CERAMIC TILE IN THE COMMERCIAL ENVIRONMENT

Sponsored by

The Flooring Contractors Association

Presented by: Daniel Grant, CTI, CIM

THE EVOLUTION OF CERAMICS

5th Century

12th Century

17th Century

For thousands of years ceramics
have served as a decorative, as well as practical,
floor and wall finish.

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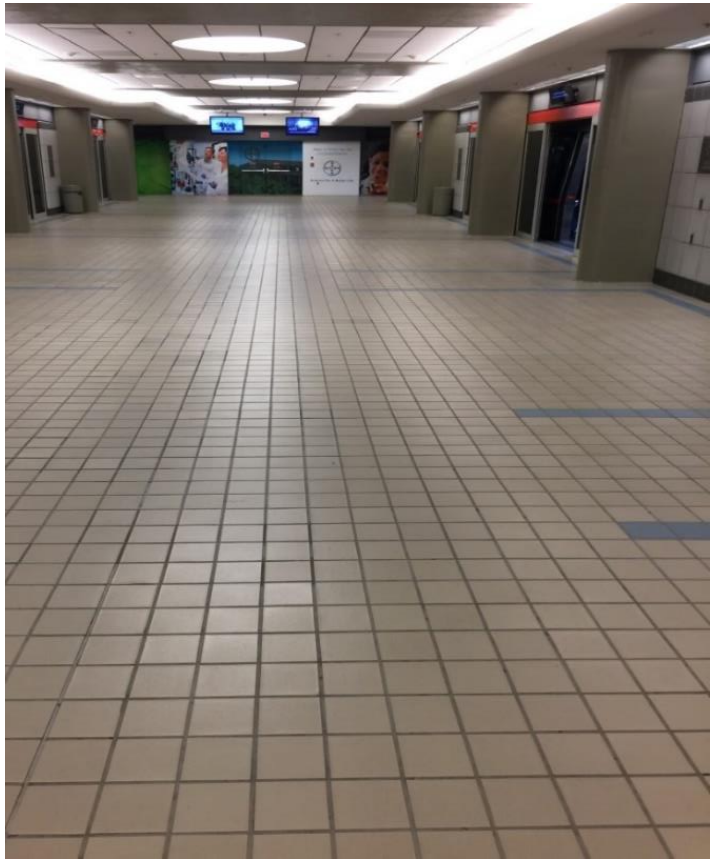
THE EVOLUTION OF CERAMICS

- During the US industrial revolution, tile became increasingly relevant in commercial construction for its durable nature and ease of hygienic cleaning



THE EVOLUTION OF CERAMICS

THE DEVELOPMENT OF TILE PRESS, INK JET PRINTING AND HIGH-VOLUME MANUFACTURING PROCESSES LED TO A BLAZING INCREASE OF TILE USAGE USE IN CONSTRUCTION.

THE TILE **PRESS AND KILN** DRYING TECHNOLOGY CREATED A MUCH HARDER, DURABLE AND CONSISTENT FINISHED MATERIAL.

THE EVOLUTION OF CERAMICS

Increased Tile Size

Large Format Tile:
Tile with any edge greater than 15”

Common sizes:

- 18” x 18”
- 12” x 24”
- 24” x 24”
- 6” x 24”
- 6” x 36”

Notes:

- The most specified and installed tiling products
- For use interior and exterior, floor and wall, residentially and commercially
- Substrate Requirement: **1/8” in 10’**
- Typically have considerable warpage
- Require higher performance, modified mortar selection

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THE EVOLUTION OF CERAMICS

Gauged Tile Panels

Gauged: Indicates Specific Thickness

Tile Panel: Tile Greater than 1 Square Meter

Some facial dimensions exceed 5’ x 12’

ANSI A 108.19

126in x 59in.*
(3.2m x 1.5m)

144in. x 49in.*
(3.6m x 1.2m)

RECOMMENDED EQUIPMENT FOR GAUGED PANEL TILES

- Specialty Handling Tools
- Collapsible Notch Trowels
- Bedding Floats
- Lippage Tuning Devices
- Specialty Cutters
- Vibrating Sander

KEYS TO A SUCCESSFUL INSTALLATION

- Qualified Labor
- Using your resources
- Having the necessary tools
- Follow ANSI Standard
- Use the proper products

TYPES OF SUBSTRATES

- In the growing Tile and Stone industry, products are being installed over many different types of substrates

- Proper knowledge on **<u>suitable</u>** and **unsuitable** substrates to receive a tile or stone installation can be the difference between success… and failure!

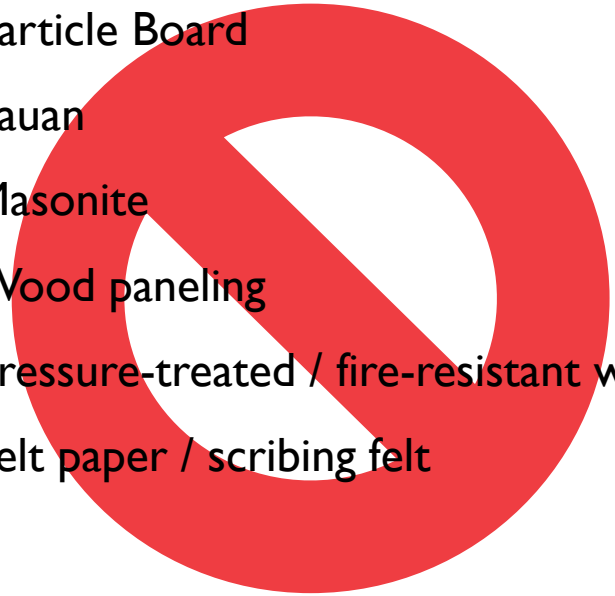
TYPES OF SUBSTRATES

Suitable

- Concrete and Masonry Surfaces
- Wood – Exterior plywood/OSB
- Metal – Ships
- Existing Tile
- Drywall
- Cementitious backer boards
- Engineered Leveling and Patching Compounds

Not Suitable

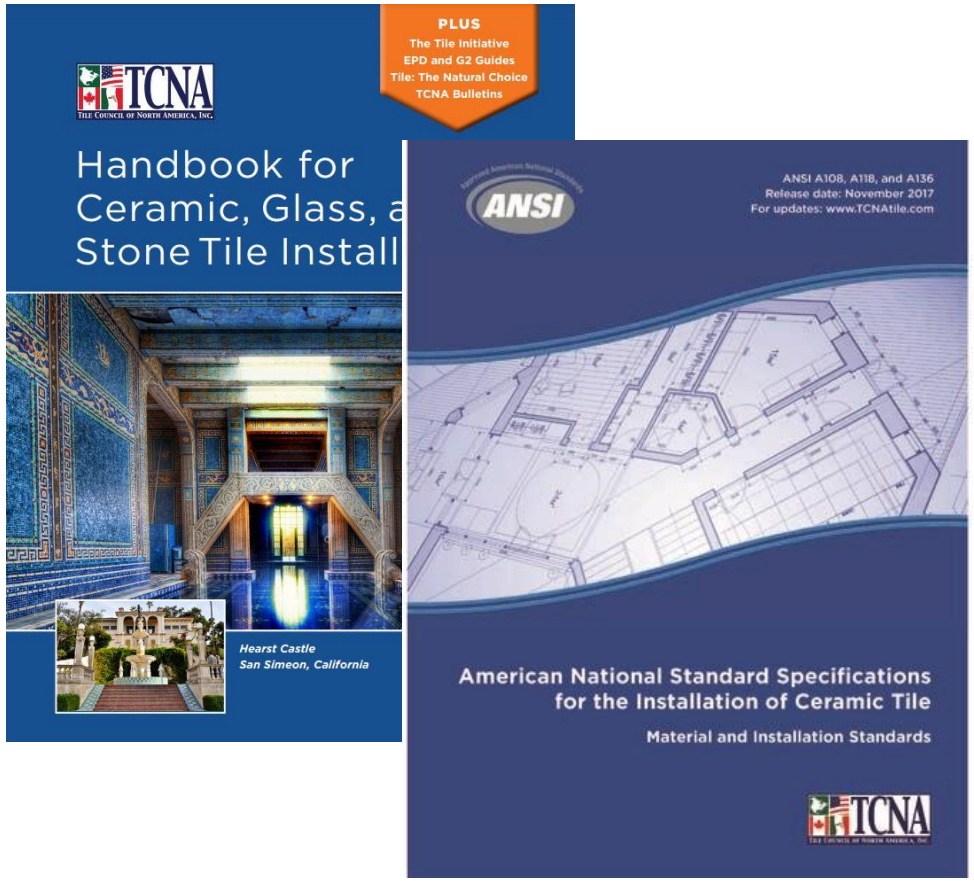
- Particle Board
- Lauan
- Masonite
- Wood paneling
- Pressure-treated / fire-resistant wood
- Felt paper / scribing felt



SUBSTRATE PREPARATION

Substrates must be clean, structurally sound, and solidly bonded. Excess deflection must be corrected, and the resulting **substrate must be free of contaminations and excessive movement!**

SUBSTRATE PREPARATION



Know the Industry's guidelines and recommendations for properly preparing substrates for tile and stone installations

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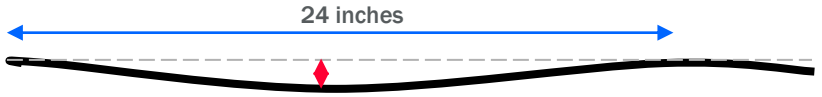
SUBSTRATE TOLERANCES FOR THIN BED METHODS

- For tiles with all edges less than 15” in facial dimension - 1/4” in 10’; 1/16” in 12”
- For **Large Format and Gauged Porcelain Tiles and Panels** – 1/8” in 10’; 1/16” in 24”

1/8“ – Maximum variation in 10 feet



1/16“ – Maximum variation in 24“

SUBSTRATE PREPARATION CONCRETE

- Must be structurally sound
- Remove superficial contamination via standard cleaning
- Remove any bond breaking contaminants via **mechanical cleaning**

SUBSTRATE PREPARATION CONCRETE WITH ADHESIVE

- The adhesive must be on a concrete substrate
- The adhesive must be scraped down to a well bonded thin layer or residue
- The adhesive must **NOT** be water soluble

  Water soluble adhesive must be completely mechanically removed

- Follow manufacturer instructions

ALWAYS REMOVE

- ✓ Release Agents – Tilt Wall
- ✓ Paint
- ✓ Drywall Mud
- ✓ Sweeping Compounds
- ✓ Oil / Grease
- ✓ Asphalt / Tar

CONCRETE CONTAMINATION

- Sweeping compounds are commonly wax or petroleum based.

- Their use can leave a bond breaking residue on the surface of the concrete.

SUBSTRATE PREPARATION
GYPSUM

Distressed Gypsum subfloor

- Must be solid
- Remove any weak top layer and superficial contamination
- **Prime according to manufacturer reccommendations**

SUBSTRATE PREPARATION
GYPSUM

This would **not** be considered structurally sound !!!

SUBSTRATE PREPARATION
WOOD

- Make sure plywood or OSB equivalent is structurally sound and solid, as well as installed according to code:
- ¾ “ T&G and exterior rated
- Sand clean as necessary
- Follow manufacturer recommendations for installation of leveling and patch materials

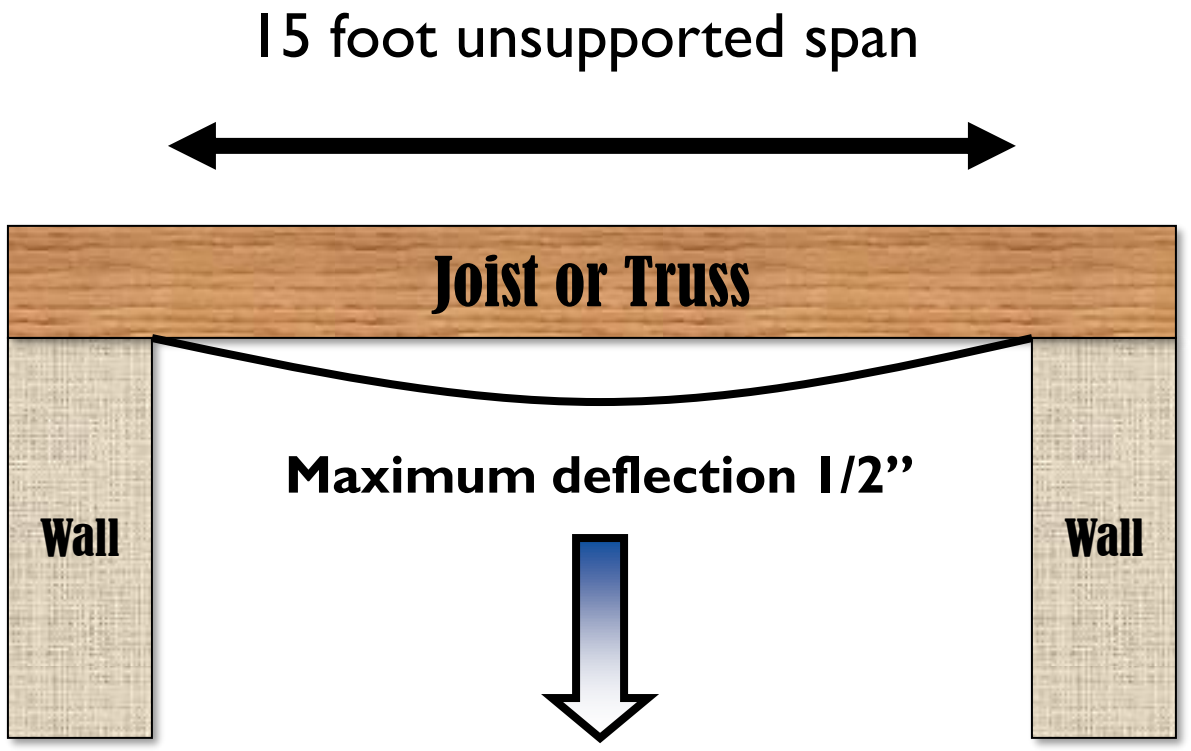
SUBSTRATE PREPARATION
WOOD

BE CAREFUL…
Some wood subfloor materials contain, or are coated with, wax or resins and may refuse adhesive bond

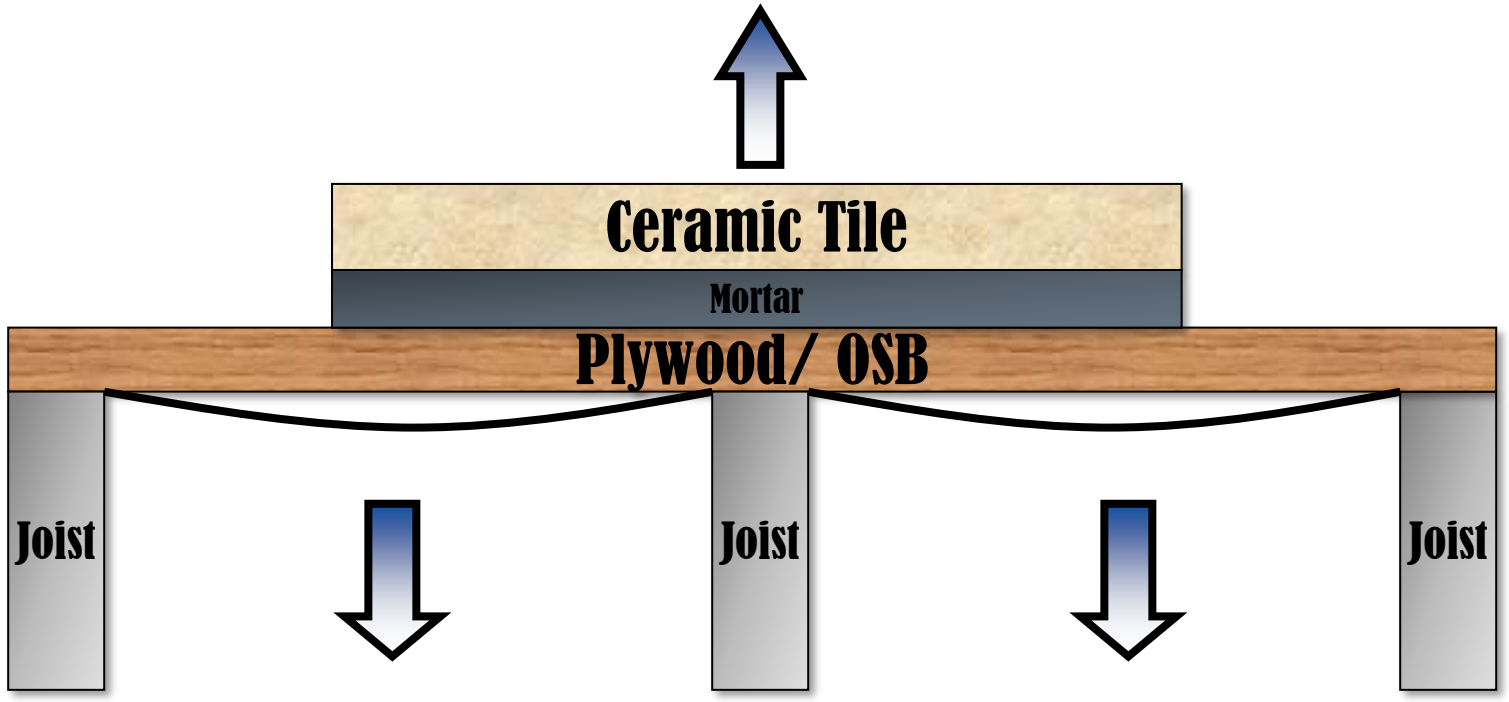
SUBSTRATE PREPARATION
WOOD

WOOD DEFLECTION

- L/360 is a proportion
- A 180 inch (15 ft.) span shall not deflect more than a ½ inch



WOOD DEFLECTION



Stress from deflection on the underlayment, mortar, and tile

can cause failure!

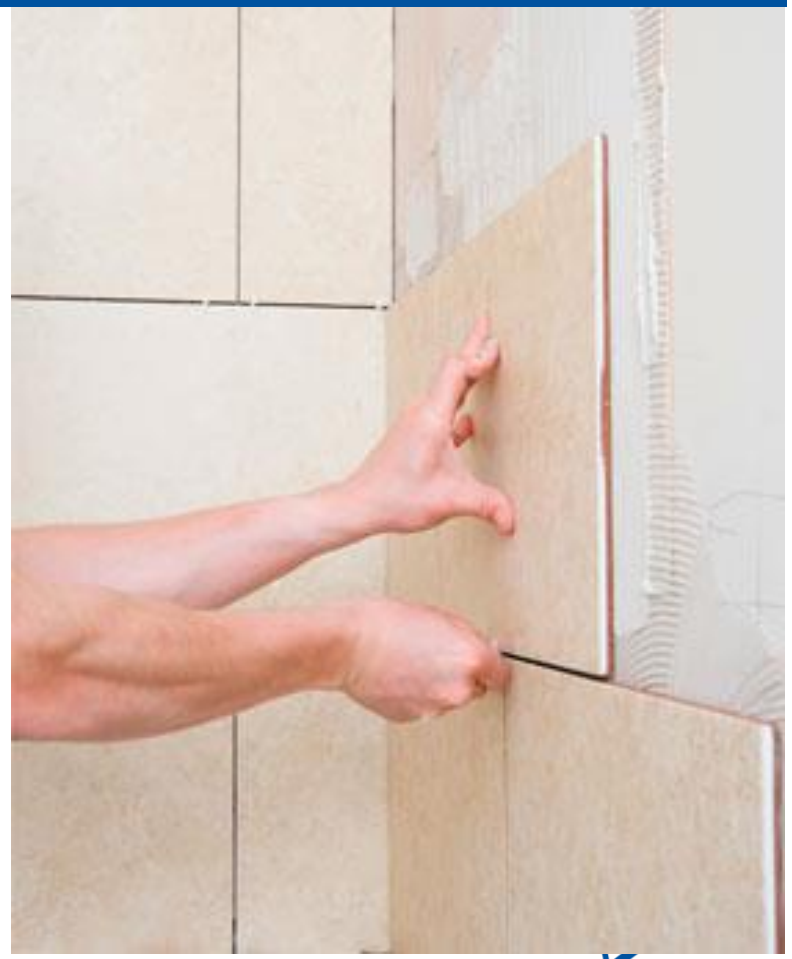
WOOD DEFLECTION

Where does the failure occur?

- Cohesive strength of ceramics - too high to fail
- Adhesive strength of mortar to tile min. 300psi per A118.4
- Cohesive strength of mortar - ≥ adhesive strength
- Adhesive strength mortar to plywood - 150psi min per A118.11
- Cohesive strength of plywood min. 300psi per APA

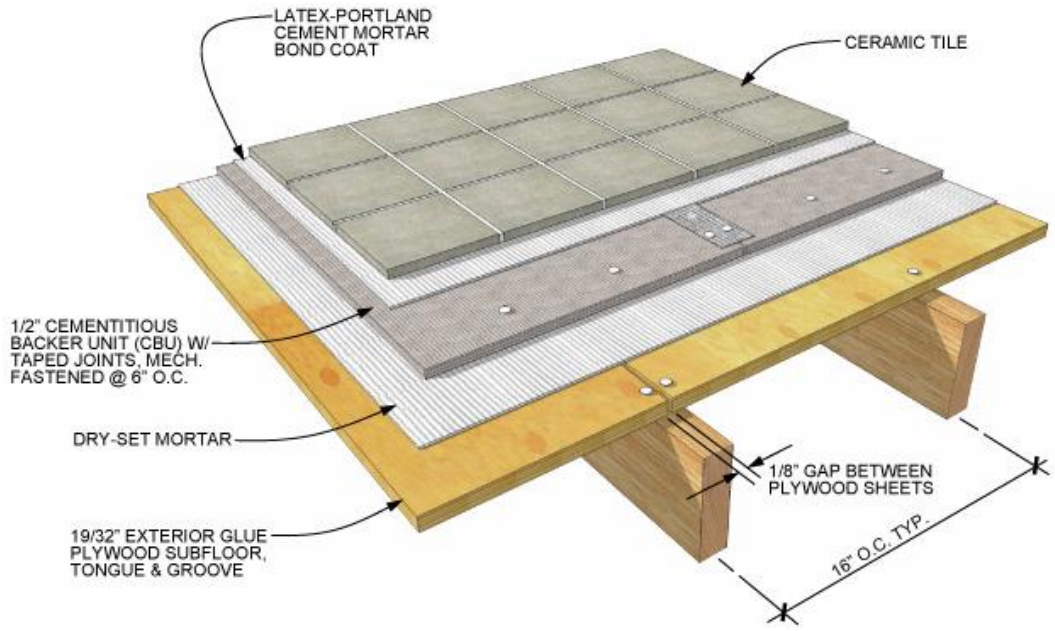
SUBSTRATE PREP
DRYWALL

- Should be clean and solidly installed
- Should not have a coating of paint on it
- Use caution when using drywall in wet areas!



SUBSTRATE PREP
CEMENT BACKER BOARDS

Follow manufacturer's proper installation instructions



FLOOR TILE OVER CBU ON WOOD SUBFLOOR
DETAIL 06.130.0101 REV. 08/31/09

International Masonry Institute
team MASONRY DETAILING SERIES
800-IMI-0988 www.imiweb.org

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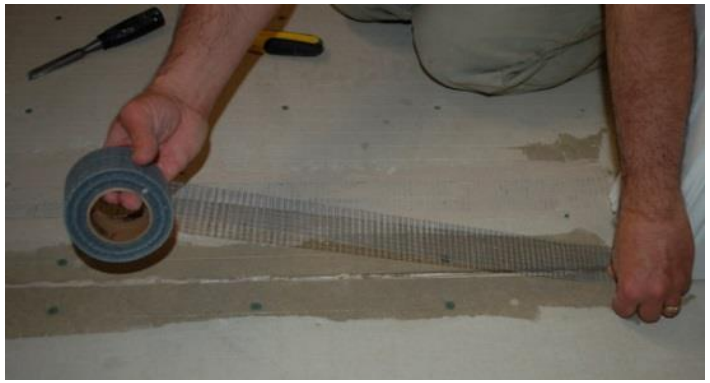
SUBSTRATE PREP
CEMENT BACKER BOARDS



- Thinset installed underneath

  (Allow thinset to dry before working on the cement boards)

- Fastened accordingly

- Joints taped

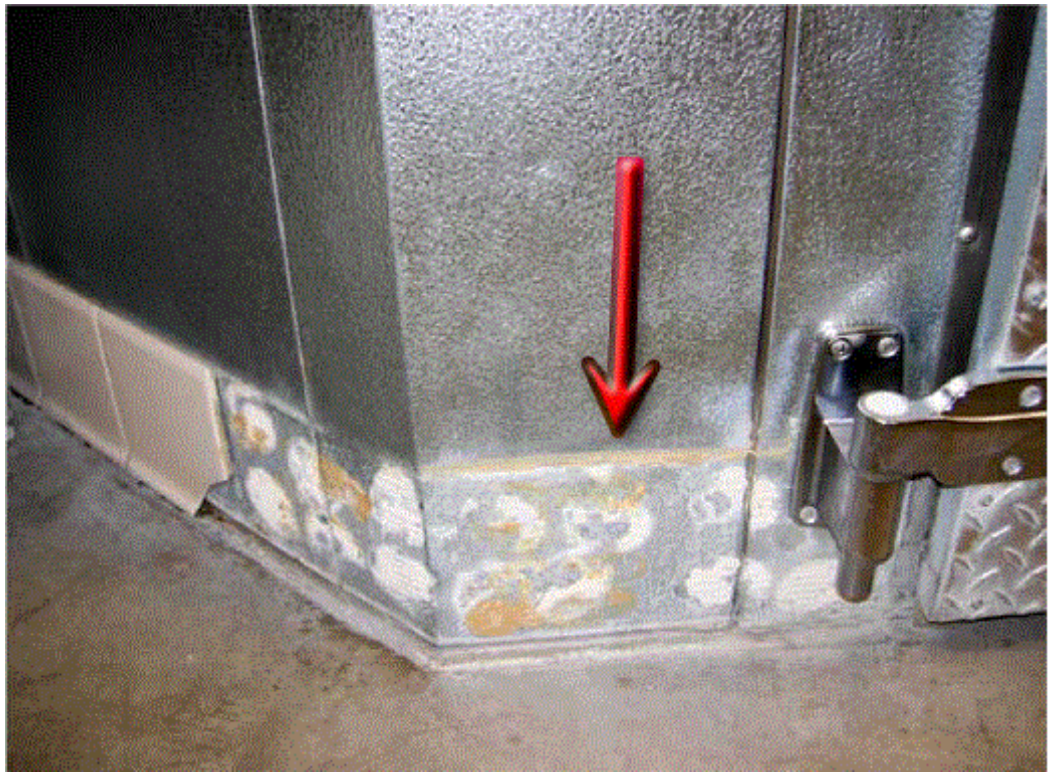
SUBSTRATE PREP
CEMENT BACKER BOARDS

- Minimum ½” on vertical applications
- Securely fastened
- No flex or deflection
- Joints taped

SUBSTRATE PREP
EXISTING TILE

- Ensure Tile is solid and well bonded
- Remove any sealers or coatings
- Possible requirement for primer or bonding agent
- Ensure proper mortar selection

SUBSTRATE PREP
METAL



- Clean and abrade the metal
- Follow manufacturer's recommendations for an anti-corrosive coating and/or primer
- Use epoxy setting material or bonding agent with an appropriate modified thin-set

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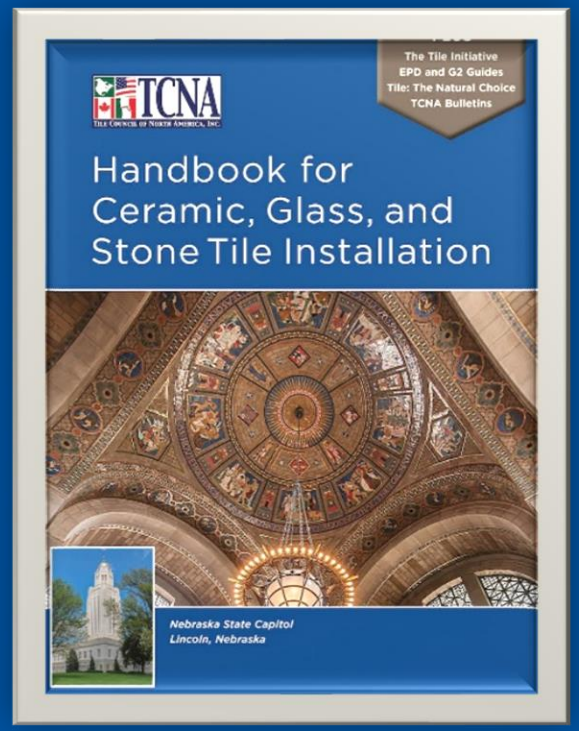
SUBSTRATE PREP
DEALING WITH CRACKS AND JOINTS

SUBSTRATE PREP
CRACKS AND JOINTS

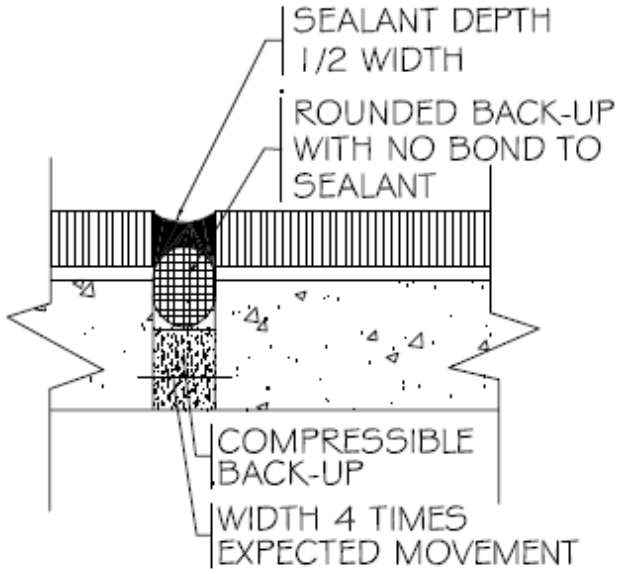
Moving cracks and joints should be honored up through the tile installation

- ✓ Expansion
- ✓ Construction
- ✓ Isolation

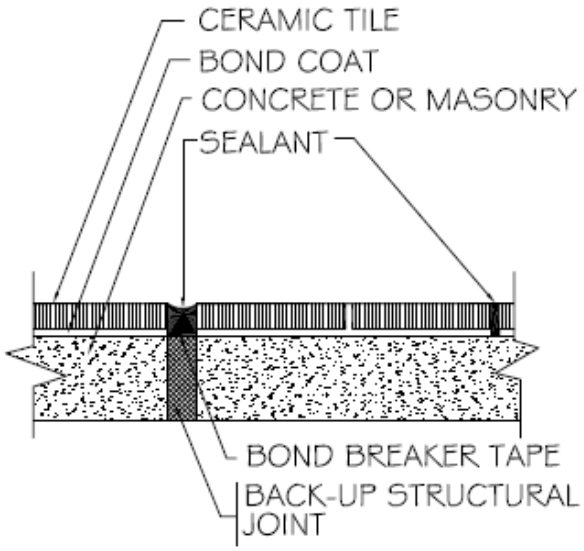
SUBSTRATE PREP CRACKS AND JOINTS



Expansion Joint

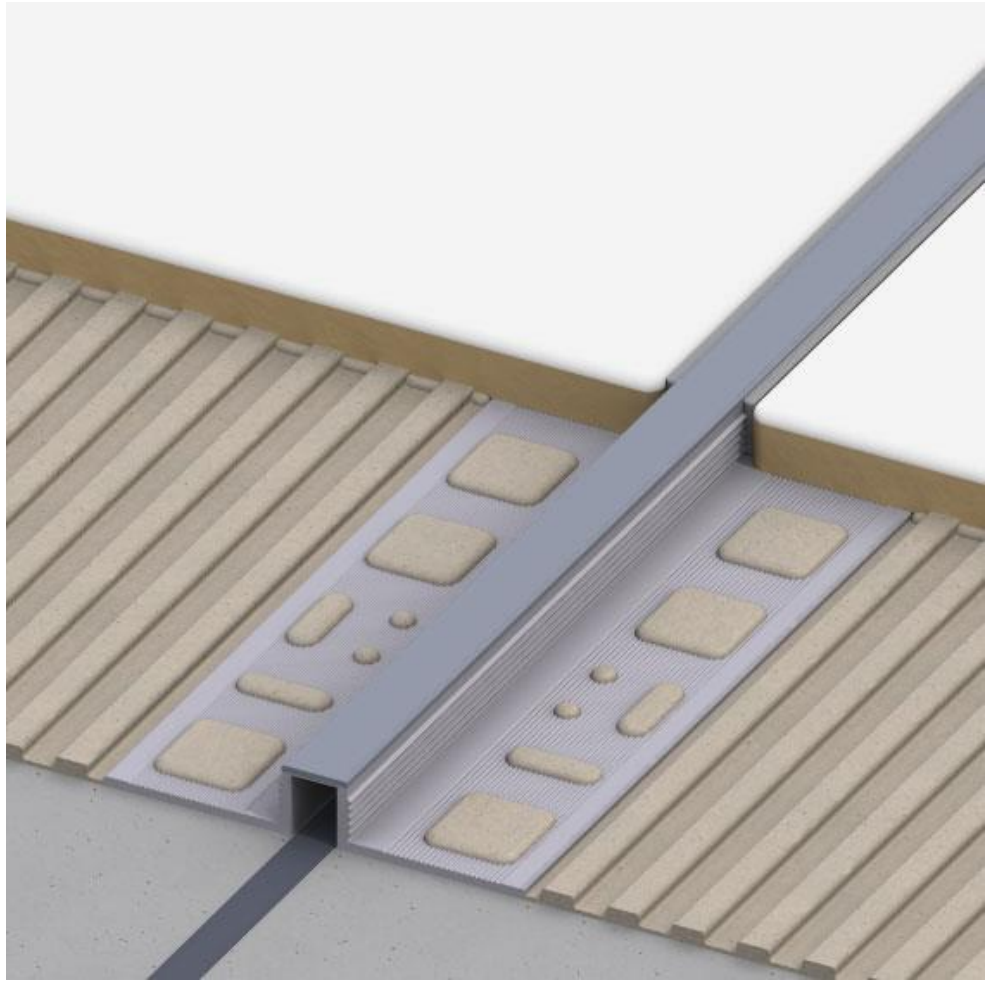


Isolation/Expansion Joint



SUBSTRATE PREP CRACKS AND JOINTS

- There are many options and designs to help honor moving cracks and joints through installations
- Joints through tile work directly over structural or moving joints must never be narrower than the structural joint itself



SUBSTRATE PREP
CRACKS AND JOINTS

Bridging Cracks:

Use of anti-fracture membrane to help absorb and minimize transfer of possible movement

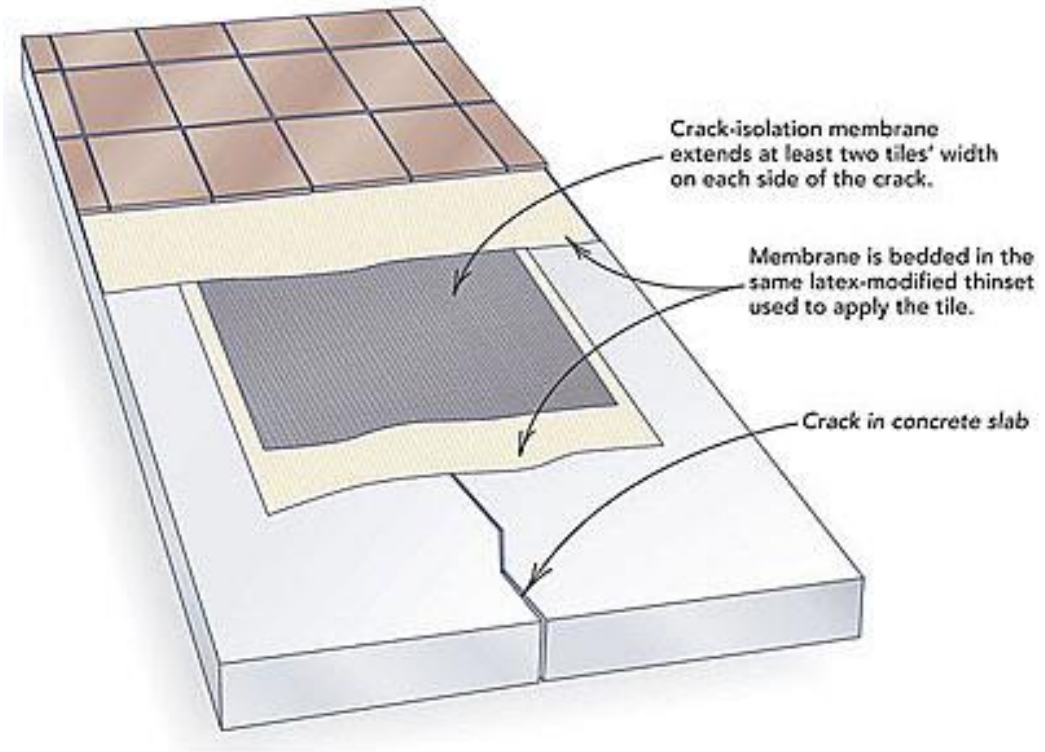
SUBSTRATE PREP
CRACKS AND JOINTS

Bridging Cracks:

- Use of anti-fracture membrane to help absorb and minimize transfer of possible movement

- Membrane must extend at least one and a half times the width of the tile on each side of the crack.

  (Total width is 3 times the width of the tile)



SUBSTRATE PREP

SUBSTRATE PREP
TROWEL GRADE PRODUCTS

- Ideal for use to prepare joints in wood subfloors prior to the installation of self leveling materials

SUBSTRATE PREP
TROWEL GRADE PRODUCTS

- Smoothing and ramping mortars
- Ideal for use to slope to drains and sloping balconies

SUBSTRATE PREP
MUD BEDS / SCREEDS

- Available options include bonded, unbonded, floating screeds
- Ideal for showers, pools and other wet areas
- Can be used with in floor heat systems

SUBSTRATE PREP
SELF LEVELING UNDERLAYMENT

- The application of self-leveling and trowel grade underlayment products are not structural repair
- The materials are surface repair products that prepare the substrate for the installation of finish flooring
- **The substrate must be structurally sound!**

SUBSTRATE PREP
SELF LEVELING UNDERLAYMENT

- **Self-leveling underlayments:** Polymer-modified cements with high flow characteristics
- **Primers:** Acrylic, epoxy and single component; most “SLUs” will require substrate priming
- **Options:** Many SLUs for approved wood substrates, metal substrates and concrete

-Be sure to confirm with manufacturer technical data information


Do You need Flat & Smooth… or Level?


Ideal for flattening/smoothing large or small areas

SELF LEVELING PUMPING OPTIONS

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Self-Leveling vs. Trowel Grade Patch

SUBSTRATE PREP
SELF LEVELING UNDERLAYMENT

Self-Leveling can help save time and money by speeding up installation and minimizing effort and repairs due to undulating and uneven surfaces

*Priming is required for Self Levelers

THINSET MORTARS

THINSET MORTAR SELECTION CONSIDERATIONS

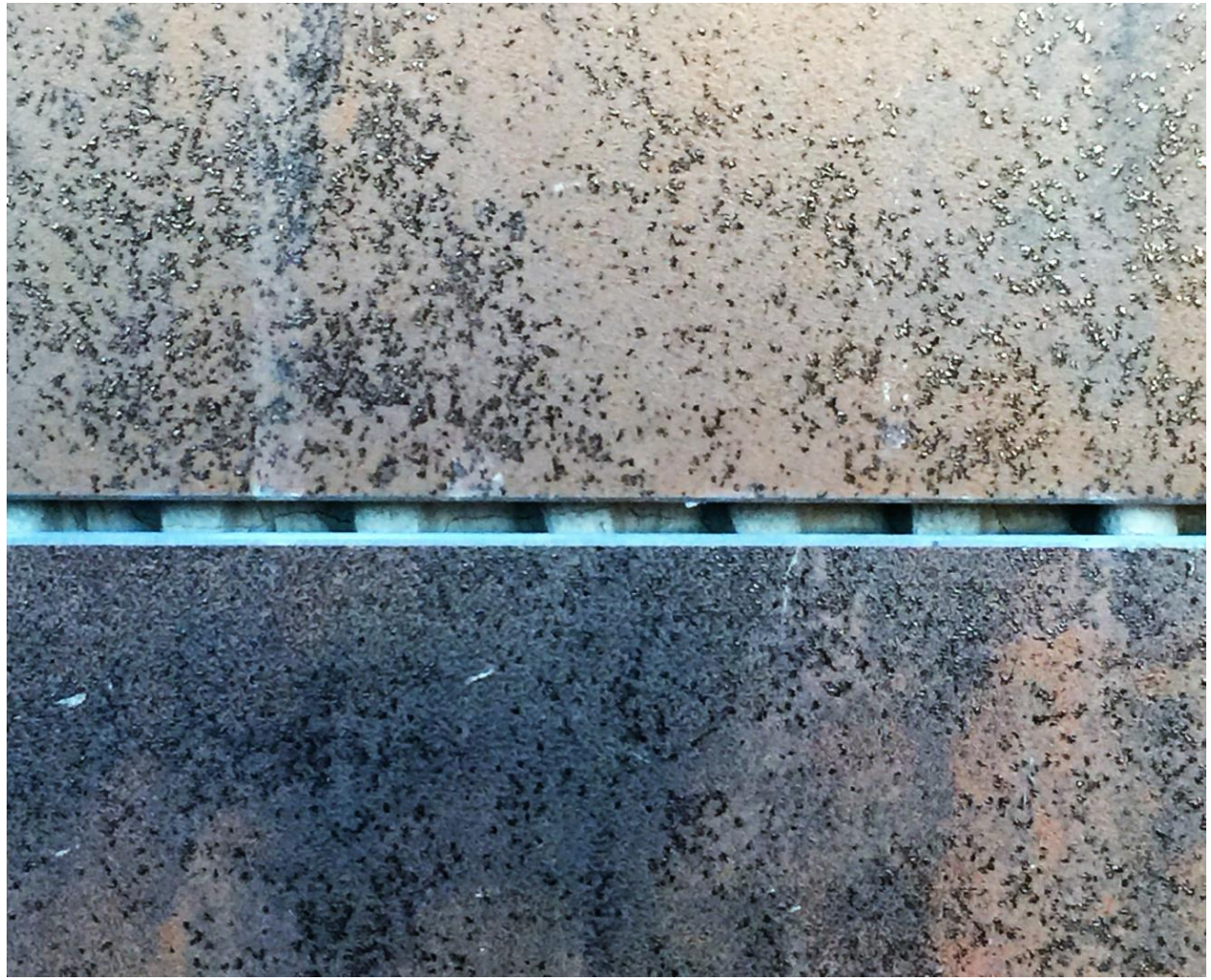
- Substrate
- Tile Size
- Tile Material
- Interior/Exterior
- Time Constraints

- Proper Mixing
- Open Time
- Pot Life
- Adjustment Time
- Sag Resistance
- Thixotropic

INSTALLATION FINISHES

Cement Grout, Epoxy Grout,

or Elastomeric Sealant



FINISH CONSIDERATIONS

What type of product should be used:

- Cement Grout
- Epoxy Grout
- Elastomeric Sealant

Expansion joints

- Interior, expansion joints must be installed no more than 25 lineal feet
- Exterior, expansion joints must be installed every 8-12 lineal feet
- Leave expansion at all change of plane area

Tile spacing is required

- Always check with tile manufacturer for recommended grout joint width


What could go Wrong?

SELF LEVELING COMPOUND INSTALLED OVER THICK LAYER OF WEAK ADHESIVE

OVERWATERED
WEAKENED
UNDERLAYMENT

SPOT BONDED TILE IS NEVER ACCEPTABLE

FINAL CONSIDERATIONS

- ✓ Substrate prep is key to all tile and stone installation success!
- ✓ There's always a "right way" solution.
  - ▪
- ✓ Stay in tune with industry trends and best practices.
- ✓ Be aware of the inherent challenges.
- ✓ Use your resources…
  - ▪ Industry guidelines, manufacturer technical services, supply partners, etc.

Don't be that installer!

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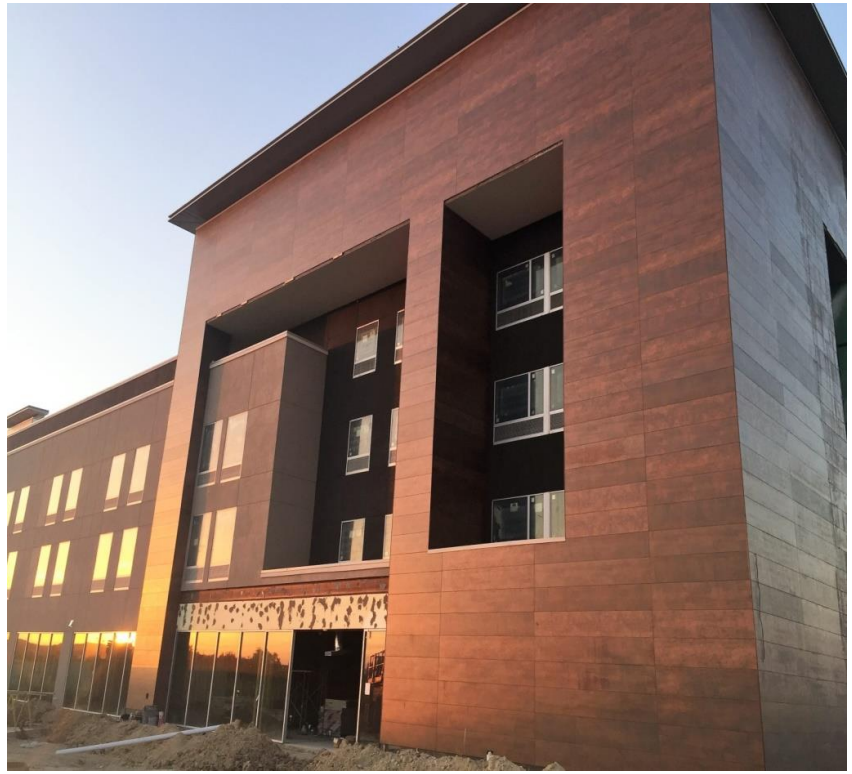
Ceramic Tile In the commercial environment

BE DISCIPLINED… DO IT RIGHT *EVERY TIME!*

CERAMIC TILE IN THE COMMERCIAL ENVIRONMENT



Thank you!

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