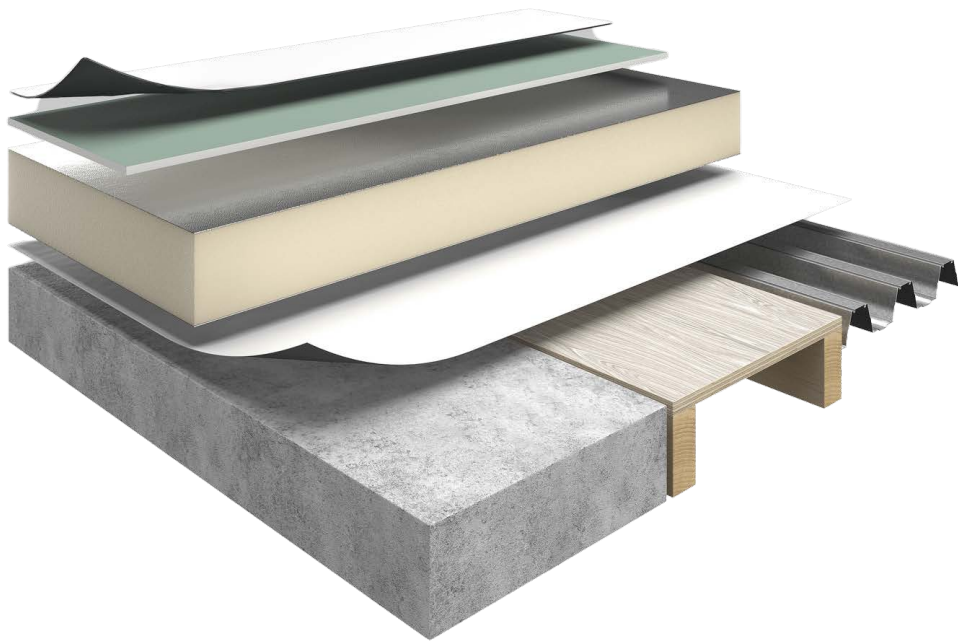


ALLCO ALLTHERM WARMROOF SYSTEM TPO BUILD UP

COMPLIANCE DOCUMENTS



DOCUMENT INDEX

1. Glue Guru Bit-U-Prime vapour barrier primer.
2. Johns Manville vapour barrier.
3. Glue Guru Roof-Tac adhesive.
4. Conqueror PIR insulation board.
5. Georgia Pacific DensDeck Prime cover board.
6. Johns Manville TPO.
7. Allco Alltherm BRANZ appraisal.
8. AFS Concrete substrate test report.
9. Glue Guru Bit-U-Prime warranty.
10. Glue Guru Roof-Tac warranty

PRODUCT DOCUMENT SUMMARY

1. Cantac Bit-U-Prime. Sprayable bitumen primer formulated to prepare substrates for the installation of bitumen membranes for roofing. Supplied in 17kg canisters, Low VOC.
2. JM Vapour barrier. Tri-laminate woven polyethylene SBS rubber and asphalt blend membrane. Suitable for use on concrete and plywood substrates.
3. Cantac Roof-Tac. Sprayable rubber-based adhesive formulated for bonding roofing membranes. Supplied in 17kg canisters, Low VOC
4. Conqueror PIR. Polyisocyanurate (PIR) insulation panels. PIR insulation core is sandwiched between 2 sheets of high-performance foil facings.
5. Georgia Pacific DensDeck cover board. An exceptional fire barrier, thermal barrier and recovery board used in various commercial and residential roofing systems. Roof board design employs fibreglass mats front and back that are mechanically bonded to a high-density gypsum core, providing excellent fire resistance and wind uplift properties.

6. Johns Manville TPO. Single ply fabric reinforced thermoplastic polyolefin sheet membrane which be applied as a fully bonded system with heat welded seams.
7. Allco Alltherm BRANZ Appraisal 1166.
8. All Façade Services. Uplift test results for Allco Alltherm warmroof system installed on concrete substrate.
9. Glue Guru Bit-U-Prime 20-year product warranty.
10. Glue Guru Roof-Tac Adhesive 20-year product warranty.
Casali BBA 95 certification including uplift test results.

ALLCO ALLTHERM WARMROOF BUILD-UP

1. Glue Guru Cantac Bit-U-Prime vapour barrier primer.
2. Johns Manville vapour barrier.
3. Glue Guru Roof-Tac adhesive.
4. Conqueror PIR insulation board.
5. Glue Guru Roof-Tac adhesive.
6. Georgia Pacific DensDeck roof cover board.
7. Glue Guru Roof-Tac adhesive.
8. Johns Manville TPO membrane.

BIT-U-PRIME

CANTAC BIT-U-PRIME is an industrial strength bitumen primer formulated to prepare substrates for the installation of bitumen membranes for roofing, decking and other structures. Bit-U-Prime can also be used with a wide range of membranes and applications to optimise adhesion.

BIT-U-PRIME can be sprayed directly onto timber, concrete, metal, mastic and flashing materials.

BIT-U-PRIME can also be used to prime and prepare potholes for the repair of asphalt.



USES

- Primes and seals new and existing roofs, decks and other structures with better adhesion of primers, tapes and membranes including bitumen felt and flashings.
- Primer can be used with a wide range of other roofing membranes and other applications where a surface is difficult for a bonding agent to adhere to.

FEATURES

- ✓ Improves Waterproofing
- ✓ High Coverage
- ✓ Easy Application
- ✓ Improves Bond Strength
- ✓ Fast Drying
- ✓ Waterproof
- ✓ Minimal Preparation Required

THE CANISTER ADVANTAGE

- CANTAC's self contained, environmentally friendly, portable canister system was designed for ease of use.
- The canister, equipped with a reusable gun and hose, eliminates the need for air assisted primer application systems.
- No power or compressor is required!
- This approach significantly reduces set up and clean-up time. The canister system is almost maintenance free. No solvent is needed to flush out guns and messy pressure pots.
- The spray pattern is consistent, delivering perfect results every time which eliminates human error caused by inconsistent spray patterns. Its portability enables you to easily apply the primer on site.
- Once you have emptied the eco friendly canister, simply attach your gun and hose to a new one. The empty canister is made from recyclable steel and can be easily recycled making it more environmentally friendly than traditional plastic containers.

PHYSICAL & CHEMICAL PROPERTIES

Chemical Description	Black Bitumen Based Primer	Minimum Open Time	1 - 5 mins
Odour	Minimal Solvent Odour	Maximum Open Time	24 hours (best results within 1hr)
Appearance	Black Liquid	Heat Resistance	-40 – +120°C
Solids Content	High Solid Content	Cleaner	Citrus Cleaner or Acetone
Viscosity	Sprayable Grade	Flash Point	Extremely Flammable
Coverage	17kg Canister: 250 sm Single Sided <small>(Guide only: Coverage depends on absorbency of substrate and coating weight. Generally the heavier the coating weight the stronger the bond.)</small>	Specific Density	0.70kg per ltr +/- 5%
		Size	17kg Recyclable Canister

DIRECTIONS FOR USE

1. For best results all surfaces to be primed must be clean, dry and free from dirt, dust, oil, loose paint, wax and grease. The temperature of the primer and the surfaces being bonded should be between 15°C - 27°C.
2. Attach the larger end of the hose to the spray gun and tighten securely, attach the smaller end of the hose to the canister valve securely.
3. Slowly open the canister valve and inspect the connections for any leaks. Tighten if needed. Fully open the valve.
4. Unscrew the trigger stop nut on the gun and spray a test pattern. Adjust nut to vary primer output.

PRIMER APPLICATION

Hold the applicator 150-250mm away from the surface and apply an even coat of primer to one surface with a coating weight of approximately 80-100% of the surface. Allow primer to dry until tacky (2-5mins).

Note: Test for tackiness by gently touching the primer with your knuckle. If the primer transfers to your skin it is too wet. If the primer is tacky and does not transfer to your skin, it is ready to bond. If the primer is dry or has very little tack, it is too dry and another coat of primer should be applied. Porous substrates may require additional coats. High strength of critical bonds may require two coats per surface.

Apply even pressure over the entire surface to ensure intimate contact. Pressure may be applied by mechanical presses, nip rollers or hand rollers. Insufficient pressure will result in poor bonds.

CLEAN UP

Clean tip after use with CANTAC Citrus Cleaner. Excess primer and overspray may be removed with CANTAC Citrus Cleaner, Acetone, WOODLOK GLAZE-AWAY & DSOLV-AWAY, GLUE GURU 05CR or most Industrial Solvents.

EQUIPMENT SHUT DOWN / STORAGE

Screw the trigger stop adjustment nut all the way to the trigger lock position.

DO NOT disconnect the hose until the canister is completely empty and ready to attach to another canister.

The canister system can be stored as long as the canister as been left on the and gun is in the lock out position by using the adjustment nut.

Alternatively remove the tip and soak in solvent, spray a small amount of primer through the gun and hose every 1-2 months to ensure there is no thickened primer in the hose.

TROUBLESHOOTING

COLD WEATHER PROBLEMS

EFFECTS OF COLD WEATHER AND CANISTERS

The primer in the canister will thicken as temperatures get colder. The propellants used will decrease in pressure and therefore effectiveness. The propellants may condense and reduce the effective amount of available pressure in the canister. This will adversely affect the spray pattern and consequently, the performance of the primer.

HOW TO ELIMINATE COLD WEATHER PROBLEMS

1. Store the canisters in a controlled environment with temperatures between 15°C and 27°C.
2. Keep canisters off cold concrete floors and away from outside walls.
3. Allow additional time for solvents and propellants to flash off when temperatures are below 15°C.
4. If the canisters are too cold for use, they can be brought up to room temperature by submerging them up to the valve in warm water or by attaching a heater belt. Once the canisters equilibrate to at least 15°C, the products will perform as normal.

APPLICATOR – HOSE BLOCK CHECK LIST

IF THE SYSTEM SPRAYS POORLY, OR NOT AT ALL:

The sequence below runs through to a complete clog in the canister valve. If at any time during the sequence the problem is resolved, stop, clean the needed parts, put the system back together, and you are finished.

1. Make sure the canister is not empty.
2. Make sure the canister valve is open.
3. Close the spray gun trigger stop adjusting nut and clean the nozzle tip. (Does it spray now?)
4. Take off the nozzle and try spraying (Does it spray now?). Clean the nozzle.
5. Shut off the canister valve. Carefully and slowly, loosen the spray gun/hose connection and look for primer to squirt out. If primer starts to leak out, allow it to slowly continue to do so until it stops. (This will be messy but you will need to bleed off the pressurised primer to clean the spray gun). The spray gun has a clog at the valve, stem or inlet area and needs to be cleaned.
6. If nothing leaks out after fully loosening the spray gun, carefully remove the spray gun, realising that the hose may be clogged but could be full of primer and pressure depending on where the clog is. (Secure the open end of the hose into a bucket in case the clog releases and the system flushes).
7. Carefully and slowly loosen the hose connection at the canister valve. Look for primer to squirt out. If primer starts to leak out, allow it to slowly continue to do so until it stops. (This will be messy but you will need to bleed off the pressurised primer in the hose.) Clean or replace the hose.
8. With everything now isolated from the canister, place a bucket in front of the canister valve and slowly open to see if any primer comes out. If it does, put the cleaned system parts back together. If it does not, there is something wrong with the canister valve and it should be returned.

SOLVENTS THAT CAN BE USED FOR CLEANING THE NOZZLE, SPRAY GUN:

CANTAC Citrus Cleaner, Acetone, Toluene, WOODLOK GLAZE-AWAY & DSOLV-AWAY, GLUE GURU 05CR or most Industrial Solvents.

FOR CLEANING THE HOSE:

Keep the hose connected to a gun and canister that is turned on. This keeps the primer inside the hose pressurized and prevents blockages.

HEALTH & SAFETY

Refer to the Material Safety Data Sheet for health and safety information before using this product.

HANDLING & STORAGE

Product should be stored between 5°C and 25°C on a wooden pallet and kept from freezing. Keep out of direct sunlight and away from sources of heat. If the product has been left for prolonged periods between uses, agitating is recommended.

DISPOSAL

Canister disposal: Use extreme caution. Empty canister completely. Puncture the friable disc on the canister using a non-spark producing tool. Dispose of the scrap metal in accordance with local regulations.

SHELF LIFE

Best used within 18 months from date of manufacture when stored under the above conditions in the original unopened containers.

TESTING

Always test the suitability of the product for your application before use.

OTHER CANTAC PRODUCTS

HSE-TAC

Premium high strength contact with low odour. Extra long open time for high volume applications.

HSE-BIO

Premium high strength contact adhesive with low odour, double pressurized with extra-long open time for high volume applications. Greenstar approved.

POLY-TAC

Industrial strength, polystyrene safe contact adhesive for bonding polystyrene to itself and many other materials.

HIGH-TAC

High strength, high heat resistant contact adhesive for high pressure laminates, upholstery & most wall & floor coverings.

ULTRA-TAC

Pressure sensitive adhesive with exceptional tack for insulation materials.

ROOF-TAC

Premium high strength contact adhesive for TPO, EPDM, PVC and other rubber roofing membranes.

CITRUS CLEANER

Cleans gun tips and removes a variety of adhesives and tape residue.



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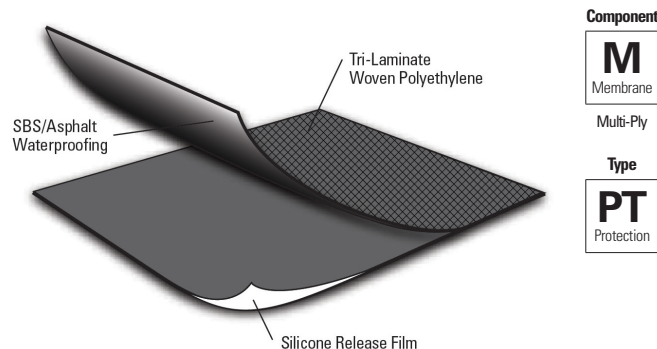


Features and Components

Tri-laminate woven polyethylene, nonslip, UV-protected top surface: Provides temporary weather protection for 90 days. Provides high tensile strength and puncture resistance.

Self-sealing, high-quality SBS rubber and asphalt blend: Provides low air and vapor permeability.

Silicone release film: Allows for ease of self-adhering installation.



System Compatibility This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR		APP			SBS				
	HA	CA	HW	HA	CA	HW	SA	MF		
	Compatible with all multi-ply systems*									

Single Ply	TPO				PVC			EPDM		
	MF	AD	SA	IW	MF	AD	IW	MF	AD	BA
	Compatible with all single ply systems above*									

Key: HA = Hot Applied CA = Cold Applied HW = Heat Weldable SA = Self Adhered MF = Mechanically Fastened IW = Induction Weld BA = Ballasted AD = Adhered

* This product is compatible with all systems when used as a vapor barrier.

** Do not apply hot asphalt to this product.

Energy and the Environment

Pre-Consumer Recycled Content	0%
Post-Consumer Recycled Content	0%

Peak Advantage® Guarantee Information

Systems	Guarantee Term
When used as a vapor barrier in most JM systems.*	10, 15 or 20 years

*Contact JM Technical Services for specific system requirements or guarantee terms.

Codes and Approvals



Installation/Application



Self-Adhered

- This product is not suitable for hot asphalt application to the top surface
- Can be installed on plywood, gypsum or concrete board as well as asphalt, metal or concrete
- All substrates must be primed prior to installation
- Minimum application temperature is 14°F (-10°C)
- Ideal for low-slope applications up to 3" per foot (7.5 cm/m) or 14°
- Side laps are 3" (7.62 cm); end laps are 6" (15.24 cm)
- Refer to Vapor Barrier Installation Instructions for application information

Packaging and Dimensions

Roll Coverage*	468 ft ² (43.5 m ²)
Roll Length	134 ft (40.8 m)
Roll Width	45 in (1.1 m)
Roll Weight	80 lb (35.8 kg)
Rolls per Pallet	25
Pallet Weight	2,050 lb (930 kg)
Pallets per Truck**	21

*Assumes a 4" side lap **Assumes 48' flatbed truck.

Tested Physical Properties

Physical Properties		ASTM Test Method	Vapor Barrier SA	
			MD*	XMD**
Strength	Tear Resistance	D 5147	90 lbf (400 N)	79 lbf (350 N)
	Tensile Strength	D 5147	54 lbf/in. (9.5 kN/m)	68 lbf/in. (12 kN/m)
	Dynamic Puncture Resistance	E 154	152 lbf (675 N)	
Longevity	Low Temp. Flexibility	D 5147	< -22°F (< -30°C)	
	Thickness	D 5147	31.5 mil (0.8 mm)	
	Lap Adhesion with Primer	D 1876	68 lbf/ft (1000 N/m)	
	Lap Adhesion without Primer	D 1876	41 lbf/ft (600 N/m)	
	Ultimate Elongation	D 5147	33%	20%
Performance	Peel Resistance (Steel)	D 903	5.4 lbf/in (950 N)	
	Water Vapor Permeance	E 96	0.03 perm (1.7 ng/Pa•s•m ²)	
	Air Permeability	E 2178	< 0.001 L/s/m ²	
		E 283	< 0.002 L/s/m ²	

*MD = Machine Direction

**XMD = Cross-Machine Direction

Note: Material tested in accordance with ASTM D 5147 Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Materials.

Technical specifications as shown in this literature are intended to be used as general guidelines only. Please refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the web at www.jm.com/roofing. The physical and chemical properties of the product listed herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Check with the regional sales representative nearest you for current information.

All Johns Manville products are sold subject to Johns Manville's standard Terms and Conditions, which includes a Limited Warranty and Limitation of Remedy. For a copy of the Johns Manville standard Terms and Conditions or for information on other Johns Manville roofing products and systems, visit www.jm.com/terms-conditions.

RS-2075 8-21 (Replaces 4-19)

CANTAC ROOF-TAC is a natural rubber based, plasticiser resistant contact adhesive formulated for bonding. TPO and EPDM roofing membranes to substrates.

ROOF-TAC features very fast flash-off, with extra-long open time. High heat stability (128°) and superior long-term bond strength.

ROOF-TAC is an excellent choice for permanent bonding of TPO, EPDM and most other roofing membranes to a variety of substrates and is also suitable for a wide variety of applications involving laminating of plastic materials.



USES

- Bonds TPO, EPDM and other roofing membranes to most common roofing materials.
- Bonds polyester wall & floor coverings.
- Bonds most vinyl's & rubbers.

FEATURES

- | | |
|-------------------------|---------------------------------|
| ✓ Plasticiser Resistant | ✓ Waterproof |
| ✓ Extra Long Open Time | ✓ No Ozone Depleting Substances |
| ✓ Very Low Odour | ✓ High Coverage |
| ✓ High Heat Resistant | ✓ High Solids |
| ✓ High Strength | |

THE CANISTER ADVANTAGE

- CANTAC's self contained, environmentally friendly, portable canister system was designed for ease of use.
- The canister, equipped with a reusable gun and hose, eliminates the need for air assisted adhesive application systems.
- No power or compressor is required!
- This approach significantly reduces set up and clean-up time. The canister system is almost maintenance free. No solvent is needed to flush out guns and messy pressure pots.
- The spray pattern is consistent, delivering perfect results every time which eliminates human error caused by inconsistent spray patterns. Its portability enables you to apply adhesive in your facility or on site.
- Once you have emptied the eco friendly canister, simply attach your gun and hose to a new one. The empty canister is made from recyclable steel and can be easily recycled making it more environmentally friendly than traditional plastic containers.

PHYSICAL & CHEMICAL PROPERTIES

Chemical Description	Solvent Based Contact Adhesive
Odour	Minimal Solvent Odour
Appearance	Blue
Solids Content	38 - 42%
Viscosity	Sprayable Grade
Coverage	17kg Canister: 272m ² Single Sided (Guide only: Coverage depends on absorbency of substrate and coating weight. Generally the heavier the coating weight the stronger the bond.)

Minimum Open Time	1 - 2 minutes
Maximum Open Time	24 hours
Heat Resistance	-40 – +120°C
Cleaner	Citrus Cleaner or Acetone
Flash Point	Non applicable
Specific Density	0.70kg per ltr +/- 5%
Size	17kg Recyclable Canister

DIRECTIONS FOR USE

1. For best results all surfaces to be bonded must be clean, dry and free from dirt, dust, oil, loose paint, wax and grease. The temperature of the adhesive and the surfaces being bonded should ideally be between 15°C - 27°C.
2. Attach the larger end of the hose to the spray gun and tighten securely, attach the smaller end of the hose to the canister valve securely.
3. Slowly open the canister valve and inspect the connections for any leaks. Tighten if needed. Fully open the valve.
4. Unscrew the trigger stop nut on the gun and spray a test pattern. Adjust nut to vary adhesive output.

ADHESIVE APPLICATION

Hold the applicator 150-250mm away from the surface and apply an even coat of adhesive to **100% of the surface area of both surfaces, achieving approximately 80-100% coverage.** Allow adhesive to dry until tacky (1-2mins).

Note: Test for tackiness by gently touching the adhesive with your knuckle. If the adhesive transfers to your skin it is too wet. If the adhesive is tacky and does not transfer to your skin, it is ready to bond. If the adhesive is dry or has very little tack, it is too dry and another coat of adhesive should be applied. Porous substrates may require additional coats. High strength of critical bonds may require two coats per surface.

Apply even pressure over the entire surface to ensure intimate contact. Pressure may be applied by mechanical presses, nip rollers or hand rollers. Insufficient pressure will result in poor bonds.

CLEAN UP

Clean tip after use with CANTAC Citrus Cleaner. Excess adhesive and overspray may be removed with CANTAC Citrus Cleaner, Acetone, WOODLOK GLAZE-AWAY & DSOLV-AWAY, GLUE GURU 05CR or most Industrial Solvents.

EQUIPMENT SHUT DOWN / STORAGE

Screw the trigger stop adjustment nut all the way to the trigger lock position.

DO NOT disconnect the hose until the canister is completely empty and ready to attach to another canister.

The canister system can be stored for up to 2 months without being used. If the canister is going to be left for longer than 2 months it is recommended to turn off the canister, bleed the pressure from the gun and hose. Remove the gun and hose and attach to a canister of Gun & Hose Cleaner and flush out the line for approximately 3 minutes. The gun and hose can then be removed and stored.

Alternatively remove the tip and soak in solvent, spray a small amount of adhesive through the gun and hose every 1-2 months to ensure there is no thickened adhesive in the hose.

TROUBLESHOOTING

COLD WEATHER PROBLEMS

EFFECTS OF COLD WEATHER AND CANISTERS

The adhesive in the canister will thicken as temperatures get colder. The propellants used will decrease in pressure and therefore effectiveness. The propellants may condense and reduce the effective amount of available pressure in the canister. This will adversely affect the spray pattern and consequently, the performance of the adhesive.

HOW TO ELIMINATE COLD WEATHER PROBLEMS

1. Store the canisters in a controlled environment with temperatures between 15°C and 27°C.
2. Keep canisters off cold concrete floors and away from outside walls.
3. Allow additional time for solvents and propellants to flash off when temperatures are below 15°C.
4. If the canisters are too cold for use, they can be brought up to room temperature by submerging them up to the valve in warm water or by attaching a heater belt. Once the canisters equilibrate to at least 15°C, the products will perform as normal.

APPLICATOR – HOSE BLOCK CHECK LIST

IF THE SYSTEM SPRAYS POORLY, OR NOT AT ALL:

The sequence below runs through to a complete clog in the canister valve. If at any time during the sequence the problem is resolved, stop, clean the needed parts, put the system back together, and you are finished.

1. Make sure the canister is not empty.
2. Make sure the canister valve is open.
3. Close the spray gun trigger stop adjusting nut and clean the nozzle tip. (Does it spray now?)
4. Take off the nozzle tip and try spraying (Does it spray now?). Clean the nozzle.
5. Shut off the canister valve. Carefully and slowly, loosen the spray gun/hose connection and look for adhesive to squirt out. If adhesive starts to leak out, allow it to slowly continue to do so until it stops. (This will be messy but you will need to bleed off the pressurised adhesive to clean the spray gun). The spray gun has a clog at the valve, stem or inlet area and needs to be cleaned.
6. If nothing leaks out after fully loosening the spray gun, carefully remove the spray gun, realising that the hose may be clogged but could be full of adhesive and pressure depending on where the clog is. (Secure the open end of the hose into a bucket in case the clog releases and the system flushes).
7. Carefully and slowly loosen the hose connection at the canister valve. Look for adhesive to squirt out. If adhesive starts to leak out, allow it to slowly continue to do so until it stops. (This will be messy but you will need to bleed off the pressurised adhesive in the hose.) Clean or replace the hose.
8. With everything now isolated from the canister, place a bucket in front of the canister valve and slowly open to see if any adhesive comes out. If it does, put the cleaned system parts back together. If it does not, there is something wrong with the canister valve and it should be returned.
9. Be sure to wear appropriate PPE, especially eye protection when connecting/disconnecting gun or hose.

SOLVENTS THAT CAN BE USED FOR CLEANING THE NOZZLE, SPRAY GUN:

CANTAC Citrus Cleaner, Acetone, Toluene, WOODLOK GLAZE-AWAY & DSOLV-AWAY, GLUE GURU 05CR or most Industrial Solvents.

FOR CLEANING THE HOSE:

Attach gun and hose to a canister of CANTAC Gun & Hose Cleaner and flush out for approximately 3 minutes.

HEALTH & SAFETY

Refer to the Material Safety Data Sheet for health and safety information before using this product.

HANDLING & STORAGE

Product should be stored between 5°C and 25°C on a wooden pallet and kept from freezing. Keep out of direct sunlight and away from sources of heat. If the product has been left for prolonged periods between uses, agitating is recommended.

DISPOSAL

Canister disposal: Use extreme caution. Empty canister completely. Puncture the friable disc on the canister using a non-spark producing tool. Dispose of the scrap metal in accordance with local regulations.

SHELF LIFE

Best used within 24 months from date of manufacture when stored under the above conditions in the original unopened containers.

LIMITATIONS

ROOF-TAC is not suitable for Polystyrene.

TESTING

Always test the suitability of the product for your application before use.

OTHER CANTAC PRODUCTS

HSE-TAC

Premium high strength contact with low odour. Extra long open time for high volume applications.

POLY-TAC

Industrial strength, polystyrene safe contact adhesive for bonding polystyrene to itself and many other materials.

HIGH-TAC

High strength, high heat resistant contact adhesive for high pressure laminates, upholstery & most wall & floor coverings.

ULTRA-TAC

Pressure sensitive adhesive with exceptional tack for insulation materials.

CITRUS CLEANER

Cleans gun tips and removes a variety of adhesives and tape residue.



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CONQUEROR INSULATION BOARD

TECHNICAL SPECIFICATIONS AND PROFILES



Conqueror NZ Ltd has a policy of continuous product improvement; we reserve the right to change design or specifications without prior notice.



CONQUEROR

PRODUCT INFORMATION

Polyisocyanurate (PIR) insulation is suitable for use in buildings, extensions and renovations, and is one of the most effective insulation materials used in construction. PIR insulation core sandwiched between two high performance paper/foil facings creates a durable, light weight insulation board with superior performance and reduced material cost.

Thickness (mm)	20	30	40	50	60	75	90	100
R Value at 15°C (mK/W)	0.97	1.46	1.95	2.43	2.92	3.65	4.38	4.87
R Value at 23°C (mK/W)	0.93	1.40	1.87	2.34	2.80	3.50	4.21	4.67
Weight (kg/m ²)	0.97	1.41	1.85	2.29	2.73	3.39	4.05	4.49

Weight for glass fabric/glass fabric facings

FIRE PERFORMANCE

AS 1366.2-1992, ISO5660.1.

PIR foam is a thermosetting material. It does not melt, flow or drip when exposed to fire. It will form a strong char that helps protect the foam core and prevent flame spread within the panels. PIR will self-extinguish as soon as the cause of the fire is removed.

MOISTURE ABSORPTION

The PIR core has a closed cell structure, making it highly resistant to water absorption, and suitable for use in damp environments. The Aluminium Foil Board has a higher vapour resistance due to its foil facing.

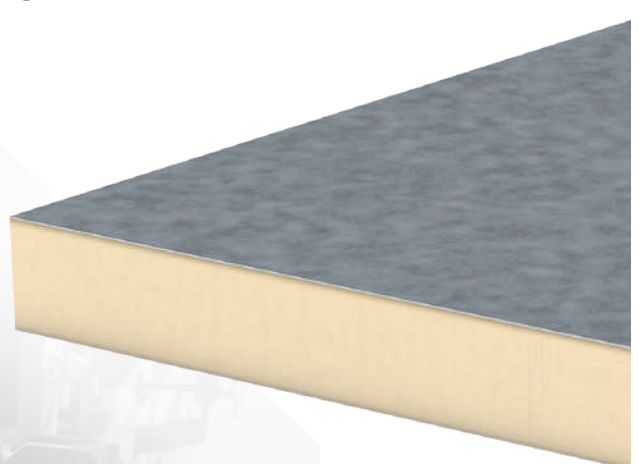
PRODUCT PROPERTIES

Density	38-42kg/m ³
Compressive strength	≥0.09MPa
Shear strength	≥0.11MPa
Water vapour transmission rate	10-15 g/m ² .24h
Thermal conductivity at 15°C	0.0205 W/m.K
Thermal conductivity at 23°C	0.0214 W/m.K
Dimensional stability	≤3% (70C/95%RH,20hrs) ≤1% (-10C,20hrs)
Width	900-1200mm
Length	Up to 5500mm
Thickness (mm)	20, 30, 40, 50, 60, 75, 90 and 100

Aluminium Foil Skin



Glass Fabric Skin



1. DIRECT FIXING

1.1 DIRECT FIXING OF THE BOARDS TO CONCRETE SOFFIT

- The boards are produced in the standard size of 2400 x 1200mm. They must be fixed directly to the concrete soffit using a minimum of 11 insulation fasteners, with incorporated washer head diameter of 30 mm (min). The fasteners should provide a minimum embedment of 40mm into the solid substrate and they must be evenly distributed over the entire surface of the board. (Note: The substrate and fixing materials must be fit for purpose. Design loading on the board is not to exceed 0.375kPa for this fixing pattern. Additional fixings may be required when the boards are subjected to greater wind loads.) Please contact Conqueror NZ for advice.
- Use two rows of 4 fasteners along the length, between 50 to 150mm from edge of the board; and 3 fasteners along the middle in an offset position from the exterior rows of fasteners as shown in figure 1.2.
- The board joints can be staggered or aligned as shown in Figures 1.2 and 1.3. Repeat steps to install the board in a continuous layer on the underside of the concrete soffit.



Figure 1.0. Direct fix to concrete soffit

- If required, tape all joints with a minimum 96mm wide insulation tape. Ensure to seal around the perimeter and joints, this will prevent air flow between any air cavities formed below or above the boards.



Figure 1.2. Board joints aligned. Fastener pattern (11 fixings per board)

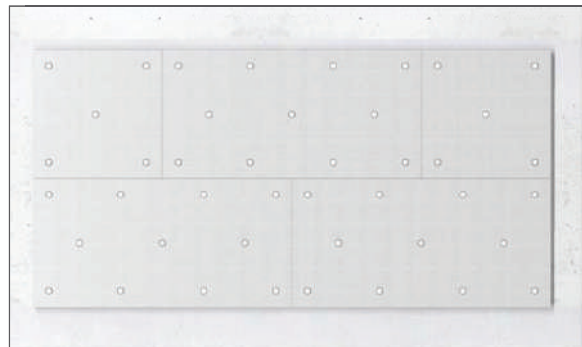


Figure 1.3. Board joints staggered



Figure 1.4. Insulation fastener

1. DIRECT FIXING (continued)

1.2 DIRECT FIXING OF THE BOARDS TO MASONRY AND / CONCRETE WALL

1.2.1 WITH CONSTRUCTION ADHESIVE BONDING

- Using construction adhesive, the board can be installed directly to dry and structurally sound walls free from moisture penetration. The wall should also be free from contaminant (e.g. oil, grease, paint) that may affect the adhesive bonding.
- Ensure the existing walls are straight and plumb and remove any protrusions that could result in an irregular surface finish.
- Apply a continuous bead of construction adhesive around the perimeter of the wall, and penetrations such as doors and windows.
- Apply 25mm diameter blobs of construction adhesive at 300mm CRS across the width and height, to the back of the board, or directly on to the wall. Ensure that no blob is closer than 25mm to any edge of the board to ensure a clean joint between boards.
- Align the board on the wall so that all joints butt tightly and apply pressure to ensure the board is plumb and true.
- Temporary support may be required to support the board, in cases where the construction adhesive does not develop immediate grab.



Figure 1.6. Masonry brick or block wall



Figure 1.5. Concrete wall

- Mechanical fixings may be used to complement the adhesive bond. In this case, after the adhesive has set, use 2 mechanical fixings at the mid height of the board, 15mm from the edge, with a 25mm nominal embedment into the wall.
- Mechanical fixings should be positioned in the tapered edge of the plasterboard which will be covered after installation.
- Repeat steps to install the boards and ensure there are no gaps between segments or abutments with other materials.

1.2.2 WITH MECHANICAL FIXING

- The boards can be mechanically fixed, if an acceptable adhesive bond cannot be achieved due to the wall surface conditions.
- Screws should be fixed at a maximum of 600mm CRS horizontally and 300mm vertically as shown in figure 1.6. (Note: The substrate and fixing materials must be fit for purpose. Design loading on the board is not to exceed 0.375kPa for this fixing pattern. Additional fixings may be required when the boards are subjected to greater wind loads.) Please contact Conqueror NZ for advice.
- Ensure that the existing walls are straight and plumb and remove any protrusions that may result in an irregular surface finish.
- Predrill the wall substrate using a suitable masonry drill bit. Insert the masonry anchor with a minimum embedment of 25mm into the solid substrate.
- Ensure the fixings are driven straight, with the heads embedded just below the surface of the plasterboard. Do not overdrive screws.

2. FIXING TO METAL OR TIMBER BATTENS

- If direct fixing is not possible due to uneven surface or the presence of mechanical services, the boards can be fixed to metal or timber battens.
- Suitable metal battens or 50 x 25 mm timber battens are required at 600mm CRS. This will result in three rows of battens, lining up with the two edges and the centre of the boards. The battens are to be fixed to the soffit as per manufacturer's recommendations.

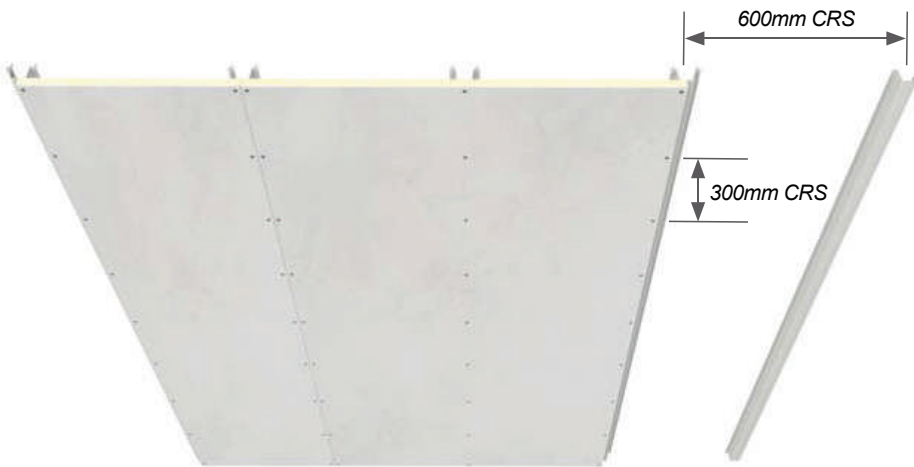


Figure 1.6. Masonry brick or block wall



Figure 1.6. Masonry brick or block wall

- Use screws at a maximum of 300mm CRS to fix the boards to the furring metal battens. For timber battens use screws or nails at a maximum of 200mm CRS. The screws or nails must be in rows less than 600mm apart. (Note: The substrate and fixing materials must be fit for purpose. Design loading on the board is not to exceed 0.375kPa for this fixing pattern. Additional fixings may be required when the boards are subjected to greater wind loads. Please contact Conqueror NZ for advice.

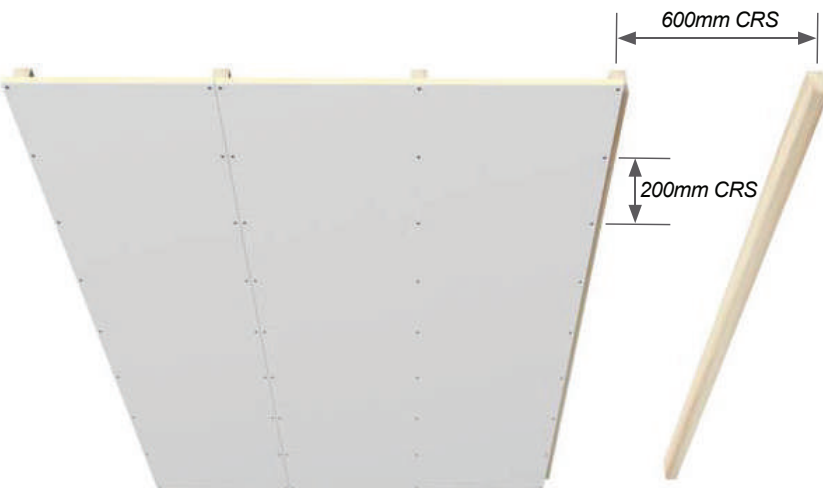


Figure 1.6. Masonry brick or block wall

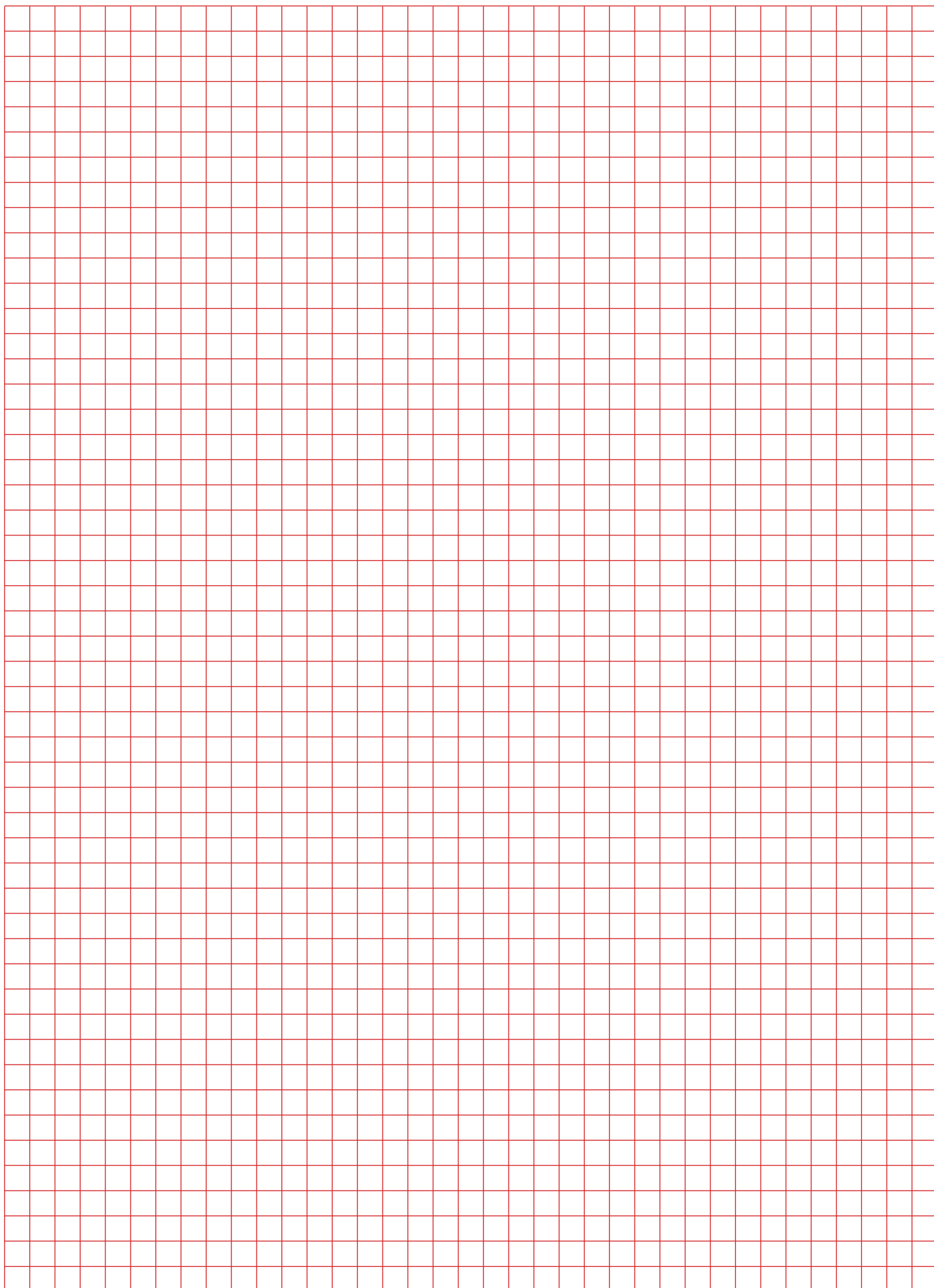


Figure 1.6. Masonry brick or block wall

3. SERVICE PENETRATIONS

- Installation of the boards should tightly fit around penetrations and fire collars to reduce the effect of thermal bridging. Use appropriate methods to fill in the gaps where there is danger of overheating around flues, electrical cables and equipment.

Blank lined paper for writing.



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CONQUEROR

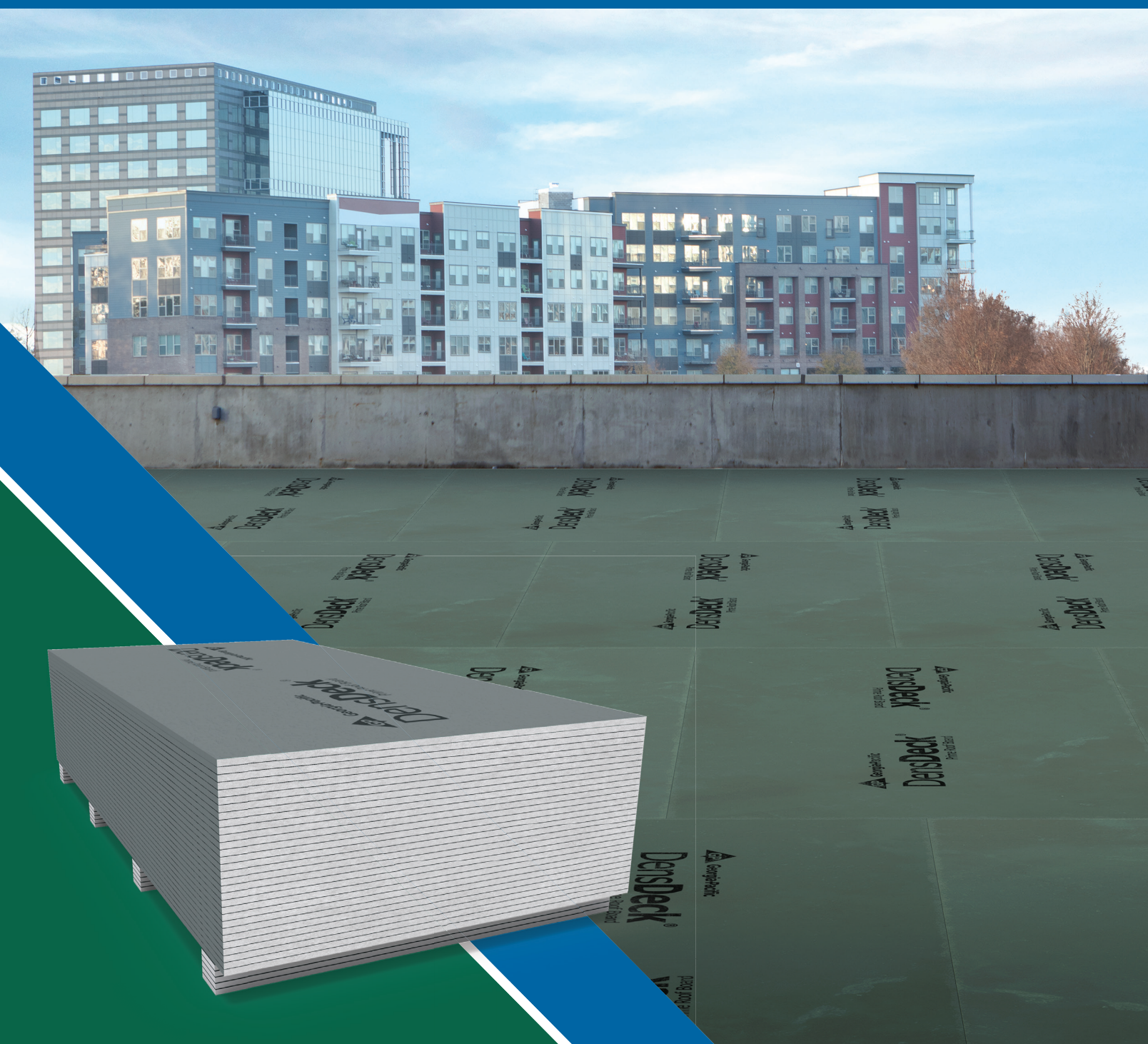


Georgia-Pacific

DensDeck®
Prime Roof Board
with **EONIC™**
TECHNOLOGY

TECHNICAL GUIDE

ROOF BOARD



Product Overview

Over 30 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 roofing products such as wood fiberboard and perlite.

- Provides superior fire protection.
- Resists fire and hail damage.
- Holds up well under normal construction and maintenance foot traffic while stiffening and stabilizing roof decks.
- Easy to install in all types of roof systems.
- Ideal product for direct membrane application.
- Tested within roofing systems for sound isolation.

DensDeck® is designed to address persistent challenges inherent in commercial roofing assemblies: fire resistance, strength and dimensional stability when installed in a properly designed roof assembly. DensDeck is a fiberglass mat-faced, noncombustible (as described and tested in accordance with ASTM E136), nonstructural, gypsum core panel. DensDeck is recommended for mechanically attached membrane systems

DensDeck® Prime Roof Board provides enhanced performance and is recommended for mechanically attached, adhered and partially adhered roofing systems, providing an ideal bonding surface for roofing membranes as well as air/vapor retarders. Building on our 30-year history of market-driven innovation DensDeck Prime Roof Boards have now been enhanced with EONIC™ Technology, a patented system that delivers advanced moisture performance and mat-to-core bond strength.

With this advancement, DensDeck Prime Roof Boards are the first roof board with manufacturing specifications that include max 5%¹ total water absorption by weight and 1 gram² surface water absorption on both the face and the back of the board.³ Another critical benefit of EONIC Technology includes improved mat-to-core bond strength which in third party testing⁴ averaged 23% stronger on the face and 192% stronger on the back when compared to DensDeck Prime Roof Boards before the enhancement.

DensDeck Prime Roof Board continues to provide a broader compatibility and higher performance with roofing adhesives. Face mat allows adhesives to be applied more uniformly and consistently and results in a stronger bond with the membrane. For fully adhered and self-adhered “peel & stick” roofing systems, as well as hot mopped, cold mastic and torch-applied modified bitumen roofs, DensDeck Prime provides a stronger, more economical installation by reducing the amount of mastic or adhesive, and potentially eliminating the field primer. Consult with membrane manufacturer for actual priming requirements.

DensDeck® StormX™ Prime Roof Board provides a higher level of performance and is recommended for mechanically attached, adhered and partially adhered roofing systems. Like DensDeck Prime, it is produced with patented EONIC Technology for enhanced strength/moisture resistance. DensDeck StormX is FM classified for Very Severe Hail (VSH) in approved single ply membrane assemblies. Consult

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¹Maximum value, per ASTM C473, section 20

²Nominal value, per ASTM C473 Section 21

³Based on published manufacturing specifications as of June 1, 2020

⁴Comparison based on third party testing conducted by PRI Construction Materials Technologies in October 2017. ½” boards tested in accordance to ASTM C209.

RoofNav® for specific assemblies. DensDeck® StormX™ was the first gypsum cover board to pass FM VSH in a single ply assembly, and this assembly used an adhered standard 60 mil TPO bareback membrane.

1/2" and 5/8" DensDeck® Prime Roof Boards, and 5/8" DensDeck StormX are the first and only gypsum roof boards with a limited warranty for up to 90 days of exposure to normal weather conditions when applied on **vertical** parapet walls.*

Georgia-Pacific Gypsum and Sustainability

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

Architectural Specifications

Georgia-Pacific Gypsum's 3-part guide specifications are downloadable, as rewritable Microsoft® Word documents, in both CSI and ARCOM MasterSpec® formats. Georgia-Pacific Gypsum specifications and 3-D Revit® compatible models can be found at www.gpdesignstudio.com. Downloadable specifications are also available online from Building Systems Design, Inc. at www.bsdssoftlink.com, and ARCOM Product Masterspec at www.masterspec.com.

Code Compliance

DensDeck Roof Boards are manufactured to meet ASTM C1177 and conforms with IBC Sections 1505 and 1508, and have the following approvals:

- Florida Product Approved
- Miami-Dade County Product Control Approved

Standards and Classifications – Fire Resistance

DensDeck, DensDeck Prime, and DensDeck StormX Roof Boards are excellent fire barriers over combustible and noncombustible roof decks, including steel decks. Roofing specifications for steel deck installations often require a fire barrier as the component applied above the metal to help control and limit the amount of fuel contributed to a fire beneath the roof.

UL Fire Resistance Ratings. 5/8" (15.9 mm) DensDeck Roof Boards are UL Classified and designated as Type DD by UL LLC and included in assembly designs investigated by UL for hourly fire resistance ratings. 5/8" (15.9 mm) DensDeck roof boards may also replace any unclassified 5/8" (15.9 mm) gypsum board in an assembly in the UL Fire Resistance Directory under the prefix "P".

UL 790 Classification. DensDeck, DensDeck Prime, and DensDeck StormX Roof Boards have been certified by UL for use as a fire barrier over combustible and noncombustible decks in accordance with the ANSI/UL 790 and ULC CAN-S114 test standard. The UL classification includes a comprehensive Class A, B or C rating. This test method and resulting classification measures the external fire resistance of the roof system but does not include an investigation of fire resistance to internal sources directed at the underside of the roof system. For additional information concerning the UL 790 classification for DensDeck Roof Boards, consult the UL certifications directory under categories TGFU.R15206 (Roofing Systems) and TGFU7.R15206 (Roofing Systems Certified for Canada).

UL 1256 Classification. DensDeck and DensDeck Prime Roof Boards have also been certified by UL in roof deck constructions for internal (under deck) fire exposure in accordance with the ANSI/UL 1256 Steiner Tunnel test. The UL listing includes the use of 1/4" DensDeck Roof Boards under foam plastic insulation. For additional information concerning the UL 1256 classification for DensDeck Roof Boards, consult the UL certifications directory under categories TGKX (Roof Deck Constructions), TIAR (Building Units) and TIAR7 (Building Units Certified for Canada).

FM Class 1 Approvals. 1/4" (6.4 mm) DensDeck Roof Boards have passed testing under the FM Calorimeter Standard 4450 (Approval Standard for Class 1 Insulated Steel Deck Roofs) and have been approved by FM for insulated steel deck roofs when installed per FM guidelines. To achieve a Class 1 designation, the assembly must satisfy criteria for fire, wind uplift, foot traffic and hail damage resistance. For more information about FM Approvals and Class 1 assemblies, consult FM or RoofNav, FM's tool for roofing professionals. Please note, however, that the performance of a roof depends on all components used in the roofing assembly and how the components interact.

ASTM C1177. 5/8" (15.9 mm) DensDeck, 5/8" (15.9 mm) DensDeck Prime, and 5/8" (15.9 mm) DensDeck StormX Roof Boards are manufactured to meet the "Type X" requirements of ASTM C1177 for increased fire resistance beyond regular gypsum board.

**For complete warranty details, visit www.DensDeck.com.*

Standards and Classifications – Fire Resistance *continued*

Flame Spread and Smoke Development. When tested in accordance with ASTM E84, UL723 and ULC CAN-S102, DensDeck® and DensDeck® Prime Roof Boards had Flame Spread 0, Smoke Developed 0.

Long-term fire protection of roofing systems is a key concern of the design authority, code officials and building owners. DensDeck Roof Boards will contribute to the fire-resistant characteristics of roof assemblies over time.

“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.)

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

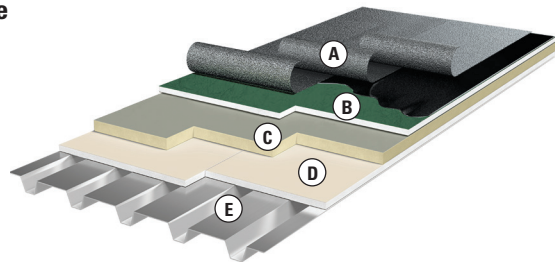
The design assemblies in this guide are presented for illustrative purposes only. It is important that you consult a design professional and the appropriate fire resistance directory or test report for complete assembly information and related information. Georgia-Pacific Gypsum does not provide architectural, engineering or roofing system services. For additional fire safety information concerning Georgia-Pacific Gypsum's products, visit www.buildgp.com/safetyinfo.

UL Classifications

The following are typical configurations with DensDeck Roof Boards certified by UL for use as a fire barrier over combustible and noncombustible decks and are for illustration purposes only. Please consult UL for additional information.

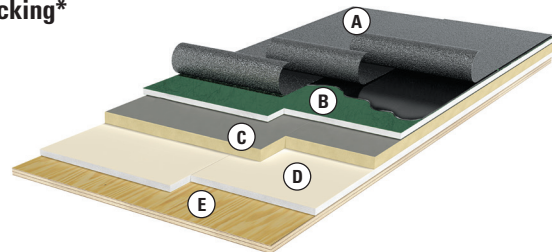
Typical UL Fire Barrier Board Classification on Noncombustible Decking

- A. UL Classified Roof Covering
- B. Min. 1/4" (6.4 mm) DensDeck Prime Roof Board
- C. UL Classified Insulation
- D. **Minimum 1/4" (6.4 mm) DensDeck Roof Board serving as an insulation thermal barrier underlayment and an acceptable code alternative to a thermal barrier.**
- E. Classified Steel Deck



Typical UL Fire Barrier Board Classification on Combustible Decking*

- A. UL Classified Roof Covering
- B. Min. 1/4" (6.4 mm) DensDeck Prime Roof Board
- C. UL Classified Insulation (optional)
- D. Minimum 1/4" (6.4 mm) DensDeck Roof Board serving as an insulation thermal barrier overlayment with all joints staggered a min. of 6" (152 mm) from the plywood joints.
- E. Classified Wood Deck



**Note: The UL 790 classification for DensDeck provides that the use of DensDeck roof boards as a barrier board over a combustible deck permits the use of any classified roofing system which would otherwise be limited to use over a noncombustible deck. When used, the insulation must consist of one of the types specified. For additional information, consult the UL certifications directory under category TGFU (Roofing Systems).*

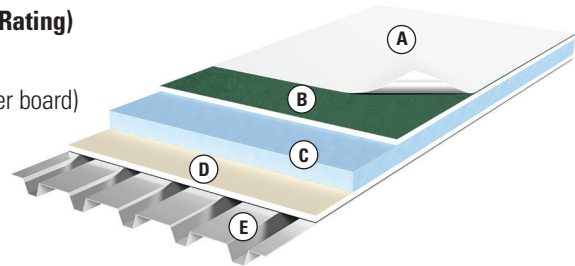
FM Approvals

DensDeck® Roof Boards are often utilized in these constructions as an insulation underlayment (thermal barrier) or substrate for air or vapor retarders. In most assemblies it will be used as an insulation overlayment (membrane underlayment) or cover board (1/4" (6.4 mm), 1/2" (12.7 mm) or 5/8" (15.9 mm)). In other assemblies it will serve both of these roles in the same system.

The following are typical configurations of a roof deck for a FM Class 1 fire rating and a FM Very Severe Hail (VSH) classified system and are for illustration purposes only. Please consult FM or RoofNav (<https://www.roofnav.com>) for additional information.

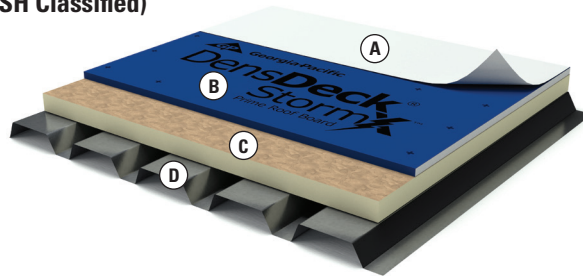
Typical Configuration of DensDeck Roof Boards (Class 1 Fire Rating)

- A. Membrane (various)
- B. Minimum 1/4" (6.4 mm) DensDeck Roof Boards Overlayment (cover board)
- C. Rigid Foam Insulation
- D. Minimum 1/4" (6.4 mm) DensDeck Roof Boards Underlayment (thermal barrier)
- E. Metal Deck



Typical Configuration of DensDeck® StormX™ Roof Boards (VSH Classified)

- A. Membrane
- B. Minimum 5/8" (15.9 mm) DensDeck StormX Roof Boards placed directly below the roofing membrane. In this application the product provides the primary support for the roofing membrane and protects insulation.
- C. Rigid Foam Insulation
- D. Any Structural Deck



System Components, Standards and Classifications – Wind Uplift Resistance

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 and ANSI/UL 1897 test procedures. The test results show the tested (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. 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.

Vertical Pull Resistance Over Structural Concrete Deck

The assemblies listed are a sample of the highest vertical pull values available through FM's RoofNav® utilizing DensDeck® Roof Boards. The test method used was FM 1-52.

Roof System with DensDeck or DensDeck® Prime used as cover board	Attachment to roof deck	PSF
Single Ply Fully Adhered	Adhered	915
Multi-Ply Hot Asphalt	Hot Asphalt	825
Multi-Ply Torched	Hot Asphalt	825
Multi-Ply Torch Cap Hot Asphalt Base	Hot Asphalt	840
Multi-Ply Torched	Adhered	810

It is important to note that the vertical pull results are for the entire roof assembly, not just the DensDeck Roof Boards. For a comprehensive list of vertical pull tests and additional information, please visit <https://www.roofnav.com>. **Actual results may vary depending on moisture (see page 17), and other factors. Georgia-Pacific Gypsum makes no representations or warranties concerning the vertical pull or uplift resistance of any roof assembly or system.**

The vertical pull test measures the uplift resistance in pounds on a four square foot test area. A 2' x 2' assembly is adhered to a concrete deck and the uplift force is divided by four to get the pounds per square foot uplift resistance.

Uplift Resistance Pressures Achieved With DensDeck® Through Independent Testing

The following are typical roofing systems with examples of assemblies evaluated by FM, UL or other labs for wind uplift resistance. These systems are presented for illustration only, and the examples of wind uplift resistance are for the entire assembly tested, not just the DensDeck Roof Boards. **Actual results may vary depending on moisture (see page 17), and other factors. Georgia-Pacific Gypsum makes no representations or warranties concerning the vertical pull or uplift resistance of any roof assembly or system.**

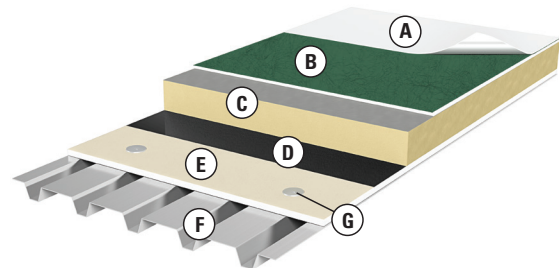
(Check membrane manufacturers' listing including FM, UL and other accredited labs for thousands of additional uplift assembly ratings with DensDeck products.)

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. Unless otherwise noted, all screws used in tests are polymer coated, FM approved, min. 12 gauge steel and plates are 3" (76 mm) diameter corrosion resistant steel. Tests were conducted over 22 gauge steel decks. For fastener requirements in wood or structural concrete decks, refer to FM Global Property Loss Prevention Data Sheet 1-29.

System Type and Description	Wind-Uplift PSF	Product	# of fasteners (4' x 8' board)
Vapor Retarder Substrate	FM 1-90	5/8" (15.9 mm) DensDeck	8
	FM 1-90	5/8" (15.9 mm) DensDeck Prime or StormX™	8

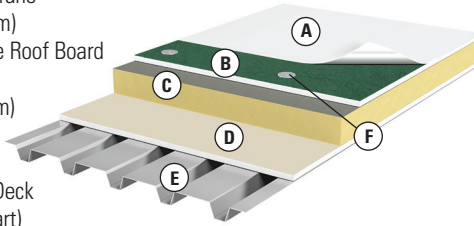
- A. Any Rated Adhered Membrane
- B. Min. 1/4" (6.4 mm) DensDeck Roof Board (optional)
- C. Insulation (optional)
- D. Vapor Retarder
- E. Min. 5/8" (15.9 mm) DensDeck Roof Board
- F. Classified Steel Deck
- G. Fastener (see chart)

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



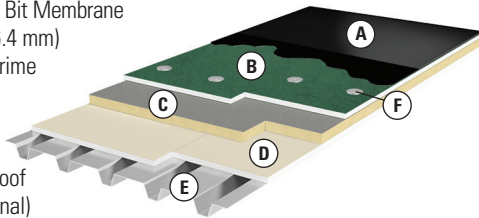
Uplift Resistance Pressures Achieved With DensDeck® Through Independent Testing *continued*

System Type and Description	Wind-Uplift PSF	Product	# of fasteners (4' x 8' board)
Fully Adhered EPDM and Thermoplastic Membranes A. Single ply Membrane B. Min. 1/4" (6.4 mm) DensDeck® Prime Roof Board C. Insulation D. Min. 1/4" (6.4 mm) DensDeck Roof Board (optional) E. Classified Steel Deck F. Fastener (see chart)	FM 1-90	1/4" (6.4 mm) DensDeck Prime	12
	FM 1-90	1/2" (12.7 mm) DensDeck Prime	8
	FM 1-90	5/8" (15.9 mm) DensDeck Prime	8
	FM 1-105	1/4" (6.4 mm) DensDeck Prime	18
	FM 1-135	1/2" (12.7 mm) DensDeck Prime	18
	FM 1-150	1/2" (12.7 mm) DensDeck Prime	20
	FM 1-180	5/8" (15.9 mm) DensDeck Prime	24
	FM 1-285	1/2" (12.7 mm) DensDeck Prime	32



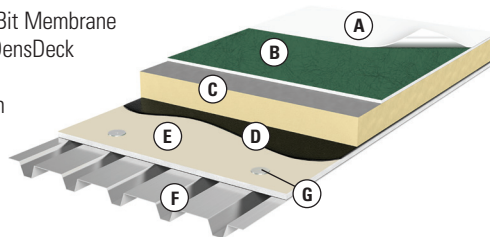
Single ply and EPDM will include both reinforced and nonreinforced.

System Type and Description	Wind-Uplift PSF	Product	# of fasteners (4' x 8' board)
Modified Bitumen/BUR A. BUR or Mod Bit Membrane B. Min. 1/4" (6.4 mm) DensDeck Prime C. Insulation D. Min. 1/4" (6.4 mm) DensDeck Roof Board (optional) E. Classified Steel Deck F. Fastener (see chart)	FM 1-90	1/4" (6.4 mm) DensDeck Prime	8
	FM 1-90	1/2" (12.7 mm) DensDeck Prime	8
	FM 1-90	5/8" (15.9 mm) DensDeck Prime	8
	FM 1-135	1/2" (12.7 mm) DensDeck Prime	20
	FM 1-225	1/2" (12.7 mm) DensDeck Prime	24
	FM 1-315	1/2" (12.7 mm) DensDeck Prime	32
	UL 150 PSF	1/2" (12.7 mm) DensDeck Prime	16
	UL 195 PSF	5/8" (15.9 mm) DensDeck Prime	16
	UL 240 PSF	5/8" (15.9 mm) DensDeck Prime	20



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

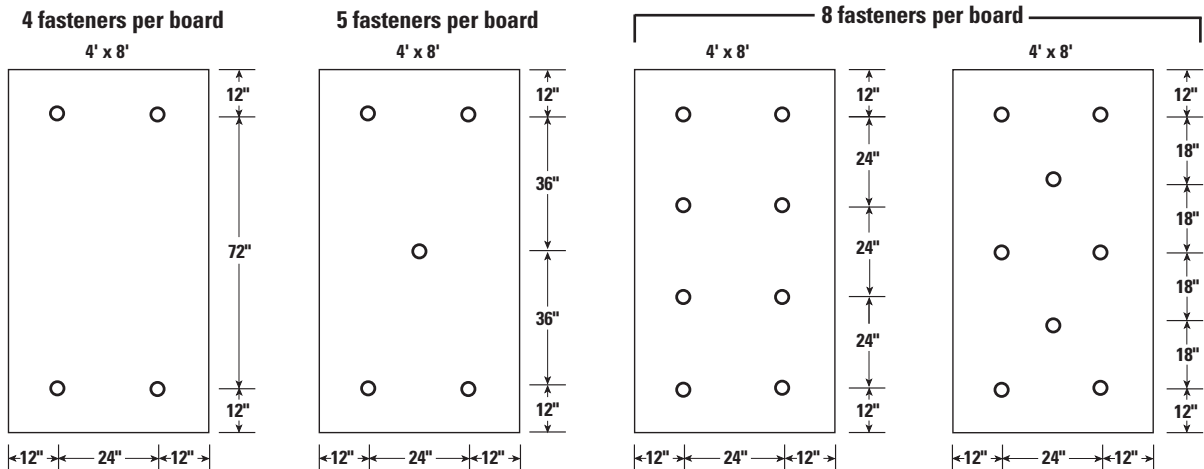
System Type and Description	Wind-Uplift PSF	Product	# of fasteners (4' x 8' board)
EPDM, BUR or Mod Bit with Insulation Adhered with Hot Asphalt A. EPDM, BUR or Mod Bit Membrane B. Min. 1/4" (6.4 mm) DensDeck Prime (optional) C. Rigid Foam Insulation D. Asphalt Adhesive E. Min. 1/2" (12.7 mm) DensDeck Prime Roof Board F. Classified Steel Deck G. Fastener (see chart)	FM 1-60 (EPDM)	1/2" (12.7 mm) or 5/8" (15.9 mm) DensDeck or DensDeck Prime	8
	DensDeck Roof Board (1/2" (12.7 mm) or 5/8" (15.9 mm)) and fully adhered single ply membranes FM-rated 60 PSF with insulation attached with asphalt adhesive.		
	1-90 (BUR or Mod Bit)	1/2" (12.7 mm) or 5/8" (15.9 mm) DensDeck or DensDeck Prime	8
DensDeck Roof Board (1/2" (12.7 mm) or 5/8" (15.9 mm)) and BUR or modified bitumen membranes FM-rated 90 PSF with insulation attached with asphalt adhesive.			



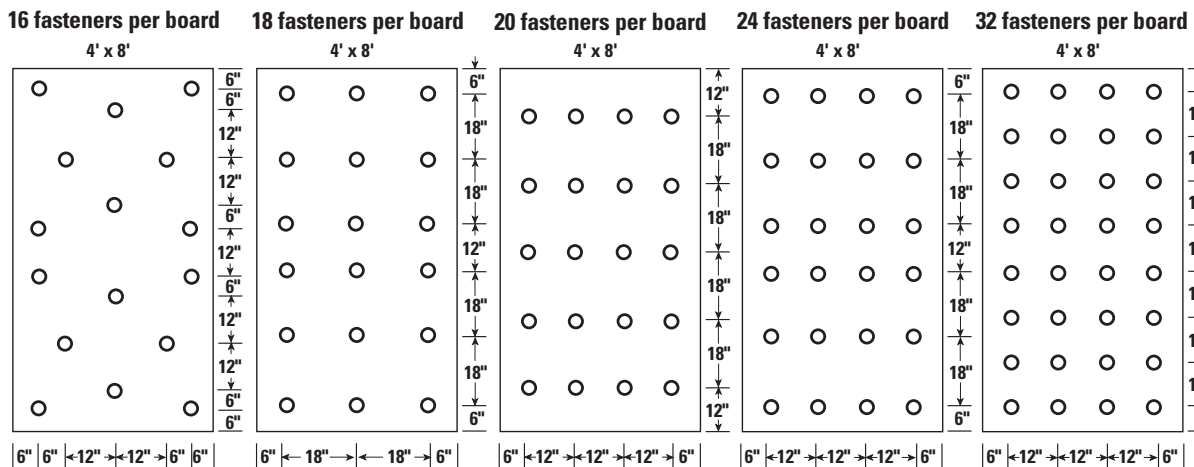
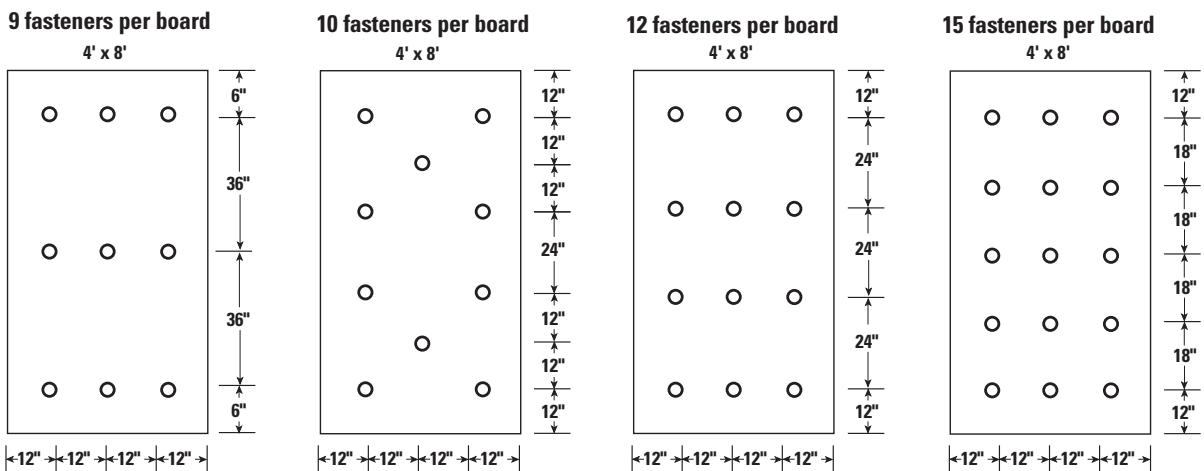
Wind *continued*

GP Fastener Patterns

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.

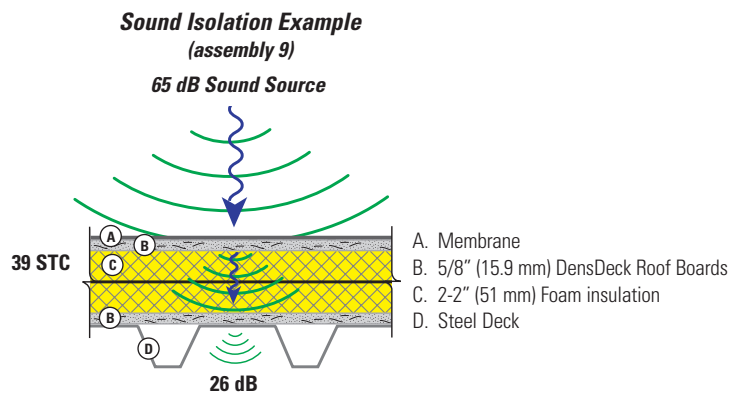


Standards and Classifications – Sound Control

To block unwanted entry of sound through a roof assembly, multiple layers of DensDeck® Roof Boards will help 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.

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.

An Outdoor Indoor Transmission Class (OITC) rating is a single number calculated in accordance with standard ASTM E1332 using the Transmission Loss measured at 18 one-third octave bands from 80 Hz to 4000 Hz. The rating is most appropriate for comparing the performance of exterior facade elements including roofs exposed to typical transportation noise sources.



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

The following table summarizes results from sound testing conducted on steel deck assemblies with DensDeck Roof Boards. The tests were conducted using a modified version of ASTM E90 and E413, and the results are based on characteristics, properties and performance of materials and systems obtained under controlled test conditions. Actual results may vary and Georgia-Pacific makes no representations or warranties concerning the STC rating of any assembly.

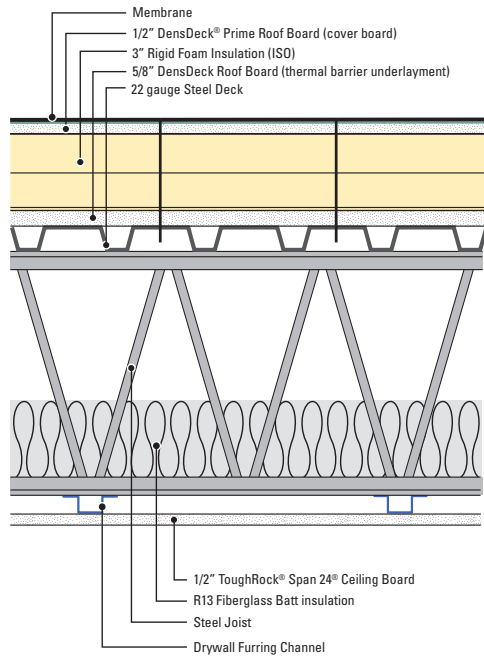
Sound Testing of Steel Deck Roof Assemblies Tested for STC

	STC	Underlayment	Insulation	Coverboard	Membrane	System Attachment
1	28	None	6" (152 mm) ISO	None	None	Mechanical
2	28	None	3" (76 mm) ISO	None	None	Mechanical
3	29-30	None	6" (152 mm) XPS (Extruded)	None	None	Mechanical
4	36	5/8" (15.9 mm) DensDeck Roof Board	3" (76 mm) ISO	1/2" (12.7 mm) DensDeck® Prime Roof Board	EPDM	Mechanical/EPDM-Adh.
5	36	5/8" (15.9 mm) DensDeck Roof Board	3" (76 mm) ISO	1/4" (6.4 mm) DensDeck Prime Roof Board	EPDM	Mechanical/EPDM-Adh.
6	38	5/8" (15.9 mm) DensDeck Roof Board	3" (76 mm) ISO	1/2" (12.7 mm) DensDeck Prime Roof Board	EPDM	All components adhered
7	38	5/8" (15.9 mm) DensDeck Roof Board	8" (203 mm) ISO	5/8" (15.9 mm) DensDeck Prime Roof Board	None	Mechanical
8	39	5/8" (15.9 mm) DensDeck Roof Board	8" (203 mm) ISO	5/8" (15.9 mm) DensDeck Prime Roof Board	None	All components adhered
9	39	5/8" (15.9 mm) DensDeck Roof Board	4" (101.6 mm) ISO	5/8" (15.9 mm) DensDeck Prime Roof Board	SBS Mod Bit	Mechanical/ Mod Bit-Torched
10	41	5/8" (15.9 mm) DensDeck Roof Board	6" (152 mm) ISO	Two: 5/8" (15.9 mm) DensDeck Roof Board 5/8" (15.9 mm) DensDeck Prime Roof Board	None	Mechanical
11	41	5/8" (15.9 mm) DensDeck Roof Board	6" (152 mm) ISO 1/2" (12.7 mm) HD Fiberboard	One: 5/8" (15.9 mm) DensDeck Prime Roof Board	None	Mechanical
12	41	5/8" (15.9 mm) DensDeck Roof Board	6" (152 mm) XPS (Extruded)	Two: 5/8" (15.9 mm) DensDeck Roof Board 5/8" (15.9 mm) DensDeck Prime Roof Board	None	Mechanical

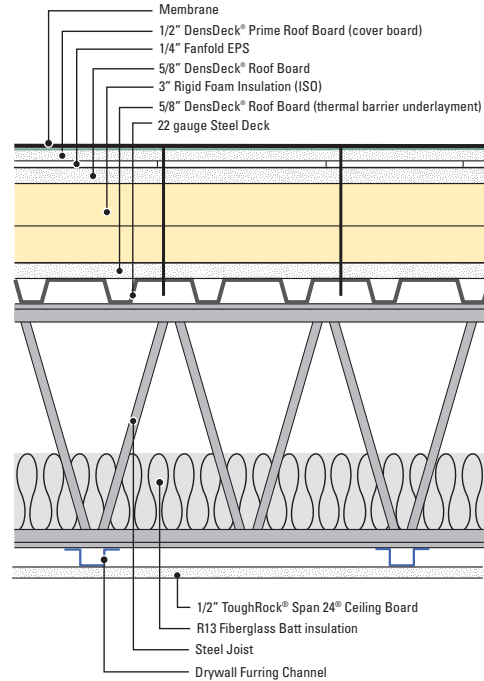
*See website for more details and assembly drawings.

Sound Control Illustrations

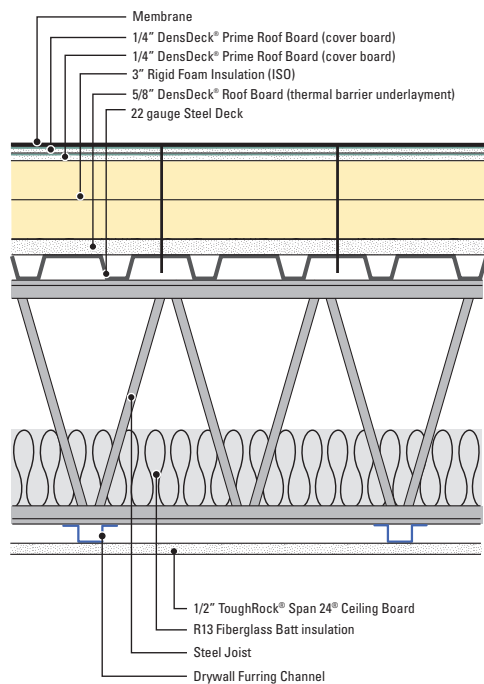
STC 56/OITC 42



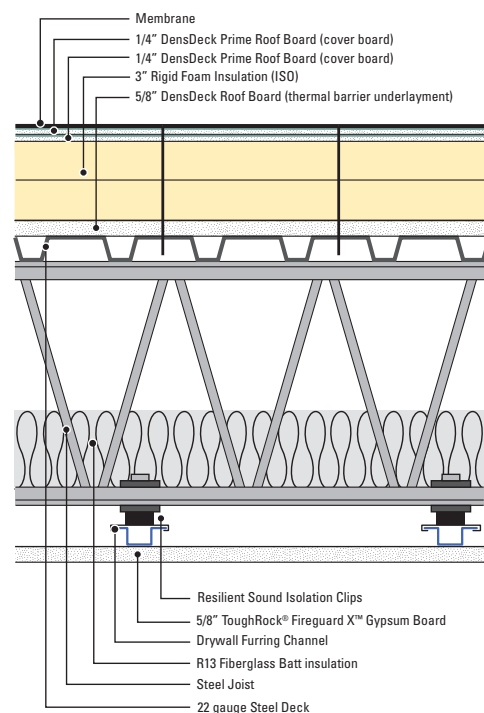
STC 57/OITC 43



STC 56/OITC 41



STC 58/OITC 43

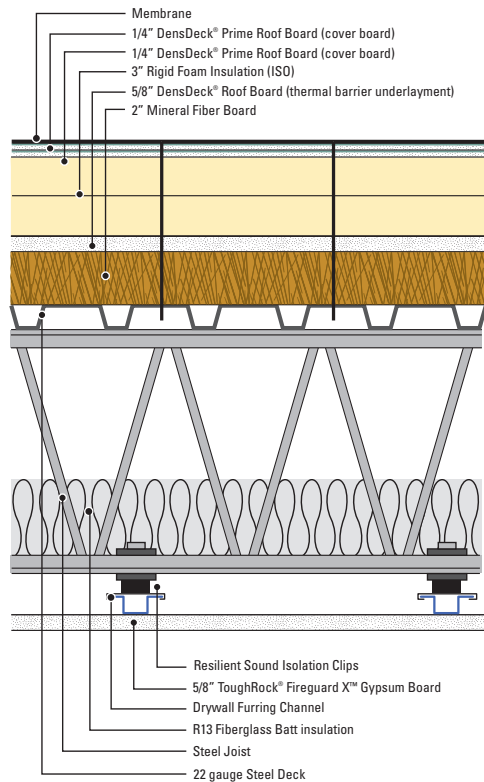


Tests per ASTM E90 and ASTM E413, were conducted in 2011 at Riverbank Acoustical Laboratories. Results are based on characteristics, properties and performance of materials and systems obtained under controlled test conditions. Actual results may vary and Georgia-Pacific makes no representations or warranties concerning the STC rating of any assembly.

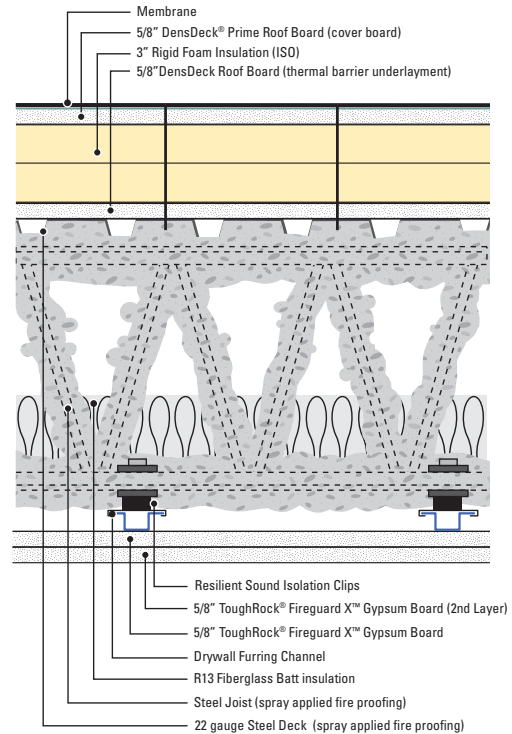
Assemblies are presented for illustration only. It is important that you consult a design professional for assembly information. Georgia-Pacific Gypsum does not provide architectural or engineering services.

Sound Control Illustrations continued

STC 59/OITC 44



STC 61/OITC 49



Tests per ASTM E90 and ASTM E413, were conducted in 2011 at Riverbank Acoustical Laboratories. Results are based on characteristics, properties and performance of materials and systems obtained under controlled test conditions. Actual results may vary and Georgia-Pacific makes no representations or warranties concerning the STC rating of any assembly.

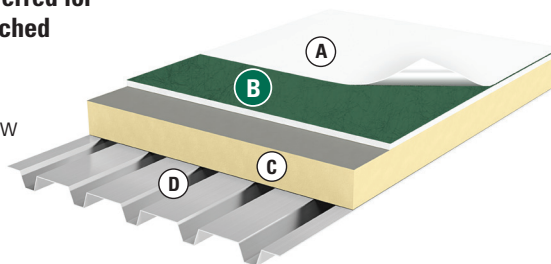
Assemblies are presented for illustration only. It is important that you consult a design professional for assembly information. Georgia-Pacific Gypsum does not provide architectural or engineering services.

Applications

The following are typical examples of roofing system applications with DensDeck® Roof Boards and are presented for illustration only. Please consult with the designer, system manufacturer or other design authority for use and installation of any application. Georgia-Pacific Gypsum does not provide roofing design services and makes no warranties or representation with respect to any particular system or any components or materials other than DensDeck Roof Boards. It is the responsibility of the system manufacturer or design authority to determine the suitability of DensDeck Roof Boards, or the use of other materials with DensDeck Roof Boards, for any particular application.

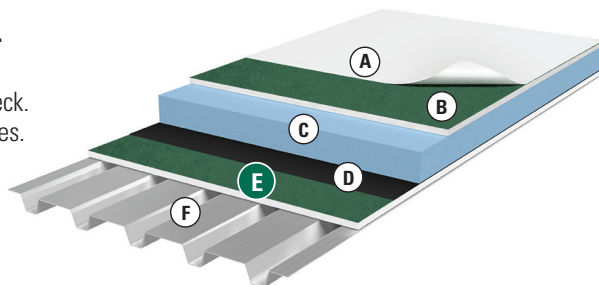
Cover Board – DensDeck® Prime and DensDeck® StormX™ preferred for adhered membrane. DensDeck preferred for mechanically attached membrane.

- A. Membrane
- B. Minimum 1/4" (6.4 mm) 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.
- C. Rigid Foam Insulation
- D. Any Structural Deck



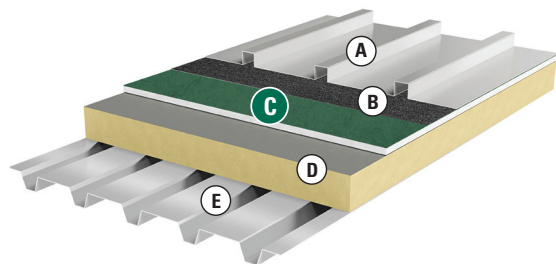
Substrate for Vapor Retarder – DensDeck Prime preferred.

- A. Membrane
- B. Minimum 1/4" (6.4 mm) DensDeck Roof Boards fastened to deck. Membrane attached with cold mastics, hot asphalt or adhesives.
- C. Rigid Foam Insulation
- D. Vapor Retarder
- E. Vapor Retarder Substrate
- F. Any structural deck



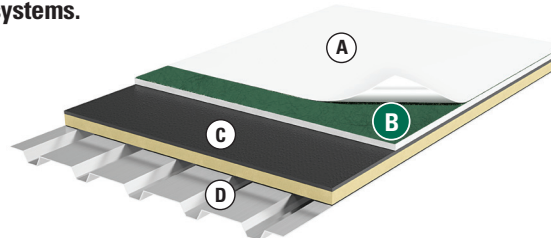
Metal Roof Thermal Barrier – DensDeck Prime preferred.

- A. Standing Seam Metal Roof
- B. Secondary Water Barrier
- C. Minimum 1/4" (6.4 mm) 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.
- D. Insulation (optional)
- E. Metal Deck



Roof Recover Board – DensDeck Prime preferred for adhered systems.

- A. Membrane
- B. Minimum 1/4" (6.4 mm) 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

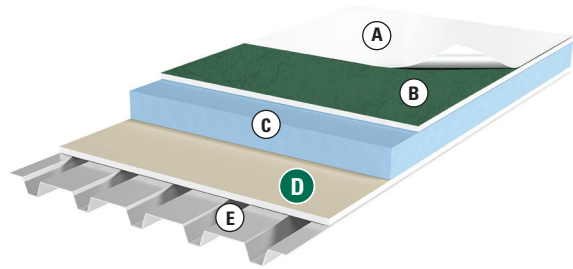


The highlighted green circle is intended to call attention to the recommended DensDeck board for that particular application.

Applications *continued*

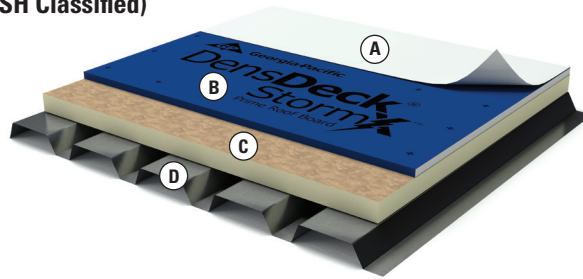
Thermal Barrier – DensDeck® or DensDeck® Prime

- A. Membrane
- B. Minimum 1/4" (6.4 mm) DensDeck Roof Board
- C. Rigid Foam Insulation*
- D. Minimum 1/4" (6.4 mm) DensDeck Roof Boards provide a thermal barrier installed directly to metal deck for both expanded and extruded polystyrene insulation.
- E. Metal Deck



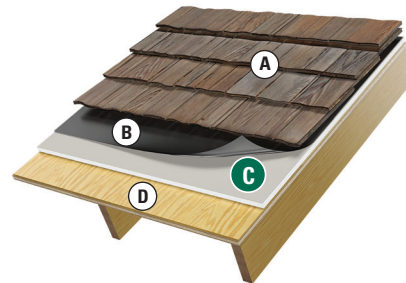
Typical Configuration of DensDeck® StormX™ Roof Boards (VSH Classified)

- A. Membrane
- B. Minimum 5/8" (15.9 mm) 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.
- C. Rigid Foam Insulation
- D. Any Structural Deck



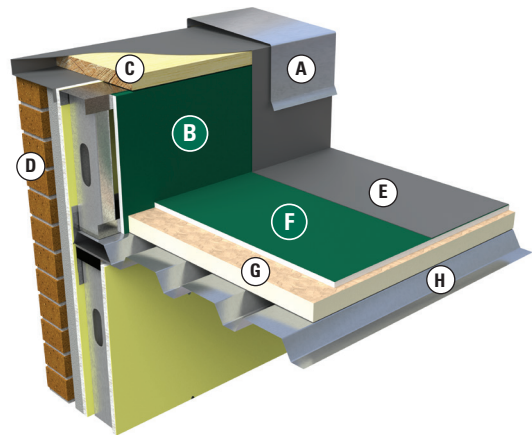
Wood Shake/Shingle Underlayment

- A. Wood Shake/Shingles
- B. Organic Felt
- C. Minimum 1/4" (6.4 mm) DensDeck Roof Board as a wood shake/shingle underlayment on a combustable deck assembly to achieve a UL Class A fire rating
- D. Combustible Deck



Parapet Wall Substrate – DensDeck Prime Roof Board preferred

- A. Coping
- B. Minimum 1/2" (12.7 mm) DensDeck Prime or 5/8" (15.9 mm) DensDeck StormX Roof Boards*
- C. Nailers
- D. Concrete Masonry Unit (CMU)
- E. Adhered Flashing Membrane
- F. Minimum 1/2" (12.7 mm) DensDeck Prime or 5/8" (15.9 mm) DensDeck StormX Roof Boards*
- G. DensDeck, DensDeck Prime or DensDeck StormX Roof Board
- H. Rigid Foam Insulation
- I. Any Structural Deck



*Fastened 8" o.c.

1/2" for 16" metal stud spacing

5/8" for 24" metal stud spacing

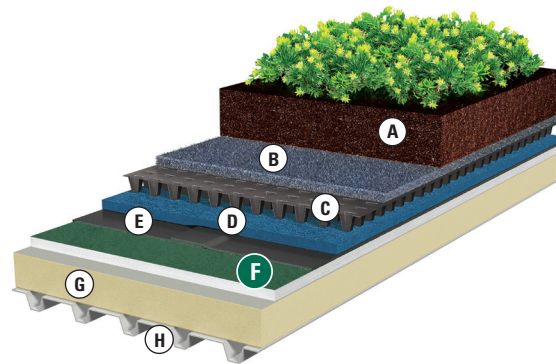
5/8" minimum over wood framing, 24" maximum stud spacing

The highlighted green circle is intended to call attention to the recommended DensDeck board for that particular application.

Applications continued

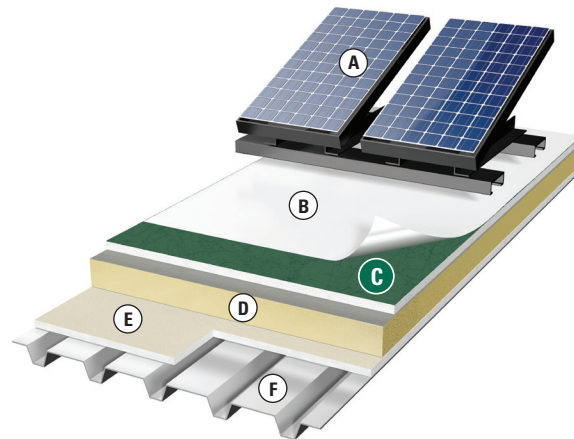
Vegetative “Green” Roof

- A. Growing Medium and Plants
- B. Moisture Retention Mat
- C. Drainage Layer
- D. Protection Fabric/Root Barrier
- E. Waterproofing Membrane
- F. Minimum 1/2” (12.7 mm) DensDeck® Prime Roof Board
- G. Insulation
- H. Any Structural Deck



Photovoltaic Roofing System

- A. PV Panels
- B. Roofing Membrane
- C. Minimum 1/4” (6.4 mm) DensDeck Prime Roof Board
- D. Insulation
- E. DensDeck® (optional)
- F. Any Structural Deck



The highlighted green circle is intended to call attention to the recommended DensDeck board for that particular application.

Physical Properties

DensDeck® Roof Board

Properties	1/4" (6.4 mm)	1/2" (12.7 mm)	5/8" (15.9 mm)
Thickness, nominal	1/4" (6.4 mm) ± 1/16" (1.6 mm)	1/2" (12.7 mm) ± 1/32" (0.8 mm)	5/8" (15.9 mm) ± 1/32" (0.8 mm)
Width, standard	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)
Length, standard	8' (2438 mm) ± 1/4" (6.4 mm)	8' (2438 mm) ± 1/4" (6.4 mm)	8' (2438 mm) ± 1/4" (6.4 mm)
Weight nominal, lbs./sq. ft. (Kg/m ²) ¹	1.2 (5.9)	2.0 (9.8)	2.5 (12.2)
Surfacing	Fiberglass mat	Fiberglass mat	Fiberglass mat
Flexural Strength ² , parallel, lbf. min. (N)	≥40 (178)	≥80 (356)	≥100 (444)
Flute Spanability ³	2-5/8" (67 mm)	5" (127 mm)	8" (203 mm)
Permeance ⁴ , perms (ng/Pa•S•m ²)	>50 (>2850)	>35 (>1995)	>32 (>1824)
R Value ⁵ , ft ² •°F•hr/BTU (m ² •K/W)	0.28 (0.05)	0.56 (0.10)	0.67 (0.12)
Linear Variation with Change in Temp., in/in/°F (mm/mm/°C)	8.5x10 ⁻⁶ (15.3x10 ⁻⁶)	8.5x10 ⁻⁶ (15.3x10 ⁻⁶)	8.5x10 ⁻⁶ (15.3x10 ⁻⁶)
Linear Variation with Change in Moisture	6.25x10 ⁻⁶	6.25x10 ⁻⁶	6.25x10 ⁻⁶
Water Absorption ⁶ , % max	10.0	10.0	10.0
Compressive Strength ⁷ , psi nominal	900	900	900
Surface Water Absorption, grams, nominal ²	<2.5	<2.5	<2.5
Flame Spread, Smoke Developed (ASTM E84, UL 723, ULC CAN-S102)	0/0	0/0	0/0
Fire Classification	UL certified FM Approvals See page 3	UL certified FM Approvals See page 3	UL certified FM Approvals See page 3
Bending Radius	5' (1524 mm)	8' (2438 mm)	12' (3658 mm)
Mold Resistance ⁸	10 (highest possible)	10 (highest possible)	10 (highest possible)
Product Standard Compliance	ASTM C1177	ASTM C1177	ASTM C1177

¹ Represents approximate weight for design and shipping purposes. Actual weight may vary based on manufacturing location and other factors.

² Tested in accordance with ASTM C473, method B.

³ Tested in accordance with ASTM E661.

⁴ Tested in accordance with ASTM E96 (dry cup method).

⁵ Tested in accordance with ASTM C518 (heat flow meter).

⁶ Specified values per ASTM C1177.

⁷ Tested in accordance with ASTM C473.

⁸ When tested, as manufactured, in accordance with ASTM D3273, DensDeck® Roof Boards have scored a 10, the highest level of performance for mold resistance under the ASTM D3273 test method. The score of 10, in the ASTM D3273 test, indicates no mold growth in a 4-week controlled laboratory test. The mold resistance of any building product when used in actual job site conditions may not produce the same results as were achieved in the controlled, laboratory setting. No material can be considered mold proof. For additional information, go to www.buildgp.com/safetyinfo.

Physical Properties *continued*

DensDeck® Prime Roof Board

Properties	1/4" (6.4 mm)	1/2" (12.7 mm)	5/8" (15.9 mm)
Thickness, nominal	1/4" (6.4 mm) ± 1/16" (1.6 mm)	1/2" (12.7 mm) ± 1/32" (0.8 mm)	5/8" (15.9 mm) ± 1/32" (0.8 mm)
Width, standard	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)
Length, standard	4' (1219 mm) & 8' (2438 mm) ± 1/4" (6.4 mm)	4' (1219 mm) & 8' (2438 mm) ± 1/4" (6.4 mm)	4' (1219 mm) & 8' (2438 mm) ± 1/4" (6.4 mm)
Weight nominal, lbs./sq. ft. (Kg/m ²) ¹	1.2 (5.9)	2.0 (9.8)	2.5 (12.2)
Surfacing	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating
Flexural Strength ² , parallel, lbf. min. (N)	≥40 (178)	≥80 (356)	≥100 (444)
Flute Spanability ³	2-5/8" (66.7 mm)	5" (127 mm)	8" (203 mm)
Permeance ⁴ , perms (ng/Pa•S•m ²)	>30 (>1710)	>23 (>1300)	>17 (>970)
R Value ⁵ , ft ² •°F•hr/BTU (m ² •K/W)	0.28 (0.05)	0.56 (0.10)	0.67 (0.12)
Linear Variation with Change in Temp., in/in/°F (mm/mm/°C)	8.5x10 ⁻⁶ (15.3x10 ⁻⁶)	8.5x10 ⁻⁶ (15.3x10 ⁻⁶)	8.5x10 ⁻⁶ (15.3x10 ⁻⁶)
Linear Variation with Change in Moisture	6.25x10 ⁻⁶	6.25x10 ⁻⁶	6.25x10 ⁻⁶
Water Absorption ⁶ , % max	5.0	5.0	5.0
Compressive Strength ⁷ , psi nominal	900	900	900
Surface Water Absorption, grams, nominal ²	1.0	1.0	1.0
Flame Spread, Smoke Developed (ASTM E84, UL 723, ULC CAN-S102)	0/0	0/0	0/0
Fire Classification	UL certified	UL certified	UL certified
FM Approvals	See page 3	See page 3	
Bending Radius	4' (1219 mm)	6' (1829 mm)	8' (2438 mm)
Mold Resistance ⁸	10 (highest possible)	10 (highest possible)	10 (highest possible)
Product Standard Compliance	ASTM C1177	ASTM C1177	ASTM C1177

DensDeck® StormX™ Prime Roof Board

Properties	5/8" (15.9 mm)
Thickness, nominal	5/8" (15.9 mm) ± 1/32" (0.8 mm)
Width, standard	4' (1219 mm) ± 1/8" (3 mm)
Length, standard	4' (1219 mm) & 8' (2438 mm) ± 1/4" (6.4 mm)
Weight nominal, lbs./sq. ft. (Kg/m ²) ¹	3.0 (14.6)
Surfacing	Fiberglass mat with non-asphaltic coating
Flexural Strength ² , parallel, lbf. min. (N)	≥100 (444)
Flute Spanability ³	8" (203 mm)
Permeance ⁴ , perms (ng/Pa•S•m ²)	>17 (>970)
R Value ⁵ , ft ² •°F•hr/BTU (m ² •K/W)	0.67 (0.12)
Linear Variation with Change in Temp., in/in/°F (mm/mm/°C)	8.5x10 ⁻⁶ (15.3x10 ⁻⁶)
Linear Variation with Change in Moisture	6.25x10 ⁻⁶
Water Absorption ⁶ , % max	5.0
Compressive Strength ⁷ , psi nominal	900
Surface Water Absorption, grams, nominal ²	1.0
Mold Resistance ⁸	10 (highest possible)
Product Standard Compliance	ASTM C1177
Fire Classification	UL certified FM Approvals. See page 3.

¹ Represents approximate weight for design and shipping purposes. Actual weight may vary based on manufacturing location and other factors.

² Tested in accordance with ASTM C473, method B.

³ Tested in accordance with ASTM E661.

⁴ Tested in accordance with ASTM E96 (dry cup method).

⁵ Tested in accordance with ASTM C518 (heat flow meter).

⁶ Specified values per ASTM C1177.

⁷ Tested in accordance with ASTM C473.

⁸ When tested, as manufactured, in accordance with ASTM D3273, DensDeck® Roof Boards have scored a 10, the highest level of performance for mold resistance under the ASTM D3273 test method. The score of 10, in the ASTM D3273 test, indicates no mold growth in a 4-week controlled laboratory test. The mold resistance of any building product when used in actual job site conditions may not produce the same results as were achieved in the controlled, laboratory setting. No material can be considered mold proof. For additional information, go to www.buildgp.com/safetyinfo.

Recommendations and Limitations for Use

The following recommendations and limitations together with the delivery, storage, handling and other guidelines contained in this guide are given to help assure satisfactory performance from DensDeck® Roof Boards. Failure to adhere to such recommendations and limitations may void the limited warranty provided by Georgia-Pacific Gypsum for such product. DensDeck® Prime Roof Boards (1/2" and 5/8" only) and DensDeck® StormX™ Roof Boards (5/8") are backed with a limited warranty for up to 90 days of exposure to normal weather conditions when applied on **vertical** parapet walls. For additional details and warranty information for DensDeck Roof Boards, please go to www.DensDeck.com.

Georgia-Pacific Gypsum does not warrant and does not provide specifications or instructions for any specific assembly or system utilizing DensDeck Roof Boards or any component in such assemblies or systems other than DensDeck Roof Boards. Any references to assemblies or systems are for illustration or general information only. Consult with the appropriate system manufacturer and/or design authority for system specifications and instructions. In case of conflicting recommendations, system manufacturers and/or design authority's should prevail.

Design

DensDeck Roof Boards are manufactured to act with a properly designed roof system following good roofing practices. The actual use of DensDeck Roof Boards as a roofing component in any system or assembly is the responsibility of the roofing system's designing authority. Georgia-Pacific Gypsum does not offer roofing system design services and neither warrants, nor is responsible for, any systems or assemblies utilizing DensDeck Roof Boards or any component in such systems or assemblies other than DensDeck Roof Boards.

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 system designer.

Confirm any priming requirements of DensDeck Roof Boards with membrane manufacturer.

The entry of water vapor and its subsequent condensation can be detrimental to a roof's performance, including the performance of DensDeck Roof Boards. Vapor retarders can be used to control migration of water vapor into the roof system. Determining the need for a vapor retarder, its compatibility with other materials, such as structural concrete decks, and the details of its construction is the responsibility of the designer.

Application

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

DensDeck and DensDeck Prime 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.

When Roof Top Paver Pedestal Systems are applied over DensDeck Roof Boards, the calculated pedestal PSI loads with safety factor shall not exceed the compressive strength of DensDeck.

For hot mopping asphalt or coal tar directly to DensDeck Prime 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. However, the product must be dry prior to commencing installation of torch application.

- Ensure product is dry. Ensure proper torching technique.
- Limit the heat to the roof board. Maintain a majority of the torch flame directly on the roll.
- When torching to DensDeck Prime or DensDeck StormX Roof Boards, field priming should not be required.

Recommendations and Limitations for Use *continued*

Installation

Apply only as many DensDeck® Roof Boards as can be covered by a roof membrane system in the same day.

DensDeck Roof Boards of any thickness do not require gapping. Board edges and ends should be butted tightly together. When installed on a structural metal deck, edge joints should be located on and parallel to top flutes, so that edges are supported.

Independent evaluations have demonstrated that hot mopping to DensDeck products is an acceptable method of bonding membranes. However, the product must be dry prior to commencing installation of hot asphalt application, with free moisture content less than 1% using a moisture meter that has been set to the gypsum scale.

- When using DensDeck or DensDeck® Prime Roof Boards, Georgia-Pacific Gypsum recommends maximum asphalt application temperatures of 425°F (218°C) to 450°F (232°C). 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.

DensDeck Prime and DensDeck® StormX™ may be flood mopped to a substrate followed by a flood mopped application of membrane using these guidelines:

- DensDeck Prime Roof Boards and substrate must be dry.
- Asphalt used to install DensDeck Prime should be allowed to cool prior to mopping base sheet to top of DensDeck boards.
- Allow base ply to cool before mopping additional plies or cap sheet to limit the amount of direct heat that is applied to boards.

Moisture Management

Conditions beyond the control of Georgia-Pacific Gypsum, such as weather conditions, dew, leaks, application temperatures and techniques may cause adverse effects with roofing systems. **All components used in roofing systems, including DensDeck Roof Boards, must be protected from exposure to moisture before, during and after installation.** Although DensDeck Roof Boards are engineered with fiberglass facings and high density gypsum cores, the presence of moisture can have a detrimental effect on the performance of the product and the installation of roofing membranes.

To ensure that the DensDeck Roof Boards remain dry prior to installation, the materials must be properly handled upon receipt. Remove any plastic packaging from all DensDeck products immediately upon receipt of delivery. Failure to remove plastic packaging may result in entrapment of condensation or moisture, which may cause application problems that are not the responsibility of Georgia-Pacific Gypsum.

Any protective, plastic factory packaging that is used to wrap DensDeck Roof Boards for shipment is intended to provide temporary protection from moisture exposure during transit only and is not intended to provide protection during storage after delivery.

DensDeck products stored outside must be stored level and off the ground and protected by a waterproof covering. Provide means for air circulation around and under stored bundles of DensDeck Roof Boards. Use adequate supports to keep the bundles flat, level and dry.

Moisture can cause blisters to form during hot mopping or torching to any substrate. Because DensDeck Roof Boards are relatively dense, any excess moisture will typically vaporize and travel upward into the interface between the membrane and substrate rather than dissipating within the board. In fully adhered single ply or cold mastic bitumen systems, the evaporation of solvents may be restricted and may cause solvent blisters.

Moisture accumulation may also adversely affect the structural stability or bond of roofing system components, including DensDeck Roof Boards, and may significantly decrease wind uplift and vertical pull resistance in the system or assembly. DensDeck Roof Boards exposed to moisture may need to be evaluated for structural stability to assure wind uplift performance.

Recommendations and Limitations for Use *continued*

Care should also be taken during installation to avoid the accumulation of moisture in the system. DensDeck® Roof Boards must be covered the same day as installed. Avoid application of DensDeck Roof Boards during rain, heavy fog and any other conditions that may deposit moisture on the surface, and avoid the overuse of non-vented, direct-fired heaters during winter months. **When roofing systems are installed on new poured concrete or light weight concrete decks or when re-roofing over an existing concrete deck, a vapor retarder should be installed above the concrete to limit the migration of water from the concrete into the roof assembly.** Always consult the roofing system manufacturer or design authority for specific instructions for applying other products to DensDeck Roof Boards.

Finally, care must be taken after installation to avoid and properly manage leaks and other water accumulation. Moisture vapor movement by convection must be eliminated, and the flow of water by gravity through imperfections in the roof system must be controlled. After a leak has occurred, no condensation on the upper surface of the system should be tolerated, and the water introduced by the leak must be dissipated to the building interior in a minimum amount of time.

High-Performance Gypsum Products from Georgia-Pacific

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



SALES INFORMATION AND ORDER PLACEMENT

U.S.A.	Northeast: 1-800-947-4497
	Southeast: 1-800-327-2344
	Pacific Southwest: 1-800-824-7503
	Pacific Northwest: 1-800-444-0092
	Midwest: 1-800-876-4746
	Central: 1-800-231-6060
CANADA	Eastern Canada: 1-800-387-6823
	Western Canada: 1-800-558-0092
DENSDECK	1-855-647-3325

TECHNICAL HOTLINE

U.S.A. and Canada: **1-800-225-6119**



TRADEMARKS –

Unless otherwise noted, all trademarks are owned by or licensed to Georgia-Pacific Gypsum. MICROSOFT is a registered trademark of Microsoft Corporation. MASTERSPEC is a registered trademark of The American Institute of Architects. REVIT is a registered trademark of Autodesk, Inc. RoofNav is a registered mark of FM Approvals LLC.

WARRANTIES, REMEDIES AND TERMS OF SALE –

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

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.

CAUTION: For product fire, safety and use information, go to buildgp.com/safetyinfo or call 1-800-225-6119.

HANDLING AND USE –

WARNING: Provide appropriate exhaust ventilation at places where dust is formed. Minimize dust generation and accumulation. Do not breathe dust. Do not get this material in contact with eyes. Do not taste or swallow. Avoid prolonged exposure. Observe good industrial hygiene practices. Use only in well-ventilated areas. Wear appropriate NIOSH/MSHA approved dust mask or filtering facepiece if dust is generated. Do not eat or drink while using the product. Wash hands before eating, drinking, or smoking.

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

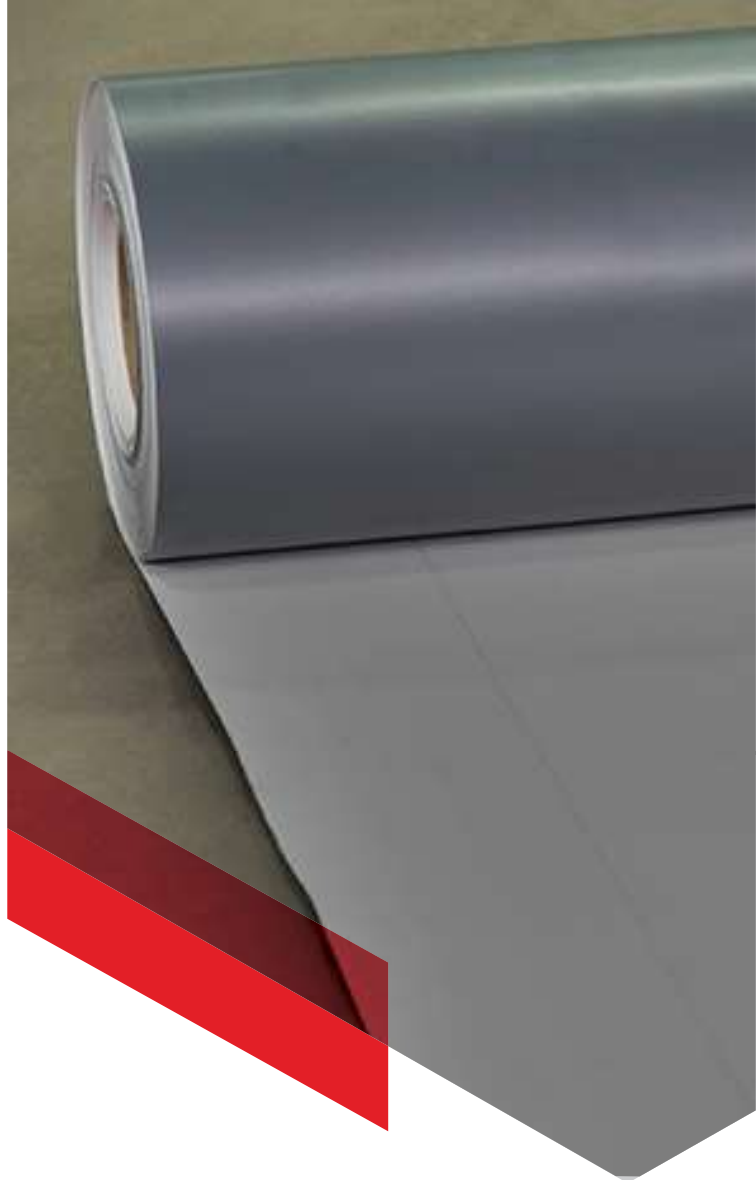
rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other 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.

www.gpgypsum.com

ALLCO JM TPO

Allco JM TPO is a single ply, polyester fabric reinforced, thermoplastic polyolefin (TPO) fully bonded waterproofing sheet membrane for roofs and decks, applied as a fully bonded or mechanically fixed system with heat-welded seams. Also available in fleece backed (FB).

Allco JM TPO is suitable for commercial and residential low-slope and pitched roofs, gutters, parapets, balconies, and under floating decks. Allco JM TPO can also be used as the waterproofing membrane for Allco's warm & cold roof solutions.



Product	Colour	Thickness (mm)	Roll Length (m)	Roll Width (mm)	Coverage (m2)	Cut-to-length	Water Potable*	BRANZ Appraised	Product Warranty	Stock item
JM TPO	White	1.52	30	1524	46.45		Yes	Yes	20 Years	Indent
		1.52	30	3048	92.90		Yes	Yes	20 Years	Indent
		2.03	23	1524	34.84		Yes	Yes	20 Years	Indent
	Grey	1.14	30	3048	92.90		Yes	Yes	20 Years	Yes
		1.52	30	1524	46.45		Yes	Yes	20 Years	Yes
		1.52	30	3048	92.90	Yes	Yes	Yes	20 Years	Yes
		1.52	30	3657	111.5		Yes	Yes	20 Years	Yes
		2.03	23	1828	41.70		Yes	Yes	20 Years	Indent
	Tan	1.14	30	1828	55.57		Yes	Yes	20 Years	Indent
JM TPO FB	White	2.92	30	3048	92.90		Yes	Yes	20 Years	Indent
	Grey	2.92	30	3048	92.90	Yes	Yes	Yes	20 Years	Yes

SCOPE OF USE

Allco JM TPO membrane is suitable for use as a roof and deck waterproofing membrane on buildings within the following scope:

- The scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1
- The scope limitations of NZBC Acceptable Solutions E2/AS1, Paragraph 1.1 with regard to building height and floor plan area when subject to specific structural design; and with substrates of plywood, Strandsarking (roofs only) or suspended concrete slab;
- With minimum falls of roofs 1:30 and decks 1:40
- With deck size limited to 40m²
- Situated in NZS 3604 Wind Zones, up to, and including Extra High; and with the weather tightness design of junctions for each specific structure being the responsibility of the building designer.

Allco recommends that before specifying waterproofing membrane products that Architects and building designers consult the relevant NZBC documents and NZ Standards including, but not limited to these listed below:

- NZBC Acceptable Solution E2/AS1: External Moisture
- NZS 3604: 2011 Timber-framed Buildings
- AS/NZS 2269: 2012 Plywood - Structural
- AS/NZS 1170: 2002 Structural Design Actions
– General Principles NZBC Acceptable Solution C/AS1 – C/AS6: Protection from Fire

TECHNICAL

Durability: Allco JM TPO has a 20 Year durability warranty
NZBC Compliance: Allco JM TPO, when installed and maintained in accordance with the supplier's instructions and maintenance requirements, will satisfy the durability clause NZBC B2.3.1 (b) 15 years. Allco JM TPO meets the relevant clauses of NZBC E3 Internal Moisture and F2 Hazardous Building Materials.

Design requirements: Product specification and incorporation of Allco JM TPO, into the building design shall be carried out by a designer, or architect, or engineer, or building professional who; is qualified to design the buildings covered under the "Scope" of use of this product; and has ready access to the technical specifications including installation details and standards referenced to in the BRANZ Appraisal No.1046 (2018) where the design limitations are outlined for the scope of this data sheet.

Allco JM TPO is supplied as a complete system with proprietary heat weldable accessories to deal with roof penetrations including internal and external corners and pourable pockets. Refer to the Allco website www.allco.co.nz or refer to an Allco Account Manager for a full list of accessories.



masterspec
Specification No. 4422AJ

INSTALLATION

Installation shall be carried out by an Allco Approved Applicator. Installation shall be undertaken in accordance with all relevant technical information related to the selected installation method, including information contained within the BRANZ Appraisal No. 1046 (2018) and the suppliers installation instructions.

MSDS

Material Safety Data Sheets (MSDS) are available on request from your Allco account manager or by visiting our website www.allco.co.nz

SPECIFICATION & SUBSTITUTION

Allco specification documents are available through Masterspec or can be downloaded from our website (www.allco.co.nz). Substitution of any products in NZBC compliant systems should not be accepted and we recommend this be made clear in all specification and tender documents.

MAINTENANCE REQUIREMENTS

Maintenance requirements for Allco JM TPO are outlined in Allco's Care and Maintenance Guide.

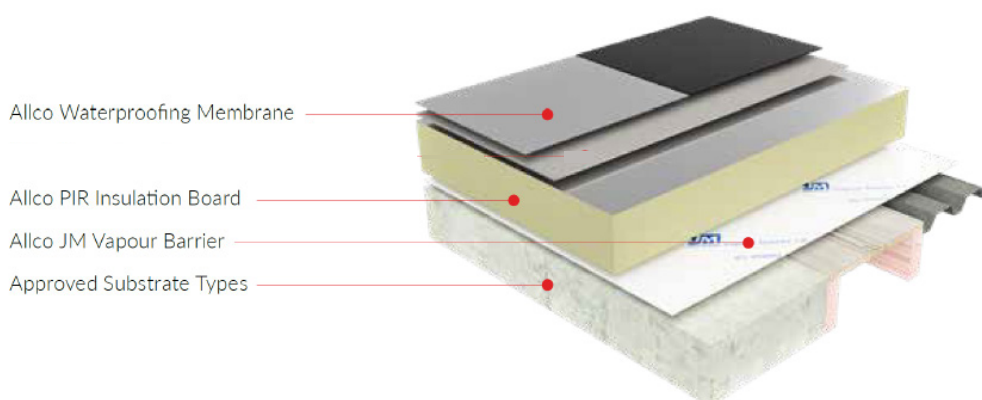
In the event of damage to the membrane, the membrane must be repaired by an Allco approved applicator only who can remove the damaged portion and heat weld a patch as for new work. Drainage outlets must be maintained to operate effectively.



BRANZ Appraised
Appraisal No. 1166 [2021]

THE ALLCO WATERPROOFING SOLUTIONS - WARM ROOF AND DECK SYSTEM

Appraisal No. 1166 [2021]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 The Allco Waterproofing Solutions - Warm Roof and Deck System is an insulating roofing system for limited access flat roofs and decks with concrete, timber or steel substrates. It consists of a thermal insulation layer and a waterproofing membrane roof finish.

Scope

- 2.1 The Allco Waterproofing Solutions - Warm Roof and Deck System has been appraised for use as an insulating roof or deck on buildings within the following scope:
- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and maximum floor plan areas; and,
 - on limited access flat roofs with concrete, timber or steel structural decks subject to specific structural design; and,
 - with roofs and decks constructed to drain water to gutters and drainage outlets complying with the NZBC; and,
 - with roofs and decks constructed to suitable falls [Refer Paragraphs 15.3 and 15.4]; and,
 - with no steps within the deck, no integral roof gardens and no downpipes directly discharging to the deck; and,
 - situated in NZS 3604 Wind Zones up to, and including, Extra High.
- 2.2 The Allco Waterproofing Solutions - Warm Roof and Deck System has also been appraised for durability and thermal performance as an insulated roofing and deck system on buildings that are the subject of specific design with no building height restriction. Building designers are responsible for the building design and for the incorporation of The Allco Waterproofing Solutions - Warm Roof and Deck System into their design in accordance with the declared properties and instructions of Allco Waterproofing Solutions Ltd.
- 2.3 The Allco Waterproofing Solutions - Warm Roof and Deck System must be installed by Allco Waterproofing Solutions Ltd approved and trained installers.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, The Allco Waterproofing Solutions - Warm Roof and Deck System, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 [b] 15 years. The Allco Waterproofing Solutions - Warm Roof and Deck System meets this requirement. See Paragraphs 10.1 and 10.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. The Allco Waterproofing Solutions - Warm Roof and Deck System meets these requirements. See Paragraphs 15.1-15.9.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Allco Waterproofing Solutions - Warm Roof and Deck System meets this requirement.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 [a]. The Allco Waterproofing Solutions - Warm Roof and Deck System will contribute to meeting this requirement. See Paragraph 14.1.

Technical Specification

- 4.1 The Allco Waterproofing Solutions - Warm Roof and Deck System is an insulating roofing for flat roofs. The thermal layer is a polyisocyanurate board available in a number of thicknesses to suit design requirements. The insulation board is adhesive-bonded on limited access flat roofs and decks of concrete, timber and steel substrates. The roof and deck finish is either a modified bitumen or TPO waterproofing membrane which is either torch-applied or adhesive-fixed to the insulation board.
- 4.2 Materials supplied by Allco Waterproofing Solutions Ltd are as follows:
- Allco Casali Dermafil Cap Sheet
 - Allco Casali Dermabit Extra Cap Sheet
 - Allco Casali Aderix SA Base Sheet
 - Allco JM TPO
 - Allco PIR Insulation (Conqueror)
 - Allco JM TPO Vapour Barrier SA
 - Allco JM Membrane Primer
 - Allco JM Urethane Adhesive
 - Allco Roof-Tac Contact Adhesive

Handling and Storage

- 5.1 Handling and storage of all materials whether on-site or off-site is under the control of the Allco Waterproofing Solutions Ltd approved and trained installers. Dry storage must be provided for all products and the rolls of membrane must be stored in an upright position.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for The Allco Waterproofing Solutions - Warm Roof and Deck System. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 The Allco Waterproofing Solutions - Warm Roof and Deck System is a roof and deck system which provides thermal insulation and waterproofing. It is for use on limited access flat roofs and decks subject only to light foot traffic for maintenance purposes. The insulation board is adhesive-bonded to concrete, timber or metal structural decks which are subject to specific structural design. The insulation board is available in several thicknesses to suit various thermal insulation designs.
- 7.2 The system can be used on new or existing roofs and decks subject to the suitability of the substrate of existing roofs.
- 7.3 The waterproofing membrane system is either a fully bonded adhesive-fixed TPO membrane with heat welded joints, or a double-layer, torch-applied, modified bitumen sheet.
- 7.4 The vapour control membrane, JM Vapour Barrier, is self-adhesive and applied over the structural deck before the installation of the insulation board.
- 7.5 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membrane. Refer to the BRANZ publication 'Good Practice Guide - Membrane Roofing'.

Structure

- 8.1 The fully bonded Allco Waterproofing Solutions - Warm Roof and Deck System is suitable for buildings situated in NZS 3604 Wind Zones up to, and including, Extra High.
- 8.2 For buildings subject to specific design, the structural designer must confirm that the adhesive fixing has adequate adhesion to the substrates.

Substrates

Plywood

- 9.1 Plywood must be treated to H3 [CCA treated]. LQSP treated plywood must not be used. Plywood must be a minimum of 17 mm to comply with AS/NZS 2269, at least CD Grade Structural, with the sanded C face upwards.

Concrete

- 9.2 Concrete substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101.

Steel

- 9.3 The steel substrate must be G550 aluminium-zinc AZ150 to AS1397.

Existing Construction

- 9.4 A thorough inspection of the substrate must be made to ensure it is in fit condition.
- 9.5 Repairs must be undertaken, where applicable, to ensure the substrate is sound. Plywood and steel substrates must be checked for screw fixings, and if necessary, refixed as for new plywood and steel.

Durability

Serviceable Life

- 10.1 The Allco Waterproofing Solutions - Warm Roof and Deck System is expected to have a serviceable life of at least 15 years, provided it is designed, used, installed and maintained in accordance with this Appraisal and the Technical Literature.

Chemical Resistance

- 10.2 Industrial air pollutants and windborne salt deposits should not significantly affect the durability of the membrane. However, the long term properties of the material may be affected by contact with petroleum-based products such as oils, greases and solvents.

Maintenance

- 11.1 The membrane roof system, including any areas with an ultraviolet (UV) coating applied, must be regularly (at least annually) checked for damage, rubbish and debris or coating breakdown. Damage, such as small punctures and tears, must be repaired and coatings reapplied as recommended by Allco Waterproofing Solutions Ltd.
- 11.2 Special care must be taken when inspecting the membrane roof system to ensure the continuing prevention of moisture ingress, and repairs must be undertaken where required.
- 11.3 Drainage outlets must be maintained to operate effectively.

Prevention of Fire Occurring

- 12.1 Separation or protection must be provided to The Allco Waterproofing Solutions - Warm Roof and Deck System from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Control of Internal Fire and Smoke Spread

- 13.1 The Allco Waterproofing Solutions - Warm Roof and Deck System meets the flame propagation criteria of AS 1366 as specified in NZBC Acceptable Solution C/AS1, Paragraph 4.3 and NZBC Acceptable Solution C/AS2, Paragraph 4.17.
- 13.2 The Conqueror PIR 50 mm insulation board has been tested in accordance with ISO 9705 and achieved a Group Number of 2-S. Refer to Table 4.1 of NZBC Acceptable Solution C/AS2 to determine where the product may be used when exposed to view from interior spaces according to its Group Number.

Energy Efficiency

- 14.1 Thermal resistance [R-Value] of building elements may be verified by using NZS 4214. The R-Value for the Allco PIR Insulation 80 mm thick is R 3.40.

External Moisture

- 15.1 Roofs must be designed and constructed to shed precipitated moisture. They must also take account of snowfalls in snow prone areas. A means of meeting code compliance with NZBC Clause E2.3.1 is given in the Technical Literature which aligns with details in NZBC Acceptable Solution E2/AS1.
- 15.2 When installed in accordance with this Appraisal and the Technical Literature, The Allco Waterproofing Solutions - Warm Roof and Deck System will prevent the penetration of water and will therefore meet code compliance with NZBC Clause E2.3.2. The membrane is impervious to water and will give a weathertight roof.
- 15.3 Roof and deck falls must be built into the substrate.
- 15.4 The minimum fall is 1 in 30 for plywood roofs, 1 in 60 for concrete roofs, and 1 in 100 for gutters. The minimum fall for decks is 1 in 40. All falls must slope to an outlet. Inadequate falls will allow moisture to collect and increase the risk of deterioration of the membrane. *[Note: Where possible BRANZ recommend a fall of 1:60 for gutters].*
- 15.5 Allowance for deflection and settlement of the substrate must be made in the design of the roof to ensure falls are maintained and no ponding of water can occur.
- 15.6 The Allco Waterproofing Solutions - Warm Roof and Deck System is impermeable; therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with NZBC Clause E2.3.6.
- 15.7 Drainage flanges must be used for any outlet and must be fitted with a grate or cage to reduce potential sources of blockages. An overflow must be provided where the roof does not drain to an external gutter or spouting.

- 15.8 Penetrations and upstands of the membrane must be raised above the level of any possible flooding caused by the blockage of roof drainage.
- 15.9 The design of details not covered by the Technical Literature is subject to specific weathertightness design and is outside the scope of this Appraisal.

Condensation Control

- 16.1 JM Vapour Barrier must be installed over the substrate prior to installing the insulation.

Water Supplies

- 17.1 The Allco Waterproofing Solutions - Warm Roof and Deck System has not been assessed for roofs used for the collection of potable water.

Installation Information

Installation Skill Level Requirement

- 18.1 Installation must always be carried out in accordance with The Allco Waterproofing Solutions - Warm Roof and Deck System Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.
- 18.2 Installation and finishing of components and accessories supplied by Allco Waterproofing Solutions Ltd and its approved applicators must be completed by trained applicators, approved by Allco Waterproofing Solutions Ltd.
- 18.3 Installation of the accessories supplied by the building contractor must be carried out in accordance with The Allco Waterproofing Solutions - Warm Roof and Deck System Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.

Preparation of Substrates

- 19.1 Substrates must be dry, clean and stable before installation commences.
- 19.2 The relative humidity of concrete substrates must be 75% or less before membrane application. The concrete can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 585.
- 19.3 The moisture content of the plywood and timber substructure must be a maximum of 20% and the plywood sheets must be dry at time of membrane application.

System Installation

- 20.1 The Allco Waterproofing Solutions - Warm Roof and Deck System must be installed in accordance with the Technical Literature.
- 20.2 The vapour layer is installed onto the substrate followed by the insulation. The insulation is set out in a brick bond fashion and is screwed down using the screws and washers as defined in the Technical Specification.
- 20.3 The membrane double layer system is then installed over the insulation; generally the membrane must be unrolled without tension onto the prepared substrate and allowed to 'relax' for at least 30 minutes prior to installation.
- 20.4 The membrane is then installed from the lowest point and each layer is installed across the roof or deck fall allowing a 80 mm side overlap and a 150 mm end overlap. The cap sheet layer must be offset against the base sheet layer.

Inspections

- 21.1 Critical areas of inspection for waterproofing systems are:
- Construction of substrates, including crack control and installation of bond breakers and movement control joints.
 - Moisture content of the substrate prior to the application of the system.
 - Acceptance of the substrate by the system installer prior to application of the system.
 - Installation of the system to the Technical Literature.

Health and Safety

- 22.1 Safe use and handling procedures for The Allco Waterproofing Solutions - Warm Roof and Deck System are provided in the Technical Literature. The products must be used in conjunction with the relevant Material Safety Data Sheets for each product.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 23.1 The following is a summary of the testing and test reports on The Allco Waterproofing Solutions - Warm Roof and Deck System:
- Assessment by Belgian Union for Technical Approval [UBAtc] and granted "Technical Approval with Certification" under ATG certificate numbers 1924 and 2850. The testing covered tensile strength, elongation, peel resistance [joints], joint strength, low temperature flexibility, fatigue resistance, nail hold, resistance to heat aging, static load, indentation resistance and peel resistance [substrate].
 - Assessment by BRANZ for tensile adhesive strength of The Allco Waterproofing Solutions - Warm Roof and Deck System.

The above test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 24.1 A durability opinion has been provided by BRANZ technical experts.
- 24.2 Installation of the insulation and membranes has been assessed by BRANZ for practicability of installation and found to be satisfactory.
- 24.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 25.1 The manufacture of the components of the system has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 25.2 The quality of the supply of products to the New Zealand market is the responsibility of Allco Waterproofing Solutions Ltd.
- 25.3 Quality on-site is the responsibility of the Allco Waterproofing Solutions Ltd trained and approved installers.
- 25.4 Designers are responsible for the building design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of Allco Waterproofing Solutions Ltd and this Appraisal.
- 25.5 Building owners are responsible for the maintenance of the membrane system in accordance with the instructions of Allco Waterproofing Solutions Ltd and this Appraisal.



Sources of Information

- AS/NZS 1170: 2002 Structural design actions - General principles.
- AS/NZS 2269: 2012 Plywood - structural.
- BRANZ Bulletin No. 585 Measuring Moisture in Timber and Concrete.
- BRANZ Good Practice Guide - Membrane Roofing, reprint October 2015.
- ISO 9705:1993 Fire tests - Full scale room test for surface products.
- NZS 3101: 2006 The design of concrete structures.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 4214: 2006 Methods of determining the total thermal resistance of parts of buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



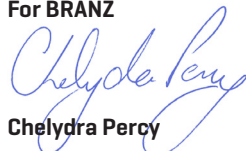
In the opinion of BRANZ, **The Allco Waterproofing Solutions - Warm Roof and Deck System** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **GL Imports Ltd**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **GL Imports Ltd**:
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For BRANZ



Chelydra Percy
Chief Executive

Date of Issue:
24 May 2021

Supplementary Test Report

Test Report No. AFS-R1059

The following supplementary report of observations and outcomes from testing of the Allco Waterproofing Solutions Limited warm roof system on a 40mm thick reinforced concrete substrate. The information and results recorded in this supplementary report has been extrapolated from the full test report AFS-R1058.

The test results recorded in Test Report AFS-R1059 are outside the scope of the laboratories accreditation.

Prepared for: Allco Waterproofing Solutions Limited

Date of Issue: 21st July 2022

Test Date(s): 25th May 2022

Sample Designer: Allco Waterproofing Solutions Limited

Manufacturer: Allco Waterproofing Solutions Limited

Test & Sample Details: Uplift Resistance Testing of Allco Waterproofing Solutions adhered TPO membrane warm roof systems on 40mm reinforced concrete substrate.

Test Procedure: ANSI/SPRI IA-1 Standard Field Test Procedure for Determining the Uplift Resistance of Insulation and Insulation Adhesive Combinations over Various Substrates

Client Details: Allco Waterproofing Solutions Limited
5 Te Kea Place,
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Laboratory Details: All Facade Services Limited
74 Moxham Ave
Hataitai
Wellington 6021

Tested by:
Darryl Scott (AFS)

Checked by:
Jon Johnston

1. Summary

1.1 Description

For each warm roof systems tested, a total of five 610mm x 610mm test samples were prepared by Allco Waterproofing Systems Limited using a combination of TPO membrane, a paper faced gypsum cover board, a foil faced PIR insulation layer and a vapour barrier, all of which were adhesive fixed onto a 40mm thick reinforced concrete substrate.

Full details of the test samples are recorded at Section 3.0.

1.2 Results

Table 1 below records the average uplift resistance achieved for the 5 warm roof samples tested on a 40mm thick reinforced concrete substrate. Uplift resistance is shown in pounds per square foot (psf).

Sample Substrate	TPO	Cover Board	PIR	Vapor Barrier	Adhesive Type 1	Adhesive Type 2	Average Resistance (psf)
40mm Reinforced Concrete	JM 1.52mm Single Ply TPO	Georgia Pacific 15.9mm DensDeck Cover Board	Conqueror 75mm Foil Faced PIR	JM Tri-laminate Membrane	Glue Guru Bit-U-Prime	Glue Guru CANTAC Roof-Tac	300

Table 1: Averaged uplift resistance results.


Uplift resistance results for each warm roof sample are recorded at section 6.0 Test Results. Full test results are recorded at Appendix B.

2. Objective

Uplift resistance tests were conducted on the Allco Waterproofing Systems Ltd test samples to determine the comparative performance of each combination in resisting separation of the individual sample components. The results are used as the basis for selection of the most critical (membrane, adhesive, substrate) combination to be used to achieve the highest level of uplift resistance without delamination or destruction of the test sample or individual components.

3. Sample Description

A total of five 610mm x 610mm test samples were prepared by Allco Waterproofing Systems Limited using a combination of TPO membrane, a paper faced gypsum cover board, a foil faced PIR insulation layer and a vapour barrier with all layers adhesive fixed to the 40mm thick concrete substrate.

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Checked by: 

With the exception of the cover board thickness, all test samples comprised of the same layers using the following materials:

- Cantac Bit-U-Prime. A low VOC sprayable bitumen primer formulated to prepare substrates for the installation of bitumen membranes for roofing. Supplied in 17kg canisters.
- JM Vapour barrier. A tri-laminate woven polyethylene SBS rubber and asphalt blend membrane. Suitable for use on concrete and plywood substrates.
- Cantac Roof-Tac. A low VOC sprayable rubber-based adhesive formulated for bonding roofing membranes. Supplied in 17kg canisters.
- Conqueror 75mm thick PIR. A polyisocyanurate (PIR) insulating core sandwiched between 2 high-performance foil facing sheets.
- GP DensDeck Prime roof cover board. A nominal 6.4mm* or 15.9mm* gypsum based core with fibreglass mat facer to both front and back of sheet.
- JM TPO. A 1.52mm thick Thermoplastic Polyolefin reinforced single ply membrane.

**Although manufacturers literature advised the GP DensDeck cover boards are manufactured with thicknesses of 6.4mm and 15.9mm, a cover board thickness of 8.5mm was measured on the plywood and profiled metal substrates with cover board thicknesses of 8.5mm and 12mm measured for the concrete substrate test samples.*

The 5 x tests samples for the 40mm thick substrate comprised as follows:


Sample Type CS (Concrete Substrate)

- A 40mm thick reinforced concrete substrate.
- Glue Guru Bit-u-Prime
- JM Vapour barrier
- Glue Guru Cantac Roof-Tac adhesive
- Conqueror 75mm thick embossed foil faced PIR
- Glue Guru Cantac Roof-Tac adhesive
- Georgia Pacific DensDeck Prime 6.4mm or 15.9mm cover board
- Glue Guru Cantac Roof-Tac adhesive
- JM 1.52mm Single Ply TPO

4. Specimen Preparation

A 610mm x 610mm piece of 19mm thick (minimum) CD grade plywood attachment plate is adhered to the top of the TPO waterproof membrane using an adhesive with a bonding strength greater than the bonding strength of the adhesive being tested.

When the assembly has been allowed to cure to at least the minimum time specified by the adhesive manufacturer the attachment plate is connected to the pull test equipment.

Tested by: 
Darryl Scott (AFS)

Checked by: 


5. Procedure

Calibrated pull testing equipment is used to apply a load perpendicular to the test sample substrate. The test commences when the load equals 120 lbf plus the tare weight of the equipment used to connect the load cell to the test sample.

The load is then gradually increased in increments of 60 lbf with each incremental load held for 60 seconds. The process is repeated until failure occurs. Failure occurs when any component of the assembly loses connection to itself or subsequent components.

The maximum load value maintained for 60 seconds is recorded and converted to pounds per square foot (psf). A minimum of 4 pull tests are carried out for each TPO membrane roofing system.

Tested by: 
Darryl Scott (AFS)

Checked by: 



Producer Warranty (Material Only) to Support Bituminous Waterproofing Membrane **Cantac Bit-U-Prime Bitumen Primer Spray**

Glue Guru Cantac products are manufactured and tested in the UK to the highest quality standards using only premium materials.

The in-service life expectancy of Cantac Bit-U-Prime Bitumen Primer when used to facilitate installation of approved bitumen membrane is a minimum of twenty (20) years or the life of the membrane or substrate when the system is applied by a skilled and approved contractor in accordance with specifications and recommended methods of application as outlined in the Cantac Bit-U-Prime Technical Data Sheet which is available online at www.glueguru.co.nz

Exemptions

This life expectancy does not cover breakdown of the system partially or wholly due to:

- Problems caused by movement of the substrate or failure of adjoining areas
- Damage caused by hydrostatic pressure, entrapped or pooled moisture
- Damage caused by maltreatment, such as mechanical damage, either during installation or at some subsequent time
- Damage resulting from the use of improper cleaning agents or methods
- Damage caused either deliberately or accidentally by a third party
- Damage caused by faulty design and/or construction of the premises
- Failure due to faulty application
- Failure to store components in an approved manner
- Failure to use the components within the recommended shelf life
- Any damage caused by fire, earthquake, flooding or 'Acts of God'
- Failure to regularly inspect and repair any defects
- Application outside approved temperature range
- The presence of phthalates or plasticisers in the membrane
- Installation by an unapproved installer

Conditions

The following information must be recorded on an Adhesion Production Record when using Cantac Bit-U-Prime. These can be obtained from Glue Guru

1. Glue Guru invoice number
2. ID code from each canister
3. Installer's name
4. Confirmation that application instructions have been read and understood
5. Address, date and details of installation
6. Results of 50mm pull test performed for each combination of substrate and adherent
7. Results of 50mm pull test for every 100m² of adhesion



Cover

- In the event of any failure of adhesion Glue Guru Industrial Products Ltd will handle all correspondence with the roofing or decking company that carried out the installation. Glue Guru Industrial Products Ltd will produce a report outlining the cause of the problem.
- Any claim under warranty is subject to Glue Guru Industrial Products claim process and liability is limited to re-supply of its materials only.
- Glue Guru is the sole judge of any defects in its products and the sole determiner of which option (e.g repair, replacement or credit) if any is warranted in their judgment

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Producer Warranty (Material Only) to Support TPO Synthetic Membrane for Roofing and Decking

Cantac Roof-Tac Canister Contact Spray Adhesive

Glue Guru Cantac products are manufactured and tested in the UK to the highest quality standards using only premium materials.

The in-service life expectancy of Cantac Roof-Tac Canister Contact Spray Adhesive when used to bond approved TPO membrane is a minimum of twenty (20) years or the life of the membrane when the system is applied by a skilled and approved contractor in accordance with specifications and recommended methods of application as outlined in the Cantac Roof-Tac Canister Spray Adhesive Technical Data Sheets which are available online at www.glueguru.co.nz

Exemptions

This life expectancy does not cover breakdown of the system partially or wholly due to:

- Problems caused by movement of the substrate or failure of adjoining areas
- Damage caused by hydrostatic pressure, entrapped or pooled moisture
- Damage caused by maltreatment, such as mechanical damage, either during installation or at some subsequent time
- Damage resulting from the use of improper cleaning agents or methods
- Damage caused either deliberately or accidentally by a third party
- Damage caused by faulty design and /or construction of the premises
- Failure due to faulty application
- Failure to store components in an approved manner
- Failure to use the components within the recommended shelf life
- Any damage caused by fire, earthquake, flooding or 'Acts of God'
- Failure to regularly inspect and repair any defects
- Application outside approved temperature range
- The presence of phthalates or plasticisers in the membrane
- Installation by an unapproved installer

Conditions

The following information must be recorded on an Adhesion Production Record when using Cantac Roof-Tac. These can be obtained from Glue Guru

1. Glue Guru invoice number
2. ID code from each canister
3. Installer's name
4. Confirmation that application instructions have been read and understood
5. Address, date and details of installation
6. Results of 50mm pull test performed for each combination of substrate and adherent
7. Results of 50mm pull test for every 100m² of adhesion



Cover

- In the event of any failure of adhesion Glue Guru Industrial Products Ltd will handle all correspondence with the roofing or decking company that carried out the installation. Glue Guru Industrial Products Ltd will produce a report outlining the cause of the problem.
- Any claim under warranty is subject to Glue Guru Industrial Products claim process and liability is limited to re-supply of its materials only.
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