



INVINSA[®] & INVINSA[®] FR ROOF COVER BOARDS

Manual for Design Professionals and Contractors

INVINSA & INVINSA FR

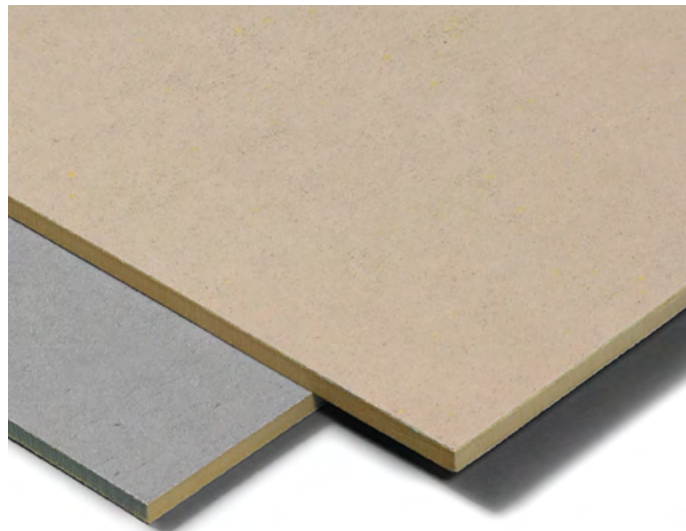
Highest Density Polyisocyanurate Cover Boards

In a roofing system, insulation provides thermal resistance, while your membrane provides waterproofing. And the best way to protect insulation, one of the most expensive material components of a roof system, is to use a cover board.

Cover boards provide performance, protection and peace of mind.

Invinsa was originally developed from customer feedback that uncovered a need for a lighter, more moisture-resistant product than gypsum-based cover boards.

As a result, and with more than 25 years of polyiso manufacturing expertise, JM led the charge in developing a HD polyiso cover board with benefits that far exceeded expectations. Invinsa meets the requirements of ASTM C 1289, Type II, Class 4, Grades 1, 2 and 3.



Typical Physical Property (C 1289 Type II, Class 4, Grade 3)	Invinsa and Invinsa FR
Compressive Strength – psi, min.	140 min (150 avg)
Dimensional Stability – % Linear Change, max.	<0.6
Dimensional Stability – % Thickness Change, max.	<4.0
Flexural Strength – psi, min.	1,500
Break Load – lbf, min.	25
Tensile Strength – psf, min.	>2,000
Water Absorption – % Vol, max.	<4.0
Water Vapor Transmission – perm, max.	<1
Minimum Thermal Resistance @ 75 +/- 2F	1.2 avg

Other major polyisocyanurate manufacturers followed our lead and now offer their own version of a HD polyiso cover board.

To meet the demand for fire-rated products, we developed Invinsa FR, the first lightweight HD polyiso board listed to achieve UL® Class A fire ratings over combustible decks for JM Single Ply Systems.

Read on to find out why design professionals and contractors should trust the proven materials from JM in their roof system.

DESIGN PROFESSIONALS

For **Design Professionals**, Invinsa can provide a technically superior roof system compared to both gypsum cover boards and other HD polyiso cover boards as demonstrated in the following charts.

Protection for the Membrane & Insulation

An important factor affecting the performance of roofing systems is the ability to resist damage from punctures that can cause leaks in a roof system.

Third-party dynamic puncture resistance testing revealed that **Invinsa outperforms other HD polyiso cover boards by as much as 83%*** when tested in accordance with ASTM D5635.

Membrane	Thickness (mil)	Board	Compressive Strength (psi)	Puncture Resistance (J)
JM TPO	60	Polyiso	20	12.5
		½" HD Board	100	20
		Invinsa	140 (min.)	22.5
	80	Polyiso	20	20
		½" HD Board	100	22.5
		Invinsa	140 (min.)	37.5
JM PVC	60	Polyiso	20	15
		½" HD Board	100	15
		Invinsa	140 (min.)	27.5
	80	Polyiso	20	22.5
		½" HD Board	100	20
		Invinsa	140 (min.)	35

*JM engaged PRI Construction Materials Technologies in Tampa, FL, an independent third party testing lab, to evaluate how various HD polyiso boards stood up to puncture loads under JM PVC and JM TPO membranes. The results confirm that Invinsa outperforms other HD polyiso boards by as much as 83%.

Performance Benefits for the Life of the System

Choosing Invinsa can significantly affect the long-term performance of the entire roof system.

Once Invinsa is installed, it provides outstanding performance benefits. Invinsa's low water absorption means fewer weather concerns during staging. Invinsa will not rot, dissolve, or support mold, and it maintains its integrity under adverse weather conditions for the life of the system.

CONTRACTORS

For **Contractors**, Invinsa can help get to the lowest installed cost, and is easy to work with.

Protection from the Human Factor

Without a cover board to protect the roof from the damaging effects of repetitive foot traffic and heavy carts, the membrane and insulation are at risk for damage.

Invinsa provides the highest grade protection of all HD polyiso cover boards by meeting ASTM C1289, Type II, Class 4, Grade 3, protecting the roof better than gypsum and other HD polyiso cover boards. To demonstrate Invinsa's resistance to the damage of foot traffic, a third party tester conducted a Robinson-type floor test. The testing showed that **Invinsa resisted damage 2.4 times longer than the ½" Grade 2 HD polyiso** at 75 pounds per wheel, and 7 times longer than ¼" glass-faced gypsum at 100 pounds per wheel during a test of Invinsa, gypsum and other HD polyiso boards.

	Invinsa	Gypsum	Invinsa	1/2" HD Polyiso
Revolutions completed before facer failure	7x	–	2.4x	–
Wheel Weight (lb)	100		75	

When Time is Money

Choosing Invinsa over gypsum can significantly affect the bottom line of every project, because it's lighter weight, easier to cut, creates less dust and waste and uses less adhesive.

Each of the following incremental costs adds up to big savings over time.

Easier to Carry & Move

At 12 lb on average, ¼" Invinsa is about a third of the weight of ¼" gypsum boards.*

	1/4" Invinsa	1/4" Invinsa FR	1/4" Gypsum	1/2" Gypsum	5/8" Gypsum
4 ft x 8 ft Board Weight (lb)	12	13	38-50	64-88	80-102
Weight per 1,000 SQs (lb)	38,000	41,000	138,000	238,000	284,000
Extra weight (dead load)	N/A	N/A	100,000	200,000	246,000

*A 4 ft x 8 ft board of Invinsa weighs only 12 lb. A 1/4", 4 ft x 8 ft gypsum board weighs 38-50 lb.

Equal to 50 tons of extra weight!

DESIGN PROFESSIONALS

This water absorption chart shows how Invinsa compares to gypsum and how this relates to pounds of water in your roof system if a leak has infiltrated the system:

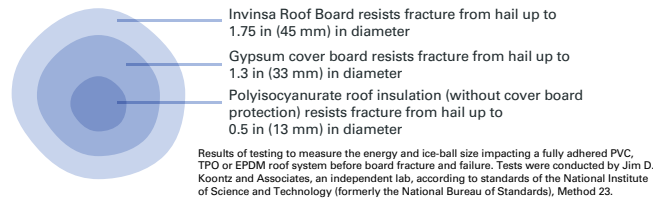
	1/4" Invinsa	1/4" Invinsa FR	1/4" Gypsum	1/2" Gypsum	5/8" Gypsum
Water Absorption % vol Invinsa, % wt Gypsum	2	4	10	10	10
Water Absorbed per 4 ft x 8 ft board (lb)	0.8	1.7	3.8-5.2	6.4-8.8	8.0-10.2
Extra Weight From Water on 1,000 SQs (lb)	260	520	1,600	2,800	3,200

Equal to 1 ton additional weight

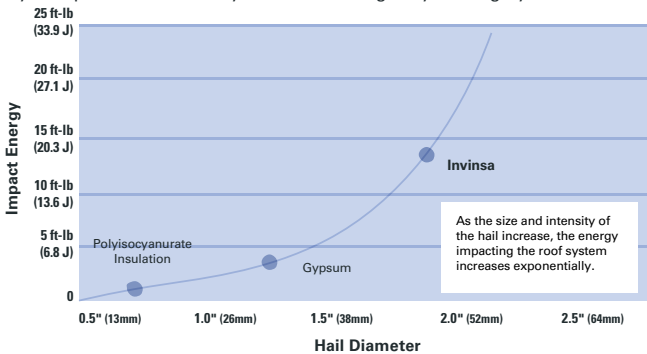
Hail can be one of the most damaging weather elements to a roof system. Invinsa works as a protective layer between the membrane and insulation to resist the destructive forces of fracture caused by hail. This graphic shows how Invinsa improves impact resistance from hail better than glass-faced gypsum.

Hail...

The right cover board increases a roof's ability to resist fracture from impact.



System performance in fully adhered JM Single Ply Roofing Systems



R-Value Reminder

The primary financial investment in a roof is almost always the high R-value per inch insulation. Why protect that investment with a cover board that doesn't provide the puncture and foot traffic resistance that Invinsa does, just to gain an extra tenth of system R-value?

In most cases, you can get a superior system with Invinsa at a comparable R-value and cost. Also, cover boards report R-values, not LTRR values.

R-value is not an LTRR value. R-value is only a snapshot in time and has not been evaluated for its long term value;

CONTRACTORS

The lighter weight also means that more boards of Invinsa can be shipped per truckload, saving on fuel and transportation costs. Because it takes fewer trucks to bring Invinsa to a job site, logistics become easier. There are fewer trucks needed to ship 1,000 SQs of Invinsa, and therefore fewer chances for a late or missed truck.

This table shows that 922 SQs of 1/4" Invinsa can ship per standard flatbed compared to only 272 SQs to 376 SQs of 1/4" gypsum products per truckload for a 1,000 SQ job:

	1/4" Invinsa	1/4" Invinsa FR	1/4" Gypsum	1/2" Gypsum	5/8" Gypsum
4 ft x 8 ft Board – SQs per TL	922	922	<400	<250	<200
Trucks / 1,000 SQs	2	2	4	6	8

Invinsa is easier to carry and maneuver around the roof, and pallets don't need to be broken down or redistributed like gypsum products. This chart shows how using Invinsa allows for reduced crane time with lower hoisting and staging costs for a 1,000 SQ job:

	1/4" Invinsa	1/4" Invinsa FR	1/4" Gypsum	1/2" Gypsum	5/8" Gypsum
# of Pallets per 1,000 SQs	104	104	63	104	130
Pallets Loaded per Hr	21	21	4	4	4
Hoisting – Fork-Lift / Crane (Hrs)	5	5	17	28	35
Loading – Man Hrs	9	9	33	56	69
Staging – Man Hrs	14	14	63	83	104

In fact, it takes about half the amount of time to place and fasten Invinsa as demonstrated when compared to gypsum for a mechanically fastened single ply system:

	1/4" Invinsa	1/4" Invinsa FR	1/4" Gypsum	1/2" Gypsum	5/8" Gypsum
Man Hrs per SQ	.065	.065	.12	.12	.12
Man Hrs per 1,000 SQs	65	65	120	120	120

Easier to Cut, Less Dust and Waste

Working with Invinsa is easy. It's fast to score, cut and snap each board, permitting fast, tight fabrication around roof penetrations with no special tools. **In fact, Invinsa is up to 30% faster as demonstrated to install than gypsum.**

Because Invinsa is a closed cell, high-density polyiso product, there is virtually no dust when cutting the board. In addition, the coated glass-mat facing does not itch as much as gypsum products, which means better overall worker satisfaction and improved productivity:

	1/4" Invinsa	1/4" Invinsa FR	1/4" Gypsum	1/2" Gypsum	5/8" Gypsum
Detail Man Hrs per 1,000 SQs	20	20	27	27	27
Clean-up Man Hrs per 1,000 SQs	20	20	27	27	27

DESIGN PROFESSIONALS

therefore you may be getting nothing extra over the life of the roof when specifying a higher R-value cover board.

This analysis shows that system R-value and overall thickness can be maintained when using Invinsa compared to 1/2" HD polyiso cover boards, providing higher performance and higher LTTR value insulation system:

	1/4" Invinsa	1/2" HD Polyiso Grades 1 & 2
Board R-value Note: LTTR value is not the same as R-value Cover boards do not report LTTR values	1.2	2.5
2 layers, 2.0" LTTR Value		22.8
2 layers, 2.1" LTTR Value	24.0	
Cover Board/Insulation R-value	25.2	25.3
Overall Insulation/Cover Board Thickness	4.5	4.5

Big Savings in Structural Design

When considering the building's structural design, Invinsa will contribute less dead load to the roof compared to gypsum boards.

At 12 lb on average, 1/4" Invinsa is about a third of the weight of 1/4" Gypsum boards.*

	1/4" Invinsa	1/4" Invinsa FR	1/4" Gypsum	1/2" Gypsum	5/8" Gypsum
4 ft x 8 ft Board Weight (lb)	12	13	38-50	64-88	80-102
Weight per 1,000 SQs (lb)	38,000	41,000	138,000	238,000	284,000
Extra weight (dead load)	N/A	N/A	100,000	200,000	246,000

*A 4 ft x 8 ft board of Invinsa weighs only 12 lb. A 1/4", 4 ft x 8 ft gypsum board weighs 38-50 lb.

Equal to 50 tons of extra weight

The lighter weight also means that more boards of Invinsa can be shipped per truckload, reducing the carbon emissions generated from transportation sources. Because it takes fewer trucks to bring Invinsa to a job site, logistics become easier. Fewer trucks mean less disruption to building operations, occupants, and even the local community.

CONTRACTORS

Also, compared to heavier, more brittle gypsum products, Invinsa creates less scrap and waste.

Adhesive Absorption

The coated glass-mat on Invinsa provides a smooth closed-surface and low-dust environment resulting in less adhesive usage and no additional priming of the board:

Suggested Coverage Rate Ranges

	Ft ² /gal (gal/SQ)				
	90 (1.11)	80 (1.25)	70 (1.43)	60 (1.67)	50 (2.0)
Solvent-Based or Low-VOC/Solvent-Based					
Water-Based	130 (0.77)	120 (0.83)	110 (0.91)	100 (1.0)	90 (1.11)
	◀ Less Adhesive More Adhesive ▶				
Insulation and Cover Boards	Invinsa				
	SECUROCK Gypsum Fiber Roof Board				
	DensDeck Prime				
	ENRGY 3				
	Wood Fiber DensDeck				

Notes:

- Listed rates are for finished roofing areas.
- See JM requirements for correct application method.
- Two-Sided Application: Most applications apply approximately half the listed rate to the membrane and the other half to the substrate. For porous substrates such as wood and gypsum, apply more adhesive on the substrate.



DESIGN PROFESSIONALS

This table shows that 922 SQs of 1/4" Invinsa can ship per standard flatbed compared to only 272 SQs to 376 SQs of 1/4" gypsum products per truckload for a 1,000 SQ job:

	1/4" Invinsa	1/4" Invinsa FR	1/4" Gypsum	1/2" Gypsum	5/8" Gypsum
4 ft x 8 ft Board – SQs per TL	922	922	<400	<250	<200
Trucks / 1,000 SQs	2	2	4	6	8

A Versatile Choice

This means that in re-roof applications, Invinsa can even accommodate minor irregularities found in many existing roof decks.

Flexibility also means that Invinsa can be used as a substrate for parapet walls and other applications in addition to being used as a roof cover board.

CONTRACTORS



More Flexibility for Every Project

A more flexible product means less breakage during handling, which results in less waste, and less waste removal as demonstrated in the previous charts.

Invinsa FR

UL Class A Fire Rated

In addition to the benefits of Invinsa, our fire-resistant product, Invinsa FR, is the only lightweight HD polyiso cover board capable of achieving UL Class A fire ratings over combustible decks for JM Single Ply Systems. This provides design professionals and contractors a choice other than gypsum products for their combustible deck cover board needs.

Deck	Class	Max. Slope in/ft	Membrane	Insulation	Cover Board	Attachment Method
Combustible	A	1/2	JM TPO	ENERGY 3 (Optional – can be installed above or below Invinsa FR)	Invinsa FR	Fully Adhered (SB, WB)
		1	JM TPO			Mechanically Fastened
		1/2	JM TPO FB			Mechanically Fastened
		1	JM PVC			Fully Adhered (LV, WB)
		2	JM PVC FB			Fully Adhered (LV, WB)
		2	JM PVC SD			Fully Adhered (LV, WB)
		2	JM PVC			Mechanically Fastened
		2	JM PVC SD			Mechanically Fastened
		2	JM EPDM NR			Fully Adhered (SB, LV)
		1	JM EPDM NR			Fully Adhered (WB)
		3/4	JM EPDM R			Fully Adhered (WB)
		1	JM EPDM R			Fully Adhered (SB, LV)
		3/4	JM EPDM R			Mechanically Fastened
		B	2			JM TPO

Membrane Notes

FB =	Fleece-Backed
NR =	Nonreinforced
R =	Reinforced

Attachment Method

SB =	Solvent Based
WB =	Water Based
JV =	Low VOC

For additional information on Invinsa and Invinsa FR, including product literature, case studies and demonstration videos, go to www.JM.com



717 17th St. Denver, CO 80202
800-922-5922
www.JM.com