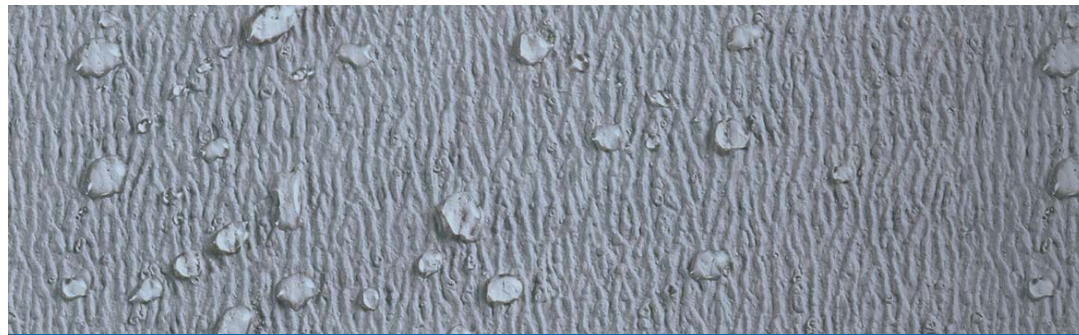


DensShield®

Tile Backer

DensShield is an ideal tile backer board for high moisture areas because it has a built-in moisture barrier that stops moisture at the surface.



**MOISTURE- AND MOLD-RESISTANT
FIBERGLASS MAT TILE BACKER**

Overview of Products

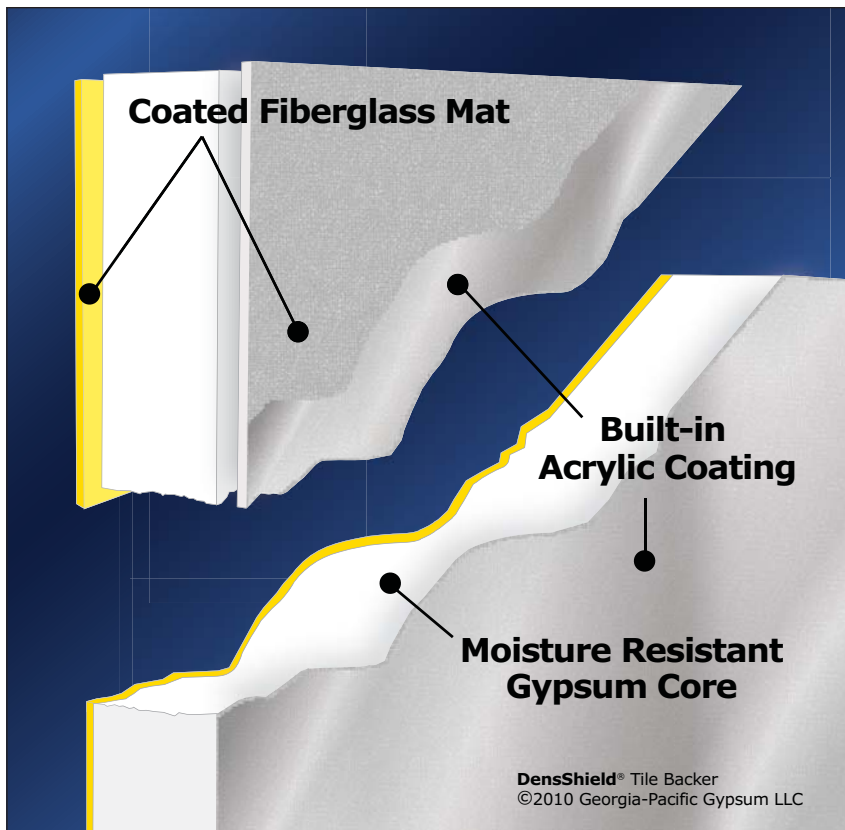


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DensShield® Tile Backer is designed for use as a tile substrate for walls, ceilings, floors and countertops. DensShield is an ideal tile backer board for high moisture areas because it has a built-in moisture barrier that stops moisture at the surface. This special coating helps protect the tile installation and wall cavity from moisture intrusion. DensShield panels are mold resistant, scoring a 10, the highest score, when tested in accordance with ASTM D 3273.*

- *Patented product with treated, water-resistant core.*
- *Fiberglass mats on front and back add strength.*
- *Grey, heat-cured acrylic coating helps protect the tile installation and wall cavity from moisture intrusion and damage.*
- *The only tile backer in the industry with a built-in moisture barrier and a proprietary water-resistant treated core.*

DensShield Tile Backer is the first and only tile backer listed as a GREENGUARD microbial-resistant product by a leading third-party organization, GREENGUARD Environmental Institute. This listing means DensShield Tile Backer, which features fiberglass mats instead of the paper facings used on the surface of traditional tile backers, resists mold growth. The microbial-resistant test is based on ASTM Standard D 6329, a testing standard set by ASTM International, which develops testing guidelines and procedures for building materials, products, systems and services.

Georgia-Pacific Gypsum Products and LEED®

Many of our products may contribute to LEED® credits. To find out more, please reference the Sustainable Materials Data Sheets (SMDS) on our website (www.gpgypsum.com) for recycled content, regional materials, low emitting materials and other potential categories for LEED credit contributions.

*See Mold Resistance Test on page 4.

CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

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Physical Properties

Properties	1/4" (6.4 mm) DensShield®	1/2" (12.7 mm) DensShield®	5/8" (15.9 mm) DensShield® Fireguard®
Width, standard	4' (1220 mm)	4' (1220 mm), 32" (813 mm)	4' (1220 mm)
Length, standard	4' (1220 mm)	5' (1524 mm) 8' (2438 mm)	8' (2438 mm)
Edges	square	square	square
Weight, lbs./sq. ft., nominal (kg/m ²)	1.6 (7.8)	2.0 (9.8)	2.5 (12.2)
Bending Radius	8' (2438 mm)	12' (3658 mm)	16' (4877 mm)
Fire Classification	n/a	*	Type X (ASTM C 1178), UL classified**
R Value, F•ft ² •hr/Btu (K•m ² /w)	.56 (0.098)	.56 (0.098)	.67 (0.118)
Standards	ASTM C 1178	ASTM C 1178	ASTM C 1178
Code Evaluation	IRC and IBC Code Compliant, NY MEA 65-88-M, ICC-ES Legacy Report NER 572		
TCNA Recognition	ASTM C 627 (Robinson Floor Test); Floors - F146, F151; Radiant Floor - RH135; Walls - W221, W222, W223, W243, W245; Ceilings - C311, C312, C315; Tubs - B413, B419; Showers - B420; Counter Top - C513		

*1/2" DensShield can be used as a component of certain one-hour and two-hour fire-rated assemblies, as indicated on pages 11 and 12.

** Consult the UL Directory for approved use.

Fastener Guide

Application	Fastener	Min. Length	Spacing
		1/2" (13 mm) / 5/8" (16 mm)	
Walls & Ceilings	Galvanized* roofing nail	1-1/2" (38 mm) 1-3/4" (45 mm)	6" (152 mm) o.c. along framing
Walls & Ceilings (wood frame)	Buglehead, rust resistant*, coarse thread, sharp point screw	1-1/4" (32 mm) 1-5/8" (41 mm)	6" (152 mm) o.c. along framing
Walls & Ceilings (metal frame)	Buglehead, fine thread, sharp point rust resistant* drywall screw	1-1/4" (32 mm)	6" (152 mm) o.c. along framing
Floors	Galvanized* roofing nail	1-1/4" (32 mm)	8" (203 mm) o.c. in both directions
Floors	Buglehead, corrosion resistant*, coarse thread, sharp point screw	1-1/4" (32 mm)	8" (203 mm) o.c. in both directions
Floors (1/4" only) (6.4 mm only)	1/4" (6 mm) crown, corrosive resistant* chisel point staples	7/8" (22 mm)	2" (51 mm) o.c. on edges 4" (102 mm) o.c. in field

Note: For walls, fasteners should penetrate at least 3/4" (19 mm) into the wood framing.

*Contact fastener manufacturer for proper selection of corrosion resistance.

Testing and Code Recognition

Robinson Floor Test/ASTM C 627 – DensShield® Tile Backer passed the industry standard test conducted by the Tile Council of North America for residential and light commercial floors.

Adhesion Bond Testing – CTC-Geotek conducted tests comparing adhesion capabilities using most major manufacturers' setting materials. The tests concluded that bonds with DensShield Tile Backer are as good, if not better, than bonds with cement board.

Moisture Wick Testing – The Ceramic Tile Institute wicking test CTI-T83 procedures showed that within a 24-hour period, cement board will “wick” at least 3” (76 mm) up the board while DensShield Tile Backer will wick less than 1/3” (8 mm) during that same period.

Shower Test – In a test by an independent testing laboratory, DensShield Tile Backer was subjected to a shower of water at 110°F (43.3°C), 12 minutes per hour, 24 hours a day, 7 days a week for six months. The installation had no grout between the tiles. No deterioration occurred to either the back board, the framing members or the wall cavity. Cement board, gypsum fiber board and fiber cement boards tested under the same conditions. DensShield Tile Backer out performed all competitive backer boards.

The DensShield Tile Backer test was designed to represent 12 years of regular shower use. **Although cementitious backer boards would not likely deteriorate under the same conditions, the possibility exists for deterioration of framing members and the wall cavity due to water infiltration if a moisture barrier isn't positioned behind the cementitious backer unit.**

Percolation Test – The International Code Council–Evaluation Service (ICC-ES) percolation test measures how much water will pass through a panel within 48 hours. The test determines if an additional moisture barrier should be installed. The test consists of a 2” (51 mm) diameter tube, 48” (1220 mm) long, bonded to test samples with silicone sealant. The tube is filled with water and after the allotted time, the remaining water is measured (minus evaporation).

1/8” (3 mm) of water passed through DensShield Tile Backer, 19” (483 mm) + of water passed through one cementitious tile substrate sample and 43” (1092 mm) + of water passed through another sample of cement board. **The test shows that DensShield Tile Backer stops water at the surface, while cement boards allow water to pass through their porous construction.**

The Tile Council of North America requires the use of a membrane in wet areas for cement backer boards but does not require a membrane for DensShield Tile Backer since DensShield panels have a built-in moisture barrier that stops moisture at the surface.

Mold Resistance Test – When tested, as manufactured, in accordance with ASTM D 3273, DensShield Tile Backer scored a 10, the highest level of performance for mold resistance under the ASTM D 3273 test method.

The score of 10, in the ASTM D 3273 test, indicates no mold growth in a 4-week controlled laboratory test. The mold resistance of any building product when used in actual job site conditions may not produce the same results as were achieved in the controlled, laboratory setting. No material can be considered mold proof. When properly used with good design, handling and construction practices, Dens™ Brand gypsum products provide increased mold resistance compared to standard paper-faced wallboard.

DensShield Tile Backer is the first and only tile backer listed as a GREENGUARD microbial-resistant product by a leading third-party organization, GREENGUARD Environmental Institute. This listing means DensShield Tile Backer, which features fiberglass mats instead of the paper facings used on the surface of traditional gypsum tile backers, resists mold growth. The microbial resistant test is based on ASTM Standard D 6329, a testing standard set by ASTM International, which develops testing guidelines and procedures for building materials, products, systems and services.

Standards and Code Compliance – IRC and IBC Code Compliant DensShield Tile Backer in 1/4” (6.4 mm), 1/2” (12.7 mm) and 5/8” (15.9 mm) thicknesses meets ASTM C 1178 as a fiberglass mat gypsum substrate for use as tile backer. DensShield Tile Backer has the following evaluation reports: ICC-ES Legacy Report NER 572; New York City MEA 65-88-M.

DensShield Tile Backer installation information is listed in the current Tile Council of North America (TCNA) Handbook for Ceramic Tile Installation.

CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

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Tub/Shower Walls or Ceilings

DS001 Walls or Ceilings

DensShield® Tile Backer can be used as a tile substrate in residential and commercial wall applications. Attach DensShield Tile Backer with grey side facing the interior. Tiles should always be applied to grey side. Cut panel to required size and make cutouts. Fit ends and edges closely. Do not leave gaps between panels.

DensShield Tile Backer may be cut by using a utility knife to score, then snap, working from the grey face side.

For walls, when used as a tile substrate, 20-gauge (30 mils) steel or wood framing should be spaced no greater than 16" (406 mm) o.c. or 24" (610 mm) with blocking at all joints for 1/2" (12.7 mm) DensShield Tile Backer and 24" (610 mm) o.c. for 5/8" (15.9 mm) DensShield Tile Backer. Board can be applied horizontally or vertically.

For ceilings, framing should be spaced no greater than 12" (305 mm) o.c. for 1/2" (12.7 mm) or 16" (406 mm) o.c. for 5/8" (15.9 mm) thickness. Board should be applied perpendicular to framing.

Fasteners shall be spaced 6" (152 mm) o.c. for walls and ceilings for wood and metal framing. Do not countersink. Drive fasteners flush with grey coated surface. See Fastener Guide for proper selection.

Do not use additional vapor retarder behind DensShield. DensShield Tile Backer has a built-in moisture barrier.

Do not use DensShield panels as a base for nailing and mechanical fastening.

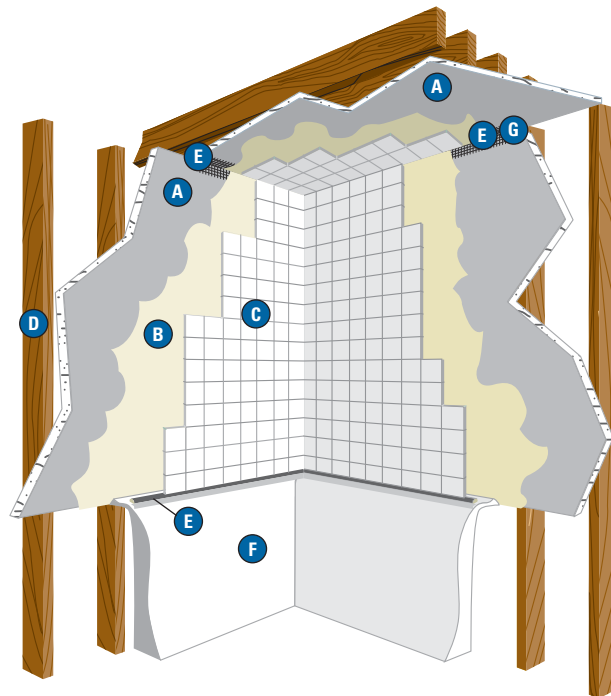
In all corners, bed self-adhesive 2" (51 mm) wide fiberglass mesh tape in a bead of flexible sealant. Bed tape on all joints and corners with material used to set tiles.

Caulk or seal fixture/plumbing penetrations and abutments to dissimilar materials.

Do not use all-purpose joint compound or paper tape in wet areas.

In areas outside the shower where DensShield Tile Backer meets gypsum board: (1) If the tiles fall over the DensShield Tile Backer-to-gypsum board joint, apply 2" (51 mm) wide fiberglass mesh tape and skim with tile setting material (Type I mastic or latex modified thin-set). (2) If the tiles stop before the DensShield Tile Backer-to-gypsum board joint, apply 2" (51 mm) wide fiberglass mesh tape and skim with setting type joint compound to achieve a smooth and paintable surface. (3) For areas that will not be exposed directly to moisture, all purpose joint compound may be used.

- A. DensShield Tile Backer
- B. Tile adhesive
- C. Tiles
- D. Wood or min. 20-gauge (30 mils) metal framing
- E. Flexible sealant into min. 1/8" (3 mm) gap
- F. Bathtub
- G. Fiberglass mesh tape



DS002 Shower Pan

Install DensShield® Tile Backer on walls according to assembly DS001.

Shower pan or rubber membrane must be adequately sloped to the open drain or weep-hole detail to permit proper water drainage.

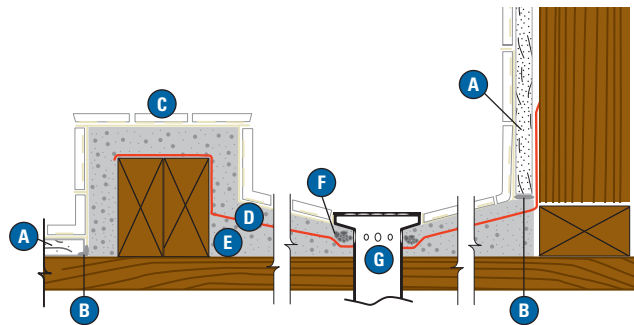
For showers with curbs, apply waterproof membrane up walls minimum 2" (51 mm) and maximum 4" (102 mm) above curb. Do not use DensShield Tile Backer in the curb.

For showers without curbs, apply waterproof membrane up walls minimum 6" (152 mm) and maximum 8" (203 mm).

Wood or other satisfactory blocking should be applied at the bottom framing to support the vertical sides of the shower pan or membrane and DensShield Tile Backer.

Do not place DensShield Tile Backer into a conventional shower pan mortar bed. Leave minimum 1/8" (3 mm) gap and fill with flexible sealant.

- A. DensShield Tile Backer
- B. Flexible sealant into min. 1/8" (3 mm) gap
- C. Tiles
- D. Sloped rubber membrane
- E. Sloped mortar bed
- F. Crushed stone
- G. Weep holes



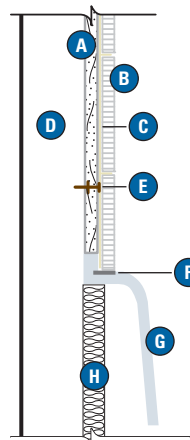
DS003 Bathtub Receptor

Apply DensShield Tile Backer either horizontally or vertically on walls as shown in DS001.

To prevent water penetration, completely fill the space between tile and tub with a flexible sealant.

To compensate for the tub flange, some contractors add a furring strip to the framing members. This enables them to hang the DensShield within 1/8" (3 mm) from the top of the tub.

- A. DensShield Tile Backer
- B. Tiles
- C. Tile adhesive (latex thinset mortar or mastic)
- D. Wood or minimum 20-gauge (30 mils) metal studs
- E. Fastener
- F. Flexible sealant into min. 1/8" (3 mm) gap
- G. Bathtub
- H. Fireproofing when required (by other trades)

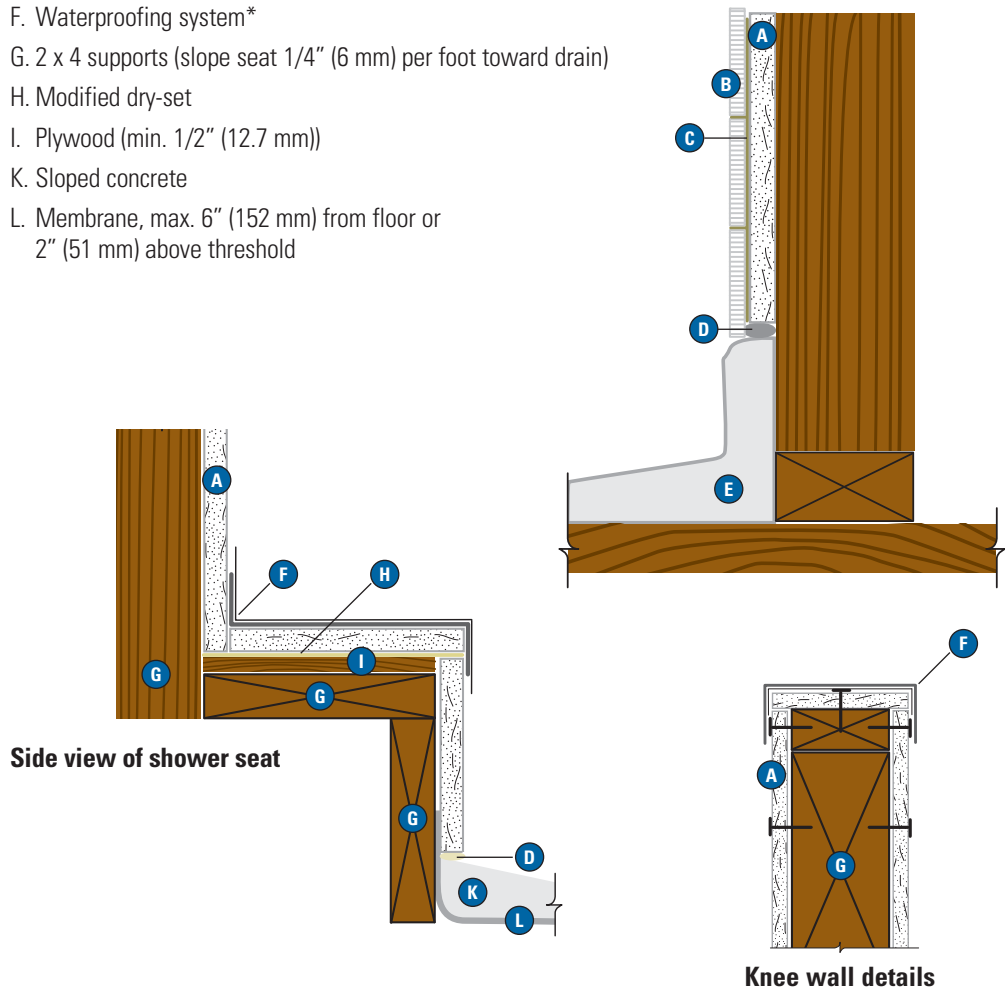


DS004 Other Details

Apply DensShield® Tile Backer either horizontally or vertically on walls as shown in DS001.

To prevent water penetration, completely fill the space between tile and tub with a flexible sealant.

- A. 1/2" (12.7 mm) or 5/8" (15.9 mm) DensShield Tile Backer
- B. Tiles
- C. Tile adhesive (latex thinset mortar or mastic)
- D. Flexible sealant into min. 1/8" (3 mm) gap
- E. Shower pan
- F. Waterproofing system*
- G. 2 x 4 supports (slope seat 1/4" (6 mm) per foot toward drain)
- H. Modified dry-set
- I. Plywood (min. 1/2" (12.7 mm))
- K. Sloped concrete
- L. Membrane, max. 6" (152 mm) from floor or 2" (51 mm) above threshold



*See table on page 11 for waterproofing system examples.

Residential and Light Commercial Floors

DS005

1/4" (6.4 mm) and 1/2" (12.7 mm) DensShield® Tile Backer can be used as a tile substrate in residential and light commercial floor tile applications as defined in the *Handbook for Ceramic Tile Installation*, published by the Tile Council of North America.

Laminate DensShield panels, grey coated side up, to subfloor using a latex portland cement mortar liberally applied with minimum 1/4" x 1/4" x 1/4" (6.4 x 6.4 x 6.4 mm) square-tooth notched trowel. Embed DensShield Tile Backer into mortar while still pliant (do not exceed open time). Stagger DensShield Tile Backer joints so as not to align with subfloor joints. Butt panels tightly to each other. Leave no gaps between panels.

Fasten panels to subfloor with 1-1/4" (32 mm) galvanized roofing nails or corrosion-resistant screws. Begin fastening in the center of each panel, working your way to the edges. Avoid nailing into floor joists on new construction to prevent nail pops. Space fasteners no greater than 8" (203 mm) o.c. in both directions. Drive fasteners flush with the acrylic surface. Do not countersink.

Staples: (1/4" (6.4 mm) DensShield only) 1/4" (6.4 mm) or larger crown corrosive-resistant chisel-point staples equal to approximately the total thickness of underlayment and subfloor. Staples shall be placed 2" (51 mm) o.c. around the perimeter and 4" (102 mm) o.c. in the field ensuring that the staples are between 3/8" (10 mm) and 1/2" (13 mm) from ends and edges.

Apply 2" (51 mm) wide fiberglass mesh tape over joints. Embed tape with setting material.

Apply flooring-grade tile with latex portland cement mortar. Full-thickness thresholds should be used and butted against the DensShield panels, flush with the tile surface. Use a 2" x 2" (51 x 51 mm) or larger floor-grade tile.

Use either standard floor grout (ANSI A118.6) or polymer modified grout (ANSI A118.7).

DensShield Tile Backer is not to be used in conjunction with heated floor systems that exceed 125°F (52°C) continuous temperature.

DensShield Tile Backer is not for exterior use.

Do not use Type I organic mastics for floor applications.

Requirements:

Design floor areas over which tile is to be applied to have a deflection not greater than L/360 of the span when measured under 300 lb. (136 kg) concentrated load (see ASTM C 627) or as required by code or tile manufacturer. Maximum variation in the subfloor surface shall not exceed 1/2" (13 mm) in 10'-0" (3048 mm) from the required plane or as required by design/code.

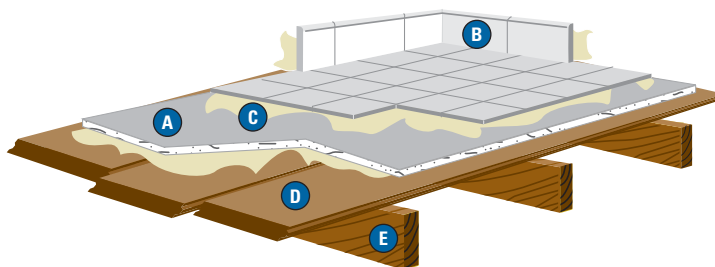
Materials:

Coated fiberglass mat backer – ASTM C 1178. Latex portland cement mortar – ANSI A118.4. Polymer modified tile grout – ANSI A118.7.

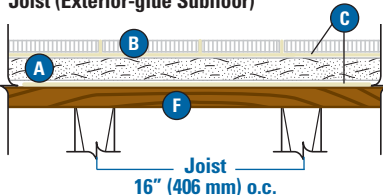
Installation Specifications:

Coated fiberglass mat backer board in accordance with manufacturer's literature. Tile – ANSI A 108.5. Grout – ANSI 108.10.

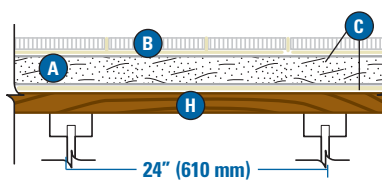
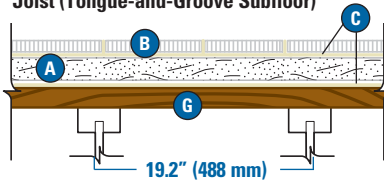
- A. Min. 1/4" (6.4 mm) DensShield Tile Backer
- B. Tile
- C. Latex Portland Cement Mortar
- D. Subfloor
- E. Floor Joists
- F. 5/8" (15.9 mm) APA Rated Sturd-I-Floor®
- G. 3/4" (19 mm) APA Rated Sturd-I-Floor®
- H. 7/8" (22.2 mm) APA Rated Sturd-I-Floor®



DensShield Tile Backer Over Conventional Joist (Exterior-glue Subfloor)



DensShield Tile Backer Over Engineered Joist (Tongue-and-Groove Subfloor)



Minimum Subfloor Thickness	Maximum Joist Spacing
5/8" (15.9 mm) Plywood Sturd-I-Floor®*	16" (406 mm) o.c. joists
3/4" (19 mm) Plywood Sturd-I-Floor®*	19.2" (488 mm) o.c. engineered lumber
7/8" (22.2 mm) APA Rated Sturd-I-Floor®	24" (610 mm) o.c. engineered lumber

*3/4" (19 mm) OSB is acceptable

The application of thin-set over subfloor provides a leveling bed between the subfloor and the back of DensShield Tile Backer. If this step is not completed, air gaps can cause movement and crack the grout lines. (This step is common with all other backer board products.)

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Countertops

DS006

Plywood must be installed flat and level.

Framing spacing should not exceed 24" (610 mm) o.c.

Install minimum 1/2" (12.7 mm) exposure 1 plywood on top of supports.

Provide support on overhangs on cantilever counters to prevent movement.

Apply leveling bed of latex portland cement mortar to plywood using 1/4" x 1/4" x 1/4" (6.4 x 6.4 x 6.4 mm) notched trowel.

Apply clean, dry DensShield® Tile Backer to base (grey acrylic coated side up), fastening every 6" (152 mm) to 8" (203 mm) o.c. in both directions into substrate while leveling bed is still fluid. Use either 1-1/4" (32 mm) galvanized roofing nails or 1-1/4" (32 mm) rust-resistant drywall screws.

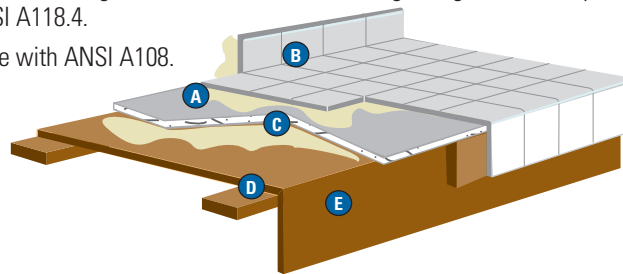
Stagger joints of DensShield Tile Backer panels with those of the plywood base.

Butt DensShield Tile Backer joints tightly. Tape all joints and corners using 2" (51 mm) wide self-adhering fiberglass mesh tape. Embed tape with latex portland cement mortar that meets ANSI A118.4.

Install tile, expansion and control joints and grout in accordance with ANSI A108.

Use latex portland cement mortar to set tile.

- A. Min. 1/4" (6.4 mm) DensShield Tile Backer
- B. Tile
- C. Latex Portland Cement Mortar
- D. Framing support
- E. Base min. 1/2" (12.7 mm) plywood



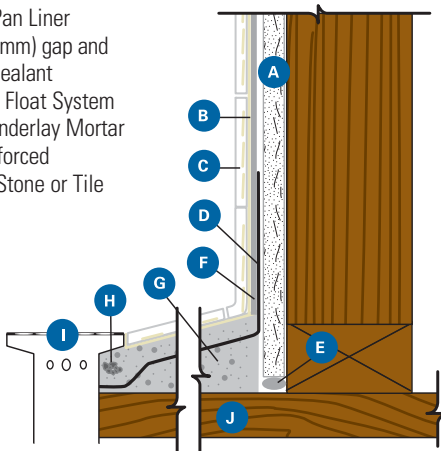
Showers

DS007 One Coat Float Tile Assembly

- DensShield Tile Backer can be installed as a baseboard for a traditional reinforced floated wall tile system attached to the framing. DensShield Tile Backer may be hung either vertically or horizontally for wall applications.
- Grey coated side should always face out, away from the studs.
- Framing should be spaced no greater than 16" (406 mm) o.c.
- Attach DensShield Tile Backer, spacing fasteners 6" (152 mm) o.c. along studs for wood or metal framing.
- For tub and pre-formed shower pans, leave a 1/8" (3 mm) to 1/4" (6.4 mm) gap above the lip, and fill with flexible sealant.
- For shower pan receptors with membranes, the lath membrane shall be installed in a weather board fashion over the pan membrane.
- Attach membrane and lath per lath and membrane manufacturers' guidelines. Apply mortar bed per TCNA assembly W231. Membrane (ANSI A-2.1.8) shall be installed such that water is continually sloped toward the drain.

DensShield® with Tile Installation

- A. 1/2" (12.7 mm) or 5/8" (15.9 mm) DensShield® Tile Backer
- B. Tile Adhesive (latex thinset mortar or mastic)
- C. Tile
- D. Shower Pan Liner
- E. 1/4" (6.4 mm) gap and Flexible Sealant
- F. One Coat Float System
- G. Sloped Underlay Mortar Bed, reinforced
- H. Crushed Stone or Tile
- I. Drain
- J. Subfloor

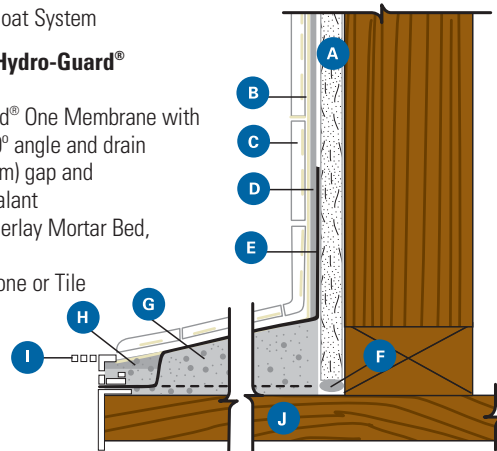


DensShield with Tile Installation

- A. 1/2" (12.7 mm) or 5/8" (15.9 mm) DensShield Tile Backer
- B. Tile Adhesive (latex thinset mortar or mastic)
- C. Tile
- D. One Coat Float System

Mer-Krete® Hydro-Guard® One System

- E. Hydro-Guard® One Membrane with Fabric at 90° angle and drain
- F. 1/4" (6.4 mm) gap and Flexible Sealant
- G. Sloped Underlay Mortar Bed, reinforced
- H. Crushed Stone or Tile
- I. Drain
- J. Subfloor



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Non-Tile Walls or Ceilings

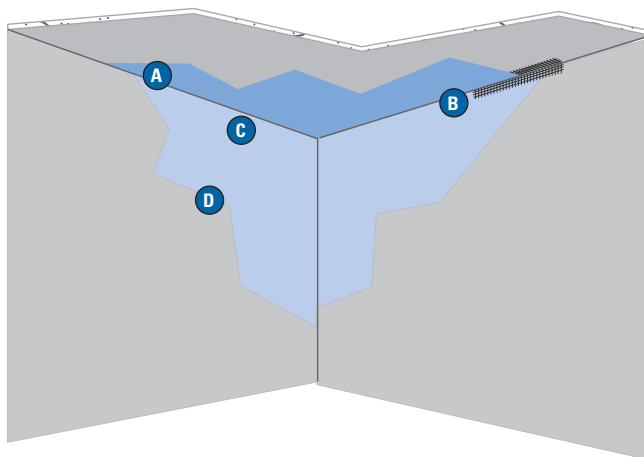
DS010 Dry Non-Tile, Non-Wet Areas

This installation should be used in interior non-tile areas that do not come in contact with water and may experience intermittent exposure to high levels of humidity for short and infrequent periods of time, such as outside of tub and shower areas in residential construction. For walls, steel 25-gauge min (.0188) or wood framing should be spaced no greater than 16" (406 mm) o.c. for 1/2" (12.7 mm) DensShield® Tile Backer or 24" (610 mm) o.c. for 5/8" (15.9 mm) DensShield Tile Backer. For ceilings, boards should be spaced no greater than 16" (406 mm) o.c. for 1/2" (12.7 mm) thickness or 24" (610 mm) o.c. for 5/8" (15.9 mm) thickness.

Joint Compound

Apply 2" (51 mm) fiberglass mesh tape over joints and angles. Embed tape in setting compound. Trowel all purpose or a setting type joint compound over entire DensShield Tile Backer panel to produce a smooth surface. Prior to painting or papering, the surface should always be primed with a primer suitable for high-moisture areas, as recommended by the paint or wallpaper manufacturer for applications over joint compound.

- A. Min. 1/2" (12.7 mm) DensShield Tile Backer
- B. 2" (51 mm) Wide Fiberglass Mesh Tape
- C. Joint Compound (Skim Coat)
- D. Paint



High-Humidity Non-Tile Areas

DS011

For areas exposed to continuous, higher-than-normal moisture levels, such as those found in enclosed swimming pools, garden areas, therapy rooms, locker rooms, laboratory white rooms, operating rooms, commercial and institutional kitchens, etc., finish DensShield Tile Backer with materials that are highly water-resistant and form a moisture barrier in conjunction with DensShield Tile Backer of less than 1.0 perms (28.6 ng/Pa•s•m²). For walls, steel or wood framing should be spaced no greater than 16" (406 mm) o.c. for 1/2" (12.7 mm) DensShield Tile Backer or 24" (610 mm) o.c. for 5/8" (15.9 mm) DensShield Tile Backer. For ceilings, boards should be spaced no greater than 12" (305 mm) o.c. for 1/2" (12.7 mm) thickness or 16" (406 mm) o.c. for 5/8" (15.9 mm) thickness. See Sto Corporation Specification No. F-477, or other manufacturers' highly water-resistant equivalents.

Note: A finishing method must never be used in a more severe environment than described.

Wet Non-Tile Areas

DS012

For wet, non-tile areas, steel or wood framing should be spaced no greater than 16" (406 mm) o.c. for 1/2" (12.7 mm) DensShield Tile Backer or 24" (610 mm) o.c. for 5/8" (15.9 mm) DensShield Tile Backer. For ceilings, boards should be spaced no greater than 12" (305 mm) o.c. for 1/2" (12.7 mm) thickness or 16" (406 mm) o.c. for 5/8" (15.9 mm) thickness.

In non-tile areas exposed to water or water condensation for prolonged periods, such as gang showers, processing plants, clean rooms and laboratories, apply a 6" (152 mm) wide strip of Sto Reinforcing Mesh or equivalent to angles and embed with Sto Flexyl™ Ground Coat or equivalent.

Skim coat the entire surface with Sto Flexyl to achieve a flat and uniform surface. Prime with Sto Primer.

Note: Results in a fine sanded texture.

Use a two part or one part water reducible epoxy coating suitable for the use intended. Coating must be applied according to manufacturer's instructions and meet desired water vapor transmission rate.

In all steps, apply finishing materials according to manufacturers' instructions.

CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

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Residential Steam Rooms

DS013

DensShield® Tile Backer can be used in residential steam rooms with a maximum floor area size of 48 sq. ft. (15 sq. meters). For walls, steel or wood framing should be spaced no greater than 16" (406 mm) o.c. for 1/2" (12.7 mm) DensShield Tile Backer or 24" (610 mm) o.c. for 5/8" (15.9 mm) DensShield Tile Backer. For ceilings, board should be spaced no greater than 12" (305 mm) o.c. for 1/2" (12.7 mm) thickness or 16" (406 mm) o.c. for 5/8" (15.9 mm) thickness.

Apply DensShield Tile Backer to steam room wall and ceiling surfaces using corrosion-resistant nails or screws 6" (152 mm) o.c. along all framing members. All parts of the steam room shall be tiled. *Caution: Exposing untiled areas such as wallpaper, joint compound, drywall or untiled DensShield Tile Backer may result in unsatisfactory performance of these materials.*

Tape all corners and joints with a self-adhering fiberglass mesh tape and embed with a latex modified dry-set (thin-set) mortar. Spot fasteners that were incidentally countersunk and other surface deformations. As an alternative, corners and joints may be finished with a liquid membrane manufacturer's taping procedures. See manufacturer's directions.

Seal around all penetrations and where DensShield Tile Backer meets dissimilar materials with a flexible silicone sealant. Avoid getting sealant on DensShield Tile Backer surface.

Use an appropriate waterproofing system approved for steam room applications directly over the entire DensShield Tile Backer surface, covering all fasteners, corners and joints. (See chart below for examples.)

Apply tile with a modified thin-set mortar per manufacturer's recommendations.

Use flexible silicone caulk as grout in all corners.

Use **unfaced** fiberglass insulation in wall cavity to retard heat transmission.

Do not install a vapor barrier behind DensShield Tile Backer.

Operation and Maintenance – The steam generation unit should be timer-controlled to avoid incidental lengthy exposure. Maintenance of grout and caulking of corners due to movement should be performed when required.

Finishing Materials*	Manufacturer
Genesis® DM; DS174	Dryvit® Systems, Inc (1.800.556.7752)
Sto Flexyl,™ Sto Primer	Sto Corp. (1.800.221.2397)
ParFlex®	Parex® (1.800.537.2739)
BASF Building Systems	(1.800.221.9255)
Waterproofing Material*	Manufacturer
Laticrete® 9235	Laticrete Intl., Inc. (1.800.243.4788)
Mer-Krete® Hydro-Guard® 2000	Mer-Krete Systems. (1.800.851.6303)
NobleSeal® TS	Noble Company (1.800.878.5788)

Any installation recommendations of other manufacturers using DensShield Tile Backer as a component must be in accordance with the installation instructions contained in this brochure. Direct questions to the Georgia-Pacific Gypsum Technical Hotline at 1-800-225-6119. Or visit our Web site at www.gpgypsum.com. Georgia-Pacific Gypsum is not responsible or liable for improper DensShield Tile Backer application.

**Products may be substituted with equivalent products. Manufacturer must provide equivalency.*

Fire-Rated Assemblies

DensShield® Fireguard® Tile Backer

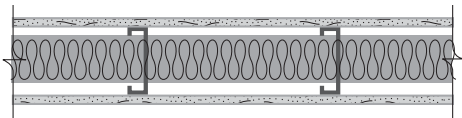
- The only tile substrate to specify where a fire rating and moisture protection are necessary.
- The preferred high-performance tile substrate that protects a tile installation in wet areas while achieving a 1-hour fire rating.
- 5/8" (15.9 mm) DensShield Fireguard Tile Backer meets Type X requirements (ASTM C 1178).
- Tile is not required to achieve a 1- or 2-hour fire rating.
- Aligns perfectly with 5/8" (15.9 mm) Type X gypsum board and is UL Classified (consult the UL Directory).
- When tiling, refer to Fastener guide on page 3.
- When DensShield is finished with tile, the fasteners should be spaced no more than 6" (152 mm) o.c.
- Minimum 20-gauge (30 mils) steel stud required when fire-rated assembly is finished with tile.

1-Hour Fire Rating*
Test Reference: WHI 495-0853, UL U305, ULC W301


30-34 STC Sound Trans. Test Reference: OR 64-8

 Partition Thickness: 4-3/4" (121 mm). Weight per Sq. Ft.: 7.0 (34 kg/m²)

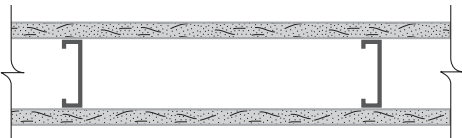
5/8" (15.9 mm) DensShield® Fireguard® Tile Backer applied parallel or at right angles to 2 x 4 wood studs 16" (406 mm) o.c. with 1-7/8" (48 mm) phosphate-coated nails 8" (203 mm) o.c. Joints staggered each side and covered with 2" (51 mm) wide fiberglass mesh tape and tile adhesive. (Load-bearing)

1-Hour Fire Rating*
Test Reference: CTC 1897-1655


45-49 STC Sound Trans. Test Reference: Based on RAL TL69-42

 Partition Thickness: 3-1/2" (89 mm). Weight per Sq. Ft.: 5.0 (24 kg/m²)

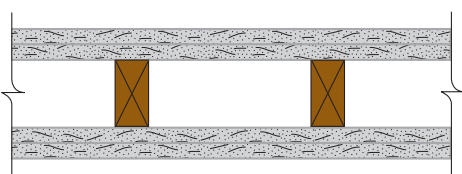
1/2" (12.7 mm) DensShield Tile Backer applied parallel to each side of 2-1/2" (64 mm) metal studs 16" (406 mm) o.c. with 1" (25 mm) Type S screws 8" (203 mm) o.c. at edge joints and 12" (305 mm) o.c. at perimeter and intermediate studs. Cavity filled with 3-1/2" (89 mm), 0.526 pcf (8.43 gcm) fiberglass batts friction fit in stud space. Joints covered with 2" (51 mm) wide fiberglass mesh tape and tile adhesive.

1-Hour Fire Rating*
Test Reference: UL U465, ULC W415


49 STC Sound Trans. Test Reference: RAL-TL00-125

 Partition Thickness: 4-5/8" (118 mm). Weight per Sq. Ft.: 6.0 (29 kg/m²)

5/8" (15.9 mm) DensShield Fireguard Tile Backer applied parallel or at right angles to each side of 3-5/8" (92 mm) metal studs 24" (610 mm) o.c. with 1-1/4" (32 mm) Type S drywall screws 8" (203 mm) o.c. to vertical studs and 12" (305 mm) o.c. to perimeter track. Stagger joints each side. Sound tested with 2-1/2" (64 mm) fiberglass batt insulation, friction fit.

2-Hour Fire Rating*
Test Reference: UL U301, cUL U301

 Partition Thickness: 6" (152 mm). Weight per Sq. Ft.: 13.8 (67 kg/m²)

Base Layer: 5/8" (15.9 mm) DensArmor Plus® Fireguard® or 5/8" (15.9 mm) ToughRock® Fireguard® gypsum board. Base layer attached horizontally or vertically to studs with 1-7/8" (48 mm) nails spaced 16" (406 mm) o.c.

Face Layer: 5/8" (15.9 mm) DensShield® Fireguard® Tile Backer applied horizontally or vertically. Face layer attached to studs over base layer with 2-3/8" (60 mm) nails spaced 8" (203 mm) o.c. Vertical joints located over studs. All joints in face layers staggered with joints in base layers. Joints of each base layer offset with joints of base layer on opposite side. (Load-bearing)

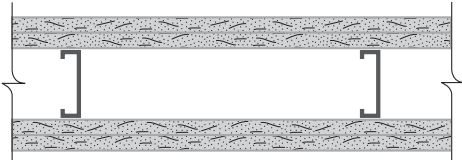
2-Hour Fire Rating*
Test Reference: CTC 1894-1530, GA WP 1632


54 STC Sound Trans. Test Reference: Est.

 Partition Thickness: 4-1/2" (114 mm). Weight per Sq. Ft.: 8.0 (39 kg/m²)

Base Layer: 1/2" (12.7 mm) DensArmor Plus® Fireguard C™ panels or 1/2" (12.7 mm) ToughRock® Fireguard C™ gypsum board applied parallel to each side of 2-1/2" (64 mm) metal studs 24" (610 mm) o.c. with 1" (25 mm) Type S screws 24" (610 mm) o.c.

Face Layer: 1/2" (12.7 mm) DensShield Tile Backer applied parallel to each side of studs with 1-5/8" (41 mm) Type S screws 8" (203 mm) o.c. at edge joints, 12" (305 mm) o.c. at perimeter and intermediate studs. Stagger joints 24" (610 mm) o.c. each layer and side. Joints covered with 2" (51 mm) wide fiberglass mesh tape and tile adhesive. Sound tested with 2-1/2" (64 mm) fiberglass batt insulation, friction fit.

2-Hour Fire Rating*
Test Reference: UL U411, cUL U411


57 STC Sound Trans. Test Reference: RAL-TL00-122

 Partition Thickness: 6-1/4" (158.8 mm). Weight per Sq. Ft.: 9.0 (44 kg/m²)

Base Layer: 5/8" (15.9 mm) DensArmor Plus® Fireguard® panels or 5/8" (15.9 mm) ToughRock Fireguard C gypsum board applied parallel to each side of 2-1/2" (64 mm) metal studs 24" (610 mm) o.c. with 1" (25 mm) Type S screws 16" (406 mm) o.c.

Face Layer: 5/8" (15.9 mm) DensShield Fireguard Tile Backer applied parallel to each side of studs with 1-5/8" (41 mm) Type S screws 16" (406 mm) o.c. at edge joints, 12" (305 mm) o.c. at perimeter and intermediate studs. Stagger joints 24" (610 mm) o.c. each layer and side. Sound tested with 2-1/2" (64 mm) fiberglass batt insulation, friction fit.

**Design assemblies for illustrative purposes only. Consult appropriate fire resistance directory for assembly information. See Fire Safety Caution on back panel.*

CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

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Architectural Specifications

Part 1 – General

1.0 Description

Work in this section includes, but is not limited to:

- Backer board for ceramic tile and untiled installation on walls and ceilings.
- Underlayment for ceramic tile installation on indoor floors.
- Substrate for ceramic tile installation on countertops.

Related work specified elsewhere:

- Rough carpentry
- Ceramic tile
- Grout
- Finish carpentry
- Tile adhesive
- Painting

1.1 Submittals

Product data: Submit manufacturer's descriptive literature indicating material composition, thickness, sizes and fire resistance and that product meets specified requirements.

1.2 Quality Assurance

Fire resistance ratings: Where applicable, provide materials and construction that are identical to those of assemblies whose fire resistance ratings are indicated.

1.3 Delivery, Storage and Handling

Delivery: Deliver materials to the job site in manufacturer's original packaging, containers and bundles with manufacturer's brand name and identification intact and legible. Product also may be wrapped in temporary factory-applied plastic packaging (plastic wrap) that **must** be removed upon receipt. **Failure to remove the plastic shipping covers and plastic wrap may result in entrapment of condensation or moisture, which may cause application problems.**

Storage and handling: Store and handle materials to protect against contact with damp and wet surfaces, exposure to weather, breakage and damage to edges. Provide air circulation under covering and around stacks of materials. Store materials flat, inside and under cover.

Part 2 – Products

2.0 Tile Backer

Acceptable products: Georgia-Pacific Gypsum, 1/4" (6.4 mm) or 1/2" (12.7 mm) DensShield® Tile Backer; Georgia-Pacific Gypsum, 5/8" (15.9 mm) DensShield® Fireguard® Tile Backer.

Size: 1/4" (6.4 mm) DensShield Tile Backer: 4' x 4' (1220 x 1220 mm). 1/2" (12.7 mm) DensShield Tile Backer: 32" x 5' (813 x 1524 mm), 4' x 5' (1220 x 1524 mm) and 4' x 8' (1220 x 2438 mm). 5/8" (15.9 mm) DensShield Fireguard Tile Backer: 4' x 8' (1220 x 2438 mm).

Composition: Water-resistant treated core with fiberglass mats, both sides. The face side is surfaced with heat-cured copolymer water-resistant coating.

Fire resistance, 5/8" (15.9 mm) DensShield Fireguard Tile Backer: Type X as defined in ASTM C 1178, UL classified, Type DS.

Standards: ASTM C 1178.

2.1 Accessories

Trim: Sheet steel, galvanized.

Wood framing fasteners: Nails: 11-gauge galvanized nails with 7/16" (11 mm) head, hot dipped. Screws: Type W-coarse thread or Type S-fine thread, bugle head, rust resistant.

Metal framing fasteners: Screws: Light-gauge metal framing – Type S, bugle or wafer head, self-tapping, rust resistant.

Heavy-gauge metal framing – Type S-12, bugle or wafer head, rust resistant.

2.2 Joint Treatment Materials

Joint tape: 2" (51 mm) wide fiberglass mesh tape.

Reinforcing fabric: Balanced, alkali-resistant, open-weave, fiberglass fabric, made from continuous multi-end strands complying with ASTM D 1682 and complying with ASTM D 578.

Joint compound: Untiled, non-wet areas: ToughRock® setting compounds, all-purpose joint compound or equivalent.

Tile setting material: Mastic or mortars, organic adhesive ANSI A136.1, dry set ANSI A118.1, latex portland cement mortar ANSI A118.4.

CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

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2.3 High-Humidity and Wet-Area Untiled Finish System Materials

Acceptable manufacturers: Dryvit Systems – Genesis® DM, DS174 or comparable. Sto Corporation – F-477, Flexyl™ or comparable. Parex – ParFlex® or comparable. Synergy – Xtra-Stop or comparable.

Ground coat: Job-mixed formulation of portland cement complying with ASTM C 150, Type I, white or natural color, and system manufacturer's standard polymer-based adhesive designed for use indicated.

Primer: System manufacturer's standard primer.

Finish coat for high-humidity areas: System manufacturer's standard mixture, factory-mixed formulation of polymer emulsion admixture, colorfast mineral pigments, ground stone particles and fillers.

Finish coat for wet areas: Water-reducible epoxy coating system specified for wet areas.

Part 3 – Execution

3.0 General

Provide DensShield® Tile Backer where indicated on drawings using fastening systems specified.

Use maximum lengths possible to minimize number of joints. Stagger end joints and edge joints. Attach DensShield panels to framing with fasteners recommended by tile backer manufacturer, spaced 6" (152 mm) o.c.

Locate control and expansion joints at same locations as substrate and where required by finishes. Expansion joints for tile and non-tile applications: Walls – Expansion joints not to exceed every 30 lineal feet (9100 mm) of continuous wall or as specified by designing authority. Ceilings – Not to exceed every 30' (9100 mm) of continuous ceiling surface without perimeter relief or a maximum of 900 sq. ft. (84 sq. meters), not to exceed every 50' (15000 mm) of continuous ceiling surface with perimeter relief or a maximum of 2,500 sq. ft. (230 sq. meters), or as specified by designing authority.

3.1 Tile Backer

Wall and ceiling installations: On walls, install DensShield panels vertically or horizontally. On ceilings, install DensShield panels perpendicular to framing. Install tile backer in accordance with manufacturer's recommendations and TCNA Handbook for Ceramic Tile Installation, Method W221, W222, W223, W243, W245 and C315.

Residential and light commercial floors: Install DensShield panels in accordance with manufacturer's recommendations as applicable in TCNA Handbook for Ceramic Tile Installation, Method RH135, F146 and F151.

Countertops: Install DensShield panels in accordance with manufacturer's recommendations and TCNA Handbook for Ceramic Tile Installation, Method C513.

Bathtubs: Install DensShield panels in accordance with manufacturer's recommendations and TCNA Handbook for Ceramic Tile Installation, Methods W245, B413 and B419.

Showers: Install DensShield panels in accordance with manufacturer's recommendations and TCNA Handbook for Ceramic Tile Installation, Methods W245 and B420 for thin-set installation and mastic installation.

Finishing: Substrate for tile – Apply fiberglass mesh joint tape over joints. Embed tape in setting material indicated for specified tile finishes. Allow joints to dry prior to installing tile systems. Substrate for paint and wall coverings, dry areas (untiled) – Apply fiberglass mesh joint tape over joints. Embed tape in setting-type joint compound or all-purpose joint compound specified. Apply skim coat of setting-type joint compound over surface of tile backer for smooth finish. Substrate for high-humidity finish systems (untiled) – Apply 6" (152 mm) wide reinforcing fabric over joints. Embed fabric in ground coat. Skim-coat tile backer surface with ground coat for smooth finish. Apply in accordance with finish coat manufacturer's instructions. Substrate for wet area, water reducible epoxy coating finish (untiled) – Apply 6" (152 mm) wide reinforcing fabric over joints. Embed fabric in ground coat. Skim-coat with ground coat and compatible primer. Apply epoxy coatings specified as finishing step with epoxy coating system specified.

3.2 Accessories

Install accessories where indicated and in accordance with tile backer manufacturer's instructions.

Limitations

Apply tile only to grey side of DensShield® Tile Backer.

Do not use DensShield Tile Backer where there is prolonged exposure to temperatures exceeding 125°F (52°C).

Do not use DensShield Tile Backer where there is continuous exposure to extreme conditions, e.g., saunas, commercial steam rooms and radiant barriers at fireplaces.

Do not install vapor retarders directly behind DensShield panels. DensShield has a built-in moisture barrier; a #15 felt behind the DensShield panel is permissible if required by local code jurisdiction.

Do not use DensShield Tile Backer in conjunction with passive solar heat systems.

Do not use DensShield panels as a base for nailing and mechanical fastening.

Do not use DensShield Tile Backer in floor tile installation using tile having less than 2" x 2" (51 x 51 mm) face dimensions.

A subfloor of Exposure-1 APA-rated plywood floor panels with a thickness of 5/8" (15.9 mm) is recommended. But Exposure-1 APA-rated OSB floor panels having a thickness of 3/4" (19 mm) are acceptable. The subfloor should be applied over joists spaced 16" (406.4 mm) o.c. or engineered lumber spaced 19.2" (488 mm) o.c. maximum with an L/360 deflection limitation for the span, including live and dead loads. Joists can be spaced 24" (610 mm) o.c. maximum when using 7/8" (22.2 mm) tongue-and-groove plywood subfloor (L/360 deflection limitation).

Do not apply DensShield Tile Backer directly to concrete or masonry block. Framing or furring of wall is necessary.

Not for exterior use.

Do not use Type I organic mastics for floor applications.

DensShield Tile Backer should not be used as a backer for resilient flooring.

Do not place DensShield Tile Backer into shower pan mortar bed unless part of an approved system. Leave minimum 1/8" (3 mm) gap and fill with 100% silicone caulk.

Do not use wallboard joint compound or paper tape in wet areas.

Do not install DensShield Tile Backer on shower floors or in shower curbs.

The Dens™ Brand of High-Performance Gypsum Products from Georgia-Pacific

DensGlass® Sheathing	The original and universal standard of exterior gypsum sheathing offers superior weather resistance, with a 12-month weather exposure limited warranty. Look for the familiar GOLD color.
DensShield® Tile Backer	Acrylic-coated tile backer stops moisture at the surface. Lightweight and strong, built for speed on the job site. IBC/IRC Code Compliant. GREENGUARD listed for microbial resistance.
DensDeck® Roof Boards	Fiberglass mat roof board used as the ideal thermal barrier and cover board to improve resistance to wind uplift, hail, foot traffic, fire, moisture and mold in a broad range of commercial roofing applications. Look for green DensDeck Prime and DensDeck DuraGuard, too.
DensGlass® Shaftliner	Specially-designed panels for moisture-prone vertical or horizontal shafts, interior stairwells and area separation wall assemblies. 12-month weather exposure limited warranty. GREENGUARD listed for microbial resistance.
DensArmor Plus® High-Performance Interior Panel	High-performance interior panel accelerates scheduling because it can be installed before the building is dried-in. 12-month weather exposure limited warranty. GREENGUARD Indoor Air Quality Certified,® GREENGUARD Children & Schools™ Certified and CHPS™ listed for low emissions. GREENGUARD listed for microbial resistance.
DensArmor Plus® Abuse-Resistant Interior Panel	Same benefits as DensArmor Plus® High-Performance Interior Panel with added resistance to scuffs, abrasions and surface indentations. Ideal for healthcare facilities and schools. GREENGUARD Indoor Air Quality Certified,® GREENGUARD Children & Schools™ Certified and CHPS™ listed for low emissions. GREENGUARD listed for microbial resistance.
DensArmor Plus® Impact-Resistant Interior Panel	Even greater durability with an embedded impact-resistant mesh for the ultimate resistance in high traffic areas. Ideal for healthcare facilities, schools and correctional institutions. GREENGUARD Indoor Air Quality Certified,® GREENGUARD Children & Schools™ Certified and CHPS™ listed for low emissions. GREENGUARD listed for microbial resistance.



Georgia-Pacific Gypsum

U.S.A. Georgia-Pacific Gypsum LLC
CANADA Georgia-Pacific Canada, ULC

SALES INFORMATION AND ORDER PLACEMENT

U.S.A. Midwest: **1-800-876-4746** West: **1-800-824-7503**
South: **1-800-327-2344** Northeast: **1-800-947-4497**

CANADA Canada Toll Free: **1-800-387-6823**
Quebec Toll Free: **1-800-361-0486**

TECHNICAL HOTLINE U.S.A. and Canada: **1-800-225-6119**



Some of our products have been certified by Scientific Certification Systems (SCS). SCS is an internationally recognized third-party evaluation, testing and certification organization. Its program spans a wide cross-section of the economy, including manufacturing and retailing, consumer products, the energy industry, and the home improvement and construction sectors. For details on specific Georgia-Pacific Gypsum products and plants, please contact our Technical Hotline at 1-800-225-6119.



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WARRANTIES, REMEDIES AND TERMS OF SALE –

For current warranty information for this product, please go to www.gpgypsum.com and select the product for warranty information. All sales of this product by Georgia-Pacific are subject to our Terms of Sale available at www.gpgypsum.com.

UPDATES AND CURRENT INFORMATION –

The information in this document may change without notice. Visit our website at www.gpgypsum.com for updates and current information.

CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo or call 1-800-225-6119.

HANDLING AND USE –

CAUTION: This product contains fiberglass facings which may cause skin irritation. Dust and fibers produced during the handling and installation of the product may cause skin, eye and respiratory tract irritation. Avoid breathing dust and minimize contact with skin

and eyes. Wear long sleeve shirts, long pants and eye protection. Always maintain adequate ventilation. Use a dust mask or NIOSH/MSHA approved respirator as appropriate in dusty or poorly ventilated areas.

FIRE SAFETY CAUTION –

Passing a fire test in a controlled laboratory setting and/or certifying or labeling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance or protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating of any product or assembly/system.