

**SECTION 075200**

**MODIFIED BITUMINOUS MEMBRANE ROOFING**

*Note: GAF does not practice architecture or engineering. This document is provided as a guide specification and is based on criteria provided to GAF. GAF has not observed the jobsite conditions, contract specifications, or other documents and shall not be construed in any manner to be the designer of record.*

1. **GENERAL**
   1. SUMMARY
      1. Section Includes
         1. Asphaltic modified bituminous roofing
         2. Insulation
      2. Related Sections
         1. Section 06100: Rough Carpentry
         2. Section 07620: Sheet Metal Flashing and Trim
         3. Section 15430: Plumbing Specialties
   2. REFERENCES
      1. American Society for Testing and Materials (ASTM) - *Annual Book of ASTM Standards*
      2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - *Architectural Sheet*

*Metal Manual*

* + 1. Asphalt Roofing Manufacturers Association (ARMA)
    2. National Roofing Contractors Association (NRCA)
    3. American Society of Civil Engineers (ASCE)
    4. Factory Mutual (FM Global) - *Approval Guide*
    5. Underwriters Laboratories (UL) - *Roofing Systems and Materials Guide* (TGFU R1306)
    6. Florida Building Code
    7. Miami-Dade County Product Control Section
  1. DEFINITIONS
     1. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) *Roofing and Waterproofing Manual* for definitions of roofing terms related to this section.
  2. PERFORMANCE REQUIREMENTS
     1. GAF shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.
  3. SUBMITTALS
     1. Product Data: Provide product data sheets for each type of product indicated in this section.
     2. Shop Drawings: Provide manufacturers standard details and approved shop drawings for the roof system specified.
     3. Samples: Provide samples of insulation(s), fasteners and roll goods for verification of quality.
     4. Certificates: Installer shall provide written documentation from the manufacturer of their authorization to install the roof system, and eligibility to obtain the warranty specified in this section.
     5. To ensure compliance with GAF’s minimum warranty requirements, the following project details should be forwarded to GAF for review prior to installation, preferably prior to bid.
  4. QUALITY ASSURANCE
     1. Manufacturer’s Qualifications: GAF shall provide a roofing system that meets or exceeds all criteria listed in this section.
     2. Installer’s Qualifications:
        1. Installer shall be classified as a ***Master*** or ***Master Select™*** contractor as defined and certified by GAF.
     3. Source Limitations: All components listed in this section shall be provided by a single manufacturer or approved by the primary roofing manufacturer.
     4. Final Inspection

Manufacturer’s representative shall provide a comprehensive final inspection after completion of the roof system. All application errors must be addressed and final punch list completed.

* 1. PRE-INSTALLATION CONFERENCE
     1. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, architect, owner, GAF representative and any other persons directly involved with the performance of the work. The installer shall record conference discussions to include decisions and agreements reached (or disagreements), and furnish copies of recorded discussions to each attending party. The main purpose of this meeting is to review foreseeable methods and procedures related to roofing work.
  2. REGULATORY REQUIREMENTS
     1. All work shall be performed in a safe, professional manner, conforming to all federal, state and local codes.
  3. DELIVERY, STORAGE AND HANDLING
     1. Deliver all roofing materials to the site in original containers, with factory seals intact. All products are to carry either a GAF label.
     2. Store all pail goods in their original undamaged containers in a clean, dry location within their specified temperature range.
     3. Store roll goods on end on pallets in a clean, dry, protected area. Take care to prevent damage to roll ends or edges. Do not double stack modified bitumen products.
     4. Do not expose materials to moisture in any form before, during, or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.
     5. Remove manufacturer supplied plastic covers from materials provided with such. Use “breathable” type covers such as canvas tarpaulins to allow venting and protection from weather and moisture. Cover and protect materials at the end of each work day. Do not remove any protective tarpaulins until immediately before the material is to be installed.
     6. Materials shall be stored above 55°F (12.6°C) a minimum of 24 hours prior to application.
  4. PROJECT CONDITIONS
     1. Weather
        1. Proceed with roofing only when existing and forecasted weather conditions permit.
        2. Ambient temperatures must be above 45°F (7.2°C) when applying hot asphalt or water based adhesives.

* 1. WARRANTY
     1. Provide RUBEROID®/GAFGLAS® Diamond Pledge™ NDL Roof Guarantee with edge to edge coverage and no monetary limitation, where the manufacturer agrees to repair or replace components in the roofing system, which cause a leak due to a failure in materials or workmanship.
        1. Duration: Twenty (20) years from the date of completion.
           1. Materials and workmanship of listed products within this section are included when installed in accordance with current GAF application and specification requirements. Contact GAF Technical Support Services for the full terms and conditions of the guarantee.

1. **PRODUCTS**
   1. ACCEPTABLE MANUFACTURER
      1. Acceptable Manufacturer: GAF, Commercial Roofing Products Division, which is located at: 1 Campus Drive; Parsippany, NJ 07054; Toll Free Tel: 877-423-7663 (option 4, then option 2); Email: designservices@gaf.com; Web: [www.gaf.com](http://www.gaf.com)

* 1. INSULATION
     1. Rigid polyisocyanurate board, with a glass-reinforced cellulosic felt facer. Conforms to or exceeds the requirements of ASTM C 1289 Type II, Class 1, Grade 2. **EnergyGuard™ Polyiso Insulation**, with the following characteristics:
        1. Board Thickness:
        2. Thermal Resistance (LTTR value) of:
        3. Board Size: 4’ x 4’ or 4’ x 8’
        4. Compressive Strength:
     2. Rigid, non-halogenated polyisocyanurate board, with a glass-reinforced cellulosic felt facer. Holds a Health Product Declaration (HPD), is GreenCircle third-party recycled content certified, and is a Red List Free product with a Declare label designation. Conforms to or exceeds the requirements of ASTM C 1289 Type II, Class 1, Grade 2. **EnergyGuard™ NH Polyiso Insulation**, with the following characteristics:
        1. Board Thickness:
        2. Thermal Resistance (LTTR value) of:
        3. Board Size: 4’ x 4’ or 4’ x 8’
        4. Compressive Strength:
     3. Coated glass fiber and a special coated glass-fiber facer laminated to a closed-cell polyisocyanurate foam core. Conforms to or exceeds the requirements of ASTM C 1289 Type II, Class 2, Grade 2. **EnergyGuard™ Barrier Polyiso Insulation**, with the following characteristics:
        1. Board Thickness:
        2. Thermal Resistance (LTTR value) of:
        3. Board Size: 4’ x 4’ or 4’ x 8’
        4. Compressive Strength:

**\*This product is subject to regional availability.**

* + 1. Coated glass fiber and a special coated glass-fiber facer laminated to a closed-cell non-halogenated polyisocyanurate foam core. Conforms to or exceeds the requirements of ASTM C 1289 Type II, Class 2, Grade 2. **EnergyGuard™ NH Barrier Polyiso Insulation**, with the following characteristics:
       1. Board Thickness:
       2. Thermal Resistance (LTTR value) of:
       3. Board Size: 4’ x 4’ or 4’ x 8’
       4. Compressive Strength: 20 psi

**\*This product is subject to regional availability.**

* + 1. Rigid polyisocyanurate board, with a coated glass-fiber mat facer. Conforms to or exceeds the requirements of ASTM C 1289 Type II, Class 2, Grade 2. **EnergyGuard™ Ultra Polyiso Insulation**, with the following characteristics:
       1. Board Thickness:
       2. Thermal Resistance (LTTR value) of:
       3. Board Size: 4’ x 4’ or 4’ x 8’
       4. Compressive Strength: 20 psi
    2. Rigid, non-halogenated polyisocyanurate board, with a coated glass-fiber mat facer. Holds a Health Product Declaration (HPD), is GreenCircle third-party recycled content certified, and is a Red List Free product with a Declare label designation. Conforms to or exceeds the requirements of ASTM C 1289 Type II, Class 2, Grade 2. **EnergyGuard™ NH Ultra Polyiso Insulation**, with the following characteristics:
       1. Board Thickness:
       2. Thermal Resistance (LTTR value) of:
       3. Board Size: 4’ x 4’or 4’ x 8’
       4. Compressive Strength: 20 psi
    3. Non-structural composite roofing panel comprised of a top layer of EnergyGuard™ HD cover board (80psi) adhered with a high-tack adhesive to a second layer of EnergyGuard™ Ultra polyiso insulation (20psi). All panels of the composite are faced with a coated glass for increased durability and mold resistance. Conforms to or exceeds the requirements of ASTM C 1289, Type II, Class 4, Grade 1. **EnergyGuard™** **Ultra HD Composite Insulation**, with the following characteristics:

1. Board Thickness:

2. Thermal Resistance (LTTR value) of:

3. Board Size: 4’ x 4’ or 4’ x 8’

4. Compressive Strength: 20 psi

* 1. TAPERED INSULATION
     1. Rigid, tapered polyisocyanurate board, with a glass-reinforced cellulosic felt facer. Conforms to or exceeds the requirements of ASTM C 1289 Type II, Class 1, Grade 2. **EnergyGuard™ Tapered Polyiso Insulation**, with the following characteristics:
        1. Board Thickness:
        2. Thermal Resistance (LTTR value) of: varies
        3. Board Size: 4’ x 4’
        4. Compressive Strength:
     2. Rigid, tapered polyisocyanurate board, with a coated glass-fiber mat facer. Conforms to or exceeds the requirements of ASTM C 1289 Type II, Class 2, Grade 2. **EnergyGuard™ Ultra Tapered Polyiso Insulation**, with the following characteristics:
        1. Board Thickness:
        2. Thermal Resistance (LTTR value) of: varies
        3. Board Size: 4’ x 4’
        4. Compressive Strength: 20 psi
  2. COVER BOARD
     1. Fiber-reinforced gypsum panel with an integral water-resistant core. **Securock® Gypsum Fiber Roof Board** by US Gypsum.
        1. Board Thickness: ¼” 3/8” ½” 5/8”
        2. Board Size: 4’ x 4’ 4’ x 8’
        3. Thermal Resistance (R value) of:
  3. INSULATION ACCESSORIES
     1. Cant Strip: Factory fabricated rigid perlite strip cut at angles to provide a true 45° Angle between horizontal and vertical surfaces, **EnergyGuard™ Perlite Cant Strip,** by GAF
     2. Tapered Edge Strip: Factory fabricated rigid perlite strip cut at angles to provide a smooth transition between differences in elevation. **EnergyGuard™ Tapered Edge Strip**, by GAF
  4. BASE / PLY SHEETS
     1. Tough, resilient, smooth surfaced, asphalt modified bitumen membrane containing a core of non-woven polyester mat coated with flexible, SBS polymer-modified asphalt designed for heat weld application. Conforms to or exceeds requirements of ASTM D 6164 Type I Grade S. Each roll contains one square of material, approximately 39.625” x 32.6’ (1 m x 9.9 m), 88 lbs. (47.2 kg), **RUBEROID® HW Smooth** base / ply sheet.
  5. MEMBRANE MATERIALS
     1. Fire-retardant, granule surfaced modified bitumen sheet shall be a prefabricated styrene butadiene styrene (SBS) modified asphalt membrane. Non-woven polyester (180 g/m²) reinforcement. Conforms to or exceeds the requirements of ASTM D 6164 Type I Grade G. Each roll contains one (1) square of material, approximately 39.625” x 32.6’ (1 m x 9.9 m), 104 lbs. (47.2 kg), **Ruberoid®** **HW Granule FR** flashing membrane.
     2. Premium, heavy-duty, fire-resistant, granule-surfaced asphalt modified bitumen membrane containing a core of non-woven polyester mat coated with flexible, SBS polymer-modified asphalt designed for heat weld application. Conforms to or exceeds requirements of ASTM D 6164 Type II Grade G. Each roll contains one square of material, approximately 39.625” x 32.6’ (1 m x 10.3 m), 105 lbs. (47.6 kg), **Ruberoid® HW Plus Granule FR** roof membrane.
  6. FLASHING MATERIALS
     1. Tough, resilient, smooth surfaced, asphalt modified bitumen membrane containing a core of non-woven polyester mat coated with flexible, SBS polymer-modified asphalt designed for heat weld application. Conforms to or exceeds requirements of ASTM D 6164 Type I Grade S. Each roll contains one square of material, approximately 39.625” x 32.6’ (1 m x 9.9 m), 88 lbs. (47.2 kg), **Ruberoid® HW Smooth** flashing membrane.
     2. Fire-retardant, granule surfaced modified bitumen sheet shall be a prefabricated styrene butadiene styrene (SBS) modified asphalt membrane. Non-woven polyester (180 g/m²) reinforcement. Conforms to or exceeds the requirements of ASTM D 6164 Type I Grade G. Each roll contains one (1) square of material, approximately 39.625” x 32.6’ (1 m x 9.9 m), 104 lbs. (47.2 kg), **Ruberoid®** **HW Granule FR** flashing membrane.
     3. Premium, heavy-duty, fire-resistant, granule-surfaced asphalt modified bitumen membrane containing a core of non-woven polyester mat coated with flexible, SBS polymer-modified asphalt designed for heat weld application. Conforms to or exceeds requirements of ASTM D 6164 Type II Grade G. Each roll contains one square of material, approximately 39.625” x 32.6’ (1 m x 10.3 m), 105 lbs. (47.6 kg), **Ruberoid® HW Plus Granule FR** roof membrane.
  7. BITUMEN / ADHESIVES
     1. Asphalt Primer: ASTM D 41 **Matrix™ 307 Premium Asphalt Primer**, by GAF
     2. Two component, low rise polyurethane foam adhesive. VOC free and contains no solvents. Dispensed using the Millennium Cyclone and Cyclone II pump, or another suitable low pressure pump which equally mixes Part 1 and Part 2. Also available as a simple to use cartridge with disposable mixing tip for small jobs. **LRF M Adhesive** by GAF.
     3. Two component, construction grade low-rise polyurethane foam adhesive. The “A” and “B” components are dispensed from two pre-pressurized disposable cylinders utilizing a two-component disposable foam applicator. **LRF Adhesive XF** distributed by GAF.
     4. Two component, low-rise polyurethane adhesive. Appropriate for application temperatures of 40°F+ (4.4°C). Available in Bag-in-Box, 15 Gal (57L) drums, and SpotShot. **Oly-Bond 500™** distributed by GAF.
     5. Two component fast-acting, low-rise polyurethane foam adhesive. The “A” and “B” components are dispensed from two pre-pressurized disposable cylinders. **OlyBond500® Equipment Free Canister System** distributed by GAF.
     6. Solvent based synthetic elastomeric sealant designed for use where elastomeric caulks are required such as term bar applications, or around clamping rings at penetrations. **FlexSeal™ Caulk Grade Sealant**, by GAF.
  8. ACCESSORIES
     1. **Mechanical Fasteners** 
        1. **Drill-Tec™ #12 Fastener**: Standard duty alloy steel insulation fastener with CR-10 coating with a.220” diameter thread. Factory Mutual Standard 4470 Approved, #3 Phillips head for use on steel and wood decks.
        2. **Drill-Tec™ #14 Fastener**: Heavy gauge alloy steel fastener with CR-10 coating with a.245” (6.2 mm) diameter thread. Miami Dade and Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on wood, concrete and steel decks.
        3. **Drill-Tec™ CD-10 Fastener:** Hammer-in, non-threaded fastener with a CR-10 coating designed to secure insulation and membrane to structural concrete. Miami Dade and Factory Mutual Standard 4470 approved.
     2. Plates
        1. **Drill-Tec™ Insulation Plates**: Galvalume, 3” (76 mm) diameter, suitable for use with Drill•Tec™Standard and HD screws, and Drill•Tec™Spikes. Special design available for use with Drill•Tec™Polymer Screws.
     3. One Way Vents (Lightweight Concrete Decks Only)
        1. Pressure relief device consisting of a one-piece spun aluminum vent pre-flashed with modified bitumen. Internally, the vent contains a neoprene valve that allows air pressure and moisture vapor to escape out of the system without allowing additional air and moisture vapor to return. The **One Way MVent**, by MWeld®.

* + 1. Standard Vents
       1. A spun aluminum vent, pre-flashed with modified bitumen designed to waterproof soil pipes and roofing protrusions. The **Standard MVent**, by MWeld®.

***NOTE: Not for use over active pipes that emit steam or excessive moisture vapor, condensation may occur. Not for use over boiler or heater/furnace vent pipes.***

* + 1. Adjustable Vents (Not approved in Dade County)
       1. A two-piece roof-flashing unit consisting of a pre-flashed spun aluminum base and a flexible upper boot, allowing for waterproofing of tall or awkward roof protrusions. The **Adjustable MVent,** by MWeld®.
    2. Drains (Not approved in Dade County)
       1. A spun aluminum (or copper) roof drain with gravel guard, strainer cap, and waterproofing plumbing seal attached. Pre-flashed with modified bitumen and available in full and insert sizes to accommodate new construction and retrofit applications. The **MDrain**, by MWeld®.
       2. A Pre-flashed metal through-wall roof drain designed for easy installation to aid in quick lateral removal of water. The **Mscupper**, by MWeld®.
    3. Sealant Pans
       1. A structural urethane outer shell, bonded to the roof surface, filled with a urethane rubber sealant. The urethane sealant conforms to the shape of any roof penetration through a roof surface to protect the roof system from moisture. The **M-Curb** and **M-Thane**,by MWeld®
    4. Expansion Joint Covers
       1. Factory fabricated assemblies used to accommodate three-dimensional joints in a roof structure. Heavy reinforced flexible cover with a flexible flame retardant foam bellows for support. Nailing flanges conform to curb irregularities. The **Metalastic® Expansion Joint Cover**, by GAF.

1. EXECUTION
   1. SITE CONDITIONS
      1. Obtain verification that the building structure can accommodate the added weight of the new roofing system.
      2. Confirm the adequacy of the new roofing system to provide positive slope to drain. Eliminate ponding areas by the addition of drainage locations or by providing additional pitch to the roof surface.
      3. Prepare substrate surfaces thoroughly prior to application of new roofing materials. This is particularly important for re-cover and reroofing applications. Providing a smooth, even, sound, clean, and dry substrate minimizes the likelihood that underlying deficiencies will cause premature deterioration or even failure of the new roofing system.
      4. All defects in the roof deck or substrate must be corrected by the responsible parties before new roofing work commences. Verify that the deck surface is dry, sound, clean, and smooth, and free of depressions, waves, or projections.
      5. Protect building surfaces against damage and contamination from roofing work.
      6. Where work must continue over completed roof areas, protect the finished roofing system from damage.
      7. Verify that the surfaces and site conditions are ready to receive work.
      8. Verify that the deck is supported and secured.
      9. Verify that the deck surfaces are dry and free of ice or snow.
      10. Verify that all roof openings, curbs, pipes, sleeves, ducts, vents or other penetrations through the roof are solidly set, and that all flashings are tapered.
   2. SUBSTRATE PREPARATION

* + 1. Steel Deck
       1. Metal decks must be a minimum uncoated thickness of 22 gauge (0.8 mm) and shall have a G-90 galvanized finish on all panels.
       2. When re-roofing over steel decks, surface corrosion shall be removed, and repairs to severely corroded areas made. Loose or inadequately secured decking shall be fastened, and irreparable or otherwise defective decking shall be replaced.
       3. Code standards apply when their requirements exceed those listed here.
    2. Structural Concrete Deck
       1. Minimum deck thickness for structural concrete is 4” (10.2 cm).
       2. Only poured in place concrete decks that provide bottom side drying are acceptable. Decks that are installed over non-vented metal decks or pans that remain in place may trap moisture in the deck beneath the roof system and are not acceptable.
       3. The roof deck shall be properly cured prior to application of the roofing system; twenty-eight (28) days is normally required for proper curing. Curing agents must be checked for compatibility with roofing materials. Prior to the installation of the roof assemblies, GAF recommends the evaluation of the surface moisture and deck’s dryness through the use of ASTM D-4263 or hot bitumen test.
       4. The deck must be smooth, level and cannot be wet or frozen. If deck is determined to be wet, it must be allowed to dry.
       5. Treat cracks greater than 1/8” (3 mm) in width in accordance with the deck manufacturer’s recommendations.
       6. Sumps for the roof drains shall be provided in the casting of the deck.
       7. When insulation or roofing is to be adhered with hot asphalt, prime the deck with asphalt/concrete primer, ASTM D 41 at the rate of one gallon per 100 square feet (0.4 L/m2). Allow the primer to dry prior to the application of the roofing system.
       8. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected per the deck manufacturer’s recommendations prior to the new roof application.
       9. Code standards apply when their requirements exceed those listed here.
    3. Wood Deck (Plank / Heavy Timber)
       1. Wood boards must be at least 1” nominal thickness and have a nominal width of 4’-6”. Tongue and groove or shiplap lumber is preferred to square edge material since subsequent shrinkage or warping of square edge planks may cause ridging of the roof system above adjacent boards.
       2. All boards must have a bearing on rafters at each end and be securely nailed.
       3. Lumber should be kiln dried.
       4. Preservatives or fire retardants used to treat decking must be compatible with roofing materials.
       5. Decking should be kept dry and roofed promptly after installation.
       6. Knotholes or large cracks in excess of ¼” (6 mm) shall be covered with securely nailed sheet metal.
       7. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected per the deck manufacturer’s recommendations and standards of the APA/Engineered Wood Association prior to new roof application.
       8. Code standards apply when their requirements exceed those listed here.
    4. Plywood Deck
       1. Plywood sheathing must be exterior grade, minimum 4 ply, and not less than 15/32” (12 mm) thick.
       2. Preservatives or fire retardants used to treat the decking must be compatible with roofing materials.
       3. The deck must be installed over joists that are spaced 24” (61 cm) o.c. or less.
       4. The deck must be installed so that all four sides of each panel bear on and are secured to joist and cross blocking. “H” clips are not acceptable.
       5. Panels must be installed with a 1/8” to 1/4” (3mm – 6mm) gap between panels and must match vertically at joints to within (1/8” (3mm).
       6. Decking should be kept dry and roofed promptly after installation.
       7. Light metal wall ties or other structural metal exposed on top of the wood deck shall be covered with one ply of a heavy roofing sheet, such as Stratavent® Eliminator™ Nailable Base Sheet, extending 2”-6” (5.1 cm – 15.2 cm) beyond the metal in all directions. Nail in place before applying the base ply.
       8. Tape and staple fastening systems may be used on wood decks when they comply with local building codes.
       9. Attach an acceptable base sheet through flat metal caps or use nails with attached 1” (25 mm) square or round metal caps that have a minimum withdrawal resistance of 40 pounds each (178 N).
       10. Code standards apply when their requirements exceed those listed here.
    5. Oriented Strand Board (OSB) Deck
       1. Oriented Strand Board must carry a Structural 1 rating if it is to be used as a decking material.
       2. Preservatives or fire retardants used to treat decking must be compatible with roofing materials.
       3. The deck must be installed over joists that are spaced 24” (61 cm) o.c. or less.
       4. The deck must be installed so that all four sides of each panel bear on and are secured to joist and cross blocking; the APA/Engineered Wood Association (APA) recommendations. “H” clips are not acceptable.
       5. Panels must be installed with a 1/8” to 1/4” (3mm – 6mm) gap between panels and must match vertically at joints to within (1/8” (3mm).
       6. Decking should be kept dry and roofed promptly after installation.
       7. When light metal wall ties or other structural metal are exposed on top of the wood deck, cover them with a heavy ply of a roofing sheet, such as Stratavent® Eliminator™ Nailable Base Sheet, extending 2”-6” (5.1 cm – 15.2 cm) beyond the metal in all directions. Nail in place before applying the base ply.
       8. Tape and staple fastening systems may be used on wood decks when they comply with local building codes.
       9. Attach an acceptable base sheet through flat metal caps or use nails with attached 1” (25 mm) square or round metal caps that have a minimum withdrawal resistance of 40 pounds each (178 N).
       10. Code standards apply when their requirements exceed those listed here.
    6. Lightweight Insulating Concrete Deck
       1. Lightweight insulating concrete decks are required to have a minimum thickness of 2” (5.1 cm), a minimum compressive strength of 125 psi (87,000 kg/m²) and a minimum density of 22 pcf (352 kg/m²).
       2. The lightweight insulating deck/fill must be installed by an applicator approved by the deck manufacturer.
       3. The roof system shall be installed immediately following deck curing to prevent damage from exposure to precipitation. The deck manufacturer determines the minimum curing time and maximum exposure limitations.
       4. LWIC should not be poured during rainy periods. Deck areas that have frozen before they have cured must be removed and replaced. Decks which receive precipitation prior to installation of the roof membrane, must be checked for moisture content and dryness.
       5. Where the mean January temperature (Reference current ASHRAE Fundamentals Handbook) is below 40° F (4.4°C), lightweight insulating concrete decks must be poured and roofed between April 1st and October 31st; this type of deck is unacceptable in Alaska.
       6. Lightweight insulating concrete decks are acceptable only on slopes up to 1” per foot (8.3 cm/m).
       7. Do not attach insulation directly to lightweight concrete decks. Over old, dry decks, additional board insulation may be solidly mopped to an approved mechanically attached anchor sheet (base sheet).
       8. **Local building code or individual deck manufacturer’s standards apply when their specifications exceed the minimum thickness, compressive strength, or density requirements listed in this section.**
  1. INSTALLATION
     1. General:
        1. Install GAF roofing system according to all current application requirements in addition to those listed in this section.
        2. Substrates must be inspected and accepted by the contractor as suitable to receive and hold roof membrane materials.
        3. Start the installation of all membrane plies at the low point or drains, so the flow of water is over or parallel to the ply laps, but never against the laps.
        4. Chalk lines where necessary to ensure proper alignment and headlap widths of membrane plies.
        5. Use half base sheet width as a starter strip in two-ply roof constructions.
        6. Installation of all membrane plies, except those that are mechanically fastened, shall result in a visible, uniform flow-out of bitumen at side and end laps.
        7. Ensure that all membrane plies lay flat and are uniformly secured to their substrate. Wrinkles, fishmouths, and similar defects must be removed and patched.
        8. Extend all membrane plies to dimensions necessary to accommodate flashing conditions shown in the RUBEROID®/GAFGLAS® Roof Flashing Details Manual.
        9. All lap edges for GAF cap membranes shall be rolled-in or walked-in immediately after installation. Additional care must be taken to ensure complete bonding at “T” laps. Lap edges on all membrane sheets should be inspected for full and uniform bonding to the underlying membrane sheet.
        10. Stagger all adjacent end laps for all membrane plies a minimum of 18" (457 mm). Side laps shall not coincide with underlying plies in multiple layer applications.
        11. Prime all masonry, metal, and existing asphalt surfaces and substrate with asphalt primer where insulation or GAF membranes are to be adhered. Matrix™ 307 Premium Asphalt Primer (ASTM D41) shall be applied at the rate of 1 gal/square (0.41 L/m2). Allow the primer adequate time to dry.
        12. Brooming-in of glass felts is vital to minimize voids and ensure complete, uniform attachment.
        13. Occasionally, a roll of felt or 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.
        14. Back nailing of felts and cap sheets, and the use of ASTM D312 Type IV asphalt is required on slopes 1/2:12 or greater. Refer to “Steep- Slope Requirements” in the next section.
     2. Phasing:
        1. The term “phasing” refers to the practice of applying part of a total roof membrane at one time and allowing that part to remain exposed to the weather for a period of time before applying the remaining elements of the roof system. Membranes applied in this manner are subject to early deterioration.
        2. Blisters, voids, membrane damage, and moisture infiltration are much more likely to occur in “phased” roof membranes.
        3. GAF does not approve the practice of “phasing”.
        4. Whenever it is necessary to put a building “in the dry” quickly, a temporary roof covering is recommended; this temporary roof should be removed prior to installation of the roof system.
  2. INSULATION - GENERAL 
     1. Do not apply roof insulation or roofing until all other work trades have completed jobs that require them to traverse the deck on foot or with equipment. A vapor retarder coated lightly with asphalt may be applied to protect the inside of the structure prior to the insulation and final roofing installation. Before the application of the insulation, any damage or deterioration to the vapor retarder must be repaired.
     2. Do not install wet, damaged or warped insulation boards.
     3. Install insulation boards with staggered board joints in one direction (unless taping joint).
     4. Install insulation boards snug. Gaps between board joints must not exceed ¼” (6 mm). All gaps in excess of ¼” (6 mm) must be filled with like insulation material.
     5. Wood nailers must be 3-1/2” (8.9 cm) minimum width or 1” (25 mm) wider than metal flange. They shall be of equal thickness as the insulation with a minimum 1” (25 mm) thickness. All nailers must be securely fastened to the deck.
     6. Do not kick insulation boards into place.
     7. Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.
     8. Do not install insulation over old lightweight insulating concrete decks without the use of a vapor retarder. Insulation should not be installed over new lightweight insulating concrete.
     9. Cant strips must be installed at the intersection of the roof and all walls, parapets, curbs, or transitions approaching 90°, to be flashed. They shall be approximately 4” (10.2 cm) in horizontal and 4” (10.2 cm) in vertical dimension. The face of the cant shall have an incline of not more than 45 degrees with the roof.
     10. Adhesion test is required for any insulation that will be installed with low rise foam adhesive.
     11. Do not install any more insulation than will be completely waterproofed each day.
  3. INSULATION ATTACHMENT
     1. MECHANICALLY ATTACHED
        1. The insulation must be securely attached to the roof deck with Drill-Tec™ Fasteners and 3” plates. Refer to local code or GAF attachment tables for appropriate fasteners and fastening pattern.
        2. Use only fasteners with a minimum 3 inch (7.6 cm) stress plate when mechanically attaching insulation. Do not attach insulation with nails.
     2. LOW-RISE FOAM
        1. The substrate must be free of and debris, dust, dirt, oil, grease, and standing water before applying the adhesive.
        2. Install insulation layers in a ribbon pattern to achieve proper coverage rates for insulation attachment:
           1. Field: 12” o.c.
           2. Perimeter: 6” o.c.
           3. Corners: 4” o.c.
  4. PLY / CAP SHEET 
     1. Install one ply of the specified Ruberoid® smooth sheet and follow with the specified granule surfaced sheet.
     2. Lap sheets 3” (7.6 cm) on the sides and 6” (15.2 cm) on ends. All end laps must be staggered a minimum of 18” (45.7 cm) so that no adjacent end laps coincide. If end laps fall in line or are not staggered the proper distance, a full width of membrane must be installed over the end laps. End laps, flashing sheets and other seams formed over granule surfaces require pre-heating of the top surface of the underlying granule surface membrane to a point where the granules just begin to sink into, and the modified bitumen compound comes up through the granules to ensure proper seam construction and adhesion.
     3. The surface over which the membrane is to be installed must be clean, smooth, dry and prepared in accordance with GAF requirements*.* Do not apply membrane directly to a fresh asphalt glaze or flood coat, or over base plies with excessive asphalt mopping bleed out at laps.
     4. For slopes 3/4 “ per foot (6.2 cm per meter) and over, membrane must be run parallel to the roof slope and back nailed in accordance with GAF steep slope application requirements. On slopes less than 3/4” per foot (6.2 cm per meter), install cap sheet perpendicular to the slope.
     5. Never apply membrane by any method except welding with a propane torch or other equipment specifically designed for application of torchable modified bitumen.
     6. The coiled membrane must be unrolled approximately 10 ft. (3 meters), and aligned. The propane torch flame is then applied uniformly across the exposed back surface of the membrane and lap areas until the compound reaches the proper application temperature and exhibits a slight sheen. A complete burn-off of release films where present on the underside of the rolls, membrane selvage edges or both surfaces is necessary. Avoid overheating which may result in damage to or improper adhesion of the membrane. (The flame should be moved from side to side in the shape of an “L”, applying about 75% of the heat to the membrane and 25% to the substrate or underlying plies including the lap area of the previously installed courses.) The membrane is slowly unrolled as heat is applied to ensure proper adhesion. When complete, re-roll the opposite end of the membrane and install in the same manner.
     7. A minimum 3/8” (10 mm) bitumen flow-out must be obtained at all seam areas. Dry laps are not acceptable. To ensure the proper 3/8” (10mm) flow of bitumen at the seam areas, a roller may be used. Roller application should follow behind the torch no more than 4 ft. (1.2 m) nor less than 3 ft. (0.91 m) to be sure that the membrane will be at the proper temperature to produce proper flow. Hand rollers or “walking-in the seam” methods are also acceptable. Check all seams for full and uniform adhesion. Un-adhered seams must be lifted with a heated trowel and resealed by lightly torching the seam area.
     8. (Optional) Matching granules may be broadcast into the modified bitumen bleed out at seams while hot to enhance the finished appearance of the membrane.
     9. All laps must be parallel or perpendicular to the slope of the roof such that the flow of water is never against the lap.
     10. Membranes must not be applied during adverse weather or without precautionary measures in temperatures below 45ºF (7.2ºC). Contact GAF Contractor Services for details.
  5. BITUMINOUS BASE FLASHINGS
     1. Install GAF base flashing specification over all cant strips, horizontal to vertical transitions, roof edges and roof penetrations. Flashings are to be secured in accordance with current GAF application guidelines.
     2. Nailable curbs and walls must be covered with a layer of approved GAFGLAS® Base Sheet or backer ply fastened 8” (20.3 cm) o.c. in all directions with approved fasteners. All vertical laps shall be 4” (10.2 cm). Base sheet or backer ply must extend out onto the field of the roof as shown in the applicable GAF construction detail.
     3. Prime all metal and masonry surfaces with asphalt primer, and allow adequate drying time prior to adhering flashing plies.
     4. Backer plies installed over masonry or other non-nailable substrates must be cut into manageable lengths to ensure adequate adhesion to the cant strip and vertical surfaces without excessive voids. All vertical laps shall be 4” (10.2 cm). Backer plies shall extend onto the field of the roof as shown in the applicable GAF construction detail.
     5. The finished ply of base flashing shall be run vertically to provide a selvage edge that will aid in achieving proper adhesion at the 3” (7.6 cm) vertical laps. If the sheet is run horizontally, the vertical laps must be a minimum of 6” (15.2 cm) and the selvage edge must be removed from the sheet or fully covered by the counterflashing. The finished flashing ply must extend out onto the field of the roof as shown in the applicable GAF construction detail, and must be extended a minimum of 4” (10.2 cm) beyond the edge of the prior flashing plies. The flashing must be soundly adhered to the parapet, cant area and roof surface to result in a minimum void, non-bridging construction.
     6. Base flashing heights must be a minimum of 8” (20.3 cm) and a maximum of 24” (61.0 cm) above the roofline.
     7. Corner membrane flashings, such as “bow ties” for outside corners and “footballs” for inside corners or other membrane reinforcements are required to ensure that base flashing corners are sealed at cant areas. An alternate method of corner reinforcing is to install a smooth MB membrane reinforcement piece on the prepared corner substrate prior to final surfacing membrane. Refer to MB Flashing Details section of the GAF *Application and Specifications Manual*.
  6. SHEET METAL
     1. Metal should not be used as a component of base flashing. Because of the high coefficient of expansion of sheet metals and the large temperature changes that can be experienced on a roof, sheet metal or exposed metal components must be isolated from the waterproofing components of the roofing and flashing system as efficiently as possible to prevent the metal from splitting the membranes.
     2. All metal edge details scheduled to be included in the **Edge to Edge Coverage** of the Diamond Pledge™ Guarantee must be submitted and approved in writing by the manufacturer prior to project commencement.
     3. When it is unavoidable to use metal in the roofing system (i.e., lead flange at drains, gravel stops), treated wood nailers and insulation stops, 1” (25 mm) wider than the metal flange, should be provided for metal flange attachment. Metal flanges must always be set on top of the roof membrane with modified trowel grade cold adhesive applied material for SBS roof systems. The metal flange is then sealed using the applicable construction detail to meet applicable guarantee requirements. Metal accessories (gravel stops, counter flashing, etc.) should be 16 oz. (0.56 mm) copper, 24 gauge (0.71 mm) galvanized or stainless steel, 2 1/2 to 4 lb. (1.1-1.8 kg) lead, or 0.032” (0.81 mm) aluminum.
     4. Fabricate and install all sheet metal materials as shown in applicable construction details. Refer to SMACNA (Sheet Metal and Air Conditioning Contractors National Association, Inc.) for guidance on sheet metal treatments not addressed in this specification.
     5. Clean metal and apply asphalt primer to all sheet metal surfaces that will come into contact with asphalt or other bituminous materials; allow the primer adequate time to dry.
     6. Use fastener types compatible with the sheet metal type.
        1. Copper or lead-coated copper: use copper or bronze fasteners.
        2. Lead and galvanized steel: use galvanized or cadmium-plated sheet fasteners.
        3. Aluminum: use aluminum fasteners.
        4. Stainless steel: use stainless steel fasteners.
     7. Metal counter-flashing shall have a minimum 4” (10.2 cm) face with a drip lip. The bottom edge of the counterflashing shall cover the roofing membrane and/or base flashing by a minimum of 4” (10.2 cm). Metal counter flashing used for masonry walls, wooden walls, or through wall metal flashings should be a two piece design to allow for installation and later removal. Metal counter-flashings for stucco, EIFS, wood siding or similar materials should be designed appropriately, such as “Z” type flashing. End joints shall be lapped 3” (7.6 cm) or more. Adequate fasteners must be provided to secure against wind forces. Skirt fasteners shall be watertight.
     8. Metal termination bars shall be a minimum of 1/10” (3 mm) thick x 1” (25 mm) wide with preformed sealant edge lap. Bar should have 1/4” (6 mm) x 3/8” (10 mm) slotted holes on 4” (10.2 cm) centers to facilitate mechanical anchorage.

**Note: Termination bars are not suitable in all base flashing and wall flashing conditions. Termination bars may only be used in conjunction with an appropriate counter-flashing extending a minimum of 4” (10.2 cm) below the termination bar.**

* + 1. Metal flanges for gravel stops, eave strips, and pitch pockets to be used in conjunction with roofing shall be primed (both sides), set in modified trowel grade cold adhesive applied material for SBS roof systems. Flanges shall be a minimum of 3 1/2” (8.9 cm) wide for gravel stops or eave strips and 4” (10.2 cm) wide for projections and extensions through the roof. The gravel stop lip should be at least 3/4” (19 mm) high. Eave strip lips shall be at least 3/8” (10 mm) high. Provisions must be made for securing the skirt to the face of the wall. This may be a wood nailer strip for masonry and metal construction. In all cases, gravel stop and eave strip nailer should be fastened to the deck or deck system with adequate resistance against wind forces.
    2. Stacks shall have metal sleeve flashing a minimum of 8” (20.3 cm) high. Pitch pockets for brackets, supports, pad-eyes, etc., shall have a 4” (10.2 cm) minimum height metal sleeve.
    3. On re-roofing projects, provisions shall be made for reinstallation of existing sheet metal duct work, equipment, coping metal and counter-flashing removed in conjunction with the new work. Also, provide for cleaning and repairing of existing defective sheet metal, and replacement of missing and irreparable sheet metal to match existing types. Light gauge sheet metal flashings which are incorporated into the Ruberoid® roof system are not suitable for re-use and must be replaced with new material.
    4. Conduits and piping such as electrical and gas lines must be set on wood blocking or some other form of support. Wood blocking/supports must be set on pads constructed of an additional layer of roof membrane material.
  1. WALKWAYS
     1. Walkways for normal rooftop traffic may be constructed from two plies of modified bituminous membrane of the same type as the field of the roof. This type of walkway is not for sidewalk or patio-type use.
     2. Construct walkways by solidly adhering a first ply of smooth surfaced membrane to the field of the roof followed by a granule surfaced membrane to the surface of the first ply.
     3. Walkway sections should be no longer than 10’ (3 m), with a 6” (15.2 cm) minimum gap between each section to allow for drainage.
  2. ROOF PROTECTION
     1. Protect all partially and fully completed roofing work from other trades until completion.
     2. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed roof areas.
     3. When it is not possible to stage materials away from locations where partial or complete installation has taken place, temporary walkways and platforms shall be installed in order to protect all completed roof areas from traffic and point loading during the application process.
     4. Temporary tie-ins shall be installed at the end of each workday and removed prior to commencement of work the following day.
  3. CLEAN-UP
     1. All work areas are to be kept clean, clear and free of debris at all times.
     2. Do not allow trash, waste, or debris to collect on the roof. These items shall be removed from the roof on a daily basis.
     3. All tools and unused materials must be collected at the end of each workday and stored properly off of the finished roof surface and protected from exposure to the elements.
     4. Dispose of or recycle all trash and excess material in a manner conforming to current EPA regulations and local laws.
     5. Properly clean the finished roof surface after completion, and make sure the drains and gutters are not clogged.
     6. Clean and restore all damaged surfaces to their original condition.

END OF SECTION