

# DensDeck® Roof Boards:

DensDeck®  
DensDeck Prime™  
DensDeck DuraGuard™



# DensDeck® Roof Boards are Designed to Solve Your Problems Protect What You Create<sup>SM</sup>

DensDeck® roof boards are designed to address four persistent challenges inherent in commercial roofing assemblies: fire resistance, moisture absorption, strength and dimensional stability. DensDeck roof board is a patented glass mat-faced, noncombustible, nonstructural, treated gypsum core panel.

**DensDeck Prime™** roof board combines all the features of standard DensDeck with an enhanced surface treatment. The green surface coating makes the board more user-friendly by allowing a more uniform spread 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™** is a new, more enhanced roof board incorporating a low perm, integrated coating with all the features of DensDeck roof board. Additionally, the durable DuraGuard coating provides an ideal substrate for a wide variety of adhered roofing systems, including self-adhered and hot-mopped membranes. The coated surface assures more uniform spreading of adhesives with an even better coverage rate than DensDeck Prime and can eliminate the need for field priming with a number of systems.\*

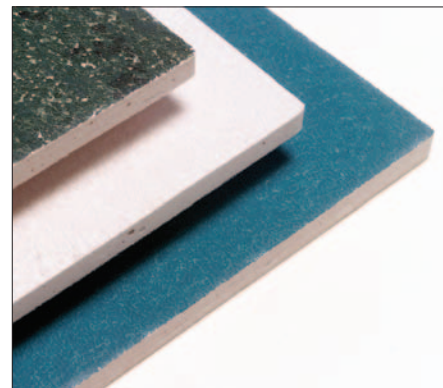
With hundreds of millions of square feet installed in a complete range of roofing systems and climate extremes, DensDeck has proven its toughness and versatility. It helps stiffen and stabilize roof decks. Its unique construction has been shown to withstand delamination, deterioration, warping and job site damage far more effectively than paper-faced gypsum board and other conventional roofing products such as wood fiberboard and perlite.

- Resists mold growth when tested, as manufactured per ASTM D 3273
- Gypsum treated core for moisture absorption resistance
- Fire- and rot-resistant
- Inorganic construction
- Holds up well under normal foot traffic
- Easy to install in all types of roof systems
- Ideal product for direct membrane application

\* Consult with membrane manufacturer for actual priming requirements

## Table of Contents

Product Description . . . . .	3
Applications . . . . .	3
Advantages . . . . .	3
DensDeck DuraGuard Features Benefits . . . . .	3
Comparison of Recommended Applications . . . . .	4
Properties, Standards and Classifications . . . . .	5-6
Competitive Roof Substrate Comparisons . . . . .	7
Flute Span Ability . . . . .	7
System Manufacturers Approvals/ Warranties . . . . .	7
Applications . . . . .	8-9
Factory Mutual Approvals . . . . .	10
UL Assemblies . . . . .	10
Long-Term Fire Protection . . . . .	11
Sound Control . . . . .	11
Elevated UL Wind Uplift Ratings with DensDeck Hot Mopped over Steel Decks . . . . .	11
DensDeck and DensDeck Prime Wind Uplift Information as Tested at Factory Mutual . . . . .	12
Fastener Patterns . . . . .	13
Architectural Specifications . . . . .	14-15



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## Product Description

G-P Gypsum engineered DensDeck roof board as a nonstructural glass mat gypsum roof board to deliver top performance in commercial roof assemblies. The fire, wind uplift and moisture absorption resistance, strength and durability of DensDeck roof boards make it the right choice for:

- Cover board
- Overlayment (fire barrier protection)
- Underlayment (thermal barrier)
- Reroof/recover board
- Separator board (heat/solvent barrier)
- New and re-roof applications
- Vapor barrier substrate
- Air barrier component

The newest DensDeck roof board, DuraGuard, has all the properties of DensDeck plus a low perm, integrated, durable coating that enhances strength of membrane system without requiring field priming.\* It is ideal for self-adhered systems.

## Applications

Roofing systems manufacturers have found that DensDeck roof board works well in all the following applications or systems:

- Single-ply (thermoplastic/elastomeric)
- Modified bitumen (torched/cold/hot mopped)
- Built-up roofing systems (asphalt/coal tar)
- Hybrid systems
- Metal roofing
- Peel and stick
- Spray foam (SPUR)
- Liquid membranes
- Tile and slate roofing systems
- Wood shake
- Parapet wall substrate

## Advantages

### Strength:

DensDeck holds up far better than the competition against wind up-lift forces, hail, foot traffic or construction damage, as well as enhancing the fire resistant properties.

- High compressive strength
- Superior hail resistance
- Excellent flute span capabilities
- Great dimensional stability
- Resistance to handling and installation damage

### Fire Protection:

DensDeck is 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)-tested, 1/2" DensDeck is the only 1/2" gypsum product that meets the calorimeter requirements for conventionally insulated steel decks. DensDeck panels are an excellent fire barrier in built-up, modified bitumen and single-ply roofing systems.

- When tested to ASTM E 84, achieved a rating of 0 flame spread and 0 smoke developed.

- 5/8" DensDeck Fireguard® can replace classified or unclassified 5/8" gypsum board in roof assemblies in the UL Fire Resistance Directory under the prefix "P."

### Moisture-resistant:

Comparative testing has demonstrated DensDeck's supremacy in moisture resistance over such alternatives as perlite and wood fiberboard.

- Resists delamination
- Dimensionally stable under varying humidity conditions
- Resists the growth of mold (per ASTM D 3273)
- Low moisture absorption

DensGuard, however, must remain dry in all stages of roof construction and performance.

### Excellent Adhesion:

A variety of roofing membranes can be directly adhered to the appropriate DensDeck roof board.

- Cold mastic modified – bitumen
- Adhered single-ply
- Spray foam adhesive systems
- Self-adhesive systems
- Hot mopped systems

## New: DensDeck DuraGuard™ Features and Benefits

Feature:	Benefit:
Low perm, durable, integrated coating	<ul style="list-style-type: none"> <li>• Enhances board strength of membrane system to board</li> <li>• Increases peel strength</li> <li>• Eliminates need for field priming*</li> <li>• Adhesives spread uniformly with better coverage</li> <li>• Ideal substrate for wide variety of adhered roof systems including self adhered and hot mopped asphalt</li> </ul>
Coated glass mats	<ul style="list-style-type: none"> <li>• Adds strength, dimensional stability, durability</li> <li>• Resists job site damage</li> <li>• Increases life cycle of roof system</li> <li>• Resists growth of mold,** which can help improve indoor air quality</li> </ul>
Moisture-resistant, treated, inorganic core	<ul style="list-style-type: none"> <li>• Added moisture protection for the system</li> </ul>

\*Consult membrane manufacturer for specific requirements. \*\*Tested, as manufactured, per ASTM D 3273.



## DensDeck® Is The Most Durable Roof Board Available

DensDeck roof boards are ideal in a wide variety of applications:

- **Churches & nursing homes** – Superior fire resistance ensures peace of mind where safety is critical.
- **Major airports** – Improved fire and sound resistance contribute to the comfort and safety of travelers.
- **Food processing plants** – Mold and moisture resistance make for a better indoor air environment.

- **National retail chains** – Improved hail resistance means less damage and lower maintenance bills for owners and managers.
- **Coastal communities** – High wind uplift resistance provides long-term protection from severe weather conditions.
- **Schools** – Improved fire resistance protects the safety of children.
- **Health care facilities** – Fire resistance and reduced potential of mold growth are important in these settings.

## Patents

DensDeck roof board is manufactured under one or more of the following U.S. patents: 4,647,496; 4,810,569; 4,879,173; 5,135,805; 5,148,645; 5,220,762; 5,319,900; 5,342,680; 5,371,989; 5,644,880; 5,704,179; 5,791,109; 5,718,785; 5,883,024; 6,001,496. Other patents pending.

## Roof System Application Recommendations

Roofing System	DensDeck	DensDeck Prime	DensDeck DuraGuard
<b>Single Ply Mech Attached</b>	<b>Recommended</b> , has all the properties needed to perform well	<b>Acceptable</b> , has the added benefit of drying a little more quickly	<b>Not recommended</b> , may create a "double vapor retarder" situation
<b>Single Ply Adhered (solvent)</b>	<b>Acceptable</b> , requires more adhesive and may result in uneven drying	<b>Recommended</b> , controlled absorption and breathable surface resists adhesive blisters	<b>Acceptable</b> , certain adhesives may not dry quickly and may cause adhesive blisters
<b>Single Ply Adhered (water based)</b>	<b>Acceptable</b> , excess adhesive use and absorption may cause uneven drying	<b>Recommended</b> , controlled absorption and ability to dry to the inside	<b>Not recommended</b> , adhesives may take too long to dry through the low perm coating
<b>Mod Bit Torched</b>	<b>Not recommended</b> , the fiberglass facer carbonizes and turns to a powder, may create a bond breaker	<b>Recommended</b> , works very well without having to field prime*	<b>Acceptable</b> , has been used successfully and creates a very strong bond; coating may blister under extended direct flame
<b>Mod Bit Cold</b>	<b>Acceptable</b> , field primer may be required to control the absorption*	<b>Recommended</b> , controlled absorption and drying of mastic	<b>Not recommended</b> , solvents in mastic may take too long to dry through the low perm coating
<b>Mod Bit Mopped</b>	<b>Acceptable</b> , has a long history, can work but may require field priming and some application temperature guidelines may have to be followed	<b>Acceptable</b> , some application temperature guidelines and procedures may have to be followed	<b>Recommended</b> , the gypsum is separated from the hot asphalt by the low perm coating
<b>BUR Ply Sheets</b>	<b>Acceptable</b> , has a long history of performing well by following application temperature guidelines	<b>Acceptable</b> , can work well by following application temperature guidelines	<b>Recommended</b> , the gypsum is separated from the hot asphalt by the low perm coating
<b>BUR Hybrid</b>	<b>Acceptable</b> , has a long history of performing well by following application temperature guidelines	<b>Acceptable</b> , can work well by following application temperature guidelines	<b>Recommended</b> , the gypsum is separated from the hot asphalt by the low perm coating
<b>Self Adhered</b>	<b>Acceptable</b> , must be field primed prior to installation of membrane	<b>Acceptable</b> , must be field primed prior to installation of membrane	<b>Recommended</b> , high strength surface and integral coating, does not require field priming*
<b>Spray Foam</b>	<b>Acceptable</b> , can work well but excess absorption of foam may be an issue; may require field priming	<b>Recommended</b> , dark surface increases foam yield and controlled absorption	<b>Acceptable</b> , darker surface increases foam yield
<b>Thermal Barrier</b>	<b>Recommended</b> , has a long history, if bonded vapor retarder is installed choose DensDeck Prime or DuraGuard for self adhesive	<b>Acceptable</b> , works well if bonded vapor retarder is used	<b>Acceptable</b> , works well if bonded vapor retarder is used; do not use if vapor retarder is not desired
<b>Fluid Applied</b>	<b>Acceptable</b> , works well but may absorb more of coating, rough surface "grabs" coating for high peel strength	<b>Acceptable</b> , works well and controls absorption of fluid applied coating	<b>Recommended</b> , controlled absorption and high strength surface

\* Confirm priming requirements with membrane manufacturer.

## Properties, Standards and Classifications

### DensDeck®

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	1.1	1.95	2.5
Surfacing	Glass mat	Glass mat	Glass mat
Flexural Strength <sup>1</sup> , parallel, lbs. min.	40	80	100
Flute Spanability <sup>2</sup>	25/8"	5"	8"
Permeance <sup>3</sup> , Perms	50	35	32
"R" Value <sup>4</sup>	.28	.56	.67
Linear Variation with Change in Temp., in/in °F	8.5x10 <sup>-6</sup>	8.5x10 <sup>-6</sup>	8.5x10 <sup>-6</sup>
Linear Variation with Change in Moisture, in/in %RH	6.25x10 <sup>-6</sup>	6.25x10 <sup>-6</sup>	6.25x10 <sup>-6</sup>
Water Absorption <sup>5</sup> , % max	10.0	10.0	10.0
Compression Strength, psi nominal	500 - 900	500 - 900	500 - 900
Surface Water Absorption <sup>5</sup> , 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 <sup>6</sup>	Mold resistant	Mold resistant	Mold resistant
FM Approvals <sup>7</sup>	60 and 90 psf uplift/ FM Class 1-90 as an overlayment	FM 1-60, 1-90, 1-135	FM 1-60, 1-90, 1-180
Bending Radius	5'	8'	12'

### DensDeck Prime™

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	1.975	2.55
Surfacing	Glass mat non-asphaltic coating	Glass mat with non-asphaltic coating	Glass mat with non-asphaltic coating
Flexural Strength <sup>1</sup> , parallel, lbs. min.	40	80	100
Flute Spanability <sup>2</sup>	25/8"	5"	8"
Permeance <sup>3</sup> , Perms	50	35	32
"R" Value <sup>4</sup>	.28	.56	.67
Linear Variation with Change in Temp., in/in °F	8.5x10 <sup>-6</sup>	8.5x10 <sup>-6</sup>	8.5x10 <sup>-6</sup>
Linear Variation with Change in Moisture, in/in %RH	6.25x10 <sup>-6</sup>	6.25x10 <sup>-6</sup>	6.25x10 <sup>-6</sup>
Water Absorption <sup>5</sup> , % max	10.0	10.0	10.0
Compression Strength, psi nominal	500 - 900	500 - 900	500 - 900
Surface Water Absorption <sup>5</sup> , 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 UL Classified "P" assemblies ULC Classified "R" assemblies ULC S-101 Class A (UL 790), ULC S-107
Mold Resistance per ASTM D 3273 <sup>6</sup>	Mold resistant	Mold resistant	Mold resistant
FM Approvals <sup>7</sup>	60 and 90 psf uplift/ FM Class 1-90 as an overlayment	FM 1-60, 1-90, 1-135	FM 1-60, 1-90, 1-180
Bending Radius	5'	8'	12'

DensDeck® DuraGuard™

Properties	1/4"	1/2"	5/8" Fireguard®
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	1.2	2.0	2.5
Surfacing Treatment to one side	Glass mat Durable, low perm coating	Glass mat Durable, low perm coating	Glass mat Durable, low perm coating
Flexural Strength <sup>1</sup> , parallel, lbs. min.	40	80	100
Flute Spanability <sup>2</sup>	2 <sup>5</sup> / <sub>8</sub> "	5"	8"
Permeance <sup>3</sup> , perms	<2	<2	<2
"R" Value <sup>4</sup>	.28	.56	.67
Linear Variation with Change in Temp., in/in °F	8.5x10 <sup>-6</sup>	8.5x10 <sup>-6</sup>	8.5x10 <sup>-6</sup>
Linear Variation with Change in Moisture, in/in %RH	6.25x10 <sup>-6</sup>	6.25x10 <sup>-6</sup>	6.25x10 <sup>-6</sup>
Water Absorption <sup>5</sup> , % max	10.0	10.0	10.0
Compression Strength, psi nominal	500 - 900	500 - 900	500 - 900
Surface Water Absorption <sup>5</sup> , grams, nominal	≤ 1.0	≤ 1.0	≤ 1.0
Flame Spread, Smoke Developed (ASTM E 84)	15/0	15/0	15/0
Fire Classification	UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	UL 1256, ULC S-126 UL Class A (UL 790) ULC S-107	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 <sup>6</sup>	Mold resistant	Mold resistant	Mold resistant
Bending Radius	8'	12'	16'

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. Tested as manufactured in accordance with ASTM D 3273.
7. Higher wind uplift ratings have been achieved by numerous membrane manufacturers using DensDeck and DensDeck Prime in their FM-Approved construction designs.

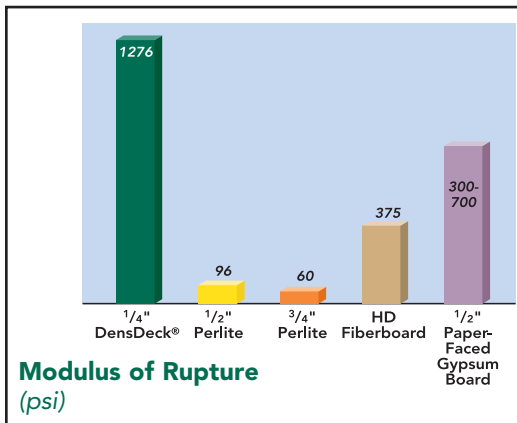
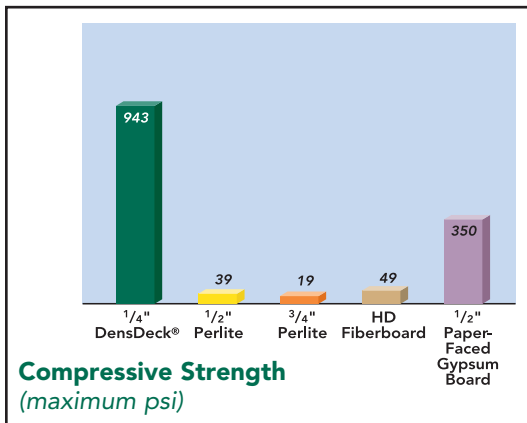
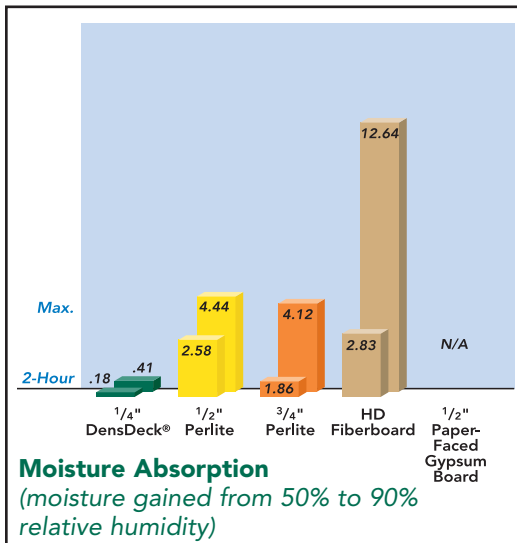
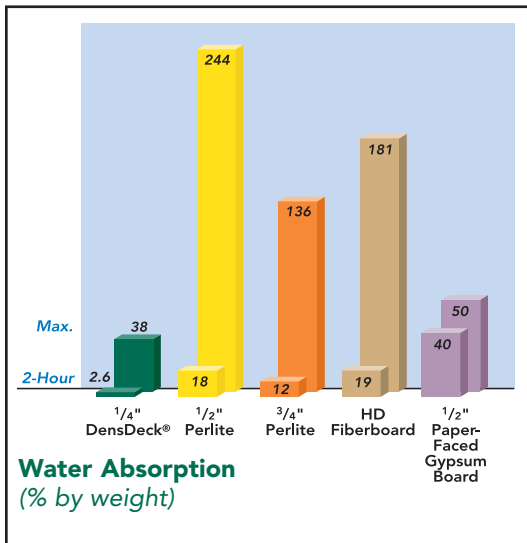
DensDeck, DensDeck Prime and DensDeck DuraGuard roof boards have achieved a very comprehensive Class A (UL 790) fire rating at Underwriters Laboratories due to their outstanding fire resistance.

- 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."

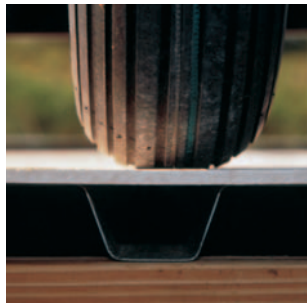
- 5/8" DensDeck Fireguard Type X roof board is classified by Underwriters Laboratories and can be used in the following UL "P" assemblies: P225, P227, P230, P232, P235, P254, P257, P259, P266, P508, P510, P512, P514, P518, P701, P713, P714, P717, P718, P719, P720, P722, P724, P725, P726, P727, P728, P729, P730, P731, P732, P733, P734, P735, P736, P738, P739, P740, P801, P803, P805, P811, P813, P814, P815, P818, P819, P824, P825, P826, P828, P921
- UL of Canada R210, R217, R221, R222, R223, R224, R225, R702, R703, R705, R804, R805, R806, R808.

- ANSI/UL 1256 Steiner Tunnel "Fire Classified Construction." This listing allows direct application on steel decking with 1/4", 1/2" or 5/8" DensDeck, DensDeck Prime or DensDeck DuraGuard roof boards under foamed plastic insulations.

### Competitive Roof Substrate Comparisons\*



### Flute Span Ability



Thickness	Span
1/4"	2 5/8"
1/2"	5"
5/8"	8"

### Results of ASTM D 3273

In tests conducted by an independent testing service, DensDeck, DensDeck Prime and DensDeck DuraGuard roof boards resist mold growth when tested, as manufactured, according to ASTM D 3273, a standard test method for mold growth. During the test, DensDeck roof boards were exposed to four weeks of moisture and temperatures favorable to mold growth.

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

### System Manufacturers Approvals/Warranties

Check the current *FM Approval Guide* from FM Approvals and *UL Roofing Materials and Systems Directory* for further joint listings from these roofing systems manufacturers:

- AFM Corp.
- Atlas Roofing Corp.
- BASF Corp.
- Bitec Inc.
- Black Warrior Roofing
- Bluestone Inc.
- Bondcote Corp.
- Burkeline Roofing Systems
- Carlisle SynTec Inc.
- Celotex Corp.
- Centimark Corp.
- Certainteed Corp.
- Commercial Innovations
- Conklin Co. Inc.
- Cooley Roofing Systems
- Custom Seal Inc.
- Duro-Last Roofing Inc.
- Ecology Roof Systems
- Environmental Roofing Systems
- ER Systems

- E S Products Inc.
- Fields Corp.
- Firestone Building Products Co.
- Flex Membrane International
- Flexible Products
- GAF Materials Corp.
- Garland Co. Inc.
- GenFlex Roofing Systems
- GS Roofing Products
- Haartz-Mason Inc.
- Henry Co.
- Hydro Stop Inc.
- Hyload Inc.
- IB Roof Systems
- Imperial Adhesives
- Intec/Permaglas
- Johns Manville
- Koppers Industries Inc.
- Lexcan Industrial Supply Ltd.
- Liquid Plastic

- Magnum Systems
- Malarkey Roofing Co.
- Monsey Bakor
- Mule-Hide Products
- NOVA Chemicals Inc.
- Performance Roof Systems
- Pittsburgh Corning Corp.
- Polyethane Systems Inc.
- Polyglass USA
- Republic Powdered Metals
- Sarnafil Inc.
- Seaman Corp. Building Systems
- Sika-Trocac
- Siplast Inc.
- Soprema Inc.
- SPI Inc.
- Stafast Roofing Products
- Stevens Roofing Systems
- Styro Chem Int. Inc.
- 2001 Inc.

- Tamko Roofing
- Tenneco
- The Garland Co.
- Thermo Mfg. Co.
- Tremco Inc.
- Tri Ply
- US Intec Inc.
- Versico Inc.
- WP Hickman Systems Inc.

## Applications for DensDeck® Roof Board

The unique physical properties of DensDeck roof board make it a high-performance, versatile, roof board for use in many commercial roofing applications.

### Cover Board

✱ **DensDeck Prime preferred for adhered system.** Minimum 1/4" DensDeck roof board placed directly below the roofing membrane. In this application the product provides the primary support for the roofing membrane and protects insulation. DensDeck may help achieve a class A, B, or C fire rating in conjunction with various membranes.

### Substrate for Vapor Retarders

✱ **DensDeck Prime preferred.** Minimum 1/4" DensDeck roof board fastened to deck. Membrane attached with cold mastics, hot asphalt or adhesives.

### Hot Mop

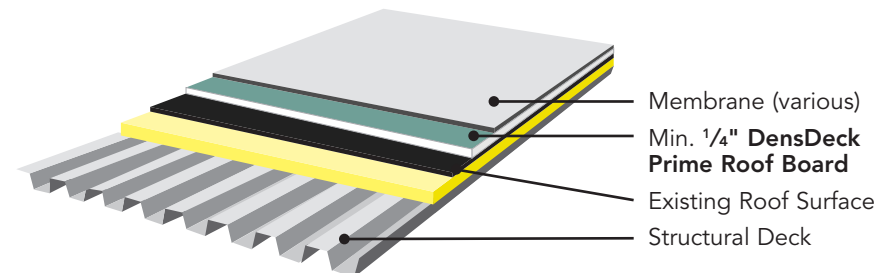
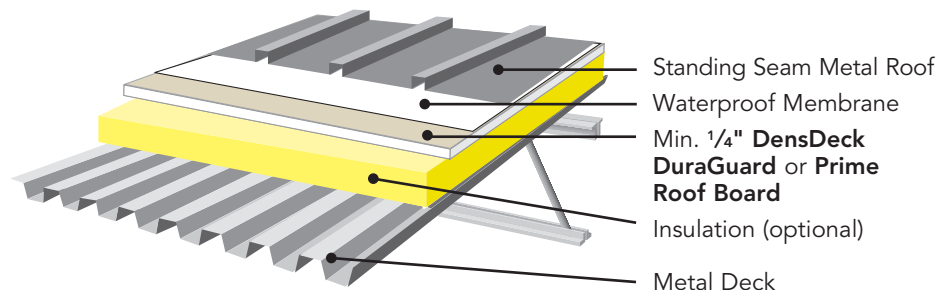
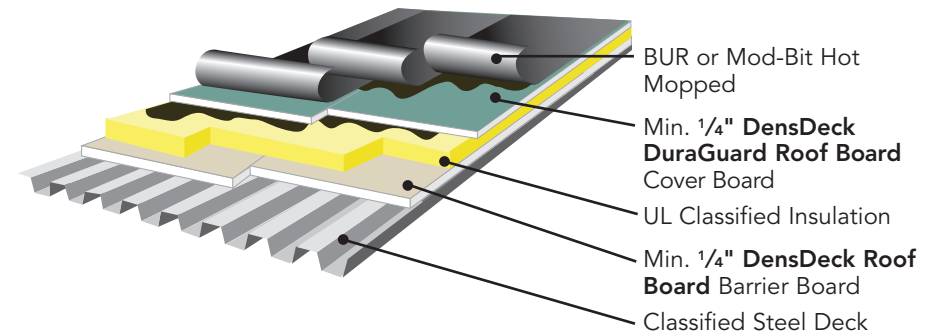
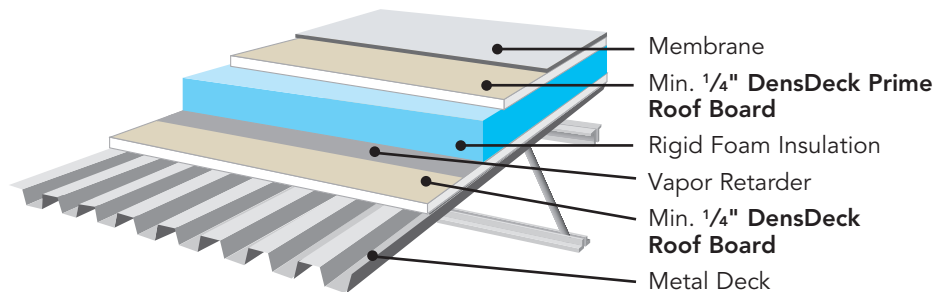
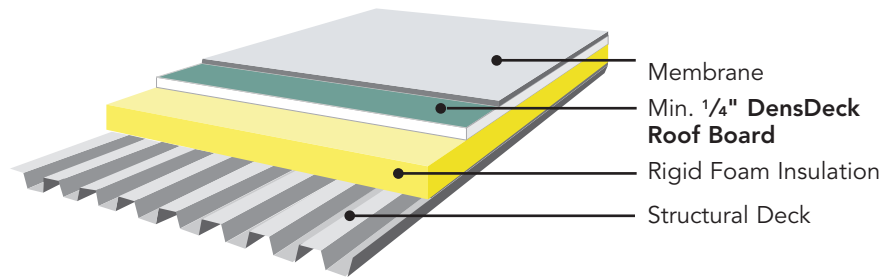
✱ **DensDeck DuraGuard preferred.** Minimum 1/4" DensDeck roof boards may be mechanically fastened, bonded with mastic or adhesives or hot mopped to foam insulation. Asphalt or coal tar built up roofing systems may then be mopped directly to the DensDeck roof boards.

### Metal or Tile Roof Thermal Barrier

✱ **DensDeck DuraGuard preferred.** Minimum 1/4" DensDeck roof boards provide a thermal barrier in conjunction with a standing-seam metal or tile roofing system while providing support for hail resistance and noise reduction.

### Roof Recover Board

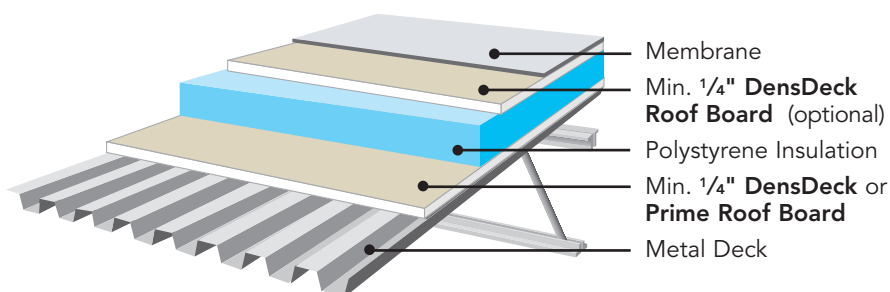
✱ **DensDeck Prime preferred for adhered systems.** Minimum 1/4" DensDeck roof board utilized as a roof recover board. Recover boards are placed over the existing membrane surface where they function as a separator and support layer between the old roof and a new roofing membrane.





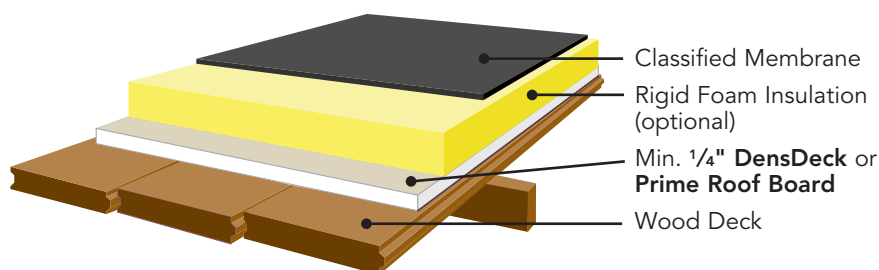
### Thermal Barrier

Minimum 1/4" DensDeck or Prime roof board provides a thermal barrier installed directly to metal deck for both expanded and extruded polystyrene insulation.



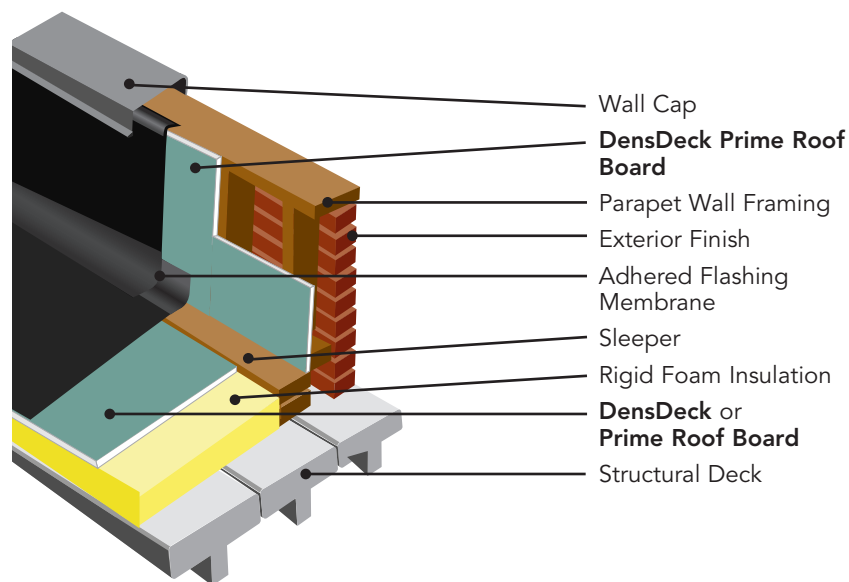
### Fire Barrier Underlayment

Minimum 1/4" DensDeck or 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.



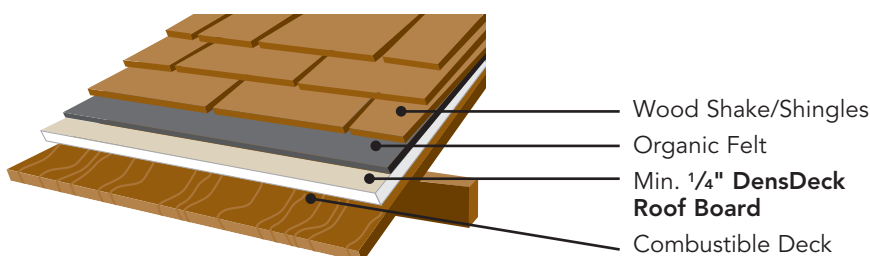
### Parapet Wall Substrate

**✳️ DensDeck Prime preferred.**  
Minimum 1/2" DensDeck roof board fastened 8" o.c. to wood or metal framing.  
(16" o.c. = 1/2"; 24" o.c. = 5/8")



### Wood Shake/Metal Shingle Underlayment

Minimum 1/4" DensDeck roof board as a wood shake/shingle underlayment on a combustible deck assembly to achieve a UL Class A fire rating.

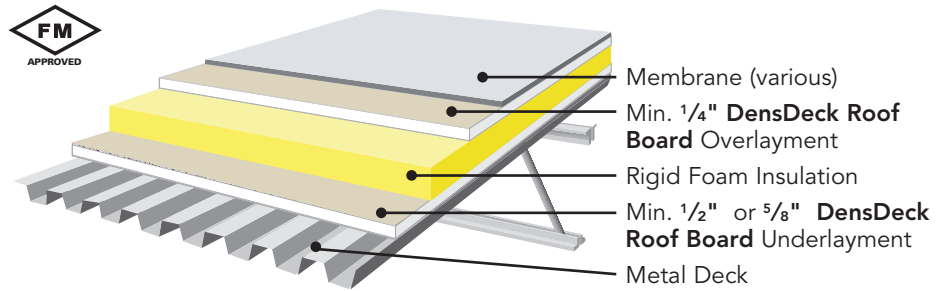


## Factory Mutual Approvals

### Typical Configuration of DensDeck or DensDeck Prime Roof Board

#### (Factory Mutual Class 1 Fire Information)

Due to the superior fire resistance of DensDeck roof board, both the 1/2" and 5/8" products meet the calorimeter test requirements of Factory Mutual. Further, 1/2" DensDeck roof board and DensDeck Prime roof board are the only 1/2" gypsum-based products that meet the requirements of this stringent fire test.



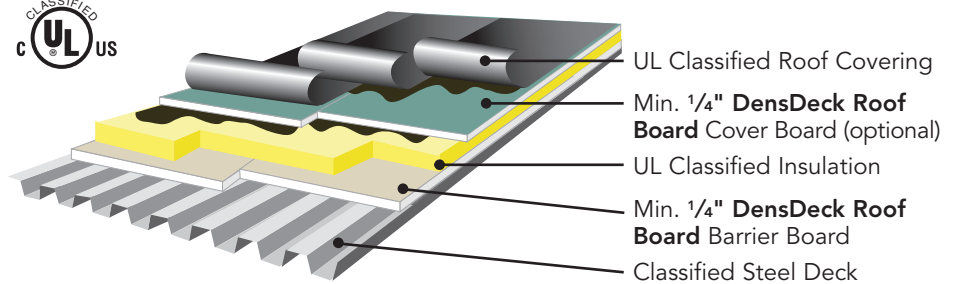
See the current *Factory Mutual Approval Guide* for descriptions of numerous approved systems and assemblies incorporating DensDeck roof board for use in approved combinations.

DensDeck roof board is typically utilized (see sketch) in these constructions as an insulation underlayment (1/2" or 5/8"). 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.

## Min. 1/4" DensDeck, DensDeck Prime, DensDeck DuraGuard Roof Boards in UL Assemblies

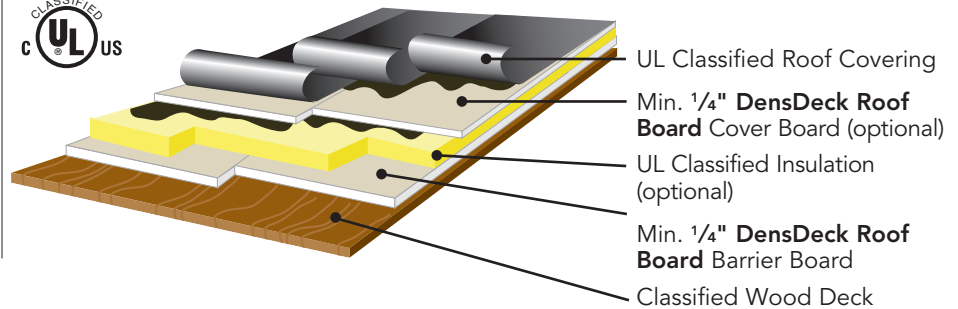
### UL 1256 Fire Barrier Board Classification

Minimum 1/4" DensDeck roof board serving as an insulation thermal barrier underlayment and an acceptable code alternative to a thermal barrier.



### UL 790 Class A Barrier Board on Combustible Decking

Minimum 1/4" DensDeck roof board serving as an insulation thermal barrier overlayment with all joints staggered a min. of 6" from the plywood joints.



#### 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.

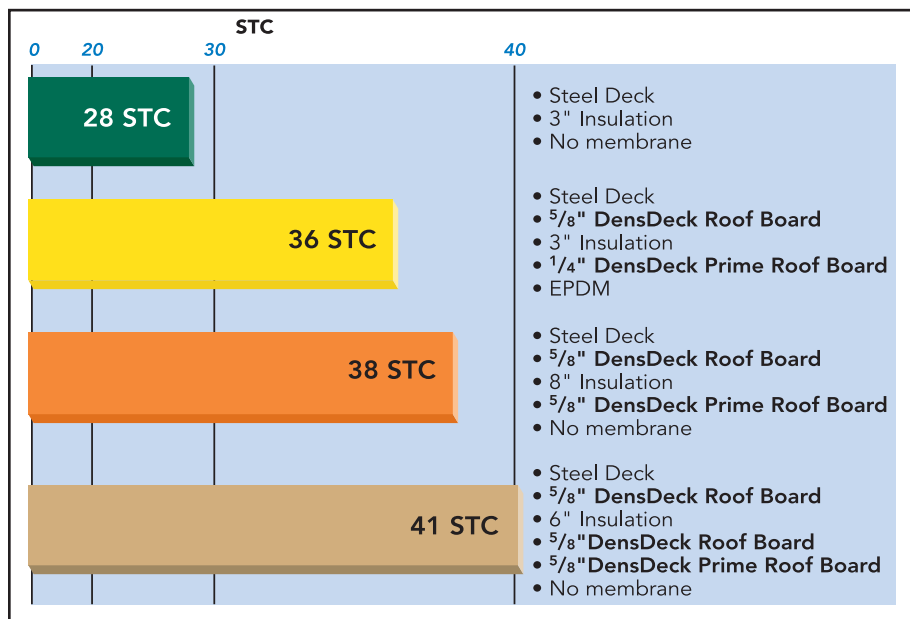
**Note 3:** The use of the DensDeck barrier board directly over the combustible deck permits the use of any classified Roofing System (TGfU) which otherwise is limited to use over non-combustible deck. When used, insulation must consist of one of the types specified.

**The use of DensDeck as an underlayment achieves a non-combustible classification on a combustible deck.**

## 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 maintain fire performance characteristics for the life of the roof. DensDeck roof boards can enhance the fire performance of a roofing assembly and can overcome limitations of the membrane or insulation.

## Sound Control



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

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

\*Typically 9 fasteners: 3" round steel plates and screws  
 \*\*Olybond 500 Adhesive: ISO down/EPDM Adhesive for Membrane

## Elevated UL Wind Uplift Ratings with DensDeck® 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:** UL classified cover 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 H" thick, loose laid

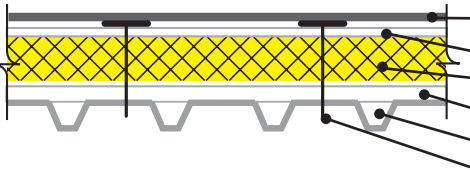
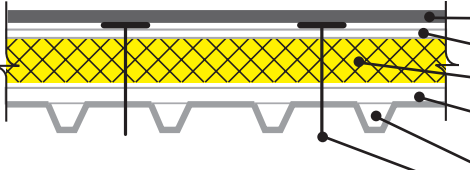
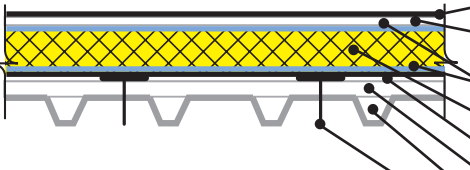
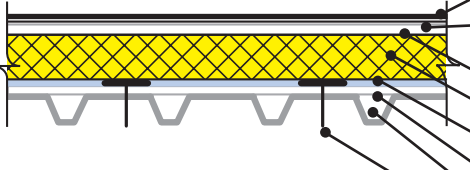
**Barrier Board:** DensDeck roof board, 5/8" thick minimum, hot-mopped

**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

The data relating to fire and sound-tested assemblies is based on the characteristics, properties and performance of materials and systems obtained under controlled test conditions as set forth under the appropriate ASTM standard, such as E 119 and E 108 (fire), E 90 (sound) or E 72 (structural).

## DensDeck® and DensDeck Prime™ Wind Uplift Information as Tested at Factory Mutual

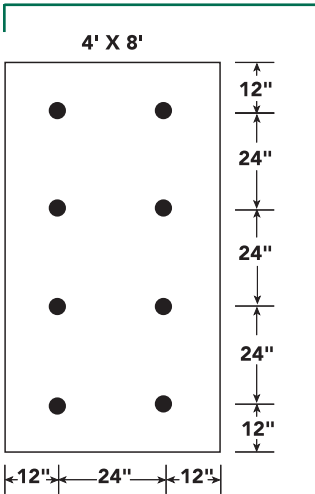
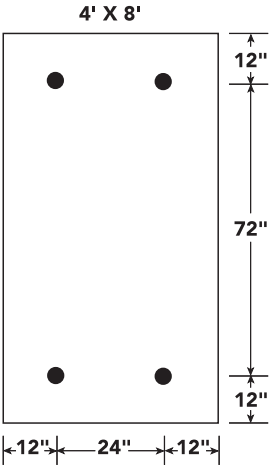
System Type and Description	Wind-Uplift	Product	# of fasteners* (4' x 8" board)
<p><b>Fully Adhered EPDM and Thermoplastic Membranes</b></p>  <ul style="list-style-type: none"> <li>Single-ply Membrane*</li> <li>Min. 1/4" DensDeck Roof Board</li> <li>Rigid Foam Insulation</li> <li>Min. 1/2" DensDeck (optional)</li> <li>Steel Deck</li> <li>Fastener (see chart)</li> </ul> <p>Single-ply and EPDM will include both reinforced and nonreinforced.</p> <p><i>*Carlisle Reinforced 45 mil TPO was used to achieve an FMRC 1-180 rating.</i></p>	FM 1-60	1/4" DensDeck	12
	FM 1-60	1/4" DensDeck Prime	12
	FM 1-60	1/2" DensDeck	10
	FM 1-60	1/2" DensDeck Prime	10
	FM 1-60	5/8" DensDeck	8
	FM 1-60	5/8" DensDeck Prime	8
	FM 1-90	1/4" DensDeck	15
	FM 1-90	1/4" DensDeck Prime	12
	FM 1-90	1/2" DensDeck	15
	FM 1-90	1/2" DensDeck Prime	12
	FM 1-90	5/8" DensDeck	8
	FM 1-90	5/8" DensDeck Prime	8
	FM 1-180*	5/8" DensDeck Prime	24
	<p><b>Modified Bitumen/BUR</b></p>  <ul style="list-style-type: none"> <li>BUR or Mod-Bit Membrane*</li> <li>Min. 1/4" DensDeck Roof Board</li> <li>Rigid Foam Insulation</li> <li>Min. 1/2" DensDeck Barrier Board (optional)</li> <li>Classified Steel Deck</li> <li>Fastener (see chart)</li> </ul> <p>Modified bitumen without base sheet. Mod. Bit is torched or set in hot asphalt. BUR is minimum 3-ply.</p> <p><i>*Siplast SBS Mod-Bit torched or set in hot asphalt was used to achieve the FM 1-135 rating.</i></p>	FM 1-60	1/4" DensDeck
FM 1-60		1/4" DensDeck Prime	8
FM 1-60		1/2" DensDeck	9
FM 1-60		1/2" DensDeck Prime	8
FM 1-60		5/8" DensDeck	8
FM 1-60		5/8" DensDeck Prime	8
FM 1-90		1/4" DensDeck	12
FM 1-90		1/4" DensDeck Prime	8
FM 1-90		1/2" DensDeck	9
FM 1-90		1/2" DensDeck Prime	8
FM 1-90		5/8" DensDeck	8
FM 1-135*		1/2" DensDeck Prime	20
<p><b>Vapor Retarder Substrate</b></p>  <ul style="list-style-type: none"> <li>Any Rated Membrane</li> <li>Min. 1/4" DensDeck Roof Board (optional)</li> <li>Adhesive</li> <li>Rigid Foam Insulation (optional)</li> <li>Vapor Retarder</li> <li>Min. 5/8" DensDeck Barrier Board</li> <li>Classified Steel Deck</li> <li>Fastener (see chart)</li> </ul> <p>Components above vapor retarder bonded with cold mastics, hot asphalt, adhesives or insta-stick.</p>		FM 1-60	5/8" DensDeck
	FM 1-60	5/8" DensDeck Prime	8
	FM 1-90	5/8" DensDeck	8
	FM 1-90	5/8" DensDeck Prime	8
<p><b>EPDM, BUR or Mod. Bit. with Insulation Attached with Asphalt Adhesive</b></p>  <ul style="list-style-type: none"> <li>EPDM, BUR or Mod. Bit. Membrane</li> <li>Min. 1/4" DensDeck Roof Board (optional)</li> <li>Asphalt Adhesive</li> <li>Rigid Foam Insulation</li> <li>Asphalt Adhesive</li> <li>Min. 1/2" DensDeck Roof Board</li> <li>Classified Steel Deck</li> <li>Fastener (see chart)</li> </ul>	FM 1-60 (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 FMRC-rated 1-60 with insulation attached with asphalt adhesive.		
	FM 1-90 (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 FMRC-rated 1-90 with insulation attached with asphalt adhesive.			

\*Fastener rates shown are for the field of the roof. Additional fasteners may be required for perimeter and corner areas. See FM Data Sheet 1-28 and 1-295.

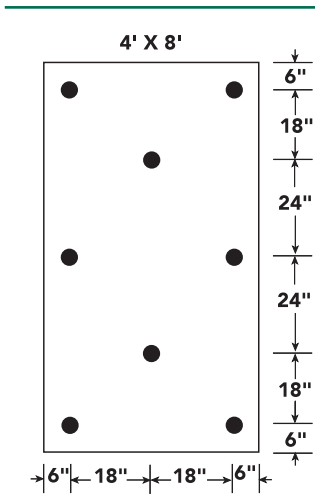
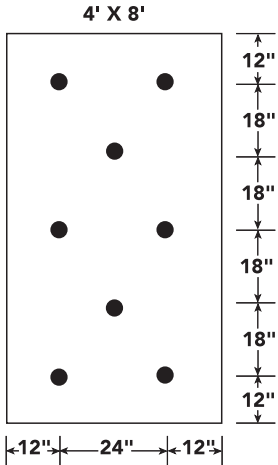


### Fastener Patterns

#### 4 fasteners per board



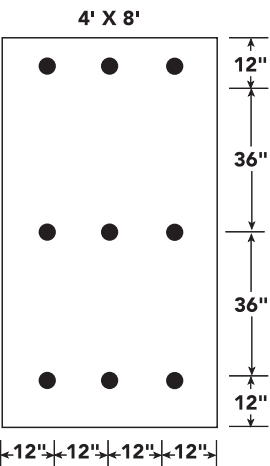
#### 8 fasteners per board



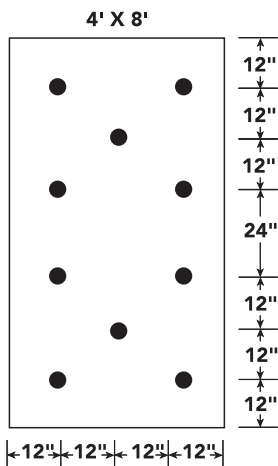
Note: Preliminary insulation or mechanically attached roof covering requires a minimum of 4 fasteners per 4' x 8' board in FM assemblies.

1/4" and 1/2" DensDeck Prime (Mod. Bit. and BUR)  
- optional -

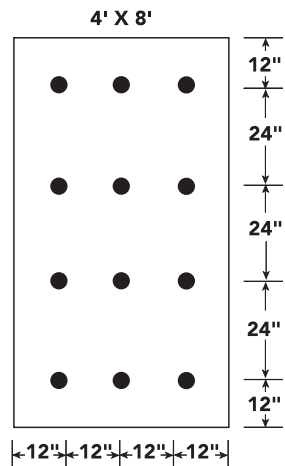
#### 9 fasteners per board



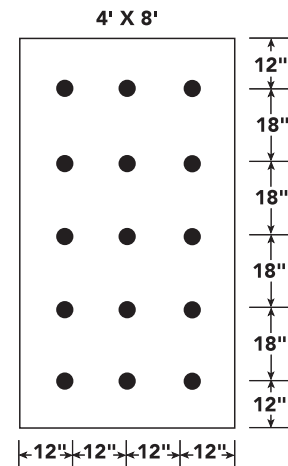
#### 10 fasteners per board



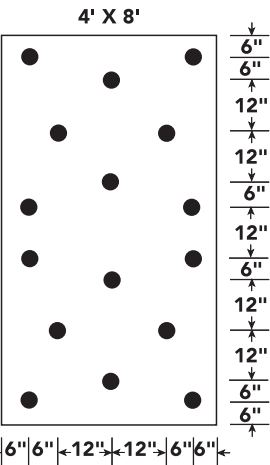
#### 12 fasteners per board



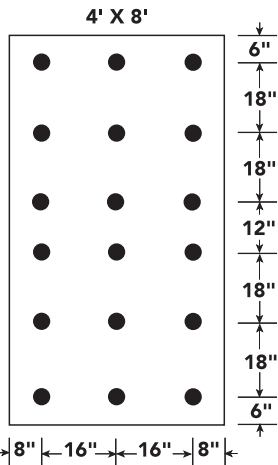
#### 15 fasteners per board



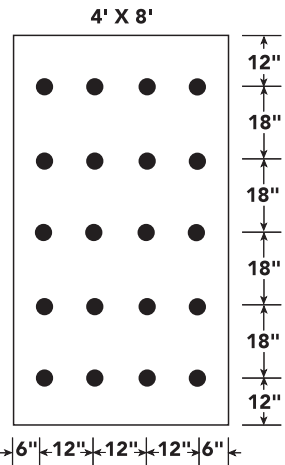
#### 16 fasteners per board



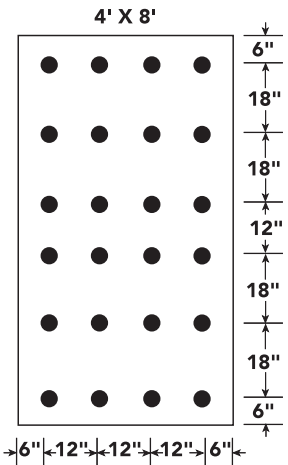
#### 18 fasteners per board



#### 20 fasteners per board



#### 24 fasteners per board



## 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.

#### 1.1 Submittals

A. *Product data*: Submit manufacturer's descriptive literature indicating material composition, thickness, sizes and fire resistance.

B. *Shop drawings*: Submit shop drawings indicating fastener and adhesive patterns for FM wind uplift resistance specified.

C. *Certification*: Submit manufacturer's written certification that product meets specified fire-resistance requirements.

#### 1.2 Delivery, Storage and Handling

A. *Delivery*: Deliver materials to the job site in manufacturer's original packaging, containers and bundles with manufacturer's brand name and identification intact and legible.

B. *Storage and handling*: DensDeck roof board must be kept dry before, during and after application. Outside storage must be off ground and protected by a breathable waterproof covering. DensDeck must be roofed the same day as laid.

#### 1.3 Limitations

A. DensDeck is designed to act with a properly designed roof system. The actual use of DensDeck as a roofing component is the responsibility of the roofing system's designing authority. G-P Gypsum does not offer roofing system design services.

B. Conditions beyond the control of G-P Gypsum, such as weather conditions, dew, application temperatures and techniques, may cause adverse effects with adhered roofing systems. Always consult roofing system manufacturers for their specific instructions on applying their products to DensDeck roof board.

C. Panels must be kept dry before, during and after installation. Apply only as much DensDeck as can be

covered by a roof membrane system in the same day.

D. Board edges and ends should be butted in typical installations.

However long, uninterrupted runs of 1/4" DensDeck Prime may require slight gapping due to higher surface temperature gain.

E. Accumulation of water due to leaks or condensation in or on DensDeck roof board **must** be avoided during construction and after construction. Avoid overuse of non-vented, direct-fired heaters during winter months. Avoid application of DensDeck during rains, heavy fogs and any other conditions that may deposit moisture on the surface.

F. The need for a separator sheet between the DensDeck roof board and the roofing membrane must be determined by the roof membrane manufacturer or roofing systems designer.

G. When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.

H. Maximum flute span is 2 5/8" for 1/4" DensDeck products; 5" for 1/2" DensDeck products; and 8" for 5/8" DensDeck Type X products.

I. DensDeck, DensDeck Prime and DensDeck DuraGuard roof board should not be subjected to abnormal or excessive loads or foot traffic such as on plaza decks or under steel wheeled equipment that may fracture or damage the panels. Provide suitable roofing system protection when required.

J. 1/4" DensDeck products are **not** recommended for vertical framed parapet applications. Use 1/2" DensDeck products for 16" o.c. and 5/8" DensDeck products for 24" o.c. with fasteners spaced 8" o.c.

K. *Hot Mopping directly to DensDeck or DensDeck Prime*:

1. Independent evaluations have demonstrated that hot mopping to DensDeck products is an acceptable method of bonding membranes.

2. When using DensDeck or DensDeck Prime, G-P recommends a maximum asphalt application temperatures for Type III asphalt of 425 to 450F. Application temperatures above these recommended temperatures may adversely affect roof system performance.

3. These recommendations and guidelines are given to help assure satisfactory product performance, they do not constitute specifications or instructions. Consult and follow roofing system manufacturer's specifications for full mopping applications and temperature requirements. In case of conflicting recommendations, system manufacturer's should prevail.

4. Follow accepted roofing industry guidelines for full mopping applications such as EVT temperature guidelines, brooming and proper applications rates of asphalt.

5. For application temperatures in excess of 450F and for mopping of type IV asphalt, ribbon or spot mopping or the installation of a perforated base sheet are acceptable methods of bonding asphalt in lieu of full mopping.

6. If questions arise about the use of DensDeck or DensDeck Prime before, during or after the product installation and/or system application, contract the system manufacturer and the G-P Gypsum Technical Hotline at 1-800-225-6119.

L. *Hot Mopping asphalt or coal tar directly to DensDeck DuraGuard*: Follow the manufacturer's recommended system application temperature guidelines and good roofing practices.

M. *Torch applied directly to DensDeck*:

1. DensDeck Prime is the preferred substrate for torch application.\*

2. Ensure proper torching technique. Limit the heat to the DensDeck Prime. Maintain a majority of the torch flame directly on the roll.

3. When using DensDeck in lieu of DensDeck Prime, prime the surface of the DensDeck and allow to dry thoroughly.\*

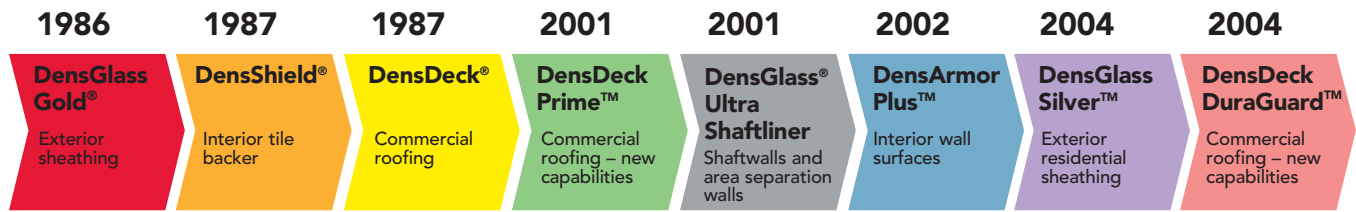
4. When torching to DensDeck DuraGuard, maintain the majority of the torch flame on the Mod-Bit roll rather than on the surface of the board. Field priming should not be required.

N. The effect and positioning of DensDeck DuraGuard's low-perm coating must be considered in the design of the roofing assembly.



# DensGuard™ Technology from G-P Gypsum

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



## Sales Information and Order Placement:

### USA

Midwest: 1.800.876.4746

South: 1.800.327.2344

Northeast: 1.800.947.4497

West: 1.800.824.7503

CANADA 1.800.387.6823

Quebec: 1.800.361.0486

[www.gpgypsum.com](http://www.gpgypsum.com)

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

Literature Requests: 1.800BUILD.GP