Hybrid Roof Assemblies

Hybrid roof assemblies can help contribute to a building's energy efficiency, resiliency, and sustainability goals by combining characteristics of multiple roofing technologies. Explore solutions to help increase the roof system's resistance to harsher environmental conditions, assist in maintaining interior temperatures, and add multi-ply system durability.

GAF HybridSystems

Hybrid Roof Assemblies

Hybrid Roof Assemblies

Hybrid roof assemblies are growing in popularity due to their contribution to a building's energy efficiency, resiliency, and sustainability goals. By combining characteristics of multiple roofing technologies, hybrid systems can increase the overall robustness of the assembly. This robustness potentially increases the system's resistance to harsher environmental conditions, can help assist in maintaining interior temperatures due to their highly reflective surface to help save energy*, and most importantly, increases the system durability by introducing a multi-ply constructed roofing assembly. This multi-ply system approach can result in less frequent repairs over the service life of the roof.

What is a hybrid roof assembly?

A hybrid roof assembly is where two roofing membranes, composed of different technologies, are used in one roof system.

For example, base roofing membrane plies of asphaltic SBS-modified bitumen can be combined with a top layer of reflective fleece-back TPO or PVC single-ply membrane. Together, this system combines the best selected performance characteristics of both asphaltic and thermoplastic membranes. The base layer of asphaltic membranes provides a strong secondary waterproofing layer and added durability to the total system performance. The cap layer provides UV resistance and acts as the primary membrane with heat-welded seams to provide a monolithic weather-resistive layer.

Asphaltic systems without a granule surfacing may be vulnerable to UV exposure, experience deterioration when exposed to ponding water, and are generally darker in color compared to single ply surfacing options.

Single ply membranes are available in 5 – 10 foot widths. Compared to industry-standard asphaltic widths of around 39 inches, the added width can help reduce time and labor in cap-ply installations. Furthermore, the addition of a single-ply reflective membrane over one of these darker-colored asphaltic cap membranes can greatly increase the Solar Reflectance Index (SRI) of the roof surface, which can help decrease the roof-surface temperature and potentially reduce the building's heat island effect. In general, roof material surfaces with a higher SRI will be cooler than a surface with a lower SRI under the same solar energy exposure. A lower roof-surface temperature can result in less heat being absorbed into the building interior during the summer months or days with higher UV exposure.

Fleece-back PVC and PVC KEE membranes may also provide protection where exposure to chemicals is a concern†, and generally hold up well to ponding water. PVC membranes also demonstrate the capability to extinguish even when the flame source remains applied to the assembly.

The combination of an asphaltic base membrane below a single-ply system increases the overall system thickness and provides protection against punctures‡, which are a primary concern with single-ply applications. Two or more plies of membrane thickness helps to ensure durability and enhance longevity of the roofing system.

Where are hybrid assemblies typically used?

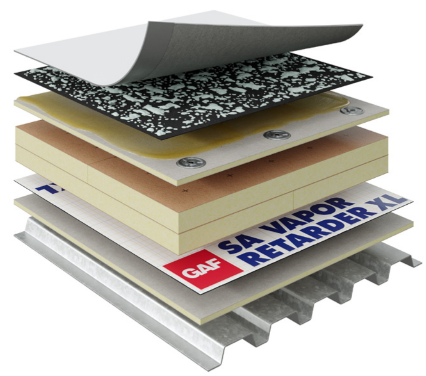
Due to their strong protection against leaks and multi-ply system redundancy, hybrid roof assemblies are a popular choice for performance-sensitive locations such as K-12 and higher education buildings, data centers, hospitals, and other structures where closures and leaks can cause unacceptable disruption.

Not just for new construction but also tear-off replacements

A hybrid roof assembly can be an attractive solution in tear-off scenarios. In these applications the existing roofing system is torn off to the deck, followed by installation of new insulation and cover board components prior to installation of the hybrid roof membrane system. Alternatively, the asphaltic base sheet and subsequent single-ply membrane can be installed on top of the existing roof system without an expensive and disruptive full tear-off of the existing assembly. By adding a single-ply membrane, reflectivity of a new cap membrane will likely increase compared to the existing darker membrane, potentially extending the service life of the roof assembly due to the additional layer of UV protection.

* Energy savings are not guaranteed and the amount of savings may vary based on climate zone, utility rates, radiative properties of roofing products, insulation levels, HVAC equipment efficiency, and other factors.
† GAF warranties and guarantees do not provide coverage against exposure to chemicals. Refer to gaf.com for more information on warranty and guarantee coverage and restrictions.
‡ GAF warranties and guarantees do not provide coverage against hail except where additional puncture-resistance coverage is purchased on eligible jobs. Refer to gaf.com for more information on warranty and guarantee coverage and restrictions.

Hybrid Roof Assemblies



New/Tear-Off Construction: Hybrid System over metal deck, heat-weld (torch) applied
This assembly option combines SBS-modified bitumen base sheet with fleece-back single-ply membrane.

Hybrid Roof Assembly Options

Assembly configurations can be as diverse as the buildings they protect. Our Design Services team can help you configure a solution from a spectrum of options, to meet your exact requirements.

Construction type:
- New/Tear-Off

Deck type:
- Steel; Min 22 gauge, 33 ksi
- Thermal Barrier (Optional): 0.5″ SECUROCK® Gypsum-Fiber Roof Board
- Thermal Barrier Attachment: Pre-Secured
- Vapor Retarder (Optional): GAF SA Vapor Retarder XL
- Vapor Retarder Attachment: Self-Adhered
- Insulation 2 Layers: EnergyGuard™ Polyiso Insulation
- Insulation Attachment: Loose Laid
- Coverboard: 0.5″ SECUROCK® Gypsum-Fiber Roof Board
- Coverboard Attachment: Drill-Tec™ #12 Fasteners with Drill-Tec™ 3 in. Ribbed Galvalume Plates (Flat)
- Primer: MATRIX™ 307 Premium Asphalt Primer

Asphaltic Base Membrane Ply:
- Base Ply: RUBEROID® HW Smooth
- Base Ply Attachment: Heat-Welded

Fleece-back Single-Ply Cap Membrane:
- EverGuard® TPO Fleece-back Membrane
- EverGuard® PVC Fleece-back Membrane
- Cap Ply Attachment: GAF LRF Adhesive XF (Spatter Pattern; 3 lb./SQ.)

Steel Deck

	Cold Applied	Heat-Weld (Torch) Applied	Hot-Mop Applied
Application and Ratings*	New/Tear-Off. Class 1-60 to 1-120, SH & ASTM E 108 Class A at max ¼ in 12	New/Tear-Off. Class 1-90 and 1-120, SH & ASTM E 108 Class A at max ¼ in 12	New/Tear-Off. Class 1-90 and 1-135, SH & ASTM E 108 Class A at max ¼ in 12
Deck	Min. 22 ga, 33 ksi steel deck secured per RoofNav	Min. 22 ga, 33 ksi steel deck secured per RoofNav	Min. 22 ga, 33 ksi steel deck secured per RoofNav
Thermal Barrier (Optional)	Min. 0.5 in. DensDeck®, DEXcell® Glass Mat Roof Board, or SECUROCK® Ultralight Glass-Mat Roof Board	Min. 0.5 in. DensDeck® or SECUROCK® Ultralight Glass-Mat Roof Board	N/A
Thermal Barrier Attachment	Pre-secured	Pre-secured	N/A
Vapor Retarder (Optional)	GAF SA Vapor Retarder XL	GAF SA Vapor Retarder XL	N/A
Vapor Retarder Attachment	Self-Adhered	Self-Adhered	N/A
Insulation	One or more layers min. 1″-thick EnergyGuard® Polyiso Insulation or EnergyGuard® Tapered Polyiso Insulation (max. total 12″ thickness)	One or more layers min. 1″-thick EnergyGuard® Polyiso Insulation or EnergyGuard® Tapered Polyiso Insulation (max. total 12″ thickness)	Two or more layers min. 48 x 96 x 2.0 in. EnergyGuard® Polyiso Insulation or EnergyGuard® Tapered Polyiso Insulation
Insulation Attachment	Loose laid	Loose laid	Drill-Tec™ #12 Fasteners and Drill-Tec™ 3 in. Ribbed Galvalume Plates (Flat) (see below for rates)
Cover Board	48 x 96 x 0.5 in EnergyGuard® HD Polyiso Cover Board	48 x 96 x 0.5 in. DensDeck® Prime or SECUROCK® Gypsum-Fiber Roof Board	Min. 1/4″-thick DensDeck® Prime
Cover Board Attachment	Drill-Tec™ #12 Fasteners and Drill-Tec™ 3 in. Ribbed Galvalume Plates (Flat) (see below for rates)	Drill-Tec™ #12 Fasteners and Drill-Tec™ 3 in. Ribbed Galvalume Plates (Flat) (see below for rates)	Hot Asphalt
Base Ply	RUBEROID® 20 Smooth or RUBEROID® Mop Smooth 1.5	RUBEROID® HW 25 Smooth, RUBEROID® HW 20 Smooth, RUBEROID® HW Smooth, RUBEROID® HW Granule or RUBEROID® Torch Granule (APP)	RUBEROID® 20 Smooth, RUBEROID® Mop Smooth 1.5, RUBEROID® Mop Smooth or RUBEROID® Mop Plus Smooth
Base Ply Attachment	MATRIX™ 101 Premium SBS Membrane Adhesive	Heat-Weld (Torch)	Hot Asphalt
Cap Ply (60 – 80 mil):	EverGuard® TPO Fleece-back Membrane, EverGuard Extreme® TPO Fleece-back Membrane, EverGuard® PVC Fleeceback, or EverGuard® PVC KEE Fleeceback & EverGuard® TPO Fleece-back Membranes (115 – 135 mil)	EverGuard® TPO Fleece-back Membrane, EverGuard Extreme® TPO Fleece-back Membrane, EverGuard® PVC Fleeceback, or EverGuard® PVC KEE Fleeceback & EverGuard® TPO Fleece-back Membranes (115 – 135 mil)	EverGuard® TPO Fleece-back Membrane, EverGuard Extreme® TPO Fleece-back Membrane, EverGuard® PVC Fleeceback, or EverGuard® PVC KEE Fleeceback & EverGuard® TPO Fleece-back Membranes (115 – 135 mil)
Cap Ply Attachment	GAF LRF Adhesive XF, LRF Adhesive M, or OlyBond® 500 Adhesive Fastener (splatter pattern)	GAF LRF Adhesive XF, LRF Adhesive M, or OlyBond® 500 Adhesive Fastener (splatter pattern)	GAF LRF Adhesive XF, LRF Adhesive M, or OlyBond® 500 Adhesive Fastener (splatter pattern)
RoofNav Assy. #:	557540-557460-0 (Class 1-60 @ 6 fasteners per board) 557529-557460-0 (Class 1-90 @ 10 fasteners per board) 552965-552899-0 (Class 1-120 @ 22 fasteners per board)	552903-552897-0 (Class 1-90 @ 8 fasteners per board) 552976-552897-0 (Class 1-120 @ 16 fasteners per board)	554223-554162-0 (Class 1-90 @ 6 fasteners per board) 554373-554162-0 (Class 1-135 @ 18 fastener per board)

*FM Approved per Approval Standard 4470. Assembly summary provided for convenience only. Refer to RoofNav.com and Loss Prevention Data Sheets 1-29 and 1-29 for all assembly and installation details required for FM Approval.

Hybrid Roof Assemblies

LWIC Over Steel Deck

	Cold Applied Base Ply	Cold Applied Base Ply	Torch Applied Base Ply
Application and Ratings*	Re-Roof. Class 1-90, SH & ASTM E108 Class A @ max. 1/4:12	Re-Roof. Class 1-150, SH & ASTM E108 Class A @ max. 1/4:12	Re-Roof. Class 1-90, SH & ASTM E108 Class A @ max. 1/4:12
Existing LWIC & Deck	Min. 2″-thick, 300 psi over min. 22 ga., 33 ksi steel	Min. 2″-thick, 300 psi over min. 22 ga., 33 ksi steel	Min. 2″-thick, 300 psi over min. 22 ga., 33 ksi steel
Base Sheet	GAFGLAS® Stratavent Nailable Venting Base Sheet	GAFGLAS® Stratavent Nailable Venting Base Sheet	GAFGLAS® Stratavent Nailable Venting Base Sheet
Base Sheet Attachment	Drill-Tec™ Base Sheet Fastener (1.7 in.) 9 in. o.c. in min. 2″-wide side laps & 18″ o.c. in two staggered field rows	Drill-Tec™ Base Sheet Fastener (1.7 in.) 7 in. o.c. in min. 3″-wide side laps and 7 in. o.c. in two staggered field rows	Drill-Tec™ Base Sheet Fastener (1.7 in.) 9 in. o.c. in min. 2″-wide side laps & 18″ o.c. in two staggered field rows
Base Ply	RUBEROID® 20 Smooth	RUBEROID® 20 Smooth	RUBEROID® HW 20 Smooth, RUBEROID® HW 25 Smooth or RUBEROID® HW Smooth
Base Ply Attachment	MATRIX™ 102 SBS Membrane Adhesive	MATRIX™ 102 SBS Membrane Adhesive	Heat-Weld (Torch) Applied
Cap Ply (60 – 80 mil)	EverGuard® TPO Fleece-back Membrane, EverGuard Extreme® TPO Fleece-back Membrane, EverGuard® PVC Fleeceback, or EverGuard® PVC KEE Fleeceback & EverGuard® TPO Fleece-back Membranes (115 – 135 mil)	EverGuard® TPO Fleece-back Membrane, EverGuard Extreme® TPO Fleece-back Membrane, EverGuard® PVC Fleeceback, or EverGuard® PVC KEE Fleeceback & EverGuard® TPO Fleece-back Membranes (115 – 135 mil)	EverGuard® TPO Fleece-back Membrane, EverGuard Extreme® TPO Fleece-back Membrane, EverGuard® PVC Fleeceback, or EverGuard® PVC KEE Fleeceback & EverGuard® TPO Fleece-back Membranes (115 – 135 mil)
Cap Ply Attachment	GAF LRF Adhesive XF, LRF Adhesive M, or OlyBond® 500 Adhesive Fastener (splatter pattern)	GAF LRF Adhesive XF, LRF Adhesive M, or OlyBond® 500 Adhesive Fastener (splatter pattern)	GAF LRF Adhesive XF, LRF Adhesive M, or OlyBond® 500 Adhesive Fastener (splatter pattern)
RoofNav Assy. #	553214-553211-0	553216-553211-0	553215-553209-0

*FM Approved per Approval Standard 4470. Assembly summary provided for convenience only. Refer to RoofNav.com and Loss Prevention Data Sheets 1-29 and 1-29 for all assembly and installation details required for FM Approval.

Structural Concrete Deck

	Cold Applied	Heat-Weld Applied	Hot-Mop Applied
Application and Ratings*	New/Tear-Off. Class 1-255 to 1-405, SH, & ASTM E 108 Class A at max. ¼ in 12	New/Tear-Off. FM Class 1-255, SH, & ASTM E 108 Class A at max. ¼ in 12	New/Tear-Off. FM Class 1-510, SH, & ASTM E 108 Class A at max. ¼ in 12
Deck	Structural Concrete	Structural Concrete	Structural Concrete
Primer	MATRIX™ 307 Premium Asphalt Primer	None	MATRIX™ 307 Premium Asphalt Primer
Vapor Retarder	RUBEROID® 20 Smooth	GAF SA Vapor Retarder XL	RUBEROID® 20 Smooth or 1-2 plies of GAFGLAS® Ply 4 or GAFGLAS® FlexPly 6
Vapor Retarder Attachment	MATRIX™ 101 Premium SBS Membrane Adhesive or MATRIX™ 102 SBS Membrane Adhesive	Self-Adhered	Hot Asphalt
Insulation (max. 48″ x 48″)	Min. 1″-thick EnergyGuard® Polyiso Insulation or EnergyGuard® Tapered Polyiso Insulation (one or more layers, max. total 12″)	Min. 1″-thick EnergyGuard® Polyiso Insulation or EnergyGuard® Tapered Polyiso Insulation (one or more layers, max. total 12″)	Min 1″-thick EnergyGuard® Polyiso Insulation or min. 1/2″-thick EnergyGuard® Tapered Polyiso Insulation (one or more layers, max 12″ total thickness)
Insulation Attachment (per layer)	OlyBond® 500 Adhesive Fastener (1″-wide ribbons spaced 12 in. o.c.)	GAF LRF Adhesive XF, OlyBond® 500 Adhesive Fastener, LRF Adhesive M, TPO LRF Adhesive M Low Temp (1″-wide ribbons spaced 12 in. o.c)	Hot Asphalt
Cover Board (min. 48″ x 48″)	Min. 1/2″-thick DensDeck® Primeor SECUROCK® Gypsum-Fiber Roof Board or EnergyGuard® HD Polyiso Cover Board	Min. 1/2″-thick DensDeck® Prime or SECUROCK® Gypsum-Fiber Roof Board	Min. 1/4″-thick DensDeck® Prime or min. 1/2″-thick Structodek® High Density Fiberboard Roof Insulation
Cover Board Attachment	Same as insulation attachment	GAF LRF Adhesive XF, OlyBond® 500 Adhesive Fastener, LRF Adhesive M, TPO LRF Adhesive M Low Temp (1″-wide ribbons spaced 12 in. o.c)	Hot Asphalt
Base Ply	RUBEROID® 20 Smooth or RUBEROID® Mop Smooth	RUBEROID® HW 25 Smooth, RUBEROID® HW 20 Smooth, RUBEROID® HW Smooth, RUBEROID® HW Granule or RUBEROID® Torch Granule (APP)	RUBEROID® 20 Smooth, RUBEROID® Mop Smooth 1.5, RUBEROID® Mop Smooth or RUBEROID® Mop Plus Smooth
Base Ply Attachment	MATRIX™ 101 Premium SBS Membrane Adhesive	Heat-Weld (Torch)	Hot Asphalt
Cap Ply (60 – 80 mil)	EverGuard® TPO Fleece-back Membrane, EverGuard Extreme® TPO Fleece-back Membrane, EverGuard® PVC Fleeceback, or EverGuard® PVC KEE Fleeceback & EverGuard® TPO Fleece-back Membranes (115 – 135 mil)	EverGuard® TPO Fleece-back Membrane, EverGuard Extreme® TPO Fleece-back Membrane, EverGuard® PVC Fleeceback, or EverGuard® PVC KEE Fleeceback & EverGuard® TPO Fleece-back Membranes (115 – 135 mil)	EverGuard® TPO Fleece-back Membrane, EverGuard Extreme® TPO Fleece-back Membrane, EverGuard® PVC Fleeceback, or EverGuard® PVC KEE Fleeceback & EverGuard® TPO Fleece-back Membranes (115 – 135 mil)
Cap Ply Attachment	GAF LRF Adhesive XF, LRF Adhesive M, or OlyBond® 500 Adhesive Fastener (splatter pattern)	GAF LRF Adhesive XF, LRF Adhesive M, or OlyBond® 500 Adhesive Fastener (splatter pattern)	GAF LRF Adhesive XF, LRF Adhesive M, or OlyBond® 500 Adhesive Fastener (splatter pattern)
RoofNav Assy. #	■ 554214-552900-0 (DensDeck® Prime, Class 1-255) ■ 554213-552899-0 (SECUROCK® Gypsum-Fiber Roof Board, Class 1-345) ■ 554212-552899-0 (EnergyGuard® HD Polyiso Cover Board, Class 1-405)	554203-552897-0	554480-554162-0

*FM Approved per Approval Standard 4470. Assembly summary provided for convenience only. Refer to RoofNav.com and Loss Prevention Data Sheets 1-29 and 1-29 for all assembly and installation details required for FM Approval.

Learn more about GAF products

We protect what matters most™