers' compensation, and other employee programs.
- ☑ **Has a traceable business location** so customers can be sure post-installation questions and issues are addressed and resolved.
- ☑ **Has a track record for quality and service:** Good contractors can easily produce references and verifiable documentation of their commitment to quality and service.

Architects and Specifiers

Include language in job specifications requiring qualified labor and enforce it with the GC. See the TCNA Handbook for a list of industry recognized prequalification programs for installers and contractors such as the CTEF Certified Tile Installer Program, the ACT (Advanced Certifications for Tile Installers) Program, the NTCA 5-Star Contractor Program, and the TCAA Trowel of Excellence Program.

General Contractors

Deliver a quality tile installation by fulfilling contractor qualification requirements in job specifications. When not included, utilize internally developed qualifications. Require proof of qualifications to be included with all project bids. Thoroughly compare estimates from bidding contractors before awarding contracts. Often, higher estimates reflect better materials and additional necessary components and tasks, like substrate preparation and movement joints.

Homeowners

Don't hesitate to ask contractors for proof of insurance, their license (where required), and their installation qualifications. Thoroughly interview bidding contractors and check several references. Utilize consumer resources available from your state on the internet and from the Ceramic Tile Education Foundation.

"Because tile is a permanent finish, the lowest bid should not be the driving factor, but rather who is the most qualified to perform the scope of the work specified."

— TCNA Handbook

Call CTEF at 864-222-2131 or visit CeramicTileFoundation.org for assistance finding or specifying a quality contractor.

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Tile Heritage Foundation: Guardian of American Tile History

Tile Heritage Foundation was established in 1987 as a member supported, not-for-profit organization whose sole purpose is to protect and preserve the history of the American Tile Industry.

Tile Heritage is dedicated to promoting an awareness and appreciation of ceramic surfaces in the United States.

The Foundation is a repository, an archive, which embraces all aspects of the industry from its inception in the 1870s through to the present time, validating its significance for posterity.

The Foundation's archives include an estimated 40,000 documents and an equal number of images, both historic and contemporary. Manufacturing, distribution and installation histories are represented.

The body of information on hand, coupled with expertise resulting from over 70 years of combined experience in the field and access to a network of experts worldwide, provides assurance of both helpful and accurate answers to questions and solutions to problems.

Above, a "bottle" kiln at the American Encaustic Tiling Co. with tiles being loaded into saggars for firing. At left, a fanciful, dust-pressed American Encaustic frieze for the center of a fireplace surround, circa 1890s. Photos from the Tile Heritage Digital Library.

Manufacturing represents the cornerstone of the tile industry.

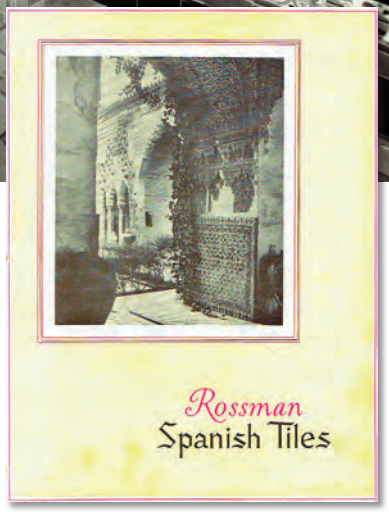
The American Encaustic Tiling Company in Zanesville, Ohio, was the largest tile manufacturer in the country by 1930. Its first commission in 1876 was to produce encaustic floor tile for the Muskingham County Courthouse in Zanesville (below, right).

The primary goal of Tile Heritage is to assist in the preservation of ceramics surfaces, which includes its legendary history, significant installations, as well as the objects themselves. By providing pertinent information, unbiased consultation and specific recommendations when needed, the Foundation serves both the industry and the public at large as no other agency can.

At left, an undated picture of the office staff at the American Encaustic Tiling Company in Zanesville. From the women's attire and hairstyles, a likely date would be mid-1920s.

Photos from the Tile Heritage Digital Library.

Marketing, sales, and distribution have served as an essential realm within the tile industry since tiles were first made to sell.



During the last half of the 1920s a number of companies hosted exotic showrooms in major urban centers with sales supported by sophisticated printed materials in full color. Rossman Corporation was one of these with representation in New York City, Chicago and San Francisco featuring both imported and domestic tiles.

Photos from Tile Heritage Archives, E.L. Bradley Collection. Gift of Rodger Dunham.

The offices of E.L. Bradley in San Francisco, which represented Rossman, were rather dark and austere by today's standards. Lots of hand-written letters, typewriting and teletype options, but none of the convenient forms of communication we have today.

"Tile Heritage speaks for all of us interested in the world of tiles."

Marie Glasse Tapp, Founder
Tile Restoration Center

Honoring the work and artistry of tile installers through the archiving of their accomplishments validates tiles for posterity.

Henry Krier (1886-1967), a legend in his own right in Southern California during the '20s and '30s, learned his trade in Germany, emigrated to the United States early in the 20th century, establishing himself as a mason and then as a productive tile contractor.

Henry Krier, posing proudly in front of his home/office, c. 1938. Tile Heritage Archives, Krier Collection. Gift of Rick Baratta.


STATE OF CALIFORNIA
REGISTRAR OF CONTRACTORS
No. 152

CONTRACTOR'S LICENSE

PURSUANT TO THE PROVISIONS OF CHAPTER 791, STATUTES OF 1929 AND AMENDMENTS THERETO, AND THE RULES AND REGULATIONS WHICH ARE NOW OR MAY HEREAFTER BE PRESCRIBED, THE REGISTRAR OF CONTRACTORS DOES HEREBY GRANT TO

HENRY KRIER
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MONROVIA CALIFORNIA

THIS LICENSE TO ENGAGE IN THE BUSINESS OR ACT IN THE CAPACITY OF CONTRACTOR WITHIN THE STATE OF CALIFORNIA.

WITNESS MY HAND AND OFFICIAL SEAL THIS DATE.

JULY 21, 1931
DATE

REGISTRAR OF CONTRACTORS

SIGNATURE OF LICENSEE

"The Legacy of Henry Krier" by Lynn Downey, was published in "Flash Point," vol. 2, no. 3 by the Tile Heritage Foundation in 1989.

"Each time I kneel, it'll cost you money!" **HK**

*With the development of the vision for Tile Heritage an important aspect has always been education through integration—**the bringing together of all those with a vital interest in ceramic surfaces.***

Tiled bath set by Henry Krier at the castle of Evangelist Aimee Semple McPherson at Lake Elsinore, California, 1929.

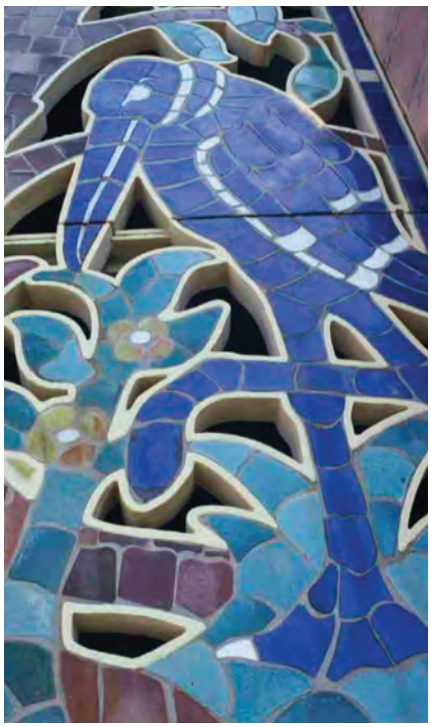
Photo by Albert E. Cawood. Tile Heritage Archives, Krier Collection. Gift of Rick Baratta.

Identification encourages restoration of historic tile installations.

Tiles by Handcraft Tile Co. of Milpitas, California adorn this 1937 Spanish Colonial residence in San Jose.

TILE INSTALLATION IDENTIFICATION. *The Tile Heritage Foundation offers tile identification services to the public at no charge. Simply email foundation@tileheritage.org with clear, low res images of individual tiles or tile installations along with whatever relevant information is readily available: site (city/state), size, date (approximate), architect/designer if known. If the experts at Tile Heritage are not able to identify the work, your email will be forwarded to others who are likely to know.*

Tile Heritage has been involved with Bok Tower Gardens in Lake Wales, Florida since 1994 when we were contacted to verify the identity of the tile installations at Pinewood, a Spanish Colonial house built in 1931. Currently, the Gardens are engaged in an extensive restoration of the exterior of Bok Tower itself, the 205-foot, 60-bell carillon decorated with a series of colorful tile grilles that provide the openings for the bell chamber. Sadly, the grilles, designed and fabricated in 1929 by the Enfield Pottery and Tile Works, have been compromised by an acid wash applied during a previous cleaning of the tower. The situation has now been addressed by industry experts.



Tile Heritage involves more than the identification and protection of tiles. *The Foundation represents the need to preserve a perception of ourselves. The archival records held by THF are of national importance—they tell our story! We are all part of this heritage!*

Preservation of significant installations is of paramount importance.

Port of Long Beach Administration Building. Photo courtesy Long Beach *Press-Telegram.*

Adorning the front of the vacated Port Administration Building in Long Beach, California is a historic ceramic tile mural produced in 1959 at Gladding, McBean under the direction of Sheridan Stanton and painted by Paul Marciel Souza, a well-known Southern California artist. This 74-foot mural is scheduled for demolition in 2018 unless the tiles can be removed and relocated. Long Beach Heritage has been communicating with the Port of Long Beach for several years encouraging the relocation of the mural. At the time of this writing, sample tiles have been safely removed and a protocol for the removal, labeling, packing and storing of the tiles is being prepared for potential bidders. Long Beach Heritage will soon spearhead a fundraising drive to fund the removal process.

Tile Heritage documents the location and producers of contemporary installations as well. Their future is often as vulnerable as historic works and the need to preserve them in situ equally important.

"Water Through Time," is the creation of Susan Dunis and Sienna Dunis Ginn of Dunis Studios in Wimberley, Texas. The 15 x 5-foot mural was mounted on the Briscoe Western Art Museum in San Antonio in 2014. Photo courtesy of Susan Frost.

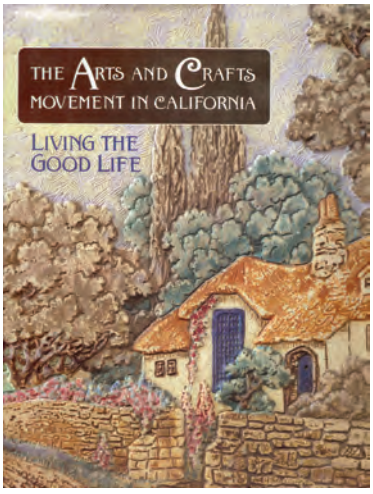
Educational outreach has always been fundamental to the mission of the Tile Heritage Foundation.

"California Tile," an exhibition of historic tiles, opened at the San Francisco Airport Museum in 2004, where it remained for over nine months. Tile Heritage supplied tiles from its collection and provided all of the tile graphics from its slide library.

Over the past 25 years a number of prestigious institutions have partnered with Tile Heritage or borrowed historic materials for their periodic exhibitions. The Oakland Museum was the first for "The Arts and Crafts Movement in California: Living the Good Life" in 1993, introducing a variety of historic California tiles and publishing a 328-page hard cover catalog that featured a decorative tile cover and included a chapter devoted to these tiles.

In 2004 the California Heritage Museum in Santa Monica sponsored a 2-volume publication, "California Tile: The Golden Era 1910-1940" to coincide with its tile exhibition of the same name. Joseph Taylor of Tile Heritage served as the book's editor.

That same year the San Francisco Airport Museum presented "California Tile" in its North (United) Terminal, an extraordinary exhibition of both historic tiles and tile graphics (above) provided by the Tile Heritage slide library. The display was seen by millions of travelers over its nine month duration. Currently, the museum is planning an Arts and Crafts exhibition for 2017, for which Tile Heritage has provided a selection of historic tiles.



A Claycraft Potteries tile was chosen for the cover of this exhibition catalog.

"Educate" is what we do best!

To be most effective, education necessitates direct communication.

Screening raw clay dug from the mountains near La Madera, New Mexico to make tiles from scratch, a 2-day workshop at "Spirit in Clay," in the fall of 2000.

Between 1991 and 2005 Tile Heritage presented annual symposiums is different cities around the United States, partnering with local organizations, to bring like minds together and to raise a community's consciousness about the significance of local tile installations within these diverse venues. The program, most often 4-5 days, included workshops, tours and lectures on both historic and contemporary tile-related subjects. Useful tile tour maps were created as a lasting memento.

Tile Heritage tour discovers encaustic tiles at Sacred Heart Music Center in Duluth, Minnesota in 2005.

"Communicate" is what we do!

Email provides our principal means of communication today both from the office and when we're "on the road," responding to the daily barrage of inquiries from throughout the United States.

As a guest of Tile Council of North America at Coverings, Tile Heritage engages with industry people concerning historic installations as well as preservation and restoration issues. Las Vegas 2011.

Thirty years ago one would be hard pressed to find a book on American tiles; today there are scores to choose from, covering both historic and contemporary ceramic surfaces. Tile Heritage published 42 issues of "Flash Point" (ISSN 1078-5647) between 1988 and 2003; 16 issues of *Tile Heritage: A Review of American Tile History* (ISSN 1978- 5655) have been published as well. Since 2004 "E-News" and "Shards & Snippets" serve as the Foundation's principal means of outreach; all back issues are available online.

Please visit: www.tileheritage.org.

The Foundation is now engaged in maintaining the industry's history as a living archive through a publicly accessible finding-aid Index.

Tile Heritage Foundation's archived tile collections, available by appointment.

"Where art and architecture meld and merge in the world of tile, Tile Heritage Foundation is there, preserving and documenting to educate the future of our industry."

Eric Astrachan
Tile Council of North America

The tile collection alone contains over 4000 different glazed and decorative samples from scores of American companies dating to the 19th century. All of the tiles in the collection have been donated; Tile Heritage does not buy or sell historic material.

The present time is of critical importance as we strive to enhance the accessibility of the Tile Heritage archives and collections *for industry-wide and public use. Our goal is to keep the archives "alive" with our ongoing development of the *online Finding-aid Index. It is imperative that this work be completed. Expanding our industry partnership is essential to its success.*

The Tile Heritage Library contains hundreds of books and over 40,000 documents. The collections include over 700 original company catalogs and more than 40 tile-related periodicals dating back to the 1880s.

"Tile Heritage represents the 'soul' of the industry in America."

Donato Grosser
D. Grosser & Associates, Ltd.

Tile Heritage Foundation's archived periodical collections.

A Feather in our Cap! Tile Heritage Archives has been accepted as a contributor by the Online Archive of California (OAC), providing access to the Tile Heritage Archives Index nationwide and beyond!

A broad funding base is essential for the long-term sustainability of Tile Heritage. Membership and sponsorship have always provided the core of the Foundation's financial stability.

For the past 30 years Tile Heritage has received substantial support from sponsors in the tile industry. Diverse membership within and beyond the industry has also played a major role. The Foundation has benefited from substantial grant support as well.

Industry Sponsors play a major role in providing sustainability for the Tile Heritage Foundation.

THF engages in creative, public-centric fundraisers such as tile festivals, tile tours, lectures, auctions and other events, often creating venues that showcase contemporary tile making.

Tile Festival at the Moravian Pottery and Tile Works, Doylestown, PA.

TEAM UP WITH TILE HERITAGE!

Email: foundation@tileheritage.org

www.tileheritage.org

Tile Council of North America (TCNA) has embraced Tile Heritage for many years recognizing the importance of maintaining the historic tile industry archives and collections.

TCNA advocacy and inclusiveness has contributed greatly to the Foundation's validation and visibility.

"It is very important that we, as an industry, promote an appreciation of tiles—to know what came before. Individually we are not always able to do that, but by supporting the Tile Heritage Foundation we can preserve the history. As an industry we should support that work."

Svend Hovmand, Crossville Ceramics

We invite you to partner with the Tile Heritage Foundation by becoming an Industry Sponsor—protecting tile history today, validating that history for tomorrow!

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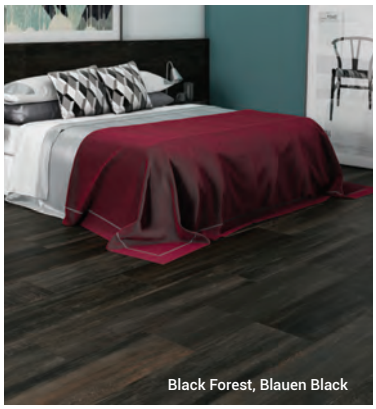
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