



GP Georgia-Pacific

DensGlass®
Sheathing

TECHNICAL GUIDE

SHEATHING



Product Overview

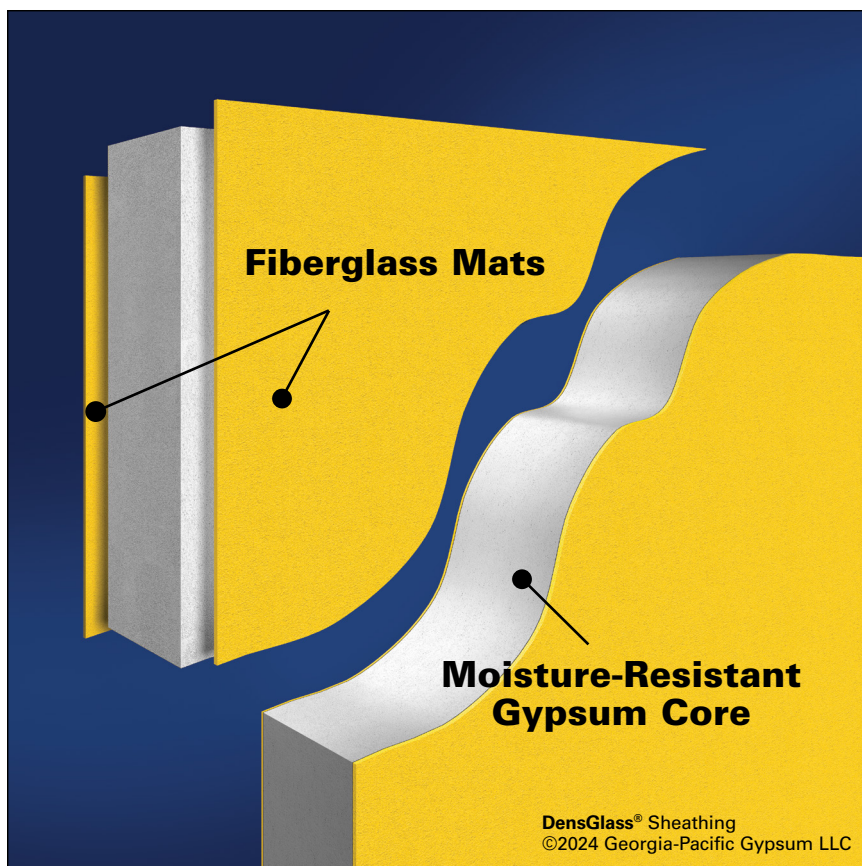


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DensGlass® Sheathing Overview

DensGlass® Sheathing is a preferred substrate under brick, stone, stucco, siding and exterior insulation and finishing systems (EIFS) because of its exemplary track record. The DensGlass® Sheathing gypsum panel is made of a treated, water-resistant core, surfaced with fiberglass mats and a gold-colored primer coating.

Providing superb protection from the elements, DensGlass® Sheathing is resistant to delamination and deterioration due to weather exposure—even during construction delays that last as long as 12 months after installation—and are backed by a limited warranty against delamination and deterioration for up to 12 months of exposure to normal weather conditions.¹ DensGlass® Sheathing panels are also mold-resistant and have scored a 10, the highest level of performance, for mold resistance under ASTM D3273 test method. DensGlass® Sheathing exhibits a dimensional stability that assures resistance to warping, rippling, buckling and sagging for a flat and even substrate and is noncombustible as defined and tested in accordance with ASTM E136 or CAN/ULC S114. Since DensGlass® Sheathing is strong in both directions, it may be installed either parallel or perpendicular to wall framing members (always follow specific assembly installation instructions).

DensGlass® Sheathing is a preferred substrate under brick, stone, stucco, siding and EIFSs because of its exemplary track record. DensGlass® Sheathing should be specified for any project where flexibility and easy sheathing installation are paramount without the headaches and expense of delamination, deterioration, sagging and warping. Look for the distinctive GOLD color to ensure you're using genuine DensGlass® Sheathing.

¹ For complete warranty details, visit buildgp.com/resources/literature/warranties.

Available Sizes/Dimensions

DensGlass® Sheathing is available in 1/2 inch (12.7 mm) thickness and DensGlass® Fireguard® Sheathing is available in 5/8 inch (15.9 mm) thickness. DensGlass® Sheathing is manufactured in a 4 foot (1219 mm) width and 8 foot (2438 mm), 9 foot (2743 mm) and 10 foot (3048 mm) lengths. Other lengths are available upon request.

Mold Resistance

In independent testing, DensGlass® Sheathing, with its fiberglass mat design, has achieved a score of 10, the highest level of performance for mold resistance under ASTM D3273. For additional information concerning mold resistance, go to www.buildgp.com/safetyinfo.

Strength

Fiberglass mats penetrate into the panel to make an integrated unit that offers superb strength; outstanding resistance to delamination, deterioration and warping. It is an excellent bonding surface for EIFS and air barrier systems. The flexural strength of DensGlass® Sheathing is approximately the same in both directions. This means DensGlass® Sheathing can be installed either vertically or horizontally¹ without sacrificing wall strength between studs.

Stability

DensGlass® Sheathing is extremely resistant to rippling, buckling and sagging, even under humid conditions—which makes it particularly suitable for soffits. In actual tests, DensGlass® Panels exceeded ASTM C1396 standards for humidified deflection by a factor of five times over the standard for paper-faced gypsum sheathing.

Fire Resistance Properties

5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing meets the definition of a Type X product; classified with UL and ULC and designated as Type DGG. Additional designs may be found in the Gypsum Association Fire Resistance and Sound Control Design Manual (GA-600).

Superior Weather Protection

DensGlass® Sheathing integrates a water-resistant, treated core with a fiberglass mat face and back to provide superb protection from the elements during construction.

DensGlass® Sheathing is the ideal substrate for a wide variety of air and water-resistive barriers including building wraps, fluid applied coatings, self-adhering membranes and spray foam applications. See page 8 for details.

Easy to Install

DensGlass® Sheathing is easy to handle and install. It can be cut and fastened with standard drywall tools. The product is much easier to work with than cement board, fiber cement sheathing or magnesium oxide sheathing which tend to be heavy and brittle.

Outstanding Warranty

DensGlass® Sheathing is covered by a 12-month limited warranty against delamination and deterioration for exposure to normal weather conditions, a five-year limited warranty against manufacturing defects and a 12-year limited warranty against manufacturing defects when used as a substrate for architecturally specified EIFS. For a copy of the limited warranty, visit our website at buildgp.com/resources/literature/warranties.

Standards and Code Compliance

DensGlass® Sheathing is manufactured to meet ASTM C1177. Application where applicable is in accordance with Gypsum Association Publication GA-253 Application of Gypsum Sheathing or ASTM C-1280 Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.

Evaluated by Florida Product Approval: FloridaBuilding.org

¹ Refer to specific fire-rated assembly designs for allowable panel orientations.

Sustainability

Georgia-Pacific Gypsum and Sustainability

Georgia-Pacific Gypsum's definition of sustainability is meeting the needs of society today without jeopardizing our ability to do so in the future. We are committed to using resources efficiently to provide innovative products and solutions that meet the needs of customers and society, while operating in a manner that is environmentally and socially responsible, and economically sound.

We continue to focus on:

- Improving energy efficiency at our manufacturing plants
- Seeking out opportunities to reduce water use, and to reuse water more efficiently
- Seeking new ways to reduce and improve air emissions
- Ensuring responsible resource management through material recovery and source reduction innovation

Green building codes, standards, and programs are establishing themselves across the country. They promote the use of products that contribute to the performance of the building, along with minimizing environmental and human health impacts over the life of the building or home. Because we embrace product performance and operate in an environmentally, socially, and economically sound manner, owners and architects can feel good about the structures they build using our products.

Many of our products contribute to LEED® and other green building programs. Please refer to the LEED® Request link: LEED® Request Form - Georgia-Pacific Building Products (buildgp.com) to get recycled content, low-emitting material and regional material information for your project. For general sustainability information, visit buildgp.com/sustainability.

Physical Properties

Properties	1/2 inch (12.7 mm) DensGlass® Sheathing	5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing
Width, nominal ¹	4 foot (1219 mm) ± 3/32 inch (2.4 mm)	4 foot (1219 mm) ± 3/32 inch (2.4 mm)
Length, standard ¹	8 foot, 9 foot, 10 foot (2438, 2743, 3048 mm) ± 1/4 inch (6 mm)	8 foot, 9 foot, 10 foot (2438, 2743, 3048 mm) ± 1/4 inch (6 mm)
Weight ² nominal, lbs./sq. ft. (kg/m ²)	1.9 (9)	2.5 (12)
Bending radius (lengthwise)	6 foot (1829 mm) ³	8 foot (2438 mm) ³
Racking strength, ⁴ lbs./ft. (dry) (N/m) (Ultimate – not design value)	>540 (7878)	>654 (9544)
Flexural strength, ⁵ parallel, lbf. (N) (4' weak direction)	≥80 ¹ (356)	≥100 (445)
Compressive strength ⁵	min. 500 psi (3445 kPa)	min. 500 psi (3445 kPa)
Humidified deflection ^{5,1}	<2/8 inch (6 mm)	<1/8 inch (3 mm)
Permeance, ⁶ perms (ng/Pa•s•m ⁵)	>23 (1300)	>17 (970)
R Value ⁷ , ft ² •°F•hr/BTU (m ² •K/W)	.56 (0.099)	.67 (0.118)
Combustibility ⁸	Noncombustible	Noncombustible
Linear expansion with moisture change in/in/%RH (mm/mm/%RH) ¹⁰	6.25 x 10 ⁻⁶ (6.375 mm)	6.25 x 10 ⁻⁶ (6.375 mm)
Surface burning characteristics ¹¹ flame spread/smoke developed	0/0	0/0
Coefficient of thermal expansion in/in/°F (mm/mm/°C) ¹²	8.5 x 10 ⁻⁶ (15.3 x 10 ⁻⁶)	8.5 x 10 ⁻⁶ (15.3 x 10 ⁻⁶)

¹Specified values per ASTM C1177

²Approximate weight for design and shipping purposes. Actual weight may vary based on manufacturing location and other factors.

³Double fasteners on ends as needed

⁴Tested in accordance with ASTM E72

⁵Tested in accordance with ASTM C473

⁶Tested in accordance with ASTM E96 (dry cup method)

⁷Tested in accordance with ASTM C518 (heat flow meter)

⁸Specified values per ASTM C1396

⁹As defined and tested in accordance with ASTM E136 and CAN/ULC S114

¹⁰As stated by Gypsum Association GA-235

¹¹Per ASTM E84 and CAN/ULC-S102

¹²Tested in accordance with ASTM E228






Installation Instructions

- DensGlass® Sheathing must be installed in accordance with the instructions in this brochure, Gypsum Association document GA-253 and ASTM C1280. DensGlass® Sheathing may be attached parallel or perpendicular to wood or metal framing. Use appropriate board orientation for specific fire assemblies and shear wall applications within this document, other reference documents or as required by designing authority. The framing width shall not be less than 1-1/2 inches (38 mm) wide for wood framing and 1-1/4 inches (32 mm) for steel framing. Framing members shall not vary more than 1/8 inch (3 mm) from the plane of the faces of adjacent framing.
- Fasteners should be driven flush with the panel surface (not countersunk) and into the framing system. Locate fasteners at least 3/8 inch (9 mm) from the ends and edges of the sheathing. Nails or screws, as listed in the fastener chart, may be used to attach DensGlass® Sheathing to framing. When a pneumatic fastening system into metal is used to attach DensGlass® Sheathing, consult with manufacturer for application specifications and shear resistance data. DensGlass® Sheathing is not to be used as a base for nailing or other fastening.
- Install DensGlass® Sheathing with vertical joints staggered. DensGlass® Sheathing shall be properly flashed at openings and preferably located so that no joint will align with an edge of the opening. Ends and edges of the sheathing should fit tightly. DensGlass® Sheathing panels shall not be less than 7 inches (178 mm) from the finish grade in fully weather- and water-protected siding systems, and not less than 12 inches (305 mm) from the ground for properly drained and ventilated crawl spaces. Consult with the design authority for control joint recommendations.

Fastening and Framing

Thickness	Framing Spacing	Panel Orientation	Fastener Spacing – Wood Framing ¹	Fastener Spacing – Metal Framing ⁴
1/2 inch (12.7 mm)	24 inches (610 mm) o.c. max ^{1,3}	Parallel ³ or Perpendicular	8 inches (203 mm) o.c. along framing	8 inches (203 mm) o.c. along framing
5/8 inch (15.9 mm)	24 inches (610 mm) o.c. max ³	Parallel ³ or Perpendicular	8 inches (203 mm) o.c. along framing	8 inches (203 mm) o.c. along framing

- Only for mechanically attached claddings. When specified behind EIFS, maximum framing spacing for 1/2 inch (12.7 mm) DensGlass® Sheathing is 16 inches (406 mm) o.c.
- Fastener spacing around the perimeter of the wall and along intermediate vertical framing members. To meet the racking shear strength listed in the physical properties table, fastener spacing is 4 inches (102 mm) o.c. around the perimeter of each panel and 8 inches (203 mm) o.c. along vertical framing members.
- For racking strength resistance, apply panel edges parallel with framing spaced a maximum of 16 inches (406 mm) o.c. for both 1/2 inch (12.7 mm) and 5/8 inch (15.9 mm) DensGlass® Sheathing.
- Fire-rated assemblies may require additional fasteners, see specific assembly details.

Fastener*	Length		Description	Application
	1/2 inch (12.7 mm) Sheathing	5/8 inch (15.9 mm) Sheathing		
	1 inch (25 mm) ¹	1-1/4 inches (32 mm) ¹	Bugle head fine thread, corrosion-resistant drill point drywall screw	DensGlass® Sheathing to heavy-gauge metal framing (18 gauge or thicker)
	1 inch (25 mm) ²	1-1/4 inches (32 mm) ²	Bugle head fine thread, corrosion-resistant sharp point drywall screw	DensGlass® Sheathing to light-gauge metal framing furring (20-25 gauge)
	1-1/4 inches (32 mm) ³	1-5/8 inches (41 mm) ³	Bugle head, rust-resistant, coarse thread sharp point screw	DensGlass® Sheathing to wood framing
	1-1/4 inches (32 mm) ⁴	1-1/4 inches (32 mm) metal ⁴ 1-5/8 inches (41 mm) wood ⁴	Wafer head, corrosion-resistant screws, drill or sharp point	DensGlass® Sheathing to heavy-gauge or light-gauge, metal or wood framing
	1-1/2 inches (38 mm)	1-3/4 inches (45 mm)	11-gauge, galvanized nail	DensGlass® Sheathing to wood framing

*Contact fastener manufacturer for correct amount of corrosion resistance.

¹ Type S-12 that meet or exceed ASTM C954, #6 minimum, ² Type S-12 that meet or exceed ASTM C1002, #6 minimum, ³ Type W that meet or exceed ASTM C1002, #6 minimum, ⁴ Type S that meet or exceed ASTM C1002, #6 minimum

Negative Uniform Wind Load

5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing Horizontally Applied

Stud Spacing, In./O.C. (mm)	Screws, In./O.C. (mm)	Ultimate load, PSF* (kPa)
16 (406)	8 (203)	132 (6.32)
16 (406)	6 (152)	178 (8.52)
16 (406)	4 (102)	198 (9.48)
12 (305)	8 (203)	165 (7.90)
12 (305)	6 (152)	192 (9.19)
12 (305)	4 (102)	236 (11.30)
8 (203)	8 (203)	227 (10.87)
8 (203)	6 (152)	213 (10.2)
8 (203)	4 (102)	318 (15.23)

NOTE: Apply DensGlass® Fireguard® Sheathing to appropriately engineered framing system. Tested applied to 6 inches (152 mm) x 1-5/8 inches (41 mm) 18-gauge (43 mils) steel studs using #6 1-1/4 inches (32 mm) bugle head screws. Other stud sizes may be suitable.

Source: For further information, refer to Intertek CCRR-0377 Evaluation Report or contact Georgia-Pacific Gypsum Technical Hotline at 1-800-225-6119.

*Apply appropriate safety factor from the design method used to calculate design load.

1/2 inch (12.7 mm) DensGlass® Sheathing and 5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing Vertically or Horizontally Applied

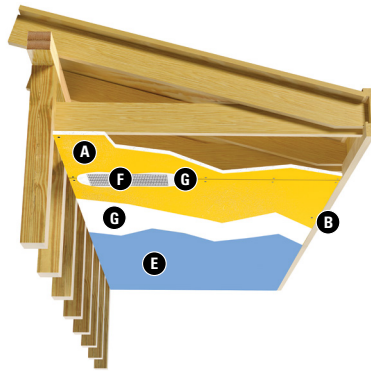
Thickness Inches (mm)	Board Orientation	Stud Spacing in. o.c. (mm)	Ultimate Load PSF* (kPa)
1/2 inch (12.7)	Vertical	16 (406)	62 (2.95)
1/2 inch (12.7)	Horizontal	16 (406)	64 (3.07)
5/8 inch (15.9)	Vertical	24 (610)	68 (3.26)
5/8 inch (15.9)	Horizontal	24 (610)	85 (4.07)

Source: For further information, refer to Intertek CCRR-0377 Evaluation Report or contact Georgia-Pacific Gypsum Technical Hotline at 1-800-225-6119.

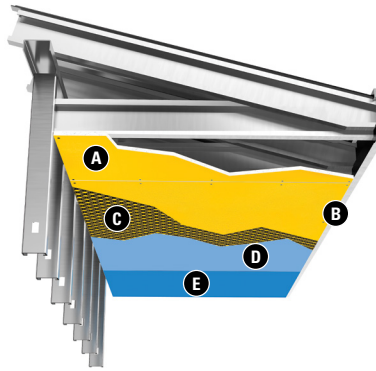
*Apply appropriate safety factor from the design method used to calculate design load.

Soffit Applications, Fastening, Framing and Finishing

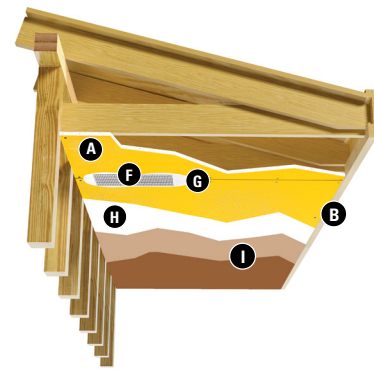
Method #1



Method #2



Method #3



- | | |
|--|---|
| A. DensGlass® Sheathing | G. Gypsum Setting Type Compound* |
| B. Drip Edge | H. Bonding Agent to Entire DensGlass® Sheathing Surface |
| C. Reinforcing Mesh/Base Coat | I. 2 Coat Thin Stucco System |
| D. Base Coat | Not to Exceed 1/4 inch (6 mm) to 3/8 (9.5 mm)inch Total Thickness |
| E. Finish Coat | |
| F. 2 inch (51 mm) Fiberglass Mesh Tape | |

*Sandable setting compounds are not recommended.

Thickness	Max Framing Spacing	Orientation	Screw Spacing
1/2 inch (12.7 mm)	16 inches (406 mm) o.c.	Parallel or Perpendicular	8 inches (203 mm) o.c. along framing
1/2 inch (12.7 mm)	24 inches (610 mm) o.c.	Perpendicular	8 inches (203 mm) o.c. along framing
5/8 inch (15.9 mm)	24 inches (610 mm) o.c.	Parallel or Perpendicular	8 inches (203 mm) o.c. along framing

Method #1

Embed 2 inches (51 mm) wide fiberglass mesh tape in 90 minute gypsum setting type joint compound over all joints. Upon setting, apply a skim coat of setting compound over the panels to achieve a uniform, smooth finish over the entire area. Prime with exterior-grade primer and finish with two coats of exterior-grade paint.

Method #2

1. Finish joints as described in method #1.
2. Apply a bonding agent to entire DensGlass® Sheathing surface.
3. Apply a 2-coat thin stucco system directly to the DensGlass® Sheathing (2-coat system not to exceed 1/4 inch to 3/8 inch (6 mm to 9.5 mm) total thickness) in accordance with the stucco manufacturer's instructions.

Method #3

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

Special considerations for all methods:

1. Control joints are recommended a maximum of 30 feet (9144 mm) or closer as specified by the design authority.
2. The roof must be dried in or protection from the elements must be provided prior to installing DensGlass® Sheathing in horizontal applications to prevent moisture from ponding or settling on top of the sheathing panel or within the finished soffit.
3. Sandable setting compounds are not acceptable for use over DensGlass® Sheathing in exterior soffit applications.

Important: Illustrations not intended for design or specification purposes.

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

For latest information and updates:
Technical Service Hotline 1.800.225.6119 or buildgp.com

Wall Applications

Installing Cladding over DensGlass® Sheathing

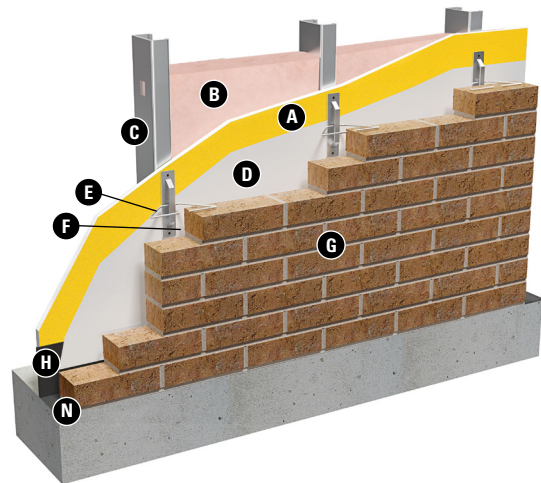
Most conventional exterior sidings and wall coverings—including vinyl, composition, metal, stone, brick, wood—may be applied over DensGlass® Sheathing.

- | | | |
|--------------------------------|-------------------|--------------------------------|
| A. DensGlass® Sheathing | G. Brick Masonry | L. Fiber Cement Siding |
| B. Insulation | H. Flashing | M. Metal Siding |
| C. Framing | I. Wood Siding | N. Minimum 1/4 inch (6 mm) Gap |
| D. Water-Resistive/Air Barrier | J. Plywood Siding | |
| E. Masonry Tie | K. Vinyl Siding | |
| F. 2 inch (50 mm) Air Space | | |

Important: Illustrations not intended for design or specification purposes.

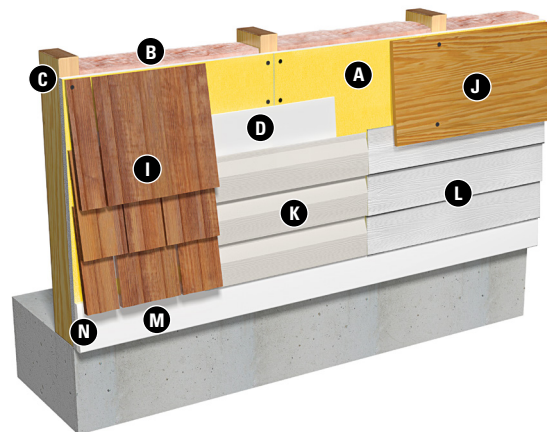
Brick Cavity Wall

Masonry or stone veneer can be applied over DensGlass® Sheathing just as it would be over any other type of sheathing. Attach the masonry ties securely through the panels and into the steel or wood framing. Space the ties as required by masonry courses. Apply water-resistive barrier/air barrier and continuous insulation as required by building code or design authority.*



Vinyl, Metal, Wood, Fiber Cement Siding

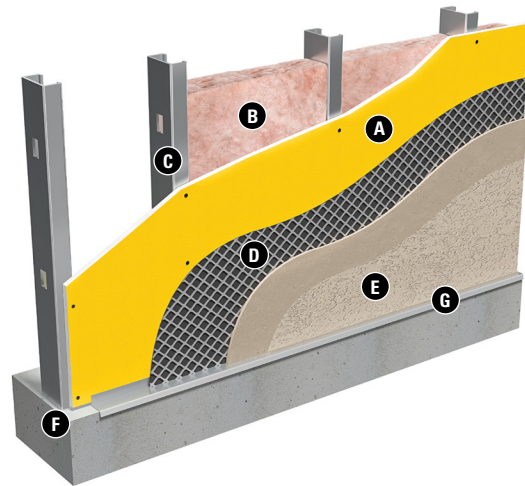
DensGlass® Sheathing can be used in applications such as under wood or plywood panel siding and other horizontal siding applications. All siding must be attached through the DensGlass® Sheathing and into the steel or wood framing. Apply water-resistive/air barrier as required by building code or design authority.*



*For a sheathing, water-resistive barrier and air barrier, that eliminates the need for building wrap or fluid applied membranes, see DensElement® Barrier System at DensElement.com

Wall Applications *continued*

- A. DensGlass® Sheathing
- B. Insulation
- C. Framing
- D. Paper-Backed Metal Lath
- E. Conventional Stucco System
- F. Minimum 1/4 inch (6 mm) Gap
- G. Flashing



Conventional Stucco

Stucco systems may be applied over DensGlass® Sheathing using paper-backed metal lath or two layers of building paper and metal lath. Metal lath must be mechanically attached through the DensGlass® Sheathing into the steel or wood framing. Install stucco system in accordance with the manufacturer's instructions and local building code requirements. For a sheathing, with an integrated water-resistive barrier and air barrier, that eliminates the need for building wrap or fluid applied membranes, see DensElement® Barrier System at DensElement.com.

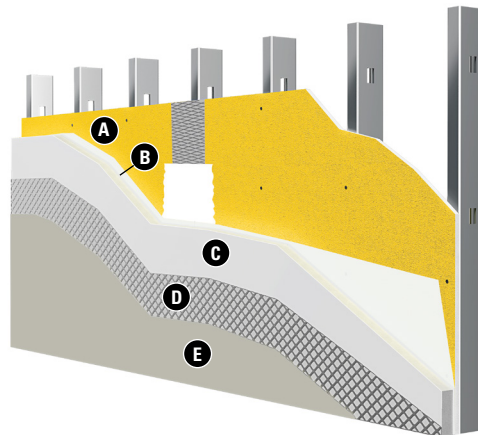
Exterior Insulation and Finish Systems (EIFS)

DensGlass® Sheathing is an ideal substrate for adhesive or mechanical application of expanded polystyrene (EPS) or extruded polystyrene insulation in EIFS applications.

DensGlass® Sheathing is a fiberglass mat gypsum panel that has several important applications for EIFS. DensGlass® Sheathing panels are surface treated with our exclusive GOLD color. This coating, developed especially for DensGlass® Sheathing, has several important advantages for EIFS applications:

- Strengthens the bond between panel and surfacing insulation product.
- Makes the panel more resistant to surface water.
- 12-year limited warranty against manufacturing defects when used in an architecturally specified EIFS application (see buildgp.com/resources/literature/warranties for complete warranty information).

- A. DensGlass® Sheathing
- B. Water Resistive/Air Barrier
- C. Insulation
- D. Mesh
- E. Finish Coat



High Velocity Hurricane Zone (HVHZ)

The ability to withstand the destructive winds and the impact of various objects during a hurricane in a coastal area is key to the survival of any exterior cladding system. DensGlass® Sheathing from Georgia-Pacific Gypsum helps BASF, Sto Corp, Dryvit, and LaHabra Stucco. systems pass the strict Miami-Dade County and Florida Building Code requirements for High Velocity Hurricane Zones (HVHZ). The systems are tested independently to determine their performance against specific criteria for impact resistance, air and water infiltration resistance and wind load resistance. For more information, please visit Miami Dade HVHZ: www.miamidade.gov/building/pc-search_app.asp or contact the system manufacturer.

Water- and Air-Resistive Barriers

Evolving codes, standards and programs are requiring the use of water and air resistive barriers. In most cases, these barriers are applied over the exterior sheathing. DensGlass® Sheathing has been widely accepted as a preferred substrate for all recognized types of water and air resistive barriers.

- Self-adhered sheet materials
- Fluid applied membranes
- Spray polyurethane foam (medium density closed cell)
- Mechanically attached flexible sheet (includes #15 asphalt felt and synthetic wraps)
- Boardstock air barrier – rigid foam core

For a list of air barrier materials, accessories and components, see the Air Barrier Association of America (ABAA) website (www.airbarrier.org).

Note: Consult with local building code, design professional, owner or cladding manufacturer for water-resistive barrier requirements and compatibility with the wall cladding.

Protection of Penetrations

All penetrations should be protected to prevent air and water infiltration. Follow building code, door/window manufacturer or design authority's recommendations for flashing around openings, abutments to dissimilar materials and wall terminations.

Air Barrier Compliance

Per the International Energy Conservation Code® (IECC), gypsum sheathing such as DensGlass® Sheathing complies with the prescriptive code language for use as a continuous air barrier when the joints and openings are properly sealed.

For a sheathing, with an integrated water-resistive barrier and air barrier please refer to DensElement® Barrier System

DensElement® Barrier System with AquaKOR™ Technology integrates a water-resistive and air barrier (WRB-AB) directly into the exterior wall assembly. This eliminates the need for building wraps, peel-and-stick membranes, or fluid-applied membranes to the field of the sheathing. For additional information on the DensElement® Barrier System, visit buildgp.com/denselement.

Fire-Rated Assemblies

5/8 inch DensGlass® Fireguard® Sheathing is UL and ULC certified as **Type DGG** and is included in numerous assembly designs investigated by UL and ULC for hourly fire resistance ratings. In addition, 5/8 inch DensGlass® Fireguard® Sheathing meets the definition of **Type X** in accordance with ASTM C1177 and may replace 5/8 inch gypsum sheathing specified as **Type X** in generic fire-rated wall assemblies.

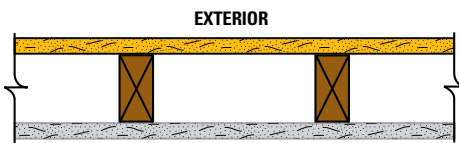
Generic systems in the GA-600 Fire Resistance and Sound Control Manual are applicable to the products of any manufacturer, including Georgia-Pacific Gypsum, provided they meet certain standards set forth in such manual, such as **Type X** gypsum board per applicable ASTM standard with specified thickness and size described in the design. **Type X** as used in this technical guide designates gypsum board manufactured and tested in accordance with specific ASTM standards for increased fire resistance beyond regular gypsum board. Please consult the ASTM standard for the specific product (for example, ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing) for further information and significance of use.

Proprietary GA-600 Designs: Assemblies listed as proprietary in the GA-600 Fire Resistance and Sound Control Manual only list one product per manufacturer and may not include all products referenced in the illustrations below. Please consult the specified UL, cUL, ULC or Intertek (ITS) for a complete list of approved products.

The following design assemblies are for illustrative purposes only. Consult the appropriate fire resistance directory or test report for complete assembly information. For additional fire safety information concerning DensGlass® Sheathing, visit www.buildgp.com/safetyinfo.

1-Hour Fire Rating

Design Reference: UL U305, U337, GA WP 8130



Wall Thickness: 4-3/4 inches (121 mm)

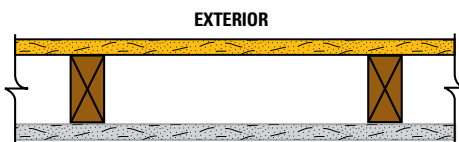
Weight per square foot: 5.5 psf (26.8 kg/m²)

Exterior: 5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing applied parallel (U337, U305) or perpendicular (U305) to 2 inches (51 mm) x 4 inches (102 mm) wood studs 16 inches (406 mm) o.c. with 1-3/4 inches (45 mm) galvanized roofing nails 7 inches (178 mm) o.c. for all framing members. Exterior surface covered with weather exposed cladding or finish system.

Interior: 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels or 5/8 inch (15.9 mm) ToughRock® Fireguard X® Gypsum Board applied parallel (U337, U305) or perpendicular (U305) to studs with 1-7/8 inches (48 mm) 6d coated nails 7 inches (178 mm) o.c. Stagger joints each side.

1-Hour Fire Rating

Design Reference: UL U309



Wall Thickness: 4-7/8 inches (124 mm)

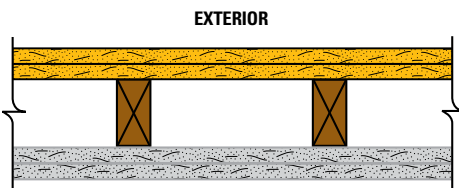
Weight per square foot: 7.0 psf (34 kg/m²)

Exterior: 5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing applied parallel or perpendicular to 2 inches (51 mm) x 4 inches (102 mm) wood studs spaced 24 inches (610 mm) o.c. with 1-3/4 inches (45 mm) galvanized roofing nails 7 inches (178 mm) o.c.

Interior: 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels or 5/8 inch (15.9 mm) ToughRock® Fireguard X® Gypsum Board applied parallel to framing with 1-7/8 inches (48 mm) 6d coated nails 7 inches (178 mm) o.c.

2-Hour Fire Rating

Design Reference: UL U301, GA WP 8416



40-44 STC Sound Transmission

Test Reference: NGC-2363

Wall Thickness: 6-1/8 inches (156 mm)

Weight per square foot: 9.4 psf (45.9 kg/m²)

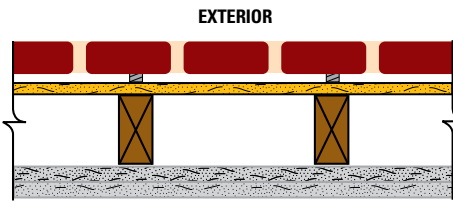
Exterior: Two layers 5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing applied parallel or perpendicular to 2 inches (51 mm) x 4 inches (102 mm) wood studs 16 inches (406 mm) o.c. Base layer attached with 1-7/8 inches (48 mm) galvanized roofing nails 6 inches (152 mm) o.c. Face layer attached with 2-3/8 inches (60 mm) galvanized roofing nails 8 inches (203 mm) o.c. Stagger joints between layers and on base layer of both sides.

Interior: Two layers 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels or 5/8 inch (15.9 mm) ToughRock® Fireguard X® Gypsum Board applied parallel to framing. Base layer attached with 1-7/8 inches (48 mm) 6d cement coated nails 6 inches (152 mm) o.c. Face layer attached with 2-3/8 inches (60 mm) 6d cement coated nails 8 inches (203 mm) o.c. Stagger joints between layers and on base layer of both sides. Sound tested with studs 16 inches (406 mm) o.c. and nails for base layer spaced 6 inches (152 mm) o.c.

Fire-Rated Assemblies continued

2-Hour Fire Rating

Design Reference: UL U302, ULC U302, GA WP 8187, STC 50-54 No. NOAL 19-0835



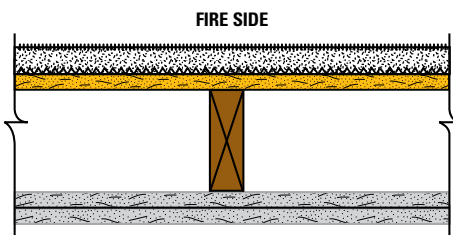
Wall Thickness: 10-1/8 inches (257 mm)

Exterior: One layer 1/2 inch (12.7 mm) DensGlass® Sheathing applied parallel or perpendicular to studs 16 inches (406 mm) o.c. with 1-3/4 inches (45 mm) galvanized roofing nails 6 inches (152 mm) o.c. Face layer is 2 inches (51 mm) x 4 inches (102 mm) x 8 inches (51 mm x 102 mm x 203 mm) clay brick with 1 inch (25 mm) air space between brick and exterior sheathing. 20-gauge (30 mils) galvanized wire ties attached to each stud with 8d coated nails 2-3/8 inches (60 mm) as described above, located at every sixth course of bricks.

Interior: Two layers 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels or 5/8 inch (15.9 mm) ToughRock® FireguardX® Gypsum Board applied parallel or perpendicular to 2 inches (51 mm) x 4 inches (102 mm) wood studs 16 inches (406 mm) o.c. Base layer attached with 1-7/8 inches (48 mm) 6d coated nails 8 inches (203 mm) o.c. Face layer attached with 2-3/8 inches (60 mm) coated nails 8 inches (203 mm) o.c.

2-Hour Fire Rating

Design Reference: UC ES-6898 12-21-67, GA WP 8192, STC 40-44 No. NOAL 19-0828



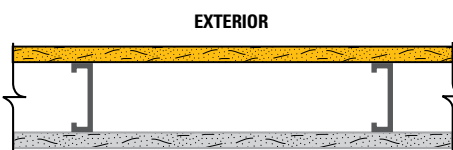
Wall Thickness: 8-5/8 inches (219 mm)

Exterior: Base layer 5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing retardant treated 2 inches (51 mm) x 6 inches (152 mm) wood studs 16 inches (406 mm) o.c. with 6d coated nails, 1-7/8 inches (48 mm) long, 0.0915 inch (2 mm) shank, 1/4 inch (6 mm) heads, 12 inches (305 mm) o.c. and covered with a single layer fire resistant protective weather retarder paper stapled along each edge at 16 inches (406 mm) o.c. Galvanized self-furring wire mesh applied over sheathing with 8d galvanized roofing nails, 2-3/8 inches (60 mm) long, 0.113 inch (3 mm) shank, 9/32 inches (7 mm) heads, 6 inches (152 mm) o.c. Cement-stucco applied over wire mesh in 2-1/2 inches (12.7 mm) thick coats with bonding agent applied between coats.

Interior: Base layer 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels or 5/8 inch (15.9 mm) ToughRock® FireguardX® Gypsum Board applied parallel to studs with 6d coated nails, 1-7/8 inches (48 mm) long, 0.0915 inch (2 mm) shank, 1/4 inch (6 mm) heads, 12 inches (305 mm) o.c. Face layer 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels or 5/8 inch (15.9 mm) ToughRock® FireguardX® Gypsum Board applied perpendicular to studs with 8d coated nails, 2-3/8 inches (60 mm) long, 0.113 inch (3 mm) shank, 9/32 inches (7 mm) heads, 8 inches (203 mm) o.c. at edges and 12 inches (305 mm) o.c. at intermediate studs.

1-Hour Fire Rating

Design Reference: UL U465, GA WP 8007



Wall Thickness: 4-7/8 inches (124 mm)

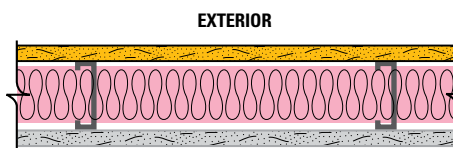
Weight per square foot: 4.6 psf (22.4 kg/m²)

Exterior: 5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing applied parallel to min. 3-5/8 inch (92 mm) corrosion resistant 25-gauge (18 mils) steel studs 24 inches (610 mm) o.c. with 1 inch (25 mm) corrosion resistant bugle head screws 8 inches (203 mm) o.c. at board edges and 8 inches (203 mm) at intermediate studs.

Interior: 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels or 5/8 inch (15.9 mm) ToughRock® FireguardX® Gypsum Board applied parallel to framing with 1 inch (25 mm) Type S bugle head screws 8 inches (203 mm) o.c. at board edges and 12 inches (305 mm) at intermediate studs. Sound tested with 3 inches mineral fiber, 2.5 psf, in stud space.

1-Hour Fire Rating

Design Reference: UL U425, GA WP 8006



Wall Thickness: 4-3/4 inches (121 mm)

Weight per square foot: 5 psf (24.4 kg/m²)

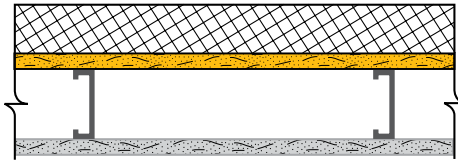
Exterior: 5/8 inches (15.9 mm) DensGlass® Fireguard® Sheathing applied parallel to min. 3-1/2 inches (89 mm) corrosion resistant 20-gauge (30 mils) steel studs 24 inches (610 mm) o.c. with 1 inch (25 mm) Type S corrosion resistant bugle head screws 8 inches (203 mm) o.c.

Interior: 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels or 5/8 inch (15.9 mm) ToughRock® FireguardX® Gypsum Board applied parallel to framing with 1 inch (25 mm) Type S bugle head screws 12 inches (305 mm) o.c. Insulation to completely fill stud cavity.

Fire-Rated Assemblies *continued*

1-Hour Fire Rating

Design Reference: GA WP 8122



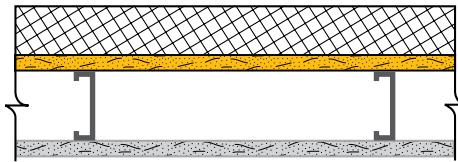
Partition Thickness: 6 inches – 7 inches (152 – 178 mm) Varies based on insulation thickness
Weight per square foot: 7.0 psf (34 kg/m²)

Exterior: 5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing applied parallel to 3-5/8 inches (92 mm) 18-gauge (43 mils) steel studs 16 inches (406 mm) o.c. with #6 x 1-1/4 inches (32 mm) self-drilling, corrosion-resistant, bugle head, drywall screws 8 inches (203 mm) o.c. at edges and ends and 8 inches (203 mm) o.c. at intermediate studs. Proprietary polymer modified exterior insulation and finish system applied over sheathing. 2 inches (51 mm) maximum foam-plastic thickness.

Interior: 5/8 inch (15.9 mm) ToughRock® FireguardX® Gypsum Board or 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels applied parallel to studs with #6 x 1-1/4 inches (32 mm) self-drilling, bugle head drywall screws 8 inches (203 mm) o.c. at edges and ends and 12 inches (305 mm) o.c. at intermediate studs.

1-Hour Fire Rating

Design Reference: GA WP 8123



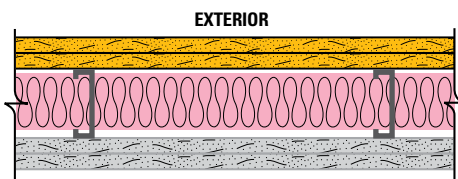
Partition Thickness: 6 inches – 9 inches (152 – 229 mm) Varies based on insulation thickness
Weight per square foot: 7.0 psf (34 kg/m²)

Exterior: 5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing applied parallel to 3-5/8 inches (92 mm) 18-gauge (43 mils) steel studs 24 inches (610 mm) o.c. with #6 x 1-1/4 inches (32 mm) self-drilling, corrosion-resistant, bugle head, drywall screws 8 inches (203 mm) o.c. at edges and ends and 8 inches (203 mm) o.c. at intermediate studs. Polymer-based exterior insulation and finish system applied over sheathing. 4 inches (102 mm) maximum foam-on-plastic thickness.

Interior: One layer 5/8 inch (15.9 mm) ToughRock® FireguardX® Gypsum Board or 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels applied parallel to studs with #6 x 1-1/4 inches (32 mm) self-drilling, bugle head drywall screws 8 inches (203 mm) o.c. at edges and ends and 12 inches (305 mm) o.c. at intermediate studs.

2-Hour Fire Rating

Design Reference: UL U425, GA WP 8203



Wall Thickness: 6 inches (152 mm)

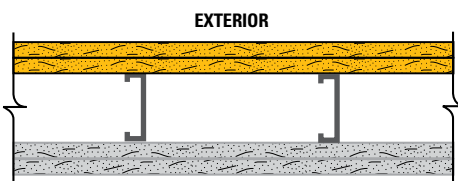
Weight per square foot: 10 psf (48.8 kg/m²)

Exterior: Two layers 5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing applied parallel to min. 3-1/2 inches (89 mm) corrosion resistant 20-gauge (30 mils) steel studs 24 inches (610 mm) o.c. Base layer attached with 1 inch (25 mm) Type S-12 corrosion resistant bugle head screws 8 inches (203 mm) o.c. Face layer attached with 1-5/8 inches (41 mm) Type S-12 corrosion resistant bugle head screws spaced 8 inches (203 mm) o.c. Joints staggered.

Interior: Two layers 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® Interior Panels or 5/8 inch (15.9 mm) ToughRock® FireguardX® Gypsum Board applied parallel to framing. Base layer attached with 1 inch (25 mm) Type S-12 bugle head screws 12 inches (305 mm) o.c. Face layer attached with 1-5/8 inches (41 mm) Type S-12 bugle head screws spaced 12 inches (305 mm) o.c. Joints staggered. Insulation to completely fill stud cavity. (Load Bearing: 80% of design load)

2-Hour Fire Rating

Design Reference: UL U411, UL V487, STC 55-59, RALTL09-331



55-59 STC Sound Transmission

Test Reference: IRC IR 761

Wall Thickness: 6 1/8 inches (156 mm)

Weight per square foot: 9.2 psf (44.9 kg/m²)

Exterior: Two layers 5/8 inch (15.9 mm) DensGlass® Fireguard® Sheathing applied parallel to min. 2-1/2 inches (64 mm) corrosion resistant 25-gauge (18 mils) steel studs 24 inches (610 mm) o.c. Base layer attached with 1 inch (25 mm) Type S corrosion resistant bugle head screws 16 inches (406 mm) o.c. Face layer attached with 1-5/8 inches (41 mm) Type S corrosion resistant bugle head screws spaced 8 inches (203 mm) o.c. Joints staggered.

Interior: Two layers 5/8 inch (15.9 mm) DensArmor Plus® Fireguard® or 5/8 inch (15.9 mm) ToughRock® FireguardX® Gypsum Board applied parallel to framing. Base layer attached with 1 inch (25 mm) Type S bugle head screws 16 inches (406 mm) o.c. Face layer attached with 1-5/8 inches (41 mm) Type S bugle head screws spaced 16 inches (406 mm) o.c. in the field and along vertical edges and 12 inches (305 mm) o.c. to the floor and ceiling runners. Joints staggered. Batt or blanket insulation optional. Sound tested with 3-1/2 inches (89 mm) fiberglass insulation.

Handling & Storage of Gypsum Panel Products

All materials shall be delivered in original bundles bearing the brand name, if any; applicable standard designation; and name of the manufacturer or supplier for whom the product is manufactured. The plastic packaging used to wrap gypsum panel products for rail and/or truck shipment is intended to provide temporary protection from moisture exposure during transit only and is not intended to provide protection during storage after delivery. Such plastic packaging shall be removed immediately upon receipt of the shipment. **WARNING:** Failure to remove protective plastic shipping covers can result in condensation which can lead to damage, including mold.

All materials should be kept dry. Gypsum panel products shall be neatly stacked flat with care taken to prevent sagging or damage to edges, ends and surfaces. Gypsum panel products and accessories shall be properly supported on risers on a level platform, and fully protected from weather, direct sunlight exposure, and condensation. Gypsum panel products shall be stacked flat rather than on edge or end. **WARNING:** Gypsum panel products stacked on edge or end can be unstable and present a serious hazard in the workplace should they accidentally topple.

Refer to *Handling Gypsum Panel Products, GA-801*, for proper storage and handling requirements.

Refer to *Application and Finishing of Gypsum Panel Products, GA-216, Gypsum Association*.

Recommendations and Limitations for Use

The following recommendations and limitations are important to ensure the proper use and benefits of DensGlass® Sheathing. Failure to strictly adhere to such recommendations and limitations may void the limited warranty provided by Georgia-Pacific Gypsum for such product. For additional warranty details, please go to buildgp.com/resources/literature/warranties.

DensGlass® Sheathing is resistant to normal weather conditions, but it is not intended for immersion in water. Cascading roof/floor water should be directed away from the sheathing until appropriate drainage is installed.

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. 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.

When DensGlass® Sheathing panels are used in slanted wall applications, that portion of the wall must be temporarily protected from the elements by the use of a water-resistant barrier prior to application of the cladding. Do not allow water to pond or settle on sheathing. Also, exposed wall ends such as those that may be found in parapets must be covered to prevent water from infiltrating the cavity.

Georgia-Pacific Gypsum does not warrant and is not responsible or liable for the performance of any cladding, coating, finishes, coverings or other materials or exterior systems applied over DensGlass® Sheathing. The suitability and compatibility of any system is the responsibility of the system manufacturer or design authority.

Brackets to support heavy cladding such as tile and marble should not be installed over DensGlass® Sheathing.

Do not laminate DensGlass® Sheathing to masonry surfaces; use furring strips or framing.

DensGlass® Sheathing is not intended for roof applications. For roof applications, consult our DensDeck® Roof Board technical guide.

DensGlass® Sheathing is not intended for interior or exterior tile applications. For interior tile applications, consult our DensShield® Tile Backer brochure.

DensGlass® Sheathing should not be used in lieu of plywood where required.

Do not apply DensGlass® Sheathing below grade.

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 flashed and sealed. Failure to do so will void the warranty.

Do not use DensGlass® Sheathing as a base for nailing or mechanical fastening.

Fasteners should be flush to the face of the board, not countersunk.

When DensGlass® Sheathing is used in panelized construction, install panels so panel joints are tightly butted together on both horizontal and vertical joints.

Georgia-Pacific recommends as a best practice that cut sheathing edges in in-plant and offsite panelized construction should be sealed. DensDefy® Liquid Flashing has been determined to be a product that is effective in sealing cut sheathing edges and has been tested internally for adhesion to Georgia-Pacific sheathing products.

DensGlass® Sheathing is not intended to be installed directly in contact with masonry units and cementitious materials.

COMMONLY USED METRIC CONVERSIONS**Gypsum Board Thickness**

1/4 in. – 6 mm
1/2 in. – 12.7 mm
5/8 in. – 15.9 mm
1 in. – 25.4 mm

Gypsum Board Width

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

Gypsum Board 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

High-Performance Gypsum Products from Georgia-Pacific

DensDeck® Roof Board	Fiberglass mat roof board used as the ideal thermal barrier and cover board to improve resistance to wind uplift, hail, foot traffic, fire and mold in a broad range of commercial roofing applications. Look for DensDeck® Prime Roof Board and DensDeck® StormX™ Prime Roof Board.
DensGlass® Sheathing	The original and universal standard of exterior gypsum sheathing offers superior weather resistance, with a 12-month limited warranty against delamination or deterioration during exposure to normal weather conditions. Look for the familiar GOLD color. GREENGUARD listed for microbial resistance.
DensGlass® Shaftliner	These specially-designed panels are perfect for moisture-prone vertical or horizontal shafts, interior stairwells and area separation wall assemblies. 12-month limited warranty against delamination or deterioration during exposure to normal weather conditions. GREENGUARD listed for microbial resistance.
DensArmor Plus® Interior Panel	High-performance interior panel accelerates scheduling because it can be installed before the building is dried-in. A 12-month limited warranty against delamination or deterioration during exposure to normal weather conditions. GREENGUARD and GREENGUARD Gold certified for low VOC emissions. GREENGUARD listed for microbial resistance.
DensShield® Tile Backer	Acrylic-coated tile backer stops moisture at the surface. Lightweight and strong, they are built for speed on the job site. Conforms to requirements of 2012 IBC/IRC Code. GREENGUARD listed for microbial resistance.
ToughRock® Gypsum Board	Paper-faced line of gypsum panels for a variety of applications, including interior wall and ceiling applications, and panels for use in fire-rated assemblies. ToughRock products are GREENGUARD and GREENGUARD Gold certified for low VOC emissions.
ToughRock® Mold-Guard™ Gypsum Board	ToughRock® Mold-Guard Gypsum Board products have enhanced mold resistance in comparison to regular ToughRock® Gypsum Boards. They are GREENGUARD and GREENGUARD Gold Certified for low VOC emissions. The ToughRock® Mold-Guard Gypsum Board is also listed as GREENGUARD microbial resistant.
DensElement® Barrier System	DensElement® Barrier System delivers the same advantages of DensGlass® Sheathing while incorporating AquaKOR™ Technology, a water barrier system that maintains high vapor permeability mitigating the risk of moisture in the wall cavity. With this innovation built into its core, DensElement® Barrier System eliminates the need for additional barrier (WRB-AB) saving time, labor and materials.



Georgia-Pacific
Gypsum

U.S.A. Georgia-Pacific Gypsum LLC
CANADA Georgia-Pacific Canada LP

SALES INFORMATION AND ORDER PLACEMENT

U.S.A. West: **1-800-824-7503**
Midwest: **1-800-876-4746**
South Central: **1-800-231-6060**
Southeast: **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**



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WARRANTIES, REMEDIES AND TERMS OF SALE –

For current warranty information, please go to buildgpc.com/resources/literature/warranties and select the applicable product. All sales by Georgia-Pacific are subject to our Terms of Sale available at www.buildgpc.com/tc.

UPDATES AND CURRENT INFORMATION –

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

CAUTION: For product fire, safety and use information, go to buildgpc.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.

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