



Bonding Ceramic Tile or Stone Over Poured Gypsum Underlayments

TDS 148

Poured gypsum underlayments are typically used to level floors and encapsulate radiant heat systems. Lightweight gypsum underlayments pour fast, easy and economical, but if not prepared properly can lead to issues when receiving ceramic tile or stone as the finish.

Prior to the installation of tile over poured gypsum underlayments, make sure to check with the manufacturer of the poured gypsum underlayment for proper installation instructions and ensure that poured gypsum underlayment is properly installed. Confirm that their specific product can receive tile or stone as a finish and determine the minimum cure period required before the tile or stone can be installed. Typically, the poured gypsum underlayment must reach a minimum compressive strength of 2,000 psi (13.8 MPa) when tested in accord with ASTM C472 (modified).

Systems, including the framing system and panels, over which tile or stone will be installed 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. The project design should include the intended use and necessary allowances for the expected live load, concentrated load, impact load, and dead load including the weight of the finish and installation materials. In addition to deflection considerations, above-ground installations are inherently more susceptible to vibration. Consult grout, mortar, and membrane manufacturer to determine appropriate installation materials for above-ground installations. A crack isolation and higher quality setting materials can increase the performance capabilities of above-ground applications. However, the upgraded materials cannot mitigate structural deficiencies including floors not meeting code requirements and/or over loading or other abuse of the installation in excess of design parameters.

Consult with Poured Gypsum Underlayment manufacturer for their maximum allowable moisture content before proceeding with the membrane or tile installation.

Poured gypsum based underlayments must meet TCNA requirements for compressive strength and the performance requirements of ASTM C627 for the anticipated service level designated by the design professional. Poured gypsum underlayment thickness and application varies, consult the manufacturer for specific recommendations. The underlayment must be dry and properly cured following the manufacturer's recommendations to achieve a permanent installation. Surfaces to be covered must be clean, structurally sound and meet the maximum allowable deflection standard of L/360 for ceramic tile and L/480 for stone under total anticipated load. Expansion joints must be installed in accordance with ANSI/TCNA guidelines.

Most gypsum based underlayments are very sensitive to moisture and movement. If there is a chance of water or moisture getting to the poured gypsum underlayments from above the tile, install HYDRO BAN[®] or 9235 Waterproofing Membrane over a skim coat of 254 Platinum. Proper detailing at corners, coves, etc. is critical. Unforeseen moisture sources (e.g. condensation on pipes) can still soften a poured gypsum underlayment.

Crack suppression is always recommended over poured gypsum underlayment; HYDRO BAN[®] can be used for this purpose. The use of 125 Sound & Crack Adhesive, as both an anti-fracture material and as a tile adhesive, is an excellent option over the hardened skim coat or gypsum overspray.

The preferred method of tile or stone installation over poured gypsum underlayments is to install a minimum 2" thick, non-bonded, wire-reinforced mortar bed (Tile Council of North America (TCNA) Handbook for Ceramic, Glass, and Stone Tile Installation method F111 or LATICRETE[®] Architectural Guidebook method ES-F111) using 3701 Fortified Mortar, 3701 Lite Mortar, 3701 Lite Mortar R, or, 226 Thick Bed Mortar Mix mixed with 3701 Mortar Admix.

For thin-bed ceramic tile installations when a cementitious bonding material will be used, including large and heavy tile (medium bed) mortar: maximum allowable variation in the tile substrate – for tiles with edges shorter than 15" (375mm), maximum allowable variation is ¼" in 10' (6mm in 3m) from the required plane, with no more than 1/16" variation in 12"

(1.5mm variation in 300mm) when measured from the high points in the surface. For tiles with at least one edge 15" (375mm) in length, maximum allowable variation is 1/8" in 10' (3mm in 3m) from the required plane, with no more than 1/16" variation in 24" (1.5mm variation in 600mm) when measured from the high points in the surface. For modular substrate units, such as exterior glue plywood panels or adjacent concrete masonry units, adjacent edges cannot exceed 1/32" (0.8mm) difference in height. Should the architect/designer require a more stringent finish tolerance (e.g. 1/8" in 10' [3mm in 3m]), the subsurface specification must reflect that tolerance, or the tile specification must include a specific and separate requirement to bring the subsurface tolerance into compliance with the desired tolerance.

Given a situation where sound, poured gypsum underlayments already exists and a non-bonded mortar bed is not possible, the best technique for installing tile by the thin bed method is as follows:

125 TRI MAX[®] can be used, without a skim coat or gypsum overspray, as the tile installation adhesive directly to the gypsum underlayment. 125 TRI MAX acts as the tile adhesive, an ANSI A118.12 compliant product and a sound control with a ΔIIC of 15.

There are three alternative method when the poured gypsum underlayment overspray/primer sealer is not installed;

1. Thoroughly remove any surface residue or powder with a damp sponge. Apply a continuous latex or polymer-fortified skim coat nominal 1/16" the (1.5mm) (e.g. 254 Platinum, 257 TITANIUM[™] or MULTIMAX[™] LITE) to the poured gypsum underlayment surface and allow to harden. Install a suitable LATICRETE Waterproofing/Anti-Fracture Membrane (e.g. HYDRO BAN[®] or 9235 Waterproofing Membrane) over the skim coat as directed in DS 663.5 and allow to cure. Install tile directly onto the membrane.

2. Thoroughly remove any surface residue or powder with a damp sponge. Apply a continuous latex or polymer-fortified skim coat nominal 1/16" the (1.5mm) (e.g. 254 Platinum, 257 TITANIUM or MULTIMAX LITE) to the poured gypsum underlayment surface and allow to harden. Install STRATA_MAT[™] or STRATA_MAT XT onto the hardened skim coat and tile onto the STRATA_MAT or STRATA_MAT XT following the instructions as stated in DS 026.0 or DS 028.0.

Note: The thin-set mortar skim coat (used in options 1 & 2 above) serves as a replacement for some poured gypsum underlayment manufacturer's overspray. Consult poured gypsum underlayment supplier for recommendations.

3. Thoroughly remove any surface residue or powder with a damp sponge. Prime all surfaces to receive HYDRO BAN with properly applied manufacturer's sealer or with a primer coat of HYDRO BAN, consisting of 1 part HYDRO BAN, diluted with 4 parts clean, cool tap water. In a clean pail, mix at low speed to obtain a homogeneous solution. The primer can be brushed, rolled or sprayed to achieve an even coat. Apply the primer coat to the floor at a rate of 250 - 300 ft²/gallon (6.1 - 7.5 m²/L) of diluted HYDRO BAN. Allow the primer coat to dry completely (approximately 24 hrs. depending on substrate and air temperature and humidity). When dry apply two full coats of undiluted HYDRO BAN to the primed area following the guidelines in this data sheet and the HYDRO BAN Installation Instructions (DS 663.5). HYDRO BARRIER[™] can also be used following the same instructions as above for HYDRO BAN. When dry apply two full coats of undiluted HYDRO BARRIER to the primed area following the guidelines in this data sheet and the HYDRO BARRIER Installation Instructions (DS 105.5).

Once the poured gypsum underlayment has been properly prepared and cured, install tile or stone with 254 Platinum, 257 TITANIUM or MULTIMAX LITE. Use LATAPOXY[®] 300 Adhesive or LATAPOXY BIOGREEN 300 Adhesive for the installation of water sensitive marble, agglomerates or resin-backed tile and stone.

Using either method requires accommodation of all movement joints and allowance for movement around the perimeter of the room. Expansion joints must be installed in accord with TCNA detail EJ171.

Once tile is set firm, grout tile or stone with SPECTRALOCK[®] PRO Premium Grout*, SPECTRALOCK PRO Grout; SPECTRALOCK 1; PERMACOLOR[®] Select^; PERMACOLOR Grout; or, READY-TO-USE Grout.

NOTES: The use of a waterproofing and/or anti-fracture membrane (e.g. HYDRO BAN) is strongly recommended for installations over poured gypsum based underlayments. When it is confirmed that the poured gypsum underlayment manufacturer's recommended overspray/primer sealer is correctly applied, a suitable LATICRETE Waterproofing/Anti-Fracture Membrane (e.g. HYDRO BAN, STRATA_MAT, or STRATA_MAT XT) can be installed without an additional

skim coat or primer. Tile or stone can then be installed using a LATICRETE® ANSI A118.4 or ANSI A118.15 adhesive directly to the membrane.

If a membrane is not specified for dry areas; tile can be installed directly to the poured gypsum underlayment (with the overspray or by applying a coating of PRIME N' BOND™). Then use 254 Platinum, 257 TITANIUM™ or MULTIMAX™ LITE to install the tile or stone finishes. Note that there will be no crack isolation protection with the omission of the membrane.

Refer to the LATICRETE 25-Year System Warranty (0025.0) for more information. For more information on installing tile or stone over gypsum underlayments refer to LATICRETE Architectural Guidebook Execution Statement/Specification ES-F200 for direct bond applications to poured gypsum underlayments over concrete, ES-F180 for direct bond applications to poured gypsum underlayment over wood framed construction, or ES-RH111 for poured gypsum underlayment with hydronic radiant heat. Visit <https://laticrete.com/ag> for more information on the LATICRETE Architectural Guidebook.

* United States Patent No.: 6,881,768 (and other Patents)

^ United States Patent No.: 6,784,229 (and other Patents)

Technical Data Sheets are subject to change without notice. For latest revision, check our website at <https://laticrete.com>
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