

# Notice of Copyright

This presentation is protected by U.S. and international copyright law.

Reproduction, distribution, display, and use of the presentation without written permission is prohibited.



© Tile Council of North America

For information, contact Stephanie Samulski ([ssamulski@tileusa.com](mailto:ssamulski@tileusa.com))

# STANDARDS. SCIENCE. EDUCATION. ADVOCACY.

Update on Critical Industry Issues



Eric Astrachan, Executive Director

# What We'll Cover



- 2014 Market Update
- Changes to ANSI and the *Handbook*
- Overview of other standards under development
- Micro updates on sustainability, COF, thin tile, water absorption standards, & installer certification

2014  
INDUSTRY  
UPDATE

---

# U.S. Ceramic Tile Consumption through 2Q 2014

**Total YTD:** ↓ 1.1%  
(vs. 2Q 2013 YTD)

**U.S. \$ Value:** ↑ 3.8%  
from 2Q 2013 YTD

**Estimated 2014 Total:** ↓ 2.2% from 2013

# U.S. Imports through August 2014 YTD

(in sq. ft.)

## Total Imports:

 3.0% vs. August 2013 YTD

## % of Total:

Mexico..... 30.7%

China..... 28.7%

Italy..... 18.0%

**68.4% of U.S. Consumption**

 14% vs. historic high (2006)

(in \$ value)

## % of Total

Italy..... 35.1%

China..... 25.1%

Mexico..... 17.1%

## Total \$ Value/Sq. Ft.

 \$0.07 vs. August 2013 YTD

# Domestic Shipments: 2Q 2014 YTD vs 2Q 2013

**Total Sq. Ft.:** 382 million

↓ 0.7%

**Total \$ Value:** \$558 million

↑ 2.2%

**\$ Value/Sq. Ft.:** \$1.46

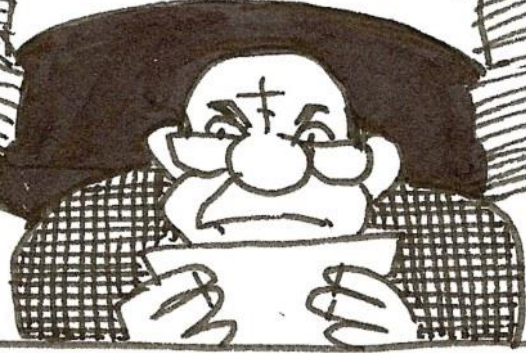
↑ \$0.04



OFFICE  
OF  
MANAGEMENT  
AND  
BUDGET



LEADING  
ECONOMIC  
INDICATORS



MISLEADING  
ECONOMIC  
INDICATORS



*Cartoonist signature*



**GDP: ↑ 4.6%**

**New Housing Starts:  
↑ 8.00%**

**New Home Sales:  
↑ 33.0%**

**Construction Spending:  
↑ 5.0%**



**Unemployment:**

↓ **1.3%**



**Mortgage Rates:**

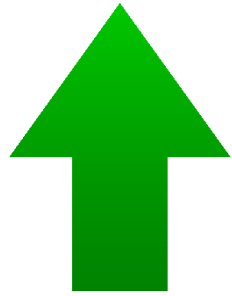
↓ **0.33%**

**Foreclosures:**

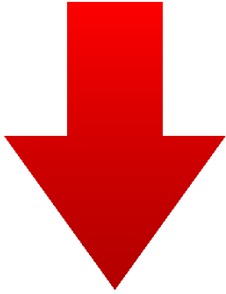
↓ **9.1%**



Consumption *should* be



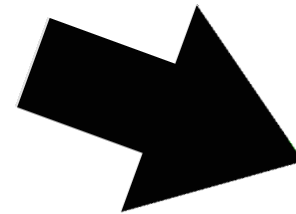
Instead, it's



**WHY?! Nobody knows.**



**Tile sales are expected to decline slightly**



# ANSI STANDARDS UPDATE

# Stuff you probably already know about ANSI ASC A108...

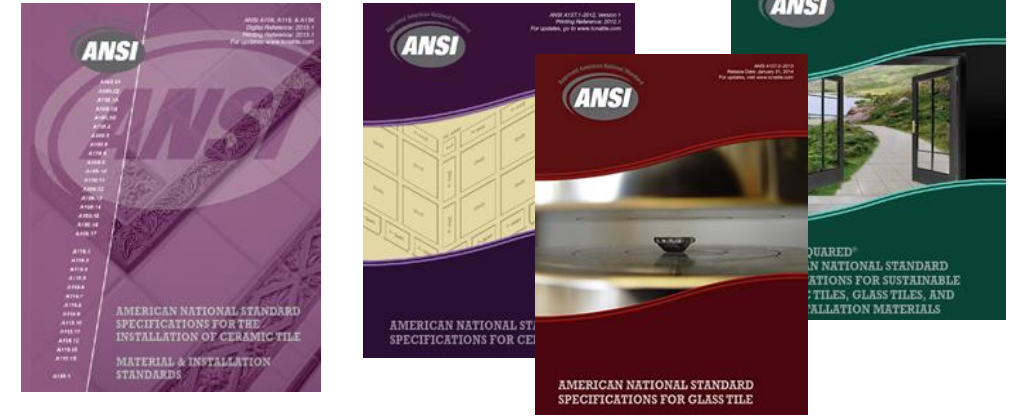
- Committee develops “voluntary” standards according to ANSI rules: Committee balance, consensus process, etc...

# Stuff you probably already know about ANSI ASC A108...



- 57 voting members: manufacturers, labor, distributors, importers, etc...
- TCNA is the Secretariat and a representative of labor is the Committee Chair

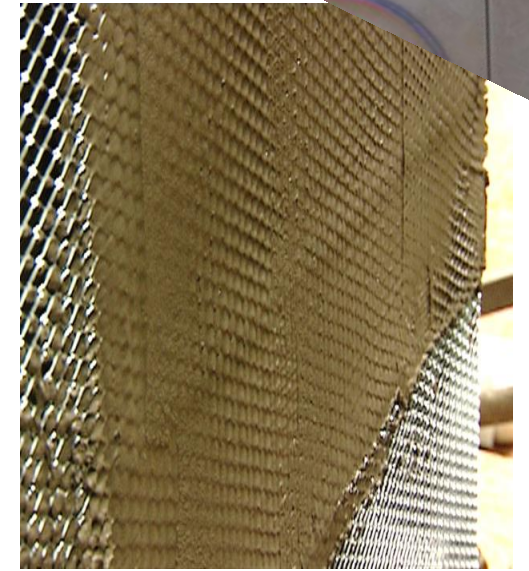
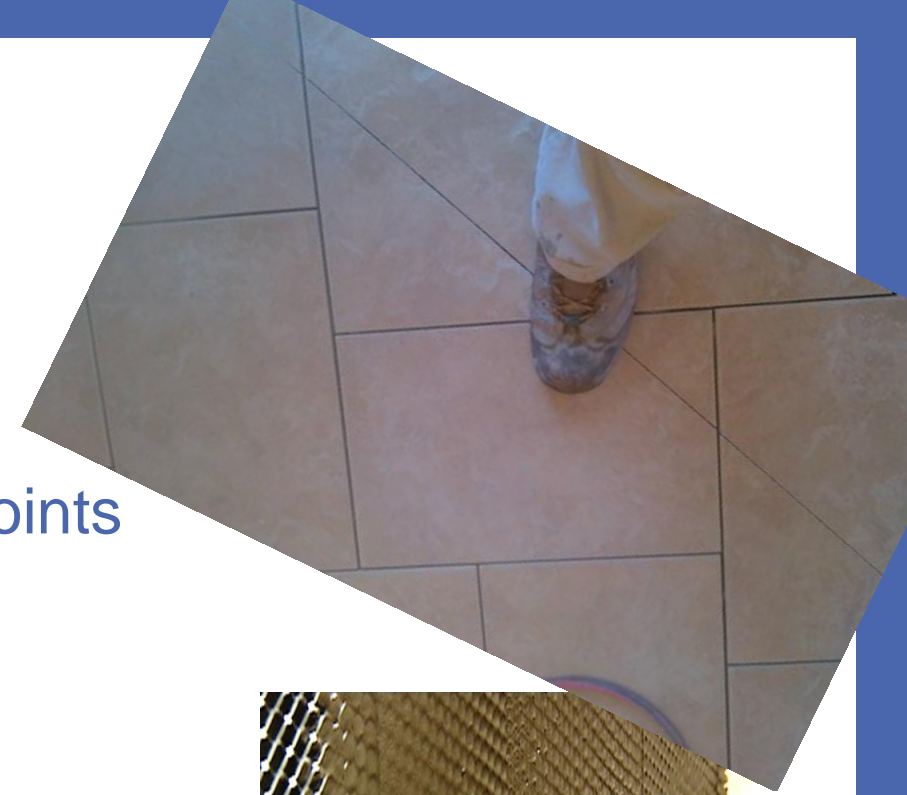
# The result...



- Lippage allowances . . . . . A108 (installation)
- Warpage allowance for rectified tile . . . . . A137.1 (tile)
- Opacity . . . . . A137.2 (glass tile)
- Bond strength (mortars, membranes, etc.) . . . . . A118 (installation materials)
- Recycled content . . . . . A138.1 (sustainability)

# ANSI work in progress

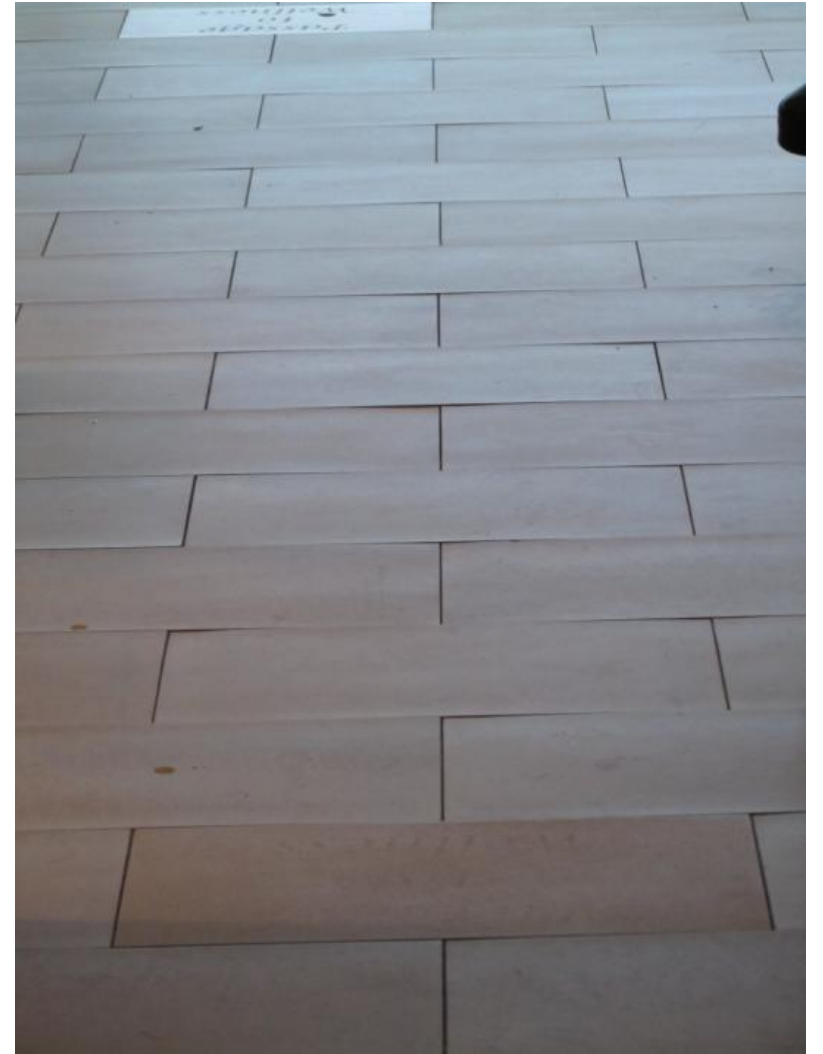
- Proposal to “officially” allow saw-tooth movement joints
  - very important to some designers
  - required evaluation of sealant performance
- Proposal to allow use of metal lath varieties not specifically named, with evaluation report from accredited evaluator
  - To allow for newer, suitable products contractors use
- Both in balloting stage, *expected* to pass in 2015



# ANSI work in progress

Possible expansion of recent “max. 1/3 offset” standard for large tiles set in running bond pattern

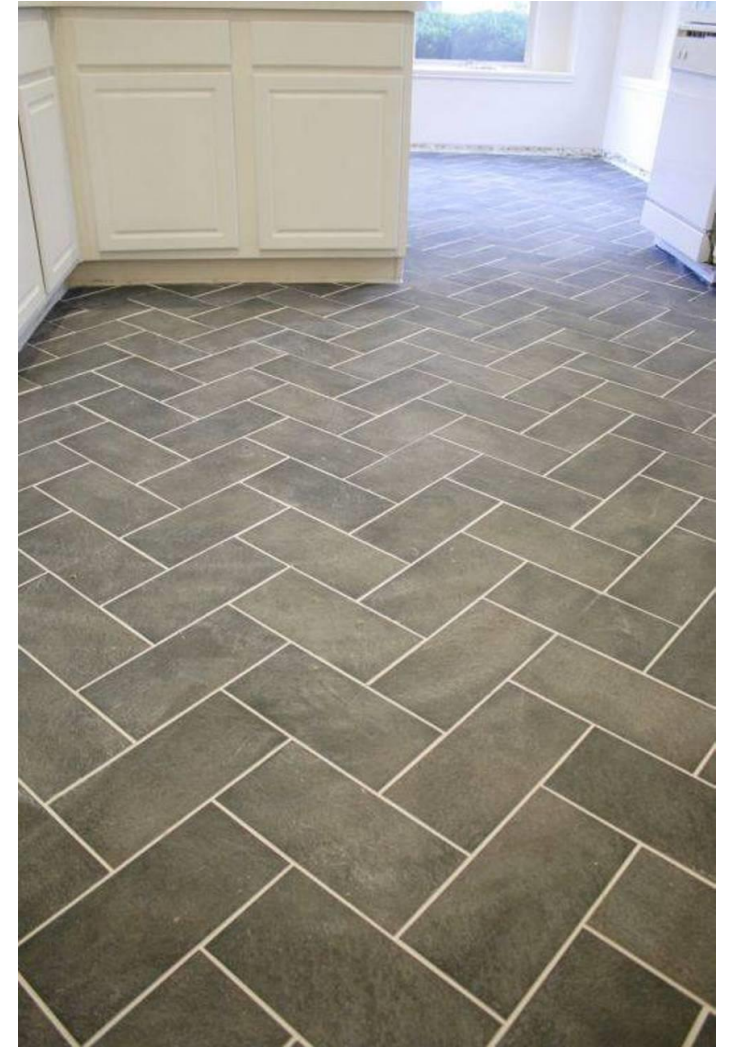
- Warpage is accentuated in 50% offset pattern because highest and lowest tile points are adjacent
- 50% offset prohibited for tiles 15” on any side unless otherwise allowed by tile manufacturer
  - Prohibits adjacent high/low points



# ANSI work in progress

Possible expansion of recent “max. 1/3 offset” standard for large tiles set in running bond pattern

- Same issue can present itself with other patterns: basketweave, herringbone, chevron
- Limiting lippage due to warpage = limiting complaints, managing expectations
- Stay tuned... beginning stages



# CHANGES TO THE 2015 TCNA HANDBOOK

---

# ~~Medium Bed Mortar~~

Dry set Mortar for

Large and Heavy Tile (LHT mortar)

- “Medium bed” brought confusion: specs asking for tile to be set by “the medium bed method”
- Nice idea: the best of both worlds
  - Fast (single step) and light installation AND fix substrate flatness issues, create slopes to drains, and transition between floor heights
- **TOO BAD IT DOESN'T WORK!!!!**

Take it from this guy....



- Lack of a standard further contributes to confusion
- In the interim, a change to the Handbook should help

# ~~Medium Bed Mortar~~

Dry set Mortar for

Large and Heavy Tile (LHT mortar)

## Addresses

- incorrect specifications for tile to be set by a “medium bed method”
- incorrect specifications for mortar to be used to fix substrates that aren't flat
- incorrect specifications for mortar to be used to form slope to drain, transitions in floor heights

# Dry Set Mortar for Large and Heavy Tile (LHT Mortar), formerly *Medium Bed Mortar*

## Similarities

- for thin-set installations
- minimize slump/thicker bond coat, useful for larger tiles
- declared by manufacturer; no ANSI or ISO standards
  - must meet requirements of ANSI A118.1, A118.4, A118.11, or A118.15 or ISO C1 or C2



# Dry Set Mortar for Large and Heavy Tile (LHT Mortar), formerly *Medium Bed Mortar*

## Improved/added info:

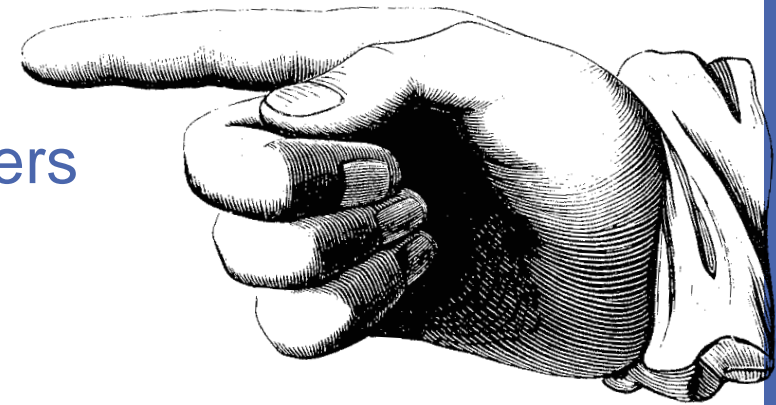
- bond coat  $3/32$ " to  $1/2$ " thick after tile is embedded (previously  $3/4$ " )
- for heavy tiles: 5 lb/square foot or heavier
- for ungauged tiles
- for large tiles, as required to achieve coverage requirements if/when there is warpage that creates larger void between tile and substrate



# Dry Set Mortar for Large and Heavy Tile (LHT Mortar), formerly *Medium Bed Mortar*

## “Note to specifier” section

- not for truing or leveling substrates or the work of others
  - exceeds “the limitations of the mortar”
- a product, not an installation method
- Specs that reference a “medium bed method” or call for mortar to level, flatten, or fill substrates or to create slopes or transitions between finish floor heights **“do not conform to tile industry standards or norms.”**



# Changes to Environmental Classifications

- Handbook “Environmental Classifications” describe levels of moisture and heat exposure
- Classifications assigned to methods to relay suitability under typical conditions

- Res1/Com1: dry
- Res2/Com2: limited water exposure
- Res3/Com3: wet
- Res4/Com4: high humidity, heavy moisture
- Res5/Com5: high temp (125°F or higher)
- Res6/Com6: exterior



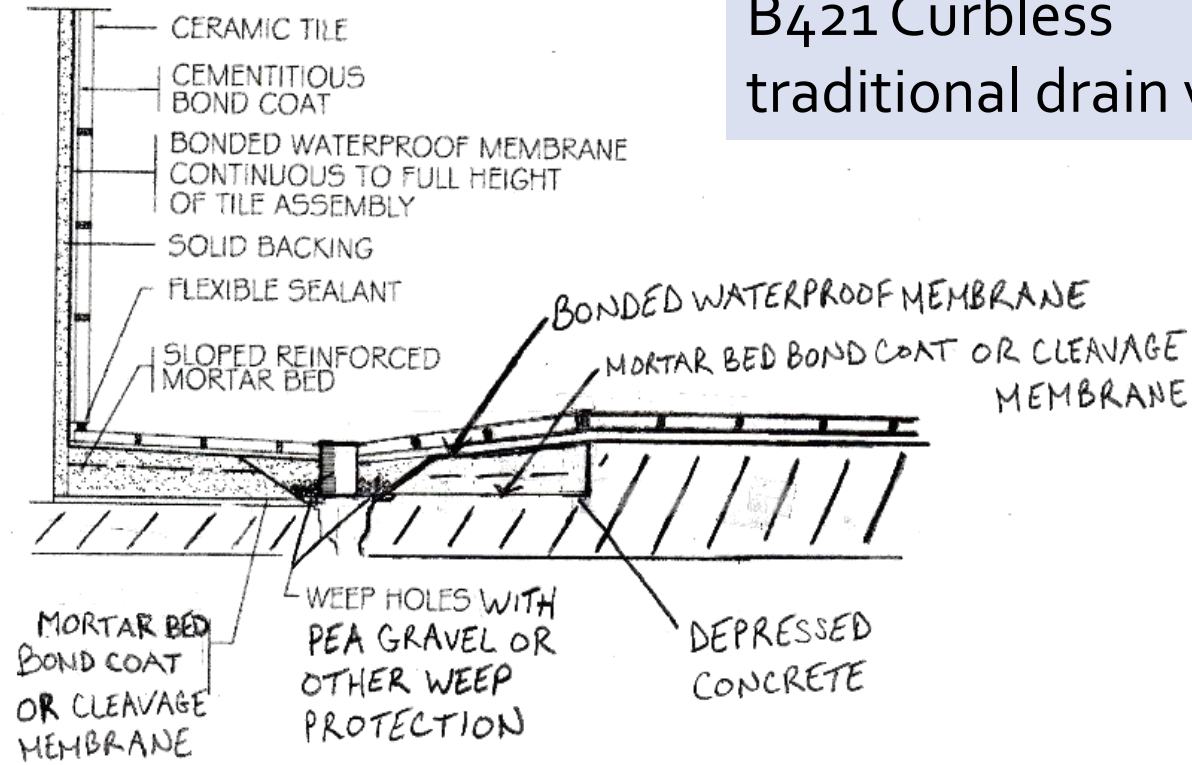
# Changes to Environmental Classifications

- Now: Environmental **Exposure**  
Classifications to avoid confusion with sustainability considerations
- Res7 and Com7 categories added for submerged installations: pools, fountains, water features
- Because not all mortars and grouts are suitable for submerged applications

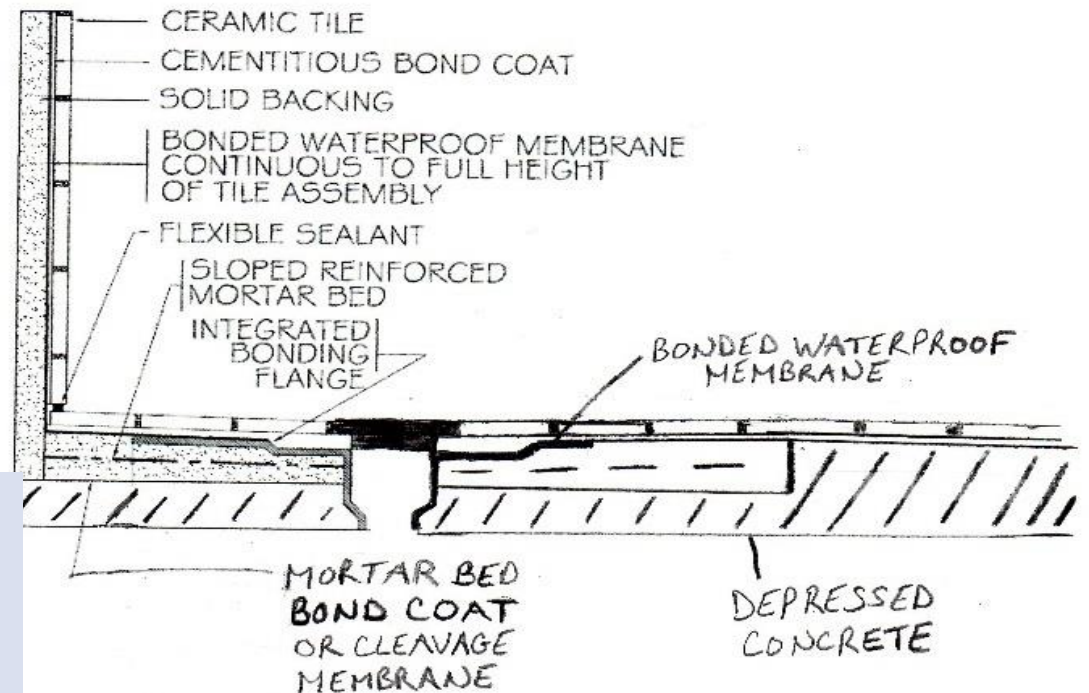
# New Methods for Curbless Showers

- based on existing B421  
and B422 shower methods
  
- full waterproofing up walls

## B421 Curbless traditional drain version



## B422 Curbless integrated bonding flange version

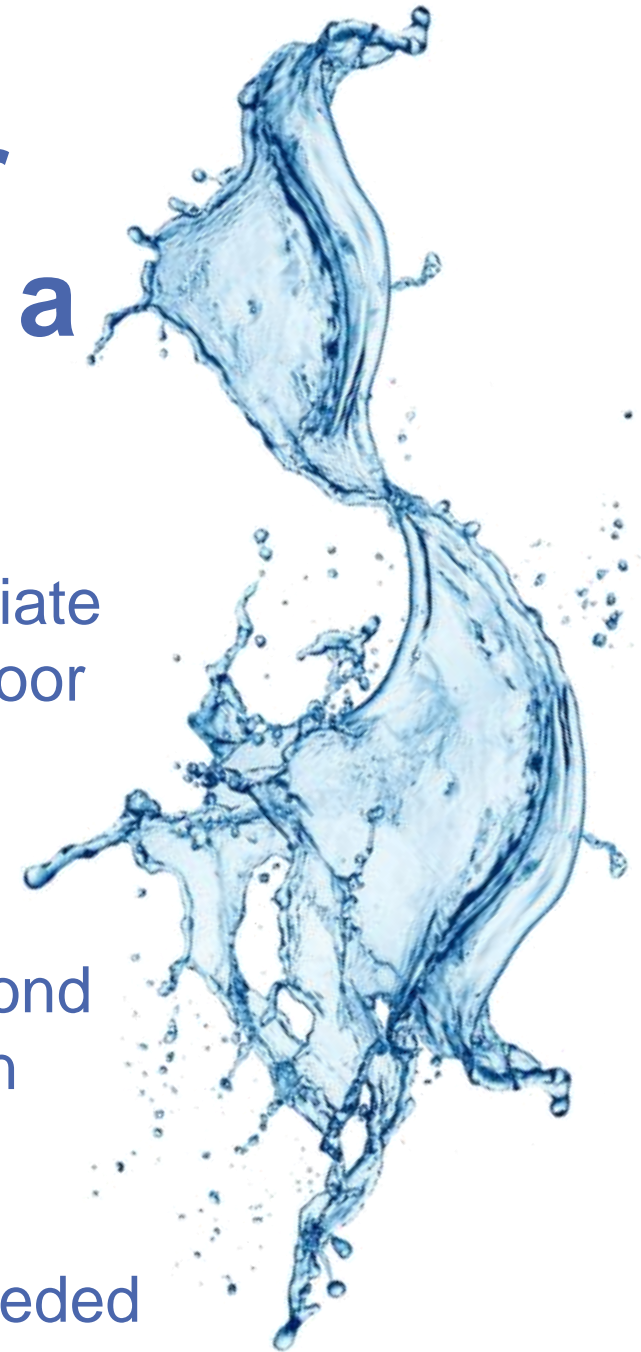


# Design/Specification Considerations for “Zero-Entry” or Curbless Showers

- Depressed slab prevents added floor height at entryway (what occurs when contractors are asked to create curbless showers w/o depressed slab)
- Refer to ADA for compliance; curbless methods do not inherently comply

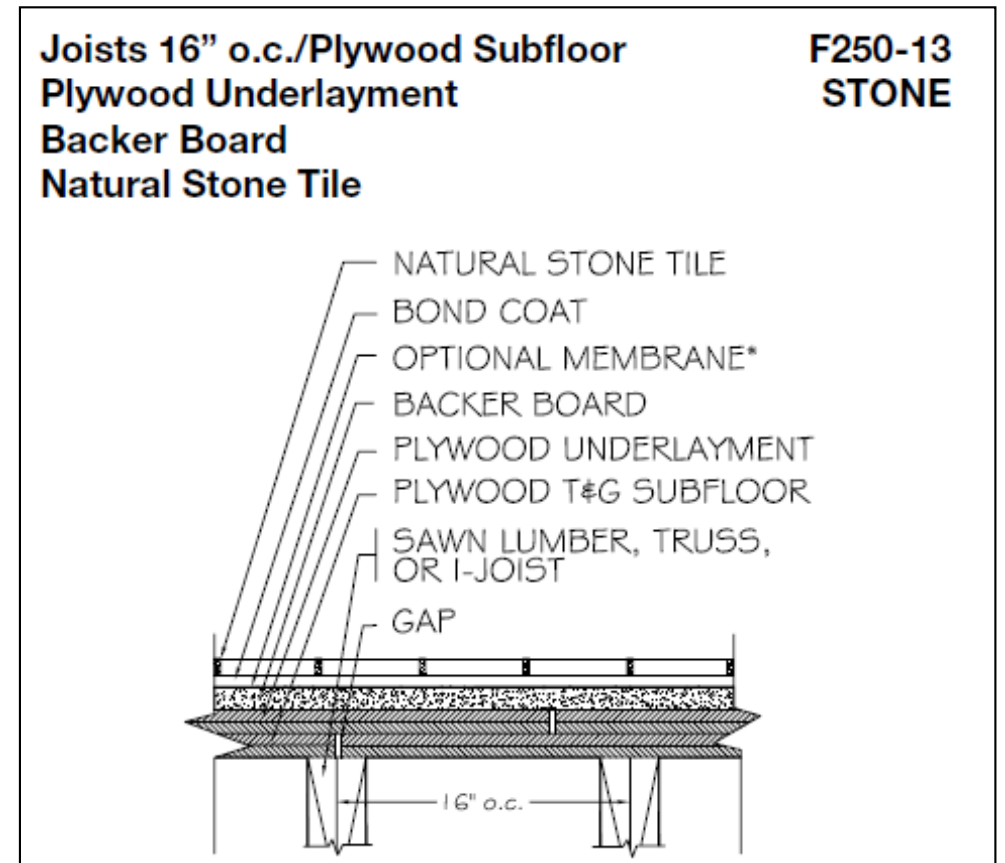
# Shower Water and Splash Water “often difficult to contain within a curbless shower”

- Floor and wall waterproofing required outside the immediate shower area, at least one foot beyond high point of the floor
- Secondary drain may be required outside shower area
- High point of floor must be outside the shower area, beyond shower door/curtain; location of high point is critical when secondary drain not included
- Additional waterproofing outside shower area may be needed



# Change to Deflection Limitation in Stone Methods over Wood Substrate

- deflection = bending
- maximum allowable floor member live load and concentrated load deflection shall not exceed ~~L/360~~ L/720
- Applies to 3 methods
- Consensus resolution to stone industry discussions



# Field and Installation Requirements Guide

## Natural Stone Tile Installation Over Frame Construction

Strongbacks, bridging, or other load-sharing members may be required within a wood framed system to reduce differential deflection between adjacent framing members.

Without load-sharing members, deflection may differ significantly between adjoining members. Accordingly, for framed construction, an L/720 requirement has been specified... L/360 accepted for concrete/masonry substrates.

# Crack Isolation

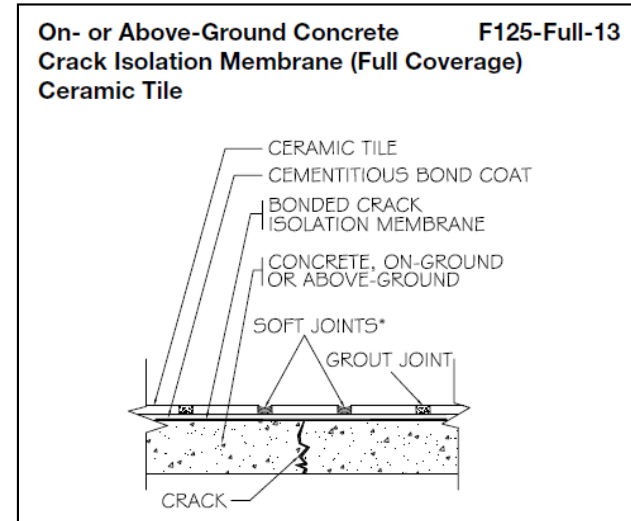
## F125-Full v. F125-Partial

Requirements section modified to address problems of unclear specs/bidding issues

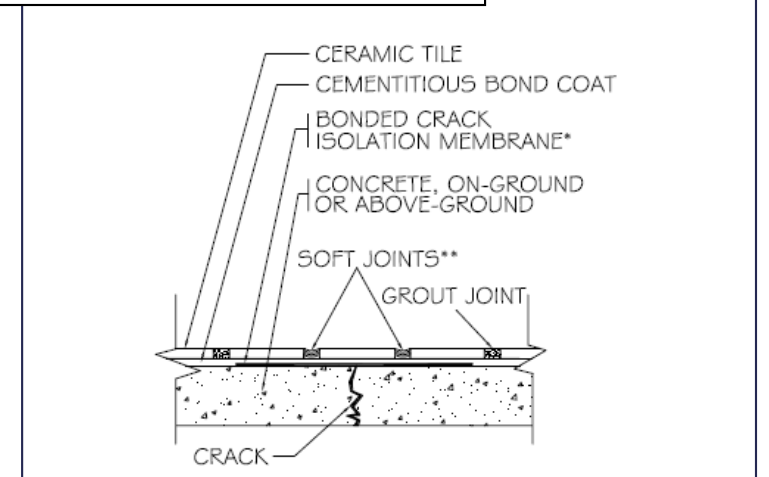
### Requirements

- Specifier to identify areas of coverage (partial or full).  
Unless full coverage is clearly specified, installing contractor's responsibility is limited to partial coverage.

Same language added under "Materials"

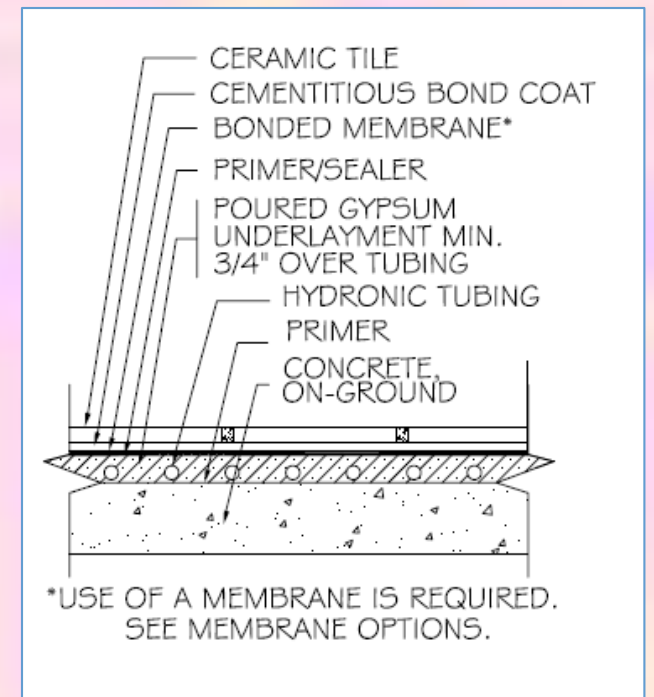


**F125-Partial-13**  
**(Partial Coverage)**



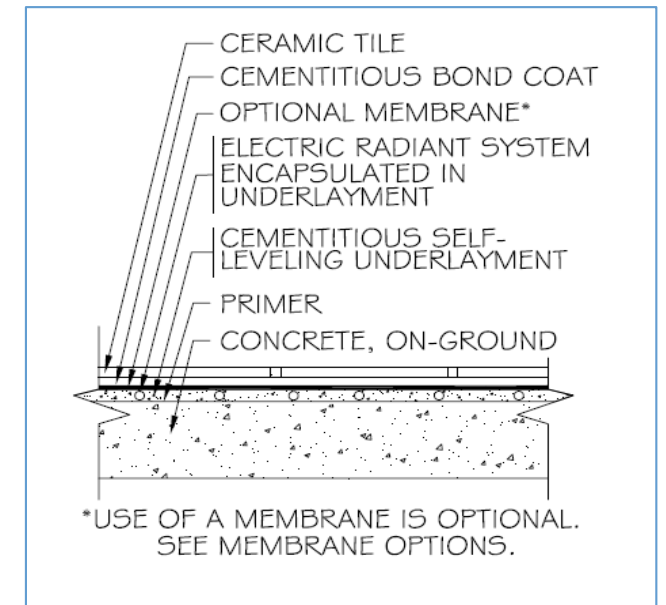
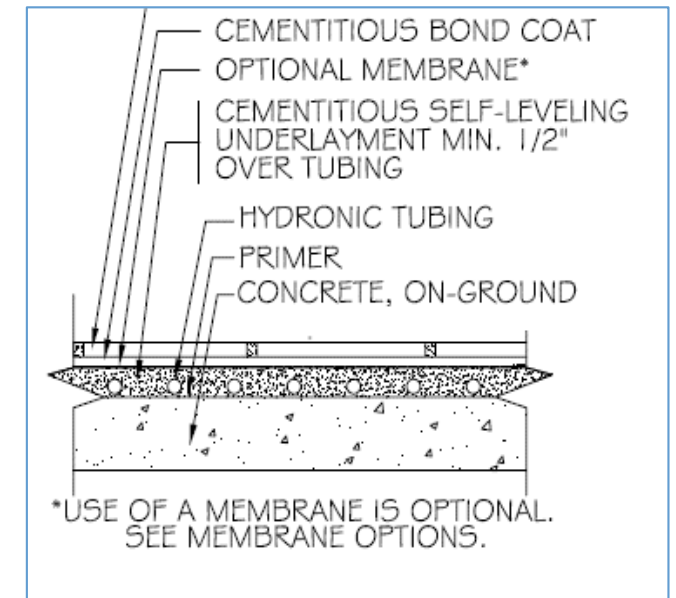
# 6 New Radiant Heat Methods for Natural Stone Tile

- Based on ceramic tile methods, adapted as all other stone methods are
  - Small joints, unsanded grout may be necessary
  - Service rating dependent on the stone used
- RH111/RH111A: poured gypsum underlayment encapsulating hydronic tubing (membrane required)

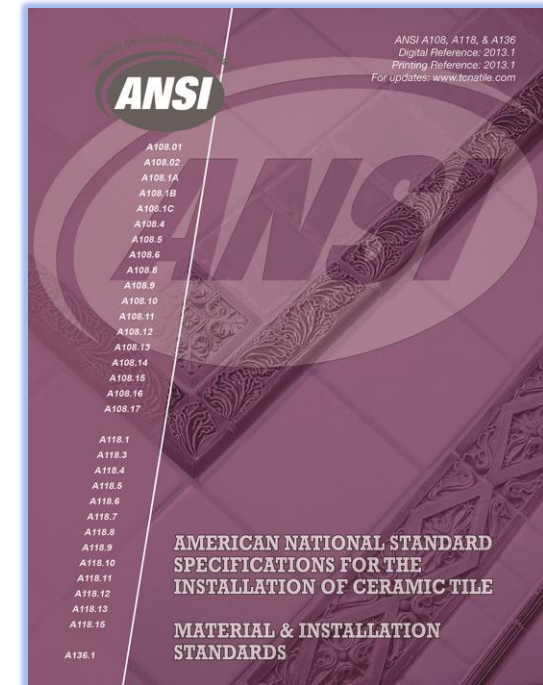
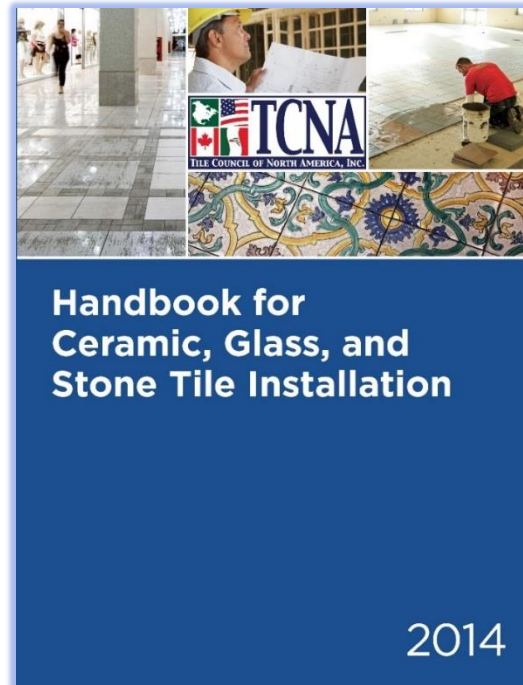
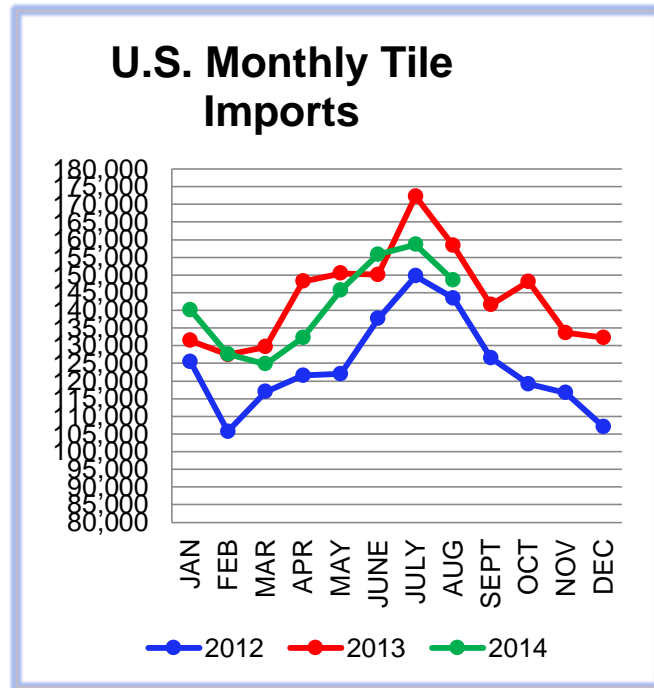


# 6 New Radiant Heat Methods for Natural Stone Tile

- RH112/RH221A: cementitious self-leveler encapsulating hydronic tubing (membrane optional)
- RH116/RH116A: electric heat system encapsulated in cementitious self-leveler (membrane optional)
- New methods provide a means of specifying popular and successful use of stone tile with heat



# We've Just Covered Familiar TCNA Territory





---

What Has TCNA Done for You Lately?

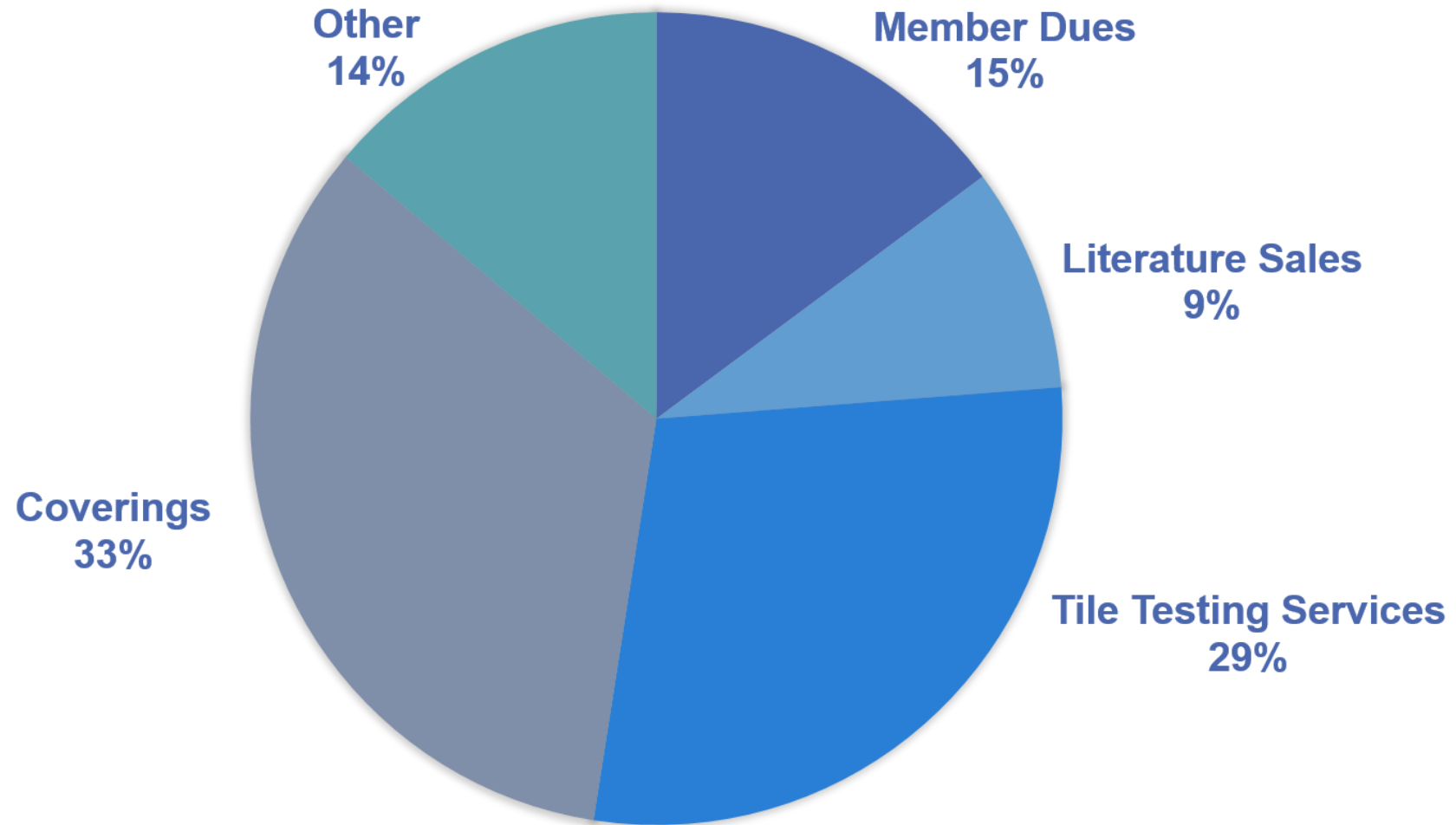
ELSE<sup>^</sup>

# First, a Pop Quiz:

## How Is TCNA Funded?



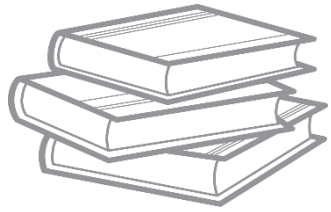
# TCNA's Diverse Funding



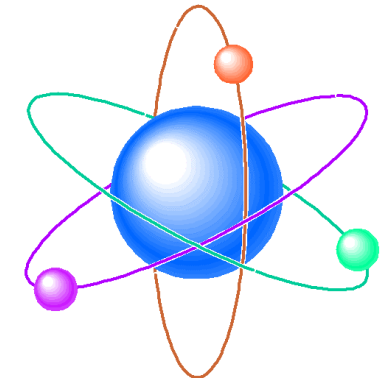
# TCNA's Work Impacts All Industry Segments (not just manufacturers)

- Distributors
- Tile installers and contractors
- Architects and designers
- General contractors
- Specifiers





STANDARDS



SCIENCE



EDUCATION



ADVOCACY

# STANDARDS

---



# Tile Industry Standards

- Product standards establish a benchmark for product performance
- Installation standards establish guidelines for the end result, sometimes the technique by which that is achieved
- Standards for testing protocols and testing materials establish consistency, so valid evaluations and comparisons can be made

# Tile Industry Standards

- TCNA primarily engages in research and development of product standards, testing protocols, and testing materials
  - In many cases TCNA staffers chair the Committees
- Standards should relate to the actual product function, consumer expectations
  - Example: antibacterial efficacy
- Where function and/or expectations are different, standards should be different
  - Example: glass tile vs. quarry tile



# TCNA STANDARDS WORK

---

ANSI ♦ NMX ♦ ASTM ♦ MMSA ♦ NTCA ♦ ISO ♦ NSF ♦ SCS ♦ UL  
USGBC ♦ ICC/IgCC ♦ NIBS ♦ Green Globes ♦ GSA ♦ ASHRAE

# ASTM International

(formerly: *American Society for Testing and Materials*)

- Developer/publisher of globally recognized consensus-based standardized test methods for virtually every industry
- More than 30,000 individual members
  - Anyone can participate
- 90% consensus requirement = stringent standards
- Commonly referenced in U.S. construction specifications, regulations, and codes



# TCNA and ASTM International

C21—Ceramic Whitewares and Related Products

C18—Dimension Stone

E60—Sustainability

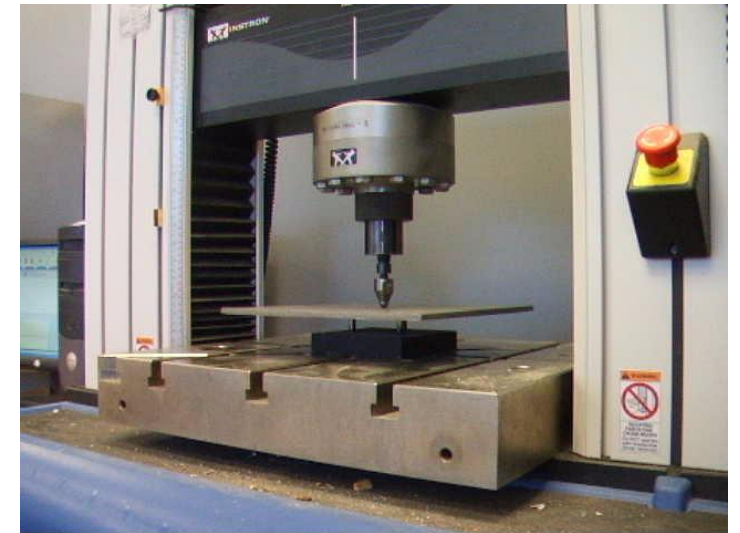
F13—Pedestrian/Walkway Safety and Footwear

COTCO—Regulatory Committee for ASTM Committees



# ASTM C21: Ceramic Whitewares

- Most tile quality/performance tests in the ANSI A137.1 tile standard are ASTM tests: breaking strength, warpage, etc.
- Tests regularly reviewed, revised
  - Improved, changed manufacturing methods
  - New products, new data, new test equipment
  - Safety improvements
- Currently under review: water absorption, surface abrasion, and the Robinson Floor Test



# Materials & Methods Standards Association

- Tile industry professionals collaborating to develop and revise methods and standards for installation materials (thin-set, grout, etc.)
- Often the first stop on the journey to generic consensus standards for installation products
- Often, manufacturers conduct in-house testing in preliminary stages as an affordable way to do a lot of testing during the test R&D stage



# TCNA and MMSA

- Fresh set of eyes and hands to replicate test methods and data in round robin testing
- Research expertise
- In progress standards
  - Large and Heavy Tile Mortars
  - Uncoupling Membranes



# NTCA Technical Committee

## NTCA Methods and Standards

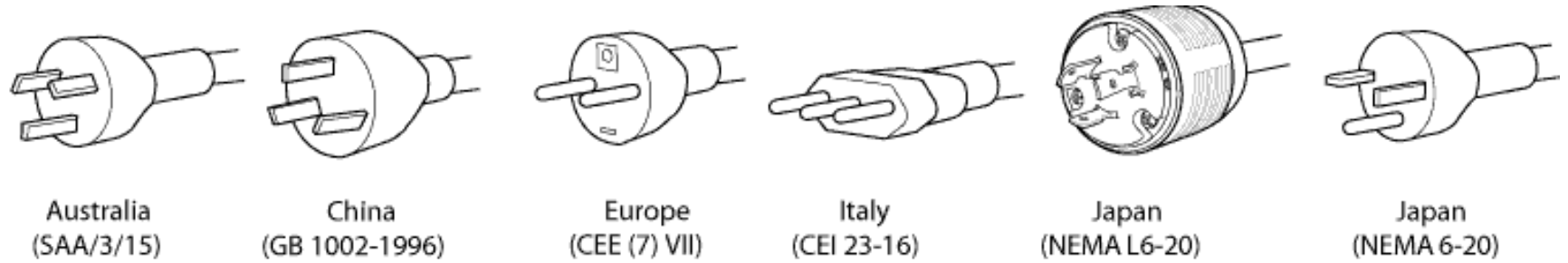


- Collaboration where standards/lack of standards impacts contractors
- Origin of curbless shower methods, original stone methods
- Harmonization of NTCA reference manual where possible and a forum for TCNA to understand contractor impact, perspective
- Development of much needed documentation of shared jobsite issues, especially while waiting for formal standards, e.g., EQ studs

# International Standards Organization

- World's largest developer of voluntary international standards
- Over 19,500 international standards
- Almost every industry has an ISO Committee
- 165 member countries; one vote each





# TCNA and ISO

- Establish compatibility where possible, helpful, and more efficient to do so for producers and consumers
  - Example: U.S. vs. European outlets
- Where there must be differences, international standards provide a benchmark and common language for product quality
- 68% of tile sold in the U.S. is imported
  - What is expected and how is that measured?

# International vs. Domestic Standards

- International standards widely perceived as superior, due to global participation, but are often (not always) “watered-down” compromises
- De facto lowest common denominator
- Domestic standards are more relevant/reflective of their marketplace, and are usually more stringent in countries like the U.S.
- Domestic standards take precedence in the U.S.
- International standards are valuable, should coexist with domestic standards without conflicting

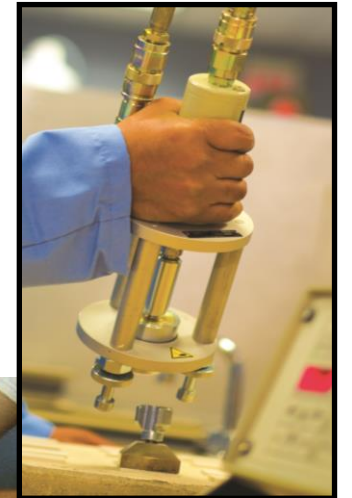
# TCNA and ISO: How?

- The ANSI Committee doubles as the Technical Advisory Group (TAG) to ISO and determines the U.S. position on international standards developed through ISO
  - How to vote
  - Revisions/objections
  - New standards needed
  
- This is how U.S. interests are heard, included



# ISO TC 189 tile-related working groups

- Working Group 1—Tile Test Methods
  - Water absorption, surface abrasion, etc.
- Working Group 2—Tile Specifications
  - Criteria for rectified tile
- Working Group 3—Installation Materials
  - ISO mortar and grout specs introduced in 2011
- Working Group 4—Thin Tile



# ISO TC 189 tile-related working groups

- Working Group 6—Guidelines for Installing Tile
  - technical report (non-normative)
- Working Group 7—Tile Sustainability
- Working Group 8—Antimicrobial Properties of Tile
- Working Group 9—Low Modulus Adhesives for Exteriors
- Working Group 10—Slip Resistance for Ceramic Tile



# SUSTAINABILITY GROUPS AND GREEN BUILDING STANDARDS

---



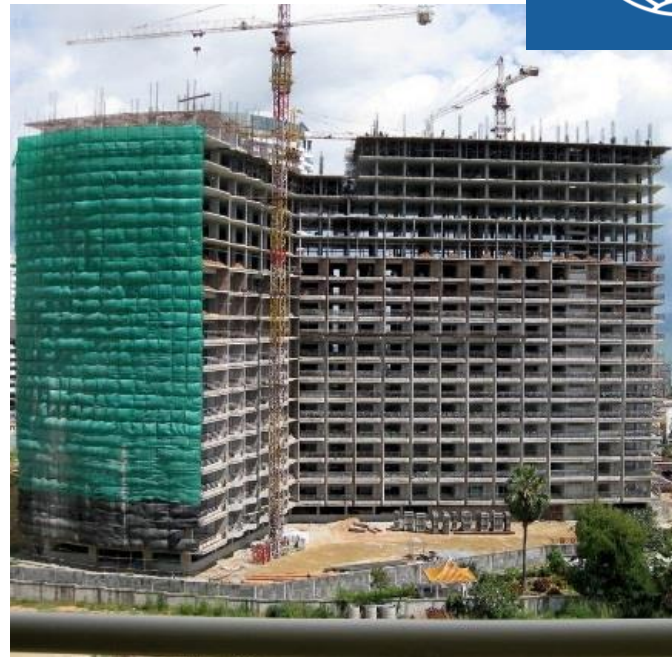
# TC 59 (Sustainable Buildings/Construction)

## PC 277 (Sustainable Procurement)



### Standards for

- developing sustainability standards for building products
- environmental assessment of buildings
- general building sustainability principles
- sustainable procurement/purchasing



# UL Environment, SCS Global and NSF International



- Leading sustainability standards developers and certifiers
- NSF — well known for public health standards and certification programs
- UL — known globally for safety-related certifications and is on every “green” committee affecting tile (LEED Materials and Resources, LEED Pilot Credit Committee, etc.)
- SCS — claims to fame are indoor air quality assessments, recycled content verification, and life cycle assessments

# International Code Council (ICC)



- Developer of model building and fire safety codes used by all 50 states, federal agencies, private companies, etc.
- Developed IgCC, the International Green Construction Code
  - Similar to other codes (plumbing, electrical, etc.)
  - Becomes “the law” if adopted by a jurisdiction
  - Contains enforceable language and criteria



# US Green Building Council



- Largest green building organization in the world?
- Developer of the LEED rating and certification for green buildings



# Architectural Sustainability Initiatives Today

- LEED
- Green Globes
- IgCC International Green Construction Code
- ASHRAE Standard for the Design of High-Performance, Green Buildings
- NAHB National Green Building Standard (ICC 700)
- GSA Facilities Standards
- National Institute of Building Sciences (NIBS)



# Green Construction Grows Up



- “Building green” gets more complex, more critical
- So many standards and rating systems! How to specify products?
- Single-attribute sustainability claims no longer sufficient

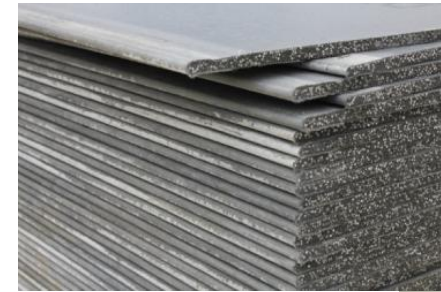
# Green Construction Grows Up

- In response multi-attribute sustainability standards are developed by other flooring industries: carpet, resilient, laminate, stone...
- Other industries with multi-attribute sustainability standards
  - Commercial Furniture
  - Textiles
  - Wall Coverings
  - Single Ply Roofing Membranes
  - Gypsum Board and Panels
  - Door Leafs



# Green Squared

- Multi-attribute sustainability standard and certification program launched in 2012 for tile and installation materials
- Mandatory and elective requirements in each category
  - Product characteristics
  - Manufacturing
  - Corporate governance
  - End of life
  - Innovation



# Conformance to Green Squared

- Manufacturers can self declare, but 3<sup>rd</sup> party certification is increasingly important
- Thousands of certified products today
  - 12 U.S., Mexican, and European tile mfrs.
  - 2 U.S. mortar manufacturers



**Environment**

# What does Green Squared® mean for the tile industry?

- Credibility behind sustainability claims; not perceived as greenwashing
- Balanced approach, based on North American norms
- Easy to recognize sustainable products
- A way to drive tile into green building standards and rating systems like LEED



# Stress-Free Sustainability

## CREDITS!!!

- LEED v4
- Green Globes
- NAHB National Green Building Standard

## COMPLIANCE

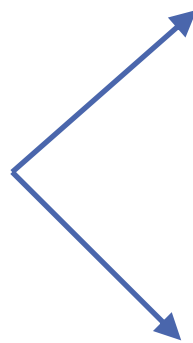
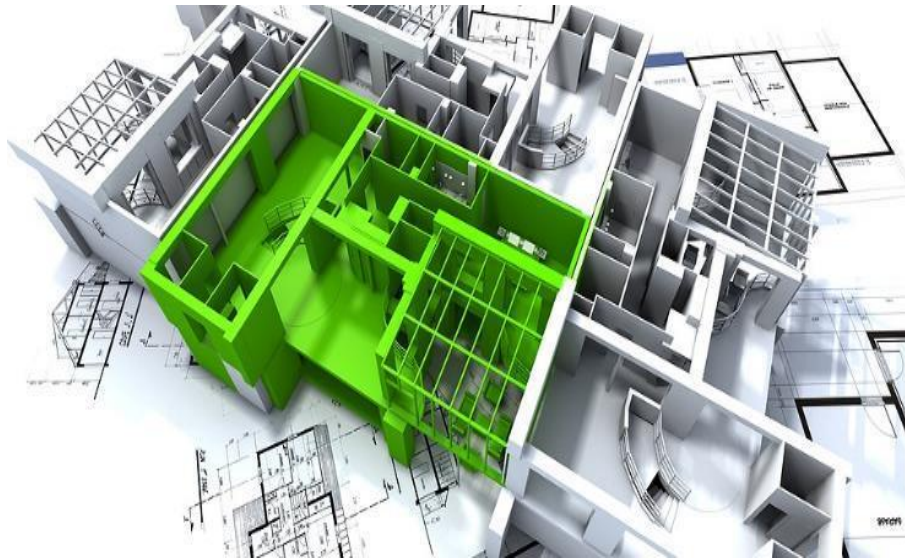
- IgCC International Green Construction Code
- ASHRAE standard for green buildings
- GSA Facilities Standards for Public Buildings

## CONFIDENCE

- Listed in the National Institute of Building Sciences' Whole Building Design Guide



# Taking Sustainability to the Next Level



Products certified to meet a multi-attribute sustainability standard



Total transparency, reporting



# What's the difference?



## Performance

Minimum criteria that a product must meet

**Environmental**

**Product**

**Declaration**

## Transparency

A report on the various environmental impacts of a product, based on rules of what to report and how to report it

# The Ceramic Tile EPD

- Similar to a nutrition label
- Reporting requirements, but no specific requirements that have to be met
- Product category rules (PCRs) are in place so all flooring products report in the same fashion
- Comparisons, evaluations, informed choice



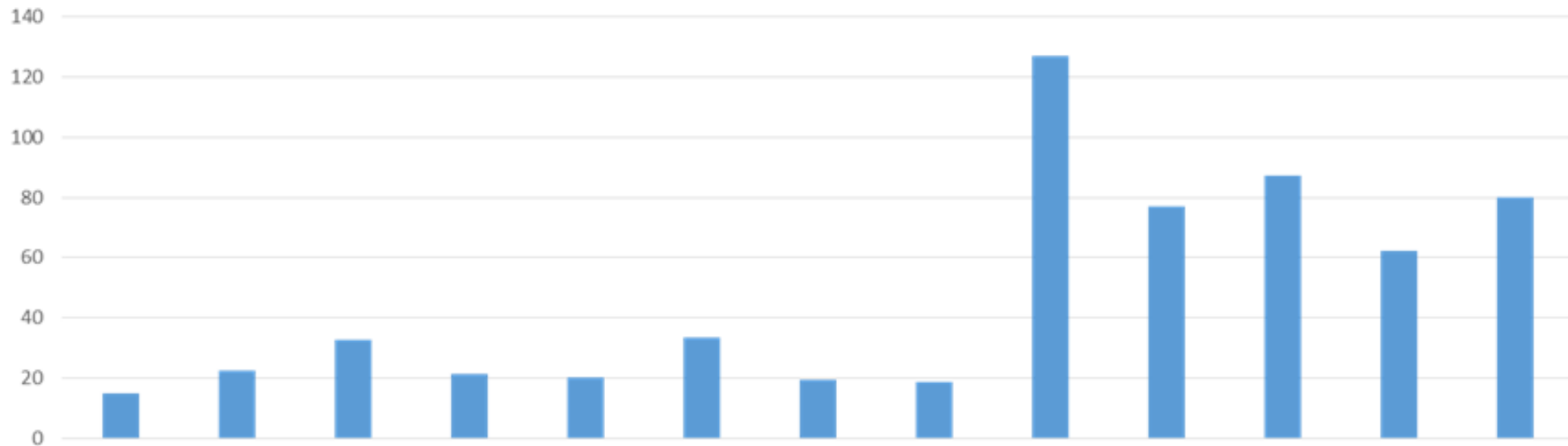
Environmental Facts	
Functional unit: 1 m <sup>2</sup> of Ceramic Tile (Porcelain) Floor Covering	
Reference Service Life (RSL): 60 Years	
60 Year Inventory Analysis	
Energy Demand [MJ x (60 / RSL)]	
Primary Renewable [MJ x (60 / RSL)]	
Primary Non-Renewable [MJ x (60 / RSL)]	
Secondary [MJ x (60 / RSL)]	
Non-Renewable Material Sources [kg x (60 / RSL)]	
Waste Output [kg x (60 / RSL)]	
Non-Hazardous [kg x (60 / RSL)]	
Hazardous [kg x (60 / RSL)]	
60 Year Impact Assessment	
Global Warming Potential [lb CO <sub>2</sub> eq x (60 / RSL)]	
Acidification Potential [lb H <sup>+</sup> eq x (60 / RSL)]	
Ozone Depletion Potential [lb CFC-11 eq x (60 / RSL)]	
Smog Potential [lb O <sub>3</sub> eq x (60 / RSL)]	
Eutrophication Potential [lb N eq x (60 / RSL)]	
Boundaries: Cradle to Grave	Clay: 50%
Company:	Quartz: 10%
Product Name:	Feldspar: 40%
Total Recycled Content %:	Misc. Minerals: <0.1%
<b>Green Squared Certified</b> (Y or N):	
Other Attributes:	



**The EPD for ceramic tile  
*PROVES* tile has a lower  
environmental footprint  
than all other floorings !!!**

# Tile Made in North America Comparison to Carpet and Vinyl—60-Year Carbon Footprint

Global Warming Potential  
(GWP) [kg CO<sub>2</sub> eq]



Industry-Wide Ceramic Tile (Draft)

Industry-Wide VCT

Industry-Wide LVT/SVT

Industry-Wide Heterogeneous Vinyl

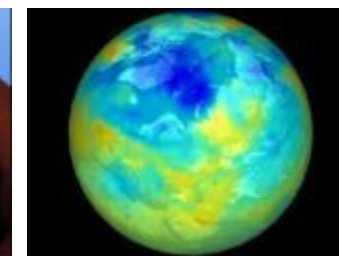
Industry-Wide Homogeneous Vinyl

Industry-Wide Rubber Floor Tile

Sampling of brand-specific carpet products

# Tile Made in North America Comparison to Carpet and Vinyl—Other Impact Categories

- Smog Formation Potential
  - Ozone Depletion
  - Acidification
  - Eutrophication
  - Resource Depletion
- 
- TCNA's EPD shows tile to have the lowest 60-year impact across all categories



# Just Certified by UL Environment!

- Green building points for products that were used to create the generic EPD
- LEED requires EPDs to be certified
- Green Building Community Acceptance
- Peer Review by Green Building Experts
- CREDIBILITY!



# ON THE HORIZON: HPD<sub>s</sub>?



# Health Product Declarations (HPDs)

- The HPD Collaborative developed the HPD Open Standard for reporting product content and associated health information
- Requires complete disclosure of every ingredient and known residual
- Top 30 largest architectural firms in the country are now asking for HPDs with some requiring them by 2015 or product will be pulled



# HPD Requests, Reasons

- Eliminating “known or suspected” hazardous chemicals
- Growing interest in product transparency
- Notifications range from “preference” for HPDs to required compliance by stated deadlines, or products will be phased out of specs and product libraries

# TCNA Response

- Publishing information and working with HPD Collaborative to correct false assumptions being made
- The tile ingredients known to cause health risks are permanently fused together during firing and no longer a health risk

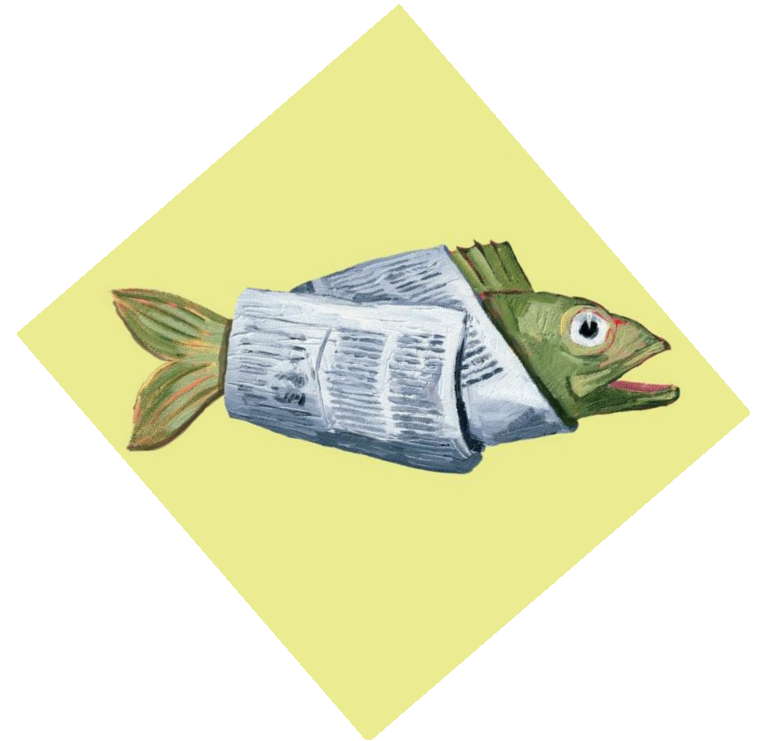
# STANDARDS

---

# DCOF UPDATE

# Old News...

- The standard for COF has changed!
- After 20+ years of specifying ASTM C1028 as the standard for COF in the U.S., the ANSI A137.1 tile standard was updated with a new method for testing COF, and a requirement was added.



DCOF AcuTest®

# 0.42 is the new 0.6

- Construction professionals need to change from long-time practice of specifying minimum 0.6 SCOF per C1028
- The minimum is 0.42 per the DCOF AcuTest for interior level tiles expected to be walked on while wet
- TCNA uses the BOT3000



# 0.42 is the new 0.6

- Project plans/specs, maintenance programs, etc., referencing minimum COF of 0.6 per ASTM C1028 (the old COF test method) do not meet the requirements of the ANSI A137.1 tile standard
- C1028 was officially withdrawn Feb.1, 2014
- Ramifications for using expired, “unsupported” standard???



# More-recent Developments in COF

- ASTM Committee on Pedestrian/Walkway Safety and Footwear
  - Created a standard for calibrating/certifying walkway tribometers
  - Now working on a way to use tribometers like the BOT3000 in estimating slip resistance thresholds
- ISO TC 189 working toward worldwide consensus on COF



# More-recent Developments in COF

- TCNA proposal to include DCOF criteria in the International Building Code (IBC) section on “slip-resistant” materials used in areas of egress
- Gaining traction for AcuTest: several other hard surface flooring associations are considering following suit

# Why all the interest in COF?

- Desire to avoid accidents
- Desire to match traction to how a floor will be used
- Safety in all aspects has become a much bigger concern and is a growing industry unto itself
- Need for a reliable way to check initial COF and changes over time (maintenance, wear)
- Slipperiness of a floor can affect safety and cleanability



**SCIENCE**

---

# Research and Testing for Standards Development



- Determine what needs to be measured, defined, standardized
  - How to test? Use/tweak existing test? Develop new test?
- Generate data, look for trends
- As trends emerge, standards can start to take shape
- Often back to the drawing board at points along the way

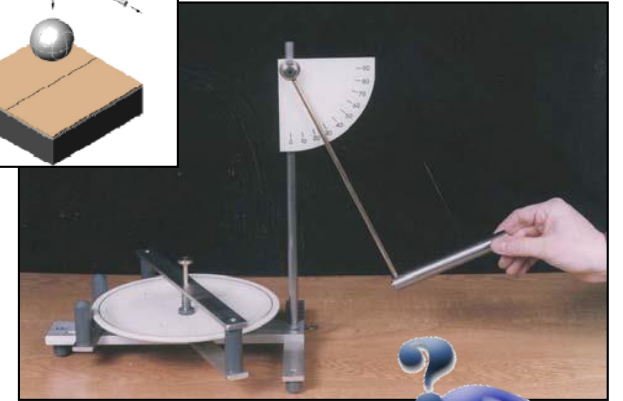
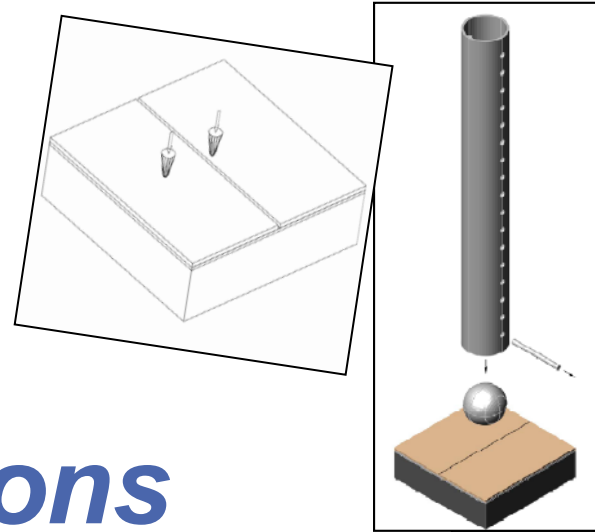
# TCNA Laboratory

- 3<sup>rd</sup> party, confidential testing
- ASTM, ISO, ANSI, etc.
- Ceramic tile, glass tile, dimension stone, installation materials, antimicrobial, sustainability, etc.
- Current research
  - Thin Tile
  - Uncoupling Membrane
  - Large and Heavy Tile Mortar
  - Water absorption
  - DCOF





# SCIENCE FOCUS ON THIN TILE



## *Last year at Total Solutions*

- TCNA “reported” on thin tile
- OK...mainly we posed A LOT of theories and questions
  - What methods can be used to test?
  - Required performance: Same as traditional tile? Less? More?
  - What tiles should be tested (size, thickness, method of manufacture, etc)?



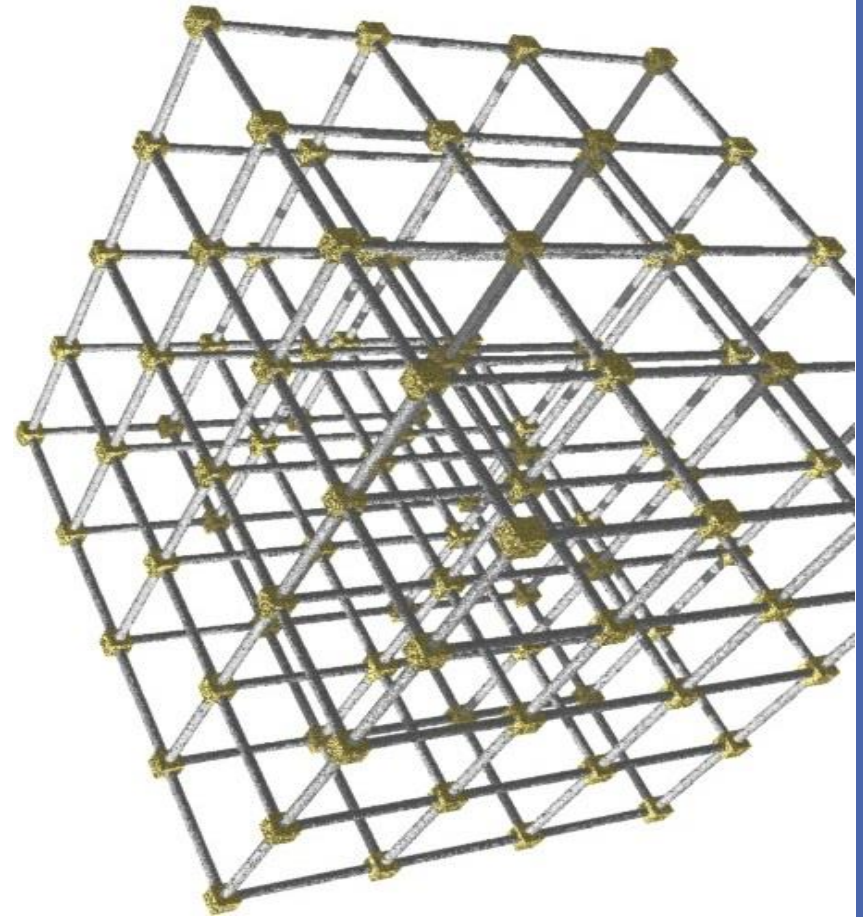
# One Year Later

- TCNA has been aggressively testing thin tiles
- Initial focus:
  - gauging variation between tiles and effects of variation
  - determining most important properties to test
  - developing appropriate tests
- Objective: thin tile product standard (ANSI A137.3)



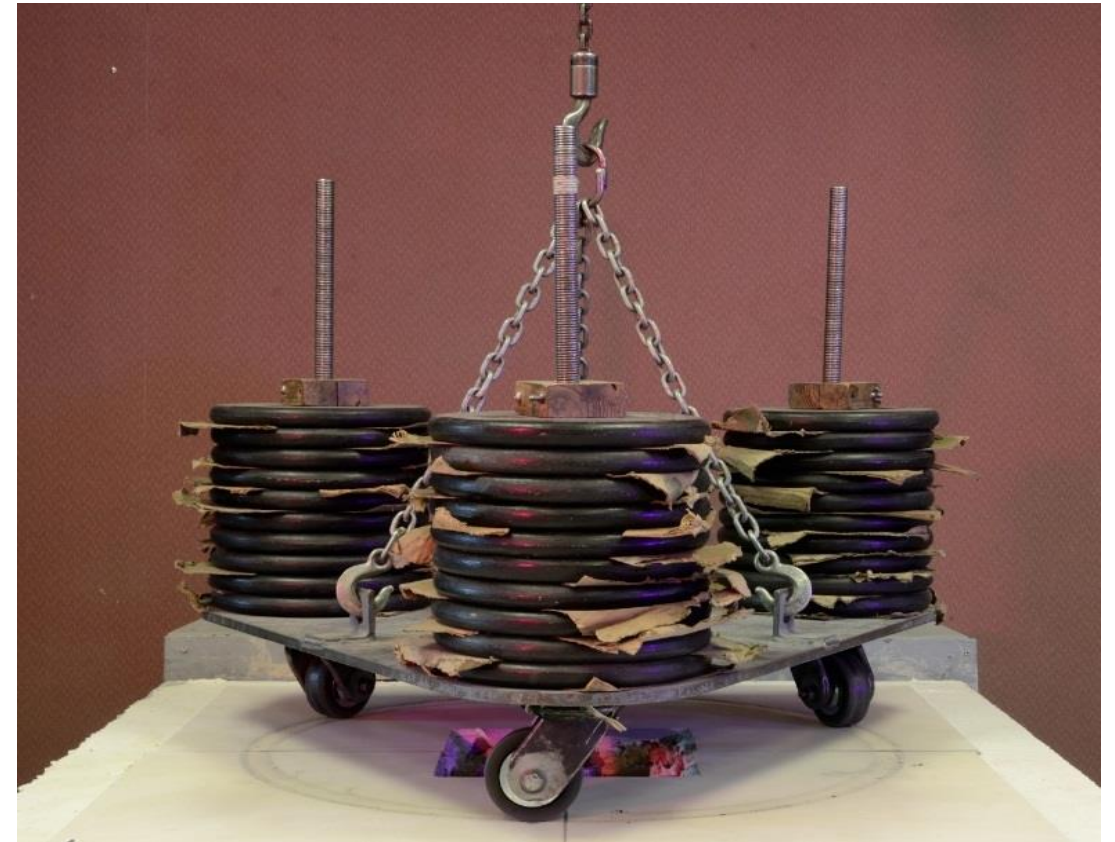
# Framework of Research

- Narrowed down the range of tests and most relevant properties
  - System performance (Robinson Test)
  - Breaking strength
  - Impact resistance
- Continuing to perfect test methods



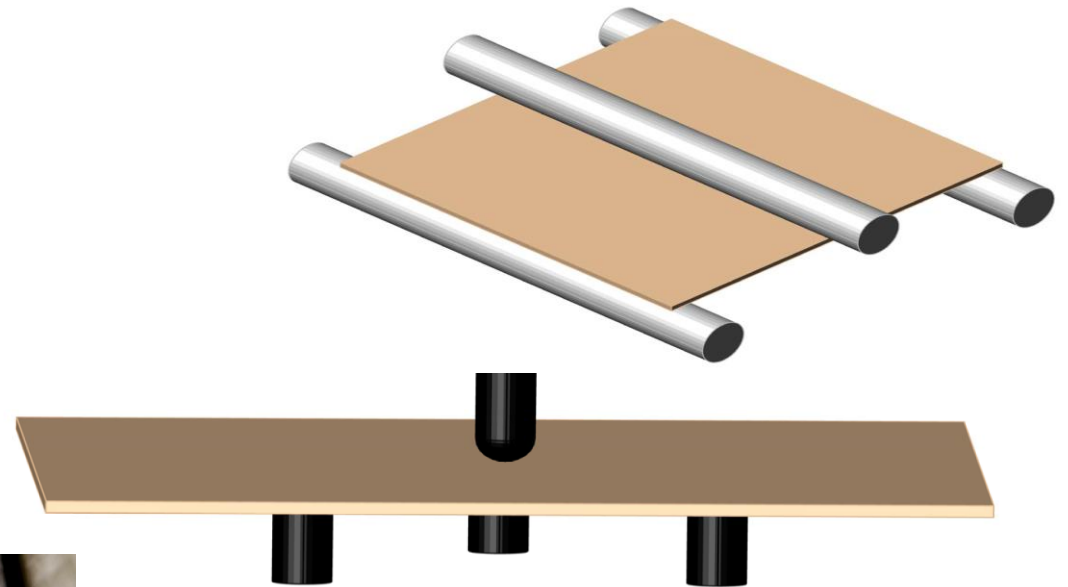
# System Testing with Robinson Floor Testing

- The most important and studied area, other countries may be following suit
- Subjects the test system to increasingly rigorous loading
- Checking lippage throughout testing and how/if it affects performance
- Could determine thin tile lippage allowances



# Two Tests for Breaking Strength

- Better idea of average values of products currently in the marketplace
- Reinforcing results in two breaks
  - initial crack
  - final break



# Impact Resistance Testing

## Falling Ball Method

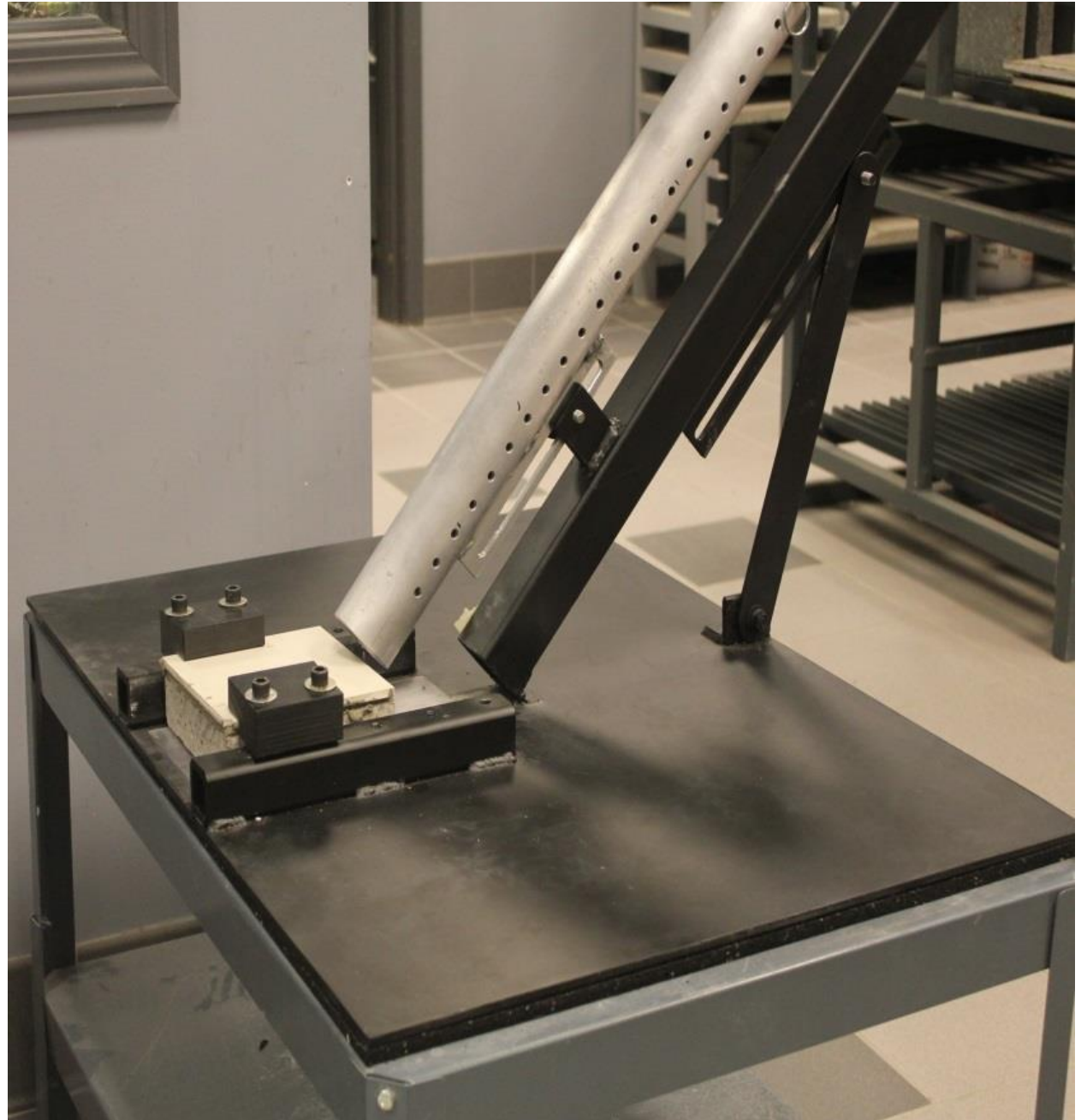
Metal ball dropped once onto tile bonded to block



# Impact Resistance Testing

## Rolling Ball Method

Ball rolls into the edge of  
a tile bonded to block



# Damage from Impact

- Correlating impact testing with Robinson performance
- Edge appears to be especially relevant



# Recommendations and Requirements to Expect

- Very specific mortar and grout recommendations
- Draft product standards
  - Heavy or extra heavy rating
- What do we know today?



# SCIENCE

---

# FOCUS ON WATER ABSORPTION

# Water Absorption Test Methods

## ASTM C373 (boil)



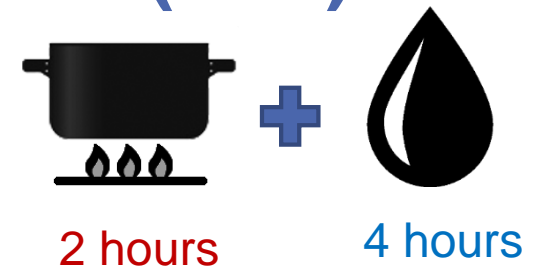
- Stringent
- Most time needed

## ISO 10545-3 (vacuum)



- Stringent
- Quickest test
- Not used as basis for classification

## ISO 10545-3 (boil)



- Less stringent
- Quicker than ASTM C373

**0.85-1.25%**

**0.5%**



## Boil Methods:

Simple equipment, complex protocols

- accuracy to 1/100<sup>th</sup> of a gram
- clean deionized water every run
- precise boil and soak cycles
- desiccants used during cooling to avoid trapping ambient moisture
- longer boil = more saturation



## Vacuum Method:

Similar to boil methods but faster due to use of vacuum

Current ISO vacuum test uses effectively highest reasonably achievable vacuum, so greatest saturation achievable with vacuum

**Why make a federal case out of it?**

# Revisions to Tariff System Codes

Federal crime to import under wrong code when new codes take effect

All imported tile will be classified according to its water absorption in 2017



# Revisions to Tariff System Codes

- 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

# WCO Described the New Codes As Somewhat Inelegant...

6907.21.10		Unglazed	.....	10%
	05	Tiles, whether or not rectangular, the largest surface area of which is capable of being enclosed in a square the side of which is less than 7 cm .....		
		Other:		
	11	Tiles, the largest surface area of which is capable of being enclosed in a square the side of which is 30 cm or less ..		
	51	Other .....		
		Glazed:		
		The largest surface area of which is capable of being enclosed in a square the side of which is less than 7 cm:		
6907.21.20	00	Having not over 3229 tiles per square meter, most of which have faces bounded entirely by straight lines .....		
				10%



# EDUCATION AND ADVOCACY

---

# Activities

- Market updates and quarterly consumption reports
  - Abbreviated info regularly made available on [www.tcnatile.com](http://www.tcnatile.com)
- Writing/publishing
- Provide materials to TCNA members to use
- Testimony in Washington, D.C.
  - Congressional hearings
  - Office of the U.S. Trade Representative, International Trade Commission
  - World Customs Organization
  - OSHA
  - EPA

# Topics and Issues

- Import/export, free trade, fair trade
- IP theft
- COF
- True porcelain
- OSHA silica
- Contractor and installer certifications
- Standards, changes to standards
- Benefits of ceramic tile, recent emphasis on sustainability

# COF Resources at [www.TCNAtile.com](http://www.TCNAtile.com)

- ANSI and Handbook language
- FAQ-style Technical Bulletin
- PSA-style 1-page bulletin
- Articles by TCNA and others explaining the change in methodology and requirements and related issues, such as liability

**TCNA ALERT**  
**COEFFICIENT OF FRICTION (COF)**  
**STANDARD FOR CERAMIC TILE**


**DON'T SLIP UP**  
**WHEN IT COMES TO SAFETY!**

Update your tile specs with new COF requirements including the following: 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 now 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 floors, it's important to know about recent changes to the coefficient of friction (COF) requirements in the ANSI standard. Project plans and specifications, maintenance programs, etc., referencing a minimum COF of 0.6 per ASTM C1028 (the old COF test method) do not meet the new requirements of the standard, which went into effect late in 2012.

To meet the new DCOF AcuTest criteria, you cannot use old 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 has been withdrawn, effective February 1, 2014.



**tcna technical bulletin** | 2013

Don't slip up when it comes to safety!  
For the full text of the COF standard  
and additional information, visit  
[www.tcnatile.com](http://www.tcnatile.com)

2014 TCNA | Tile Initiative | 1

**tcna technical bulletin** | 2013


coefficient of friction and  
the DCOF AcuTest

# Water Absorption/Porcelain Tile Resources at [www.TCNAtile.com](http://www.TCNAtile.com)

Bulletin included in the TCNA Tile Initiative, a free download available at [www.TCNAtile.com](http://www.TCNAtile.com)!

- Falsely-labeled porcelain
- Certified porcelain

**TCNA BULLETIN**  
**WHAT IS TRUE PORCELAIN?**



*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.*

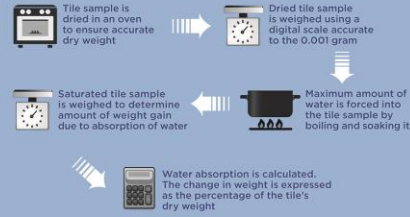
Tile Council is a partner in the Porcelain Tile Certification Agency (PTCA), a non-profit consumer protection group that combats falsely-labeled non-porcelain tiles through its certification and labeling program for manufacturers and sellers of genuine porcelain tile. For a list of certified porcelain product lines and more information, visit [www.ptcaonline.org](http://www.ptcaonline.org).

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 2300°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.

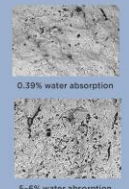
The difference between real and false porcelain cannot be detected by eye — the only way to know is to have a laboratory verify the tile's water absorption is 0.5% or less. Through our lab, Tile Council has identified more than one hundred falsely-labeled "porcelain" tiles with a water absorption well 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 more than 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 forced into the deepest pores of the tile. 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.



**TILE POROSITY MAGNIFIED 200X**  
Photos courtesy of TCNA Laboratory



0.39% water absorption

5-6% water absorption

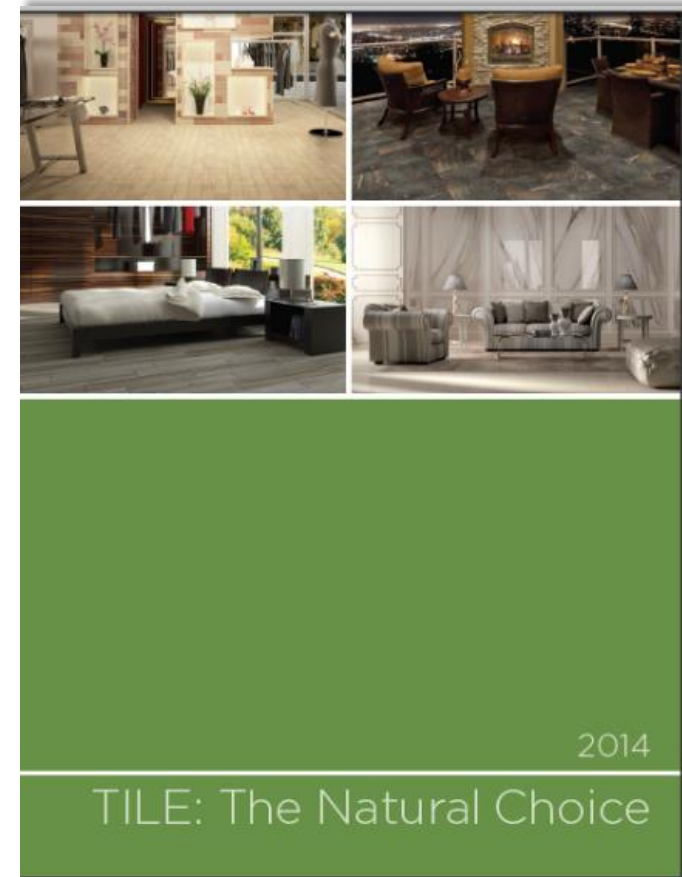
# Sustainability Resources at [www.TCNAtile.com](http://www.TCNAtile.com)

## Guide to LEED v4 and tile

- 10-page guide, organized by LEED credit category
- included in the TCNA Tile Initiative, a free download at [www.TCNAtile.com](http://www.TCNAtile.com)!

## Tile: The Natural Choice

- Brochure includes at-a-glance chart of credits and points available for using tile in various green building rating systems!



EDUCATION  
AND ADVOCACY

---

CONTRACTOR & INSTALLER  
QUALIFICATIONS

# It all boils down to this:

- Tile is a largely unregulated trade—easy entry
- Marginal installations and bad installations hurt the whole industry
  - Lost man hours
  - Negative perception of tile/negative experience
- Product standards result in quality products, but they have to be assembled

# Simple Goals and Strategies to Combat Marginal Installations and Bad Installations

- Inform the tile consuming public

Key message: identify qualified candidates... then compare prices

- Choosing Your Tile Contractor

- ACT Certification Guide



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.

# Simple Goals and Strategies to Combat Marginal Installations and Bad Installations

- Assist the organizations that develop and administer programs that enable one to identify the qualified companies and individuals
  - Curriculum assistance
  - Fundraising: over \$100K per year
  - Support A&D awareness efforts
  
- One more Handbook change...

# ACT Program Information Added

- Description of the Advanced Certifications for Tile Installers (ACT)
- ACT is an evaluation and certification program for tile installers in advanced, specific skills areas:
  - large format tile installation and substrate preparation
  - mudwork for walls
  - mudwork for floors
  - shower pan installation
  - membrane applications



# Sample Spec Language for Requiring Qualified Labor

- Ready-to-use spec language provided to require:
  - NTCA 5-Star Contractor or TCAA Trowel of Excellence Contractor
  - CTEF Certified Tile Installers, Journeyman Tile Setters, or Act Certified Tile Setters
  - IMI Certified Foreman
  - Equivalent



# Sample Spec Language for Requiring Qualified Labor

- Making boilerplate spec language available at [www.tcna.com](http://www.tcna.com)

Because...

“a home or any building today is one of the few things still made entirely ‘by hand’ and every aspect of a tile installation relies on the tile contracting company and its installers. How good the finished installation looks, how well it performs, and how long it lasts are in their hands...

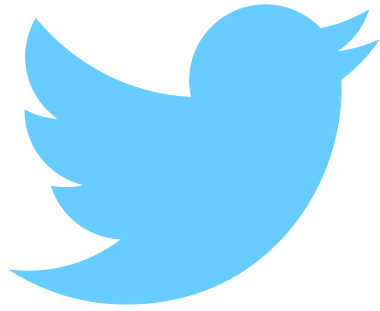
# 2014 CTEF Sponsors

- American Olean
- Bexel
- Bostik
- CertainTeed
- COVERINGS (CTDA, TCNA, NTCA, Tile of Spain and Ceramics of Italy)
- Custom
- Crossville
- Daltile
- Florida Tile
- Florim
- Georgia Pacific
- Interstyle
- James Hardie
- Joe Lundgren Consulting
- Laticrete
- Mapei
- Marazzi
- Metropolitan Ceramics
- MLT
- National Gypsum
- Noble
- ProSpec
- Schluter
- SGM
- StonePeak
- TEC
- Tex-Rite
- USG
- Wedi

# The Takeaways ...

- Despite the vagaries of the tile market, growth is steady on many fronts:
  - Standardization – international and domestic
  - Sustainability
  - Research
  - Trade and regulations
  - Methods and best practices

# Thank You!



Follow @TileCouncil

To receive email notifications  
from TCNA, send an email to  
[rshiflet@tcnatile.com](mailto:rshiflet@tcnatile.com)

