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PermaBase® BRAND Cement Board

Exterior Applications Guide

Perma BASE® BRAND Cement Board

National Gypsum®

PermaBase® BRAND Cement Board

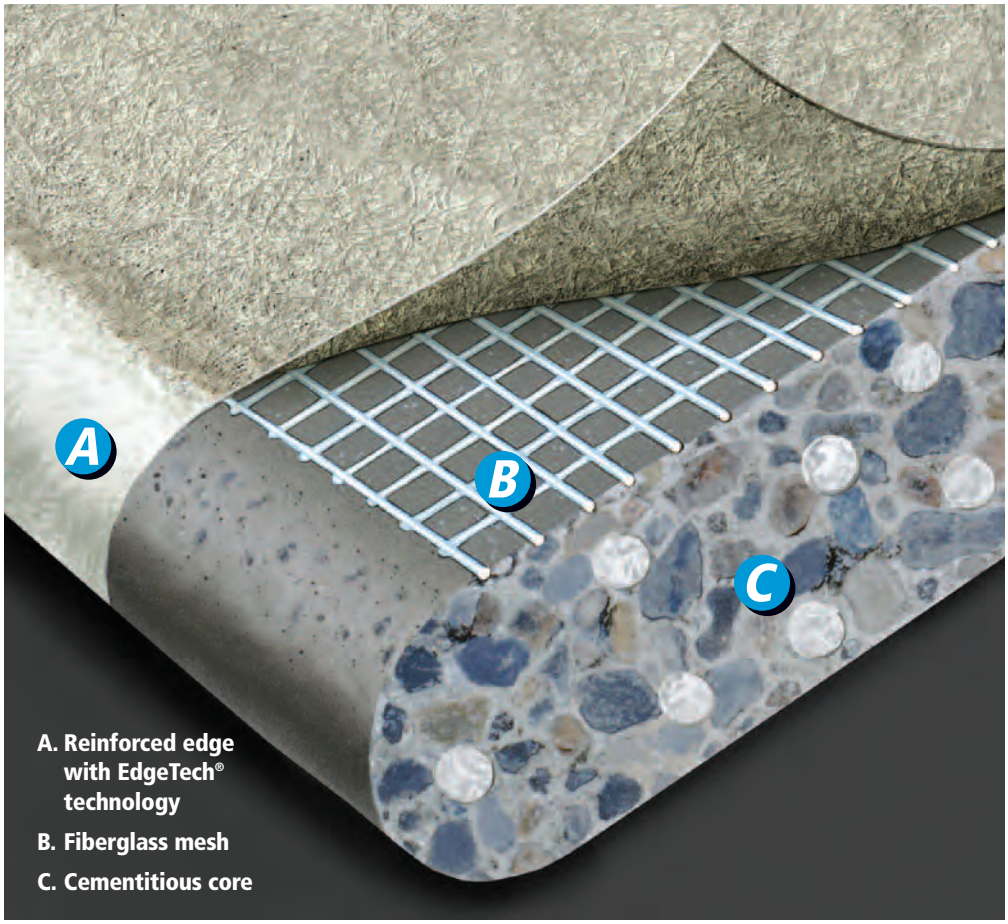
Description

PermaBase® BRAND Cement Board is a 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.

PermaBase offers a competitive advantage over similar products on the market with its patented EdgeTech® technology. The tapered, reinforced edge design allows for closer nail or screw application to the edge.

Features/Benefits

- Reinforced edge with EdgeTech technology allows for closer fastener application of nails or screws at the edge without crumbling or spinout.
- IRC and IBC 2006/2009 Compliant – Meets ASTM C 1325.
- PermaBase resists the growth of mold achieving a panel score of 10, the highest score possible, per ASTM D 3273.*
- Can be cut utilizing a standard utility knife and straightedge. With PermaBase's unique core composition, little or no additional labor is needed to clean the edge after a cut.
- PermaBase is impact resistant, extremely durable and dimensionally stable. It has excellent overall flexural, compressive and tensile strength characteristics.



A. Reinforced edge with EdgeTech® technology

B. Fiberglass mesh

C. Cementitious core

- PermaBase is highly moisture resistant, and will not rot, disintegrate or swell when exposed to water.
- 1/2" PermaBase may be used in 1 hour and 2 hour rated assemblies and is UL Classified.
- Lowest water absorption of any cement board per ASTM C 473.
- Available in various widths, lengths and thicknesses.

Warranty

- 10-year limited warranty for exterior applications.

***Mold and Mildew Resistance:**

When tested by an independent lab per ASTM D 3273 ("Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber"), PermaBase Cement Board achieved a score of 10, the best possible score for this test. No material can be considered "mold-proof," nor is it certain that any material will resist mold or mildew indefinitely. As with any building material, avoiding water exposure during handling, storage and installation, and after installation is complete, is the best way to avoid the formation of mold or mildew.

Can be cut using a standard utility knife.

Limitations

- Joints should be treated with alkali resistant fiberglass mesh tape set in a latex-Portland cement mortar.
- Conventional paper drywall tape, joint compound and drywall nails or screws should not be used.
- Maximum wall framing spacing should not exceed 16" o.c. and must be designed to limit deflection to L/360 under all live and dead loads.
- Steel wall framing must be 20 ga. (galvanized) or heavier – 16" o.c.
- PermaBase Cement Board is not a water barrier. Consult local building code for moisture barrier requirements.
- PermaBase Cement Board should not be exposed to temperatures over 220˚F (105˚C).

Composition

Cementitious Backer Unit (CBU): PermaBase Cement Board is a nailable, screwable backerboard panel which is composed of Portland cement, aggregates and reinforcements that has a significant ability to remain unaffected by prolonged exposure to moisture. PermaBase complies with ASTM C 1325 and ANSI A118.9.

Accessories

Joint Reinforcement: PermaBase mesh tape or equivalent must be used on all edges and cuts made to size. Use 4" wide polymer-coated (alkali resistant) mesh tape for exterior applications.

Bonding Materials: Treat joint and set facing material preferably with latex-Portland cement mortar or with dry-set (thin-set) mortar. All mortars should comply with ANSI A118.1 or A118.4 standards.

Fasteners: Galvanized roofing nails, 1-1/2" long with hot dipped galvanized coating, for use with wood framing. Nails should meet Federal Specification #FF-N105B/ type 2 style 20.

PermaBase corrosion resistant screws or equivalent, 1-1/4" or 1-5/8" long, for use with wood framing. Type S-12 screws or equivalent, 1-1/4" or 1-5/8" long, for use with 20 ga. or heavier steel framing.

Tape & Screws

National Gypsum recommends the use of PermaBase Tape and PermaBase Screws to complete your installation.

SIZES & PACKAGING

Size: Thickness, Width & Length	# of Pcs. Per Unit
PermaBase Cement Board	
1/2" x 36" x 5' (12.7 mm x 914 mm x 1524 mm)	50
1/2" x 36" x 8' (12.7 mm x 914 mm x 2438 mm)	30
1/2" x 48" x 8' (12.7 mm x 1219 mm x 2438 mm)	30
5/8" x 48" x 8' (15.9 mm x 1219 mm x 2438 mm)	24

COMPARISON CHART

Physical Feature Benefits	PermaBase	Other Cement Boards
Low Weight Glass Mesh Cement Board	●	○
Reinforced Edge	●	○
Fastens Near Edge With No Breakout	●	○
Highest Damage Resistancy From Handling	●	○
Cleanest To Score And Snap	●	○
Lowest Water Absorption	●	○
Meets 40 psf Rating Wind Load Test Results (Stud spacing 16" o.c.)	●	○
Cuts With Utility Knife vs. Power Tools	●	●
Inorganic vs. Organic Core	●	●

Applications

An ideal substrate for exterior applications such as:

- Tile applications
- Stucco applications
- Cement board stucco
- Thin brick
- Adhered stone veneer
- Soffit panels
- Sheathing panels
- Outdoor kitchens/grills

Installation

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.

Note: Cut or score PermaBase on rough side of panel.

Control Joints: For exterior installations, allow a maximum of 16 lineal feet between control joints. Consult finish manufacturer for other requirements.

For exterior tile applications, control joints should be spaced a maximum of every 12'. 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.

WALLS & CEILINGS

Wall Framing: Studs should be spaced a maximum of 16" o.c. Edges/ends 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.

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.

Weather Barrier: While PermaBase is unaffected by moisture, a water resistant barrier (WRB) must be installed to protect the cavity. The type and specific placement or location of the water barrier will vary based on local building codes and/or manufacturers warranties. Consult the WRB manufacturer's recommendations for specific installation guidelines.

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.

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, approximately 1/16" thick coat of bonding material over entire joint. For all joints, immediately embed 4" 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.

PermaBase Exterior Advantages

- Factory produced substrate consistently manufactured to strict ASTM C 1325 standards
- Time and labor saving alternative to field applied metal lath, brown and scratch coat substrates
- Reduced dependence on jobsite weather conditions
- Qualifies for systems warranty

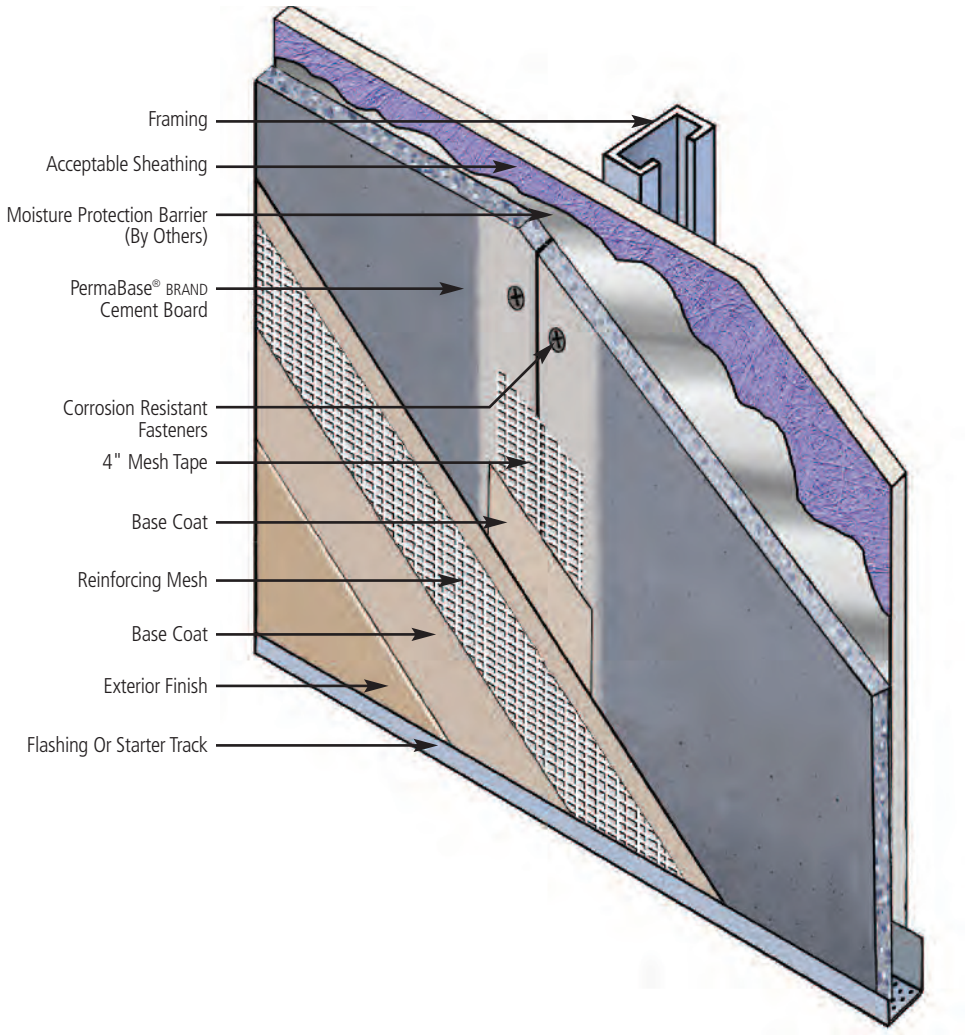
Cement Board Stucco Wall System

Description

Cement Board Stucco is a water-managed exterior wall system designed to provide increased high-impact and weather resistance and improved dimensional stability where exterior insulation value is not required. For the purposes of meeting structural racking or fire code requirements, it is applied over the following approved sheathings: Exposure 1 or exterior plywood (grade C-D or better); Exposure 1 OSB; glass mat gypsum substrate meeting ASTM C 1177.

It combines the strength and durability of PermaBase Cement Board with the performance and beauty of reinforced base coats and textured finishes. All finishes are available in a limitless color selection and offer performance enhancement options ranging from extra mildew resistance to added flexibility.

Behind the system, a weather-resistant barrier complying with ASTM D-226 protects approved sheathings and other structural components and serves as a component to evacuate incidental water. Cement Board Stucco allows you to enclose and finish a project in as little as two days, speeding project completion.



Uses

For high-impact and weather-resistant exterior wall in residential and low-rise commercial applications.

The following manufacturers have Evaluation Service Reports that list PermaBase Cement Board as a component:

STO: ESR-2536

Parex: ESR-2045

Senergy: ESR-2357, ESR-2358, ESR-2359, ESR-2022

Advantages

Durability/Strength: Moisture resistant, durable PermaBase Cement Board substrates applied over a primary sheathing provide extraordinary impact and puncture resistance to the system.

Weather Resistance: 100% Acrylic base coats and finishes repel weather at the system's surface.

Water-Managed Design: The water-managed design of the system provides drainage to the exterior of incidental water that might enter around or through window or door openings and penetrate behind the cladding in frame construction.

Design Options: Cement Board Stucco provides the popular stucco look, including the attachment of special pre-molded shapes and a wide variety of finish texture and color options in standard colors and custom colors.

Contact exterior coatings manufacturer for color options and installation instructions.

Limitations

- Use is limited to residential and low-rise commercial applications.
- Thin veneer construction can tend to reveal planar irregularities in the frame construction.
- Minor cracking at joints might become visible in the finished exterior surface.
- For exterior finishes applied direct to PermaBase, reinforcing mesh must be embedded in basecoat. Consult exterior finish manufacturer for additional installation requirements.
- For conventional Portland Cement plaster systems, self-furring metal lath must be used over PermaBase and fastened to studs.

Masonry Veneer Installation Systems (MVIS)

PermaBase as a component of MVIS Systems

The use of adhered manufactured stone and thin brick masonry veneers is increasing in popularity. Masonry Veneer Installation Systems (MVIS) have been designed to offer complete, engineered solutions for the installation of manufactured and natural stone masonry veneer, as well as thin brick veneers.

These systems have been developed and are marketed by various manufacturers of the adhering materials used to install them as well as the veneer manufacturers themselves. MVIS Systems offer increased performance by utilizing polymer modified adhesive mortars which have been designed for hanging materials versus type S and N mortars that were primarily designed for stacking materials. In some cases these systems offer warranties.

Several of these systems call for the use of an ASTM C 1325 cement board. In addition to meeting this requirement, the features and benefits of PermaBase Cement Board make it an ideal component for use in these systems.

Advantages

Durability/Strength: Moisture resistant, durable PermaBase Cement Board substrates are applied over a primary sheathing to provide a durable, dimensionally stable surface to adhere veneers to.

Consistency: PermaBase is produced in a factory controlled environment which provides for a consistent product produced within tighter tolerances than can be achieved with field fabricated substrates.

Cutting and handling: PermaBase is produced with its patented EdgeTech technology. The tapered, reinforced edge design allows for fastening of nails or screws closer to the edge without crumbling or spinout. The homogeneous core provides a very clean score and snap using a standard drywall knife.

Low Water Absorption: PermaBase has the lowest water absorption of any cement board which provides greater open time and increased workability of the adhering materials used in the application of veneer products.

Limitations

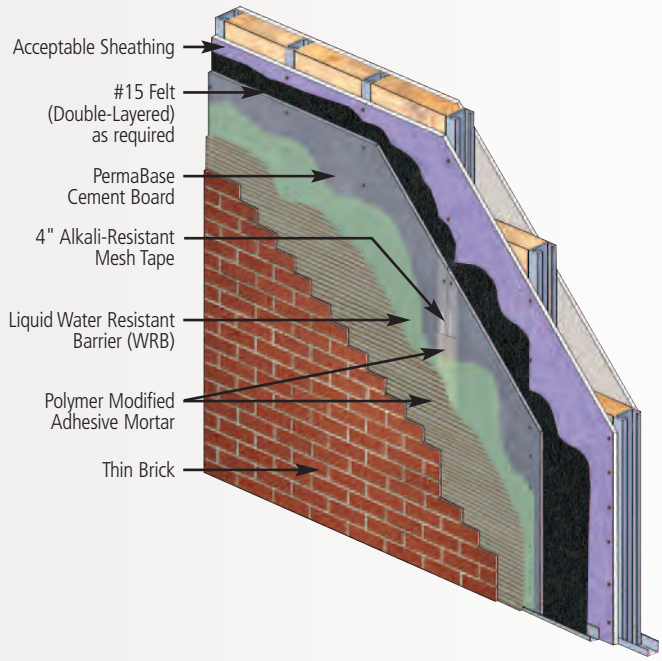
Use is limited to residential and low-rise commercial applications. MVIS Systems utilize a primary sheathing beneath the PermaBase cement board to provide required structural performance. The selection and installation of this sheathing varies according to the type of wall construction.

The details below are provided to give a general sense of representative MVIS Systems only.

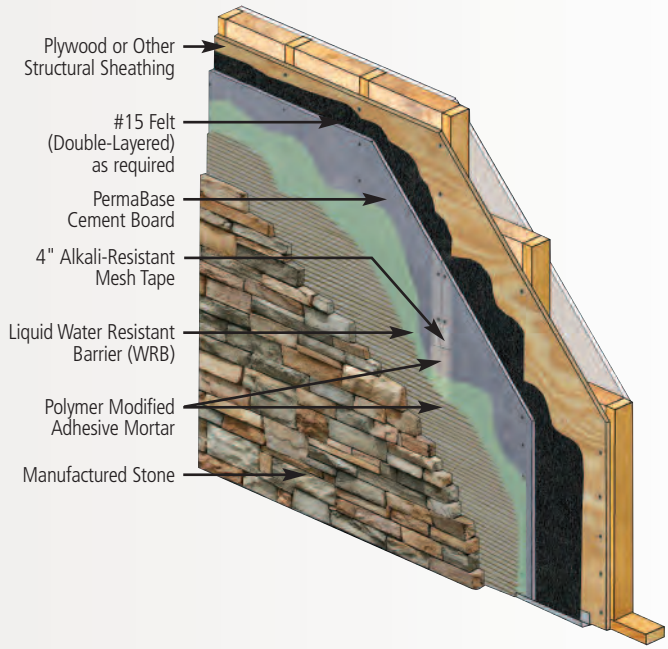
Water Resistant Barriers (WRB)

While PermaBase is unaffected by moisture, a water resistant barrier (WRB) must be installed to protect the cavity. One of the advantages of MVIS is the ability to incorporate an effective, accountable water management system. The type and specific placement of the water barrier will vary based on local building codes and/or manufacturers warranties. Consult the WRB manufacturer's recommendations for specific installation guidelines.

Thin Brick Exterior Metal Stud Assembly



Manufactured Stone Exterior Wood Stud Assembly



The information in this section of the PermaBase Exterior Applications Guide provides information on how to utilize PermaBase within an MVIS System. While some typical examples are shown below for reference purposes, the specifications and details on how to design and construct individual systems should be obtained from the adhering material or veneer manufacturer of the materials that are being used to complete the system.
For more information go to **permabase.com/MVIS.**

PermaBase® BRAND Cement Board Technical Data

Technical Data

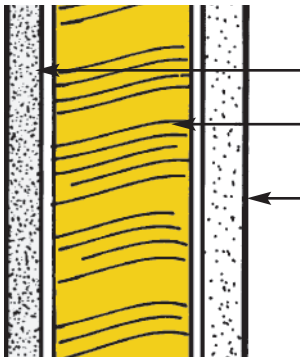
Fire-Rated Wall Assemblies

PermaBase Cement Board has been tested and/or approved for use in a variety of fire-rated wall systems.

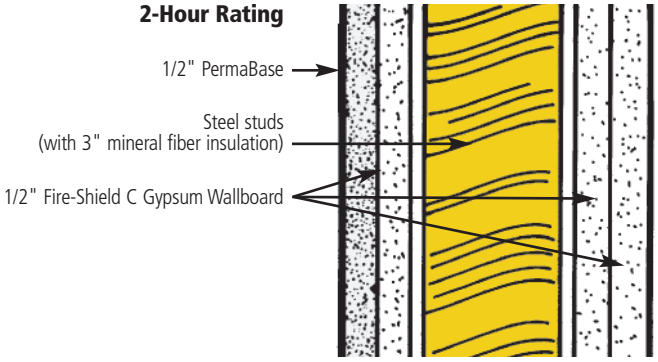
1-Hour Rating – The 1-hour wall assembly consists of 3-5/8" steel studs, 16" o.c., one layer of 1/2" PermaBase attached horizontally or vertically with 1-1/4" long cement board screws 8" o.c. in the field and perimeter on one side and one layer of 5/8" Fire-Shield® wallboard attached vertically on opposite side with joints staggered to those of opposite side, with 1-1/4" long drywall screws 8" o.c. in the field and perimeter with 3" thick mineral fiber insulation batts in the stud cavities. UL V452, ITS/WHI Report No. J99-4001.

2-Hour Fire Rating – The 2-hour wall assembly consists of 3-5/8" steel studs, 16" o.c. on one side, base layer of 1/2" Fire-Shield C or 5/8" Fire-Shield wallboard attached vertically with 1" drywall screws 24" o.c. in the field and perimeter and face layer of 1/2" PermaBase attached vertically with 1-5/8" cement board screws, 8" o.c. in the field and perimeter. Two layers of 1/2" Fire-Shield C or 5/8" Fire-Shield wallboard applied vertically to the opposite side, base layer attached with 1" drywall screws 24" o.c. in the field and perimeter and face layer attached with 1-5/8" drywall screws 12" o.c. in the field and perimeter, with 3" thick mineral fiber insulation batts in the stud cavities. All joints staggered between face and base layer. UL V452, ITS/WHI Report No. J98-32931.

1-Hour Rating



2-Hour Rating



PHYSICAL PROPERTIES

Property	Test Method	1/2" PermaBase
Water Absorption % by Weight/24 Hours	ASTM C 473	<8
Flexural Strength (psi)	ASTM C 947	750
Fastener Holding (Wet and Dry, lbs.)	ASTM D 1037 (0.400" head diameter)	90
Weight (psf)	ASTM C 473	3
Freeze/Thaw (cycles) per ANSI A118.9	ASTM C 666 Procedure B	100
Flame Spread/ Smoke Developed	ASTM E 84	0/0
Compressive Strength (psi) (Indentation)	ASTM D 2394	2250
Wind Load (psf, studs 16" o.c.)	ASTM E 330	40
Thermal "R"/k Value	Property of Material	0.2/2.7
Bending Radius (ft.)	Property of Material	5
Falling Ball Impact (12" drop)	ASTM D 1037	pass
Linear Variation (Due to change in moisture content)	ASTM D 1037	0.05%
Fungus Resistance	ASTM G 21	(No growth)
Mold Growth on Surface	ASTM D 3273*	10

* When tested by an independent laboratory per ASTM D 3273 ("Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber"), PermaBase achieved a panel score of 10, the highest score possible, indicating no mold growth under the laboratory test conditions. The use of PermaBase in actual installations may not produce the same results as were achieved in controlled laboratory conditions. No material can be considered "mold proof," nor is it certain that any material will resist mold indefinitely.

PermaBase meets the following codes and standards:

2006/2009 International Residential Code
2006/2009 International Building Code
ASTM C 1325
ANSI A118.9
ICC Acceptance Criteria 59 (AC59)

Code Report References

ICBO ES Inc. ER-5731
PermaBase Cement Board

National Evaluation Service Inc.
Report No. NER-578
PermaBase Cement Board

PermaBase BRAND Flex® Cement Board

Description

PermaBase BRAND Flex® Cement Board is a polymer-modified cement board reinforced with an alkali-resistant fiber mesh ideal for use around ceilings, beams, columns, arches and archways, walls and anywhere an evenly curved surface is required.

Applications

- Radius wall construction
- Exterior and interior columns
- Barrel ceilings
- Radius shower walls
- Radius tub step-ups
- Radius archways
- Radius stair construction
- Saunas and steamrooms

Features/Benefits

- 6" (150 mm) minimum radius for 90° corners.
- Bends immediately, easily and evenly.
- The only 1/2" lightweight cement board that bends.
- Can be bent without water saturation or kerf cuts.
- Easy installation, reduces skilled labor costs.
- Easy to cut and install with screws.
- Can be used for interior or exterior applications.
- Impact resistant.
- Creates uniform curved surfaces.
- Unaffected by water or moisture.
- Dimensionally stable.

Installation

EXTERIOR APPLICATIONS

PermaBase Flex Cement Board: Apply PermaBase Flex 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 Flex is tight to framing.

For additional information on wall and ceiling framing, see *PermaBase Construction Guide.*

Limitations

- For convex surfaces, PermaBase Flex must be applied with the rough surface and tapered edges exposed.
- For concave surfaces, PermaBase Flex must be applied with the smooth surface exposed.
- PermaBase Flex Cement Board should not be used for fire-rated assemblies.
- Maximum framing spacing should not exceed 8" o.c. and must be designed to limit deflection to less than L/360 under all live and dead loads.
- Steel framing must be 20 gauge or heavier.
- PermaBase Flex should be used on curved walls and ceilings. For flat walls and ceilings use PermaBase Cement Board.
- PermaBase Flex Cement Board is vapor permeable and unaffected by water but is not a water barrier. Consult local building code for moisture barrier requirements.
- Do not use drywall nails, screws or drywall fiberglass mesh tape.
- Maximum fastener spacing should not exceed 8" o.c. for wall and 6" o.c. for ceiling applications.

LIMITED WARRANTY AND REMEDIES

Products manufactured and sold by National Gypsum are warranted by National Gypsum to its customers to be free from defects in materials and workmanship at the time of shipment. Additional or different express limited warranties, limitations and exclusions may apply to specific National Gypsum products. Current warranty information on such products for both commercial and residential applications is available at ***nationalgypsum.com****. THIS EXPRESS WARRANTY IS THE ONLY WARRANTY APPLICABLE TO SUCH PRODUCTS, AND IS IN LIEU OF AND EXCLUDES ALL OTHER EXPRESS ORAL OR WRITTEN WARRANTIES AND ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.*

National Gypsum will not be liable for any incidental, indirect or consequential losses, damages or expenses. The customer's exclusive remedy for any type of claim or action for defective products will be limited to the replacement of the products (in the form originally shipped) or, at National Gypsum's option, to a payment or credit not greater than the original purchase price of the products.

National Gypsum will not be liable for products claimed to be defective where the defect resulted from causes not within National Gypsum's control, or which arose or occurred after shipment, including but not limited to accidents, misuse, mishandling, improper installation, contamination or adulteration by other materials or goods, or abnormal conditions of temperature, moisture, dirt or corrosive matter.

Any claim that products sold by National Gypsum were defective or otherwise did not conform to the contract of sale is waived unless the customer submits it in writing to National Gypsum within thirty (30) days from the date the customer discovered or should have discovered the defect or nonconformance. No legal action or proceeding complaining of goods sold by National Gypsum may be brought by the customer more than one year after the date the customer discovered or should have discovered the defect or problem of which it complains.

Member of TCNA Tile Council of North America, Inc.

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