GP Georgia-Pacific

Dens**Armor Plus**®
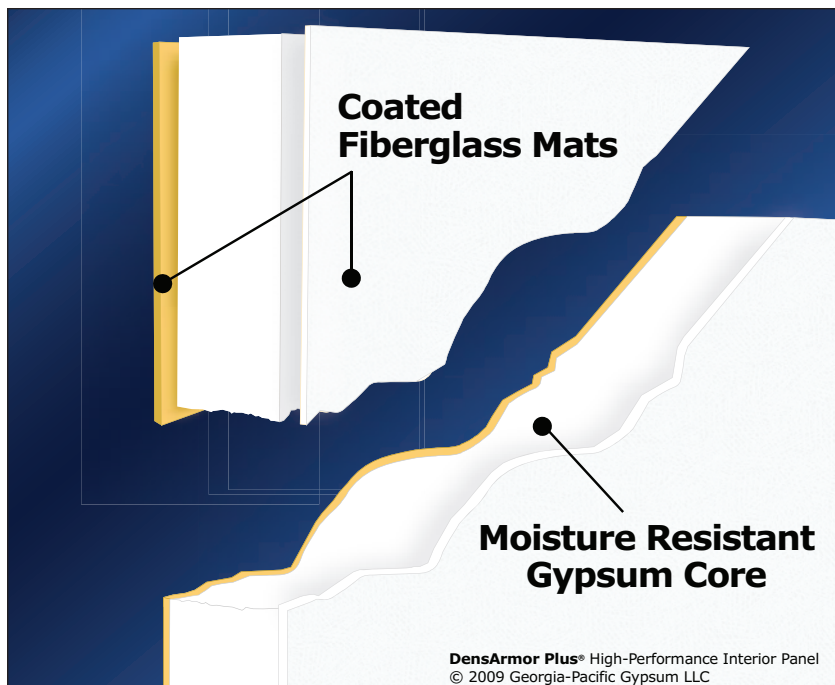High-Performance Interior Panel

MOISTURE- AND MOLD-RESISTANT HIGH-PERFORMANCE SOLUTIONS

GP Georgia-Pacific

Dens**Armor Plus**®
High-Performance Interior Panel

Product Overview

Areas of Use

Interiors of exterior walls, where moisture intrusion is most likely.

Pre-rock areas, where the windows, doors or roof have not been installed, making moisture intrusion inevitable.

Areas likely to be exposed to moisture, where paper-faced greenboard may have been specified in the past, such as laundry rooms, bathroom walls, kitchens, basements.

Coated Fiberglass Mats

Moisture Resistant Gypsum Core

DensArmor Plus® High-Performance Interior Panel
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DensArmor Plus® Interior Panels have fiberglass mats for superior mold and moisture resistance compared to paper-faced drywall.

- *Fiberglass mats, instead of paper facings, eliminate a potential food source for mold growth and may reduce remediation and scheduling delays associated with paper-faced drywall*
- *Replaces traditional paper-faced drywall*
- *Used pre-rock, DensArmor Plus Interior Panels stand up to ambient moisture and incidental wettings during and after construction*
- *Backed with a six-month weather exposure limited warranty against delamination, deterioration or decay. For complete warranty visit www.gpgypsum.com.*

When tested, as manufactured, in accordance with ASTM D 3273, DensArmor Plus® Interior Panels 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.

DensArmor Plus Interior Panels are the first and only drywall to be GREENGUARD Indoor Air Quality Certified® and GREENGUARD Children & Schools℠ Certified for low emissions of volatile organic compounds (VOCs) by a leading third-party organization, GREENGUARD Environmental Institute. In addition, DensArmor Plus Interior Panels are the first and only drywall listed as GREENGUARD microbial resistant. This listing means DensArmor Plus panels, which feature fiberglass mats instead of paper facings used on the surface of traditional gypsum board products, resist mold growth. The microbial resistant test is based on ASTM Standard D 6329-98, a testing standard set by ASTM International, which develops testing guidelines and procedures for building materials, products, systems and services.

DensArmor Plus panels also qualify for Collaborative for High Performance Schools (CHPS) credits. CHPS, based in California, is a national non-profit organization that works with school districts and their design teams to improve the quality of education by using products that have met requirements to receive CHPS credits.

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

DensArmor Plus® Interior Panels feature fiberglass mats on both the front and the back for the best in interior protection from moisture currently available. The moisture resistant fiberglass mats make DensArmor Plus panels the ideal replacement for paper-faced greenboard. A revolutionary departure from traditional wallboard, the face of DensArmor Plus panels finishes in a similar manner to traditional wallboard and offers superior performance in resisting mold.

For years, DensGlass™ Exterior Sheathing (formerly DensGlass Gold® Exterior Sheathing) has been proven tough in commercial construction – under the most challenging weather conditions. Now the same powerful protection is working on the inside as DensArmor Plus High-Performance Interior Panels.

Integrating DensArmor Plus panels into your specifications is part of an overall building solution that can help address the mold issue and reduces the time and expense of replacing alternative products if they become wet.

Georgia-Pacific Gypsum Products and LEED

Many of our products may qualify to contribute to earning LEED credits through their Green Building Rating System for *New Construction & Major Renovations Version 2.1* (LEED-NC 2.1) and other current LEED building standards. To find the Georgia-Pacific Gypsum plant source, call our Technical Hotline at 1-800-225-6119, and you may qualify for points in the following LEED categories:

Materials and Resources

• Regional Materials Credits 5.1 and 5.2

• Innovation in Design Credit

(When tested, as manufactured, in accordance with ASTM D 3273 and ASTM D 6329-98, product demonstrates significant mold growth resistance.)

Reduce Costly Remediation With Proven Fiberglass Mat Technology
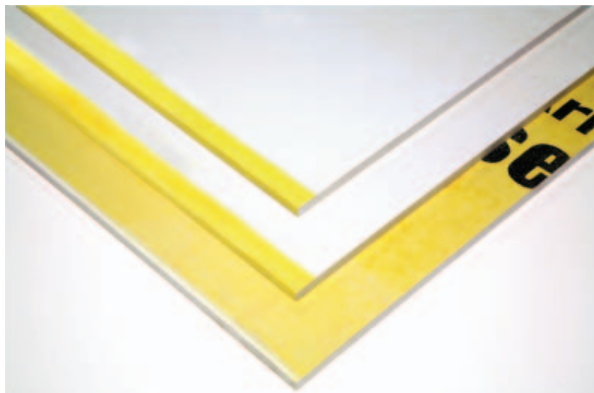
Only fiberglass mat DensArmor Plus® Interior Panels allow contractors to hang them before dry-in. Paper-faced products are often damaged by wind-driven rain and moisture during installation. DensArmor Plus panels stand up to normal weather conditions which allows for acceleration of schedules and the potential reduction of costly delays.

Only DensArmor Plus panels offer a six-month limited exposure warranty that guards against delamination and deterioration when exposed to normal weather conditions during and after installation.

DensArmor Plus High-Performance Interior Panels are now available as abuse/impact-resistant panels.

Enhanced Construction Schedule

The unique moisture-resistant features of DensArmor Plus® High-Performance Interior Panels allow builders to install gypsum assemblies when it's not feasible to wait until cladding is completed. Georgia-Pacific Gypsum Dens™ Brand gypsum products offer weather exposure limited warranties against damage from exposure to normal weather conditions or humidity if they are stored and installed according to instructions from the manufacturer.

By building from the inside out with these moisture-resistant gypsum products, general contractors potentially can complete projects ahead of schedule, and building owners have an opportunity to generate faster cash flow by moving paying occupants in more quickly. Not every project will realize such significant results and cost savings will vary by project.

For more information on the value of using Georgia-Pacific Gypsum Dens™ Brand products in commercial construction, visit www.gpgypsum.com.

Limited Warranty

DensArmor Plus Interior Panels are based on proven and patented Dens Brand gypsum products, which have a lengthy history of performance. Based on that track record, Georgia-Pacific Gypsum backs the performance of DensArmor Plus panels with the following limited warranty:*

• Six months of coverage against weather exposure (delamination, deterioration and decay)

• A three-year warranty against manufacturing defects.

For complete warranty details, visit www.gpgypsum.com or call 1.800.225.6119.

Physical Properties

Properties	1/2" DensArmor Plus®	1/2" DensArmor Plus Fireguard® Type C	5/8" DensArmor Plus Fireguard® Type X
Thickness, nominal	1/2" (12.7mm) ± 1/64" (0.4mm)	1/2" (12.7mm) ± 1/64" (0.4mm)	5/8" (15.9mm) ± 1/64" (0.4mm)
Width, standard	4' (1219mm) ± 3/32" (2.4mm)	4' (1219mm) ± 3/32" (2.4mm)	4' (1219mm) ± 3/32" (2.4mm)
Length, standard	8' (2440mm) to 12' (3658mm) ± 1/4"(6.4mm)	8' (2440mm) to 12' (3658mm) ± 1/4"(6.4mm)	8' (2440mm) to 12' (3658mm) ± 1/4"(6.4mm)
Weight[1], lbs./M sq. ft., nominal	2020[1]	2020[1]	2500[1]
Edges	Tapered	Tapered	Tapered
Surfacing	Coated fiberglass mat on face, back	Coated fiberglass mat on face, back	Coated fiberglass mat on face, back
Flexural strength, parallel, lbf.[3,6]	80	80	100
Flexural strength, perpendicular[3,6]	100	120	140
R Value[2]	.56	.56	.67
Combustibility[8]	Noncombustible	Noncombustible	Noncombustible
Nail pull resistance minimum, lbf.[3,6]	80	80	90
Hardness core, edges and ends, lbf.	>15	>15	>15
Water absorption (% of weight)[3,5]	<5%	<5%	<5%
Surface water absorption[3,5]	<1.6 grams	<1.6 grams	<1.6 grams
Surface burning characteristics (per ASTM E 84 or CAN/ULC-S102): flame spread/smoke developed	0/0	0/0	0/0
Humidified deflection, inches[3,4]	2/8"	2/8"	1/8"
Bending Radius[7]	6'	6'	8'

[1] Represents approximate weight for design and shipping purposes.

[2] Tested in accordance with ASTM C 518.

[3] Tested in accordance with ASTM C 473.

[4] Maximum requirements for ASTM C 1177 and ASTM C 1658.

[5] Maximum requirements for ASTM C 630, ASTM C 1396 and ASTM C 1658.

[6] Minimum requirements for ASTM C 1177 and ASTM C 1658

[7] Double fasteners on ends as needed.

[8] As defined and tested in accordance with ASTM E 136.

NOTE: Specified minimum values are as in applicable ASTM C 630, ASTM C 1396, ASTM C 1177 and ASTM 1658 standards.

Installation

DensArmor Plus® Interior Panels are installed in a similar manner to traditional paper-faced drywall. DensArmor Plus panels should be installed according to the most current versions of Gypsum Association Publication GA-216 "Application and Finishing of Gypsum Panel Products" and ASTM C 840 "Standard Specification for Application and Finishing of Gypsum Board for Non-Fire Rated Construction." For best results, abut DensArmor Plus panels against regular paper-faced drywall only at inside or outside corners to eliminate transitions in the field of a wall or ceiling. Adjust fastening tools to ensure that the fasteners are not over-driven through the face of the panel. Nails and screws should be driven with the heads slightly below the surface of the panel.

1. DensArmor Plus panels shall be installed in accordance with ASTM C 840 "Standard Specification for Application and Finishing of Gypsum Board."

2. For fire rated installations, the installation and details shall be in conformity with those assemblies published in the Gypsum Association Fire Resistance Design Manual GA-600, UL and ULC Fire Resistance Directories.

3. Nails shall be spaced a maximum of 7" (177.8 mm) on center on ceilings, and a maximum of 8" (203.2 mm) on center on walls.

4. Nails shall be driven with the heads slightly below the surface of the gypsum board, avoiding damage to the face and core of the board, such as breaking the fiberglass mat or fracturing the core.

5. Screws shall be spaced not more than 12" (304.8 mm) on center along the framing members for ceilings and 16" (406.4 mm) on center for walls where the framing members are 16" on center. Screws shall be spaced not more than 12" on center along the framing members for ceilings and walls where framing members are 24" (609.6 mm) on center.

6. When using a combination of fasteners consisting of nails along the perimeter and screws in the field of the gypsum board, the spacing between a nail and an adjacent screw shall be not more than the spacing specified for screws.

7. Screws shall be driven to provide screw head penetration just below the DensArmor Plus panel surface without breaking the fiberglass mat surface of the panel or stripping the framing member around the screw shank.

8. Suitable fascia and moulding shall be provided around the perimeter to protect the DensArmor Plus panels from direct exposure to water. Unless protected by metal or other water stops, the edges of the DensArmor Plus boards shall be placed not less than 1/2" (12.7 mm) away from abutting vertical surfaces. Do not allow water to pond on DensArmor Plus panels.

Maximum Framing Spacing for Single-Ply Construction[1]

Single-Ply DensArmor Plus Panel Thickness, in. (mm)	Application[2]	Maximum Framing Members on Centers Spacing, in. (mm)
Non-Tile Applications: *Ceilings*		
1/2" (12.7)	parallel	16 (406.4)
5/8" (15.9)	parallel	16 (406.4)
1/2" (12.7)	perpendicular[1]	24 (609.6)
5/8" (15.9)	perpendicular	24 (609.6)
Walls: 1/2" (12.7)	perpendicular or	24 (609.6)
5/8" (15.9)	parallel	24 (609.6)
Tile Applications[3]: *Ceilings*		
1/2" (12.7)	perpendicular	12 (305)
5/8" (15.9)	perpendicular	16 (406.4)
Walls: 1/2" (12.7)	perpendicular or	16 (406.4)
5/8" (15.9)	parallel	24 (609.6)

[1] DensArmor Plus panels to receive hand or spray-applied water-based texture material shall be applied perpendicular.

[2] Nails for DensArmor Plus panels applied over existing surfaces shall have a flat head and diamond point, and shall penetrate not less than 7/8" (22.2 mm), nor more than 1-1/4" (31.8 mm) into the framing member.

[3] When tiling over steel studs, minimum 20-gauge steel required.

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

Ceiling Applications

DensArmor Plus® Interior Panels are the ideal choice for both interior ceilings and exterior soffits. They meet the requirements for CD ceiling board.

Moisture-resistant DensArmor Plus® Interior Panels are the ideal choice for Ceiling Board applications over wet areas such as residential showers and in kitchen and interior garage areas. It has tapered edges for easy finishing and resists moisture that can cause problems with traditional ceiling board which has paper facers.

Soffit Applications, Fastening, Framing and Finishing

Moisture-resistant DensArmor Plus Interior Panels are the ideal choice for exterior soffits, porch and lanai ceilings, and drive-under garages. They have tapered edges for easy finishing.

Traditional gypsum exterior ceiling board has paper facers. Paper is a potential food source for mold growth. DensArmor Plus panels have fiberglass mats on each side instead of paper and are moisture resistant.

Thickness	Framing Spacing	Orientation	Screw Spacing
1/2"	16" o.c. max	Perpendicular	8" o.c. along framing
5/8"	24" o.c. max	Perpendicular	8" o.c. along framing

	1/2" DensArmor Plus	1/2" Gypsum Soffit Board	5/8" DensArmor Plus Fireguard Type X	5/8" Gypsum Soffit Board
Humidified Deflection[1] (Sag)[2,4]	2/8"	7/8"	1/8"	4/8"
Water Absorption[3]	<5%	40+%	<5%	40+%
Surface Water Absorption[1,3,4]	<1.6 grams		<1.6 grams	
Surface	Fiberglass mat	Paper	Fiberglass mat	Paper

[1] Maximum requirement for ASTM C 79 and C 1396.

[2] Maximum requirement for ASTM C 1177 and C 1658

[3] Maximum requirement for ASTM C 1658.

[4] Tested in accordance with ASTM C 473.

Painted Ceilings and Soffits Finished Joints

A. DensArmor Plus® Interior Panel

B. 2" 10 x 10 Fiberglass Mesh Tape

C. Drip Edge

D. ToughRock® Setting Compound

E. Finish Coats

Finishing Method #1

Embed 2" wide fiberglass mesh tape in ToughRock® 90 Setting Type joint compound, or equivalent, over all joints. Prime with high quality, high build, exterior-grade primer and finish with two coats of high quality exterior-grade paint.
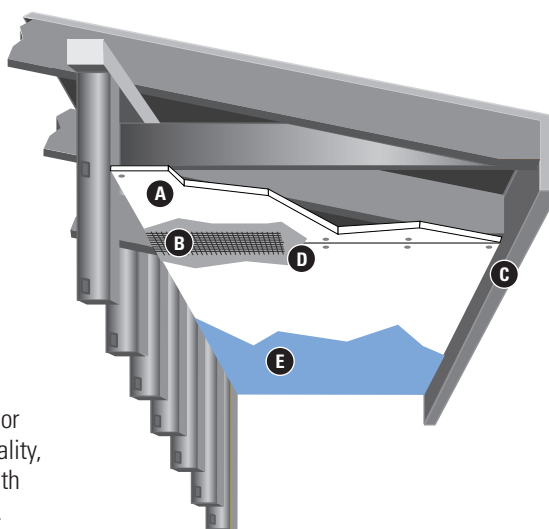
Soffit Applications, Fastening, Framing and Finishing

Exterior Ceilings and Soffits

A. DensArmor Plus® Panel

B. Drip Edge

C. Reinforcing Mesh/Base Coat*

D. Base Coat*

E. Finish Coat*
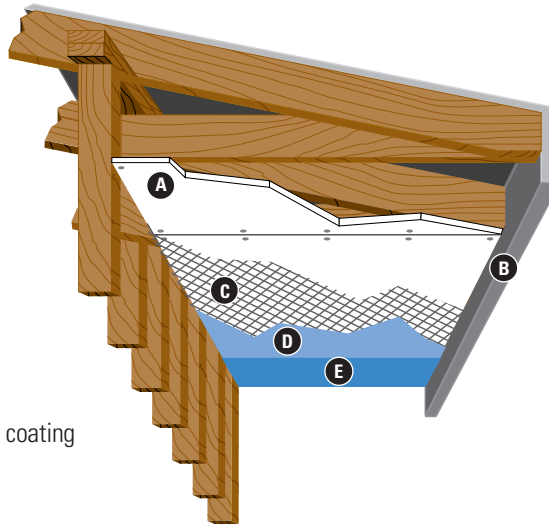
Finishing Method #2

* Apply a synthetic-type Direct Applied
  Finish System in accordance with the coating
  manufacturer's recommendation.

Special Conditions:

1. Control joints are recommended a minimum of 30 feet or closer as specified by the design authority.

2. Protection from the elements shall be provided prior to installing DensArmor Plus panels in horizontal applications to prevent moisture from ponding or settling on top of the panel.

3. Sandable setting compounds are not acceptable for use over DensArmor Plus panels in exterior soffit applications.

4. Georgia-Pacific Gypsum's ToughRock 90 setting compound is not available in all markets. It is permissible to use setting-type joint compounds from other manufacturers that are equivalent to ToughRock 90 setting compound.

Where DensArmor Plus panels are used for ceilings of carports, open walk ways, porches and soffits or eaves that are horizontal or inclined downward away from the building, the DensArmor Plus panels shall be either 1/2" or 5/8" (12.7 or 15.9mm) in thickness. Framing shall be not more than 16" (406mm) on center for 1/2" (12.7mm) thick DensArmor Plus panels and not more than 24" (610mm) on center for 5/8" (15.9mm) thick DensArmor Plus Fireguard Type X panels. Suitable fascia and moulding shall be provided around the perimeter to protect the DensArmor Plus panels from direct exposure to water. Unless protected by metal or other water stops, the edges of the gypsum panel shall be placed not less than 1/2" (12.7mm) away from abutting vertical surfaces. Do not allow water to pond on DensArmor Plus panels.

Decorative Finishes

Finishing

The finishing and sanding of DensArmor Plus® Interior Panels should be performed in accordance with the most current version of Gypsum Association Publication GA-214 "Recommended Levels of Gypsum Board Finish." Joints between DensArmor Plus panels may be finished with either paper tape embedded with all purpose joint compound or with fiberglass mesh tape and setting compound. Because of the enhanced moisture and mold resistant properties of DensArmor Plus panels, drying times for the joint and setting compounds may vary slightly. It is essential to allow each coat of compound to dry thoroughly before applying additional coats of compound. Care should be taken to ensure that all joints and fasteners are properly and adequately sanded to provide a smooth transition between the compound and the face of the panel.

Critical (Severe) Lighting Areas and Gloss Paints

When using gloss, semi-gloss or enamel paint, or when working in a critical (severe) lighting area, always finish DensArmor Plus panels to a Level 5 finish as detailed in GA-214. Critical lighting areas include but are not limited to walls and ceiling areas near windows and skylights, long hallways and atriums with large surface areas exposed to artificial and/or natural light. Refer to GA-214 for additional examples.

Wallcoverings

Because of the enhanced moisture- and mold-resistant properties of DensArmor Plus panels, drying times for the wallcovering adhesives and primers may vary slightly. Some wallcoverings, such as an unbacked vinyl wallcovering, require a Level 5 finish as detailed in GA-214 when applied over DensArmor Plus panels. Avoid the use of wallcovering material over a Level 4 finish if the material is lightweight, contains a limited pattern, has a gloss finish or any combination of these elements is present as detailed in GA-214. Always follow wallpaper and adhesive manufacturer's installation instructions.

Tile

Where DensArmor Plus panels are to receive adhesively applied tile, the panel can be used on ceilings where 20-gauge steel or wood framing is spaced not more than 12" o.c. (304.8 mm) for 1/2" (12.7 mm) thick panels and not more than 16" o.c. (406 mm) for 5/8" (15.9 mm) thick panels. For walls, when used as a tile substrate, 20-gauge steel or wood framing should be spaced no greater than 16" o.c. for 1/2" or 24" o.c. for 5/8". (This is to conform with IBC section 2509.3 and GA-216-2004 section 15.3.2)

DensArmor Plus panels can be used as a tile backerboard in dry areas or areas with limited moisture contact such as areas adjacent to sinks and toilets, bathroom ceilings and areas above tile in residential shower areas. In wet areas where 2006 IBC and IRC codes have been adopted, Georgia-Pacific Gypsum recommends the use of DensShield® Tile Backer, which incorporates a built-in moisture barrier in wet areas.

Priming and Painting

A mock up or test wall should be used to ensure the proposed decorative finish will produce an acceptable result. Proper installation, finishing and priming are critical. Skipping a step, such as the application of a primer; or taking shortcuts, such as not using proper sanding techniques, will negatively impact the quality of the final decorative finish.

Because many factors that are unrelated to the manufacture of the panels can affect the acceptability of the final finish result, Georgia-Pacific Gypsum makes no warranty, express or implied, regarding the finish results to be achieved with DensArmor Plus® panels.

The following guidelines for priming DensArmor Plus Interior Panels have been developed by the Rohm & Haas Paint Quality Institute:

1. A high solids primer with at least 40% volume solids should be used. The primer can best be applied by roller at a higher film thickness in one coat vs. brush or spray applied.

2. For adequate coverage, the primer should be applied to a dry film thickness of 1.7 to 1.8 mils dry to ensure uniform coverage and appearance. The number of coats to achieve the dry film thickness will depend on the primer used. For instance, a primer with lower than 37% volume solids may need two coats for adequate coverage.

% Volume Solids of Primer	Spread Rate, square feet/gallon
37	330-350
40	355-380
43	380-400
47	420-450

3. For best results, apply the high solids primer with a 3/8" nap roller at a natural application rate.

4. It is possible to use a 1/2" nap roller and apply a thicker coat. However, the roller pattern is more pronounced and some may find it objectionable.

5. To maximize the mold-resistant benefit of DensArmor Plus panels, a 100% acrylic primer with mildecide should be used.

6. High-quality flat or satin paint should be applied over the primer. Semi-gloss or gloss paints are not recommended.

7. Level 5 finish should be utilized for semi-gloss or gloss paints, per GA-214.

Primers on the market that provide best finishing results include:

a. ICI Paints Glidden® Gripper® Interior/Exterior Stain Killer Primers/Sealer GL3210-1200

b. ICI Paints Prep and Prime® Gripper MultiPurpose Interior/Exterior Water Based Primer Sealer 3210-1200

c. Pratt and Lambert Paints, SUPRIME® Interior Latex Enamel Undercoater Z1013/F1013

d. Do It Best® Interior Latex Wood & Wall Primer

e. Do It Best® Latex Stainblocker Primer

f. Sherwin Williams® Builders Solution®

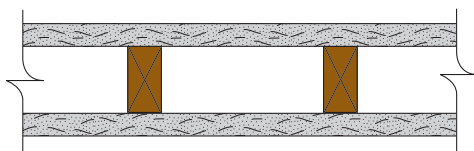Build surfacers that provide best finishing results include:

a. ICI Paints Prep and Prime Fill & Seal Equalizing Interior Water-Based Primer Sealer 1070-1200

b. Sherwin Williams® Prep Rite High Build Interior-Latex Primer Surfacer

Fire and Sound Rated Assemblies

DensArmor Plus® High-Performance Interior Panels are offered in 1/2" Fireguard® Type C and 5/8" Fireguard® Type X core types for use in fire-rated assemblies. These panels can be used in any Georgia-Pacific Gypsum or non-proprietary assembly where Type X gypsum board is required.

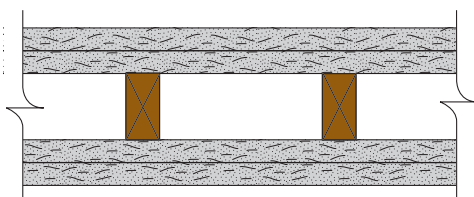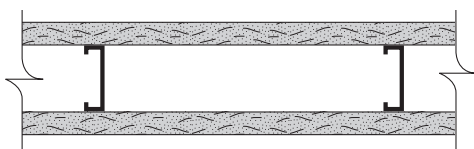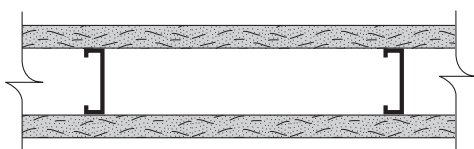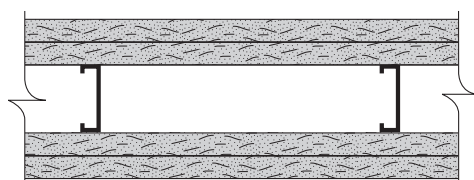|	
1-Hour Fire Rating Test Reference: UL U305, ULC W301, GAWP 3605, cUL U305	**30-34 STC Sound Trans.** Test Reference: OR 64-8 Partition Thickness: 4-7/8" Weight per Sq. Ft.: 7.0 5/8" DensArmor Plus® (formerly DensArmor Plus Interior Drywall) Fireguard® Type X panel applied parallel or at right angles to each side of 2 x 4 wood studs 16" o.c. with 1-7/8" 6d coated nails spaced 7" o.c. Joints staggered. (UL U309, studs 24" o.c.)
2-Hour Fire Rating Test Reference: UL U301, cUL U301	**40-44 STC Sound Trans.** Test Reference: NGC-2363 Partition Thickness: 6-1/8" Weight per Sq. Ft.: 12.0 Base Layer: 5/8" DensArmor Plus Fireguard Type X panel applied vertically or at right angles to each side of 2 x 4 wood studs 16" o.c. with 1-7/8" 6d coated nails 6" o.c. Face Layer: 5/8" DensArmor Plus Fireguard Type X panel applied vertically or at right angles to studs over base layer with 2-3/8" 8d coated nails 8" o.c. Stagger joints 16" o.c. each layer and side.
1-Hour Fire Rating Test Reference: UL U465, ULC W415, GA WP 1081	**48 STC Sound Trans.** Test Reference: RAL TL99-103 Partition Thickness: 4-7/8" Weight per Sq. Ft.: 6.0 5/8" DensArmor Plus Fireguard Type X panel applied vertically (UL U465, ULC W415, GA WP 1081) or horizontally (UL U465) to each side of 3-5/8" steel studs 24" o.c. with 1" Type S drywall screws 8" o.c. at edges and 12" o.c. at intermediate studs. **Sound Tested** with 2-1/2" fiberglass insulation, friction fit in cavity
1-Hour Fire Rating Test Reference: UL V450	Partition Thickness: 2-7/8" Weight per Sq. Ft.: 5.0 5/8" DensArmor Plus Fireguard Type X gypsum board applied vertically to each side of 1-5/8" UltraSTEEL® studs 24" o.c. with 1" Type S drywall screws, 8" o.c. at edges and 12" o.c. at intermediate studs.
2-Hour Fire Rating Test Reference: UL U411, cUL U411	**50-54 STC Sound Trans.** Test Reference: WHI 218-1 Partition Thickness: 5-1/8" Weight per Sq. Ft.: 10 Base Layer: 5/8" DensArmor Plus Fireguard Type X panel applied parallel to each side of 2-1/2" steel studs 24" o.c. with 1-1/4" Type S screws 16" o.c. Face Layer: 5/8" DensArmor Plus Fireguard Type X panel applied parallel to each side with drywall adhesive or secured with 1-5/8" Type S screws 12" o.c. at top and bottom track, 16" o.c. at edge joints only. Stagger joints 24" each layer and side. **Sound Tested** with 2-1/2" fiberglass insulation

2-Hour Fire Rating

Test Reference: UL U412, ULC W414
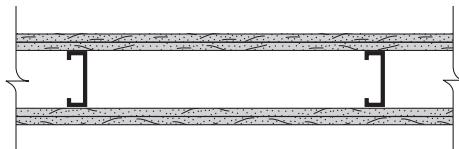
50-54 STC Sound Trans.

Test Reference: NRCC 798-NV
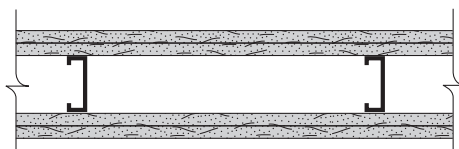Partition Thickness: 4-1/2", Weight per Sq. Ft.: 9.0
Sound Tested with 2-1/2" fiberglass insulation stapled in stud space

Base Layer: 1/2" DensArmor Plus® (formerly DensArmor Plus® Interior Drywall) Fireguard Type C panel applied parallel to each side of 1-5/8" steel studs 24" o.c. with 1" Type S drywall screws 24" o.c.

Face Layer: 1/2" DensArmor Plus Fireguard Type C panel applied parallel to each side with 1-5/8" Type S drywall screws 12" o.c. Joints staggered 24" each layer and side.

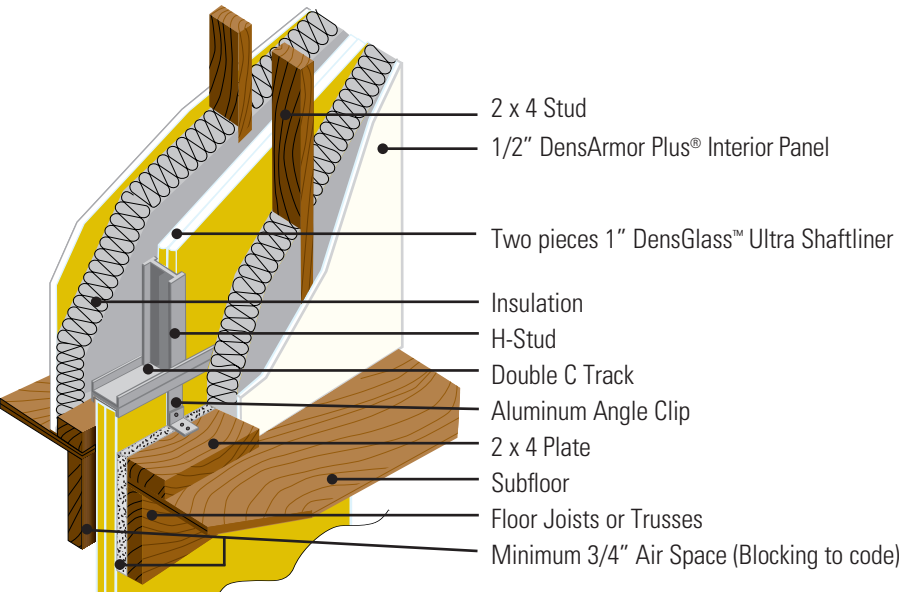**2-Hour Fire Rating**

Test Reference: V450

Partition Thickness: 48-1/8"
Weight per Sq. Ft.: 10'

Base Layer: 5/8" DensArmor Plus Fireguard Type X panel applied at right angles to each side of 1-5/8" ULTRASteel® studs 24" o.c. with 1" Type S screws 24" o.c. with the first screw installed 1-1/4" from board edge and to the track.
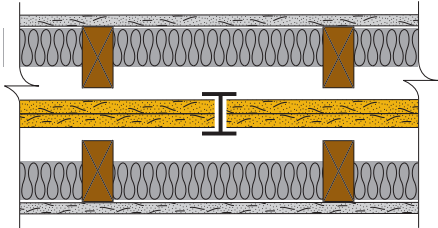
Face Layer: 5/8" DensArmor Plus Fireguard Type X panel applied at right angles to each side with 1-5/8" Type S screws spaced 16" o.c. with the first and second screws installed 1-1/4" and 8" from board edge, respectively and to track spaced 16" o.c. Horizontal joints on face layer staggered 12" from base layer.

Area Separation Wall Section Detail

2 x 4 Stud
1/2″ DensArmor Plus® Interior Panel

Two pieces 1″ DensGlass™ Ultra Shaftliner

Insulation
H-Stud
Double C Track
Aluminum Angle Clip
2 x 4 Plate
Subfloor
Floor Joists or Trusses
Minimum 3/4″ Air Space (Blocking to code)

Area Separation 2-Hour Fire Rating

Test Reference: UL DESIGN U373,
WHI GP/WA 120-04, GA ASW 1002

**60 STC Sound Trans.**

Test Reference: RAL TL89-383

Two layers 1″ DensGlass Fireguard Type X Ultra Shaftliner panel inserted in H-Studs 24″ o.c. Min. 3/4″ air space on both sides must be maintained between liner panels and adjacent framing. 1/2″ DensArmor Plus panels applied to wood framing.

Sound Tested 3-1/2″ fiberglass in stud space.

Shaftwall/Stairwell Design Summary Vertical

Series 620 2-Hour Fire Rating

Test Reference: GA File #, WP 7096, WHI Design, GP/WA 120-01
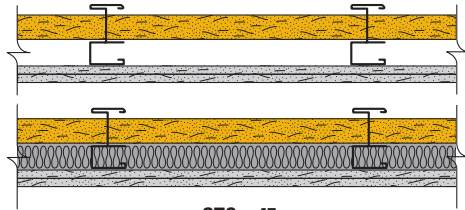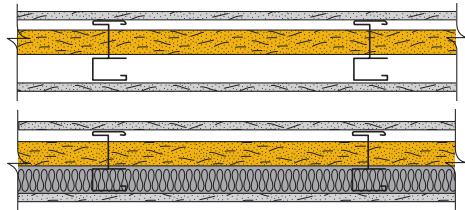
STC = 47
RAL TL 89 – 379

Approx. Weight: 9 psf

Fiberglass sound insulation thickness is 1″, 2-1/2″ and 3-1/2″ for C-T, C-H or I studs of 2-1/2″, 4″ and 6″ respectively. Finished one side. Components: 1″ DensGlass™ Fireguard Type X Ultra Shaftliner (formerly DensGlass Ultra® Shaftliner) panel, C-T studs and two layers of 1/2″ DensArmor Plus® Fireguard® Type C installed horizontally or vertically. Edges and ends offset 24″ o.c.

C-T, C-H or I Stud	2-1/2″	4″	6″
Wall Thickness	3-1/2″	5″	7″

Sound Tested with 1-1/2″ fiberglass insulation, friction fit in cavity

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Series 621 2-Hour Fire Rating

Test Reference: WHI Design, GP/WA 120-02, GA File # WP 7097

STC = 47
RAL TL 89 – 380

Approx. Weight: 9 psf

Fiberglass sound insulation thickness is 1″, 2-1/2″ and 3-1/2″ for C-T, C-H or I studs of 2-1/2″, 4″ and 6″ respectively. Finished both sides with 1/2″ DensArmor Plus Fireguard Type C installed horizontally or vertically. Edges and ends offset 24″ o.c.

C-T, C-H or I Stud	2-1/2″	4″	6″
Wall Thickness	3-1/2″	5″	7″

Sound Tested with 1-1/2″ fiberglass insulation, friction fit in cavity

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UL V473

STC = 47
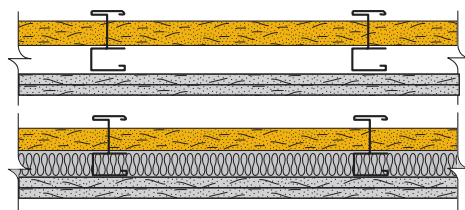**Based on RAL TL 89 – 379**

Test Reference: UL V473

Approx. Weight: 9 psf

Fiberglass sound insulation thickness is 1″, 2-1/2″ and 3-1/2″ for C-T or C-H studs of 2-1/2″, 4″ and 6″ respectively. Finished one side. Components: 1″ DensGlass™ Fireguard® Type X Ultra Shaftliner panel, C-T or C-H studs and two layers of 5/8″ DensArmor Plus® Fireguard® Type X installed horizontally for base layer and vertically for face layer. Edges and ends offset 24″ o.c.

C-T or C-H Stud	2-1/2″	4″	6″
Wall Thickness	3-3/4″	5-1/4″	7-1/4″

Architectural Specifications

Part 1 – General

1.01 Summary

A. Section Includes: Fiberglass mat faced, moisture resistant gypsum board.

EDIT LIST BELOW TO CONFORM TO PROJECT REQUIREMENTS. VERIFY SECTION NUMBERS AND TITLES.

B. Related Sections:
    1. Section 06 10 00 Rough Carpentry.
    2. Section 09 21 16 Gypsum Board Assemblies.
    3. Section 09 22 00 Supports for Plaster and Gypsum Board.

IF THE PROJECT INCLUDES ALLOWANCES OR ALTERNATES OR UNIT PRICES, RETAIN PARAGRAPHS BELOW AND COORDINATE WITH DIVISION 01.

C. Allowances:

D. Unit Prices:

E. Alternates:

1.02 References

A. ASTM International (ASTM):
    1. ASTM C 473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
    2. ASTM C 518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
    3. ASTM C 630 Standard Specification for Water-Resistant Gypsum Backing Board.
    4. ASTM C 840 Standard Specification for Application and Finishing of Gypsum Board.
    5. ASTM C 1396 Standard Specification for Gypsum Board.
    6. ASTM C 1658 Standard Specification for Fiberglass Mat Gypsum Panels.
    7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
    8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.

1.03 Submittals Quality Assurance

A. Product Data: Manufacturer's specifications and installation instructions for each product specified.
    RETAIN BELOW IF REQUIRED, REVISE LIMITS IF REQUIRED.

B. Regulatory Requirements: Provide products that comply with the following limits for surface burning characteristics when tested per ASTM E 84:
    1. Flame spread: 25, maximum.
    2. Smoke developed: 450, maximum.

C. Provide products that have been GREENGUARD Indoor Air Quality Certified® by the GREENGUARD Environmental Institute under the GREENGUARD Standard for Low Emitting Products and GREENGUARD for Children & Schools℠ product certification program.
    THIS GUIDE SPEC WAS WRITTEN TO PROVIDE THREE EDITING OPTIONS: 1) PROPRIETARY, 2) GENERIC OR 3) A COMBINATION OF THE TWO.

1.04 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

IF PROPRIETARY PRODUCT NAMES ARE INCLUDED IN THE "MATERIALS" ARTICLE BELOW, DELETE THIS ARTICLE ALTOGETHER. IF A PROPRIETARY SPECIFICATION IS REQUIRED, RETAIN THIS ARTICLE AND DELETE THE "MATERIALS" ARTICLE.

2.01 Manufacturers

EDIT LISTS BELOW TO CONFORM TO PROJECT REQUIREMENTS. IF OTHER MANUFACTURERS ARE BEING ADDED TO THIS SECTION, ADD LISTINGS OF THEIR PROPRIETARY PRODUCT NAMES.

A. Georgia-Pacific Gypsum LLC:
    1. Fiberglass Mat Faced Gypsum Board: DensArmor Plus® High-Performance Interior Panels.
    2. Fire-Rated Fiberglass Mat Faced Gypsum Board: DensArmor Plus® Fireguard® Type X.

THIS ARTICLE INCLUDES GENERIC DESCRIPTIONS OF GYPSUM BOARD PANELS; THE NAMES OF THE CORRESPONDING GEORGIA-PACIFIC GYPSUM PRODUCTS ARE INCLUDED AS ACCEPTABLE PRODUCTS. IF THIS SECTION IS BEING EDITED TO BE GENERIC, THESE PRODUCT NAMES SHOULD BE DELETED. IF OTHER MANUFACTURERS ARE BEING ADDED TO THIS SECTION, 1) ADD THE PROPRIETARY PRODUCT NAMES OF THOSE MANUFACTURERS, OR 2) IF PROPRIETARY NAMES ARE LISTED IN THE "MANUFACTURERS" ARTICLE ABOVE, DELETE THEM FROM THIS ARTICLE ALTOGETHER.

2.02 Materials

A. Fiberglass Mat Faced Gypsum Board:
    1. Thickness: 1/2 inch.
    2. Width: 4 feet.
    3. Length: 8 feet.
    4. Weight: 2020 pounds per M square feet.
    5. Edges: Tapered.
    6. Surfacing: Coated fiberglass mat on face, back, and long edges.
    7. Flexural Strength, Parallel (ASTM C 473, ASTM C 1658): Not less than 80 lbf.
    8. Flexural Strength, Perpendicular (ASTM C 473, ASTM C 1658): Not less than 100 lbf.
    9. R-Value (ASTM C 518): Not less than 0.56.
    10. Nail Pull Resistance (ASTM C 473, ASTM C 1658): Not less than 80 lbf.
    11. Humidified Deflection (ASTM C 473, ASTM C 1658): Not more than 1/4 inch.
    12. Hardness Core, Edges, and Ends (ASTM C 473, ASTM C 1396): Not less than 15.
    13. Water Absorption (ASTM C 630, ASTM C 1396, ASTM C 1658): Less than 5 percent of weight.
    14. Mold Resistance (ASTM D 3273): 10, in a test as manufactured.
    15. Acceptable Products:
        a. 1/2 inch DensArmor Plus® High-Performance Interior Panels, Georgia-Pacific Gypsum.

B. 1/2 Inch Fire-Rated Fiberglass Mat Faced Gypsum Board:
    1. Thickness: 1/2 inch.
    2. Width: 4 feet.
    3. Length: 8 feet.
    4. Weight: 2020 pounds per M square feet.
    5. Edges: Tapered.
    6. Surfacing: Coated fiberglass mat on face, back, and long edges.
    7. Flexural Strength, Parallel (ASTM C 473, ASTM C 1658): Not less than 80 lbf.
    8. Flexural Strength, Perpendicular (ASTM C 473, ASTM C 1658): Not less than 120 lbf.
    9. R-Value (ASTM C 518): Not less than 0.56.
    10. Nail Pull Resistance (ASTM C 473, ASTM C 1658): Not less than 80 lbf.
    11. Humidified Deflection (ASTM C 473, ASTM C 1658): Not more than 1/4 inch.
    12. Hardness Core, Edges, and Ends (ASTM C 473, ASTM C 1396): Not less than 15.
    13. Water Absorption (ASTM C 630, ASTM C 1396, ASTM C 1658): Less than 5 percent of weight.
    14. Mold Resistance (ASTM D 3273): 10, in a test as manufactured.
    15. Acceptable Products:
        a. 1/2 Inch DensArmor Plus® Fireguard® Type C Interior Panels, Georgia-Pacific Gypsum.

C. 5/8 Inch Fire-Rated Fiberglass Mat Faced Gypsum Board:
1. Thickness: 5/8 inch.
2. Width: 4 feet.
3. Length: 8 feet.
4. Weight: 2500 pounds per M square feet.
5. Edges: Tapered.
6. Surfacing: Coated fiberglass mat on face, back, and long edges.
7. Flexural Strength, Parallel (ASTM C 473, ASTM C 1658): Not less than 100 lbf.
8. Flexural Strength, Perpendicular (ASTM C 473, ASTM C 1658): Not less than 140 lbf.
9. R-Value (ASTM C 518): Not less than 0.67.
10. Nail Pull Resistance (ASTM C 473, ASTM C 1658): Not less than 90 lbf.
11. Humidified Deflection (ASTM C 473, ASTM C 1658): Not more than 1/8 inch.
12. Hardness Core, Edges, and Ends (ASTM C 473, ASTM C 1396): Not less than 15.
13. Water Absorption (ASTM C 630, ASTM C 1396, ASTM C 1658): Less than 5 percent of weight.
14. Mold Resistance (ASTM D 3273): 10, in a test as manufactured.
15. Acceptable Products:
    a. 5/8 Inch DensArmor Plus Fireguard Type X Interior Panels, Georgia-Pacific Gypsum.

Part 3 – Execution

3.01 Installation

A. General: In accordance with ASTM C 840, GA-214 and the manufacturer's recommendations.
1. Manufacturer's Recommendations:
   a. Current "Product Catalog" Georgia-Pacific Gypsum, LLC

3.02 Protection

A. Protect gypsum board installations from damage and deterioration until the date of Substantial Completion.

Limitations

- DensArmor Plus® Interior Panels are resistant to normal weather conditions but are not intended for immersion in water. Cascading roof/floor water should be directed away from the panels until building has been properly closed in.
- The use of forced air heaters creates volumes of water vapor, which, when not properly vented, can condense on building materials. The use of these heaters and any resulting damage is not the responsibility of Georgia-Pacific Gypsum. Consult heater manufacturer for proper use and ventilation. Avoid any condition that will create moisture in the air and condensation on the exterior walls during periods when the exterior temperature is lower than the interior temperature.
- When using DensArmor Plus panels in a horizontal position, such as a ceiling, they should not be installed in pre-rock conditions. Do not allow water to pond or settle on the panels.
- DensArmor Plus panels are not intended for roof applications. For roof applications consult our DensDeck® roof board brochure.
- DensArmor Plus Interior Panels are not intended for sheathing applications. For sheathing applications consult our DensGlass™ Exterior Sheathing brochure.
- Georgia-Pacific Gypsum does not warrant and is not responsible or liable for the performance of the systems utilizing DensArmor Plus panels. The suitability and compatibility of any system is the responsibility of the system manufacturer or design authority.
- For all installations, design details such as fasteners, sealants and control joints per system specifications must be properly installed. Openings and penetrations must be properly sealed. Failure to do so will void the warranty.
- Do not finish the board until building has been properly closed in.
- Do not use DensArmor Plus panels as a base for nailing and mechanical fastening.

COMMONLY USED METRIC CONVERSIONS

Gypsum Panel Thickness

1/4 in. – 6.4 mm
1/2 in. – 12.7 mm
5/8 in. – 15.9 mm
1 in. – 25.4 mm

Gypsum Panel Width

2 ft. – 610 mm
4 ft. – 1219 mm
32 in. – 813 mm

Gypsum Panel Length

4 ft. – 1219 mm
5 ft. – 1524 mm
8 ft. – 2438 mm
9 ft. – 2743 mm
10 ft. – 3048 mm
12 ft. – 3658 mm

Framing Spacing

16 in. – 406 mm
24 in. – 610 mm

Fastener Spacing

2 in. – 51 mm
2.5 in. – 64 mm
7 in. – 178 mm
8 in. – 203 mm
12 in. – 305 mm
16 in. – 406 mm
24 in. – 610 mm

Temperature

40°F – 5°C
50°F – 10°C
125°F – 52°C

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

DensGlass™ Exterior Sheathing *(formerly DensGlass Gold® Exterior Sheathing)*	The original and universal standard of 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 coverboard with a track record of resistance *against* wind uplift, hail, foot traffic, fire, moisture and mold, in a broad range of applications. Look for green DensDeck® Prime and DensDeck® DuraGuard too.
DensGlass™ Ultra 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 that accelerates scheduling because it can be installed before the building is dried-in. Six-month weather exposure limited warranty. GREENGUARD Indoor Air Quality Certified® for low VOC emissions. GREENGUARD listed for microbial resistance.
DensArmor Plus® Abuse-Resistant Interior Panel *(formerly DensArmor Plus® Abuse Guard®)*	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® for low VOC emissions. GREENGUARD listed for microbial resistance.
DensArmor Plus® Impact-Resistant Interior Panel *(formerly DensArmor Plus® High Impact)*	Even greater durability with an embedded impact-resistant mesh for the ultimate performance in high traffic areas. Ideal for healthcare facilities, schools and correctional institutions.

GP Georgia-Pacific
Gypsum

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 800-225-6119.

TRADEMARKS
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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.

LIMITATION OF REMEDIES AND DAMAGES
Unless otherwise stated in our written warranty for these products, our sole liability for any product claim shall be limited to reimbursement of the cost of repair or replacement of the affected product, up to a maximum amount of two times the original purchase price for the affected product. We shall not be responsible under any circumstances for lost profits, damage to a structure or its contents, or indirect, incidental, special or consequential damages. Claims shall be deemed waived if they are not submitted to us in writing within ten (10) days after discovery of a product defect/circumstance giving rise to a claim.

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

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

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.