

“UP AGAINST THE WALL”

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Session Description

- This presentation will provide the architect and specification writer with a thorough understanding and framework of knowledge with regard to "best practices" when installing ceramic tile and natural stone over interior wall/vertical surfaces in wet areas.
- A review of substrate preparation and options, waterproofing, movement joints, and lighting considerations will be highlighted. In addition, relevant ANSI, TCNA, and ASTM standards will also be discussed.

Learning Objectives

1. We will explore how the use of improper substrates can contribute to excessive vapor migration, microbial growth, and end-user health concerns.
2. Explore how the use of improper substrates on wall surfaces negates extended life-cycle opportunities which directly impacts sustainability.
3. Identify concerns unique to the installation of ceramic tile & stone on interior wall/vertical surfaces as well as aesthetics.
4. Identify substrate issues and concerns and be able to select the correct substrate for particular projects and design requirements.

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When You Do Not Call Out for Qualified Labor.....



In the Beginning...

The evolution of wall substrates

- Lathe
- Mortar
- Reinforced/Coated
- "Cement Board"
- Foam Board
- Drywall/Greenboard

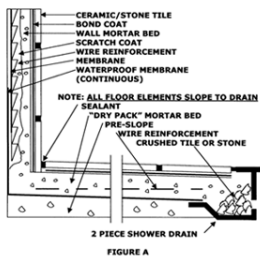
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Lathe



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Mortar



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Mortar



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Mortar – Pros & Cons

“Pros”:

- Can offer most “true substrate”
- Allows installer to address framing issues
- Extremely durable/long-lasting

“Cons”:

- Labor costs can be high
- Skilled “mud” installers can be elusive
- Logistics and “time of installation” are factors

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Coated glass mat water-resistant gypsum backer-board



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Coated glass mat water-resistant gypsum backer-board – “Pros & Cons”

“Pros”:

- No waterproof membrane needed on walls in wet areas
- Greatly reduces vapor migration into wall cavities

“Cons”:

- Any kind of punctures or cuts made to board or along the edge could expose the raw gypsum to water intrusion
- There is a concern amongst some contractors that the gypsum core can still wick moisture

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Cement Board



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Cement Board – “Pros & Cons”

“Pros”:

- Moisture will not affect the performance of this substrate
- Bonding agents will cure faster

“Cons”:

- Moisture, in the form of vapor migration, can invade the stud wall cavity
- More difficult to cut / dustier

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Lightweight Foam Boards



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Lightweight Foam Boards

- There are a variety of manufacturers offering lightweight foam panels for use in wet areas, as a wall substrate for tile and stone
- Local codes can vary with regard to flame spread, smoke, and fire concerns. Make sure the product you are using complies with all codes
- Methods of installation, fasteners, seam waterproofing, and “best practices” vary from product to product...
- Resist the temptation to “co-mingle” products and methods, as you may void warranties

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Lightweight Foam Boards - “Pros & Cons”

“Pros”:

- Lightweight
- Easy to cut / no dust

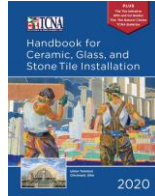
“Cons”:

- Price
- Structural integrity

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Drywall/Greenboard

- Here are the TCNA/NTCA approved details for wet areas:



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Drywall/Greenboard



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Drywall/Greenboard



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Drywall/Greenboard – “Pros & Cons”

“Pros”:

- Less expensive than “mud work”
- Faster to install than a mud installation

“Cons”:

- Poor framing results in uneven substrates
- Excessive “tape & mud” is not acceptable
- NEVER OK TO USE IN WET AREAS

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Drywall/Greenboard



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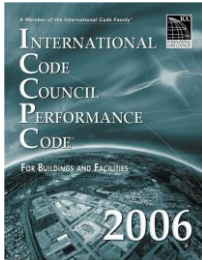
Drywall/Greenboard



*Drywall tape
and mud IS
NOT
approved as
bondable sub-
strate*

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Drywall/Greenboard



USG agrees that drywall/green board **SHOULD NOT** be used in wet areas...

Unanimous code change, "reflects the poor performance of drywall in wet areas....especially in tile/stone tub & showers"

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The argument “for using drywall/greenboard in wet areas”:

“The quality of the membrane and labor will ensure that moisture unfriendly gypsum core will not be compromised by water intrusion”

“It’s less expensive than other substrates”

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The argument against using improper substrates in wet areas:

- The NTCA, TCNA, and ICC do not endorse this practice
- Respected waterproofing consultants do not endorse the practice
- The construction defect industry and attorneys pose a threat through class action and defect litigation

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- The degradation of quality and exposure to legal liability for the sake of....???????

“St. Johns County homeowners accuse major homebuilder of faulty shower construction”

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- The degradation of quality and exposure to legal liability for the sake of....???????

*“We bought a new home because we didn’t want to deal with incessant repairs on an older home. Our new home is nothing but constant repairs...fractured trusses, missing shower membranes, horrible sheetrock walls..... **Why hasn’t a class action lawsuit put this company in the boneyard**”?*

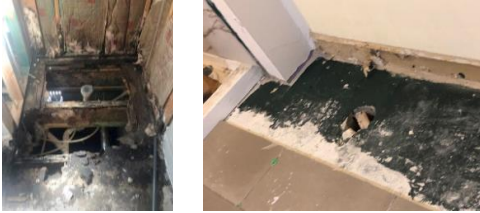
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Waterproofing

- Is waterproofing required?
- Vapor migration performance?
- Is crack isolation important on walls?

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Is waterproofing required?



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Addressing Permeation/Migration



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Addressing Permeation/Migration

- ASTM E96 Procedure E establishes a “steam room” level of performance at .5
- Most liquid membranes and some sheet membranes DO NOT meet this metric of performance
- Many “legacy” WP systems fall short
- Steam room level of performance on wet area walls

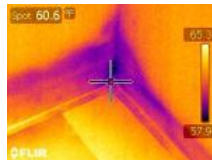
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Addressing Permeation/Migration



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Addressing Permeation/Migration



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Addressing Permeation/Migration



Moisture Vapor Transmission

	Classification / permeation*	Highest perm in classification	Oz of water / hr/ sq. ft	Amount of water / week/ 100 sq. ft	Amount of water / week/ 1000 sq. ft
1	0.1 perm or less	0.1 perm =	0.000228571	3.84 oz	38.4 oz
2	$0.1 \leq 1.0$ perm	1.0 perm =	0.002285714	38.4 oz	384 oz (3 gallons)
3	$1.0 \leq 10.0$	10 perm =	0.022857143	384 oz (3 gallons)	3840 oz (30 gallons)

ASTM E96=0.5
CPE rating: 0.15
PVC rating: 0.40

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Crack Isolation on Wall

- Dissimilar movement between floor plane and wall plane



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Case studies in vertical failure - the *wet area* redefined:

- "Non-traditional" definition of an expanded wet area – STUDENT DORMITORY SHOWERS



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Case studies in vertical failure - the *wet area* redefined:

- “Non-traditional” definition of an expanded wet area –
BACK OF THE HOUSE FOOD PREP WALLS



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Now for something completely different: “wall washing”

- Locate light fixtures at least 24 inches away from the wall; preferably in the center of the room
- Avoid the use of ceramic mosaics and scored tile where wall lighting is necessary
- Requiring smooth, flat wall, or floor surfaces within ANSI standards' tolerances will reduce the shadows

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Wall Washing

- Installing the permanent lights prior to the tile installation will allow the tile installer to make some adjustments during the installation
- A mortar bed installation with the tile installed while the bed is soft will reduce installation shadows, but will not eliminate the shadows produced by the irregularities in the manufactured tile
- Placement and angle of lighting will greatly impact the appearance of the final tile or stone installation

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How deflection on the wall is exacerbated by “wall washing”



“Up Against the Wall”

How deflection on the wall is exacerbated by “wall washing”



“Up Against the Wall”

How deflection on the wall is exacerbated by “wall washing”

- Even with a perfect tile installation, some light distortion caused by the natural variation in the tile's surface is inevitable.
- Lighting can take the smallest variance and cast a large shadow. The severity of the shadow is determined by the angle of the light.
- The most critical view is seen when the light source washes straight down or across the surface of the tile, making lighting placement a critical aspect on every project.

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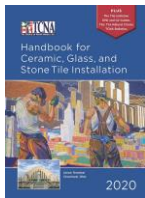
Summary

- New products and methods for the installation of wall tile are emerging
- Balance legacy performance & industry “best practices” with the “risk/reward” of circumventing those established metrics
- Be aware of crack iso and permeation issues on wet area walls
- Wall washing can negatively impact even the best wall tile installation
- Specify qualified labor to ensure the highest quality installation

Why leave it to just anyone?

“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



The Tile Council of North America urges design professionals to include language in specifications to secure qualified contractors and installers. The following nonprofit programs are well-established and recognized by the Handbook Committee:

- Advanced Certifications for Tile Installers (ACT)
- Ceramic Tile Education Foundation (CTEF) Certified Tile Installer Program
- International Masonry Institute (IMI) Contractor College
- Journeyman Tile Layer Apprenticeship Programs
- Natural Stone Institute (NSI) Accreditation for Natural Stone Tile Installation
- National Tile Contractors Association (NTCA) Five Star Contractor Program
- Tile Contractors Association of America (TCAA) Trowel of Excellence Program



MasterSpec®

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is [a Five-Star member of the National Tile Contractors Association] [or] [a Trowel of Excellence member of the Tile Contractors' Association of America].
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
3. Installer employs only [Ceramic Tile Education Foundation Certified Installers] [or] [installers recognized by the U.S. Department of Labor as Journeyman Tile Layers] for Project.
4. Installer employs at least one installer for Project that has completed the Advanced Certification for Tile Installers (ACT) certification for installation of [mud floors] [mud walls] [membranes] [shower receptors] [gauged porcelain tile/gauged porcelain tile panels and slabs] [and] [large format tile].





1000	QUALITY ASSURANCE
1000	Maintain one copy of and ANSI A108.01-2003 and TCNA-088 on site.
1007	Manufacturer Qualifications. Company specializing in manufacturing the types of products specified in this section, with minimum <u>five</u> years of documented experience.
1008	Installer Qualifications
1009	Company specializing in performing the installation, with minimum of <u>five</u> years of documented experience.
1010	Accredited Five-Star member of the National Tile Contractors Association (NTCA) or Tileset of Excellence member of the Tile Contractors' Association of America (TCAA).
1011	Installer Certification
1012	Ceramic Tile Education Foundation (CTEF) Certified Tile Installer (CTI)
1013	Apprenticeship Program: Installer has achieved Journeyworker status through an apprenticeship from the International Union of Bricklayers and Allied Craftworkers (IUBAC) or a U.S. Department of Labor (DOL)-recognized program.
1014	Advanced Certifications for Tile Installers (ACT). Certification in the installation of membranes, mortar bed (mud) floors, mortar (mud) walls, shower receptacles, large format tile, gauged porcelain tile/pencillates and grouts.
1015	International Masonry Training and Education Foundation (IMTEF) Supervisor Certification Program (SCP).



LARGE FORMAT TILE

MEMBRANES

MUD WORK

SHOWERS

GAUGED PORCELAIN TILE

GROUTS



Advanced Certifications for Tile Installers
tilecertifications.com



Ceramic Tile Education Foundation
ceramictilefoundation.org
info@ceramictilefoundation.org



National Tile Contractors Association / Five Star Contractor Group
tile-assn.com
NTCAqualifiedlabor@tile-assn.com



Tile Contractors' Association of America
tcaainc.org
info@tcaainc.org



Tile Council of North America, Inc.
TCNAtile.com/find-qualified
info@tcnatile.com

ANY QUESTIONS?

LEARNING EDUCATION

AIA

This concludes our program.

Please feel free to contact me for additional information.

Dean Moilanen

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THANK YOU!

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