Firestone

Firestone Building Products

FIRESTONE RUBBERGARD™ EPDM APPLICATION GUIDE

April 2021

I. GENERAL

This Guide includes instructions for the installation of Firestone's RubberGard EPDM Roofing Systems. References to the Design Guide, Technical Information Sheets (TIS), Detail Drawings and other sections of the Firestone Technical Database are necessary to ensure the completed roofing system is installed in accordance with Firestone requirements when projects require a Firestone Red Shield™ Warranty.

NOTE: If a proposed application falls outside of this specification, contact firestone technical services for assistance.

II. JOB SITE CONSIDERATIONS (CAUTION AND WARNINGS)

A. Safety

1. Comply with all applicable regulatory safety regulations.
2. Keep all adhesives, sealants, and cleaning materials away from ALL ignition sources (e.g., flames, fire, sparks, etc.). Do not smoke while using these materials.
3. Consult container labels, Safety Data Sheets (SDS) and TIS for specific safety instructions for all products used on the project.
4. Care must be used when installing fasteners to avoid conduits and other piping beneath or in contact with the structural deck.
5. Fumes from adhesive solvents may be drawn into the building during installation through rooftop intakes. Take suitable precautions when using such products on an occupied building.
6. Do not use heat guns or open flames to accelerate drying of adhesives and primers.

B. Cautions

1. Store Firestone RubberGard EPDM membranes in the original undisturbed plastic wrap in a manner to protect it from becoming damaged. Insulation must be properly stored and protected from ignition sources, moisture, and damage. Consult container labels, SDS and TIS for specific safety, use, and storage instructions for all products used on the project.
2. Do not use oil-based or bituminous-based roof cement with Firestone RubberGard EPDM membranes, flashings, or accessories.

C. Cold Weather

1. See the current Firestone Building Products Cold Weather Application Guidelines posted on the Firestone website.

III. ROOF SUBSTRATE PREPARATION

It is the roofing applicator's responsibility to ensure that the substrate has been deemed suitable to receive the Firestone roofing system. The applicator should not proceed with the installation unless the responsible project engineer, architect, General Contractor, or other agent of the building owner has verified that the substrate is structurally sound and meets Firestone's requirements. Consult the Firestone EPDM Design Guide for additional information.

A. Correct Substrate Defects

1. Defects that should be corrected before work can commence should be brought to the attention of the building owner in writing and addressed by the owner or their agent(s).
2. For re-roofing applications, remove existing roof system components as specified by the project designer. If components are discovered during installation that could be detrimental to the performance of the new roofing system, they should be brought to the attention of the project designer for corrective action.
3. If soundness and integrity of the existing roof system cannot be verified, good roofing practice requires a complete tear-off to the structural deck. However, recovering an existing roofing system is an alternative to removing existing roof components. Non-destructive testing, in conjunction with core cuts, must be completed to determine the condition of the existing roof system and decking.
4. The building owner or project designer is responsible for assuring that all wet insulation and/or wet substrate materials are removed in a re-roofing application. The best diagnostic technique is taking and evaluating a series of roof cuts. There are three other techniques that are currently available to make this determination by indirect means. These include:
   a) nuclear moisture detection
   b) infrared thermograph
   c) electric capacitance

These techniques provide measurement of factors that can be associated with the presence of moisture, which can then be verified with the use of roof core cuts to confirm the results of the non-destructive testing.

5. In the absence of a design professional, the roofing applicator should coordinate with the building owner to assure conditions are satisfactory to commence with the project as designed.

B. Remove Moisture

Ponding water, snow, frost and/or ice, present in more than trace amounts, must be removed from the work surface(s) prior to installing the RubberGard EPDM Roofing System.

C. Prepare Substrate

Acceptable substrates to receive the RubberGard EPDM Roofing System must be properly prepared prior to roof system installation. Surfaces must be even, clean, dry, smooth, free of sharp edges, fins, loose or foreign materials, oil, grease, and other materials that may damage the new roofing system. Rough surfaces that could cause damage to the membrane must be overlaid with an acceptable insulation.

D. Fill Voids

All surface voids of the immediate membrane substrate greater than ¼″ (6 mm) wide must be filled with insulation.

IV. WOOD NAILER LOCATION AND INSTALLATION

A. General

Wood nailers must be installed as specified by the project designer or as noted in Firestone details and the EPDM Design Guide.

B. Treated Nailers

Firestone Building Products no longer requires the use of treated wood nailers. This is due to EPA requirements that have caused treated lumber to have more corrosive properties than the previous generation of wood treatments. If architectural specifications require the use of treated wood nailers, the following Firestone requirements apply:

1. Refer to the Firestone Design Guide for the appropriate Firestone fastener to be used for securing membrane into wood nailers.
2. Nails penetrating treated wood nailers must be hot-dipped galvanized, meeting ASTM A153, Class D or as currently recommended by industry associations.
3. Aluminum fasteners, flashings and accessory products must not make direct contact with treated wood nailers.
4. Uncoated metal and painted metal flashing and accessories, except for 300-series stainless steel, shall not make direct contact with treated wood nailers.
5. When in doubt of the type of treatment of the wood nailer or its compatibility with a metal component, use EPDM membrane as a separator.
6. Because of EPA regulations regarding treated wood, treatments for lumber may be highly corrosive to fasteners. Contact the fastener manufacturer for their recommendations on fasteners if attaching nailers that have been treated with corrosive materials.

C. Wood Nailer Grade

When wood nailers are used, Firestone specifications require the use of wood that is kiln-dried (Southern Pine, Douglas Fir) structural grade #2 or better, unless otherwise noted. While being stored on the roof, properly elevate, and cover non-treated wood to protect from the weather and keep dry. Nailers must be properly anchored to provide secure attachment through the warranty term. Nailers are not covered by the Firestone warranty.

D. Size of Nailer

Nailers shall be a minimum thickness of 2″ x 4″ nominal (1-½″ (38 mm) x 3-½″ (89 mm)) and exceed the width of any metal flange attached to it by a minimum of ½″ (13 mm).

E. Position Wood Nailer

Total wood nailer height shall match the total thickness of insulation being used and should be installed with a ⅛″ (3 mm) gap between each length and each change of direction. When more than one nailer thickness is used end joints should be staggered a minimum of 12″ (305 mm) from the prior layer in straight runs.

F. Secure Wood Nailer

Wood nailers shall be firmly fastened to the deck or building. Mechanically fasten wood nailers to resist a minimum force of 200 lb/f (890 N) minimum in any direction.

G. Taper Wood Nailer

The wood nailer must be tapered (if applicable) so that it will always be flush at the point of contact with the insulation (refer to Firestone Details).

H. Poured-In-Place Decks

For new construction over poured-in-place decks or fill, and all recover projects, a waterproof separator membrane shall be placed between the non-treated lumber and the deck.

I. Installation of Wood Nailers By Others

Make these specifications and details available when nailers are to be installed by others. Work that compromises the integrity of the roof system may jeopardize the roof warranty.

J. For Additional Information

Please consult the NRCA Special Report, “Use of Treated Wood in Roof Assemblies.”

V. AIR OR VAPOR BARRIER INSTALLATION

A. Install Vapor Retarder (When Specified)

Install a vapor retarder as specified by the project designer or as required by Firestone.

B. Install Air Barrier (When Specified)

Install an air barrier as specified by the project designer or as required by Firestone.

VI. INSULATION INSTALLATION

A. General

Where a Base Sheet is required prior to insulation installation, use the following guidelines, and refer to the design section of Firestone specifications for suitable substrates and technical information sheets for product information.

1. General
    a) Starting at the low point of the roof, align the base sheet, unroll, and allow the sheet to relax prior to attaching. After allowing to relax, adhere or attach to the substrate with appropriate materials as indicated below.
    b) Roofing base ply shall not make direct contact with roofing single ply, even at roof edges, laps, tapered edge strips, and cants. Cut out fish-mouths/side laps, which are not completely sealed, and patch. Fully adhered base sheets which are not fully and continuously bonded shall be replaced.
2. Hot Asphalt Attachment of Base Sheet
    a) The Firestone base sheet may be attached using a solid mopping of Firestone SEBS mopping asphalt or ASTM D 312 Type III or IV hot steep asphalt. Priming of substrate may be required with ASTM D 41 and is determined by specification.

b) The substrate shall be suitable to receive asphalt attachment (structural concrete, base sheet, coverboard, etc.). Refer to the Firestone EPDM Design section of this manual for suitable substrates and the Technical Information Sheets for additional information on specific Firestone base sheets.

c) The asphalt shall be at the manufacturer's stated EVT at point of installation.

d) Align subsequent rolls, shingling the laps with or along the flow of water, maintaining a minimum 2″ (51 mm) side lap and minimum 6″ (152 mm) end lap and repeat the application.

e) Firestone recommends that a half sheet be used as the first roll to ensure that the base sheet laps and the cap sheet laps are not aligned. Half-length sheets may be required, depending on the roof slope.

f) Refer to the Design section for slope limitations.

g) Starting at the low point of the roof, align the Firestone base sheet and unroll into a solid mopping of hot asphalt.

h) With a stiff push broom, immediately broom the Firestone base sheet to ensure full contact with the asphalt.

3. Mechanical Attachment

a) Starting at the low point of the roof, align the base sheet, unroll, and allow the sheet to relax prior to attaching. After allowing sheet to relax, begin attachment at one end and work towards the other end, keeping the roll tight and wrinkle free. Align subsequent rolls, shingling the laps, maintaining a minimum 3″ (76 mm) side lap and minimum 6″ (152 mm) end lap and repeat the application. Stagger all end laps.

b) Fasten Base Sheet Using Firestone Insulation Plates and Fasteners: Structural Concrete, Plywood or OSB

(1) Using Firestone Insulation Plates and Fasteners, base sheets may be attached directly to poured in place concrete, wood, or through a smooth surfaced built-up or modified bitumen roof system. Refer to the Design Guide Section of this manual for information on fasteners for a particular deck type.

(2) Firestone base and cap sheets used as base sheets shall be mechanically attached 12″ (305 mm) o.c. in the side and end laps and 18″ (457 mm) o.c. in two staggered rows in the field of the sheet. Each row shall be 13″ (330 mm) (approx.) in from the sides of the sheet. See Attachment Guide for diagrams.

(3) 36″ (914 mm) wide Firestone base sheets shall be mechanically attached 18″ (457 mm) o.c. in the side and end laps and 36″ (914 mm) o.c. in two staggered rows in the field of the sheet. Each row shall be 12″ (305 mm) (approx.) in from the sides of the base sheet. See Attachment Guide for diagrams.

4. Fasten Firestone base sheet using Firestone LWC fasteners: gypsum, tectum, and LWC decks.

a) Use Firestone LWC Fasteners to anchor Base Sheets to gypsum, tectum, and LWC decks. The base sheet must be mechanically attached with Firestone LWC's at 9″ (229 mm) o.c. in the side and end laps and 18″ (457 mm) o.c. in two staggered rows in the field of the sheet. Each row shall be 12″ (305 mm) (approx.) in from the sides of the base sheet.

5. Fasten Firestone base sheets using cap nails: plywood, OSB and wood plank decks.
   a) Use 1″ (25 mm) diameter cap nails with steel heads to attach base sheets to plywood, wood plank, and oriented strand board decks. The base sheet must be mechanically attached with cap nails at 9″ (229 mm) o.c. in the side and end laps and 18″ (457 mm) o.c. in two staggered rows in the field of the sheet. Each row shall be 12″ (305 mm) (approx.) in from the sides of the base sheet. Cap nails cannot be used to attach insulation, attach a base sheet through an existing insulated roof, attach a base sheet over a gravel surfaced built-up roof, or through a smooth surfaced un-insulated built-up roof over ½″ (13 mm) thick. The fasteners used to attach base sheet must be manufactured for the deck type and be Factory Mutual approved.
   b) This attachment pattern applies to all 36″ (914 mm) and 39.4″ (1 m) (39.4″) wide Firestone compatible base sheets and cap sheets used as base sheets.
6. Base Sheet Laps
   a) Hot steep asphalt applied Base sheets must be lapped a minimum of 2″ (51 mm) for side laps.
   b) End laps must be minimum 6″ (152 mm).
   c) In all cases, an offset of 12″ (305 mm) minimum must be maintained between the side and end laps of the base sheet and the cap sheet.
   d) Seal all base sheet laps with hot asphalt or hot air welding.

B. Insulation

1. Do not install RubberGard Ballasted roofing systems directly over or onto a hard surface, such as HailGard™, ISOGARD HD™, DensDeck™, SECUROCK™, OSB or concrete. Use a suitable recovery board, etc.
2. Do not install RubberGard Ballasted roofing systems directly over insulation which has been mechanically attached.
3. Adhesive attachment is acceptable to secure insulation under for ballasted systems, if required.

C. Install Insulation

1. Install only as much insulation as can be covered with roofing membrane, completed, and watertight before the end of the day's work or before the onset of inclement weather.
2. Form continuous insulation joints over top flute of deck flange. Do not cantilever insulation edges over deck ribs. Minimum bearing surface: 1″ (25 mm). Continuous insulation joints shall be positioned on top flute of metal decks.
3. When installing multiple layers of insulation, all joints between layers should be staggered by 6″ (152 mm) minimum.
4. Fit Insulation

a) Neatly fit insulation to all penetrations, projections, and nailers. Insulation should be loosely fitted, with no gaps greater than ¼″ (6 mm). Fill any gaps with acceptable insulation.
b) On metal decks, the edge of the board parallel with the roof deck flutes should be completely supported by the flute. The membrane should not be left unsupported over a space greater than ¼″ (6 mm).
c) Tapered insulation with suitable to receive adhered EPDM shall be installed around roof drains to provide proper slope for drainage as shown in Firestone Details.

D. Attach Insulation

1. Mechanical Attachment
   a) Insulation shall be attached using Firestone Insulation Plates and Fasteners.
      (1) Fasteners can be used to attach HailGard insulation without separate insulation plates.
   b) If installing on a metal deck (where allowed by specification), the edge of the insulation board parallel with the roof deck should be completely supported and fasteners must penetrate the top rib of the deck the required depth.
   c) When installing fasteners, care should be taken to avoid penetration of conduits and other piping below or encased in the deck.
   d) For attachment, refer to the Technical Information Sheets that references the specific insulation used. Attachment patterns and fastening rates of roof insulation will vary depending on performance required.
   e) For specific deck penetration requirements refer to the Technical Information Sheet for the specific fastener being used.
   f) When installing a multi-layer insulation assembly, the fastening rate and pattern is determined by the type and thickness of the top layer of insulation. The top layer of insulation shall receive the specified fastener type and layout.
   g) Ensure that the fasteners are fully seated, but not overdriven. A properly adjusted clutch or a depth sensing drill attachment should be used to prevent over-driving or under-driving fasteners.
   h) Multiple layers may be installed using a common fastener.
   i) If the top layer of insulation under ballasted systems is not to be mechanically fastened, secure it with insulation adhesive.
   j) Please contact Firestone's Technical Services Department at (800) 428-4511 for information regarding additional fastening in perimeters and corners. Requirements vary.
2. Asphalt Attachment
   a) The substrate may require priming prior to installing the insulation. Refer to the Design Guide for specific information.
   b) The insulation should be no larger than 4′ x 4′ (1.2 m x 1.2 m) panels.
   c) Insulation may be attached using a solid mopping of Firestone SEBS Asphalt (as required by warranty term) or ASTM D 312 Type III or Type IV asphalt. RESISTA™ and ISOGARD HD cannot be attached with hot asphalt.

d) Top insulation board shall be installed without displacing asphalt to the top of the seam where it can contact the RubberGard membrane.
e) The asphalt shall be at the manufacturer's stated EVT less ~25 °F at the point of installation. Enough asphalt must be installed (25-30# /100 ft² (1.2 – 1.4 kg/m²)) to ensure that complete adhesion is achieved.
f) "Walk" insulation boards in to ensure complete adhesion to the substrate.
g) Additional layers of insulation may be installed in the same fashion.

3. Adhesive Attachment
   a) Insulation may be attached using I.S.O.Stick™, I.S.O. Twin Pack™, I.S.O. FIX™ II, I.S.O. SPRAY™ R, Twin Jet, or Hot Asphalt.
   b) Apply the adhesive in strict accordance with the Firestone Specifications, Tech Data Sheets, etc. provided with the product and the Technical Information Sheets that are a part of the Firestone Website and Technical Manual.
   c) It may be necessary to prime the substrate prior to installing the insulation adhesive.
   d) Consult the specific TIS of the adhesive selected.
   e) Edges of the insulation board parallel with the roof deck flutes must be completely supported. Continuous edges of insulation shall be fully supported on the top flutes of metal deck.
   f) Adhered insulation should be no larger than 4′ x 4′ (1.2 m x 1.2 m).
   g) "Walk" insulation boards in to ensure complete adhesion to the insulation and substrate. Unopened adhesive pails can be used to provide weight until adhesive cures.

VII. MEMBRANE INSTALLATION

This section contains information for Firestone RubberGard membranes systems. Read all the information to ensure that it is the correct system and application. For RubberGard Platinum™ systems refer to Platinum Application Guide.

A. QuickSeam RPF Strip

1. Membrane installations may require the use of a QuickSeam Reinforced Perimeter Fastening Strip (QSRPFS) resulting in coordination with the layout and installation of membrane system. This process should be addressed early in the roofing process.
2. The additional securement details for the membrane (base tie-in) will occur at all locations where the membrane goes through a slope change greater than 1″ (25 mm) in 12″ (305 mm) (i.e., roof edges, curbs, interior walls, etc.) and other areas as details indicate. See additional information in Section XII.A.
3. RubberGard LSFR PT (Pre-Taped) and RubberGard Max PT Panels
   a) Firestone RubberGard and RubberGard Max PT Panels method of installation requires that the rolls be staged correctly for unrolling for the laps to shed water correctly.

B. QuickSeam RMA Strip

1. Membrane installations may require the use of a QuickSeam Reinforced Mechanically Attached System (QSRMAS) resulting in coordination with the layout and installation of membrane system. This process should be addressed early in the roofing process.
2. The additional securement details for the membrane (base tie-in) will occur at all locations where the membrane goes through a slope change greater than 1″ (25 mm) in 12″ (305 mm) (i.e., roof edges, curbs, interior walls, etc.) And other areas as details indicate.
3. RubberGard LSFR PT (Pre-Taped) and RubberGard Max PT Panels
    a) Firestone RubberGard and RubberGard Max PT Panels method of installation requires that the rolls be staged correctly for unrolling for the laps to shed water correctly.

C. Fully Adhered System

1. Membrane Placement
    a) The RubberGard EPDM Adhered Systems shall be installed so that the seams shed or run parallel to the flow of water.
    b) Place membrane panel, unroll without stretching, over the acceptable substrate leaving sufficient membrane for tie-ins, roof edges and seaming. Allow membrane to relax for a minimum of 30 minutes before adhering or splicing. During cold weather application, it is recommended that the smallest panels be used to minimize folds (larger panels have factory folds which may take longer to relax during cold weather).
    c) Placement of additional rolls of membrane shall provide for sufficient overlaps for seaming of membranes. Refer to standard lap splice details.

2. Fold the Membrane Back

After making sure the sheet is placed in its final position allowing for the minimum lap width per Firestone specifications, fold it back evenly onto itself without wrinkles to expose the mating surface of the sheet.

3. Remove Dusting Agent and Dirt

Sweep the mating surfaces with a stiff broom to remove any dusting agent or dirt that may have accumulated.

4. Apply the Bonding Adhesive (SFBA Excluded)
    a) Apply bonding adhesive with either a 9″ (229 mm) wide solvent-resistant paint roller, power roller or a commercial-grade adhesive sprayer. Adhesive must be applied in a uniform thickness to both surfaces at the same time. If adhesive is spray-applied, it must be back-rolled with a paint roller to assure proper contact and uniform coverage. Refer to Firestone Technical Information Sheets and container labels for specific application instructions and information on spray equipment.

b) Apply bonding adhesive at specified coverage rate refer to the container label and Technical Information Sheet for specific application requirements and coverage rates.
   (1) Keep Bonding Adhesive off the membrane Seam Area.
   (2) Care must be taken not to apply bonding adhesive over an area that is to be later spliced to another sheet or flashing. All bonding adhesives must be completely removed from the seam area.

c) Allow the bonding adhesive to flash-off. Touch the adhesive surface in several places with a clean, dry finger to be certain that the adhesive does not stick or string. As you are touching the adhesive, push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, the adhesive is not ready for mating. Flash-off time will vary depending on ambient conditions of temperature and humidity.

5. Mate the Membrane to the Substrate
   a) Starting at the fold, roll the previously coated portion of the membrane into the coated substrate slowly and evenly to prevent wrinkles.
   b) Broom the membrane to assure proper contact, compress the bonded half of the membrane to the substrate with a stiff push broom.
6. Repeat Procedures as necessary until all EPDM is adhered.

Complete the membrane installation fold the un-adhered half of the membrane back onto itself and repeat the procedure.

7. Fabricate the Lap Splice
   a) Splice the outside edge of the top sheet as specified in SECTION 2.09 using the appropriate Firestone products. Refer to Lap Splice Details.
   b) Apply patches at all 3-way sheet intersections and at all factory laps that intersect another sheet. Refer to Lap Splice detail series. Apply Seam Edge Treatment as required.

D. Fully Adhered System (EPDM Solvent-Free Bonding Adhesive [SFBA])

1. Horizontal application
   a) Position non-reinforced EPDM in place over substrate (not to exceed 1″:12″ slope) to receive adhered EPDM membrane.
   b) Allow EPDM membrane to relax for 30 minutes (minimum).
   c) Fold EPDM membrane back to expose the substrate to receive EPDM Solvent-Free Bonding Adhesive.
   d) Surfaces to receive Firestone EPDM Solvent-Free Bonding Adhesive shall be clean, smooth, dry, and free of sharp edges, loose and foreign materials, oil, grease, and other contaminates. Sweep the mating surface of the membrane with a stiff broom to remove excess dusting agent, if present, and remove other contaminates from the mating surfaces.

e) Apply Firestone EPDM Solvent-Free Bonding Adhesive to the mating substrate (not the EPDM membrane) uniformly. EPDM Solvent-Free Bonding Adhesive may be dispensed on substrate as follows:
   (1) "Dip & Roll," using a medium nap paint roller to uniformly apply adhesive to substrate.
   (2) Drop Spreader with rollers
      (a) Ambient conditions will dictate the dispensing speed.
      (b) Backroll the adhesive to ensure uniform coverage.
   (3) Spray application
      (a) Graco 60:1 Xtreme pump with NXT air motor, Heavy Duty Cart & Hopper Kit for gravity feed, 50′ x ⅜″ 4500 PSI high pressure hose, G-40 air assisted airless applicator with G40 519 tip. 1000 PSI pressure yields 9″ wide adhesive fan when spray tip is 18″ from the substrate. Changing the spray tip to substrate distance will change the fan width. Follow spraying with back-rolling immediately to uniformly apply adhesive on substrate.

NOTE 1: Take care to keep EPDM Solvent-free Bonding Adhesive from lap splice areas.
NOTE 2: Do not mix.

   (4) Mate/roll the EPDM membrane immediately after dispensing the adhesive into the freshly applied SFBA. If a skin coat on the adhesive develops, reapplication will be needed.
   (5) Broom the membrane in place, followed by rolling with a heavy roller (carpet roller; lawn roller; etc.) immediately after mating the EPDM into the adhesive to insure proper adhesion.

2. Vertical Application
   a) Apply EPDM Solvent-Free Bonding Adhesive to EPDM membrane and vertical substrate to receive EPDM membrane uniformly.
   b) Allow a brief open period to allow EPDM Solvent – Free Bonding Adhesive to develop tack. This open period will vary, depending on ambient conditions. Warm, humid days will require brief open time. Cool, dry, days will require longer open time. Touch the adhesive surface with a clean, dry finger to determine whether tack has developed. Some trial and error will be required.
   c) After brief open time for tack development, mate the EPDM membrane to the vertical substrate.
   d) Roll the freshly mated vertically applied EPDM membrane using a 2″ wide seam roller to insure proper mating pressure.

E. Mechanically Attached Systems (B.I.T.S. With RubberGard and RubberGard Max using Batten Strips)

Firestone specifies installing mechanically attached membranes over steel decks; the field attachment should be installed perpendicular to the deck panels. If a project is Factory Mutual insured or specified, per FM 1-29 for Global Loss Prevention Data Sheets, attachment shall run perpendicular.

1. Place Membrane and Allow to relax
    a) Place membrane panel and unroll without stretching, over the acceptable substrate leaving sufficient membrane for tie-ins, roof edges and seaming. Allow to relax for a minimum of 30 minutes before attaching or splicing.
    b) Position subsequent membrane sheets in the same manner, overlapping the ends of adjoining sheets a minimum of 3″ (76 mm) and side laps a minimum of 6″ (152 mm).
    c) Perimeter and Field Panel widths are determined by using the Wind Design attachment Guide section of the Firestone Website.
2. Layout Firestone Batten Strips

Install Firestone batten strips continuously within the 6″ (152 mm) side lap area. Center the batten strip 3″ (76 mm) in from the edge of the lower panel. Refer to Firestone Lap Splice Details for specifics.

3. Secure Batten Strips
    a) Place the Firestone fastener starting 1″ (25 mm) in from the end of the Firestone Batten Strip, then every 12″ (305 mm) o.c. maximum (unless a more frequent fastener spacing is required per wind/application design guide) using the pre-punched holes in the battens. Round the end of each batten and remove all burrs created by cutting, when required. Where field drilling of battens is necessary, use a ¼″ (6.35 mm) diameter drill bit.
    b) Start fastening the Firestone batten strip from one end only. Install 2″ (51 mm) diameter EPDM pads beneath the battens at batten terminations as shown in Firestone Details. Refer to EPDM system specific details.
    c) Install fasteners so that it is properly engaged in the deck so the head flush with the batten strip surface (Use caution not to overdrive the fastener as this will cause the batten strip to buckle between the fasteners).
    d) Use a common fastener to anchor overlapping Firestone Batten Strips using a common hole.
    e) Do not lap corners and T-joints. Do not overlap the Firestone Batten Strips at corners or T-joints. Keep battens from the edge of intersecting splices as shown in Firestone Details.
4. Fabricate the Lap Splice

Splice the outside edge of the top sheet as specified in in SECTION IX using the appropriate Firestone products. Refer to Lap Splice Details.

F. Mechanically Attached Systems (RubberGard MAX Using V-Plates)

1. Place Membrane and Allow to Relax
   a) Place the membrane panels without stretching, over the acceptable substrate, and allow membrane to relax for a minimum of 30 minutes prior to attachment.
   b) Position subsequent membrane sheets in the same manner, overlapping the ends of adjoining sheets a minimum of 3″ (76 mm) and side laps a minimum of 6″ (152 mm).
   c) Perimeter and Field Panel attachment is determined by using the Wind Design attachment Guide section of the Firestone Website.
2. Layout Firestone V-Plates

Install Firestone V-Plate every 12″ (305 mm) o.c. min. or as required by the specification within side lap area. Center of the V-Plate 3″ (76 mm) in from the edge of the lower panel. Refer to Firestone Details for specifics.

3. Secure V-Plates

Install each fastener so that it is properly engaged in the deck and the head is seated in the V-Plate. Use caution not to overdrive the fastener.

4. Fabricate the Lap Splice

Splice the outside edge of the top sheet as specified in SECTION IX using the appropriate Firestone products. Refer to Lap Splice Details.

5. For code specific information please review the Code Approval Guide on the Firestone website www.firestonebpco.com.

G. Mechanically Attached System (MAS Using Batten Strips)

1. Place Membrane and Allow to Relax
2. Place the membrane, without stretching, over the acceptable substrate, and allow it to relax for a minimum of 30 minutes prior to attachment. Position subsequent membrane sheets in the same manner, overlapping a minimum of 4″ (102 mm).
3. Fabricate the Lap Splice
4. Splice the outside edge of the top sheet as specified in SECTION 2.09 using the appropriate Firestone products. Refer to Lap Splice Details.
5. Layout Firestone Batten Strips
   a) Place the batten strips over the membrane in the designated pattern as outlined in the Wind Design Guide in the Firestone Website.
   b) Place the Firestone fastener starting 1″ (25 mm) in from the end of the Firestone Batten Strip, then every 12″ (305 mm) (unless a smaller fastener spacing is required) using the pre-punched holes in the battens.
   c) Start fastening the Firestone Batten Strip from one end only. Do not start from both ends as this will buckle the batten.
6. Install Fasteners

Install each fastener so that it is properly engaged in the deck and the bottom of the head is flush with the batten strip surface. Use caution not to overdrive the fastener as this will cause the batten strip to buckle between the fasteners.

7. Lap Field Runs of Firestone Batten Strips
    a) Use a common fastener to anchor overlapping Firestone Batten Strips using a common hole.
    b) When batten strips must be field cut, round the cut end. Assure that all burrs created by cutting are removed. Where field drilling of metal battens is necessary, use a ¼″ (6.35 mm) diameter drill bit. Refer to Detail LS-3
    c) Do not lap corners and T-joints: do not overlap the Firestone Batten Strips at corners or T-joints. Keep battens from the edge of intersecting splices as shown in Firestone Install 2″ (51 mm) diameter EPDM pads beneath the battens at batten termination's and where two battens are joined to form a corner as shown in Firestone Details.
    d) Install QuickSeam Batten Cover Strips: All batten strips must be covered prior to the end of the workday. Should inclement weather strike before the batten cover strip is installed, ensure that the batten bar and the membrane surface beneath the bar is dry.
    e) As an option in unpredictable climates, a ⅜″ (10 mm) bead of Lap Sealant may be installed beneath the batten bar at the fastener to reduce moisture migration into the roof system in the event of inclement weather before the batten cover is installed. After applying the appropriate Firestone Primer to the membrane, apply the QuickSeam Batten Cover per Firestone Detail Lap Splice-3.
8. For code specific information please review the Code Approval Guide on the Firestone website www.firestonebpco.com.

H. Ballasted System

1. Place Membrane and Allow to relax

Place membrane panel, without stretching, over the acceptable substrate and allow membrane to relax for a minimum of 30 minutes before splicing or attaching. The RubberGard EPDM Ballasted System must be installed so that the splices shed the flow of water.

2. Move Membrane to its Final Position

Move the membrane panel to its final position allowing for a minimum 4″ (102 mm) field seam onto adjacent panels and sufficient membrane for proper membrane terminations.

3. Fabricate the Lap Splice

Splice the outside edge of the top sheet as specified in SECTION 2.09 using the appropriate Firestone products. Refer to Lap Splice Details.

4. Ballast installation
    a) Firestone Ballast Paver System
        (1) Install all Firestone Ballast Paver System Accessories, Paver Clips, AP Sealant, Metal Termination Bars and Protection Mat, as required in proper sequence for Paver system performance.
        (2) Place Firestone Ballast Paver System in accordance with Firestone Ballast Paver Installation Guide for the appropriate system requirement as determined by the design professional.

b) Stone Ballast

(1) Spread Ballast: The ballast shall be spread over the completed Firestone System at the rate specified by the project designer but never less than 10 lb (4.5 kg)./sq. ft. using ASTM #4 stone. Refer to the system Design Guide of the Firestone Website for Ballast type and size requirements. Ballast must be spread over the membrane using soft rubber-tired ballast buggies. Spread ballast around penetrations by hand. Take care not to puncture/damage EPDM when distributing the ballast.

(2) Protect Membrane and Insulation at Ballast Loading Areas: At staging areas where ballast is loaded, protect the membrane and underlying insulation using insulation and/or plywood over an additional layer of Firestone protective membrane. Remove and replace all materials damaged from ballasting operation.

(3) Distribute Ballast Around Walkway Pads Any ballast displaced by a walkway should be distributed around the pad to maintain the specified average ballast rate.

(4) Do not place a walkway and pads within 10′ (3.0 m) of a roof edge. If needed around mechanical equipment, use appropriate ballast pavers.

VIII. MEMBRANE ATTACHMENT AT PERIMETERS FOR MAS SYSTEMS

Perimeters may be adhered or mechanically attached. When mechanically attaching a perimeter, the batten layout must be as specified in the Firestone Wind Design Guide as a minimum, or as required by the designer or local building codes. Should a fully adhered perimeter be chosen, the area of the adhered perimeter is the same as if the perimeter were mechanically attached.

A. Adhered Perimeter

1. Follow Fully Adhered, Section 2.07.A for this method as required for perimeter plus the following added steps.
2. Terminate the Membrane at the Perimeter: After the perimeter sheets are adhered to the substrate, they must be terminated along the roof edge using an appropriate Firestone roof edge detail or base tie-in detail which is included as part of this specification.
3. Install Perimeter Isolation Batten Strip: Install Firestone Batten Strips continuously along the inside edge of the adhered perimeter sheet.
4. Fabricate the Lap Splice
   a) Splice the outside edge of the top sheet as specified in SECTION IX using the appropriate Firestone products. Refer to Lap Splice Details.

B. Mechanically Attached Perimeter – Batten Strips or V-Plates

As an alternative to the adhered membrane perimeter, Firestone's Reinforced Mechanically Attached, and Mechanically Anchored Systems may be installed using Firestone batten strips or V-Plates as shown in Firestone's Wind Design Guide.

1. Batten Strips
   Proceed to install as outlined in Section XII.E.
2. V-Plates
   Proceed to install V-Plates as outlined in Section XII.F.

C. QUICKSEAM R.M.A. STRIP (QSRMA STRIP)

Secure the QSRMA Strip, center the fastening system (Firestone Batten Strips, 2″ Seam Plates or V Plates) on the QSRMA Strip, a maximum of 4″ (102 mm) from the end of the QSRMA Strip and fasten a maximum of 12″ (305 mm) O.C. (unless more frequent fastener spacing is required). If using battens, place the first fastener 1″ (25 mm) in from the end of the batten strip, using the pre-punched holes in the battens.

1. QSRMA Strip Intersections
   a) Do not intersect QSRMA Strips at “T” intersections or corner intersections. Do not overlap QSRMA Strips. A fastener and batten strip or plate must be placed starting and ending a maximum of 4″ (102 mm) from the end of each QSRMA Strip.
   b) Start Fastening Batten Strips from One End Only

When fastening batten strips, start at one end and work towards the other. Fastening the two ends of the batten strip at the same time may cause buckling between fasteners.

   c) Install fastener.
   d) When using batten strips, Firestone AP Sealant must be applied over the fastener heads per Firestone details. Do not remove the release paper from the tape until all cleaning and priming has been completed and the membrane is in place. Use caution not to overdrive the fasteners as this will cause the batten strip to buckle between the fasteners or may cause the QSRMA Strip to wrinkle.
2. Membrane Installation (QSRMA Strip)
   a) Place membrane panel, without stretching, over the installed QSRMA Strip and allow to relax for a minimum of 30 minutes before splicing or attaching.
   b) Do not allow field seams to be installed over the QSRMA Strip.
   c) After making sure the sheet is placed in its final position allowing for the minimum lap width per Firestone specifications, fold it back evenly onto itself without wrinkles to expose the underside mating surface of the sheet.
   d) Mark the membrane areas that will be primed to receive the tape portion of the QSRMA.
   e) Apply the appropriate Firestone Primer to the center of the QSRMA Strip, over the plates and fasteners, and the membrane where it will mate with the QuickSeam Tape on the QSRMA Strip using the Firestone QuickScrubber™ Plus. Allow the primer to dry.
   f) After the surfaces have dried properly, as determined by using the touch-push test, remove the release paper from the QSRMA Strip, roll the membrane into place, and broom the membrane over the QSRMA with a stiff push broom.

g) Roll the membrane over the QSRMA Strip
   (1) A 1-½″- 2″ (38 mm – 51 mm) wide silicone roller or across the tape and then along its length covering the width in several passes; or
   (2) Starting in the center of the strip, roll the QSRMA Strip with the Firestone QuickRoller™ in a back-and-forth motion along the length of the QSRMA Strip, not to exceed 3′ (0.9 m) maximum at a time.
   (3) Do not use metal rollers or power rollers over the QSRMA Strip.

IX. MEMBRANE SEAMING

When using RubberGard Max membrane, Firestone Seam Edge™ Treatment must be applied to all splice or detail edges where reinforcing scrim is exposed. Refer to Detail LS-9 using seaming using SA-1065 adhesive and Lap Sealant.

A. Seaming Procedures

Firestone RubberGard LSFR PT (Pre-Taped) and RubberGard MAX PT need to be positioned with the rolls in the correct location and orientation to unroll and have the tape located for the seaming of the laps.

PT rolls are marked with the tape location and direction of unroll. Panels need only to be marked to guide the application of QuickPrime™ Products to one sheet for side laps. Roll end laps require standard application of QuickPrime and QuickSeam Tapes.

1. Position and Fold Back the Lap Edge
   a) Position the membrane at the seam area by overlapping membrane 1″ (25 mm) past the QuickSeam Tape edge. Once the membrane is in place, mark the bottom membrane ½″ (13 mm) to ¾″ (19 mm) from the edge of the top membrane every 4′ (1.2 m) to 6′ (1.8 m) using the marking crayon provided with the QuickSeam Tape.
   b) Tack the membrane back with Single-Ply QuickPrime Primer as necessary to hold back the membrane at the splicing area.
2. Apply Single-Ply QuickPrime Primer to Seam Area
   a) Remove excess amounts of dusting agent on the membrane and at factory splices using a stiff push broom. In the case of adhered systems make sure there is no contamination of bonding adhesive in the tape area.
   b) Stir appropriate Firestone Primer thoroughly before and frequently during use. Dip the QuickScrubber or QuickScrubber Plus into the bucket of primer, keeping the pad flat.
   c) Apply the appropriate Firestone Primer uniformly at least 1″ (25 mm) wider than QuickSeam Tape application area, using long back and forth type strokes with pressure along the length of the splicing area until surfaces become dark gray in color. Do not over-work the primer.
   d) PT panels only require the primer to be applied to the non-taped, bottom sheet, panel mating surface for the side seams. End seams require two-sided application of the primer.

e) Non-taped panels will need to have the appropriate Firestone Primer applied to both sheet surfaces alternating between sheets while working down the seam area.

3. Change the QuickScrubber Plus pad
   a) PT panel side laps are one side application and will result in 400′ (121.9 m) of usage.
   b) Other panels and PT ends are two-sided application and will result in 200′ (61.0 m) of seam.
   c) When the pad will no longer holds the proper amount of the primer, whichever is less.
   d) Additional scrubbing is required at all factory seams and at areas that may have become contaminated or have excess amounts of dusting agent in the creases. Allow the primer to dry, check using the Touch-Push test.
4. Apply the QuickSeam Splice Tape
   a) After allowing the appropriate Firestone Primer to dry properly, using the Touch-Push Test to verify.
   b) PT products require end laps be done, for side laps skip to 5.
   c) On other panels, apply the QuickSeam Splice Tape to the bottom membrane, aligning the edge of the release paper with the markings. Refer to Lap Splice detail appropriate for system being installed.
   d) Immediately roll the splice tape with a 1-½″ to 2″ (39 mm to 51 mm) wide silicone hand roller or a clean QuickScrubber or QuickScrubber Plus pad and handle.
5. Position the membranes, check the Splice Tape Alignment
   a) Position the top membrane on the bottom membrane with the tape's release backing still in place.
   b) PT panels: Confirm the tape will be in full contact with Single-Ply QuickPrime Primer treated membrane on side laps. End laps should follow instruction 2 given below.
   c) Other panels: trim the top panel as necessary to assure that ⅛″ to ½″ (3 mm to 13 mm) of the QuickSeam Seam Tape will be exposed on the finished seam. Confirm the tape will be in full contact with Single-Ply QuickPrime Primer primed membrane.
6. Remove Release Liner from the Seam Tape
   a) Allow the top membrane to fall freely onto the bottom membrane prior to removal of the release backing.
   b) Start to peel the release backing off the QuickSeam Splice Tape by pulling against the weight of the panel at a 45° angle to the tape and parallel with the roof surface.
   c) Broom the entire length of the seam at a 45° angle as the release paper is being removed.
   d) The QuickRoller may not be used to set the seams on any system that has mechanical attachments in the seam area such as battens or plates. It may only be used with fully adhered, ballasted, QuickSeam RMA and QuickSeam RPF assemblies.

7. Roll the Freshly Mated Seam
    a) Roll the seam using the Firestone QuickRoller and 2'-3′ strokes working from one side of the seam to the other along the seam length, or a 1-½″ to 2″ (39 mm – 51 mm) wide silicone hand roller, first across the width of the seam and then along the entire length and width of the seam.
    b) Special Considerations (Factory laps, End Laps, T-joints, transition patches, and others).
    c) End Laps of tape – When the seam is greater in length than the tape, the adjoining QuickSeam Splice Tape must be overlapped a minimum of 1″ (25 mm) and detailed per LS Details.
    d) Trim QuickSeam Splice Tape at T-joints – Trim QuickSeam Splice Tape so that the edge of QuickSeam Splice Tape and the edges of the membrane are flush beneath the T-joint area. Per LS Details.
    e) T-joints – Install Firestone QuickSeam Flashing or QuickSeam Joint Cover over the T-joint area per LS Detail.
    f) Use of 6″ or 7″ QuickSeam Splice Tape with Cured EPDM as Flashing – If cured EPDM is used as flashing, apply a 9″ (229 mm) long section of QuickSeam™ Splice Tape and cover with primed Membrane or a 9″ (229 mm) section of QuickSeam Joint Cover over the intersection of the flashing and field seams per LS Details.
    g) When using RubberGard Max membrane, Firestone Seam Edge Treatment shall be applied to all splice edges where reinforcing scrim is exposed. Refer to detail LS-9.

B. Flashing Splices Using SA-1065 Adhesive (Repairs Only)

Where splice adhesive is allowed by Firestone Details, use the following procedure for completing the seams.

1. Clean the flashing and roof membrane area to be seamed using clean natural fiber cloths with Firestone Splice Wash to remove all dusting agent, dirt, and other contaminants that will affect the finished seam and allow drying. Additional cleaning may be required to ensure that the membrane is completely cleaned. Additional cleaning at factory seams is required to remove accumulations of dusting agent. Natural fiber cloths must be discarded as they become dirty and replaced with clean ones to assure proper cleaning. Proper cleaning has been achieved when the membrane surface is uniformly black in color and no streaking is evident. FormFlash™ does not require cleaning unless it has been contaminated.
2. As an option, an appropriate Firestone Primer may be used in lieu of the cleaning procedure described above. Refer to the QuickSeam Splice Tape Section of this specification and Firestone's Technical Information Sheet for proper application techniques of Single-Ply QuickPrime Primer.
3. Thoroughly stir Firestone's Splice Adhesive before and during use. Apply the Splice Adhesive using a Firestone Splice Adhesive Brush or a 3″ to 4″ (76 mm to 101 mm) wide ½″ (13 mm) thick, solvent-resistant paint brush in a smooth, even coat with long brush strokes, such that brush marks bleed out, yielding a smooth, glossy adhesive surface. Apply Splice Adhesive to both mating surfaces at about the same time.

4. Do not use circular motions for applying Splice Adhesive. Do not use paint rollers, spray equipment or mechanical equipment for the application of splice adhesive. Do not use long handles on splice adhesive brushes to apply splice adhesive.
5. Test the splice adhesive for readiness by using the Touch-Push Test. Touch the adhesive surface in the thickest area with a clean dry finger to be certain that the adhesive does not stick or string. As you are touching the adhesive, push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, the adhesive is not ready for mating. Flash-off time will vary depending on ambient conditions.
6. After the splice adhesive has dried properly, mate the flashing to the mating area.
7. To complete the splice between the flashing and roof membrane, cut the flashing membrane down to each corner of the curb. Work the flashing membrane into the angle change as tightly as possible, and then allow the remainder of the flashing membrane to fall into place.
8. Roll the splice with a 1-½″ to 2″ (38 mm x 51 mm) silicone roller in both directions along the splice edge.

X. SEAM EDGE TREATMENT

Seam Edge Treatment (S.E.T.) is required when using splice adhesive as shown on Firestone details and at cut edges of RubberGard MAX membrane. See Detail LS-9.

A. Apply Splice Adhesive to Seam Edge

1. Using a Splice Adhesive brush, apply SA-1065 Splice Adhesive a minimum of 1″ (25 mm) on either side of the seam edge.
2. Allow the Splice Adhesive to dry.
3. If the seam edge has become contaminated, it will be necessary to clean the edge with Firestone Splice Wash prior to applying the adhesive.

B. Apply the Lap Sealant to Seam Edge

1. Apply a continuous bead of Lap Sealant, ⅜″ x ¼″ (10 mm x 6 mm) 20-22 lineal feet (6 m – 6.7 m) per 10 oz. (295 cc) tube centered over the seam edge using a standard caulking nozzle.
2. Using the Firestone supplied Lap Sealant tool, feather the Lap Sealant immediately, taking care to leave a mound of sealant directly over the seam edge (refer to Lap Splice Details). Alternately, Lap Sealant may be applied using the plastic nozzle applicator supplied by Firestone, assuring the applicator is centered at the seam edge.

XI. QUICKSEAM BATTEN COVER INSTALLATION FOR MAS SYSTEMS

A. Clean and Prime Batten Strip Area

1. Using Firestone QuickScrubber or QuickScrubber Plus, apply appropriate Firestone Primer to the membrane and batten area so that the prime extends ½″ to 1″ (13 mm to 25 mm) beyond the area to be covered with the Batten Cover Strip.
2. Additional cleaning at factory splices and areas of excessive dusting agent is required.
3. Allow the primer to flash-off.

B. Place QuickSeam Batten Cover Roll

Place the roll of QuickSeam Batten Cover on the roof a few feet ahead of the application starting point, positioned so that it unrolls from the top of the roll (release paper will be on top).

C. Install QuickSeam Batten Cover

Starting a minimum of 4″ (102 mm) prior to the start of the EPDM protection pad under the end of the batten strip, center the QuickSeam Batten Cover and apply to the cleaned and primed surface.

D. Advance the Roll

Advance the roll along the batten strip, peeling away the release liner as the QuickSeam.

E. Cut the QuickSeam Batten Cover

Cut the QuickSeam Batten Cover and release liner to extend 4″ (102 mm) beyond the end of the EPDM protection pad.

F. Apply Pressure and Roll the Splice

Apply hand pressure along the entire length of the QuickSeam Batten Cover to completely mate the two surfaces. Using a 1-½″ to 2″ (38 mm to 51 mm) wide silicone hand roller, roll the entire batten cover with positive pressure towards the outside edge and then along the entire length of the batten cover.

G. Install QuickSeam Flashing at End Laps

1. Apply the appropriate Firestone Primer to the overlap of the QuickSeam Batten Cover as necessary and allow to flash-off.
2. Install a 12″ (305 mm) long section of QuickSeam Flashing over the end lap. Roll the QuickSeam Flashing with a 1-½″ to 2″ (38 mm to 51 mm) wide silicone hand roller.
3. Apply Splice Adhesive to edges of the QuickSeam Flashing and apply Lap Sealant.
4. Intersections of QuickSeam Batten Covers must be completely covered at the intersecting T-Joints with a 12″ (305 mm) long section of QuickSeam Flashing.

XII. ADDITIONAL MEMBRANE SECUREMENT AND BASE TIE-IN FLASHING

Secure the membrane at all locations where the membrane goes through an angle change greater than 1″ (25 mm) in 12″ (305 mm) (i.e., roof edges, curbs, interior walls, etc.).

A. Installation of QuickSeam Reinforced Perimeter Fastening Strip (QSRPF)

1. Attach the QSRPF Strip to the penetration, parapet wall or deck using Firestone 2″ (51 mm) Seam Plates or Firestone Batten Strips fastened a maximum of 12″ (305 mm) o.c. Roll the membrane into place and then fold back, exposing the underside of the membrane and the QSRPF Strip. When using batten strips, apply Firestone All Purpose Sealant over each fastener head, assuring that the fastener head is completely covered.
2. Apply the appropriate Firestone Primer to the membrane where it will mate with the QuickSeam Splice Tape and allowing to dry. Apply Firestone Bonding Adhesive to the back half of the QSRPF, to the membrane that is to be bonded to the penetration or wall, and to the penetration or wall itself.
3. After the liner has dried properly as determined by using the Touch-Push Test, remove the release paper from the QuickSeam Reinforced Perimeter Fastening Strip and roll the membrane into place, assuring a tight fit into the transition between the horizontal and vertical surfaces. Continue to roll the membrane up the wall and broom in place with a stiff push broom. Roll the membrane over the QuickSeam Tape portion with a 1-½″to 2″ (38 mm to 51 mm) wide silicone roller or QuickRoller across the tape and then along its length.
4. Complete vertical lap seams as described in the lap splice section of this specification. Install a T-Joint Cover over any vertical lap splices that go through an angle change (Refer to Firestone Details).

B. Installation of Firestone Batten Strip

1. Install the RubberGard Membrane per Firestone Details and attach to the vertical substrate using Firestone Batten Strips a maximum of 12″ (305 mm) o.c. (Polymer Battens may only be used over wood or metal substrates). Apply Firestone All Purpose Sealant over each fastener head, assuring that the fastener head is completely covered.
2. Cut a piece of flashing from RubberGard Membrane or QuickSeam Curb Flashing large enough to completely cover the substrate of the wall or curb and extend onto the roof membrane a minimum of 3″ (76 mm). Complete the splice between flashing and the main roof membrane using QuickSeam Splice Tape before adhering flashing to the vertical surface. Provide lap seams in accordance with Firestone Details.
3. Apply bonding adhesive at about the same time to both the flashing and the surface to which it is being bonded to allow the same flash-off time. Apply bonding adhesive evenly to avoid puddles.
4. After the bonding adhesive has dried properly as determined by the Touch-Push Test, roll the flashing into the adhesive evenly and carefully to minimize wrinkles. Broom the flashing to the substrate with a stiff push broom to assure proper contact.

XIII. FLASHING – PENETRATIONS

A. General

1. Remove all loose existing flashing (i.e., metal, bituminous materials, mastic, etc.).
2. Flash all penetrations passing through the membrane.
3. The flashing seal must be made directly to the penetration.

B. Pipes, Round Supports, Structural Steel Tubing, Etc.

1. Flash penetrations with Firestone EPDM Pre-Molded QuickSeam Pipe Flashing, Conduit Flashings or Quick Seam Penetration Pockets wherever possible. Do not cut or patch EPDM Pre-Molded Pipe Flashings except where noted on instructions.
2. Flash penetrations using the field wrap process when the use of Pre-Molded EPDM Pipe Flashings or Penetration Pockets is not possible.
3. Refer to Firestone's Technical Information Sheets for minimum and maximum pipe diameters that can be successfully flashed with Pre-Molded EPDM Pipe Flashings.
4. Structural Steel Tubing: Use a field-fabricated pipe flashing detail when the corner radius is greater than ¼″ (6 mm) and the longest side of the tube does not exceed 4″ (102 mm). When the tube exceeds 4″ (102 mm), use a standard curb detail including base-tie in and suitable termination.

C. Roof Drains

1. The following applies for installation of cast iron drains only. For all other drain types contact Firestone Technical Services.
2. Remove existing clamping ring. Remove any broken clamping hardware and replace.
3. Remove all existing flashing (including lead flashing), roofing materials and cement from the existing drain in preparation for membrane and Water Block Seal.
4. Provide a clean even finish on the mating surfaces between the clamping ring and the drain bowl.
5. Install insulation, flat and tapered, with suitable bonding surfaces around the drain to provide a smooth transition from the roof surface to the drain. Slope into drain cannot be greater than 4 in 12 for standard membrane and 1 in 12 for reinforced membrane.
6. Position the membrane and cut a hole for the roof drain allowing a ½″ (12.7 mm) to ¾″ (19.1 mm) of membrane inside the clamping ring. Make round holes in the membrane to align with clamping bolts (a paper punch may be used). Do not cut the membrane back to the bolt holes.
7. Install Firestone Water Block Seal in a continuous bead on the clamping ring seat flange below the membrane. Use a minimum of one half of a 10 oz (295 cc) tube for a 10″ (254 mm) drain.
8. Install the roof drain clamping ring and all clamping bolts. Tighten the clamping bolts to achieve constant compression of water block seal.

D. Insert Drains

Firestone 3″ & 4″ (76 mm and 102 mm) Insert Drains are intended for installation when existing drains are deteriorated and not suitable for reuse. For other conditions outside of these, contact Firestone Technical Services.

1. Remove existing clamping ring. Remove any broken clamping hardware and debris.
2. Install wood blocking as required to support, level and square drain with new insulation sump.
3. Install Firestone Insert drain, securing to a solid substrate in accordance with instructions, in preparation to receive the roof membrane.
4. Install insulation, flat and tapered, with suitable bonding surfaces around the drain to provide a smooth transition from the roof surface to the drain. Slope into drain cannot be greater than 4 in 12 for standard membrane and 1 in 12 for reinforced membrane.
5. Position the membrane and cut a hole for the roof drain allowing a ½″ (13 mm) to ¾″ (19 mm) of membrane inside the clamping ring. Make round holes in the membrane to align with clamping bolts (a paper punch may be used). Do not cut the membrane back to the bolt holes.
6. Install Firestone Water Block Seal in a continuous bead on the clamping ring seat flange below the membrane. Use a minimum of one half of a 10 oz. (295 cc) tube for a 10″ (254 mm) strainer basket/clamping ring.
7. Install Firestone roof membrane as prescribed and secure with strainer basket and bolt assembly.

E. Pipe Clusters and Unusually Shaped Penetrations

1. Install Firestone molded Penetration Pockets per instructions. Allow a minimum clearance of 1″ (25 mm) between the penetration(s) and all sides of the Penetration Pocket.
2. Flash detail with shop made penetration pockets using FormFlash to allow a minimum clearance of 1″ (25 mm) between the penetration(s) and all sides.
3. Secure penetration pockets and flash per Firestone Details.
4. Fill penetration pockets with Firestone Pourable Sealer or FillGard M and mound to shed water. Pourable Sealer must be a minimum of 2″ (51 mm) deep and 1″ (25 mm) thick around the penetrations.

F. Hot Pipes

Protect the RubberGard EPDM components from direct contact with steam or heat sources when the in-service temperature is more than 180 °F (60 °C). In all such cases flash to an intermediate “cool” sleeve with hood. See penetration details.

G. Flexible Penetrations

Provide a weather-tight gooseneck set in Water Block Seal and secured to the deck. Flash in accordance with Firestone Details.

H. Scuppers

1. Provide and install a new welded watertight sleeve.
2. Set welded watertight scupper in Water Block Seal and secure scupper to the structure.
3. Flash in accordance with Firestone Details.

I. Expansion Joints

1. Install where specified by the project designer. Install expansion joints in accordance with Firestone details.
2. Ensure joints are sized to accommodate all anticipated movements and make logical transitions to other joint materials at roof perimeter.

J. Flashing – Walls, Parapets, Mechanical Equipment Curbs, Etc.

1. General

Using the largest pieces of QuickSeam Curb Flashing, QuickSeam Self-Adhered Flashing, or RubberGard EPDM membrane practical, flash all walls, parapets, curbs, etc., to the height as specified by the project designer.

2. Evaluate Substrate

The following substrates require an overlay of ½″ (13 mm) Dens-Deck Prime®, ½″ (13 mm) Dens-Deck® or ⅝″ (16 mm) exterior grade or "Wolmanized" plywood mechanically fastened in accordance with project designer's requirements.

a) DensGlass Gold™
b) Interior Gypsum board
c) Stucco
d) Cobblestone
e) Textured masonry
f) Corrugated metal panels
g) Other uneven substrates

NOTE: All loose existing flashing must be removed.

3. Install Additional Membrane Securement at Curbs, Penetrations, Walls, etc.
4. Provide Termination
   a) Provide termination directly to the vertical substrate as shown in Firestone Details.
   b) Provide Intermediate Attachment

   Intermediate attachment of membrane is required at 36″ (914 mm) intervals in accordance with Firestone Details unless:

   (1) The wall surface is smooth, without noticeable high spots or depressions (i.e., plywood, poured or pre-cast concrete, or hollow core block or masonry walls where joints are flush with masonry surface), AND
   (2) The termination is either a Termination Bar or membrane has been installed underneath a coping or fascia on the outer parapet edge, over the top to the outside edge and turned down to lap any nailer substrate parting line.

XIV. EDGE METALS

A. Firestone Fascia and Coping

1. Ensure membrane roof system extends enough to terminate per Firestone details at roof edge condition.
2. Install prefabricated Firestone perimeter metal edge treatment per instructions and details.

B. Gravel Stops or Roof Edge Metals

1. Flash Gravel Stops or shop made Roof Edge™ Metals using Firestone QuickSeam Flashing
   a) Clean the Membrane and Metal Edge
   b) Remove excess amounts of dusting agent by brooming. Apply the appropriate Firestone Primer to the metal edging and membrane as described in Firestone Specifications. Allow the Single-Ply QuickPrime Primer to flash-off.
2. Apply QuickSeam Flashing
   a) Place the roll of QuickSeam Flashing on the roof a few feet prior to the application starting point, positioned so that it unrolls from the top of the roll (release liner will be on top). Remove 2′ to 3′ (0.6 m to 0.9 m) of release liner and apply to the metal flange and RubberGard Membrane. Lap adjacent rolls of QuickSeam Flashing a minimum of 1″ (25 mm). Refer to Roof Edge Details.
   b) Roll the QuickSeam Flashing

   With a 1-½″ to 2″ (38 mm to 51 mm) wide silicone hand roller, roll the QuickSeam Flashing to assure proper adhesion. Additional attention must be given to factory seam intersections and to any change in plane.
3. Special Considerations (End Laps, T-joints, etc.)
   a) Apply 6″ (152 mm) length of QuickSeam Flashing, a QuickSeam Joint Cover or 6″ x 6″ (152 mm x 152 mm) FormFlash to the inside edge of the QuickSeam Flashing at all overlaps. Refer to Roof Edge Details.
   b) Apply 6″ (152 mm) length of QuickSeam Flashing, a QuickSeam Joint Cover or 6″ x 6″ (152 mm x 152 mm) FormFlash at all intersections between the QuickSeam Flashing and field-fabricated seams. Refer to Roof Edge Details.
   c) If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, an additional piece of QuickSeam Flashing must be applied over the metal lap to the top of the gravel stop, after the initial application of QuickSeam Flashing. Seam Edge Treatment shall be applied at the intersections of the two flashing sections.

C. Optimal QuickSeam Flashing Application

1. The optimal use of 5″ QuickSeam Flashing is where a 3″ (76 mm) edge metal flange is being used. This will provide the minimum 2″ (51 mm) seam to the RubberGard Membrane, with the remaining 3″ (76 mm) of the material completely covering the metal flange.
2. If a flange wider than 3″ (76 mm) is used, the joints of the sheet metal edge must be flashed using QuickSeam Flashing and Single-Ply QuickPrime Primer, after the primary flashing is complete. In addition, it is recommended that 3″ (76 mm) QuickSeam Splice Tape be placed in the sheet metal laps to help seal the metal edge. Refer to Roof Edge Details.

D. Special Considerations for Copper Edging

1. Copper may be weathered or coated with an anti-tarnish lacquer which makes adhesion difficult. Therefore, cleaning techniques must be used to prepare the copper surface to receive the QuickSeam Flashing. Firestone requires that the copper be scrubbed with acetone or lacquer thinner, using clean cotton cloths. Cleaning before installation is recommended however cleaning can take place after metal is attached if care is taken not to allow the solvents to come into contact with the membrane. After the cleaner dries, apply the appropriate Firestone Primer and QuickSeam Flashing per Firestone Specifications.

XV. MEMBRANE REPAIR

A. General

In the event that a warranted EPDM system sustains more than six punctures in any 100 ft^2 (9.29 m^2) area, the entire area must be overlaid with new membrane.

B. Repair Cuts/Punctures in The Membrane or Wrinkles Within 18″ (458 Mm) Of A Seam

1. A wrinkle running toward a seam or within 18″ (457 mm) of a seam must be repaired.
2. The wrinkle must be cut out so that the membrane lays flat and patched with a piece of EPDM membrane having no factory seams that extends a minimum of 3″ (76 mm) beyond the boundaries of the cut in all directions. If the wrinkle occurs through QuickSeam Flashing or FormFlash, like material must be used for repair. QuickSeam Flashing or FormFlash may not extend onto the roof surface more than 6″ (152 mm). QUICKSEAM FLASHING OR FORMFLASH CANNOT BE USED TO REPAIR CURED MEMBRANE. If repairing of the same wrinkle must continue, then EPDM membrane must be used. Install the EPDM repair membrane first, and round all corners of the repair piece.
3. Repair a cut or puncture in the EPDM membrane with EPDM membrane. The repair must extend a minimum of 3″ (76 mm) beyond the boundary of the affected area in all directions. Round all corners of the repair piece (Example a pinhole will require a minimum 6″ x 6″ (152 mm x 152 mm) EPDM patch).

C. Clean the Membrane

1. When repairing membrane which has been in service, it is necessary to remove accumulated dirt. Proper membrane preparation is made by scrubbing the membrane with a scrub brush and warm soapy water, rinsing with clear water, and drying with clean cotton cloths. Clean the area using clean cotton cloths with the appropriate Firestone splice wash. Additional cleaning using the appropriate Firestone splice wash is often necessary.
2. As an alternative, Firestone Membrane PreWash can be used to clean existing membrane. Spray Membrane PreWash on the membrane and allow to sit for ten minutes. Remove PreWash with power washer and allow membrane to dry before any repair activity. Additional applications of PreWash may be required. Refer to Technical Information Sheet for Membrane PreWash for more detailed instructions.

D. Install Repair Material

Repairs must be made with SA-1065 Splice Adhesive. Refer to the Flashing Seam Details found in the Firestone Website for application requirements of Splice Adhesive.

E. FullForce™ Repair Option

1. Membrane repairs using FullForce EPDM are limited to horizontal repairs only.
2. The size of a repair using FullForce EPDM should never be smaller than 6" (152 mm) in diameter (length or width) to ensure the repair extends a minimum of 3″ (76 mm) in all directions beyond the cut or puncture in the existing membrane.
3. Multiple cuts or punctures in an existing membrane in close proximity may be repaired with a single piece of FullForce EPDM. In such cases, the FullForce EPDM must extend a minimum of 6″ beyond the outermost border of the repair area.
4. When using FullForce EPDM to repair eligible membranes in ballasted, MAS, or R.M.A. applications, the repair area may not exceed 5' (1.5 m) in any direction. When repairing eligible adhered membranes, there is no maximum limitation on the size of a repair using FullForce EPDM.
5. FullForce EPDM must be unrolled and allowed to relax at least 30 minutes PRIOR TO cutting and installing the membrane. Unroll FullForce EPDM with the release liner facing down so the top side of the membrane is exposed to direct sunlight.
6. Prepare the Existing Membrane
   a) Clean the Membrane
      (1) When repairing membrane that has been in service, it is necessary to remove accumulated dirt.
      (2) Proper membrane preparation is made by scrubbing the membrane with a scrub brush and warm soapy water, rinsing with clear water, and drying with clean cotton cloths. After this initial cleaning, clean the area again using clean cotton cloths and Firestone SW100 Splice Wash. Additional cleaning using Firestone Splice Wash is often necessary.
      (3) Cleaning must extend a minimum of 6″ (152 mm) in all directions beyond the repair area.
   b) Prime the Membrane

(1) Apply an appropriate Firestone primer to the repair area according to the instructions on the Technical Information Sheet. For repairs using FullForce EPDM, Firestone QuickPrime Plus is preferred, but Firestone Single-Ply QuickPrime Primer or QuickPrime Plus LVOC may be substituted. Expect primer flash off/set up times to lengthen based on the type of primer used and ambient conditions.

(2) Primer must extend a minimum of 3" (76 mm) in all directions past the area to be covered by FullForce EPDM.

c) Install FullForce EPDM Membrane

7. **NOTE:** Application of FullForce EPDM and removal of the release liner will vary depending on the size and location of the repair. A repair using FullForce EPDM must be square or rectangular. Never cut FullForce EPDM into an L-shape or at angles greater or less than 90°. The terms ‘length’ and ‘lengthwise’ refer to the original direction of the release liner prior to cutting the FullForce EPDM.

   (1) Unroll FullForce EPDM and allow it to relax PRIOR TO cutting and installing the membrane, as per above and standard FullForce application procedures.

   (2) Cut the FullForce EPDM to the needed size. FullForce EPDM must extend at least 3" (76 mm) in all directions beyond the cut or puncture in the existing membrane [with primer extending at least 3" (76 mm) beyond the edge of the FullForce].

      (a) FullForce EPDM must be within its shelf life and must have been stored according to Firestone specifications. The release liner must be in good condition with no peeling, fraying, or tearing. If dust, dirt, or other foreign matter has accumulated along the edge of the FullForce roll, the edge must be cut off prior to installation.

      (b) Scissors must be sharp, clean, and free of adhesive or other residues. Cut the FullForce EPDM in a straight line without damaging the Secure Bond™ Adhesive. The cut edge should be straight, clean, and continuous without jagged edges. The release liner must be intact and in full contact with the Secure Bond adhesive.

      (c) For repairs extending more than 5' (1.5 m) in any direction, the existing membrane must be scored (cut) lengthwise along each edge prior to installing FullForce EPDM. FullForce EPDM must extend 6" (152 mm) beyond the scoring in the existing membrane. When applicable, score the existing membrane at least 6" (152 mm) from any seam. Scoring the existing membrane is necessary to avoid trapping air, solvent vapors, or moisture between the existing membrane and FullForce EPDM.

(3) FullForce Membrane Application

(a) Position the FullForce EPDM over the repair area. DO NOT REMOVE THE RELEASE LINER AHEAD OF TIME AND DO NOT APPLY DOWNWARD PRESSURE ON THE FULLFORCE MEMBRANE WHILE THE RELEASE LINER IS IN CONTACT WITH THE PRIMED SURFACE.

(b) Once the FullForce EPDM is in position, fold back the leading edge of the membrane at one end to expose the release liner and pull the liner at a 45° angle moving away from the center until the removed portion of the release liner extends beyond the edge(s) of the FullForce EPDM, then allow the folded back lead edge of the membrane to lie back in its original position. DO NOT FOLD FULLFORCE EPDM IN HALF TO EXPOSE THE RELEASE LINER.

(c) Keeping the FullForce EPDM flat and secured, continue removing the release liner at a 45° angle, parallel to the roof surface, along the entire length of the FullForce sheet taking care not to disturb the original positioning of the FullForce EPDM. Pulling the release liner at an alternate angle may allow the sheet to move or may trap air. Depending on the width of the FullForce EPDM, at least two people may be required to properly remove the release liner, especially if the sheet is wide enough that the release liner remains split. If it is, the two sides of the release liner are to be removed simultaneously. Keep the release liner as close to the roof surface as possible throughout its removal.

(i) For full sheet (10' (3 m) wide) repairs, first remove the split release liner, then remove the 4″ (102 mm) strip of release liner along the seam edge. FullForce EPDM repairs must “straddle” existing roof seams, extending at least 12″ onto the surface beyond an existing seam.

(d) Follow standard Firestone FullForce EPDM application procedures for brooming and rolling the membrane to initiate adhesion, adjusting as needed based on the size of the repair. For small repairs, it is sufficient to roll the entire membrane repair using a 1½″ to 2″ (38 mm to 51 mm) wide silicone roller or a Firestone QuickRoller™ just as one would normally roll a FullForce seam.

(4) Install Firestone QuickSeam™ Joint Covers at all T seam intersections created by the installation of FullForce EPDM over seams in the existing membrane.

(5) Apply FullForce Sealant along all edges of FullForce EPDM as per standard FullForce EPDM application procedures.

NOTE: If the membrane repair will be made along a roof edge or at the base of a parapet wall, adjust FullForce EPDM application and release liner removal accordingly using standard FullForce EPDM application procedures. For membrane repairs within 18″ (0.45 m) of a roof drainage device, contact Technical Services for assistance.

XVI. TEMPORARY CLOSURE

Temporary closures or tie-ins which assure that moisture does not damage any completed section of the new roofing system are the responsibility of the licensed applicator. This is not warranted in any Firestone warranty. Completion of flashings, terminations and temporary closures is required to provide a watertight condition.

XVII. ACRYLITOP PC-100 COATING

A. General

1. AcryliTop PC-100 can be applied to the RubberGard membrane or flashing to offer a reflective surface and add to its service life. In addition, AcryliTop PC-100 can be applied to existing RubberGard EPDM roofs under warranty, helping extend the membrane life. Should the coating of an existing roof be considered, the roof system should first be inspected by a Firestone licensed contractor to ensure that the system itself is not in need of repair prior to applying AcryliTop PC-100.
2. Refer to the technical information sheets and safety data sheets for AcryliTop PC-100, AcryliTop PC-100 Base Coat and Membrane PreWash for additional information on application, storage, and safety.

B. Clean Membrane Surface

1. Before applying the AcryliTop PC-100, the RubberGard membrane must be cleaned using Firestone's Membrane PreWash. Clean the roof of debris, as needed, with a broom or leaf air blower. Remove any leaves or large pieces of debris, such as stones, branches, etc.
2. Apply Membrane PreWash at a rate of 300 to 500 square feet of membrane surface (27.8 sq. m to 46.5 sq. m) using a 2 to 3 gallon (7.6 L to 11.4 L) agricultural tank sprayer and allow to dry for 5 to10 minutes (application rates may vary depending on the cleanliness of the membrane). Ensure that tank sprayer has a pressure relief valve. Do not allow PreWash to come in contact with other surfaces.
3. Using a 3000 to 4000 psi (20.7 mPa to 27.6 mPa) pressure washer that provides a minimum of 4 gallons (15.1 L) per minute, remove the PreWash working first away from the drains or gutters, then back towards them. A 40° fan spray nozzle for pressure washing should be used.
4. Should deposits of dirt and dusting agent remain, additional cleaning with the pressure washer is required. (Caution: Do not allow the spray wand to be closer than 12″ (305 mm) from the membrane to prevent damage).

C. Apply AcryliTop PC-100 Base Coat (Only Required When Using A Roller Application)

1. After the membrane has dried, apply Firestone AcryliTop PC-100 Base Coat at a rate of 200 ft² (18.5 sq. m) per gallon (3.8 L) using a ⅜″ (9.5 mm) nap paint roller. At this rate, membrane may be slightly visible through the base coat.
2. Allow Base Coat to dry thoroughly before applying the AcryliTop PC-100 topcoat.

D. Apply AcryliTop PC-100

1. Roller Application
   a) Using a ⅜″ (10 mm) nap paint roller, apply the AcryliTop PC-100 coating at a 90° angle to the AcryliTop PC-100 Base Coat at a rate of 200 square feet (18.5 sq. m) per gallon (3.8 L) or as necessary to assure complete coverage of the AcryliTop PC – 100 Base Coat.
   b) The finished dry mil thickness shall be a minimum of 10 mils total.
2. Sprayer Application
   a) Once the membrane is properly cleaned, apply AcryliTop PC-100 at a rate of 100 ft² (9.3 sq. m) per gallon (3.8 L), resulting in a minimum 10 mil dry film thickness.
   b) The sprayer used for application of the AcryliTop PC-100 shall be a 30:1 ratio pump using a pressure of 90-100 psi (621 kPa to 690 kPa) at a rate of 125 cubic feet (3.5 cu. m) per minute.

XVIII. ROOF WALKWAYS

A. Lay Out Firestone QuickSeam Walkway Pads

1. Install walkway pads in locations as specified by the project designer and in accordance with the System Design Guide Section of the Firestone Website. Layout Firestone RubberGard Walkway Pads so that the flat surface is over the completed RubberGard Membrane, spacing each pad a minimum of 1″ (25 mm) and a maximum of 3″ (76 mm) from each other to allow for drainage.
2. If Firestone QuickSeam Walkway Pads must be installed over field-fabricated seams or within 6″ (152 mm) of a seam edge, install QuickSeam Flashing over the seam edge. The QuickSeam Flashing must extend beyond the walkway pad a minimum of 6″ (152 mm) on either side.

B. Attach Firestone QuickSeam Walkway Pads to The Membrane

1. Prepare the Membrane.

Clean the membrane using the appropriate Firestone Primer where the QuickSeam Splice Tape portion will contact the membrane.

2. Place Walkpad

Remove the release liner from the QuickSeam Splice Tape. Turn the walkpad over and place it on the primed membrane.

3. Apply Pressure

Walk on the pad to press in place assuring proper adhesion.

C. Red Shield™ Walkway Systems

Install Red Shield Walkway systems as instructed with supplied materials.

XIX. EQUIPMENT SUPPORTS

Install Firestone Red Shield Pipe and equipment supports systems were specified. Follow manufactures installation instructions.

XX. SHEET METAL WORK

A. General

1. For specific installation instructions for Firestone Sheet Metal, refer to the System Design Guide and Technical Information Section of the Firestone Website and Manual.
2. For sheet metal work not supplied by Firestone, refer to fabrication and installation requirements specified by the project designer, as well as industry standards.