

2024 TCNA Handbook & Industry Standards



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Performance-Driven Installation Systems and Support



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Certifications

- Ceramic Tile Institute Of America (CTIOA)
 - Certified Tile Consultant (CTC)
- Construction Specifiers Institute (CSI)
 - Construction Documents Technologist (CDT)
 - Certified Construction Product Representative (CCPR)
- US Green Building Council
 - LEED Green Associate

Learning Objectives

We will review factors that affect tile installation requirements and safety including:

How proper substrate installation

How proper floor risks

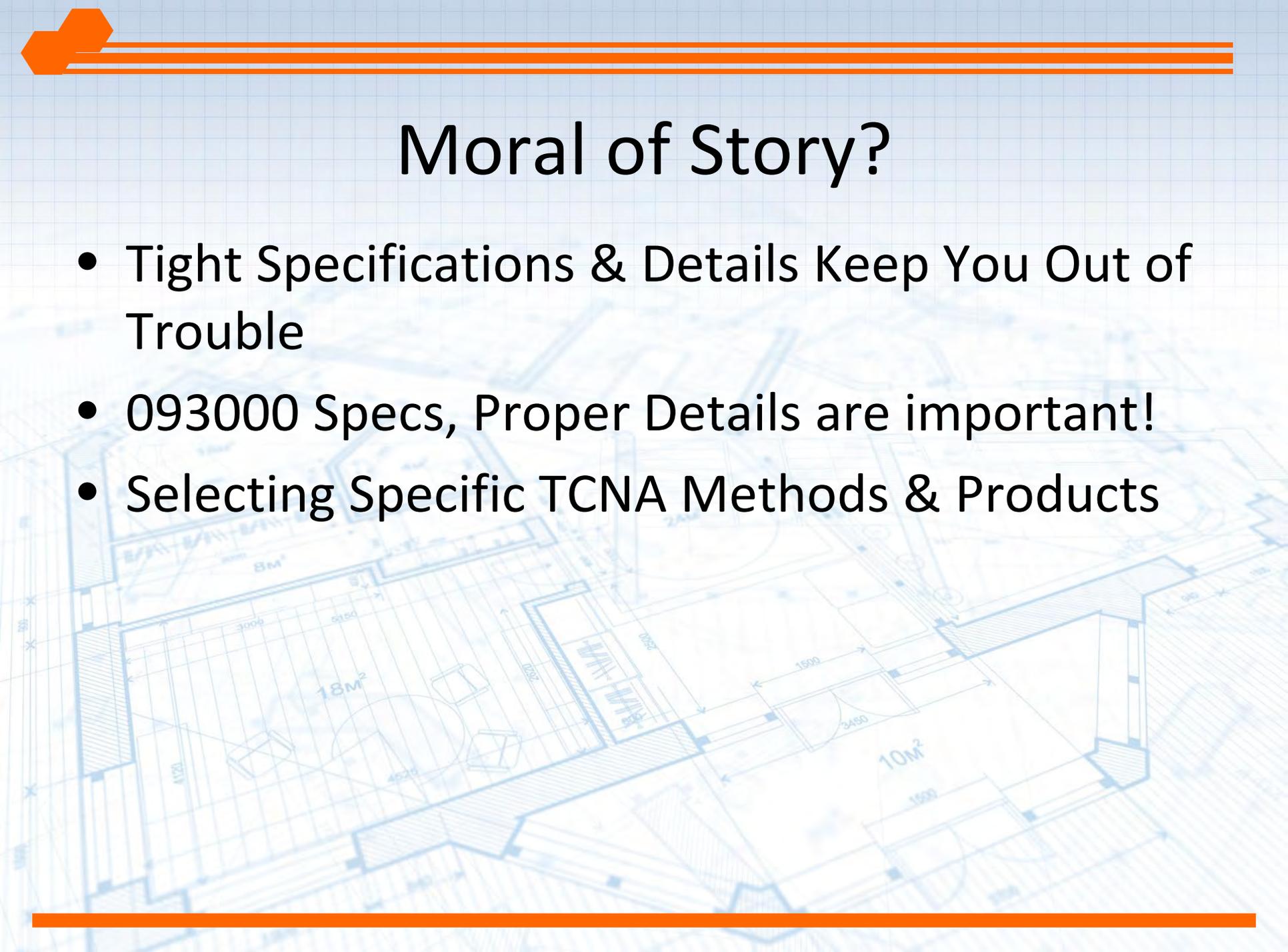
How product selection
Friiction

Difference Between





Moral of Story?

- Tight Specifications & Details Keep You Out of Trouble
 - 093000 Specs, Proper Details are important!
 - Selecting Specific TCNA Methods & Products
- 

Actual 093000 Project Spec

What Do You Want Bid?

2.5 SETTING MATERIALS

A. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

C. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3, that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."]

D. Chemical-Resistant Furan Mortar: ANSI A118.5, with [carbon] <Insert material> filler.

Setting Materials

- k. TEC, a subsidiary of H. B. Fuller Company.
 - 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Boiardi Products; a QEP company.
 - b. Bonsal American; an Oldcastle company.
 - c. Bostik, Inc.
 - d. C-Cure.
 - e. Custom Building Products.
 - f. Jamo Inc.
 - g. Laticrete International, Inc.
 - h. MAPEI Corporation.
 - i. Mer-Kote Products, Inc.
 - j. Southern Grouts & Mortars, Inc.
 - k. Summitville Tiles, Inc.
 - l. TEC; a subsidiary of H. B. Fuller Company.
 - 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

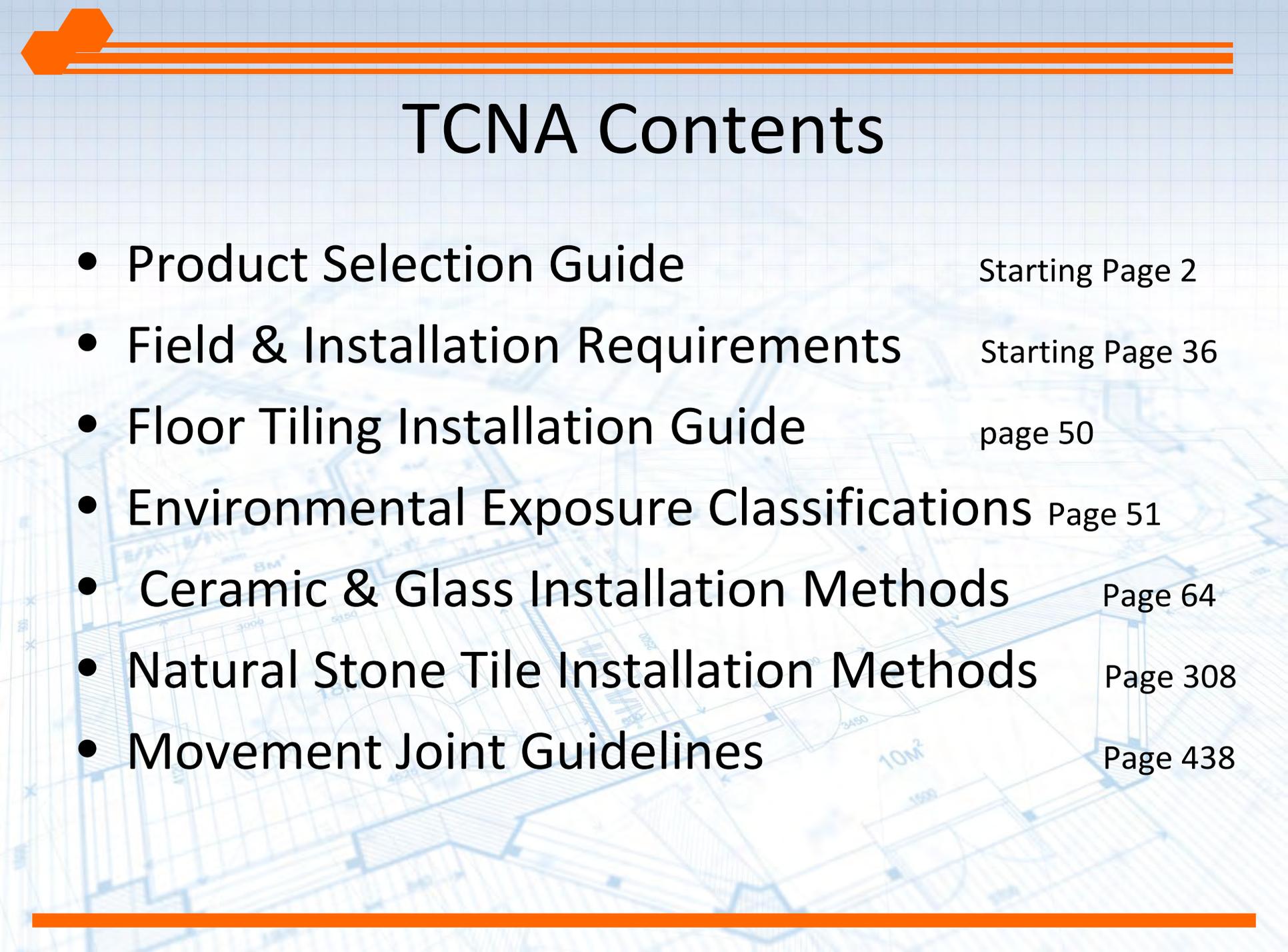


Using the TCNA Handbook pg 55

- Specifications Must Clearly indicate which, if any, Membrane is to be used.
 - If using membrane is optional, the contractor is not required to install a membrane unless clearly specified to do so!
 - When more than one material is listed, the specification must clearly indicate which material is desired.
 - If not indicated Contractor may choose any listed material option
- 

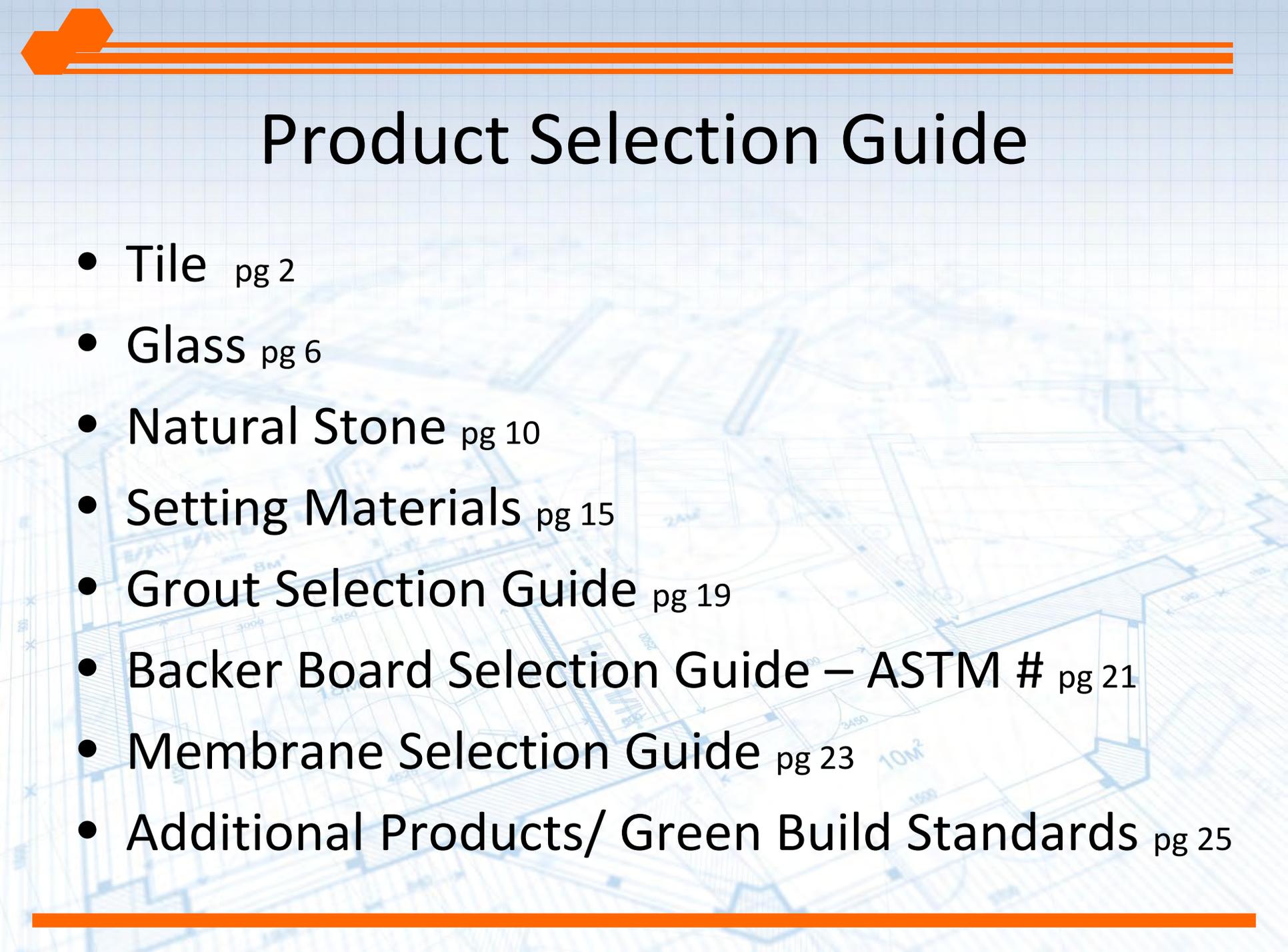


TCNA Contents

- Product Selection Guide Starting Page 2
 - Field & Installation Requirements Starting Page 36
 - Floor Tiling Installation Guide page 50
 - Environmental Exposure Classifications Page 51
 - Ceramic & Glass Installation Methods Page 64
 - Natural Stone Tile Installation Methods Page 308
 - Movement Joint Guidelines Page 438
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Product Selection Guide

- Tile pg 2
 - Glass pg 6
 - Natural Stone pg 10
 - Setting Materials pg 15
 - Grout Selection Guide pg 19
 - Backer Board Selection Guide – ASTM # pg 21
 - Membrane Selection Guide pg 23
 - Additional Products/ Green Build Standards pg 25
- 
- 

Substrate Requirements

Deflection page 36

Maximum Allowable Deflection for Floor Systems and Substrates

Floor systems, whether wood framed or concrete, over which the tile will be installed using the appropriate TCNA method, according to the "Floor Tiling Installation Guide," shall be in conformance with the International Residential Code (IRC) for residential applications, the International Building Code (IBC) for commercial applications, or applicable building codes. For ceramic tile installations maximum allowable floor member live load and concentrated load deflection for framed floor systems shall not exceed $L/360$, where "L" is the clear span length of the supporting member per applicable building code. For natural stone tile installations, maximum allowable



Substrate Requirements page 37

Substrate Tolerances For Thin-Bed Methods

- Project Specifications shall include a specific and separate requirement to bring the substrate into compliance if a thin-bed method is specified but substrate does not meet the flatness requirements.
 - Disparity Between Concrete Flatness Tolerances F-Numbers vs 10-Foot Straightedge.
- 



Substrate Tolerances LFT!

Page 37

- For Large Format Tile (LFT) & Gauged Porcelain Tile / Slabs One Side Greater Than 15" Substrate Tolerances
 - 1/8" in 10' substrate tolerance
 - Thin-Bed Installation 1/16" variation in 24"
 - Larger the tile, the flatter the substrate
- 



Reference Proper Environmental Exposure Classification pg 51

- Using Proper Detail in the correct condition
 - Com1 Commercial Dry
 - Com2 Commercial Limited Water Exposure
 - Com3 Commercial Wet
 - Com4 Com.. High Humidity Heavy Moisture
 - Com5 Com.. High Temperature > 125 F
 - Com 6 Commercial Exterior
 - Com7 Commercial Submerged
-



Mortar Application & Coverage pg 41

- Mortar Coverage Average Contact area for dry areas is 80% and for wet areas is 95%.
 - Mortar Coverage is to be evenly distribute to support edges and corners.
 - Coating the back of the tile, however, does not constitute coverage, which is the area where the mortar makes contact with the tile and the substrate.
- 

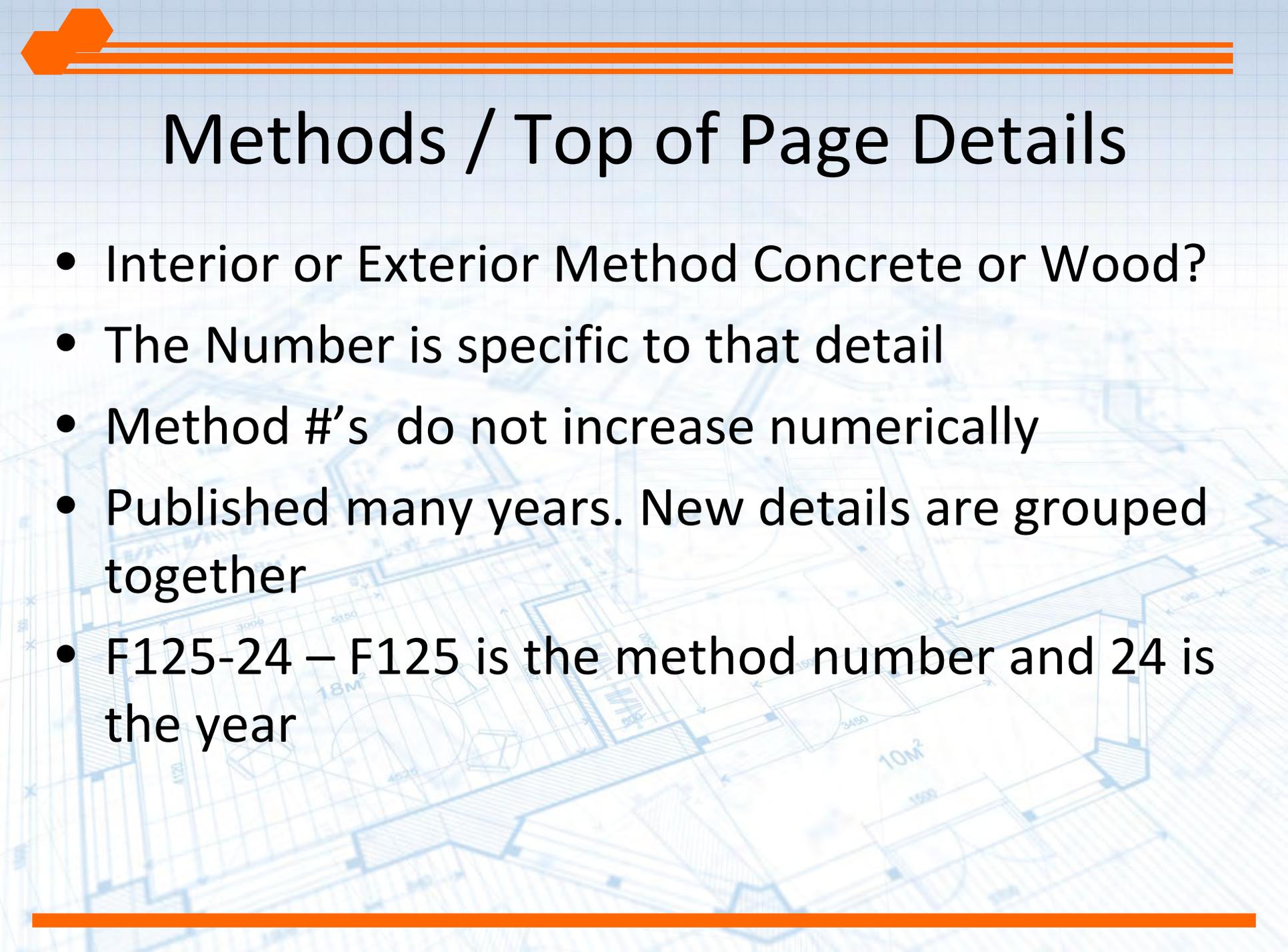


TCNA Details

- F = Floors
 - W = Walls
 - B = Bathtub & Showers
 - TR = Shower Receptor Renovation
 - C = Ceiling, Soffit, Countertop
 - SR = Steam Room / Steam Shower
 - P = Pools, Water Feature
 - S = Stairs
- 

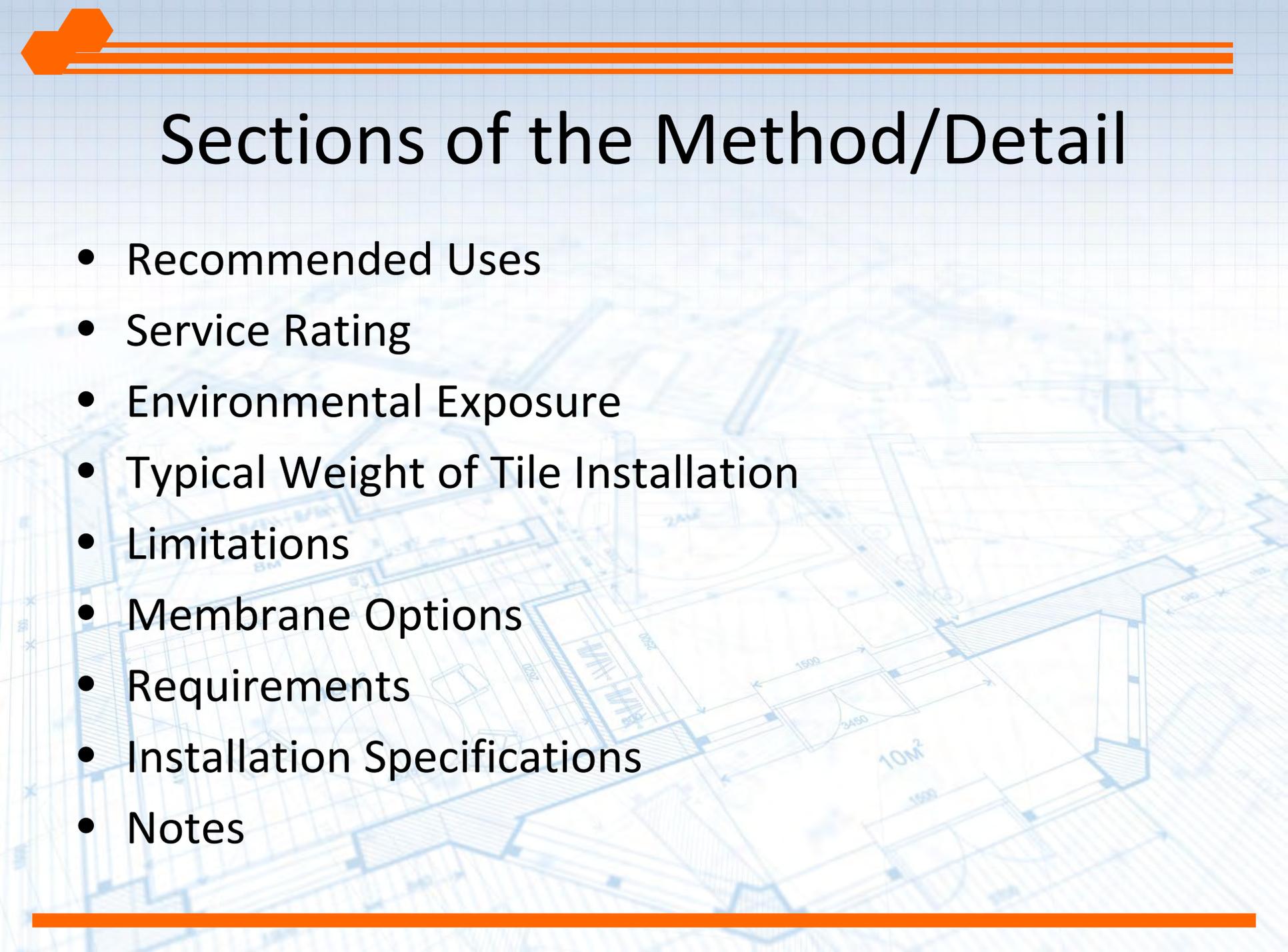


Methods / Top of Page Details

- Interior or Exterior Method Concrete or Wood?
 - The Number is specific to that detail
 - Method #'s do not increase numerically
 - Published many years. New details are grouped together
 - F125-24 – F125 is the method number and 24 is the year
- 



Sections of the Method/Detail

- Recommended Uses
 - Service Rating
 - Environmental Exposure
 - Typical Weight of Tile Installation
 - Limitations
 - Membrane Options
 - Requirements
 - Installation Specifications
 - Notes
- 



Integrated Tile Systems

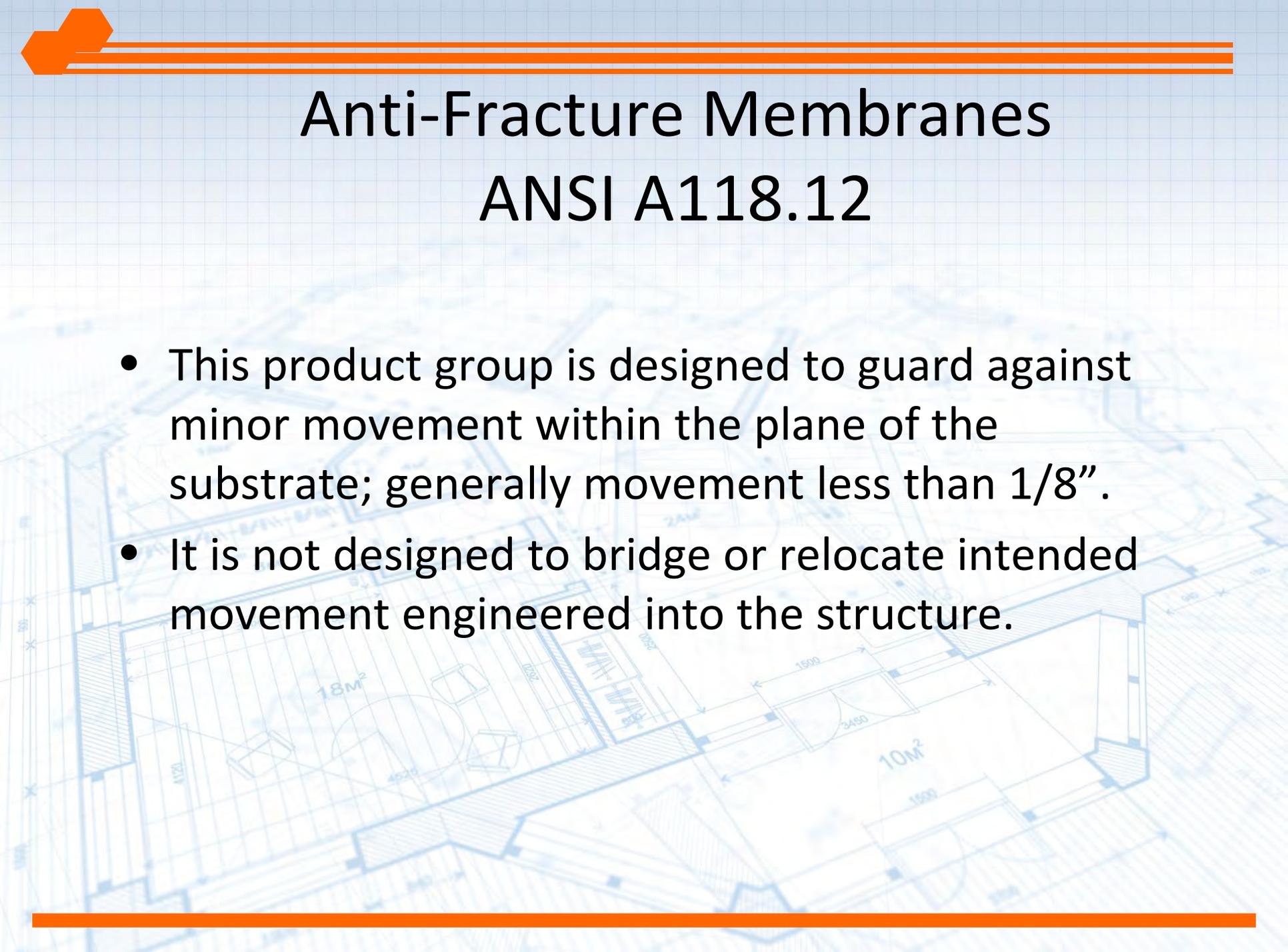
Single Source!

- Self Leveling / Patching Materials
 - Crack Isolation Membranes
 - Sound Attenuation Membranes
 - Waterproofing Membranes
 - Mortars / Thinset / Adhesive
 - Grouts
 - Sealers and Cleaners
- 



Anti-Fracture Membranes

ANSI A118.12

- This product group is designed to guard against minor movement within the plane of the substrate; generally movement less than 1/8".
 - It is not designed to bridge or relocate intended movement engineered into the structure.
- 

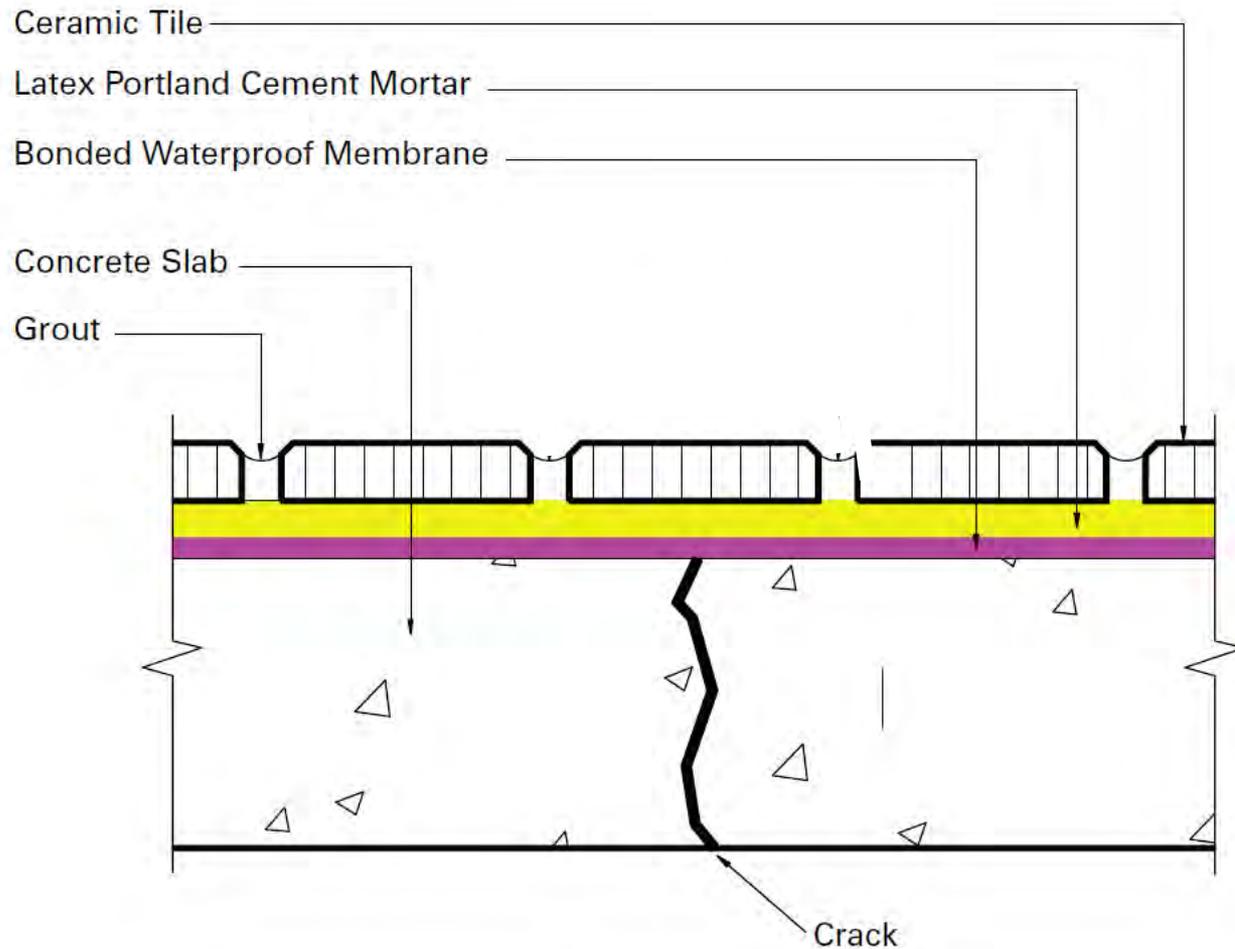
Reflective Cracking of Substrate



Reflective Cracking of Substrate

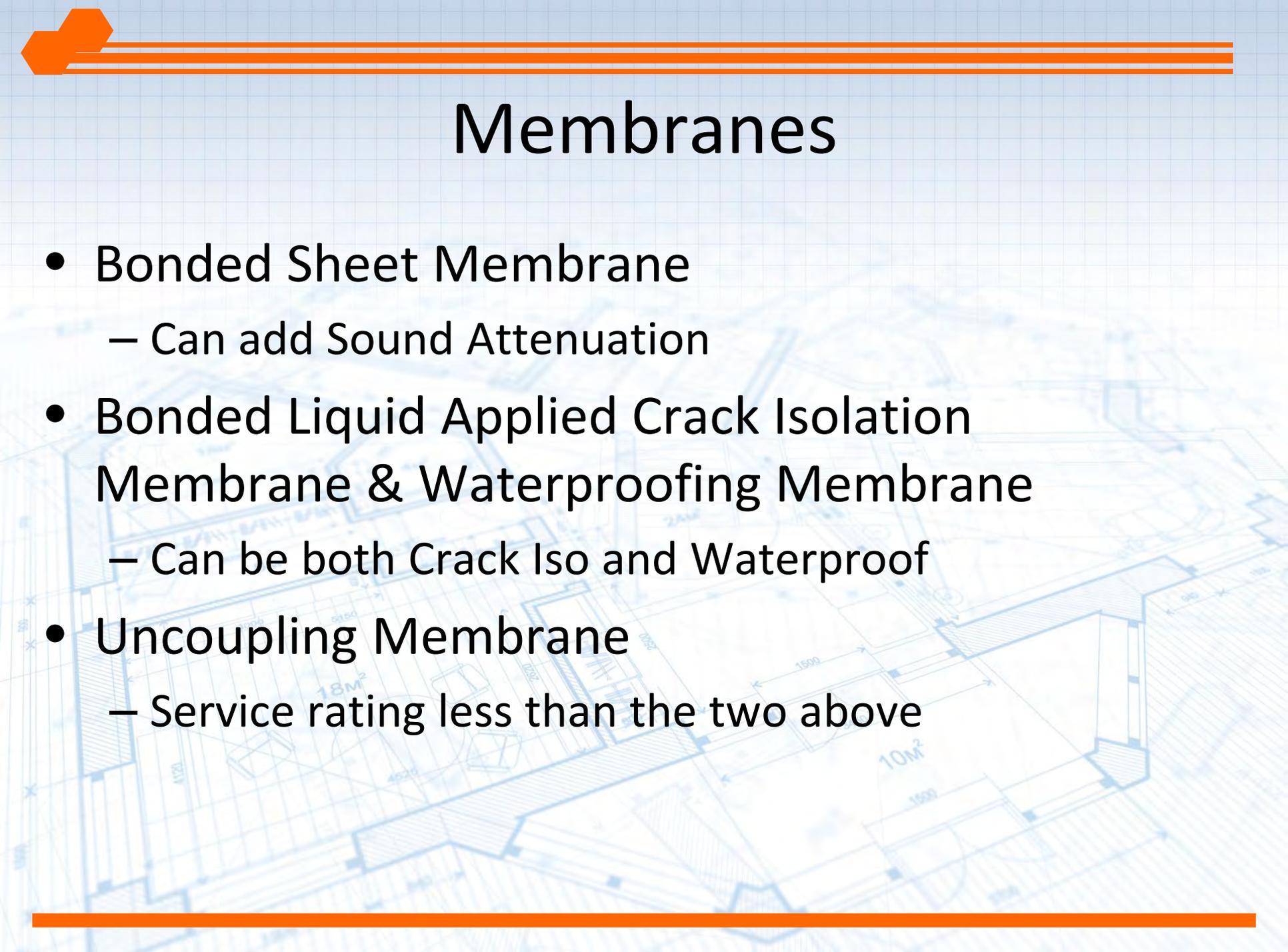


TCNA F125 Crack Isolation Membrane ANSI A118.12





Membranes

- Bonded Sheet Membrane
 - Can add Sound Attenuation
 - Bonded Liquid Applied Crack Isolation Membrane & Waterproofing Membrane
 - Can be both Crack Iso and Waterproof
 - Uncoupling Membrane
 - Service rating less than the two above
- 



Mortar ≠ Mortar Bed

- What is a Thick Bed, Mortar Bed or Thick Set Installation?
 - Traditional method of Installation, a mortar bed (substrate is depressed) wire reinforce, bond or unbonded. **Substrate.**
 - What is Mortar?
 - Mortar / Thinset is a blend of cement, sand and polymers to adhere tile or stone to the substrate with a thin layer / thinset / dryset mortar / drybond mortar. **Adhesive**
- 

ANSI Installation Methods

- Thinset
 - 108.5 Dry-Set Portland Cement Mortar or Latex
- Thick Set / Floating
 - 108.1A Wet-Set
 - 108.1B Cured Bed
 - 108.1C Contr



ANSI Standards Mortars / Thinsets For Shear Bond Strengths





ANSI Mortar / Adhesives Standards you Should Know!

- ANSI A 118.3 Chemical Resistant Tile-Setting Epoxy
 - ANSI A 118.4 Modified Dry-Set Cement Mortar
 - ANSI A 118.15 Improved Modified Dry-Set Cement Mortar
 - ANSI A 136.1 Organic (Mastic) Adhesive for Tile
-

All Materials Expand and Contract



EJ 171 Movement Joint pg438

- The Design Professional or Engineer shall show the specific locations and details of movement joints on project drawings.
- Interior Maximum of 25' in each direction
 - Width not less than $\frac{1}{4}$ " but never less than $\frac{1}{8}$ "
- Exterior 8' to 12' in each direction
 - Width min of $\frac{3}{8}$ " for joints 8' o.c.

Soft Joint / Expansion Joint
Interior - 20' to 25' in each direction
Exterior - 8' to 12' in each direction



OTHER CONSIDERATIONS

Slope to d



Examine Substrate



Comb Mortar Per TCNA Trowel & Error



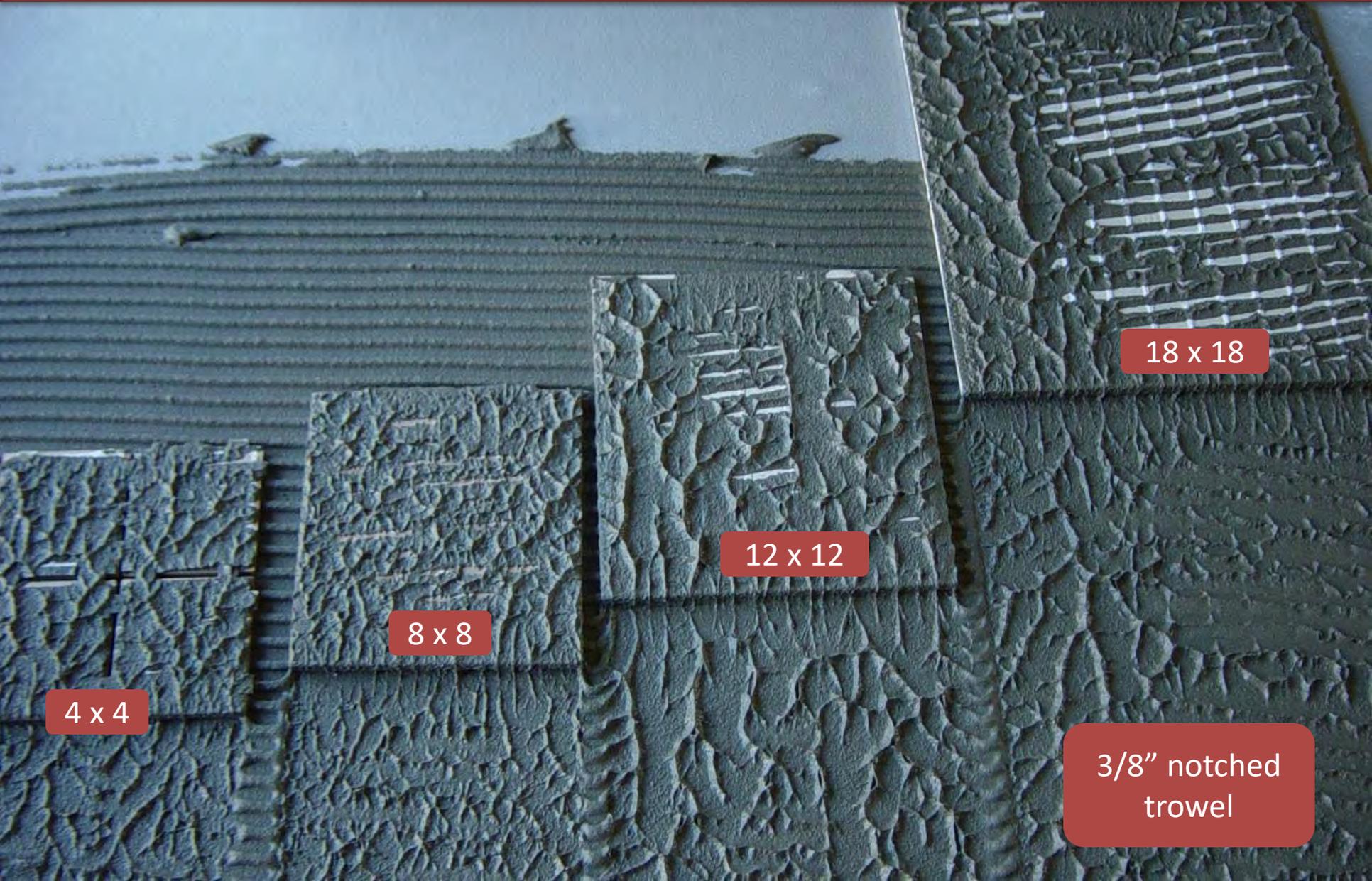
Comb Mortar in Straight Lines



Collapse Ridges 95% Coverage



The Right Mortar



4 x 4

8 x 8

12 x 12

18 x 18

3/8" notched
trowel

Lab Test – Areal Analysis

Percentage of Coverage?





Required Mortar Coverage

- No Voids Exceeding 2"
 - In ANY single square foot under the embedded tile coverage will be minimum 85%
 - Coverage Sufficiently distributed especially at corners and edges
 - Partially collapsed trowel ridges with dimensions of length & width less than 0.25 inches in Not considered a void
- 

Thank You



**This concludes the American Institute of Architects
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Dale Roberts!