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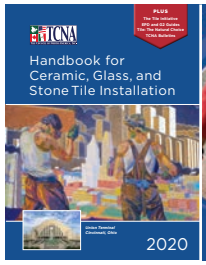

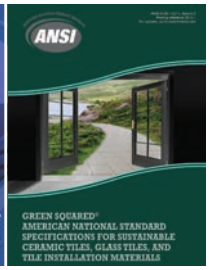

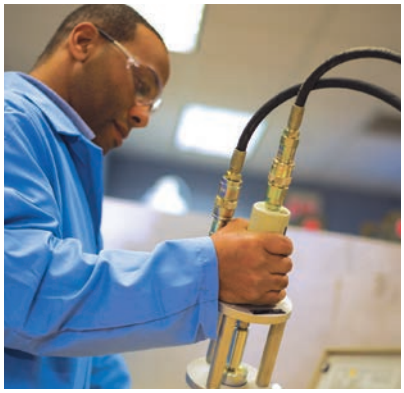

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TCNA BULLETIN
ANSI A326.3 UNIFIES MEASUREMENT OF SLIP RESISTANCE FOR HARD SURFACES

The standard for DCOF, ANSI A326.3, unifies the measurement of slip resistance for hard surface flooring materials.

Since 2012, the DCOF AcuTest® has been the ceramic tile industry standard for testing dynamic coefficient of friction (DCOF). The DCOF AcuTest® is the method used by the tile industry for assessing a floor's relative "slipperiness," whether in-situ after installation or during manufacturing. Although initially developed for ceramic tile floors and specified in ANSI 137.1[1] since 2012, the methodology has been equally applicable and useful with other hard surface flooring, where its use has been "gaining traction" every year.

With facility managers, inspectors, cleaning professionals, and forensic engineers using the method increasingly in the field, ANSI A326.3, *Test Method for Dynamic Coefficient of Friction of Hard Surface Flooring Materials*, was developed based on the DCOF AcuTest®.

Approved in March 2017 by a broad consensus of hard surface flooring stakeholders, ANSI A326.3[2] incorporates the well-known method from ANSI A137.1 into a separate, stand-alone DCOF standard for hard surface flooring materials. A field testing section is provided for in-situ testing, including criteria and guidance for testing an installed floor under prevailing conditions, as would be the case when evaluating cleaning/maintenance procedures. Additionally, the field testing section addresses testing after cleaning, including the possible use of stronger cleaning agents than the cleaner referenced in the laboratory method. This evaluation is useful for testing the flooring surface after installation and use, without contaminants, to check for wear and to compare to the manufacturer's reported DCOF.

[1] ANSI A137.1 is the American National Standard Specification for Ceramic Tile

[2] As a simple mnemonic, 326.3 spells "DCOF" on a touchtone phone.

With the adoption of ANSI A326.3, the ANSI A137.1 and A137.2[3] standards have been updated to reference ANSI A326.3 as the stand-alone DCOF test method.

Additional Guidance for the Specifier

The ANSI A137.1 specification released in 2012 included a minimum threshold of 0.42 for tiles intended to be walked upon when wet with water, and guidance to the specifier about important factors relevant to slip resistance. ANSI A326.3 has the same specification but additionally provides further guidance helpful for the specifier. Examples of the additional guidance given in ANSI A326.3 include:

- While specifying products with higher COF for use under contaminated conditions can be considered, surfaces with higher COF can lead to maintenance/cleanliness issues and hard to remove contaminants and films, which can cause hazardous and unfavorable conditions. In addition to maintenance issues, a surface with a high COF can create a difficult walking condition for that subset of the elderly and disabled who slide their feet on the floor.

[3] ANSI A137.2 is the American National Standard Specification for Glass Tile.

- 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.

- Hard surface flooring materials that have a coating applied shall only be used in areas that can be kept dry, unless otherwise specified by the coating's manufacturer. If testing data is required after a coating is applied, use the test method specified by the manufacturer, or the dry testing procedure in ANSI A326.3 if no test method is suggested by the manufacturer of the coating.

The ANSI A326.3 standard identifies many factors that must be considered when determining the suitability of a hard surface flooring material for a particular

TCNA BULLETIN
ANSI A326.3 UNIFIES MEASUREMENT OF SLIP RESISTANCE FOR HARD SURFACES

application. For example, in exterior applications, the suitability of a flooring material depends significantly on drainage of the assembly, physical structure of the flooring material, expected footwear, intended use, and the variety of contaminants present, among many other factors. This is why a single DCOF limit value is not provided for exterior applications, interior ramps/inclines, and areas expected to be contaminated with something other than water.

Putting the Standard into Practice

Tile manufacturers already report DCOF according to ANSI A137.1/A326.3, with some including the information directly on packaging and others providing the information in their product literature. While the ANSI specification for ceramic tile does not require a minimum or maximum DCOF value independent of how the tile is used, reporting the value per the DCOF AcuTest® is required. Other hard surface flooring industries are similarly following suit.

However, it is important to understand that DCOF is only one factor in determining the suitability of a flooring material for a particular application. As the standard correctly notes, there are many factors that can affect the possibility of a slip occurring, including by way of example, but not in limitation, the following: the material of the shoe sole and the degree of its wear; the presence and nature of surface contaminants; the speed and length of stride at the time of a slip; the physical and mental condition of the individual at the time of a slip; whether the floor is flat or inclined; how the hard surface flooring material is used and maintained; and the COF of the material, how the flooring surface is structured, and how drainage takes place if liquids are involved. Specifying flooring materials appropriately requires knowledge of how the space will be used

and maintained; often the better the communication regarding this early on, the better the flooring selections.

Considering slip resistance is especially important at entrances and exits where flooring can become unintentionally contaminated, for example, from water and soil tracked inside, or from fire-fighting efforts under emergency conditions. All building chokepoints deserve extra attention, as well as spots where water and other liquids can be anticipated, such as by drinking fountains, inside and around restrooms and kitchens, etc. Also, areas where the floor may be worn or polished deserve attention and periodic monitoring. Remedial treatments are always possible when DCOF monitoring indicates the need for such.

Above all, the easy measurement of in-situ flooring through the ANSI A326.3 method allows building owners/facility managers a means to monitor their spaces for essential flooring safety. Such monitoring, sometimes called DCOF auditing, can be used to keep maintenance providers accountable. After all, if a floor is not maintaining its intended DCOF value under actual use conditions, an accident can be anticipated. When floors are properly specified and maintained, safer walkways result, benefitting all.

As a public service, the Tile Council of North America, publisher of the ANSI A326.3 standard, offers the standard without charge on the TCNA website, TCNAtile.com/DCOF.


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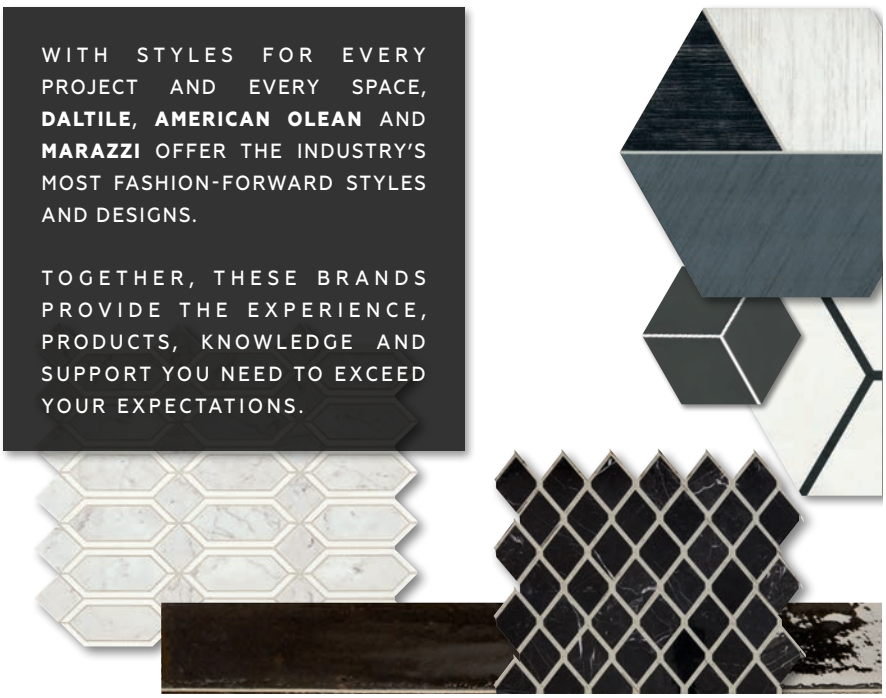

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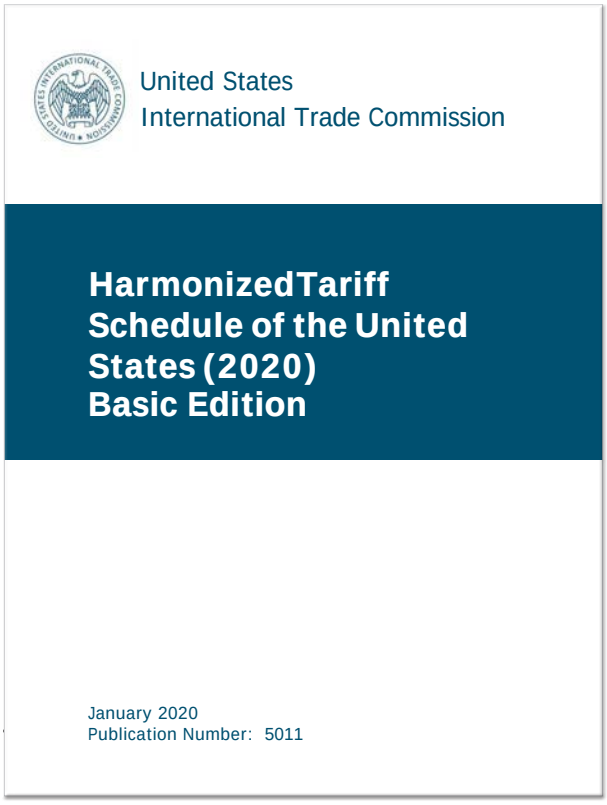
TCNA BULLETIN

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."[2]

The 6908 heading is now no longer in use, and at the six-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., ten-digit headings) for further subdivision of the categories above.

2 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, we expect CBP is interpreting 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 are 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 three-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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CRITICAL CHANGES TO HS AND HTS CODES FOR CERAMIC TILE IMPORTED INTO THE UNITED STATES

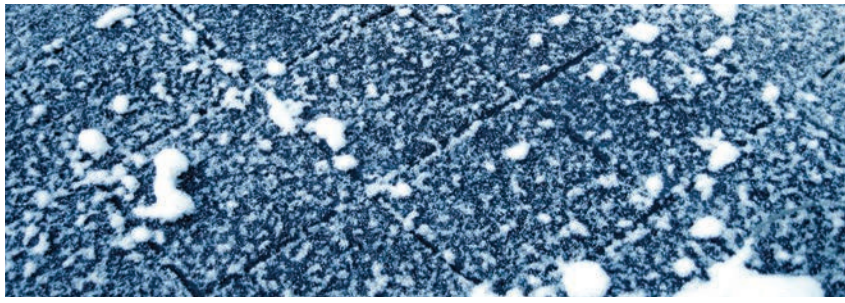
How Is Water Absorption Determined?

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, was 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 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.[3] 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.

3 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.

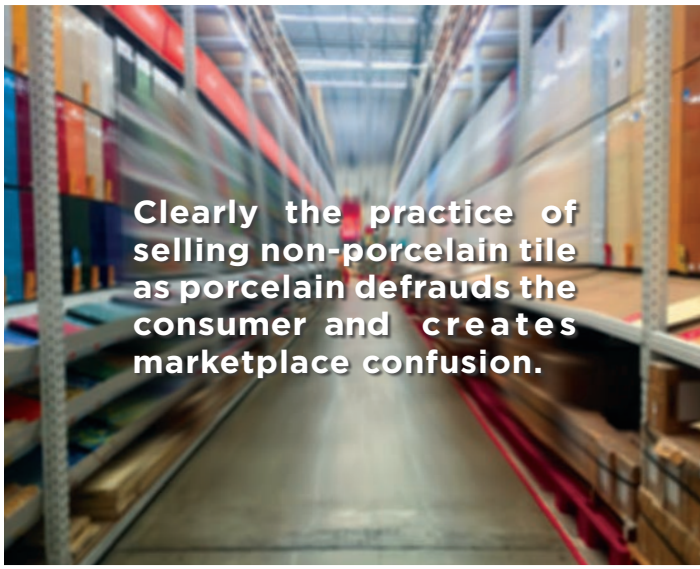
In certain instances these products have been called "residential porcelain," but as the products didn't meet porcelain tile criteria, the term misrepresented the true nature of the tiles. Invariably these efforts to sell non-porcelain tile as porcelain were to take advantage of the popularity of the 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 ten-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 ten-digit HTS codes for ceramic tile can be found on the USITC website, hts.usitc.gov.

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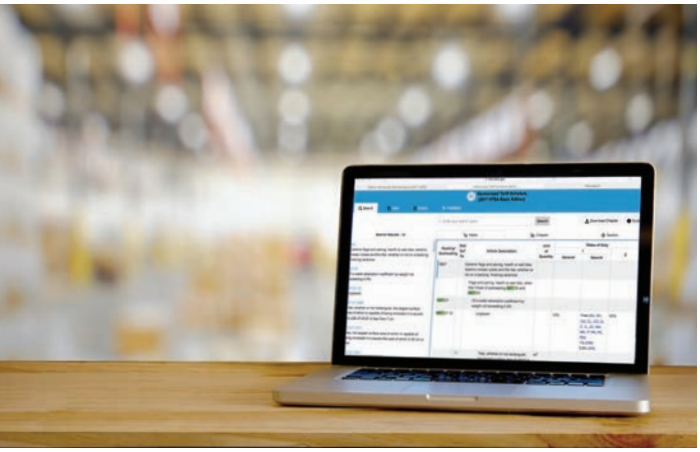


The additional four digits are used to keep the new classification revenue neutral with the old classification and to meet the following criteria:

- "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 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 ten-digit HTS codes for ceramic tile importers and exporters under the new system, compared to the eight in the prior 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 HTS codes 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 eventually clarify which categories to use given that some size-based subdivisions within the ten-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, we expect importers are more careful in requiring that information from their suppliers and are more carefully reporting it. U.S. CBP can issue fines and potentially hold importers criminally liable for making false declarations. Presumably the risk of such helps 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 completion in 2017 of the worldwide effort to harmonize water absorption testing methods and federal laws now in force as described, we fully expect consumers to benefit and the playing field to be more level for all porcelain producers abiding by accepted water absorption criteria.

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

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

In 2007 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?

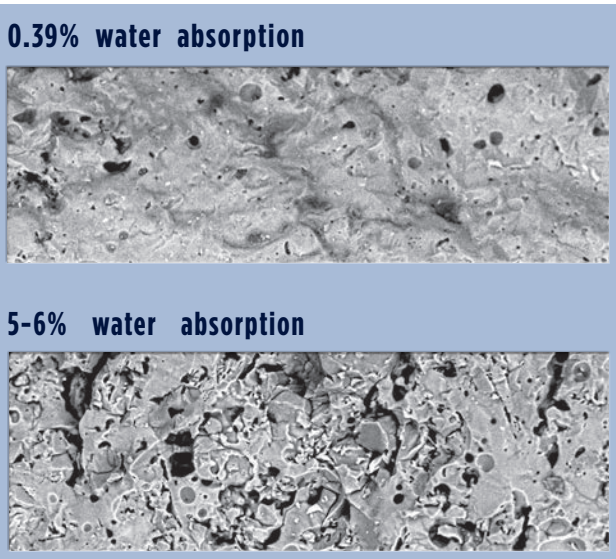
As defined by the ANSI A137.1 ceramic tile standard, porcelain tile is a ceramic tile with a very low water absorption (0.5% or less), as tested per ASTM C373. Porcelain tile is denser and has a lower water absorption than other types of ceramic tile. When non-porcelain tiles are unknowingly substituted, 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 and the ISO and ASTM water absorption methods are harmonized, but historically the method used internationally for measuring water absorption (ISO) was less rigorous than the ASTM C373 method used in North America.

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 360 tile series failed as of November 2019.

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.

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 360 series that did not meet the PTCA water absorption criteria necessary to be certified as porcelain.

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.

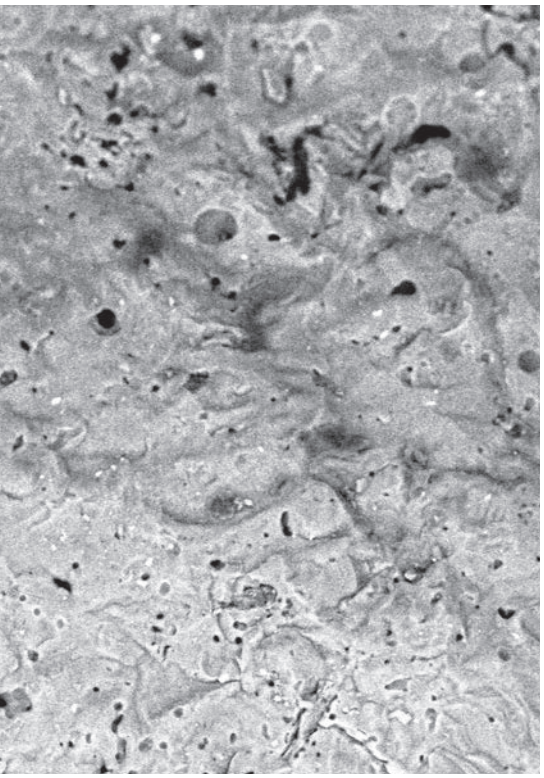
STEP 5

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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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 2018 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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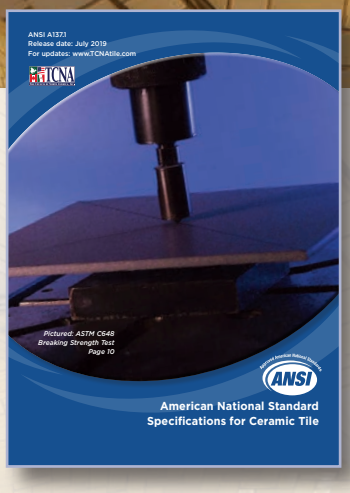
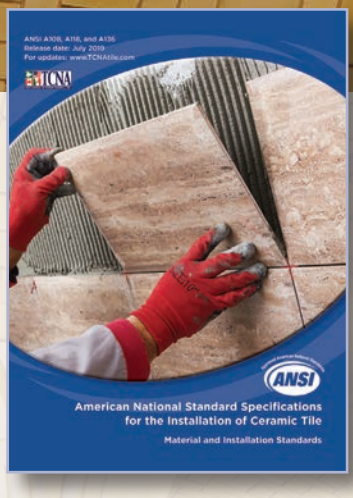
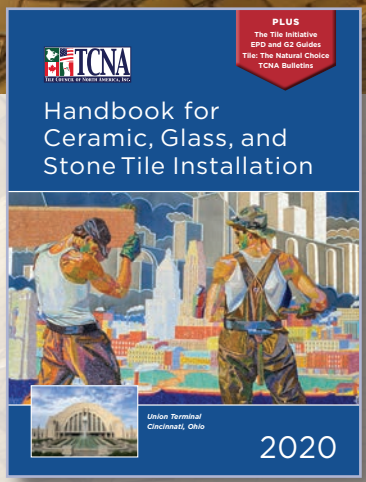


ANSI A137
product performance—ceramic and glass tile



ANSI A108, A118, A136
installation and workmanship; product performance—mortars, grouts, and membranes



TCNA Handbook
installation systems—ceramic, glass, and stone tile

Guastavino tile circa 1909, Bridgemarket, New York City
Photo: Michael Freeman

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TCNA
Tile Council of North America, Inc.

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 history 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 19th century "tilewright" at the Mosaic Tile Company in Zanesville, Ohio scrapes away excess clay from a tile mold. At left, a patented process for manufacturing mosaics (No. 537703 dated Apr. 16, 1895) provided Mosaic Tile Co. with a potential means of competing with its neighbor, American Encaustic Tiling Co., by making multilayered or multicolored tiles faster and less expensively.

Unless otherwise specified, all imagery courtesy of the Tile Heritage Digital Library.

Manufacturing represents the cornerstone of the tile industry.

Mosaic Tile Company, Zanesville, Ohio, circa 1910

After seven years modeling for American Encaustic, Herman Mueller along with his fellow ceramist Karl Langenbeck left in 1894 to establish the Mosaic Tile Company, also in Zanesville. Within a year, in April of 1895, Mueller was granted a patent for the "Process of and Apparatus for Manufacturing Mosaics," an encaustic tile that imitated fine mosaics.

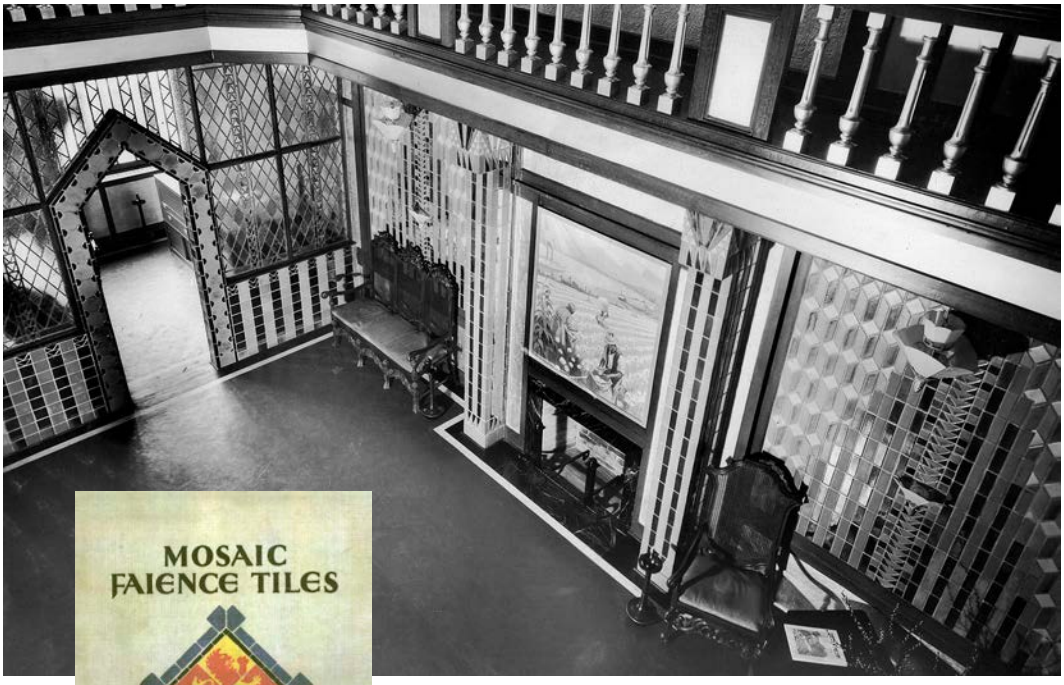
Although Mueller referred to the tile as "mosaic," the decorative patterns were executed in small tesserae shapes of clay one-eighth inch square that extended through the clay body. Along with a series of individual motifs, large mosaic murals were produced like the pictorial mural at the Moerlin Bottling Department in Cincinnati, the facade of St. Nicholas Catholic Church in Zanesville, the "Eureka" panels throughout the main floor of the California State Capitol Building in Sacramento (replaced in recent years with Heath tile), and the "Presidential Seal" in the center of the floor at the National Building Museum in Washington DC (see previous page).

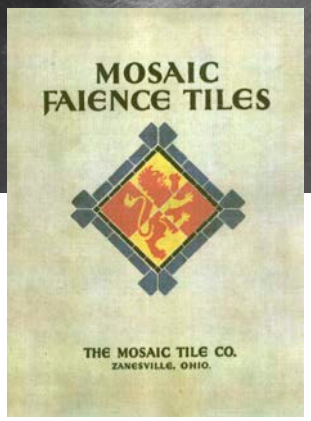
Tympanum, St. Nicholas Catholic Church, 925 E. Main St., Zanesville.

Herman C. Mueller, circa 1890

The primary goal of the Tile Heritage Foundation is to assist in the preservation of ceramic 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.

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





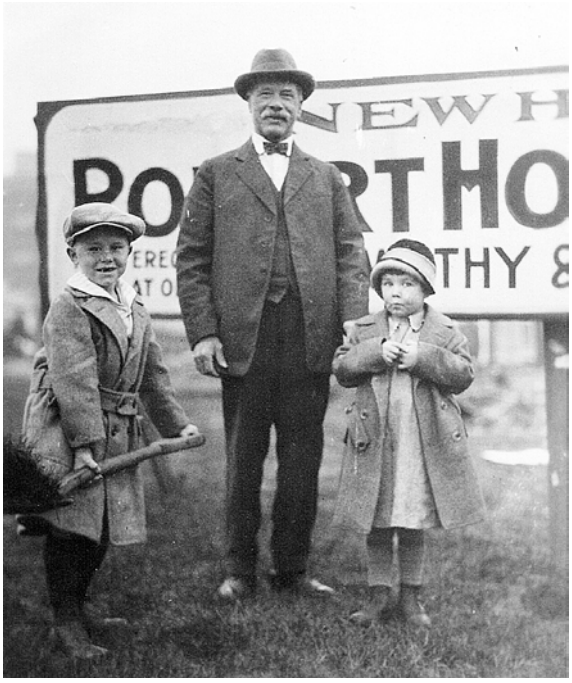
Tile showroom of J. A. Finn Co., 31 Madison Ave., New York City, exclusively featuring Mosaic Tile Company's products, circa 1930. Designed by Paul A. Faire. Tile Contractor: M. F. Welch.

During the last half of the 1920s and into the 1930s a number of tile manufacturers provided exclusive representation to independent showrooms to sell their products sometimes in addition to hosting showrooms themselves. There were competitive advantages for tile companies to do so. No doubt, Mosaic Tile was well aware of their Zanesville rival, American Encaustic, bankrolling its exotic and successful showroom in Manhattan just ten blocks to the north. Photos gift of Julie Mackall, Gilbertson Collection.

Office of J. A. Finn Co. immediately adjacent to the showroom.

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

Robert Howden, without question a "self-made man," chose tile setting for what became an illustrious career. Born in Scotland in 1863, the youngest of eleven children, he worked half time in the woolen mills from age 9, leaving school entirely at 13 to work full time. During this time he worked in six different mills while attending seven different schools!



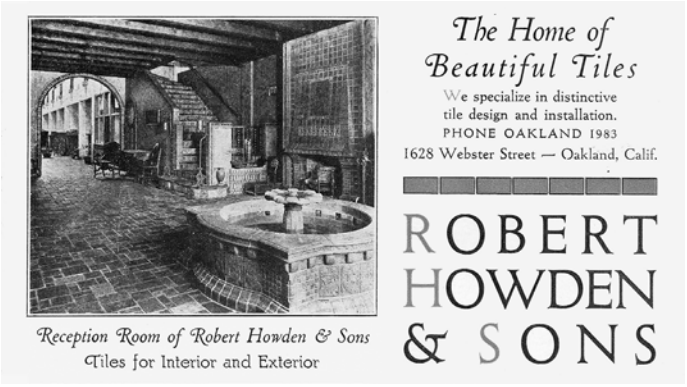
Robert with two of his three grandchildren, Ed and Betty, broke ground for the Howden Building in 1925.

Despite his losses business was booming during the reconstruction period following the quake. By the time Robert was breaking ground for the Howden Building at 17th and Webster, in his own words: "I had made the name Robert Howden a household word"!

Note: The original tile showroom in the Howden Building remains virtually intact today, featuring Batchelder, Claycraft and Solon & Schemmel tiles as well as housing a popular cafe.

The Howden Building at 17th and Webster Streets in Oakland, CA.

In 1882 at age 19 Robert immigrated to the U.S. settling in Minneapolis and took a job as a helper in a mantel and tile business; a year later he became a "full-fledged" (his word) setter. He married in 1887 and soon moved to Tacoma before discovering the Bay Area on his return from the Chicago World's Fair in 1893. Oakland became his home where he rented a store, fitted up a display in front, and lived in the rear with his wife and three children. Soon he bought a house and moved with his family there. Next he bought a lot for cash and built a 2-story brick building for his tile business, completing the work just three months before the 1906 earthquake.



Identification encourages both maintenance and restoration of historic tile installations.

Homeowner in Dallas, Texas was told that his 1926 fireplace was from the Rookwood Pottery. Could it be true? No, the tiles were produced by California Clay Products Co., popularly known as "Calco," located in South Gate, California and referred to as "Mayan Art" in the company's 1930 catalog.

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.

The archives held by THF are of national importance—they tell our story. We are all part of this heritage!

The owner of this early 1920s Tudor Revival home in Birmingham, Alabama suspected that her tiles were Batchelder's but needed confirmation. She contacted Tile Heritage to find out and received the cleaning recommendations she asked for along with the verification of her suspicions.

Preservation of significant installations is of paramount importance.

Original ceramic tile mural (11' x 45') designed and produced by Guillermo Wagner Granizo for the City of Monterey for the façade of the city's Conference Center.

In 1983 the City of Monterey (California) commissioned Guillermo Wagner Granizo to design a tile mural (11' x 45') depicting the history of this coastal community for the exterior of the city's Conference Center. The city, needing to renovate the Center, made the decision to have the mural removed in 2015, all 633 pieces of 9" x 12" tile. The arduous task was awarded to Architectural Resources Group in San Francisco. In the process sixty-five of the tiles were broken, most in multiple pieces.

Imagine the care involved in just securing each of the tiny pieces, keeping the pieces for each broken tile separate, reconfiguring what goes where once back in the studio, and finally the skill involved in adhering the pieces together and masking the repairs! The mural was successfully reinstalled at the Center by C. L. Frost Inc. in November 2018.

Pietro "Pete" Ferrante (1867-1954), considered by many the "father" of sardine fisheries in Monterey Bay, inspired the success of the canning industry on Cannery Row.

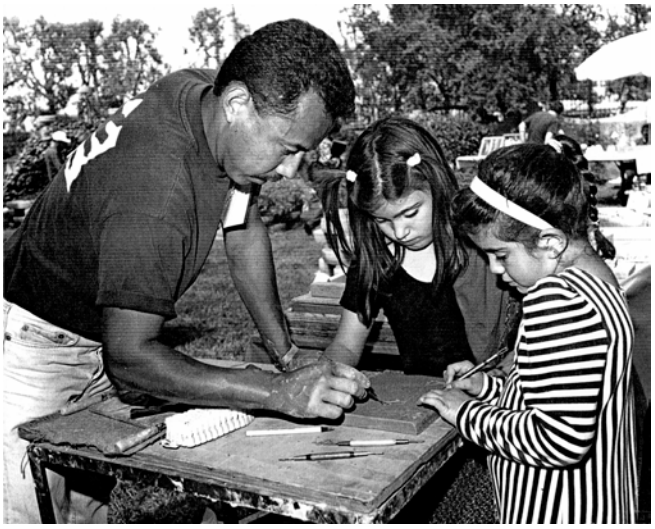
The restored and re-installed historic ceramic tile mural (11' x 45') designed and produced by Guillermo Wagner Granizo for the City of Monterey Conference Center. Photo courtesy of Ron Wagner.

To be most effective, education necessitates direct "hands-on" communication.

Between 1991 and 2005 Tile Heritage presented annual symposiums in 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.

Tile contractor demonstrates the proper use of a trowel.

Publishing is central to the Foundation's outreach. Between 1988 and 2003 Tile Heritage published 42 issues of "Flash Point" (ISSN 1078-5647). Since 2004 "E-News" and "Shards & Snippets" have served as the Foundation's principal means of communication. Since 2016 THF has resumed the annual publication of *Tile Heritage: A Review of American Tile History* (ISSN 1978-5655) featuring articles by the leading tile historians in America.



From their earliest ages children have a natural attraction to soft clay.

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 inquiries from throughout the United States.

Adults too find clay irresistible!
Photos on this page courtesy of Carter Sietsema Photography .

Workshops hosted or attended by Tile Heritage augment the educational objectives of the Foundation.

Internationally recognized architectural ceramists present a workshop in Seattle.

Tile Heritage joins with others for a week "playing" with mosaics at "Heaven on Earth" in Todos Santos on the Baja Peninsula, Mexico.

A mosaic workshop in Davis, California (left) resulted in four decorative tile pillars supporting a palapa in Palm Desert, California.

"Keeping the Craft Alive," an integral part of the Foundation's mission, brings the importance of tile's heritage into studios throughout the United States and beyond.

The library at Tile Heritage contains file folders on over 700 contemporary tile artists and artisans in the U.S., the folders representing only those who have sent their information to the Foundation with intention. No doubt there are hundreds of additional studios in the country whose work is currently not represented. Since the Foundation's inception in 1987, there has evolved a sense of community that assists in keeping the craft alive.

Preparing a custom job in Park City, Utah.

Sculpting clay for a commercial project in San Diego.

Visiting a manufacturer's showroom in Portland, OR.

Applying glaze to a lofted mural in Torrance, California.

Removing excess clay from a molded tile in Milanville, PA.

Tile Heritage tours to Europe provide opportunities once we return with new friends and broader perspectives.

Leaving the Jackfield Tile Museum at Ironbridge Gorge (above), the tour group gathers in Nottingham (left).

First stop in the Netherlands is the tile museum in Otterlo followed by a tour and demonstrations at the Makkum Tile Factory where traditional Dutch tiles are produced (right).

After the better part of a day at the tile museum in Lisbon (right), this group enjoys the spectacular display of Rococo *azulejaria* throughout the gardens at *Quinta dos Azulejos* in Lumiar, resting upon the benches in the semicircular pergola.

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 Foundation's tile collection alone contains over 4000 different glazed and decorative samples from scores of American companies dating to the late 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 90 tile-related periodicals dating back to the 1880s.

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

Donato Grosser

Tile Heritage Foundation's archived periodical collections.

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 34 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.

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

Tile enthusiasts tour installations in Philadelphia.

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.

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!

"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

An INVITATION to the GLOBAL TILE INDUSTRY

to Join in a Celebration of our Tile Community by leaving a HAND-PRINT at TCNA!

Partner in this FUN & INSPIRING OPPORTUNITY!

TILE HERITAGE FOUNDATION

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Sherri Warner Hunter
The Clay Lady Studio

A DONOR MURAL at TCNA!

Have a HAND in it with a Signature Tile made for your Company!

Custom Tile Contribution: $250. Funds cover the studio production and the shipping to TCNA as well as a link in the Tile Heritage Member Gallery. We'll email you an Image of your tile!

Importantly, your company will be permanently recognized at TCNA on a donor plaque as well as in the Hand Print Mural.

. . . HAVE A HAND IN IT. . . to participate go to . . .
https://www.tileheritage.org/pdfs/HPWebpost9-19.pdf for an on-line fillable form!

TCNA
Tile Council of North America, Inc.

Product Performance Testing Laboratory

Comprehensive Testing TCNA offers a broad array of ISO-accredited ASTM, ANSI and ISO standard tests to serve clients worldwide.

Unparalleled Experience TCNA staff can help design custom testing to support research and innovation efforts.

Multi-Disciplinary Expertise TCNA engineers and scientists, along with the lab's collaboration with Clemson University, offer a broad and unparalleled expertise.

Standards Insight TCNA staff hold leadership positions in numerous international standards committees, allowing for a unique understanding of industry standards and testing methods.

To learn more about our full testing capabilities or to place a testing order, visit: **www.tcnatile.com/test**

Examples of materials tested: Stone, Tile, Plastic Based Materials (PBM), Agglomerate Stone, Installation Materials, and more. Custom (or non-standardized) testing requests are always welcome.

IAS ACCREDITED Testing Laboratory ISO 17025

2020

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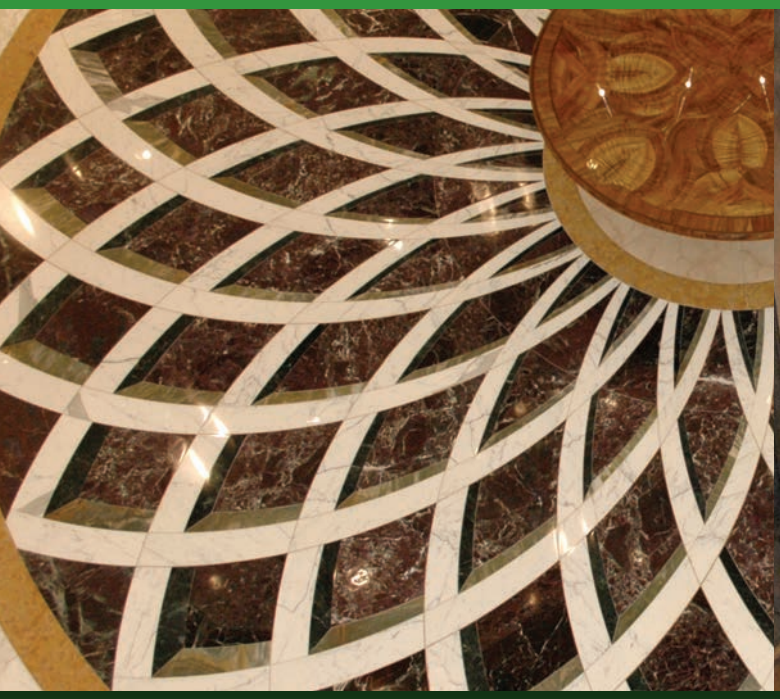

The Tile Council of North America Handbook strongly recommends using installers who have demonstrated their commitment to their craft.

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.

Contact the NTCA and TCAA for qualified Five Star and Trowel of Excellence contractors for your upcoming project.

www.tile-assn.com/Member/FiveStar.aspx?mid=84
www.tcaainc.org/trowel-of-excellence.php


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TCNA
TILE COUNCIL OF NORTH AMERICA, INC.

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