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SUBJECT: Installation Specification for Directly Bonding Individual (un-mounted) Large Format Glass Tile (2"x 2" up to 12"x 12") To Portland Cement Mortar Beds (cured 7 days), Cementitious Backer Units (CBU) and Gypsum (drywall) in interior dry areas.

Introduction

This Installation Specification has been written for the installation of large format glass tile, 2"x 2" up to 12"x 12", using the direct bond thin-set method. The direct bond system requires specific trowel sizes and application technique, in addition, to back buttering the glass tile prior to installation. This method can be employed on exterior and interior cementitious substrates using manufacturer recommended 118.4, latex modified setting systems. Additionally, this method has proven successful when bonding to cementitious backer units (CBU) and Gypsum board (drywall) in interior, dry areas only.

With the increasing volume of glass tile sales, combined with the versatility and ease of the direct bond method, the tile industry will benefit by supporting a direct bond method utilizing 118.4 thin-set systems specifically designed to bond glass tile to certain substrates.

Note: Consult glass tile manufacturer, as well as, the tile setting adhesive manufacturers for recommendations regarding specific installation material compatibility and performance.

Movement Joints

Movement joints are essential for the success of most tile installations and glass tile is no exception. Glass tile may have a higher rate of thermal expansion and contraction than other tile types. The importance of incorporating movement joints in a glass tile installation cannot be overemphasized. Follow the recommendations found in Movement Joints EJ171-2009 in the "TCNA Handbook for Ceramic Tile Installation." An architect or engineer should be consulted when specifying the number, location and type of movement joint for the tile installation.

Framing (Wood or Metal)

Framing shall be 16" on center with a maximum variation in backing surfaces of 1/4" in 10' and 1/16" in 12" from the required plane. Metal framing should be installed according to ANSI A108.11-2009. Blocking for both wood and metal framing shall be placed every 18" on center vertically and, in addition to ANSI A108.11-2009 directives, at all seams of CBU or wire reinforcement overlap.

General Substrate Preparation Recommendations

All substructures to receive large format glass tile should be designed in accordance with the "Residential Building Code (IRC) for residential installations, the International Building Code (IBC) for commercial applications or prevailing code for the installations location. Make allowances for live load, impact, and all dead loads including the weight of tile, setting bed, grout, and traffic.

***Caution: Never apply glass tile directly over wood or wood products.**

Concrete

(Best substrate for exterior freeze thaw areas) new construction, light broom finish, cured 28-day minimum. Install over clean, sound, dimensionally stable, existing masonry or concrete. Do not install over cracked or coated surfaces without proper preparation.

Mortar Beds

Follow ANSI A108.1B (7 day minimum cure time prior to installation). Specify 2.5 – 3.4 lb. Metal lath for wood or steel framed applications using 3.4 lb. galvanized metal lath for all exterior and heavy water use applications. May be suitable for exterior use when appropriate precautions are taken, such as flashing, movement joint placement and consideration for climatic conditions and exposure.

Backer Boards

Cementitious Backer Units (CBU), Exterior/Interior. Acceptable CBU standards ANSI 118.9, ASTM 1325.

Fiber cement underlayment, interior only. Acceptable Fiber cement underlayment standard ASTM C-1288.

Gypsum board (drywall), Interior, dry areas only. Acceptable Gypsum board standards ASTM C1396/C1396M

*Important: Install CBU to metal framing following ANSI A108.11-2009.

Submerged and Below Grade Installations

Cure a minimum of 21 days after grouting, prior to submersion or heavy water use.

Material: Large Format Glass Tile, Individual (un-mounted) 2"x 2" up to 12" x 12"

With the number of glass tile manufacturers making and importing large format glass tiles for both decorative and field applications it is important to consider a glass tile's physical properties prior to specifying large format glass tile for specific uses. Although there is no current standard for regulating the quality of large format glass tile, many of these products can and do meet the ANSI A137.1-2008 manufacturing standards for ceramic tile. These properties include:

- Water Absorption
- Freeze-Thaw Resistance
- Chemical Resistance
- Bond Strength
- Thermal Shock
- Breaking Strength

Special consideration should be given to each glass tile manufacturer's test results and installation recommendations. It is the responsibility of the specification writer to determine whether ASTM test results are compatible to the project at hand.

For more information on glass tile types and manufacturing please refer to CTIOA Report 2008-8-12 "Glass Tile"

Installation Adhesives for Direct Bond, Large Format Glass Tile

Not all ANSI 118.4 latex modified thin-sets are recommended for installing glass tile. However, all of the cement based setting materials recommended for glass tile installations by glass tile manufacturers, as well as, adhesive manufacturers are ANSI 118.4 rated. It is the responsibility of the specification writer and the installer to confirm the use of recommended setting adhesives as accurate for their intended use.

Recommended installation temperatures for 118.4 bonding mortars, is generally 50-90 degrees Fahrenheit. Shade substrate from direct sunlight, and wind, using screens, tarps, and umbrellas, to reduce the problem of skinning over (slight drying of the setting material surface) during installation.

Cautions:

- Mix adhesives and grouts between 150 – 300 RPM while using electrical mixing devices. Allow mixture to slake (sit) 10-15 minutes then re-mix, do not add additional latex or powder during re-mixing. Always follow installation material manufacturer's directions for the preparation and use of their products.
- When installing transparent or translucent large format glass tile in areas or adjoining areas requiring more than one unit of installation material, make sure the thin-set shade matches. Using non-unified thin-set colors behind transparent

or light translucent glass tile may cause un-acceptable color variations. Consult bonding material manufacturers for more information.

- When installing transparent or light translucent glass tile inconsistencies, such as trowel marks or insufficient coverage in the thin-set, can cause color variations in the finished installation. Be sure to achieve full thin-set coverage, without voids, and use the flat side of a trowel to key in the thin-set and to flatten notch trowel ridges so they do not show through the transparent or light translucent glass tile after installation.

Determining Proper Trowel Size

Measure glass tile thickness and follow the matrix below to determine the appropriate notch trowel size and style for your installation.

Glass Tile Thickness	Trowel Size
1/4"	3/16" x 3/16" square notch
5/16"	3/16" x 1/4" V-notch
3/8"-1/2"	1/4" x 1/4" square notch

Installation Technique:

Step 1



Using the flat side of a trowel firmly apply the setting material into the substrate.

Step 2



With additional setting material and the appropriate size notch trowel, comb full notches to establish the proper depth of setting bed.

Step 3



Using the flat side of a trowel, flatten the notches to achieve a smooth, consistent setting bed.

Step 4



Continue flattening the notches until an area that can be covered in 10 –15 minutes is prepared.

Step 5



Thoroughly clean the back of each tile using a dry cloth. Never wet glass tile prior to back buttering.

Step 6



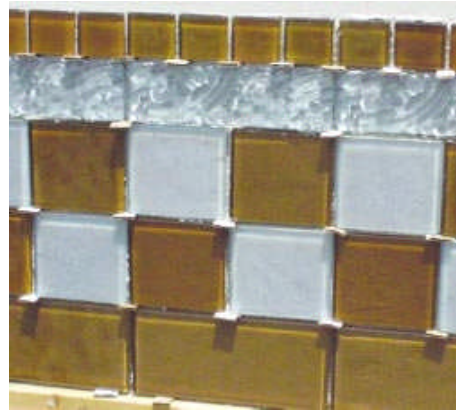
Apply setting adhesive to the back covering 100% of each glass tile.

Step 7



Apply the tile into the setting bed using firm, even pressure to establish contact and eliminate any voids.

Step 8



Remove excess setting material from the edges and space a minimum of 1/8" between tiles. Cure 48 hours prior to cleaning and grouting.

Step 9



Allow grout to set up and smooth finish with a damp sponge.

Step 10



For final polishing of excess grout haze use clean, dry cheesecloth to complete polishing.