

DensDeck®
DensDeck® Prime
DensDeck® DuraGuard



Overview of Products

Table of Contents

<i>Overview of Products</i>	2
<i>Properties, Standards and Classifications</i>	4
<i>Roof System Application Recommendations</i>	6
<i>System Manufacturers Approvals</i>	7
<i>Competitive Roof Substrate Comparisons</i>	7
<i>Sound Control</i>	8
<i>Applications</i>	9
<i>Roof Tile Application</i>	11
<i>Roof Tile Static Uplift Testing</i>	11
<i>Long-Term Fire Protection</i>	12
<i>UL Assemblies</i>	12
<i>FM Approvals</i>	12
<i>Wind Uplift Information</i>	13
<i>Elevated UL Wind Uplift Ratings with DensDeck Hot Mopped over Steel Decks</i>	13
<i>Vertical Pull Resistance</i>	13
<i>Uplift Pressures Achieved Using DensDeck Roof Boards</i>	14
<i>Fastener Patterns</i>	15
<i>Architectural Specifications</i>	16
<i>Limitations/Recommendations</i>	18
<i>Commonly Used Metric Conversions</i>	19

Over 20 Years of DensDeck® Roof Boards – Proven Performance

With billions of square feet installed in a complete range of roofing systems and climate extremes, DensDeck roof boards have proven their toughness and versatility. The unique construction has been shown to withstand delamination, deterioration, warping and job site damage far more effectively than paper-faced gypsum board and other conventional roofing products such as wood fiberboard and perlite.

- Treated gypsum core for moisture resistance and sound insulation
- Fire, rot and hail resistant
- Holds up well under normal foot traffic while stiffening and stabilizing roof decks
- Easy to install in all types of roof systems
- Ideal product for direct membrane application

DensDeck® is designed to address four persistent challenges inherent in commercial roofing assemblies: fire resistance, moisture resistance, strength and dimensional stability. DensDeck is a patented fiberglass mat faced, noncombustible,* nonstructural, moisture resistant treated gypsum core panel.

DensDeck® Prime combines all the features of standard DensDeck with an enhanced surface treatment. The green surface coating allows uniform spreading of adhesives, which results in a stronger, more consistent bond. For cold mastic and torch applied modified bitumen as well as all fully adhered single-ply systems, DensDeck Prime provides a stronger, more economical installation by reducing the amount of mastic or adhesive, eliminating the field primer** and reducing the number of fasteners required to achieve high wind uplift values.

DensDeck® DuraGuard provides a durable low perm, integrated coating with all the features of DensDeck roof board. Additionally, the DuraGuard coating provides an ideal substrate for a wide variety of adhered roofing systems, including self-adhered and hot-mopped membranes. Field primer that is typically used to prepare the substrates for self adhesive membranes can be eliminated by using DensDeck DuraGuard.** Also, DensDeck DuraGuard roof board can be used as a substrate under commercial metal and roof tile applications as a substrate for self adhesive secondary water barriers.

Georgia-Pacific Gypsum Products and LEED®

Many of our products may qualify to contribute to earning LEED credits through the USGBC's Green Building Rating System for *New Construction & Major Renovations Version 2.2* (LEED-NC 2.2) and other current LEED building standards. With 12 manufacturing plants in the United States and Canada, in many instances we are able to support regional materials credits. To determine the Georgia-Pacific Gypsum plant source, call the Technical Hotline at 1-800-225-6119, and you may qualify for points in the following LEED categories:

Materials and Resources

- Recycled Content Credits 4.1 and 4.2
- Regional Materials Credits 5.1 and 5.2

Innovation in Design Credit

- When tested, as manufactured, product resists growth of mold pursuant to the test method ASTM D 3273

*As described and tested in accordance with ASTM E 136.

**Consult with membrane manufacturer for actual priming requirements.

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

2 • For latest information and updates: **Technical Service Hotline 1.800.225.6119** or **www.gpgypsum.com**

Areas of Use

Public and government buildings – Improved fire resistance protects the safety of occupants.

Health care facilities – Fire resistance and reduced potential for mold growth are important in these settings.

Major airports – Improved fire and sound isolation contribute to the comfort and safety of travelers.

National retail chains – Improved hail resistance means less damage and lower maintenance bills for owners and managers.

Manufacturing Facilities – Superior fire resistance for long-term performance.

Churches – Superior fire resistance ensures peace of mind where safety is critical.

Sports Arenas – Improved strength and fire resistance contribute to safety of visitors.

Food processing plants – Mold and moisture resistance make for a better indoor air environment.

Coastal communities – High wind uplift resistance provides protection from severe weather conditions.

Green applications – Added protection and support for Photovoltaic (PV), Vegetative and Reflective Cool Roofs.

DensDeck® roof boards are an excellent fire barrier over steel decks and combustible roof decks. Roofing specifications for steel deck installations often require a fire barrier as the component applied above the metal. This element controls and limits the amount of fuel contributed to a fire beneath the roof.

Factory Mutual (FM) Class 1 minimum tested, 1/4" DensDeck roof board is the only 1/4" gypsum product that meets the calorimeter requirements for insulated steel decks including EPS and XEPS products. DensDeck panels are an excellent fire barrier in built-up, modified bitumen and single-ply roofing systems.

DensDeck, DensDeck® Prime and DensDeck® DuraGuard roof boards have achieved a very comprehensive Class A (UL 790) fire rating at Underwriters Laboratories and FM Approvals (ASTM E 108) due to their outstanding fire resistance.

- ASTM E 84 with DensDeck and DensDeck Prime roof board: Flame Spread 0, Smoke Developed 0
- ASTM E 119 with 5/8" DensDeck® Fireguard® Type X roof board: UL Classified Type DD
- Due to the outstanding fire performance of 5/8" DensDeck Fireguard Type X roof board, this product can replace any classified or unclassified 5/8" gypsum board in an assembly in the UL Fire Resistance Directory under the prefix "P."
- 5/8" DensDeck Fireguard Type X roof board is classified by Underwriters Laboratories and can be used in the following UL "P" assemblies: P225, P227, P230, P235, P254, P257, P259, P266, P302, P508, P510, P512, P514, P518, P701, P711, P713, P714, P717, P718, P719, P720, P722, P725, P726, P727, P728, P729, P730, P731, P732, P733, P734, P735, P736, P738, P739, P740, P741, P742, P743, P801, P811, P815, P819, P824, P825, P826, P828, P921*.
- UL of Canada R210, R217, R221, R222, R223, R224, R225, R702, R703, R804, R805, R806.
- ANSI/UL 1256 Steiner Tunnel "Fire Classified Construction," a code accepted alternative to a 15-minute thermal barrier for roof assemblies utilizing a minimum 1/4" DensDeck Roof Board (see page 12 for illustration).

*For additional information on P921, call the Technical Service Hotline.



Properties, Standards and Classifications

DensDeck® Roof Board

Properties	1/4"	1/2"	5/8"
Thickness, nominal	1/4" + 1/16"	1/2" ± 1/32"	5/8" ± 1/32"
Width, standard	4' ± 1/8"	4' ± 1/8"	4' ± 1/8"
Length, standard	8' ± 1/4"	8' ± 1/4"	8' ± 1/4"
Weight, lbs./sq. ft., nominal	1.1 - 1.2	1.95	2.5
Surfacing	Fiberglass mat	Fiberglass mat	Fiberglass mat
Flexural Strength ¹ , parallel, lbs. min.	40	80	100
Flute Spanability ²	2-5/8"	5"	8"
Permeance ³ , perms	50	35	32
"R" Value ⁴	.28	.56	.67
Linear Variation with Change in Temp., in/in °F	8.5x10 ⁻⁶	8.5x10 ⁻⁶	8.5x10 ⁻⁶
Linear Variation with Change in Moisture, in/in %RH	6.25x10 ⁻⁶	6.25x10 ⁻⁶	6.25x10 ⁻⁶
Water Absorption ⁵ , % max	10.0	10.0	10.0
Compressive Strength, psi nominal	500 - 900	500 - 900	500 - 900
Surface Water Absorption, grams, nominal	≤2.5	≤2.5	≤2.5
Flame Spread, Smoke Developed (ASTM E 84)	0/0	0/0	0/0
Fire Classification	FM CLASS 1 (as overlayment) UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	FM Class 1 (FM 4450) UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	FM Class 1 (FM 4450) UL 1256, ULC S-126 UL Classified "P" assemblies ULC Classified "R" assemblies ULC S-101 Class A (UL 790), ULC S-107
Mold Resistance per ASTM D 3273 ⁶	Mold resistant	Mold resistant	Mold resistant
ASTM Standard	C 1177	C 1177	C 1177
Uplift Standards and Testing ⁷	ANSI/UL 1897 ASCE 7 FM 4470	ANSI/UL 1897 ASCE 7 FM 4470	ANSI/UL 1897 ASCE 7 FM 4470
Bending Radius	5'	8'	12'

DensDeck® Prime Roof Board

Properties	1/4"	1/2"	5/8"
Thickness, nominal	1/4" + 1/16"	1/2" ± 1/32"	5/8" ± 1/32"
Width, standard	4' ± 1/8"	4' ± 1/8"	4' ± 1/8"
Length, standard	4' and 8' ± 1/4"	4' and 8' ± 1/4"	4' and 8' ± 1/4"
Weight, lbs./sq. ft., nominal	1.15 - 1.25	1.975	2.55
Surfacing	Fiberglass mat non-asphaltic coating	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating
Flexural Strength ¹ , parallel, lbs. min.	40	80	100
Flute Spanability ²	2-5/8"	5"	8"
Permeance ³ , perms	50	35	32
"R" Value ⁴	.28	.56	.67
Linear Variation with Change in Temp., in/in °F	8.5x10 ⁻⁶	8.5x10 ⁻⁶	8.5x10 ⁻⁶
Linear Variation with Change in Moisture, in/in %RH	6.25x10 ⁻⁶	6.25x10 ⁻⁶	6.25x10 ⁻⁶
Water Absorption ⁵ , % max	10.0	10.0	10.0
Compressive Strength, psi nominal	500 - 900	500 - 900	500 - 900
Surface Water Absorption, grams, nominal	≤2.0	≤2.0	≤2.0
Flame Spread, Smoke Developed (ASTM E 84)	0/0	0/0	0/0
Fire Classification	FM CLASS 1 (as overlayment) UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	FM Class 1 (FM 4450) UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	FM Class 1 (FM 4450) UL 1256, ULC S-126 Class A (UL 790) ULC S-107
Mold Resistance per ASTM D 3273 ⁶	Mold resistant	Mold resistant	Mold resistant
ASTM Standard	C 1177	C 1177	C 1177
Uplift Standards and Testing ⁷	ANSI/UL 1897 ASCE 7 FM 4470	ANSI/UL 1897 ASCE 7 FM 4470	ANSI/UL 1897 ASCE 7 FM 4470
Bending Radius	5'	8'	12'

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

4 • For latest information and updates: **Technical Service Hotline 1.800.225.6119** or www.gpgypsum.com

Properties, Standards and Classifications

DensDeck® DuraGuard Roof Board

Properties	1/4"	1/2"	5/8"
Thickness, nominal	1/4" + 1/16"	1/2" ± 1/32"	5/8" ± 1/32"
Width, standard	4' ± 1/8"	4' ± 1/8"	4' ± 1/8"
Length, standard	4' and 8' ± 1/4"	4' and 8' ± 1/4"	4' and 8' ± 1/4"
Weight, lbs./sq. ft., nominal	1.5 - 1.575	2.0	2.5
Surfacing	Fiberglass mat Durable, low perm coating	Fiberglass mat Durable, low perm coating	Fiberglass mat Durable, low perm coating
Flexural Strength ¹ , parallel, lbs. min.	40	80	100
Flute Spanability ²	2-5/8"	5"	8"
Permeance ³ , perms	≤2	≤2	≤2
"R" Value ⁴	.28	.56	.67
Linear Variation with Change in Temp., in/in °F	8.5x10 ⁻⁶	8.5x10 ⁻⁶	8.5x10 ⁻⁶
Linear Variation with Change in Moisture, in/in %RH	6.25x10 ⁻⁶	6.25x10 ⁻⁶	6.25x10 ⁻⁶
Water Absorption ⁵ , % max	10.0	10.0	10.0
Compressive Strength, psi nominal	1500	500 - 900	500 - 900
Surface Water Absorption, grams, nominal	< 1.0	< 1.0	< 1.0
Flame Spread, Smoke Developed (ASTM E 84)	15/0	15/0	15/0
Fire Classification	FM Class 1 (as overlayment) UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	FM Class 1 (as overlayment) UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	FM Class 1 (as overlayment) UL 1256, ULC S-126 Class A (UL 790) ULC S-107
Mold Resistance per ASTM D 3273 ⁶	Mold resistant	Mold resistant	Mold resistant
Bending Radius	8'	12'	16'
ASTM Standard	C 1177	C 1177	C 1177
Uplift Standards and Testing ⁷	ANSI/UL 1897 ASCE 7 FM 4470	ANSI/UL 1897 ASCE 7 FM 4470	ANSI/UL 1897 ASCE 7 FM 4470

1. Tested in accordance with ASTM C 473.

2. Tested in accordance with ASTM E 661 (400 lb. conc. load only for 1/2" and 5/8").

3. Tested in accordance with ASTM E-96 (dry cup method).

4. Tested in accordance with ASTM C 518 (heat flow meter).

5. ASTM C 1177 minimums.

6. When tested as manufactured in accordance with ASTM D 3273.

7. See pages 13 and 14 for uplift pressures achieved.

The mold resistance of DensDeck® roof boards has been tested, as manufactured, in accordance with ASTM D 3273. The ASTM D 3273 test is 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, DensDeck roof boards provide increased mold resistance.

Roof System Application Recommendations

Roofing System	DensDeck® Roof Boards	DensDeck® Prime Roof Boards	DensDeck® DuraGuard Roof Boards
Single Ply Mech Attached	Recommended , has all the properties needed to perform well and maintains long term fire resistance*	Acceptable , as an alternative to DensDeck roof boards and maintains long term fire resistance*	Acceptable, caution – may create a “double vapor retarder” situation, consult design authority
Single Ply Adhered (solvent)	Acceptable , may require more adhesive and may result in uneven drying	Recommended , controlled absorption and breathable surface resists adhesive blisters	Acceptable , but certain adhesives may not dry quickly and may cause solvent vapor blisters
Single Ply Adhered (water based)	Acceptable , excess adhesive use and absorption may cause uneven drying	Recommended , controlled absorption and ability to dry to the inside	Acceptable , adhesives may take longer to dry through the low perm coating
Mod Bit Torched	Acceptable , but the fiberglass facings may carbonize and turn to a powder, creating a bond breaker	Recommended , works very well without having to field prime***	Acceptable , has been used successfully; coating may blister under extended direct flame
Mod Bit Cold	Acceptable , field primer may be required to control the absorption***	Recommended , controlled absorption and drying of mastic	Acceptable , solvents in mastic may take longer to dry through the low perm coating
Mod Bit Mopped	Acceptable , has a long history, can work but may require field priming and some application temperature guidelines may have to be followed	Recommended , some application temperature guidelines and procedures may have to be followed	Recommended , the gypsum is isolated from the hot asphalt by the low perm coating minimizing the effects of substrate frothing**
BUR Ply Sheets	Acceptable , has a long history of performing well by following application temperature guidelines	Recommended , can work well by following application temperature guidelines	Recommended , the gypsum is isolated from the hot asphalt by the low perm coating minimizing the effects of substrate frothing**
BUR Hybrid	Acceptable , has a long history of performing well by following application temperature guidelines	Recommended , can work well by following application temperature guidelines	Recommended , the gypsum is isolated from the hot asphalt by the low perm coating minimizing the effects of substrate frothing**
Self Adhered	Acceptable , must be field primed prior to installation of membrane	Acceptable , field priming recommended prior to installation of membrane	Recommended , high strength surface and integral coating, does not require field priming***
Spray Foam	Acceptable , can work well but excess absorption of foam may be an issue; may require field priming	Recommended , dark surface increases foam yield and controlled absorption	Acceptable , darker surface increases foam yield
Thermal Barrier	Recommended , has a long history, if bonded vapor retarder is installed choose DensDeck Prime or DensDeck DuraGuard roof board for self adhesive	Acceptable , works well if bonded vapor retarder is used	Acceptable , works well if bonded vapor retarder is used; do not use if vapor retarder is not desired
Fluid Applied	Acceptable , works well but may absorb more of coating, rough surface “grabs” coating for high applied coating peel strength	Acceptable , works well and controls absorption of fluid applied coating	Recommended , controlled absorption and high strength surface

* NRCA and MRCA Fire Testing of Membrane Roof Systems, Tech Bulletin January 2006

** Acceptable for adhering to insulation by ribbon or spot mopping or for DensDeck DuraGuard roof board in mechanically attached systems

*** Confirm with membrane manufacturer

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

6 • For latest information and updates: **Technical Service Hotline 1.800.225.6119** or **www.gpgypsum.com**

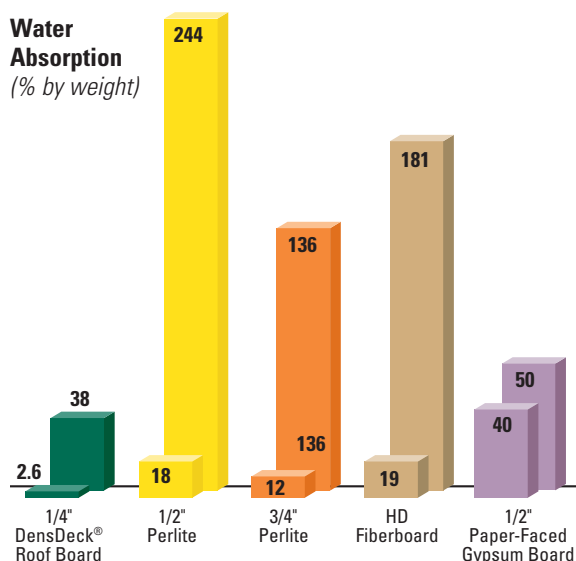
System Manufacturers Approvals

This is not intended to be a comprehensive list of companies that approve the use of DensDeck® Roof Boards.

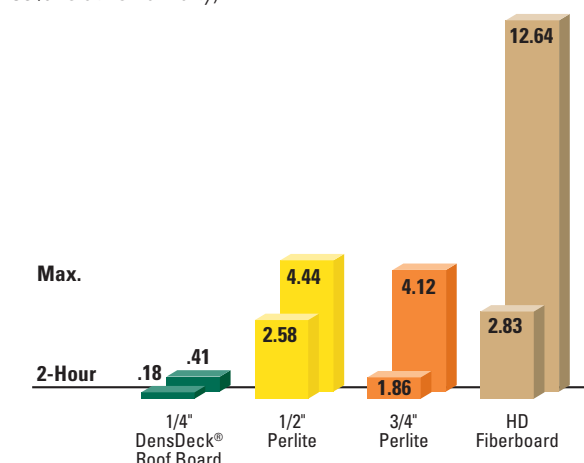
AFM Corp.	Cooley Roofing Systems	Garland Co. Inc.	Magnum Systems	Dow Roofing Systems
Atlas Roofing Corp.	Custom Seal Inc.	GenFlex Roofing Systems	Malarkey Roofing Co.	Styro Chem Int. Inc.
BASF Corp.	Dow Chemical	GS Roofing Products	Mule-Hide Products	2001 Inc.
Bitec Inc.	Duro-Last Roofing Inc.	Haartz-Mason Inc.	Performance Roof Systems	Tamko Roofing
Black Warrior Roofing	Ecology Roof Systems	Henry Co.	Pittsburgh Corning Corp.	Tenneco
Bluestone Inc.	Environmental Roofing Systems	Hydro Stop Inc.	Polyethane Systems Inc.	The Garland Co.
Bondcote Corp.	ER Systems	Hyload Inc.	Polyglass USA	Thermo Mfg. Co.
Burkeline Roofing Systems	E S Products Inc.	IB Roof Systems	Republic Powdered Metals	Tremco Inc.
Carlisle SynTec Inc.	Eurecoats	Imperial Adhesives	Sika-Sarnafil Inc.	Tri Ply
Celotex Corp.	Fields Corp.	Intec/Permaglas	Seaman Corp. Building Systems	US Ply
Centimark Corp.	Firestone Building Products Co.	Johns Manville	Siplast Inc.	Versico Inc.
Certaiteed Corp.	Flex Membrane International	Koppers Industries Inc.	Soprema Inc.	WP Hickman Systems Inc.
Commercial Innovations	Flexible Products	Lexcan Industrial Supply Ltd.	SPI Inc.	
Conklin Co. Inc.	GAF Materials Corp.	Liquid Plastic	Stafast Roofing Products	

Competitive Roof Substrate Comparisons*

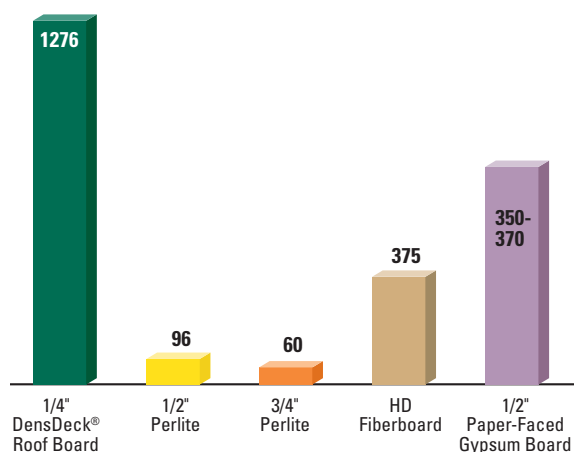
Water Absorption
(% by weight)



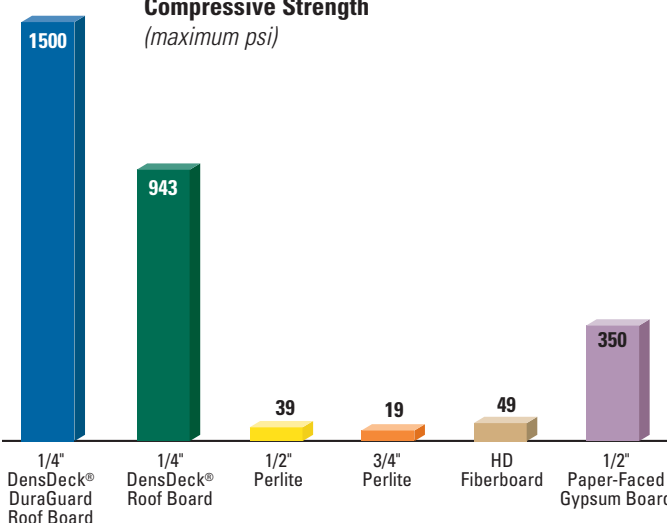
Moisture Absorption
(moisture gained from 50% to 90% relative humidity)



Modulus of Rupture
(psi)



Compressive Strength
(maximum psi)



*Actual test results from stock materials. Average or minimum values may differ.

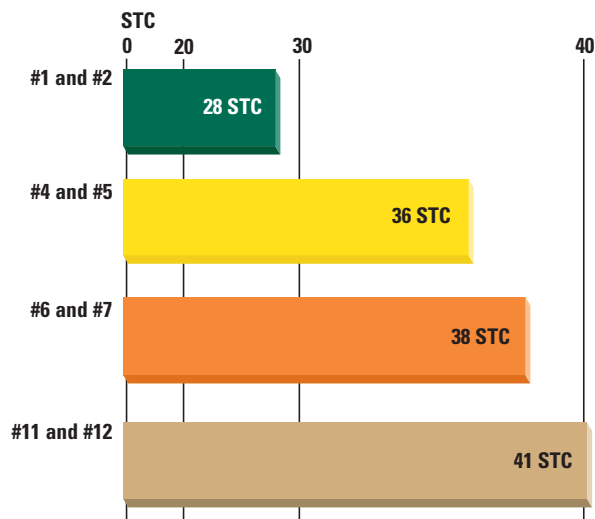
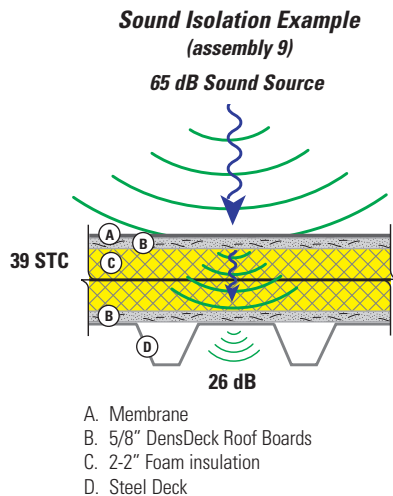
CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

For latest information and updates: **Technical Service Hotline 1.800.225.6119** or www.gpgypsum.com • 7

Sound Control

To block unwanted entry of sound through a roof assembly, multiple layers of DensDeck® Roof Boards will efficiently keep outside sound outside. Whether around airports, in urban environments or to keep equipment noise from disrupting the occupants of a building, DensDeck can effectively contribute to sound isolation. The test results in the following charts allow the designer to select the appropriate assembly.

Sound Transmission Class (STC), measured in decibels, is the weighted average of the drop in sound intensity measured in a range of frequencies from 80 to 5,000 Hz across a barrier. The sound level outside is reduced by the STC number and if the result is close to or below the background, interior sound level, it will not be heard or will not be disruptive.



The data relating to sound-tested assemblies is based on the characteristics, properties and performance of materials and systems obtained under controlled test conditions as set forth under ASTM E 90 and E 413.

Sound Source	Decibels
Jet take-off, rock concert	120
Chainsaw	110
Lawnmower, truck, tractor	90
Freeway traffic	70
Office (background)	40-50

Sound Testing of Steel Deck Roof Assemblies Tested per ASTM E-90, Rated per ASTM E-413 for STC

	STC	Underlayment	Insulation	Coverboard	Membrane	System Attachment
1	28	None	6" ISO	None	None	Mechanical
2	28	None	3" ISO	None	None	Mechanical
3	29-30	None	6" EPS (Extruded)	None	None	Mechanical
4	36	5/8" DensDeck® Roof Board	3" ISO	1/2" DensDeck® Prime Roof Board	EPDM	Mechanical/EPDM-Adh.
5	36	5/8" DensDeck Roof Board	3" ISO	1/4" DensDeck Prime Roof Board	EPDM	Mechanical/EPDM-Adh.
6	38	5/8" DensDeck Roof Board	3" ISO	1/4" DensDeck Prime Roof Board	EPDM	All components adhered
7	38	5/8" DensDeck Roof Board	8" ISO	5/8" DensDeck Prime Roof Board	None	Mechanical
8	39	5/8" DensDeck Roof Board	8" ISO	5/8" DensDeck Prime Roof Board	None	All components
9	39	5/8" DensDeck Roof Board	4" ISO	5/8" DensDeck Prime Roof Board	SBS Mod Bit	Mechanical/ Mod Bit-Torched
10	41	5/8" DensDeck Roof Board	6" ISO	Two: 5/8" DensDeck Roof Board 5/8" DensDeck Prime Roof Board	None	Mechanical
11	41	5/8" DensDeck Roof Board	6" ISO 1/2" HD Fiberboard	One: 5/8" DensDeck Prime Roof Board	None	Mechanical
12	41	5/8" DensDeck Roof Board	6" EPS (Extruded)	Two: 5/8" DensDeck Roof Board 5/8" DensDeck Prime Roof Board	None	Mechanical

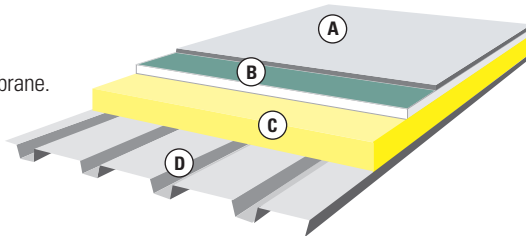
CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

8 • For latest information and updates: **Technical Service Hotline 1.800.225.6119** or www.gpgypsum.com

Applications

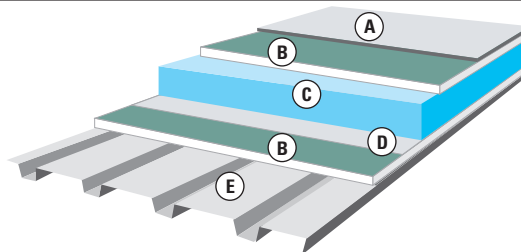
Cover Board – DensDeck® Prime preferred for adhered membrane. DensDeck preferred for mechanically attached membrane.

- A. Membrane
- B. Minimum 1/4" DensDeck® roof boards placed directly below the roofing membrane. In this application the product provides the primary support for the roofing membrane and protects insulation. DensDeck roof board may help achieve a Class A, B, or C (UL 790) fire rating in conjunction with various membranes.
- C. Rigid Foam Insulation
- D. Any Structural Deck



Substrate for Vapor Retarders – DensDeck Prime preferred.

- A. Membrane
- B. Minimum 1/4" DensDeck roof boards fastened to deck. Membrane attached with cold mastics, hot asphalt or adhesives.
- C. Rigid Foam Insulation
- D. Vapor Retarder
- E. Metal Deck

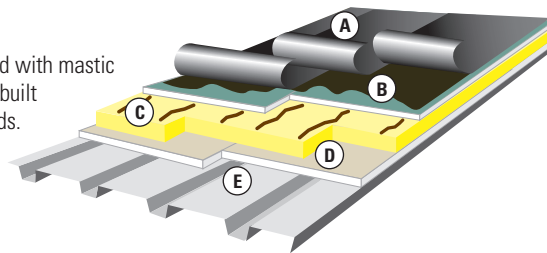


Ribbon/Spot Mopping – DensDeck Prime preferred.

- A. Asphaltic Membrane
- B. Minimum 1/4" DensDeck roof boards may be mechanically fastened, bonded with mastic or adhesives or partially hot mopped to foam insulation. Asphalt or coal tar built up roofing systems may then be mopped directly to the DensDeck roof boards.

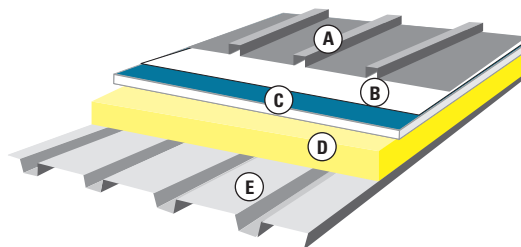
Ribbon or spot mopping is the recommended application.

- C. Rigid Insulation
- D. Minimum 1/4" DensDeck roof board
- E. Any Structural Deck



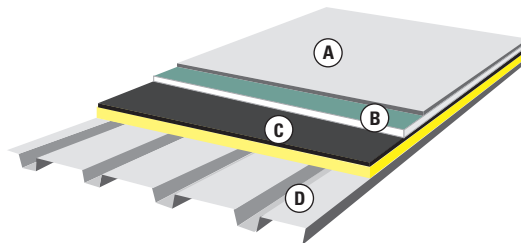
Metal Roof Thermal Barrier – DensDeck® DuraGuard preferred.

- A. Standing Seam Metal Roof
- B. Secondary Water Barrier
- C. Minimum 1/4" DensDeck roof boards provides a thermal barrier in conjunction with a standing-seam metal or tile roofing system while providing support for hail resistance and noise reduction.
- D. Insulation (optional)
- E. Metal Deck



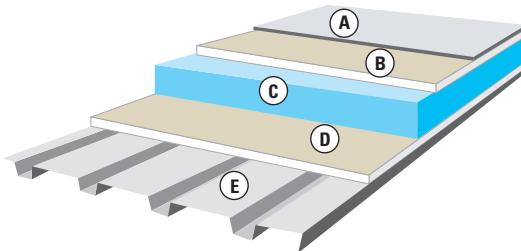
Roof Recover Board – DensDeck Prime preferred for adhered systems.

- A. Membrane (various)
- B. Minimum 1/4" DensDeck roof boards utilized as a roof recover board. Recover boards are placed over the existing membrane surface where they function as a separator and support layer between the old roof and a new roofing membrane.
- C. Existing Roof Assembly
- D. Any Structural Deck



Thermal Barrier

- A. Membrane
- B. Minimum 1/4" DensDeck cover board
- C. Polystyrene Insulation
- D. Minimum 1/4" DensDeck roof boards provide a thermal barrier installed directly to metal deck for both expanded and extruded polystyrene insulation.
- E. Metal Deck



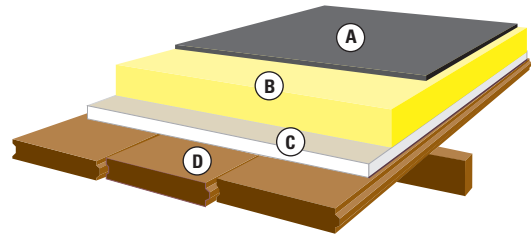
CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

For latest information and updates: **Technical Service Hotline 1.800.225.6119** or www.gpgypsum.com • 9

Applications

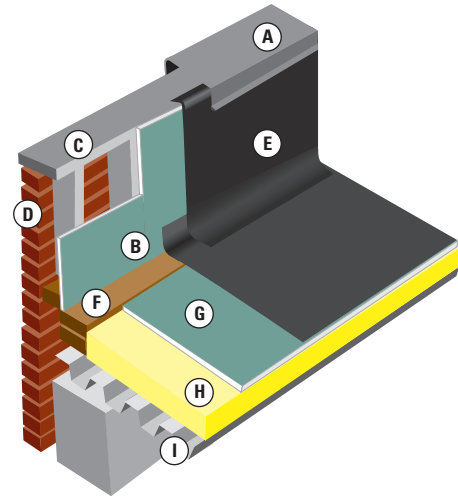
Fire Barrier Underlayment

- A. Classified Membrane
- B. Rigid Foam Insulation (optional)
- C. Minimum 1/4" DensDeck® or DensDeck® Prime roof board used as a barrier board underlayment below optional rigid foam insulation on a combustible deck (wood) to achieve a Class A, B or C fire rating (UL 790).
- D. Wood Deck



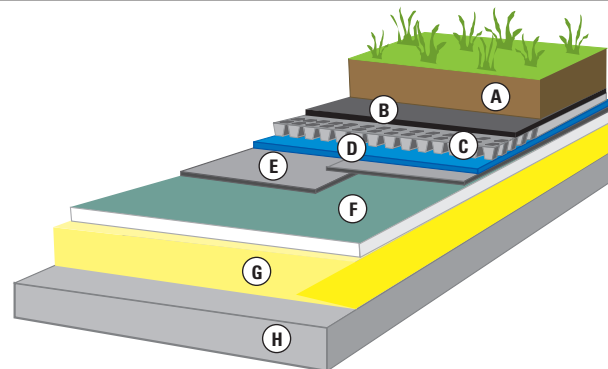
Parapet Wall Substrate – DensDeck Prime roof board preferred.

- A. Wall Cap
- B. Minimum 1/2" DensDeck Prime roof boards fastened 8" o.c. to wood or metal framing. 1/4" DensDeck roof boards may be used for fully supported or adhered applications. (16" o.c. = 1/2"; 24" o.c. = 5/8")
- C. Parapet Wall Framing
- D. Exterior Finish
- E. Adhered Flashing Membrane
- F. Nailer
- G. DensDeck or DensDeck Prime roof board
- H. Rigid Foam Insulation
- I. Any Structural Deck



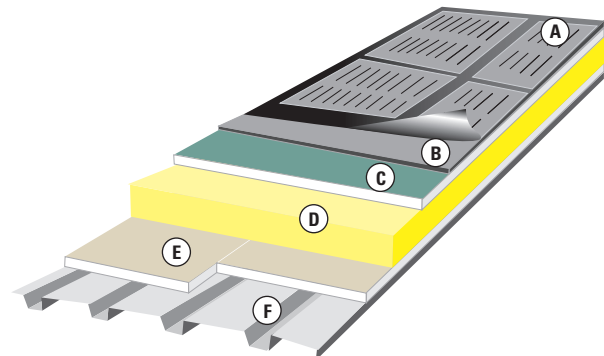
Vegetative "Green" Roof

- A. Growing Medium & Plants
- B. Moisture Retention Mat
- C. Drainage Layer
- D. Protection Fabric/Root Barrier
- E. Waterproofing Membrane
- F. Minimum 1/2" DensDeck Prime roof board
- G. Insulation
- H. Various Structural Decks



Photovoltaic Roofing System

- A. PV Panels
- B. Roofing Membrane
- C. Minimum 1/4" DensDeck Prime roof board
- D. Insulation
- E. DensDeck (optional)
- F. Any Structural Deck



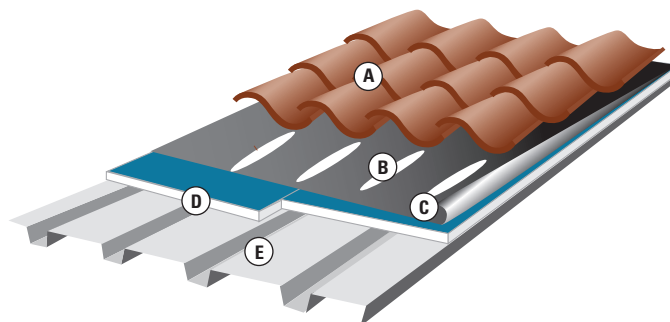
CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

10 • For latest information and updates: **Technical Service Hotline 1.800.225.6119** or www.gpgypsum.com

Foam Adhered Roof Tile

Foam Adhered Tile

- A. Cement or Clay Tile
- B. Foam
- C. Self-Adhesive Secondary Water Barrier
- D. DensDeck® DuraGuard
- E. Steel Deck



Static Uplift Testing: Minimum 1/4" DensDeck® DuraGuard – Foam Adhered Roof Tile to Membrane (All 22-gauge steel deck)

In response to a growing construction practice of adhesive application of roof tile on commercial roofs, Georgia-Pacific Gypsum sponsored a series of critical static uplift testing in simulated roof tile assembly constructions incorporating our minimum 1/4" DensDeck® DuraGuard roof board. Those tests results and partial construction details are summarized in the table below:

Thermal Barrier: Substrate	Self-Adhered, Water-Shedding Underlayment	Foam Adhesive	Tile Type	Average Ultimate Load (F bar, lbf).*	Attachment Resistant Expressed As a Moment (Mf) (ft-lbf)**
Minimum 1/4" DensDeck DuraGuard mechanically attached	Protecto Wrap Rainproof 40	PolyFoam	Cement Monier (S Type, High Profile)	149.8	81.3
Min. 1/4" DensDeck DuraGuard	Protecto Wrap (R-40)	PolyFoam	Monier, Medium Profile	139.6	75.7
Min. 1/4" DensDeck DuraGuard	Protecto Wrap (R-40)	PolyFoam	Monier, Medium Profile	172.2	94.3
Min. 1/4" DensDeck DuraGuard	PolyGlass Polystick TU Plus	PolyFoam	Monier (S Type, High Profile)	166.7	90.9
Min. 1/4" DensDeck DuraGuard	PolyGlass Polystick TU Plus	PolyFoam	Monier, Medium Profile	131.2	70.5
Min. 1/4" DensDeck DuraGuard	PolyGlass Polystick TU Plus	PolyFoam	Monier, Low Flat Profile	205.8	113.7
Min. 1/4" DensDeck DuraGuard	Protecto Wrap (R-40) Rainproof 40	PolyFoam	Hanson S Type (High Profile)	142.4	76.1
Min. 1/4" DensDeck DuraGuard	Protecto Wrap (R-40)	PolyFoam	Hanson, Medium Profile	139.6	70.0
Minimum 1/4" DensDeck DuraGuard	Protecto Wrap (R-40)	PolyFoam	Clay Altusa, Clay Tile S Type	110.1	66.9

*The maximum resistance load achieved expressed as an ultimate load.

** The attachment resistance expressed as a moment as provided by the adhesive bond between the tile and underlayment.

Long-Term Fire Protection

Long-term fire protection of roofing systems is a key concern of the design authority, code officials and building owner. DensDeck® roof boards will contribute to the fire resistance characteristics of roof assemblies over time.* DensDeck roof boards can enhance the fire resistance of a roof assembly and can overcome limitations of the membrane or insulation.

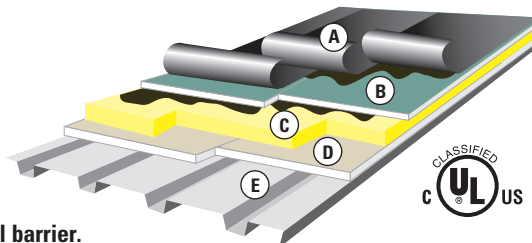
"When using a low-slope membrane roof system, designers should include in their designs a suitable cover board that is consistent with an appropriate listing or approval from a code-approved testing agency. This recommendation is consistent with the guidelines already contained in *The NRCA Roofing and Waterproofing Manual, Fifth Edition*. Furthermore, for mechanically attached single-ply membrane roof systems, designers of newly installed roof systems are now recommended to include a noncombustible cover board that is consistent with an appropriate listing or approval from a code-approved testing agency. Examples of noncombustible cover boards include **fiberglass mat faced gypsum boards and gypsum roof boards.**" (January 2006 NRCA/MRCA Technical Bulletin, at page 3.)

*See: January 2006 NRCA/MRCA Technical Bulletin: *Fire Testing of Membrane Roof Systems*.

UL Assemblies

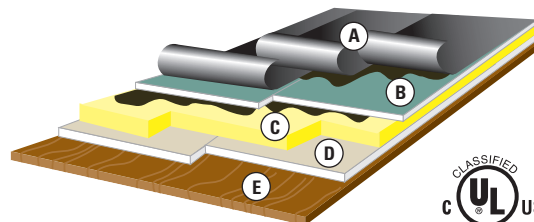
UL 1256 Fire Barrier Board Classification

- A. UL Classified Roof Covering
- B. Min. 1/4" DensDeck Roof Board Cover Board (optional)
- C. UL Classified (EPS) Insulation
- D. Minimum 1/4" DensDeck roof board serving as an insulation thermal barrier underlayment and an acceptable code alternative to a thermal barrier.**
- E. Classified Steel Deck



UL 790 Class A Barrier Board on Combustible Decking

- A. UL Classified Roof Covering
- B. Min. 1/4" DensDeck Roof Board Cover Board (optional)
- C. UL Classified Insulation (optional)
- D. Minimum 1/4" DensDeck roof board serving as an insulation thermal barrier overlayer with all joints staggered a min. of 6" from the plywood joints.
- E. Classified Wood Deck



UL Notes:

Note 1: Classification (A, B or C) and maximum incline will be the same as that of the Classified Roofing System (TGFU) which otherwise is limited to use over noncombustible deck.

Note 2: The use of the DensDeck barrier board over the insulation permits the use of any Classified Roofing System (TGFU) which otherwise is limited to use over noncombustible deck.

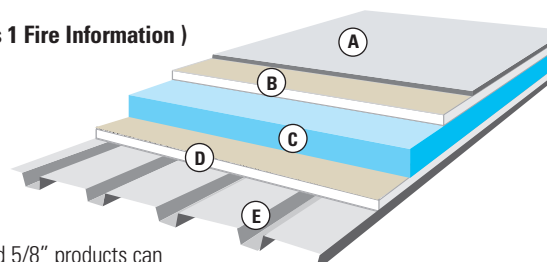
Note 3: The use of the DensDeck barrier board directly over the combustible deck permits the use of any classified Roofing System (TGFU) which otherwise is limited to use over noncombustible deck. When used, insulation must consist of one of the types specified.

The use of DensDeck roof board as an underlayment achieves a noncombustible deck classification on a combustible deck.

Factory Mutual/FM Approvals

Typical Configuration of DensDeck Roof Boards (Factory Mutual Class 1 Fire Information)

- A. Membrane (various)
- B. Minimum 1/4" DensDeck Roof Boards Overlayment
- C. Rigid Foam Insulation (including EPS)
- D. Minimum 1/4" DensDeck Roof Boards Underlayment
- E. Metal Deck



Due to the superior fire resistance of DensDeck roof boards, the 1/4", 1/2" and 5/8" products can meet the calorimeter test requirements of Factory Mutual **with EPS insulation**. Further, 1/4" DensDeck roof boards are the only 1/4" gypsum-based products that meet the thermal barrier underlayment requirements in certain Class 1 assemblies of this stringent fire test.

DensDeck roof boards are typically utilized (see diagram) in these constructions as an insulation underlayment. In some assemblies it will be used as an insulation overlayment (1/4", 1/2" or 5/8"). In other assemblies it will serve both of these roles in the same system.

See Roof Nav for descriptions of numerous approved systems and assemblies incorporating DensDeck roof board for use in approved combinations.

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

12 • For latest information and updates: **Technical Service Hotline 1.800.225.6119** or www.gpgypsum.com

Wind Uplift Information

Wind uplift resistance of roofing assemblies is achieved by fastening and/or adhering the roofing components to the structural deck. Uplift resistance testing may be conducted by several independent laboratories, in accordance with FM 4470 or ANSI/UL 1897 test procedures. The test results show the ultimate (not design) pounds per square foot (PSF) uplift resistance which has been achieved.

It is the responsibility of the roofing design authority to comply with code requirements and follow the guidelines in ASCE-7 or FM 1-28 and 1-29 to establish the appropriate design uplift resistance and safety factor. In these documents, several factors are considered to determine the design pressure required, including but not limited to, height of the building, ground roughness, exposure and importance factor. Once the design pressure is determined, the roofing assembly which meets this pressure, with the appropriate safety factor, is selected by the design authority.

Elevated UL Wind Uplift Ratings with DensDeck® Roof Board Hot Mopped over Steel Decks



Uplift Resistance: 150 psf

Deck: 22 MSG (minimum)
Insulation (optional): Any type, 2" maximum
Barrier Board: DensDeck roof board, 5/8" thick minimum
Fasteners: No. 15 steel screws (or equivalent) with 3" square No. 26 MSG formed galvanized steel plates. One fastener every 2 sq. ft.
Insulation: Polyisocyanurate, minimum 1-1/2" thick, hot-mopped
Barrier Board: DensDeck roof board, 1/2" thick minimum, hot-mopped
Membrane: Hot-mopped ply/cap asphalt or modified bitumen membrane systems

Uplift Resistance: 190 psf

Deck: 22 MSG (minimum)
Insulation: Polyisocyanurate, minimum 1" thick, loose laid
Barrier Board: DensDeck roof board, 5/8" thick minimum, hot-mopped
Fasteners: No. 15 steel screw (or equivalent) with 3" square No. 26 MSG formed galvanized steel plates. One fastener every 2 sq. ft.
Membrane: Hot-mopped ply/cap asphalt or modified bitumen membrane systems

Uplift Resistance: 245 psf

Deck: 22 MSG (minimum)
Insulation: Polyisocyanurate, minimum 1" thick, loose laid
Barrier Board: DensDeck roof board, 5/8" thick minimum, hot-mopped
Fasteners: No. 15 steel screw (or equivalent) with 3" square No. 26 MSG formed galvanized steel plates. One fastener every 1.6 sq. ft.
Membrane: Hot-mopped ply/cap asphalt or modified bitumen membrane systems

Vertical Pull Resistance Over Structural Concrete Deck

Examples of results over 600 PSF from hundreds of listings.

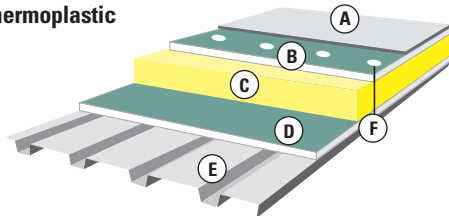
Roof System	Attachment to Deck	PSF Resistance
Single Ply Fully Adhered	Adhered	915
Single Ply Fully Adhered	Adhered	840
Single Ply Fully Adhered	Adhered	735
Multi-Ply Hot Asphalt	Hot Asphalt	840
Multi-Ply Torched	Hot Asphalt	840
Multi-Ply Torch Cap Hot Asphalt Base	Hot Asphalt	840
Multi-Ply Torched	Adhered	810

See www.roofnav.com for additional listings.

Uplift Resistance Pressures Achieved With DensDeck® Through Independent Testing

(Check membrane manufacturers' listing including FM, UL and other accredited labs for thousands of additional uplift assembly ratings with DensDeck products.²)

System Type and Description	Wind-Uplift PSF	Product ¹	# of fasteners ² (4' x 8' board)
Fully Adhered EPDM and Thermoplastic Membranes	FM 60	1/4" DensDeck	12
	FM 60/75/90	1/4" DensDeck Prime	12
	FM 60	1/2" DensDeck	10
	FM 60	1/2" DensDeck Prime	10
	FM 60/75/90	5/8" DensDeck	8
	FM 60/75/90	5/8" DensDeck Prime	8
	FM 90	1/4" DensDeck	15
	FM 90	1/2" DensDeck	15
	FM 90	1/2" DensDeck Prime	12
	FM 180*	5/8" DensDeck Prime	24
	FM 285**	1/2" DensDeck Prime	32

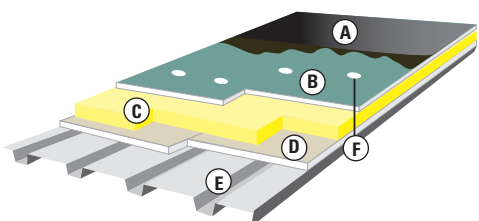


- A. Single-ply Membrane
B. Min. 1/4" DensDeck Roof Board
C. Insulation
D. Min. 1/4" DensDeck Roof Board (optional)
E. Classified Steel Deck
F. Fastener (see chart)

Single-ply and EPDM will include both reinforced and nonreinforced.

* Carlisle Reinforced 45 mil TPO was used to achieve an FM 180 rating.
** Carlisle FleeceBack was used to achieve an FM 285 rating.

Modified Bitumen/BUR



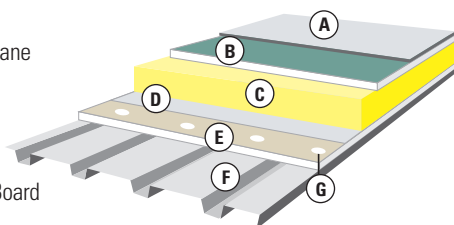
- A. BUR or Mod Bit Membrane
B. Min. 1/4" DensDeck Roof Board
C. Insulation
D. Min. 1/4" DensDeck Roof Board (optional)
E. Classified Steel Deck
F. Fastener (see chart)

Modified bitumen without base sheet. Mod Bit is torched or set in hot asphalt.
BUR is minimum 3-ply.

FM 60/75/90	1/4" DensDeck	12
FM 60/75/90	1/4" DensDeck Prime	8
FM 60/75/90	1/2" DensDeck	9
FM 60/75/90	1/2" DensDeck Prime	8
FM 60/75/90	5/8" DensDeck	8
FM 60/75/90	5/8" DensDeck Prime	8
FM-135*	1/2" DensDeck Prime	20
FM-225**	1/2" DensDeck Prime	24
FM-315**	1/2" DensDeck Prime	32
UL ³ 150 PSF	5/8" DensDeck or DensDeck Prime	16
UL ³ 190 PSF	5/8" DensDeck or DensDeck Prime	16
UL ³ 240 PSF	5/8" DensDeck or DensDeck Prime	20

*Siplast SBS Mod Bit torched or set in hot asphalt was used to achieve the FM 135 rating.
**Three plies of glass felts were set in hot asphalt to achieve the FM 225 and 315 ratings.

Vapor Retarder Substrate

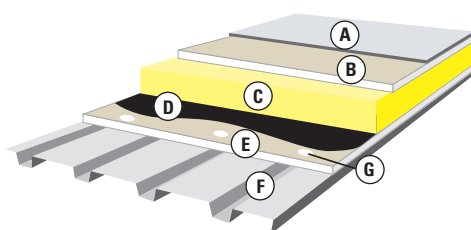


- A. Any Rated Adhered Membrane
B. Min. 1/4" DensDeck Roof Board (optional)
C. Insulation (optional)
D. Vapor Retarder
E. Min. 5/8" DensDeck Roof Board
F. Classified Steel Deck
G. Fastener (see chart)

Components above vapor retarder bonded with cold mastics, hot asphalt, adhesives or Insta-Stick.

FM 60/75/90	5/8" DensDeck	8
FM 60/75/90	5/8" DensDeck Prime	8

EPDM, BUR or Mod Bit with Insulation Adhered with Hot Asphalt



- A. EPDM, BUR or Mod Bit Membrane
B. Min. 1/4" DensDeck Roof Board (optional)
C. Rigid Foam Insulation
D. Asphalt Adhesive
E. Min. 1/2" DensDeck Roof Board
F. Classified Steel Deck
G. Fastener (see chart)

FM 60 (EPDM)	1/2" or 5/8" DensDeck or DensDeck Prime	8
--------------	-----------------------------------------	---

DensDeck Roof Board (1/2" or 5/8") and fully adhered single-ply membranes FM-rated 60 PSF with insulation attached with asphalt adhesive.

FM 90 (BUR or Mod Bit)	1/2" or 5/8" DensDeck or DensDeck Prime	8
------------------------	-----------------------------------------	---

DensDeck Roof Board (1/2" or 5/8") and BUR or modified bitumen membranes FM-rated 90 PSF with insulation attached with asphalt adhesive.

¹ DensDeck DuraGuard fastener density where applicable to the membrane system type is identical to DensDeck Prime up to FM 90 PSF.

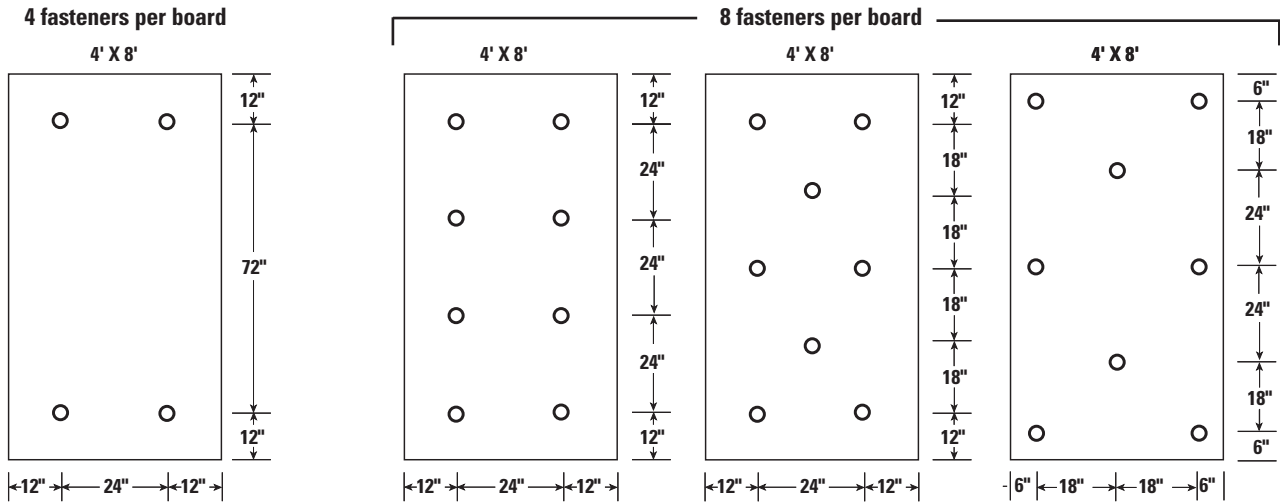
² Fastener rates shown are for the field of the roof. Additional fasteners are required for perimeter and corner areas and require either additional designer authority calculations or uplift testing.

³ Tested at Underwriters Laboratories. Refer to page 13.

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

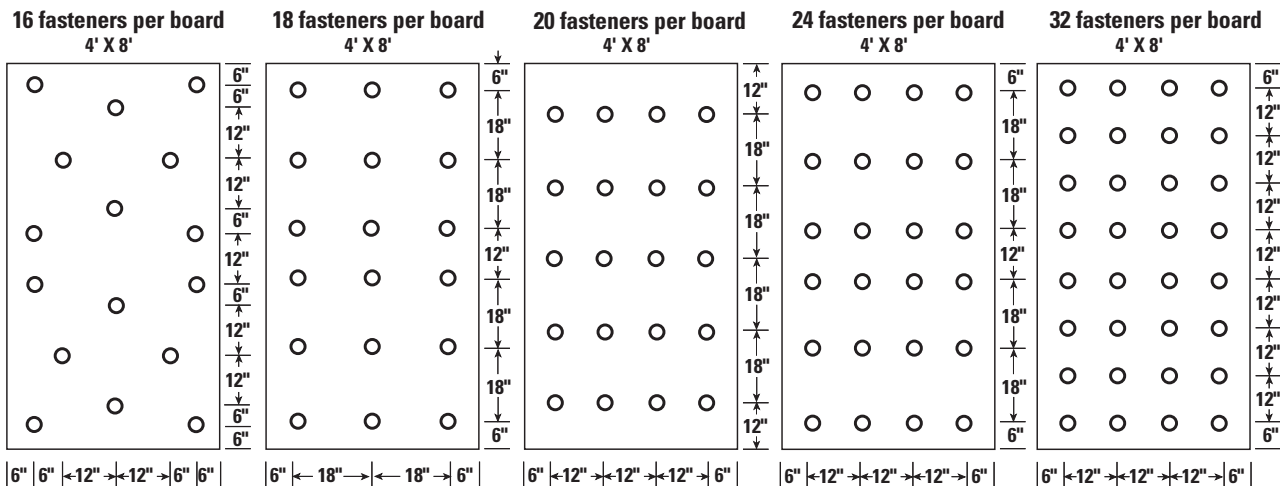
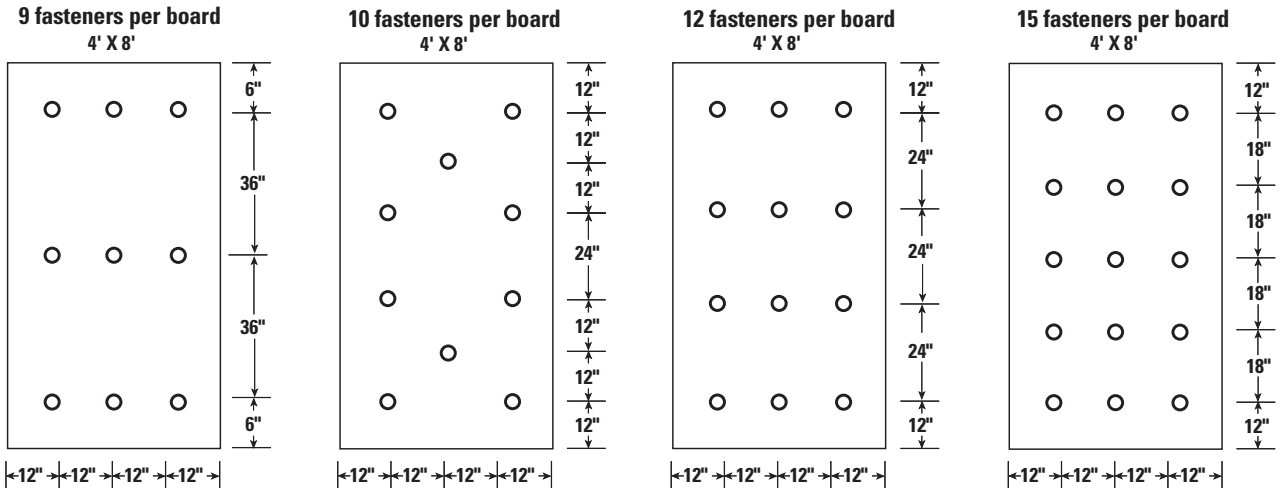
GP Fastener Patterns Tested

Other patterns are available from system manufacturers or testing agencies.



Note: Preliminary insulation or mechanically attached roof covering requires a minimum of 4 fasteners per 4' x 8' board in FM assemblies.

1/4" and 1/2" DensDeck® Prime Roof Board (Mod Bit and BUR)
– Optional –



Architectural Specifications

Part 1 – General

1.0 Description

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

1. Thermal barrier.
2. Roofing protection board.
3. Roof insulation protection board.
4. Re-cover board.

B. Related work specified elsewhere:

1. Roof insulation.
2. Roof membrane.
3. Roof assembly design.

1.1 Submittals

- A. Product data: Submit manufacturer's descriptive literature indicating material composition, thickness, sizes and fire resistance.
- B. Submittals: Indicate fastener and adhesive patterns for wind uplift resistance specified.

1.2 Delivery, Storage and Handling

- A. Deliver materials to the jobsite with manufacturer's identification intact. The protective plastic shipping covers used to wrap gypsum panel products for rail shipment are intended to provide temporary protection from moisture exposure during transit only and are not intended to provide protection during storage after delivery. Remove the plastic shipping covers immediately upon receipt of delivery. DensDeck® roof boards 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.**
- B. Provide other suitable, breathable weather protection for storage to keep DensDeck products dry. Outside storage must be off the ground and protected by a breathable water-shedding covering. Provide means for air circulation around and under stored bundles of DensDeck roof boards. DensDeck roof boards must be roofed the same day as installed. DensDeck roof boards must be kept dry before, during and after application. If boards have been inadvertently exposed to elevated job site moisture, allow boards to dry before using.

Part 2 – Products

2.0 Gypsum Roof Boards

A. **DensDeck® Roof Boards** –

1. Acceptable product: Georgia-Pacific Gypsum 1/4" DensDeck Roof Board, 1/2" DensDeck Roof Board and 5/8" DensDeck® Fireguard® Type X Roof Board
2. Composition: Nonstructural, fiberglass mat faced gypsum panel with water-resistant core.
3. Size: Nominal 4' x 8'. Edges: Square.
4. Fire Resistance:
 - a. Flame spread 0, smoke developed 0, when tested in accordance with ASTM E 84. Noncombustible as described and tested in accordance with ASTM E 136.
 - b. 5/8" DensDeck Fireguard Type X Roof Board UL-classified Type DD when tested in accordance with ASTM E 119.
 - c. Class A when tested to UL 790. (UL classified)
 - d. Code alternate to 15-minute thermal barrier as tested to UL 1256.

B. **DensDeck® Prime Roof Boards** –

1. Acceptable product: Georgia-Pacific Gypsum 1/4" DensDeck Prime Roof Board, 1/2" DensDeck Prime Roof Board and 5/8" DensDeck Prime Fireguard Type X Roof Board.
2. Composition: Fiberglass mat faced gypsum with nonasphaltic, highly filled proprietary heat-cured coating on one side.
3. Size: Nominal 4' x 8', 4' x 4'. Edges: Square.

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

16 • For latest information and updates: **Technical Service Hotline 1.800.225.6119** or www.gpgypsum.com

4. Fire Resistance:

- a. Flame spread 0, smoke developed 0, as described and tested in accordance with ASTM E 84. Noncombustible as described and tested in accordance with ASTM E 136.
- b. 5/8" DensDeck® Prime Fireguard® Type X Roof Board: UL-classified.
- c. Class A when tested to UL 790. (UL classified)
- d. Code alternate to 15-minute thermal barrier as tested to UL 1256.

C. **DensDeck® DuraGuard Roof Boards –**

1. Acceptable product: Georgia-Pacific Gypsum 1/4" DensDeck® DuraGuard Roof Board, 1/2" DensDeck DuraGuard Roof Board and 5/8" DensDeck DuraGuard Fireguard Type X Roof Board.
2. Composition: Fiberglass mat faced gypsum panel with blue low-perm, durable, integrated-coating on one side and coated fiberglass mat on the back.
3. Size: Nominal 4' x 8', special order 4' x 4'. Edges: Square.
4. Fire Resistance:
 - a. Flame spread 15, smoke developed 0, when tested in accordance with ASTM E 84. Noncombustible as described and tested in accordance with ASTM E 136.
 - b. 5/8" DensDeck DuraGuard Fireguard Type X Roof Board UL classified.
 - c. Class A when tested to UL 790. (UL classified)
 - d. Code alternate to 15-minute thermal barrier as tested to UL 1256.

2.1 Miscellaneous Materials

- A. FM or UL approved flat bottom plates and fasteners: Provide size and type in accordance with FM or UL requirements and roof membrane manufacturer's recommendations.
- B. Adhesives: As recommended by roof system manufacturer or as required by tested assembly.

Part 3 – Execution**3.0 General**

- A. Provide DensDeck® roof boards where indicated on drawings using fastening system specified.
- B. Use maximum lengths possible to minimize number of joints. Support edge joints with deck ribs. Stagger end joints of adjacent lengths of DensDeck roof boards. Ends and edges are typically butted.
- C. Use appropriate corrosion-resistant fasteners.

3.1 Roof Board Installation

- A. Adhered or Mechanically attached: As recommended by roof system and/or adhesive manufacturer or as required by FM or UL guidelines for wind uplift resistance.

3.2 Parapet (Wall) Framing and Fastening

- A. Maximum parapet framing space for 1/2" DensDeck roof boards is 16" o.c. Maximum framing for 5/8" DensDeck roof boards is 24" o.c.
- B. Fasten a maximum 8" o.c. around the perimeter and 8" o.c. on framing members in the field of the panel.

Standards and Code Compliance

- DensDeck roof boards in 1/4", 1/2" and 5/8": ASTM C 1177.
- DensDeck, DensDeck Prime and DensDeck DuraGuard roof boards meet Factory Mutual 4450 criteria for Class 1 insulated steel roof decks.
- 5/8" DensDeck Fireguard Type X Roof Board is a classified gypsum board by Underwriters Laboratories and can be used in many UL "P" and ULC "R" and S-101 assemblies.
- 1/4" DensDeck, DensDeck Prime and DensDeck DuraGuard roof boards: UL 790 Class A listing as a barrier board and UL 1256 as a thermal barrier underlayment over steel decks.
- FM, UL or other certified labs tested for uplift resistance. See wind uplift information.
- Florida Building Code #1250.
- 1/4", 1/2" and 5/8" DensDeck, DensDeck Prime and DensDeck DuraGuard roof boards. Miami-Dade County, Florida NOA # 08-0908.10.
- 1/4" DensDeck, DensDeck Prime and DensDeck DuraGuard roof boards can qualify in specific FM Class 1 assemblies.

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

For latest information and updates: **Technical Service Hotline 1.800.225.6119** or **www.gpgypsum.com** • 17

Limitations/Recommendations

- DensDeck® roof boards are designed to act with a properly designed roof system following good roofing practices. The actual use of DensDeck roof boards as a roofing component is the responsibility of the roofing system's designing authority. Georgia-Pacific Gypsum does not offer roofing system design services.
- Conditions beyond the control of Georgia-Pacific Gypsum, such as weather conditions, dew, application temperatures and techniques, may cause adverse effects with roofing systems. Always consult roofing system manufacturers for their specific instructions on applying their products to DensDeck roof boards.
- DensDeck roof board products may have temporary factory-applied packaging (plastic wrap) that must be removed upon receipt to prevent accumulation or entrapment of condensation or moisture which may cause application problems. Provide other suitable breathable weather protection for storage to keep DensDeck roof boards dry.
- Panels must be kept dry before, during and after installation. Avoid moisture accumulation through entrapped condensation. Apply only as many DensDeck roof boards as can be covered by a roof membrane system in the same day.
- Board edges and ends should be butted in typical installations. However long, uninterrupted runs of 1/4" DensDeck® Prime roof board may require slight gapping due to higher surface temperature gain.
- Accumulation of water due to leaks or condensation in or on DensDeck roof boards must be avoided during and after construction. Avoid overuse of non-vented, direct-fired heaters during winter months. Avoid application of DensDeck roof boards during rains, heavy fogs and any other conditions that may deposit moisture on the surface.
- The need for a separator sheet between the DensDeck roof boards and the roofing membrane must be determined by the roof membrane manufacturer or roofing systems designer.
- When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.
- Maximum flute span is 2-5/8" for 1/4" DensDeck roof boards; 5" for 1/2" DensDeck roof boards; and 8" for 5/8" DensDeck Fireguard Type X products.
- DensDeck, DensDeck Prime and DensDeck® DuraGuard roof boards should not be subjected to abnormal or excessive loads or foot traffic such as but not limited to use on plaza decks or under steel wheeled equipment that may fracture or damage the panels. Provide suitable roofing system protection when required.
- Independent evaluations have demonstrated that hot mopping to DensDeck products is an acceptable method of bonding membranes. **Ensure product is dry prior to commencing installation of hot asphalt application.**
 - When using DensDeck or DensDeck Prime roof boards, Georgia-Pacific Gypsum recommends maximum asphalt application temperatures for Type III asphalt of 425° to 450°F. Application temperatures above these recommended temperatures may adversely affect roof system performance. Consult and follow roofing system manufacturer's specifications for full mopping applications and temperature requirements.
 - Follow accepted roofing industry guidelines for full mopping applications such as EVT temperature guidelines, brooming and proper application rates of asphalt.
 - For application temperatures in excess of 450°F and for mopping of type IV asphalt, ribbon or spot mopping or the installation of a perforated base sheet are recommended methods of bonding asphalt in lieu of full mopping.
- For hot mopping asphalt or coal tar directly to DensDeck DuraGuard roof board, follow the manufacturer's recommended system application temperature guidelines and good roofing practices.
- DensDeck Prime roof board is the preferred substrate for torch application.* Ensure product is dry prior to commencing installation of torch application.
 - Ensure proper torching technique.
 - Limit the heat to the DensDeck Prime roof board. Maintain a majority of the torch flame directly on the roll.
 - When using DensDeck roof board in lieu of DensDeck Prime roof board, prime the surface of the DensDeck roof board and allow to dry thoroughly.*
 - When torching to DensDeck DuraGuard roof board, maintain the majority of the torch flame on the Mod Bit roll rather than on the surface of the board. Field priming should not be required.

** Independent testing has shown that field priming of standard DensDeck roof board results in higher peel strength than unprimed DensDeck roof board.*

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

18 • For latest information and updates: **Technical Service Hotline 1.800.225.6119** or **www.gpgypsum.com**

- The effect and positioning of DensDeck® DuraGuard roof board’s low-perm coating must be considered in the design of the roofing assembly.
- Confirm any priming requirements of DensDeck DuraGuard roof board with membrane manufacturer. Field priming is not expected to be needed with a number of systems.
- These recommendations and guidelines are given to help assure satisfactory product performance; they do not constitute specifications or instructions. In case of conflicting recommendations, system manufacturer’s and/or design authority’s should prevail.
- DensDeck roof boards are not intended to be used as sheathing when covered with exterior cladding. Consult our DensGlass™ Exterior Sheathing (formerly DensGlass Gold® Exterior Sheathing) brochure.

COMMONLY USED METRIC CONVERSIONS	
Gypsum Panel Thickness	Framing Spacing
1/4 in. – 6.4 mm	16 in. – 406 mm
1/2 in. – 12.7 mm	24 in. – 610 mm
5/8 in. – 15.9 mm	Fastener Spacing
1 in. – 25.4 mm	2 in. – 51 mm
Gypsum Panel Width	2.5 in. – 64 mm
2 ft. – 610 mm	7 in. – 178 mm
4 ft. – 1219 mm	8 in. – 203 mm
32 in. – 813 mm	12 in. – 305 mm
Gypsum Panel Length	16 in. – 406 mm
4 ft. – 1219 mm	24 in. – 610 mm
5 ft. – 1524 mm	Temperature
8 ft. – 2438 mm	40°F – 5°C
9 ft. – 2743 mm	50°F – 10°C
10 ft. – 3048 mm	125°F – 52°C
12 ft. – 3658 mm	

If questions arise about the use of DensDeck®, DensDeck® Prime or DensDeck® DuraGuard roof boards before, during or after the product installation and/or system application, contact the roof system manufacturer or the Georgia-Pacific Gypsum Technical Hotline at 1-800-225-6119.

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 <i>against</i> 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.



SALES INFORMATION AND ORDER PLACEMENT

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

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

Georgia-Pacific Gypsum LLC Technical Hotline
U.S.A. and Canada: **1-800-225-6119**



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



TRADEMARKS

The Georgia-Pacific logo and all trademarks are owned by or licensed to Georgia-Pacific Gypsum LLC. The GREENGUARD INDOOR AIR QUALITY CERTIFIED Mark is a registered certification mark used under license through the GREENGUARD Environmental Institute. LEED is a trademark of the U.S. Green Building Council. 'USGBC' and related logo is a trademark owned by the U.S. Green Building Council and is used by permission.

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.