

# PermaBASE PLUS<sup>®</sup> Cement Board

09 28 00 / NGC

Technical Information  
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## DESCRIPTION

PermaBASE PLUS<sup>®</sup> Cement Board is a lightweight, rigid substrate made of Portland cement, aggregate and glass mesh that provides an exceptionally hard, durable surface that is able to withstand prolonged exposure to moisture.

## BASIC USES

### Applications

**Interior:** PermaBASE PLUS Cement Board is a superior underlayment for many interior applications, including bathroom shower and tub enclosures, floors, countertops and backsplashes, saunas and steamrooms, accent areas and fireplaces.

**Exterior:** PermaBASE PLUS provides an excellent substrate for many exterior applications, including Cement Board Masonry Veneer Wall System (CBMV) and Cement Board Stucco System (CBSS). PermaBASE PLUS allows the combination of exterior finishes on one continuous substrate, providing greater design flexibility. It works well for commercial exteriors, residential exteriors, outdoor kitchens and decks.

### Advantages

- EdgeTech<sup>®</sup> Reinforced Edge allows for closer fastener application of nails or screws at the edge without crumbling or spinout.
- PermaBASE PLUS is up to 15% lighter than other cement boards on the market.
- Resists the growth of mold per ASTM D3273 with a score of 10, the best possible score.
- Can be cut using a standard utility knife and straightedge. With the unique PermaBASE PLUS core composition, little or no additional labor is needed to clean the edge after a cut.
- Is impact resistant, extremely durable and dimensionally stable. It has excellent overall flexural, compressive and tensile strength characteristics.
- Easier to cut and faster to install.
- IBC/IRC Compliant. Meets ASTM C1325.
- Is highly moisture resistant, and will not rot, disintegrate or swell when exposed to water.
- Use 1/2" (12.7 mm) PermaBASE PLUS in 1-hour and 2-hour rated assemblies (UL Classified).
- Achieves the lowest water-absorption rating of any cement board per ASTM C473, offering better tile bond.

- Achieves UL GREENGUARD Gold Certification for low chemical emissions into indoor air during product usage. For more information, visit: [ul.com/gg](http://ul.com/gg).
- Qualifies as a low-VOC emitting material by meeting California Specification 01350.

## INSTALLATION RECOMMENDATIONS

### Interior Applications

**General:** All framing should comply with local building code requirements and be designed to provide support with a maximum allowable deflection of L/360 under all intended loads. Framing members should be spaced a maximum of 16" o.c.

**Note:** Cut or score PermaBASE PLUS on printed side of panel. Install tile and tile setting materials in accordance with current ANSI specifications and Tile Council of North America (TCNA) guidelines.

**Control joints:** For interior installations, allow maximum of 30 lineal feet between control joints. A control joint must be installed, but is not limited to the following locations: where expansion joints occur in the framing or building (discontinue all cross furring members located behind joint); when boards abut dissimilar materials; where framing material changes; at changes of building shape or structural system; at each story separation. Place control joints at corners of window and door openings, or follow specifications of architect. Control joint cavity shall not be filled with coating or other materials.

### Walls & Ceilings

**Wall framing:** Edges of PermaBASE PLUS parallel to framing should be continuously supported. Provide additional blocking when necessary to permit proper PermaBASE PLUS attachment.

Do not install PermaBASE PLUS directly over protrusions from stud plane, such as heavy brackets or fastener heads. Studs above a shower floor should be either notched or furred to accommodate the thickness of the waterproof membrane or pan. The surround opening for a tub or precast shower receptor should not be more than 1/4" larger than unit to be installed.

**Ceiling framing:** The deflection of the complete ceiling assembly due to dead load (including insulation, PermaBASE PLUS, bonding material and facing material) should not exceed L/360. The dead load applied to the ceiling frame should not exceed 10 psf. Ceiling joist or furring channel should not exceed 16" o.c.

(Edges of PermaBASE PLUS parallel to framing should be continuously supported.) Provide additional blocking when necessary to permit proper PermaBASE PLUS attachment.

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Job Name \_\_\_\_\_

Contractor \_\_\_\_\_ Date \_\_\_\_\_

Submittal Approvals: (Stamps or Signatures)

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## TECHNICAL DATA

Physical Properties	1/2" PermaBASE PLUS	5/8" PermaBASE PLUS
<b>Thickness<sup>1</sup>, Nominal</b>	1/2" (12.7 mm)	5/8" (15.9 mm)
<b>Weight, Nominal</b>	2.5 lbs./sq. ft. (12.2 k/m <sup>2</sup> )	2.9 lbs./sq. ft. (14.2 k/m <sup>2</sup> )
<b>Edges</b>	Round	Round
<b>Flexural Strength<sup>8</sup></b>	≥ 750 psi	>600 psi
<b>Fastener Holding<sup>1</sup> (Wet and Dry)</b>	≥ 90 lbs.	≥ 90 lbs.
<b>Freeze/Thaw Cycles<sup>10</sup></b>	100	100
<b>Compressive Strength<sup>11</sup></b>	1,250 psi	1,250 psi
<b>Wind Load<sup>11</sup> (Studs 16" o.c.)</b>	35 psf	35 psf
<b>Bending Radius</b>	5' (1,524 mm)	5' (1,524 mm)
<b>Thermal Resistance<sup>3</sup></b>	R = .37, K = 2.7	R = .37, K = 2.7
<b>Permeance<sup>4</sup></b>	> 10 perms	> 10 perms
<b>Water Absorption<sup>9</sup> (% of Weight)</b>	< 8%	< 8%
<b>Falling Ball Impact<sup>7</sup> (12" Drop)</b>	Pass	Pass
<b>Linear Expansion with Change Moisture<sup>7</sup></b>	≤ 0.07%	≤ 0.07%
<b>Mold Resistance<sup>5</sup> (ASTM D3273)</b>	Score of 10	Score of 10
<b>Mold Resistance<sup>6</sup> (ASTM G21)</b>	Score of 0	Score of 0
<b>Shear Bond Strength 7 days (psi)</b>	<b>Test Method</b>	<b>Test Method</b>
<b>Dry-Set Portland Cement Mortar</b>	ANSI A118.1	ANSI A118.1
<b>Latex-Portland Cement Mortar</b>	ANSI A118.4	ANSI A118.4
<b>Organic Adhesives Type 1</b>	ANSI A136.1	ANSI A136.1
<b>Product Standard Compliance</b>	ASTM C1325	ASTM C1325
<b>Fire-Resistance Characteristics</b>		
<b>Core Type</b>	N/A	N/A
<b>UL Type Designation</b>	PermaBASE PLUS	PermaBASE PLUS
<b>Surface Burning Characteristics<sup>2</sup></b>	Class A	Class A
<b>Flame Spread<sup>2</sup></b>	0	0
<b>Smoke Development<sup>2</sup></b>	0	0
<b>Applicable Standards and References</b>		
ANSI A118.9 <i>Test Methods and Specification for Cementitious Backer Units</i>		
ASTM C473 <i>Standard Test Methods for Physical Testing of Gypsum Panel Products</i>		
ASTM C518 <i>Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus</i>		
ASTM C666 <i>Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing</i>		
ASTM C947 <i>Standard Test Method for Flexural Properties of Thin-Section Glass-Fiber-Reinforced Concrete (Using Simple Beam with Third-Point Loading)</i>		
ASTM C1325 <i>Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units</i>		
ASTM D1037 <i>Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials</i>		
ASTM D2394 <i>Standard Test Methods for Simulated Service Testing of Wood and Wood-Base Finish Flooring</i>		
ASTM D3273 <i>Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber</i>		
ASTM E84 <i>Standard Test Method for Surface Burning Characteristics of Building Materials</i>		
ASTM E96 <i>Standard Test Methods for Water Vapor Transmission of Materials</i>		
ASTM E330 <i>Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference</i>		
ASTM G21 <i>Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi</i>		
PermaBASE Building Products, LLC Manufacturer Standards, <i>NGC Construction Guide</i>		

1. Specified values per ASTM C1396, tested in accordance with ASTM C473.
2. Tested in accordance with ASTM E84.
3. Tested in accordance with ASTM C518.
4. Tested in accordance with ASTM E96.
5. Tested in accordance with ASTM D3273 and rated in accordance with ASTM D3274.
6. Tested in accordance with ASTM G21.
7. Specified values per ASTM C1325, tested in accordance with ASTM D1037.
8. Specified values per ASTM C1325, tested in accordance with ASTM C947.
9. Tested in accordance with ASTM C473, 24-hour immersion.
10. Per ANSI A118.9 procedure B. Tested in accordance with ASTM C666.
11. Tested in accordance with ASTM D2394.
12. Tested in accordance with ASTM E330.

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**PermaBASE PLUS Cement Board:** Apply PermaBASE PLUS with ends and edges closely butted, but not forced, together. Stagger end joints in successive courses. Drive fasteners into field of cement board first, working toward ends and edges. Space fasteners maximum 8" o.c. for walls, 6" o.c. for ceilings with perimeter fasteners at least 3/8" and less than 5/8" from ends and edges. Ensure PermaBASE PLUS is tight to framing.

**Joint reinforcement:** Trowel bonding material to completely fill the tapered recessed board joints and gaps between each panel. On non-tapered joints, apply a 6" wide, approx. 1/16" thick, coat of bonding material over entire joint. For all joints, immediately embed 2" alkali-resistant fiberglass mesh tape fully into applied bonding material and allow to cure. Same bonding material should be applied to corners, control joints, trims or other accessories. Feather bonding material over fasteners to fully conceal.

## Floors & Counters

**Subfloor or Base:** For flooring applications with 16" o.c. floor joists, 5/8" tongue and groove exterior grade plywood or 3/4" tongue and groove exterior grade OSB may be used. For 19.2" o.c. and 24" o.c. floor joists, 3/4" tongue and groove exterior grade plywood or OSB must be used. Tile size for floors with 24" o.c. floor joists must be 12" x 12" or larger. The joists and subfloor assembly must meet L/360, as well as the appropriate code tables, for live and dead loads.

**Underlayment:** Using a 1/4" square-notched trowel, apply a setting bed of Latex-Portland Cement mortar or Thin-Set mortar to the subfloor or counter base. Immediately laminate PermaBASE PLUS to subfloor or base leaving a 1/8" space between boards at all joints and corners. Leave a 1/4" gap along walls. Stagger joints so they do not line up with underlying substrate joints. Fasten PermaBASE PLUS every 8" o.c. throughout board field and around all edges while setting bed mortar is still workable. Around perimeter of each board, locate fasteners 2" from the corners and not less than 3/8" from the edges. Fill all joints solid with bonding material. On non-tapered joints such as butt ends, apply a 6" wide, 1/16" thick coat over the entire joint. For all joints, embed fiberglass mesh tape fully into applied bonding material; ensure that tape is centered over joint. Apply bonding material over fasteners to fully conceal. Remove all excess bonding material and allow to cure.

## Handling and Project Conditions

- Avoid water exposure during shipping, handling, storage, installation and after installation of cement boards to avoid the formation of mold or mildew.
- Store cement boards off the ground and under cover. Store boards flat. Use sufficient supports extending under the entire length of cement boards to prevent sagging.
- Keep cement boards dry to minimize the potential for mold growth. Take adequate care while transporting, storing, applying and maintaining cement boards.
- Do not apply cement boards with visible signs of moisture damage or mold growth. Do not apply cement boards over other building materials where conditions exist that are favorable to mold growth.

## Maintenance Following Application

- Maintain essential elements of sound weather-tight building envelope, including roofing, joint sealants, windows and flashings.
- Take immediate and appropriate remediation measures as soon as water leaks or condensation sources are identified.
- Perform routine cleaning and maintenance operations using methods that prevent moisture saturation of cement boards.
- Maintain final wall finishes to protect the cement board as well as support the structure.

## LIMITATIONS

### Interior

- Treat joints with alkali-resistant fiberglass mesh tape set in a polymer-modified mortar.
- Do not use conventional paper gypsum board tape, joint compound and gypsum board nails or screws.
- Do not exceed 16" (406 mm) o.c. as maximum wall framing spacing. Must be designed to limit deflection to L/360 under all live and dead loads.
- Steel framing must be minimum 20-gauge (galvanized) (.0312" design thickness) or heavier.
- PermaBASE PLUS is not a water barrier. Consult local building code for moisture-barrier requirements.
- Do not use with vinyl flooring.
- To install interior direct-applied finishes to PermaBASE PLUS, you must embed reinforcing mesh in basecoat. Consult finish manufacturer for additional requirements.
- Do not expose PermaBASE PLUS to temperatures over 220°F (105°C).
- Do not use PermaBASE PLUS as a nailing base for other finishes.

## SIZES AND PACKAGING

Thickness, Width and Length	# of Pcs. per Unit
1/2" x 36" x 5' (12.7 mm x 914 mm x 1,524 mm)	50
1/2" x 48" x 8' (12.7 mm x 1,219 mm x 2,438 mm)	40*
5/8" x 48" x 8' (15.9 mm x 1,219 mm x 2,438 mm)	32*

\*Limited geographic availability.

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## FOR MORE INFORMATION

### Architectural Specifications

PermaBASE Building Products CSI MasterFormat® 3-part guide specifications are downloadable as editable Microsoft® Word documents at: [permabase.com](http://permabase.com).

### Latest Technical Information and Update

Visit [permabase.com](http://permabase.com) or call National Gypsum Company Construction Services: 1-800-NATIONAL (628-4662).

**Technical Information** *Información Técnica*

**1-800-NATIONAL®**  
1-800-628-4662

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The PermaBASE family of products is manufactured by PermaBASE Building Products, LLC.



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**PermaBASE®**  
Building Products

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