

# PermaBASE® Cement Board

09 28 00 / NGC

Technical Information  
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## DESCRIPTION

PermaBASE® Cement Board is a rigid substrate made of Portland cement, aggregate and glass mesh. It has an exceptionally hard, durable surface that can withstand prolonged exposure to moisture.

Use it as an underlayment or backing surface in a variety of interior and exterior applications, including (but not limited to) tub and shower surrounds, countertops, floors, and for cement board stucco and adhered masonry veneer wall systems.

## BASIC USES

### Applications

#### Interior

PermaBASE Cement Board is a superior underlayment for many interior applications, including kitchen countertops and backsplashes; bathroom shower and tub enclosures, garden and whirlpool tubs, and steamrooms and saunas; flooring for kitchens, bathrooms, entryways, foyers and laundry rooms; walls for bathrooms, accent areas and fireplaces; and special additions, such as swimming pool and whirlpool decks and enclosures.

#### Exterior

PermaBASE provides an excellent substrate for many exterior applications, including Cement Board Masonry Veneer Wall System (CBMV), Cement Board Stucco System (CBSS), Continuous Insulation (CI), and Exterior Insulation and Finish Systems (EIFS).

PermaBASE 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® Technology allows for closer fastener application of nails or screws at the edge without crumbling or spinout.
- Use as a substrate for direct-applied finishes, tile, stone and thin brick in exterior applications (as outlined in UL Evaluation Report ER22158-01).
- Use in combustible and non-combustible construction under the IBC and IRC (as outlined in UL Evaluation Report ER22158-01).
- 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 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.

- 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® 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. For more information, visit: [calrecycle.ca.gov/greenbuilding/specs/section01350](http://calrecycle.ca.gov/greenbuilding/specs/section01350).

### Heat Shield Applications

- UL approved for heat shield/wall protector per ANSI/UL 1618 and ULC 632.
- Protects combustible walls.
- Reduces required clearance from wall by 40%.
- Lightweight and easy to install.

### Cement Board Stucco Wall System (CBSS)

- Engineered system that allows a faster installation while providing superior quality control (manufactured product that must comply with ASTM product specifications).
- Provides a 15-year exterior warranty – the industry's best.

### Cement Board Masonry Veneer Wall System (CBMV)

- Engineered system that allows a faster installation while providing superior quality control (manufactured product that must comply with ASTM product specifications).
- Approved for use in ASTM C1780, and cement board is cited as an approved substrate for this system by the Masonry Veneer Manufacturers Association (MVMA): Installation Guide and Detailing Options for Compliance with ASTM C1780.
- Easily allows for the inclusion of continuous insulation into the assembly.
- Speed up your schedule – faster, easier and cleaner than traditional metal lath/scratch coat method.

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

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

Submittal Approvals: (Stamps or Signatures)

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## TECHNICAL DATA

Physical Properties	1/2" PermaBASE	5/8" PermaBASE
Thickness <sup>1</sup> , Nominal	1/2" (12.7 mm)	5/8" (15.9 mm)
Weight, Nominal	2.9 lbs./sq. ft. (14.2 k/m <sup>2</sup> )	3.65 lbs./sq. ft. (17.8 k/m <sup>2</sup> )
Edges	Round	Round
Flexural Strength <sup>8</sup>	≥ 750 psi	≥ 750 psi
Fastener Holding <sup>1</sup> (Wet and Dry)	≥ 90 lbs.	≥ 90 lbs.
Freeze/Thaw Cycles <sup>10</sup>	> 100	> 100
Compressive Strength <sup>11</sup>	1,250 psi	1,250 psi
Wind Load <sup>12</sup> (Studs 16" o.c.)	40 psf	40 psf
Bending Radius	5' (1,524 mm)	5' (1,524 mm)
Thermal Resistance <sup>3</sup>	R = .37, K = 2.7	R = .47, K = 2.7
Permeance <sup>4</sup>	> 10 perms	> 10 perms
Water Absorption <sup>9</sup> (% of Weight)	< 8%	< 8%
Falling Ball Impact <sup>7</sup> (12" Drop)	Pass	Pass
Linear Expansion with Change Moisture <sup>7</sup>	≤ 0.07%	≤ 0.07%
Mold Resistance <sup>5</sup> , (ASTM D3273)	Score of 10	Score of 10
Mold Resistance <sup>6</sup> , (ASTM G21)	Score of 0	Score of 0
Shear Bond Strength – 7 Days (ANSI A118.4) Latex-Portland Cement Mortar	241 psi	241 psi
Product Standard Compliance	ASTM C1325	ASTM C1325
Fire-Resistance Characteristics		
Core Type	N/A	N/A
UL Type Designation	PermaBASE	PermaBASE
Surface Burning Characteristics <sup>2</sup>	Class A	Class A
Flame Spread <sup>2</sup>	0	0
Smoke Development <sup>2</sup>	0	0

### Applicable Standards and References

ANSI A118.9 *Test Methods and Specification for Cementitious Backer Units*

ASTM C473 *Standard Test Methods for Physical Testing of Gypsum Panel Products*

ASTM C518 *Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*

ASTM C666 *Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing*

ASTM C947 *Standard Test Method for Flexural Properties of Thin-Section Glass-Fiber-Reinforced Concrete (Using Simple Beam with Third-Point Loading)*

ASTM C1325 *Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units*

ASTM D1037 *Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials*

ASTM D2394 *Standard Test Methods for Simulated Service Testing of Wood and Wood-Base Finish Flooring*

ASTM D3273 *Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber*

ASTM E84 *Standard Test Method for Surface Burning Characteristics of Building Materials*

ASTM E96 *Standard Test Methods for Water Vapor Transmission of Materials*

ASTM E330 *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

ASTM G21 *Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi*

PermaBASE Building Products, LLC Manufacturer Standards, NGC Construction Guide

1. Specified values per ASTM C1325, 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.
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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## 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 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 parallel to framing should be continuously supported. Provide additional blocking when necessary to permit proper PermaBASE attachment.

Do not install PermaBASE 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, 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 parallel to framing should be continuously supported.) Provide additional blocking when necessary to permit proper PermaBASE attachment.

**PermaBASE Cement Board:** Apply PermaBASE 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 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 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 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.

### Exterior 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 live (including wind) and dead loads.

**Control joints:** For exterior installations, consult finish manufacturer for spacing requirements. For exterior tile applications, control joints should be spaced a maximum of every 12'. If no recommendation is available, allow a maximum of 16 lineal feet between control joints. A control joint must be installed but 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.

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## LIMITATIONS

### Interior

- Treat joints with alkali-resistant fiberglass mesh tape set in a modified mortar.
- Do not use conventional paper gypsum board tape, joint compound and gypsum board nails or screws.
- Do not treat joints with mesh tape or waterproofing fabrics embedded in liquid waterproofing.
- 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 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, you must embed reinforcing mesh in basecoat. Consult finish manufacturer for additional requirements.
- Do not expose PermaBASE to temperatures over 220°F (105°C).
- Do not use PermaBASE as a nailing base for other finishes.

### Exterior

- To install properly, follow the instructions of the finish material manufacturer.
- For conventional Portland cement plaster systems, use a self-furring metal lath over PermaBASE and fasten it to studs.
- Install a code-approved Weather Resistant Barrier (WRB) to protect the cavity. The type and placement will vary per local building codes and/or manufacturer's specifications, installation guidelines and warranties.
- Do not use PermaBASE as a nailing base for other finishes.

### Cement Board Stucco Wall System (CBSS)

- Follow finish material manufacturer's instructions for proper installation.
- Treat joints in PermaBASE with mesh tape and basecoat.
- Thin veneer construction can reveal planar irregularities in framing.
- Minor cracking at joints may become visible in finished exterior surface.
- Exterior finishes applied directly to PermaBASE: Reinforcing mesh must be embedded in basecoat (consult exterior finish manufacturer for additional installation requirements).
- Code-Approved Weather Resistant Barrier (WRB) must first be installed to protect the cavity (type and placement will vary per local building codes and/or manufacturer's specifications, installation guidelines and warranties).

### Cement Board Masonry Veneer Wall System (CBMV)

- Sheathing selection and installation varies according to type of wall construction.
- Code-approved Weather Resistant Barrier (WRB) must be installed to protect the cavity (type and placement will vary per local building codes and/or manufacturer's specifications, installation guidelines and warranties).

- Treat joints with alkali-resistant fiberglass mesh tape set in a modified mortar.
- Follow mortar manufacturer's instructions for proper installation.

### 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.

## SIZES AND PACKAGING

Thickness, Width and Length	# of Pcs. per Unit
1/2" x 32" x 5' (12.7 mm x 813 mm x 1,524 mm)	50*
1/2" x 32" x 8' (12.7 mm x 813 mm x 2,438 mm)	30
1/2" x 36" x 5' (12.7 mm x 914 mm x 1,524 mm)	50
1/2" x 36" x 6' (12.7 mm x 914 mm x 1,829 mm)	50*
1/2" x 36" x 8' (12.7 mm x 914 mm x 2,438 mm)	30*
1/2" x 48" x 8' (12.7 mm x 1,219 mm x 2,438 mm)	30
5/8" x 36" x 5' (15.7 mm x 914 mm x 1,524 mm)	40
5/8" x 48" x 8' (15.7 mm x 1,219 mm x 2,438 mm)	24
3/8" x 48" x 8' (9.5 mm x 1,219 mm x 2,438 mm)	40*
3/8" x 36" x 5' (9.5 mm x 914 mm x 1,524 mm)	50*
3/4" x 48" x 8' (19.1 mm x 1,219 mm x 2,438 mm)	20*

\* Special Order

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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®**  
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