



DensShield® Tile Backer

PROTECT WHAT YOU CREATE®



5 Distinctive Reasons to Use DensShield®

1. Resists Moisture and Mold Growth.

DensShield Tile Backer features a built-in water barrier that stops moisture at the surface. (Most backer boards require a vapor barrier to ensure warranty coverage.) This heat cured acrylic coating and moisture-resistant, treated core protect both the tile installation and wall cavity behind it. The patented glass mat construction of DensShield provides a high level of mold resistance.*

2. Light weight.

DensShield is 17 to 32 lbs. lighter per panel than cement board, depending on panel size.

3. Handles easily.

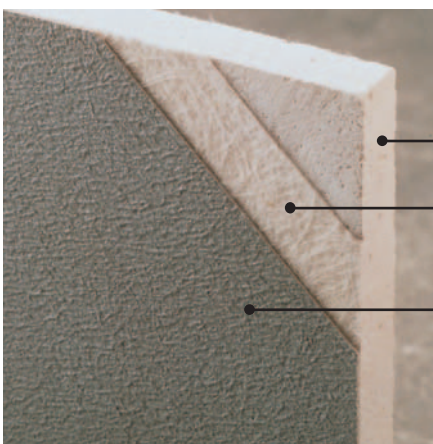
You don't need special tools or power saws to cut DensShield. Cutouts — including special rounded cuts — are simple and easy with a standard utility knife rather than expensive tools used for cement board.

4. Finishes smoothly and cleanly.

Just a simple utility knife makes smooth, clean cutouts — no ragged edges or gritty mess that can scratch fixtures like cement board residue. Can be fastened close to the edge without compromising its integrity. Aligns perfectly with studs and other gypsum board products. Detailed installation instructions on every panel.

5. Lifetime Limited Warranty on entire tile installation.

Georgia-Pacific's industry-first Lifetime Limited Warranty on any properly applied tile installation over DensShield is made possible by the board's unique patented design that protects both the tile installation and wall cavity from moisture. For complete terms, conditions and limitations, call the Georgia-Pacific Gypsum Technical Hotline at 1-800-225-6119.



Patented product with treated, water-resistant core

Glass mats on front and back add strength. No paper to delaminate or serve as food for mold.

Grey, heat-cured acrylic coating protects the tile installation and wall cavity from moisture intrusion and damage. **The only tile backer in the industry with a built-in water barrier.**

*When tested as manufactured per ASTM D 3273.

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Quality Behind Your Tile: Fast and Easy Installation

Unlike heavy, hard-to-install cement board, DensShield installs like regular wallboard but outperforms both cement board and greenboard. **The result is a 46% savings in labor and installation costs over cement board according to a study by the NAHB Research Institute.** Costly call-backs often associated with use of paper-faced greenboard also can be eliminated while providing the assurance of a Lifetime Limited Warranty on tile installations properly applied over DensShield.

DensShield Meets a Higher Performance Standard

DensShield's unique, heat-cured acrylic coating completely stops the passage of water, keeping it out of the wall cavity. This coating, combined with a treated core and glass mat construction on front and back, makes DensShield a superior product for protecting both the tile installation and the wall cavity behind it.

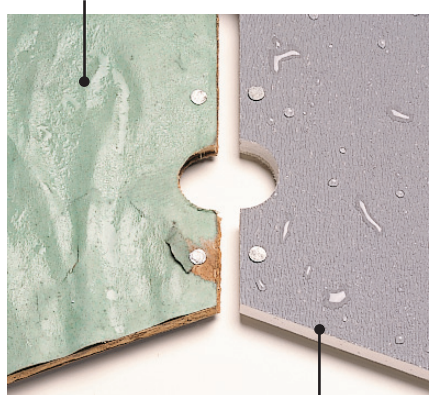
DensShield	Cement Board	Fiber Cement Board	Greenboard
Stops moisture at the surface	Transmits moisture readily	Absorbs moisture readily	Not recommended for high moisture areas.
Built-in water barrier; requires no further protection to ensure warranty coverage	Requires additional vapor barrier to ensure warranty coverage	Requires additional vapor barrier to ensure warranty coverage	
Weighs 64 lbs. per 1/2" 4 x 8 panel	Weighs about 96 lbs. per 1/2" 4 x 8 panel	Weighs about 90 lbs. per 1/2" 4 x 8 panel	
Cuts easily, cleanly with utility knife	Difficult to cut with utility knife; creates dust; usually cut with power saw	Difficult to cut with utility knife; creates dust; usually cut with power saw	
No special tools needed for installation	Requires special tools to cut and install	Requires special tools to cut and install	
Edges are smooth and straight	Has rough, uneven edges	Has rough, uneven edges	
More standard sizes to require fewer cuts	Sizes require cuts that create job site waste	Sizes require cuts that create job site waste	
Strong in both directions for easy handling	Breaks apart if not handled properly	Breaks apart if not handled properly	

Cement Board
(Heavy, hard to cut and handle)



DensShield Tile Guard
(Light weight, easy to cut and handle)

Greenboard
(Easily damaged by water and moisture)



DensShield Tile Guard
(Built-in water barrier stops moisture intrusion and protects tile installation.)

Tub/Shower Walls or Ceilings

DS001 Walls or Ceilings

DensShield can be used as a tile substrate in residential and commercial wall applications. Attach DensShield 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 may be cut by using a utility knife to score, then snap, working from the grey face side.

- For walls, 20-gauge steel or wood framing should be spaced no greater than 16" o.c. for 1/2" DensShield or 24" o.c. for 5/8" DensShield. Board can be applied horizontally or vertically.
- For ceilings, framing should be spaced no greater than 12" o.c. for 1/2" thickness or 16" o.c. for 5/8" thickness. Board should be applied perpendicular to framing.
- Fasteners shall be spaced 6" o.c. for walls and ceilings for wood and metal framing. Do not countersink. Drive fasteners flush with grey coated surface. Nails: galvanized roofing nails 1 1/2" for 1/2" DensShield, 1 3/4" for 5/8" DensShield. Screws: corrosion-resistant minimum 1 1/2" bugle head

Properties	1/4" DensShield	1/2" DensShield	5/8" DensShield
Width, standard	4'	4', 32"	4'
Length, standard	4'	5', 8'	8'
Edges	square	square	square
Weight, lbs./sq. ft., nominal	1.2	2.0	2.5
Bending Radius	8'	12'	16'
Fire Classification	n/a	1- and 2-hour assemblies	Type X, UL classified
Standards	ASTM C 1178	ASTM C 1178	ASTM C 1178
Code Evaluation	NY MEA 65-88-M, ICC-ES Legacy Report 572		
TCA Recognition	ASTM C 627 (Robinson Floor Test); Floors - F146; Walls - W245; Ceilings - C311 and C312; Tubs - B419; Showers - B420		

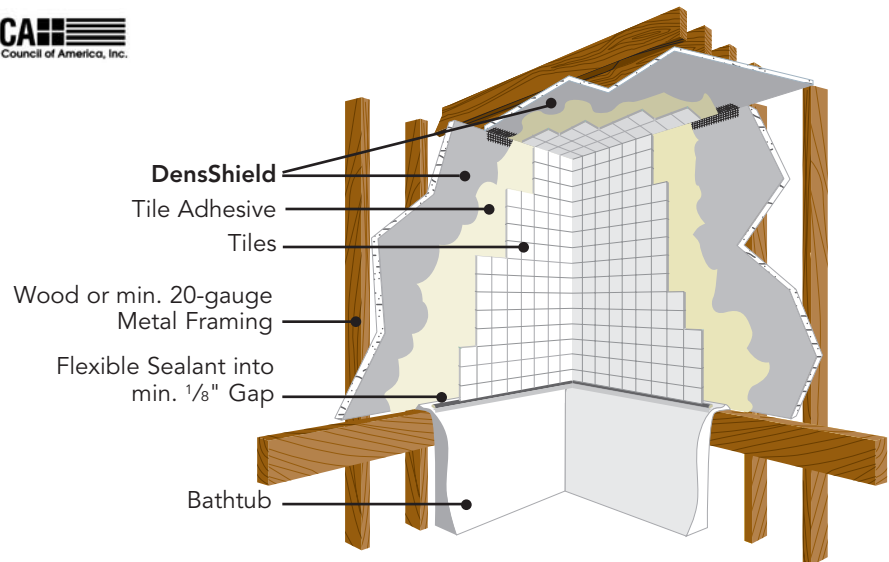
Perfect Product For:

- Indoor Pool Walls and Ceilings
- Atriums
- Laboratories
- Processing Plants

DensShield® Tile Backer

drywall screws for 1/2" DensShield, and 1 5/8" bugle head drywall screws for 5/8" DensShield.

- Do not use additional vapor barrier. DensShield has a built-in moisture barrier.
- Use self-adhesive 2" wide 10 x 10 glass fiber mesh tape. Bed tape on all joints and corners with material used to set tiles. Caulk or seal penetrations and abutments to dissimilar materials.
- Tile applications unsupported by ties or the floor shall have a maximum weight of 4 lbs./sq.ft. For larger tiles (in excess of 14" x 14"), consult tile manufacturer for wall deflection requirements.
- In areas outside the shower where DensShield meets gypsum board: (1) If the tiles fall over the



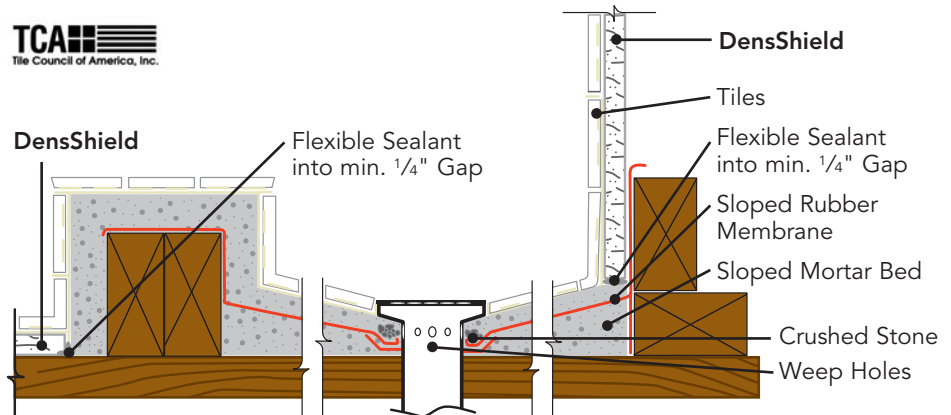
DensShield-to-gypsum board joint, apply 2" wide 10 x 10 glass mesh tape and skim with tile setting material (Type I mastic or latex modified thin-set). (2) If the tiles stop before the DensShield-to-gypsum board joint, apply 2"

wide 10 x 10 glass mesh tape and skim with setting type joint compound to achieve a smooth and paintable surface.

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

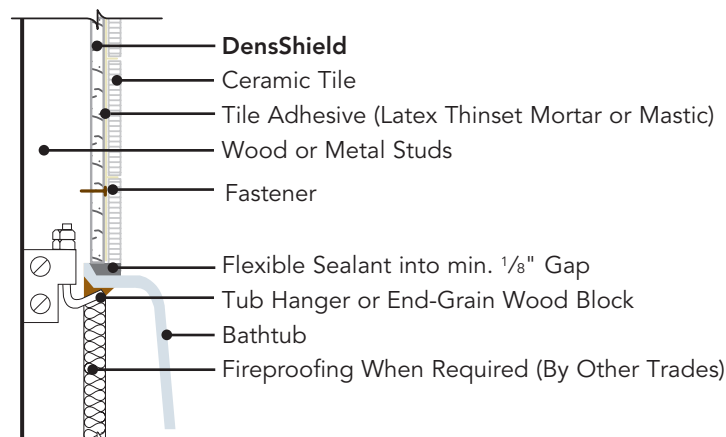
DS002 Shower Pan

- Install DensShield 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. **Do not install DensShield in the shower pan or use it as a shower base.**
- For showers with curbs, apply waterproof membrane up walls minimum 2" and maximum 4" above curb.
- For showers without curbs, apply waterproof membrane up walls minimum 6" and maximum 8".
- 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.
- Do not place DensShield into shower pan mortar bed. Leave minimum 1/4" gap and fill with 100% silicone caulk.



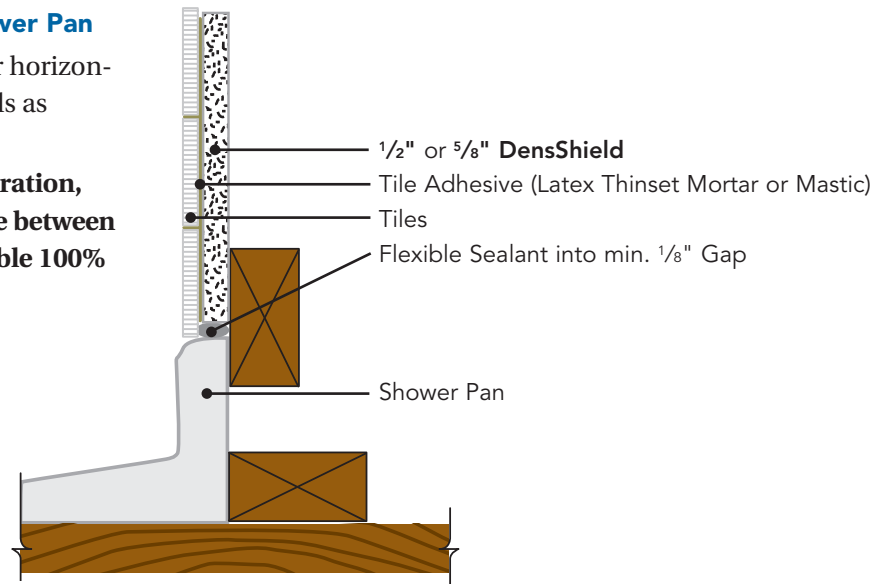
DS003 Bathtub or Shower Receptor

- Apply DensShield 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 100% silicone sealant.**

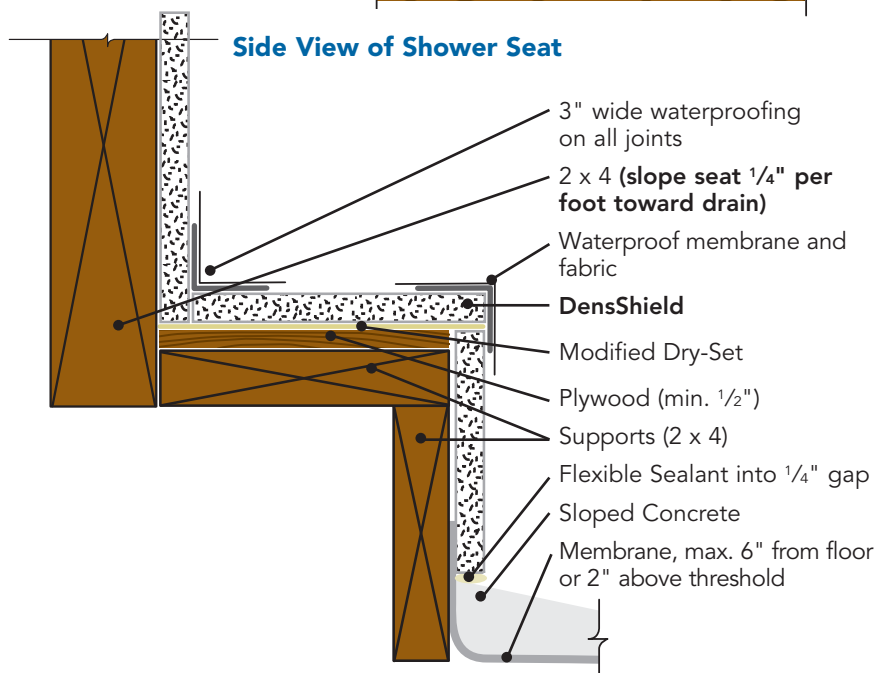


DS004 Pre-Formed Shower Pan

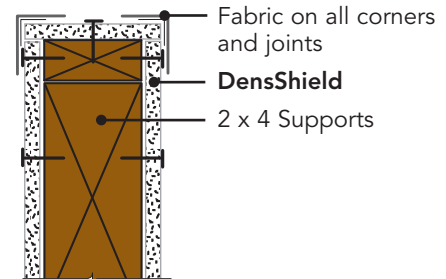
- Apply DensShield either horizontally or vertically on walls as shown in DS001.
- **To prevent water penetration, completely fill the space between tile and tub with a flexible 100% silicone sealant.**



Side View of Shower Seat



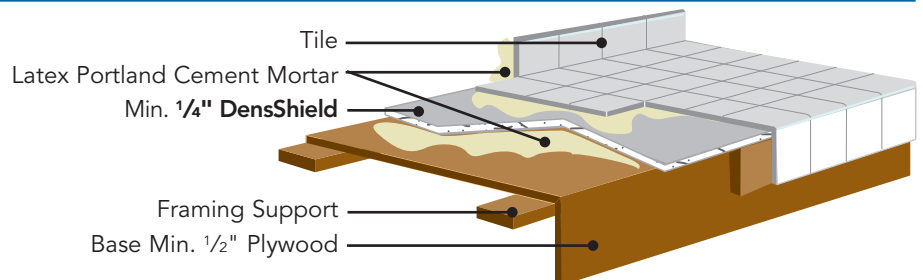
Knee Wall Details



Countertops

DS006

- Plywood must be installed flat and level.
- Framing spacing should not exceed 24\" o.c.
- Install minimum 1/2\" 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\" notched trowel.



- Apply clean, dry DensShield to base (grey acrylic coated side up), fastening every 6\" to 8\" o.c. in both directions into substrate while leveling bed is still fluid. Use either 1 1/4\" galvanized roofing nails or 1 1/4\" rust-resistant drywall screws.
- Stagger joints of DensShield panels with those of the plywood base.

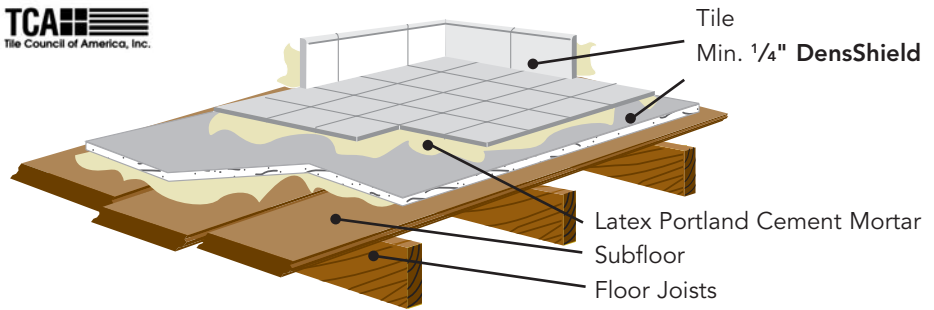
- Butt DensShield joints tightly. Tape all joints and corners using 2\"-wide self-adhering fiberglass mesh tape. Embed tape with latex portland cement mortar that meets ANSI A118.4.
- Install tile, expansion and control joints and grout in accordance with ANSI A108. Use latex portland cement mortar to set tile.

Residential and Light Commercial Floors

DS005

1/4" and 1/2" DensShield can be used as a tile substrate in floor tile applications as defined in the *Handbook for Ceramic Tile Installation*, published by the Tile Council of 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" square-tooth notched trowel. Embed DensShield into mortar while still pliant (do not exceed open time). Stagger DensShield 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" 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" o.c. in both directions. Drive fasteners flush with the acrylic surface. Do not countersink.
- If moisture is a concern, apply 2" wide 10 x 10 glass 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" or larger floor-grade tile.
- Use either standard floor grout (ANSI A118.6) or polymer modified grout (ANSI A118.7).
- DensShield is not to be used in conjunction with heated floor



systems that exceed 120° continuous temperature.

- DensShield can be used on curbs when trowel-on waterproof membrane is used.
- DensShield 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. concentrated load (see ASTM C 627).
- Maximum variation in the subfloor surface shall not exceed 1/2" in 10'-0" from the required plane.
- Use latex portland cement mortar to set tile.
- Fasten DensShield into subfloor with galvanized roofing nails or corrosion-resistant screws.
- Keep DensShield surfaces clean and free of dirt, dust or oily film.
- Set tiles on grey acrylic coating.

Materials:

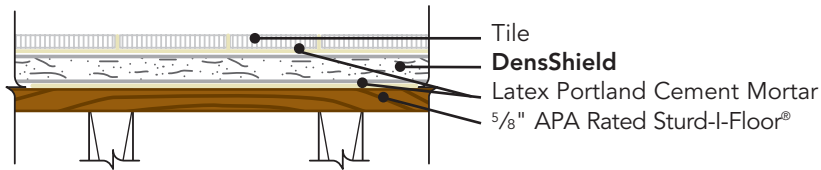
- Coated glass mat backer board – ASTM C 1178
- Latex portland cement mortar – ANSI A118.4.
- Polymer modified tile grout – ANSI A118.7.

Installation Specifications:

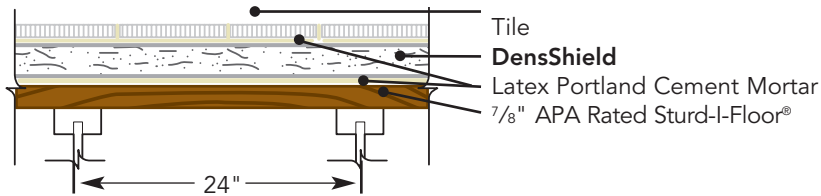
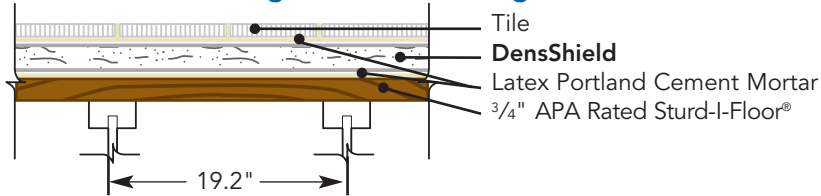
- Coated glass mat backer board in accordance with manufacturer's literature.
- Tile – ANSI A 108.5.
- Grout – ANSI 108.10.

Minimum Subfloor Thickness	Minimum Joist Spacing
5/8" Plywood Sturd-I-Floor®*	16" o.c. joists
3/4" Plywood Sturd-I-Floor®*	19.2" o.c. engineered lumber
7/8" APA Rated Sturd-I-Floor®	24" o.c. engineered lumber
*3/4" OSB is acceptable	

DensShield Over Conventional Joist (Exterior-glu Subfloor)



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

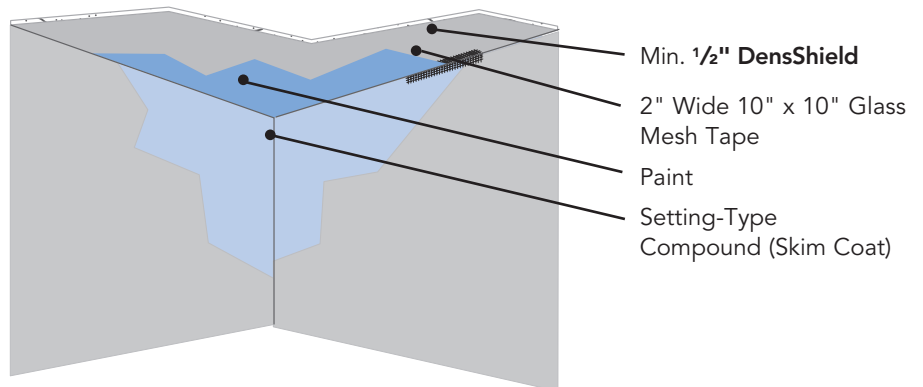


The application of thin-set over subfloor provides a leveling bed between the subfloor and the back of DensShield. If this step is not completed, air gaps can cause movement and crack the grout lines. (This step is common with all other backer board products.)

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.) or wood framing should be spaced no greater than 16" o.c. for 1/2" DensShield or 24" o.c. for 5/8" DensShield. For ceilings, board should be spaced no greater than 12" o.c. for 1/2" thickness or 16" o.c. for 5/8" thickness.



Setting-Type Joint Compound

Apply 2" 10 x 10 glass mesh tape over joints and angles. Embed tape in setting compound. Trowel (skim-coat) setting compound over entire DensShield 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 setting-type joint compound. Do not use ready-mix or sandable setting-type joint compounds in this type of application.

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 with materials that are highly water-resistant and form a vapor barrier in conjunction with DensShield of less than 0.5

Residential Steam Rooms

DS013

DensShield can be used in residential steam rooms with a maximum floor areas size of 48 sq. ft. For information on larger areas, call the G-P Technical Hotline at 1-800-225-6119. For walls, steel or wood framing should be spaced no greater than 16" o.c. for 1/2" DensShield or 24" o.c. for 5/8" DensShield. For ceilings, board should be spaced no greater than 12" o.c. for 1/2" thickness or 16" o.c. for 5/8" thickness.

- Apply DensShield to steam room wall and ceiling surfaces using corrosion-resistant nails or screws 6" 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 may result in unsatisfactory performance of these materials.*
- Tape all corners and joints with a self-adhering glass 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.

perms. For walls, steel or wood framing should be spaced no greater than 16" o.c. for 1/2" DensShield or 24" o.c. for 5/8" DensShield. For ceilings, board should be spaced no greater than 12" o.c. for 1/2" thickness or 16" o.c. for 5/8" thickness. See Sto Corporation Specification No. F-477; Dryvit Systems Inc. Specification No. DS 174; or other manufacturers' highly water-resistant equivalents.

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

- Seal around all penetrations and where DensShield meets dissimilar materials with a flexible silicone sealant.
- Roller apply a liquid waterproofing material approved for steam room applications directly over the entire DensShield surface, covering all fasteners, corners and joints.
- 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.

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 Manufacturers

Product*	Supplier
Genesis® DM; DS 174	Dryvit® Systems (1.800.556.7752)
Sto Flexyl®, Sto Primer	Sto Corp. (1.800.221.2397)
ParFlex®	Parex (1.800.537.2739)
Degussa Wall Systems	(1.800.221.9255)
Dura Clad® Epoxy Paint	Duron® Paints and Wallcoverings (1.800.723.8766)
Laticrete 9235	Laticrete (1.800.243-4788)

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

Wet Non-Tile Areas

DS012

For wet, non-tile areas, steel or wood framing should be spaced no greater than 16" o.c. for 1/2" DensShield or 24" o.c. for 5/8" DensShield. For ceilings, board should be spaced no greater than 12" o.c. for 1/2" thickness or 16" o.c. for 5/8" 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" wide strip of Sto Reinforcing Fiber 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.*
- Apply two coats of Duron® Dura Clad® two-part water-reducible epoxy paint or equal at the rate of about 300 square feet per gallon for each coat.
- In all steps, apply finishing materials according to manufacturers' instructions.

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

Fire-Rated Assemblies

DensShield Fireguard Type X: The Ultimate Choice

- The only tile substrate to specify where a fire rating and moisture protection are necessary.
- The only high-performance tile substrate that protects a tile installation in wet areas while achieving a 1-hour fire rating.
- Meets Type X requirements.
- Tile is not required to achieve a 1- or 2-hour fire rating.
- Aligns perfectly with 5/8" Type X gypsum board and is UL Classified.

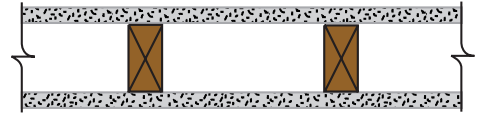
1-Hour Fire Rating

Test Reference: WHI 495-0853
UL U305

30-34 STC Sound Trans.

Test Reference: OR 64-8
Partition Thickness: 4 3/4"
Weight per Sq. Ft.: 7.0

5/8" DensShield Fireguard (Type X) tile backer applied parallel or at right angles to 2 x 4 wood studs 16" o.c. with 1 7/8" phosphate coated nails 8" o.c. Joints staggered each side and covered with 2" wide 10 x 10 glass mesh tape and tile adhesive. (Load-bearing)



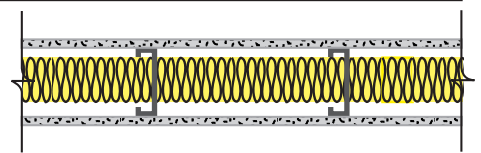
1-Hour Fire Rating

Test Reference: CTC 1897-1655

45-49 STC Sound Trans.

Test Reference: Based on RAL
TL69-42
Partition Thickness: 3 1/2"
Weight per Sq. Ft.: 5.0

1/2" DensShield tile backer applied parallel to each side of 2 1/2" metal studs 16" o.c. with 1" Type S screws 8" o.c. at edge joints and 12" o.c. at perimeter and intermediate studs. Cavity filled with 3 1/2", 0.526 pcf, glass fiber batts friction fit in stud space. Joints covered with 2" wide 10 x 10 glass mesh tape and tile adhesive.



1-Hour Fire Rating

Test Reference: CTC 2171-3996

49 STC Sound Trans.

Test Reference: RAL-TL00-125
Partition Thickness: 4 5/8"
Weight per Sq. Ft.: 6.0

5/8" DensShield Fireguard (Type X) applied parallel or at right angles to each side of 3 5/8" metal studs 24" o.c. with 1 1/4" Type S drywall screws 8" o.c. to vertical studs and 12" o.c. to perimeter track. Stagger joints each side. Sound tested with 2 1/2" glass fiber batt insulation, friction fit.



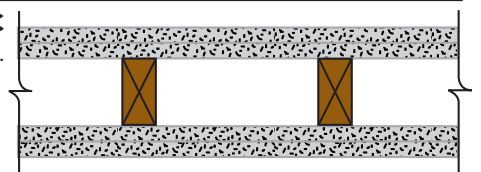
2-Hour Fire Rating

Test Reference: UL U301
Partition Thickness: 6"
Weight per Sq. Ft.: 13.8

Base Layer: 5/8" DensArmor Plus Fireguard C or 5/8" ToughRock Fireguard C gypsum board. Base layer attached horizontally or vertically to studs with 1 7/8" nails spaced 16" o.c.

Face Layer: 5/8" DensShield Fireguard

(Type X) tile backer applied horizontally or vertically. Face layer attached to studs over base layer with 2 3/8" nails spaced 8" 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

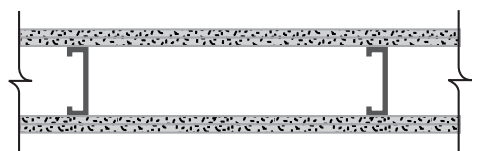
54 STC Sound Trans.

Test Reference: Est.
Partition Thickness: 4 1/2"
Weight per Sq. Ft.: 8.0

Base Layer: 1/2" DensArmor Plus Fireguard C or 1/2" ToughRock Fireguard C gypsum board applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" Type S screws 24" o.c.

Face Layer: 1/2" DensShield tile backer

applied parallel to each side of studs with 1 5/8" Type S screws 8" o.c. at edge joints, 12" o.c. at perimeter and intermediate studs. Stagger joints 24" o.c. each layer and side. Joints covered with 2" wide 10" x 10" glass mesh tape and tile adhesive. Sound tested with 2 1/2" glass fiber batt insulation, friction fit.



2-Hour Fire Rating

Test Reference: UL U411

57 STC Sound Trans.

Test Reference: RAL-TL00-122
Partition Thickness: 6 1/4"
Weight per Sq. Ft.: 9.0

Base Layer: 5/8" DensArmor Plus Fireguard or 5/8" ToughRock Fireguard C gypsum board applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" Type S screws 16" o.c.

Face Layer:

5/8" DensShield Fireguard (Type X) tile backer applied parallel to each side of studs with 1 5/8" Type S screws 16" o.c. at edge joints, 12" o.c. at perimeter and intermediate studs. Stagger joints 24" o.c. each layer and side. Sound tested with 2 1/2" glass fiber batt insulation, friction fit.



Testing and Code Recognition

Robinson Floor Test/ASTM C 627

DensShield passed the industry standard test conducted by the Tile Council of America.

Adhesion Bond Testing

CTC-Geotek conducted tests comparing adhesion capabilities using most major manufacturers' setting materials. The tests concluded that bonds with DensShield 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" up the board while DensShield will wick less than one-third of 1" (.31") during that same period.

Shower Test

In a remarkable test by an independent testing firm, DensShield was subjected to a shower of water at 110°F, 15 minutes per hour for 24 hours, five days per week for one-year. The installation had **no grout** between wall and ceiling tiles. No deterioration occurred. Water-resistant green board was tested under the same conditions and failed after only 10 days. A similar test was conducted using cement board at CTC-Geotek. DensShield **outperformed** cement board. Test results are available upon request.

The DensShield test compares to 28 years of showers without deterioration. **Although cementitious backer boards would not likely deteriorate under the same conditions, the possibility exists for deterioration of framing members and wall cavity due to water infiltration if a water barrier isn't positioned behind the cementitious backer unit.**

Percolation Test

The International Conference of Building Officials - Evaluation Service (ICBO-ES) percolation test measures how much water will pass through a panel within 48 hours. The test determines if an additional water barrier should be installed. The test consists of a 2" diameter tube, 48" 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).

$\frac{1}{8}$ " of water passed through DensShield, 19"+ of water passed through one cementitious tile substrate sample and 43"+ of water passed through another sample of cement board. **The test shows that DensShield stops water at the surface, while cement boards allow water to pass through their porous construction.**

Mold Resistance Test

DensShield features a built-in water barrier that stops moisture at the surface. (All other backer boards require a vapor barrier to ensure warranty coverage.) The patented glass mat construction of DensShield achieved a score indicating "no mold growth" when tested, as manufactured, per ASTM D 3273 by an independent testing service.

Standards and Code Compliance

DensShield in $\frac{1}{4}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ " thicknesses meets ASTM C 1178 as a glass mat gypsum substrate for use as tile backer. DensShield has the following evaluation reports:

- ICC-ES Legacy Report 572
- New York City MEA 65-88-M

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

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.
 - Finish carpentry.
 - Ceramic tile.
 - Tile adhesive.
 - Grout.
 - 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.
- 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.

1.4 Limitations

- Apply tile only to gray side of DensShield panels.
- Do not use DensShield where there is prolonged exposure to temperatures exceeding 125°F.
- Do not use DensShield 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.
- Do not use DensShield in conjunction with passive solar heat systems.
- Do not use DensShield panels as a base for nailing and mechanical fastening.
- Do not use DensShield in floor tile installation using tile having less than 2" x 2" face dimensions.
- A subfloor of Exposure-1 APA-rated plywood floor panels with a thickness of $\frac{5}{8}$ " is recommended. But Exposure-1 APA-rated OSB floor panels having a thickness of $\frac{3}{4}$ " are acceptable. The subfloor should be applied over joists spaced 16" o.c. or engineered lumber spaced 19.2" o.c. maximum with an

L/360 deflection limitation for the span, including live and dead loads. Joists can be spaced 24" o.c. maximum when using $\frac{7}{8}$ " tongue-and-groove plywood subfloor (L/360 deflection limitation).

- I. Do not apply DensShield directly to concrete or masonry block. Framing or furring of wall is necessary.
- J. Not for exterior use.
- K. Do not use Type I organic mastics for floor applications. DensShield should not be used as a backer for resilient flooring.
- L. Do not place DensShield into shower pan mortar bed. Leave minimum $\frac{1}{8}$ " gap and fill with 100% silicone caulk.
- M. Do not use wallboard joint compound or paper tape in wet areas.
- N. Do not install DensShield on shower floors.

Part 2 – Products

2.1 Tile backer

A. Acceptable products:

1. Georgia-Pacific Corporation, $\frac{1}{4}$ " or $\frac{1}{2}$ " DensShield.
2. Georgia-Pacific Corporation, $\frac{5}{8}$ " DensShield Fireguard Type X.

B. Characteristics:

1. Size:
 - a. $\frac{1}{4}$ " DensShield: 4' x 4'.
 - b. $\frac{1}{2}$ " DensShield: 32" x 5', 4' x 5' and 4' x 8'.
 - c. $\frac{5}{8}$ " DensShield Fireguard Type X: 4' x 8'.
2. Composition: Water-resistant treated core with glass mat moisture protectant coating and glass mats, both sides. The face side is surfaced with heat-cured copolymer water-resistant coating.
3. Fire resistance, $\frac{5}{8}$ " DensShield Fireguard Type X: Type X when tested in accordance with ASTM E 119, UL classified.

C. Standards: ASTM C 1178

2.2 Accessories

- A. *Trim*: Sheet steel, galvanized.
- B. *Wood framing fasteners*: Nails: 11-gauge galvanized nails with $\frac{7}{16}$ " head, hot dipped. Screws: Type W or Type S, Hi-Lo, bugle head, rust resistant.
- C. *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.

2.3 Joint treatment materials

A. Joint tape:

1. 2" wide 10 x 10 glass mesh tape.
2. Reinforcing fabric: Balanced, alkali-resistant, open-weave, glass fiber fabric, made from continuous multi-end strands with tensile strength of not less than 120 lbs. and 140 lbs. in warp and fill directions, respectively, per ASTM D 1682 and complying with ASTM D 578, and of 4.30 oz./sq. yd. minimum weight.

B. *Setting-type joint compound*: Untiled, non-wet areas: ToughRock setting compounds.

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

2.4 High-humidity and wet-area untiled finish system materials

- A. *Acceptable manufacturers*: Dryvit Systems: Genesis® DM, DS174 or comparable. Sto Industries: F-477, Flexyl® or comparable. Parex: ParFlex® or comparable. Synergy: Xtra-Stop® or comparable.
- B. *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.
- C. *Primer*: System manufacturer's standard primer.
- D. *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.
- E. *Finish coat for wet areas*: Water-reducible epoxy coating system specified for wet areas.

Part 3 – Execution

3.0 General

- A. Provide DensShield where indicated on drawings using fastening systems specified.
- B. 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" o.c. Butt ends and edges.
- 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 of continuous wall or as specified by designing authority. Ceilings – Not to exceed every 30 feet of continuous ceiling surface without perimeter relief or a maximum of 900 sq. ft., not to exceed every 50 feet of continuous ceiling surface with perimeter relief or a maximum of 2,500 sq. ft., or as specified by designing authority.

3.1 Tile backer

A. Wall and ceiling installations:

1. On walls, install DensShield panels vertically or horizontally.
2. On ceilings, install DensShield perpendicular to framing.
3. Install tile backer in accordance with manufacturer's recommendations and TCA Handbook for Ceramic Tile Installation, Method W245 and C311.

B. *Residential and light commercial floors*: Install DensShield panels in accordance with manufacturer's recommendations

as applicable in *TCA Handbook for Ceramic Tile Installation, Method F146*.

- C. *Countertops*: Install DensShield in accordance with manufacturer's recommendations and *TCA Handbook for Ceramic Tile Installation, Method C513*.
- D. *Bathtubs*: Install DensShield in accordance with manufacturer's recommendations and *TCA Handbook for Ceramic Tile Installation, Methods W245 and B419*.
- F. *Showers*: Install DensShield in accordance with manufacturer's recommendations and *TCA Handbook for Ceramic Tile Installation, Methods W245 and B420* for thin-set installation and mastic installation.
- G. *Finishing*:

1. Substrate for tile: Apply glass mesh joint tape over joints. Embed tape in setting material indicated for specified tile finishes. Allow joints to dry prior to installing tile systems.
2. Substrate for paint and wall coverings, dry areas (untiled): Apply glass mesh joint tape over joints. Embed tape in setting-type joint compound specified. Apply skim coat of setting-type joint compound over surface of tile backer for smooth finish.
3. Substrate for high-humidity finish systems (untiled): Apply 6" 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.
4. Substrate for wet area, water reducible epoxy coating finish (untiled): Apply 6" 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.

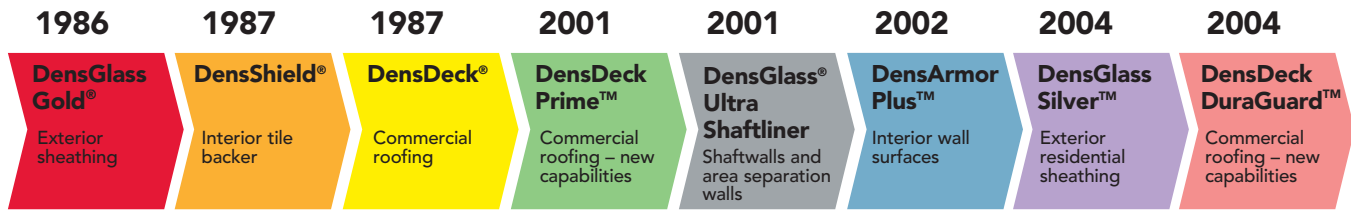
Caution: THIS PRODUCT CONTAINS CONTINUOUS FILAMENT FIBERGLASS

Fiber released during normal handling of this product can cause skin, eye and respiratory irritation. Avoid breathing dust and contact with skin and eyes. Follow these standard work practices:

- Wear long-sleeved, loose-fitting clothing, gloves and eye protection.
- Use dust mask.
- Wash exposed areas with soap and warm water after handling.
- Wash work clothes separately from other clothing; rinse washer thoroughly. Operations which generate high airborne fiber concentrations (over 10 fibers/cc) require additional respiratory protection.

Dens™ Technology from G-P Gypsum

G-P Gypsum became the first company to manufacture paperless, glass mat gypsum board with the introduction of DensGlass Gold® exterior sheathing in 1986. Since then, the company has developed a series of patented, paperless, moisture- and mold-resistant glass mat products utilizing a proprietary, breakthrough manufacturing process called Dens™ Technology. Dens Technology allows G-P Gypsum to bring unprecedented, innovative solutions to the building products industry that address previously unmet construction needs. In 2002, G-P Gypsum made history with the introduction of the industry's first moisture- and mold-resistant interior wallboard, DensArmor™ Plus Interior Panels. Today, G-P Gypsum is the only manufacturer producing paperless, moisture- and mold-resistant gypsum products for a variety of residential and commercial building solutions, including interior wallboard, exterior sheathing, tile backer, floor underlayment, roof underlayment and cover boards and shaftliners. For more information, visit www.gpgypsum.com.



The DensShield® Lifetime Limited Tile installation Warranty

Georgia-Pacific Corporation ("G-P") warrants to the initial homeowner/consumer ("Owner") of DensShield® Tile Backer installed in the Owner's dwelling, that, subject to the conditions and limitations specified below, DensShield (1) will be free of manufacturing defects that make it unsuitable for its intended use; (2) will not crack, chip or delaminate; and (3) will not decay as a result of exposure to moisture, and (4) that when DensShield has been used as a tile substrate, the integrity of the tile installation will remain intact, provided the tile is installed according to Georgia-Pacific installation instructions which are consistent with tile industry standards. This warranty is for life of the Owner and is non-transferable.

Georgia-Pacific also offers a 20-year limited warranty on commercial applications.

For complete warranty details, visit www.gpgypsum.com or call 1-800-225-6119.

www.gpgypsum.com

Technical Hotline: 1-800-225-6119 (M-F, 8-6ET)

Literature Requests: 1-800-BUILD GP



Sales Information and Order Placement:

USA

Midwest: 1.800.876.4746

South: 1.800.327.2344

Northeast: 1.800.947.4497

West: 1.800.824.7503

CANADA 1.800.387.6823

Quebec: 1.800.361.0486