

Roofing Design Concerns

This list represents the most commonly encountered roofing situations that can influence the performance of a roofing system. It is not all inclusive and should not be looked upon as representing all situations that may be encountered or considered.

1. Drains

- The use of plastic drains is not recommended and are not acceptable for installations.
- A minimum of 2 1/2 pounds lead sheeting must be incorporated in the drain flashing design.
- Drains must have properly installed clamping rings.

2. Pitch Pans

- The use of pitch pans is not recommended. Pitch pans are maintenance items that can become nuisances if ignored or improperly used or installed.
- Pitch pans are not covered by GAF Materials Corporation guarantees.

3. Metal Flanged Skylights and Other Roof Top Equipment

- Due to the differential expansion between metal and asphalt, large metal flanges are undesirable surfaces to flash to with BUR and modified bitumen materials.
- Flashing to these metal flanges is not covered by GAF Materials Corporation Guarantees.
- Such units should be mounted on canted wood curbs at least 8" above the level of the roof.

4. Plumbing Vents

- The use of primed lead flashing sleeves are required due to better compatibility between lead and asphalt roofing systems compared to sheet metal flashing.
- Lead sleeves on plumbing vents are required.

5. Gravel Stops

- All gravel stops should be raised to push water to proper draining locations.
- The membrane should be nailed to raised perimeter nailers and counterflashed with metal counter flashing where at all possible.
- Where metal gravel stop flanges are flashed to the roof membrane, leaks caused by metal movement are not covered by GAF Materials Corporation Guarantees.

6. Air Conditioning Units

- Where at all possible, install such units at ground level.
- If such units are to be installed on the roof, they must be mounted on at least 8" high canted wood curbs or platforms secured to the structural members of the roof. The curbs or platforms must be properly flashed and counter flashed.
- Do not use wood sleepers for supporting these units directly on the roof membrane. GAF Materials Corporation Guarantees do not cover leaks caused by units mounted on sleepers laid directly on the roof membrane.

7. Piping and Conduit on Roof Top

- Piping and conduit should not be run across a roof.
- Where no alternative exists, the piping/conduit should be elevated at least 8" above the surface of the roof on supports that are secured to the structural roof members or the deck if light pipes. These supports must allow for the movement of the pipes and must be flashed with TRIPLY materials.
- Leaks resulting from improper supports are not covered by GAF Materials Corporation guarantees.
- Where continuing piping and conduit penetrate the roof, a two piece, soldered, noncorroding sheet metal sleeve should be installed in conjunction with a metal umbrella.

8. General Flashing Considerations

- All flashing must be installed at least 8" above the immediate roof membrane level.
- All flashing must be mechanically attached at its top.
- Counter flashing is required and must extend at least 4' below the top nailing.
- Counter flashing is not covered by GAF Materials Corporation Guarantees.
- Termination bars may only be used in conjunction with an appropriate counterflashing extending a minimum of 4" below the termination bar. Fastener spacing must be 4" or 8" as determined by flashing height as listed in the individual flashing specifications.

9. Coatings

- Asphalt solvent based coating must not be used on new granular surfaced rolls.
- Reapplication of coating must be employed as a part of periodic maintenance program. The frequency will vary depending on climatic conditions.

Storage and Inspection of Roofing Materials

TRIPLY roofing materials leave the factory dry and must be maintained in storage to prevent the materials from getting wet. Provisions must also be made for storing in a well ventilated, ambient temperature environment out of the weather. Water based coatings must be protected from freezing.

At the job site, no more material should be stored than will be used within two weeks. It should be stored on pallets, roll goods on end, in a well ventilated area. Where dry inside storage is not possible (such as where new concrete floors or extensive plastering results in a high humidity), storage under secured canvas tarpaulins in a well ventilated area is acceptable for periods up to two weeks. For periods longer than two weeks, the materials should be properly warehoused, i.e., dry, ventilated on pallets etc. Polyethylene covers are unacceptable field covers. Rooftop storage of roofing should be on pallets, rolls on end, and protected with properly secured vapor permeable covers such as canvas tarpaulins. No more material should be stored on the roof than can be used within five days. When prolonged inclement weather threatens, i.e., rainy seasons, no more roofing materials should be supplied to the rooftop than can be used within two days.

In the unlikely event that obviously defective or damaged material reaches the job site or damage to the material occurs from improper storage on the job site, it is the responsibility of the roofing contractor not to install this material. In the case of material that has obvious manufacturing defects, GAF Materials Corporation should be notified immediately so replacement material can be supplied if the complaint is justified. Installation of defective material can result in additional costs above the cost of supplying replacement material. If the roofing contractor chooses to install material with obvious defects, this added cost is not the responsibility of GAF Materials Corporation.

Condition and Preparation of Roof Deck Surface

All open edges must have wood nailers. On steel or concrete roof decks of any kind, use treated wood nailers along all open or flush eaves so that gravel-stops or edging strips may be securely nailed. Wood nailers may also be needed at other projections through the roof.

Prime masonry and metal surfaces to receive a mopping of Roofing Asphalt with Asphalt/Concrete Primer and allow to dry thoroughly.

The surface of a roof deck should be dry, firm, smooth, and free of dirt and loose material. It is the responsibility of the roofing contractor, deck contractor, and owner's representative to determine the suitability of the roof deck surface to receive the roof assembly.

Electrical conduits, bolts, and other similar small items must be removed from the surface of the roof deck; such surface irregularities cannot be properly insulated and roofed.

None of the foregoing factors is the responsibility of GAF Materials Corporation, which under no circumstances will assume such responsibility.

If the roof is sloped 1/2 inch per foot or more, see "Installation on Steep Slopes"

NonNailable Decks

Steel Decks

Any of the TRIPLY specifications for use over insulation may be applied over a steel deck. A steel deck must be covered with rigid insulation which is firm, capable of withstanding traffic, and is thick enough to span the rib opening of the deck. The insulation must be mechanically attached using TRIPLY screws and plates to meet at least FMRC I-60 uplift resistance. When two layers of insulation are to be installed, solidly mop the second layer of insulation to the first layer.

A steel deck must be no lighter than 22 gauge and conform to the recommendations of the latest *Factory Mutual Bulletin I-28*.

Nailable Decks

Wood Decks—Plywood Decks

Wood boards must be at least 1 inch nominal thickness and have a nominal width of 4 inches to 6 inches. All boards must have a bearing on rafters at each end and be securely nailed.

Plywood sheathing shall be exterior grade, minimum 4 ply, not less than 1/2 inch thick. Plywood decks must be designed and fabricated in accordance with the recommendations of the American Plywood Association. All four sides of each plywood panel shall bear on and be securely nailed to joists and cross blocking between joists. "H" clips are not acceptable. Plywood decks must be installed with a 1/8" - 1/4" gap between sheets and must match vertically at joints to within 1/8".

Wood and plywood decks must be dry prior to roofing. Cover cracks wider than 1/4 inch and knot holes larger than 1 inch with securely nailed sheet metal. When light metal wall ties or other structural metal are exposed on top of the wood deck, cover them with a heavy ply of roofing membrane, such as inverted TRIPLY Mineral Surfaced Cap Sheet, extending 2–6 inches beyond the metal in all directions. Nail in place before applying the base ply.

If TRIPLY Ply 4 or TRIPLY FlexPly™ 6 is used as a base sheet over a wood deck, a sheathing paper is required.

Nail the base sheet through flat metal caps or use nails with attached 1 inch square or round metal caps that have a minimum withdrawal resistance of 40 pounds each.

Tape-and-staple fastening systems may be used on wood decks when they comply with local building codes and agencies such as FM and UL

Roof Drainage

Proper and adequate drainage of the roof surface is required, and is the responsibility of those involved in the design and construction of the roof substrate and supporting structure. GAF Materials Corporation recommends at least 1/4 inch per foot slope with proper grading to and placement of outlets. Guarantees will not be valid for areas of a roof that pond water. The Company defines "ponding" as water that does not drain or dissipate from the roof surface within 48 hours after precipitation. Ponding can also result from other water sources, including improperly piped air conditioning condensate and steam condensate lines.

Perlite tapered insulation may be used to create proper drainage. For recommendations on tapered insulations or fills to provide slope for drainage, consult the GAF Materials Corporation Contractor Services Office.

Expansion Joints

Separate building units from adjacent units by expansion joints to allow for structural expansion and contraction. Although requirements may vary depending on structural and climatic conditions, expansion joints are strongly recommended. The exact location and number of expansion joints are the responsibility of the building designer.

Vapor Retarders

A vapor retarder installed to the deck beneath the pre-formed roof insulation is not a part of the roofing specification; its use must be determined by the architect, design engineer, or building owner.

Asphalt

Heating of Asphalts

ASTM D-312 Type III Steep or Type IV High Temperature Steep Asphalts should be used to install mop applied TRIPLY Membranes as well as GTRIPLY Base Sheets and ply sheets.

Field experience has demonstrated that proper temperatures in the kettle and at the point of application are essential to obtain a satisfactory roof. Kettle temperatures in excess of those indicated below may result in changing of the asphalt while temperatures below specified minimums can result in lack of adhesion. Every effort should be made to maintain the temperature limitations indicated below. It is **essential** that the foreman of the roofing crew be provided with an accurate thermometer to check temperatures at the kettle and at the point of application. Prolonged heating, at 500° F or more, of Roofing Asphalts may cause changes in their physical properties which can affect roof membrane performance and must be avoided. Unless Roofing Asphalt is being continuously used, the temperature of the kettle should be reduced to below 500° F.

Recommended kettle and asphalt application temperatures:

| | |
|-------------------------|---------------------------------|
| Steep Asphalt | ASTM D-312 Type III |
| Kettle | —Not over 500° F |
| Time of Application | —EVT, but not less than 400° F |
| HT Steep Asphalt | ASTM D-312 Type IV (High Temp.) |
| Kettle | —Not over 500° F |
| Time of Application | —EVT, but not less than 400° F |

Safety Note: Asphalt should be heated to provide the EVT at the time of application, but should not be heated above the final blowing temperature or the flash point of the asphalt.

GAF Materials Corporation supports NRCA's position of two EVT's, one for mop application and one for mechanically applied asphalt. For mop applications, the optimum asphalt viscosity of 125 centipoise has been established. The optimum asphalt viscosity of 75 centipoise has been established for mechanical applications. The same asphalt will need to be heated to a higher temperature to achieve the lower optimum viscosity when it is applied with a mechanical spreader.

Application of Asphalt

Low density roof decks and insulation material tend to absorb the bitumen. It is important; therefore, that the layer of bitumen used to secure either the insulation material to the roof deck or the first ply of felt in the roof system be applied in sufficient quantity to assure adequate adhesion.

Interply moppings of asphalt must be applied in a continuous film and consist of approximately 25 pounds per 100 square feet of roof area with a tolerance not to exceed 20% plus or minus.

Temporary Water Cutoffs and Phased Construction

All TRIPLY roofing systems must be made watertight at the end of each work day. Ideally, an entire roof area will receive the installation of the complete new roof system, including all board insulation, membrane plies, and flashings, in one day. When this is not possible, the exposed edges of the new roof system must be sealed so as to prevent water penetration and wind infiltration into the new roof assembly. Any such water cutoffs must be completely removed before resuming work.

The installation of the TRIPLY roofing system shall progress in such a manner so that proper drainage of both the existing roof area and the new roof installation is maintained.

Recommended Procedures for Applying Insulation

General

Do not apply roof insulation and roofing until all other work trades have completed jobs that require them to traverse the deck on foot or with equipment.

It is recommended that insulation be applied in more than one layer, if feasible, with joints staggered between layers. The roof insulation must be firmly attached to the deck. Whenever possible, the first layer should be mechanically fastened while the second layer is applied in a continuous mopping of hot steep asphalt at the rate of 25 pounds (plus or minus 20%) per 100 square feet and joints staggered in parallel courses as well as between layers. If roof tape is specified, top layer joints of insulation may be continuous in both directions.

Cut all insulation to fit where it meets vertical surfaces. Cut $\frac{1}{4}$ inch short where insulation meets vertical flashings. Miter edges of insulation panels at ridges and elsewhere to prevent irregular surfaces and open joints. Butt edges moderately. Do not deform them.

Decks must be designed to drain freely with sufficient outlets placed and installed to promptly and thoroughly remove water from roof.

If additional taper is required, perlite tapered roof insulation can be utilized. All hip and valley panels should be mitered. Laced valleys are not acceptable.

Roofing should not be applied over wet insulation. Any insulation that has become wet or damp must be removed and replaced.

Mechanical Fasteners

Mechanical attachment of insulation to the roof deck is the preferred method of installation whenever practical and is required by GAF Materials Corporation and FM on steel decks. TRIPLY Fasteners may be used to fasten TRIPLY Insulations to most roof decks including steel, wood, and concrete. Where TRIPLY Fasteners are employed, they must be used at the minimum rate to achieve FMRC I-60 uplift resistance. See page 8, for suggested insulation fastening patterns.

Application over Steel Decks

The steel deck installation should conform with FM's recommendations. Consult the current *Factory Mutual Loss Prevention Data Sheet 1-28 and Approval Guide* for details on the roof system being installed and for the recommended number of fasteners per insulation board.

Apply panels of insulation with long sides continuous, either parallel or at right angles to steel deck ribs. The opposite edges of panel must rest firmly on the bearing surface of the steel deck. Joints of parallel courses of insulation should be staggered.

The insulation panels are placed in position immediately ahead of the fastening crew. Sight along the top flanges of the metal deck section or snap a chalkline. Place TRIPLY Fastener plates in a pattern which will enable the screws to contact and penetrate the top flange of the metal deck a minimum of $\frac{3}{4}$ ". Drive screws through the holes in the plates, insulation, and into the metal deck using an electric screwgun. Repeat across the entire area to be fastened.

If additional layers of insulation are used, secure in a continuous mopping of hot steep asphalt applied at the rate of 25 pounds (plus or minus 20%) per 100 square feet and stagger joints in parallel courses as

well as between layers. If joint tape is specified, the top layer of insulation joints may be continuous in both directions. As an alternate to asphalt, both layers of insulation can be mechanically fastened simultaneously.

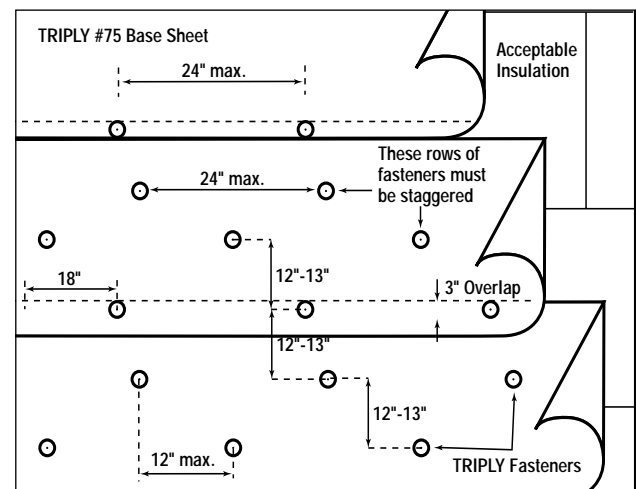
Application over Wood, Precast or Preformed Nailable Decks

This recommendation is for use when installing insulation over decks capable of adequately holding fasteners that are recommended by GAF Materials Corporation or the deck manufacturer. The condition of the deck must be carefully examined to determine the capacity of the deck to hold the fasteners.

Application of Insulation without Underlayment:

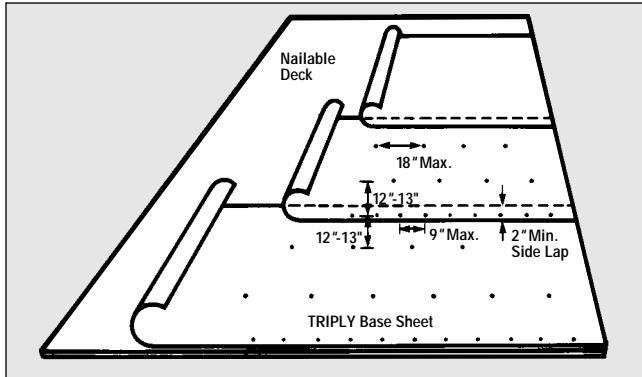
Panels of TRIPLY Insulation should be applied with long joints running continuously and short joints staggered. The insulation should be mechanically attached using the appropriate approved fastener or fastener recommended by the deck manufacturer. Nails are not to be used to fasten insulation to decks. When additional layers of insulation are used, the second and succeeding layers should be applied in a continuous mopping of hot steep asphalt at the rate of 25 pounds (plus or minus 20%) per 100 square feet and joints staggered in parallel courses as well as between layers. As an alternate to asphalt, both layers of insulation may be mechanically fastened simultaneously.

Mechanically Attached Base Sheet and TRIPLY Insulation Assemblies



Where permitted in the specification, as an alternative to steep asphalt attachment of the base sheet or a mechanically attached system for use over steel, concrete, and wood decks. Attachment of both insulation and a #75 Base Sheet can be accomplished simultaneously employing the TRIPLY Fastener System as shown above. This fastener placement is applicable only for the TRIPLY 3" diameter metal fastener. The use of other fasteners is not recommended. This specification can be used with insulation boards with a minimum compressive strength of 16 pounds per square inch (Test Method ASTM D-1621 or C-165) and includes isocyanurates and perlite products.

Nailing of Base Sheet Directly to Deck



All nailing must be done through flat metal caps or acceptable nails with 1 inch square or round metal caps. The proper nail or fastener must be selected in accordance with the recommendations of the deck manufacturer or as recommended for specific type decks in this catalog. The fastener used must have a minimum withdrawal strength of 40 pounds.

Some buckling of the base sheet may occur during its installation if it is not permitted to relax sufficiently. The base sheet must be unrolled and allowed to relax before fastening. It is suggested that the base sheet be stretched just prior to nailing. This is usually accomplished by a shuffling motion of the feet of the mechanic installing the sheet just ahead of nailing.

Nail along the side lap of the base ply at intervals not to exceed 9 inches and stagger-nail down the center of sheet in two rows with nails spaced at intervals not to exceed 18 inches in each row with each row 12-13 inches in from the edges of the sheet.

Installation on Steep Slopes

Slippage of mop applied or torch applied roof systems may occur on slopes of $\frac{1}{2}$ inch per foot or more unless supplemental nailing is used. If the roof slope is less than $\frac{1}{2}$ inch per foot, nailing is not required.

If the slope is greater than $\frac{1}{2}$ inch but less than 2 inches per foot, use wood nailers at the eave, at the ridge and at intermediate spacing of no more than 16 feet. If the slope is 2 inches to 3 inches per foot, use wood nailers at the eave, at the ridge and at intermediate spacing of no more than 8 feet. All dimensions are from inside face to inside face of the wood nailers. Ensure a snug fit with the courses of insulation, but avoid cutting the insulation. For non-insulated wood decks, back-nail the plies directly to the deck at the intervals listed above.

If insulation is to be installed, mechanically attach insulation or mop between wood nailers with the long dimension in the same direction as the roof slope. Use wood nailers treated with water-based preservative to hold the insulation in place. Use wood nailers at least 2 inches wide and the same thickness as the insulation. Install on top of the vapor retarder (if used) at right angles to the direction of slope. Mechanically attach wood nailers to the deck with nails, screws, or bolts.

Install all plies of TRIPLY base and ply sheets vertically on slopes $\frac{1}{2}$ inch per foot or more and back-nail them into wood nailers or nailable decks approximately 4 inches from the back edge of the sheet. All end laps must be at wood nailers, and the top edge must be at wood nailers, and the top edge must be nailed into the wood nailer on 6 inch centers. Use nails with integral metal heads at least 1 inch round or square.

Install TRIPLY membranes vertically on slopes $\frac{1}{2}$ inch per foot or more. Terminate at wood nailer and fasten the top edge of each sheet with TRIPLY screws and plates, placing 4 fasteners evenly spaced across the top of the sheet. The overlapping sheet must extend at least 9 inches past the top of the underlying sheet. All end laps must be staggered to the closest wood nailer, spaced a minimum of 4 feet. On slopes of 2 inches to 3 inches per foot, the TRIPLY sheets must be cut into lengths not to exceed 17 feet. For non-insulated wood decks, terminate and fasten the end of the TRIPLY sheets to the deck with the same fasteners, on the same spacing indicated above.

ASTM 312, Type IV, HT Steep Asphalt must be used to install all base sheets, ply sheets and TRIPLY Mop membranes on slopes of $\frac{1}{2}$ inch per foot or above.

For cold applied specifications, starting at $\frac{1}{2}$ inch per foot or greater, the above referenced fastening requirements must be followed, except wood nailers must be used at intermediate spacing of no more than 8 feet.

For roofs with slopes greater than 3 inches per foot, contact GAF Materials Corporation Contractor Services.

Flashing

The juncture of the roof deck and a vertical surface is probably the most vulnerable moisture infiltration point on any roof. Before selecting a flashing type, examine the many factors that may affect the optimum trouble-free joining between the roof deck and vertical surface. The potential for differential movement between deck and vertical surfaces must be addressed in the flashing design.

Recover

For reroofing projects, it is always best to remove the old roof system. This will show the deck condition, allow for up-grading roof insulation, eliminate moisture entrapment, allow proper addition of new units and curbs, and give greater confidence in the new roofing system.

Follow the recommendations below when recovering an existing BUR or any modified bitumen roof. Any deviations must be addressed in writing from GAF Materials Corporation Technical Services.

Recovering single-ply membranes present unique problems; contact GAF Materials Corporation Technical Services for guidance.

Preparation

A proper analysis of the old system, including determining the cause of its failure, must be made. A proper preparation of the old system and the roof insulation (if any) must be done.

It is the responsibility of the building owner or its agent, roof designer, or roofing contractor to determine if the old system is suitable to be recovered with a new roofing membrane. GAF Materials Corporation assumes no responsibility for determining the suitability for recovering or the composition of the existing roof system. The Company's responsibility under the term of the guarantee does not include problems with the new system caused by the substrate, in this case, the old roof system. These problems include, but are not limited to, problems in the new roof system that result from roofing over wet materials in the old roof.

The preparation for recovering the old roof should include:

- Establishing the history of the old roof system.
- Determining and correcting the cause of any premature roof failures.
- Determining that the deck is structurally sound to receive the new system.
- Taking test cuts to verify the old roof construction and condition. Three test cuts should be made for roofs under 100 squares and one test cut per 100 squares above the minimum amount.

Note: Roof systems having existing vapor retarders must be addressed with GAF Materials Corporation Technical Services.

- Confirming that the old system is securely fastened to the roof deck.
- Removing all wet roof insulation and old, wet membrane. Replacing with dry materials. The existing roof membrane must be in a condition suitable to receive the new roof assembly.

Note: It is highly recommended that a moisture survey be made to determine the extent of wet insulation and moisture entrapment.

- Providing for proper drainage of the new roof system to eliminate ponding. Provisions must be made to ensure the new roof system has proper drainage, i.e., placement of additional roof drains, use of tapered insulation, use of crickets, etc., as appropriate.
- Complying with all code requirements.
- GAF Materials Corporation recommends recovering over only one existing roof system. The Company will not issue a guarantee for a new GAF Materials Corporation roof membrane installed over more than one pre-existing roof system.

Recover Specifications:

GAF Materials Corporation requires that the new roof membrane be separated from the old roof system by either the installation of a layer of GAFTEMP® PERMALITE® Roof insulation. The maximum insulation board size is to be 4' x 4'.

Specific Deck Requirements:

Steel, Gypsum, Wood, Tectum

1. Any gravel surfacing must be removed to provide a smooth surface.
2. On smooth surfaced roofs, the old roof surface should be level and clean.
3. Remove all wet or damaged roof insulation and old, wet membrane. Replace with new insulation of the same type and cover with new membrane to complete the repair.
4. Old membrane must be cut on 3 foot centers to allow for the release of any trapped vapor pressure.
5. Recovering over existing modified bitumen smooth and granule surfaced roof systems, requires the use of a mechanically attached insulation.
6. When insulation is used, it must be mechanically fastened with TRIPLY Fasteners to steel decks. On tectum and gypsum decks, after removing any gravel, new insulation can be mopped to achieve a minimum of 70% attachment. The surface of the old BUR roof surface must be primed before mopping in the insulation. Install new roof specification to insulation as outlined in this manual.
7. Top side venting is required. Use Vent Stacks installed at the rate of one per 1000 square feet or use perimeter venting.
8. All specification requirements and recommendations listed in this manual must be followed, i.e., slope, nailing, etc.
9. If the old roof is a coal tar BUR, a mechanically fastened, insulation must be used. Proper precautions must be taken to ensure that coal tar drippage into the building does not occur.

Cold Weather Applications

Special care is necessary in applying TRIPLY Membranes at temperatures below 45°F. The roof surface must be ice-free and dry.

TRIPLY Membranes must be stored for at least overnight at a minimum of 55°F prior to their application. For mop applied TRIPLY Membranes, asphalt must be at least 425°F (with a target temperature of 425°F) or 20°F above the EVT, whichever is higher, at the point of application. Mopping must not precede the roll by more than five feet. For both mop applied and torch applied TRIPLY Membranes, the rolls must be at least 45°F at the time of application.

TRIPLY Mineral Surfaced Cap Sheet Installation

TRIPLY Mineral Surfaced Cap Sheet is considered part of the membrane system as well as surfacing. The application of TRIPLY Mineral Surfaced Cap Sheet shall commence at low points of the roof so that at no place is the flow of water against the laps. Parallel lap lines of cap sheet should not coincide with the lap lines of the underlying piles wherever possible. Application must be over and parallel to the underlying roofing membrane.

All sheets must be precut into 10 to 12 foot lengths and stacked prior to application. Sheets may be cut in 15 to 18 foot lengths if the temperature is 65°F or above. Embed cap sheet in Steep Asphalt applied at the nominal rate of 25 pounds per 100 square feet. Side laps must be a minimum of 2 inches and end laps 6 inches. End laps shall not occur in a continuous line and should be broken by a minimum of 3 feet. Uniformity of the separation of side laps is desirable for best appearance. All sheets must be firmly embedded in the hot asphalt and be free of wrinkles, buckles, blisters, fishmouths, or voids.

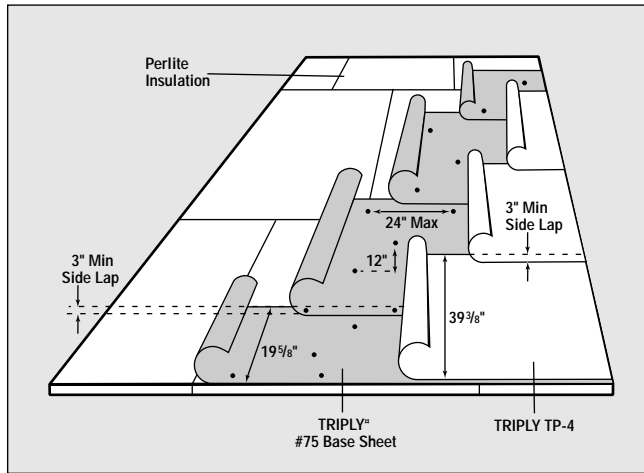
End laps must be nailed on all slopes exceeding 1 inch per foot. There are three acceptable methods of application:

1. The "flop in" method involves setting the precut sheet with mineral surfaced side down adjacent to the area where it is to be applied with the lap of the previous course exposed. Solidly mop with Roofing Asphalt the full sheet width to be covered including the lap. The TRIPLY Mineral Surfaced Cap Sheet should be picked up at each end and at the outside edge, turned over, and set immediately into the hot mopping.
2. The "fly in" method involves mopping the full width of the area to be covered and then picking up a precut sheet and setting it immediately into the hot mopping.
3. The "reroll" method involves setting the precut sheets so it is in its exact final position, rerolling it, and then mopping immediately ahead of the roll as it is rolled in place.

Note: Brooming of the TRIPLY Mineral Surfaced Cap Sheet is desirable in all cases to ensure completed adhesion. Also, in the "flop in" and "fly in" methods, tension should be placed on the precut sheet as it is being set to avoid wrinkles or buckles in the sheet.

Application of the TRIPLY Mineral Surfaced Cap Sheet at temperatures below 50°F is not recommended. At temperatures near 50°F, the reroll method with complete brooming will provide the best results. Wind conditions, which may chill the asphalt more quickly, must be considered.

“SMOOTH SURFACE”



Substrate—Insulated decks

Slope—Up to 3 inches per foot.

| Materials |
|------------------------------------|
| Perlite Insulation |
| TRIPLY Insulation Fastening System |
| TRIPLY #75 Base Sheet |
| TRIPLY TP-4 (Smooth) |
| TRIPLY Premium Aluminium Coating |

General

Design and Application Instructions shall apply in addition to the following recommendations and specifications. For additional information call 1-800-766-3411

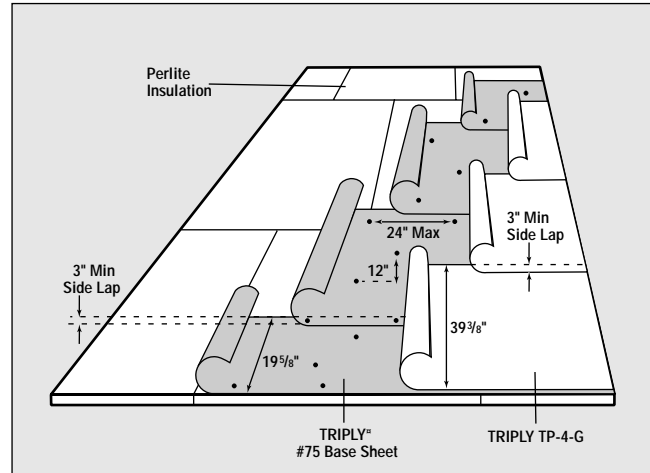
Application Recommendations

1. Install one ply of TRIPLY #75 Base Sheet over the perlite simultaneously attaching the base sheet and insulation to the deck using TRIPLY screws and plates. The side laps must be a minimum of 3 inches. The end laps must be a minimum of 4 inches.
2. Starting at the low point of the roof surface, set the TRIPLY TP-4 roll in the course to be followed and unroll half the roll where practical. Position the membrane to provide a minimum of 3 inch side laps and a 6 inch end lap. Using the propane torch, apply the flame to the surface of the coiled portion of the roll until the surface reaches the proper application temperature (approximately 350° F). The side lap and the end lap areas of the previously applied sheet must also be heated to provide proper adhesion. The flame should be moved from side to side and up the side lap area of the previously applied sheet. Unroll the membrane while pressing onto the underlying surface. Be sure that the surface of the roll is heated sufficiently so that the texture-backed products lose their sharp definition. The generation of heavy smoke is an indication that the surface is being overheated. When this half of the roll is secure, reroll the other half of the roll and torch in place in the same manner. A minimum of 1/4 inch flow out of modified bitumen compound is required at all seams. Field seams should not be troweled.
3. For smooth surfaced installation a coating is required, between 1 and 4 weeks after the installation, apply TRIPLY Premium Aluminium Roof Coating at a rate of approximately 1 1/2-2 gallons per 100 square feet. The TRIPLY Membrane surface must be clean, dry, and free of all loose dirt and dust at the time of coating.

Torch Safety Precautions and Recommendations

See reverse side of this sheet.

“GRANULAR SURFACE”



Substrate—Insulated decks

Slope—Up to 3 inches per foot.

| Materials |
|------------------------------------|
| Perlite Insulation |
| TRIPLY Insulation Fastening System |
| TRIPLY #75 Base Sheet |
| TRIPLY TP-4-G (Granular Surface) |

General

Design and Application Instructions shall apply in addition to the following recommendations and specifications. For additional information call 1-800-766-3411

Application Recommendations

1. Install one ply of TRIPLY #75 Base Sheet over the perlite simultaneously attaching the base sheet and insulation to the deck using TRIPLY screws and plates. The side laps must be a minimum of 3 inches. The end laps must be a minimum of 4 inches.
2. Starting at the low point of the roof surface, set the TRIPLY TP-4-G roll in the course to be followed and unroll half the roll where practical. Position the membrane to provide a minimum of 3 inch side laps and a 6 inch end lap. Using the propane torch, apply the flame to the surface of the coiled portion of the roll until the surface reaches the proper application temperature (approximately 350° F). The side lap and the end lap areas of the previously applied sheet must also be heated to provide proper adhesion. The plastic film must be melted off the selvage edge of granule surfaced products. The flame should be moved from side to side and up the side lap area of the previously applied sheet. Unroll the membrane while pressing onto the underlying surface. Be sure that the surface of the roll is heated sufficiently so that it develops a sheen. The generation of heavy smoke is an indication that the surface is being overheated. When this half of the roll is secure, reroll the other half of the roll and torch in place the same manner. A minimum of 1/4 inch flow out of modified bitumen compound is required at all seams. Field seams should not be troweled. At the 6 inch minimum end laps, sufficient heat must be applied to the granule surfaced TRIPLY Membranes to cause the granules to sink into the top surface coating to assure a receptive surface for bonding to the overlapping next roll of TRIPLY Membrane.

Torch Safety Precaution and Recommendations

See reverse side of this sheet.

Safety Precautions/Considerations

Roofing is a hazardous activity. Workers must be properly trained to work in a manner to avoid falls, burns, back injuries, heat related afflictions, etc.

It is the sole responsibility of the roofing applicator to enforce fire safety precautions and to ensure safety at all times. All appropriate OSHA and local codes should be followed in the application of roofing. All personnel involved in roofing should be properly trained in safety and fire procedures. Proper clothing and equipment should be worn at all times on the job site.

We refer you to the National Roofing Contractors Associations Passport to Safety booklet which addresses numerous safety concerns.

National Roofing Contractors Association
O'Hare International Center
10255 West Higgins Rd. Suite 600
Rosemont, IL 60018-5607
(708) 299-9070

Torch Safety Information

Installation of torch-applied products creates the risk of fire, including smoldering fires.

Torch-applied products must be applied only by professional roofing applicators trained in proper torch application and safety procedures.

Roofing applicators must follow GAFMCs current roofing safety requirements, procedures and specifications, which are available from GAF Technical Services, toll-free 1-800-ROOF-411.

Procedures and equipment that will be used must comply with all applicable code requirements.

Knowledge of the building construction and HVAC systems must be obtained prior to installation of torch-applied products.

All potentially combustible and flammable aspects of the buildings use and design that increase the risk of fire must be identified including:

- deck and under deck composition (materials and accessories);
- insulation types;
- cants and tapered edge strips;
- parapet wall and curb composition;
- perimeter details;
- adjoining building materials;
- expansion joints;
- wires and electrical conduit pipes;
- natural gas lines;
- chemicals, grease, oil or other condensates/exhausts/spills.

A base sheet must be used between the roofing membrane and any combustible materials such as wood.

Never apply flame directly to combustible materials or allow the flame to enter into hidden or protected areas that may contain combustible materials such as:

- air intakes or exhaust openings;
- air coolers;
- lead flashings;
- drains;
- counter flashings and coping covers;
- collars;
- flashings.

The installation equipment must be designed for the specific use, and must be in proper working order.

Ventilation must always meet or exceed OSHA or NIOSH requirements.

A supervisor trained in torch safety must conduct external and internal fire watches during application and after the torches are shut down. The watches shall never be less than one hour and may need to be longer. The watches shall be of sufficient frequency and duration based on:

- weather;
- building and roof design and composition;
- penetration types and design.

Infrared scanning equipment must be used in the fire watch.

One Class ABC fire extinguisher must be kept within 10 feet of every torch operator.

The above list is not a complete set of necessary safety requirements,

and specifications. Call GAF Technical Services for the most current GAFMC technical literature. In addition, the following steps must be taken by the applicator to prevent fires, since only the applicator is in a position to prevent fires. These steps include, but are not limited to:

Do not leave propane torches lighted and unattended. Do not place a lighted torch on the deck surface, insulation, membrane, or any other surface or object other than an acceptable torch stand. Extinguish the torch when not in use.

Avoid holding the flame on any one area of the membrane or substrate long enough for heavy smoke to be generated.

Train all personnel in GAF MATERIALS CORPORATION's recommended application techniques.

Train all personnel in fire prevention and extinguishing methods. Take precautions when working around combustible materials, such as gas lines for HVAC units, and in the presence of solvent-based products. Use caution to prevent burns and train personnel in first aid procedures.

Comply with all applicable fire regulations regarding the storage and use of propane.

Note: For more information on safety measures we recommend you refer to the Asphalt Roofing Manufacturers Association booklet titled Torch Applied Roofing Dos and Don'ts and their video, A Guide to Safety Torch-On Modified Bitumen.

Asphalt Roofing Manufacturers Association
4041 Powder Mill Road, Suite # 404
Calverton, MD. 20705-3106
(301) 231-9050

Specific Recommendations for Torch Applications

Membrane Installation

Only torches designed for installing modified bitumen roofing sheets should be used for installing TRIPLY sheets in both field and flashing constructions.

Starting at the low point of the roof surface, set the roll in the course to be followed and unroll half the roll where practical. Position the membrane to provide a minimum of 3 inch side laps and a 6 inch end lap. End laps shall not occur in a continuous line and should be offset by a minimum of 3 feet. Using the torch, apply the flame to the surface of the coiled portion of the roll until the surface reaches the proper application temperature (approximately 350° F). The side lap and end lap areas of the previously applied sheet must also be heated to provide proper adhesion. The plastic film must be melted off the selvage edge of granule surfaced products. The flame should be moved from side to side and up the side lap area of the previously applied sheet. Unroll the membrane while pressing onto the underlying surface. BE SURE that the surface of the roll is heated sufficiently so that it develops a sheen and the texture-backed products lose their sharp definition. The generation of heavy smoke is an indication that the surface is being overheated. When this half of the roll is secure, reroll the other half of the roll and heat weld in place in the same manner. A minimum of 1/4 inch flow out of modified bitumen compound is required at all seams. More than 1" flow out of modified bitumen compound may indicate excess heating of the sheet. Field seams should not be troweled. Vertical flashing seams may be troweled when desired for appearance.

At the 6 inch minimum end laps, sufficient heat must be applied to the granule surfaced TRIPLY Membranes to cause the granules to sink into the top surface coating to assure a receptive surface for bonding to the overlapping next roll of TRIPLY Membrane.

Occasionally, a roll of TRIPLY membrane will contain a splice that was fabricated as part of the manufacturing process. These splices are marked. Cut out all splices, and treat as an end lap area.

Note: Torch applied TRIPLY Membranes must **not** be installed with asphalt **nor** should they be used in conjunction with roofing cements.

Surfacing

Coatings or gravel surfacing are required for smooth surfaced torch applied TRIPLY Membrane installations to be guaranteed for 12 years. Apply TRIPLY Premium Aluminum Roof Coating within 1 - 4 weeks.

Reapplication of surfacing should be employed as part of a periodic maintenance program. The frequency may vary depending on climatic conditions.