FIRESTONE SBS ROOFING SYSTEMS APPLICATION GUIDE

July 6, 2011

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2.01.1 GENERAL

This Guide provides instructions for the installation of Firestone's SBS Roof Systems. Reference to the Design Guide, Technical Information Sheets (T.I.S.), and other sections of Firestone's Technical Specifications is necessary to ensure that the finished roof system is installed in compliance with Firestone requirements.

Extended warranties of 15, 20 and 25 years may require special considerations with regard to fasteners, insulations, and flashing, coating, and attachment requirements. Refer to the Asphalt Design Guide at www.firestonebpco.com for specific requirements or contact your Technical Coordinator at 800-428-4511.

2.02.1 JOB SITE CONSIDERATIONS (CAUTION AND WARNINGS)

A. Keep all adhesives, sealants and cleaning materials away from ALL ignition sources (i.e., flames, fire, sparks, etc.). Do not smoke while using these materials.
B. Consult container labels, Material Safety Data Sheets and Technical Information Sheets for specific safety instructions for all products used on the project.
C. Care must be used when installing fasteners to avoid contact with conduits and other piping concealed in and beneath the deck.
D. Occupied Buildings: The contractor shall take precautions to prevent the spread of fumes, dust, and debris, where such material may enter into the building. The roofing contractor shall provide labor and materials to construct, maintain and remove, as necessary, temporary enclosures to prevent fumes, dust, and debris in the construction area(s) from entering the building.
E. Store Firestone SBS rolls on end to protect them from becoming damaged. Do not stack rolls.
F. Insulation must be properly stored and protected from ignition sources, moisture and damage.
G. Cold weather:
   1. When the outside temperature is below 40 °F (4.4 °C), certain combinations of temperature and humidity may cause condensation on the surface of solvent-based adhesives and primers. If this condition occurs, discontinue the application until the ambient temperature reaches 45-50 °F and condensation no longer occurs.
   2. The consistency of sealants, adhesives and primers will thicken as the ambient temperature drops. Membranes stiffen as they cool. To minimize this phenomenon the following procedures are recommended:
      a. Start work with sealants, adhesives, primers and SBS roll goods that have been stored between 60°F (15.5°C) and 80°F (26.7°C). Insulated, heated boxes can provide the required storage temperature.
      b. Complete test areas to determine if conditions will cause problems such as condensation with the application of the material.
      c. Stop the operation or change to another warm container when material becomes too thick or stiff to properly apply.
   3. Do not use heat guns or open flames to dry or cure adhesives and primers.
H. Follow all OSHA and NRCA provisions for fire protection.

2.03.1 ROOF SUBSTRATE PREPARATION

A. Correct Substrate Defects:

1. Defects that need to be corrected before work can commence should be brought to the attention of the General Contractor or Building Owner in writing.

2. For re-roofing applications, remove existing roof system components as specified by the project designer. If inferior or damaged components are discovered during installation, they should be brought to the attention of the project designer for corrective action.
3. Good roofing practice requires a complete tear-off to the structural deck if soundness and integrity of the existing roof system cannot be verified. Recovering an existing roof system is an alternative to removing existing roof components. However, non-destructive testing, in conjunction with core cuts, may be necessary to determine the soundness 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 prior to the commencement of re-roofing. The best techniques that are used to determine the presence or absence of moisture are:
    - nuclear moisture detection
    - infrared thermography
    - electric capacitance
5. All wet materials must be removed and replaced before roof construction begins.

B. Remove Moisture:

Ponded water, snow, frost and ice, must be removed from the work surface(s) prior to installing a Firestone SBS Roofing System. Applicators are encouraged to work in small areas to insure all moisture is completely removed. Surfaces to be roofed must be completely dry before application begins.

C. Prepare Surface:

Acceptable substrates to which the Firestone SBS Roofing System will be installed must be properly prepared prior to membrane installation. The surface must be even, clean, dry, smooth, and free of sharp edges, fins, loose or foreign materials, oil, grease and other contaminants that may damage the membrane or prevent proper adhesion. Rough surfaces that could cause damage to the membrane must be overlaid with insulation.

D. Prime substrates as necessary:

Prime the substrate with an ASTM D 41 asphalt primer, applied at a rate of 1-1/2 to 2 gallons per 100 square feet (0.61 to 0.82 L/sq. m).

E. Fill Voids:

All surface voids of the immediate substrate greater than 1/4” (6.35 mm) wide must be filled with insulation or other appropriate material.

F. Install Vapor Retarder (When Specified):

Install a vapor retarder as specified by the project designer.

2.04.1 WOOD NAILER LOCATION AND INSTALLATION

Wood nailers must be installed as specified by the project designer or as noted in Firestone Details and the System Design Guide. Install wood nailers as follows:

A. Position Wood Nailer

Total wood nailer height must match the total thickness of insulation being used and should be installed with a 1/8" (3.2 mm) gap between each length and each change of direction.

B. Secure Wood Nailer

Wood nailers must be firmly fastened to the deck or building supports. Mechanically fasten wood nailers to resist a force of 200 lbf (890 N) in any direction, typically 12“(304.8 mm) o.c. Refer to attachment requirements as specified by the project designer.

C. Tapered 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).

D. Chemical Treating of Wood Nailer

Chemically treated lumber may affect the performance of the Firestone membranes and accessories including fasteners. Do not use chemically treated lumber with Firestone warranted roof systems.

E. 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 system may jeopardize the warranty for the entire project.

2.05.1 INSULATION INSTALLATION

A. Install Insulation:

Install only as much insulation as can be covered with roofing membrane and completed before the end of the day's work or before the onset of inclement weather.

B. Fit Insulation:

Neatly fit insulation to all penetrations, projections, and nailers. Insulation should be loosely fitted. Gaps greater than 1/4" (6.4 mm) must be filled with acceptable insulation**.** On metal decks, the edge of the board parallel with the roof deck should be completely supported. The roof membrane should not be left unsupported over a space greater than 1/4" (6.4 mm). Firestone requires for warranty that tapered insulation with acceptable facers for bonding be installed around roof drains so as to provide proper slope for drainage as shown in Firestone Details.

C. Stagger Insulation Joints:

When installing multiple layers of insulation, all joints between layers shall be staggered.

2.05.1.1 Attach Insulation

A. Mechanical Attachment:

Insulation must be attached using Firestone Insulation Plates and Fasteners.

1. Refer to Firestone Technical Information Sheets, for attachment patterns and insulation fastening rates.
2. When installing a multi-layer insulation assembly, the fastening pattern is determined by the type and thickness of the top layer of insulation.
3. For proper performance, fasteners must be fully seated, but not overdriven. Insulation plates may cup if fasteners are overdriven.
4. Multiple layers may be installed using a common fastener.

B. Asphalt Attachment:

Insulation, except DensDeck may be attached using a solid mopping of ASTM D 312 Type III or Type IV asphalt or Firestone SEBS Asphalt (as required by warranty term). If DensDeck products are to be installed in hot asphalt, they can only be applied in ASTM D 312 Type III. **Mopping asphalt temperature must not exceed 450 °F when mopping to DensDeck and DensDeck Prime. Use only ASTM D 312 Type III asphalt**.

1. Insulation installed in adhesive can not be larger than 4' X 4' (1.2 m X 1.2 m).
2. If the substrate is structural concrete or DensDeck (unprimed) it will require priming prior to installation of the insulation layer.
3. The asphalt shall be applied at a rate sufficient to visually cover the surface area being bonded. The insulation is embedded in the asphalt while the asphalt is still hot and fluid.
4. Insulation boards must be walked in to ensure complete adhesion to the substrate.
5. Additional layers of insulation may be installed in the same fashion.

C. Adhesive Attachment:

1. Insulation may be attached using I.S.O. Fix, I.S.O.SPRAY S, I.S.O. Twin Pack or I.S.O. Stick.
   a. Apply the adhesive in strict accordance with the instructions provided with the product and the appropriate Firestone Technical Information Sheets.
   b. It may be necessary to prime the substrate prior to installing the insulation in adhesive.
   c. If installing on a metal deck (where allowed by specification), the edge of the board parallel with the roof deck must be completely supported.
   d. The insulation boards must be no larger than 4' X 4' (1.2 m X 1.2 m).
   e. Insulation boards must be walked in to ensure complete adhesion to the substrate.
   f. Additional layers of insulation may be installed in the same fashion.

2.06.1 CANT STRIP INSTALLATION

Install non-combustible cant strips at all walls and curbs as required by the appropriate design specifications and details using hot asphalt, or Firestone Multi-Purpose MB Flashing Cement. Refer to the Firestone Asphalt Design Guide on line at www.firestonebpco.com for specific requirements or contact your Technical Coordinator at 800-428-4511.

2.07.1 BASE SHEET INSTALLATION

2.07.1.1 Hot Asphalt Attachment

Base sheets may be attached to an appropriate substrate using ASTM D 312 Type III (3) or type IV (4) or IV CSA A123.4 Type III (3) or Type IV (4) asphalt or Firestone SEBS Mopping Asphalt. Refer to the Firestone Asphalt Design Guide on line at www.firestonebpco.com for suitable substrates and product information. Adhesion asphalt must be applied at the manufacturer's stated EVT at point of installation. Align subsequent rolls, shingling the laps, maintaining a minimum 2" (50.8 mm) side lap and minimum 6" (152.4 mm) end lap and repeat the application.

A. Solid Mopping

1. Starting at the low point of the roof, align the base sheet and unroll into a solid mopping of hot asphalt.
2. With a stiff push broom, immediately broom the base sheet to ensure full contact with the asphalt.
3. Do not walk on freshly applied sheets until the adhesion asphalt has cooled.

Note:

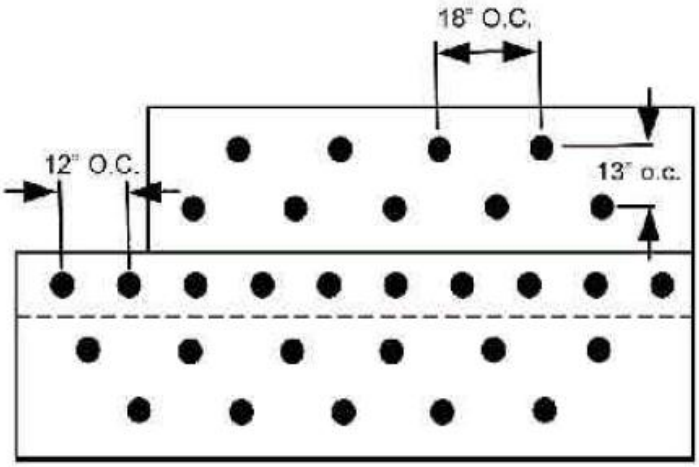
1. Firestone recommends that a half sheet be used as the first roll to ensure that the base sheet laps and the cap sheet laps are not aligned. Refer to the Firestone Asphalt Design Guide on line at www.firestonebpco.com for slope limitations.
2. Do not install any base or ply sheets directly to polyiso insulation with hot asphalt. DensDeck may be installed over Firestone ISO 95+ polyiso insulation before a base sheet is installed.

2.07.1.2 Mechanical Attachment

Starting at the low point of the roof, align the base sheet, unroll he sheet and allow it to relax prior to attachment. 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" (76.2 mm) side lap and minimum 6" (152.4 mm) end lap and repeat the application staggering all end laps.

2.07.1.2.1 Fasten Base Sheet Using Firestone Insulation Plates and Fasteners
Using the proper Firestone approved fasteners, base sheets may be attached through the insulation directly into the deck including structural concrete, wood, gypsum, cementitious wood fiber and lightweight concrete. Refer to Firestone Asphalt Design Guide on line at www.firestonebpco.com for information on the proper fastener to be used with a particular deck type. *Do not use polymer fasteners and/or plates with torch applied systems*.

The minimum attachment rate for Firestone MB Base M must be 12” (304.8 mm) o.c. in the side and end laps and 18” (457.2) o.c. in two staggered rows in the field of the sheet. Each row shall be 13” (330.2 mm) (approx.) in from the sides of the base sheet. See diagram below.

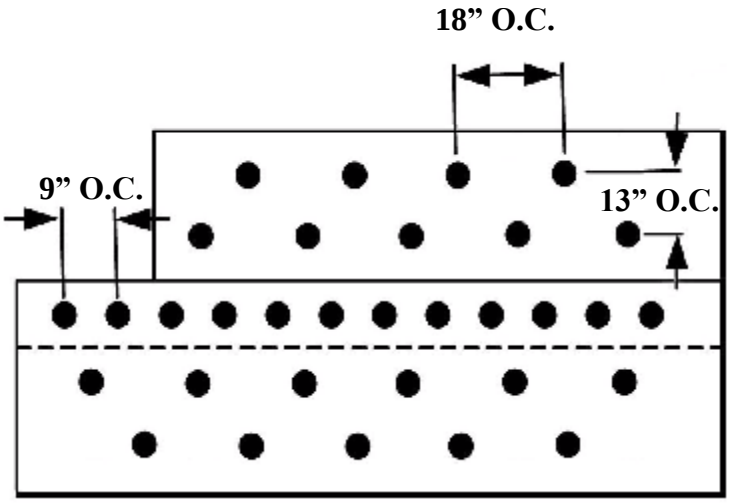


This attachment pattern applies to all meter wide Firestone base sheets and cap sheets used as base sheets.

2.07.1.2.2 Fasten Base Sheet Using Cap Nails

Using cap nails with 1” (25.4 mm) diameter steel heads, base sheets may be attached to plywood, wood plank, and oriented strand board decks. The base sheet must be mechanically attached with cap nails specified by the project designer 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, to attach a base sheet over a gravel surfaced built-up roof, or through a smooth surfaced un-insulated built up roof that is more than 1/2" (13 mm) thick. The fasteners used to attach base sheet must be manufactured for the particular deck type and be Factory Mutual Approved.

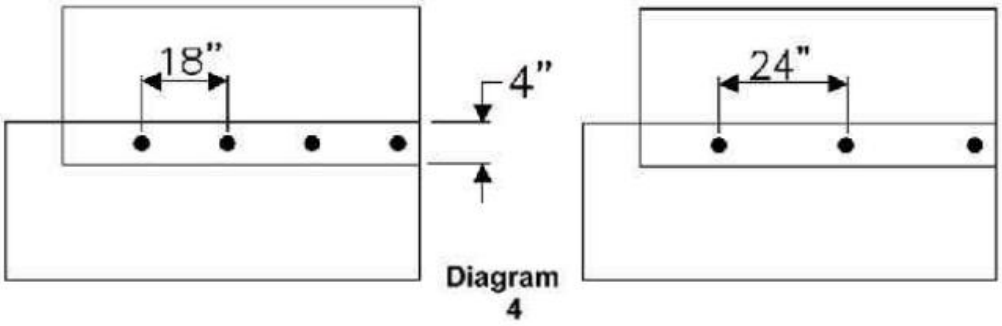
See diagram below.



This attachment pattern applies to all 1 meter (39.4") wide Firestone APP compatible base sheets and cap sheets used as base sheets.

2.07.1.2.3 Mechanically Attached Poly Torch Base (MOD BIT MAS system)

Firestone Poly Torch Base must be fastened with Firestone MB 2" Barbed Metal Lap Pates and fasteners, in the seam at a rate of 18" (457.2) o.c. or 24" (609.6 mm) o.c. or as required by the specification.
Note: The application requires the cap sheet to be heat fused (torched).



Attachment of base sheet using
Firestone MB 2" Barbed Metal Lap Plates and Fasteners
4" = 101.6 mm 18" = 457.2 mm 24" = 609.6 mm

Note: The application requires the cap sheet to be heat fused (torched).

2.07.1.2.4 Fasten Base Sheet Using Specialty Fasteners

Using approved fasteners and plates, base sheets may be attached to gypsum, cementitious wood fiber or lightweight insulating concrete decks. Base sheets must be mechanically attached with fasteners specified by the project designer and Firestone. Nail-in fasteners 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 to attach through a smooth surfaced built-up roof. The fasteners used to attach base sheet must be Factor Mutual Approved and manufactured for the particular deck type.

2.07.1.3 Multi-Purpose MB Cold Adhesive and LiquiGard Attachment of SBS Cool (non-torch) Sheets

Starting at the low point of the roof, install base sheet in a uniform application of Firestone Multi-Purpose MB Cold Adhesive or LiquiGard at a rate of 1 ½ to 2 gallons per 100 ft^2. Align subsequent rolls, shingling the laps, maintaining a minimum 3" (76.2 mm) side lap and minimum 6" (152.4 mm) end lap and repeat the application.

1. Lay out the first base sheet by unrolling and aligning into final position.
2. Re-roll the sheet halfway and apply MB Cold Adhesive to the substrate with an airless sprayer or a 1/4" (6.4 mm) notched squeegee at a rate of 1-1/2 to 2 ½ gallons per100 square feet (0.6 to 0.8 L/sq. m). LiquiGard should be applied at the same rate using a ¼" notched squeegee. Some substrates may require more adhesive depending on the absorbency and texture of the surface.
3. Roll the base sheet into the adhesive and broom into place.
4. Re-roll the other half of the sheet and install using the same process.
5. Install additional base sheets in the same fashion, assuring that the application of the Multi-Purpose MB Cold Adhesive and LiquiGard are applied fully in the side and end lap areas as well as the field.

2.07.1.5 Attachment by Heat Welding

1. Starting at the low point of the roof, completely remove the roll tape and then unroll the first roll of SBS Torch Base, sheet. Align the sheets and allow them to relax.
2. Re-roll one end approximately half way.
3. Unroll remaining rolls approximately halfway in order to properly align the side laps and ensure the required end laps are maintained.
4. Heat weld the re-rolled portion of the Base Sheet. Be alert to insure the lap area of the installed sheet is heated, as well as the bottom of the sheet being applied. DO NOT STEP ON FRESHLY HEAT WELDED SHEETS! Be alert to insure the lap area of the installed sheet is heated. The welding temperature is usually correct when a 1/8th inch wide flow of bitumen is extruding from the side lap.
5. Roll the un-adhered half of the membrane sheet and repeat the above procedure to complete the installation of the roll.

Note:
Base Sheets must never be heat fused directly to any insulation except DensDeck. Base sheets must be attached to insulation in accordance with Firestone requirements. An approved coverboard may be installed over Firestone polyiso insulation before the base sheet is installed.

2.07.1.5 Attachment of MB Base SA Self-Adhered Base

Starting at the low point of the roof, unroll Firestone MB Base SA and allow the sheet to relax. Align the Firestone SA Base sheet so that it lies flat, with no wrinkles. Align subsequent rolls, shingling the laps, and maintaining a minimum 3" (76.2 mm) side lap and a minimum 6" (152.4 mm) end lap and repeat the application.

1. Begin the attachment by removing half of the release paper backing from the membrane.
2. Apply pressure to the top side of the exposed area, starting at the center and working out to the edges, to ensure continuous attachment to the substrate.
3. Remove the remaining release-backing from the Firestone MB Base SA, keeping the membrane in contact with substrate and applying continuous pressure to the top of the sheet, from the center out to the edges.

4. Install subsequent sheets in the same manner.

Note: Firestone MB Base SA Roofing Systems **require** a heat fused (torched) cap sheet or insulation adhered in I.S.O. Twin Pack, to be installed over the top. When MB Base SA is used as a vapor retarder in the Firestone Non-Penetrating Vapor Retarder System, MB Base SA must be installed in SA Primer, with all laps (side and end) primed with SA Primer prior to sealing.

2.07.1.6 Lap Base Sheets

Base sheets applied in hot asphalt must be lapped a minimum of 3” (76.2 mm) on the sides. When mechanically attached, heat welded or applied in Multi-Purpose MB Cold adhesive. All Base sheet end laps must be a minimum of 6" (152.4mm). In all cases, a minimum offset of 12" (304.8 mm) must be maintained between the side and end laps of base and cap sheets.

2.08.1 CAP SHEET INSTALLATION

2.08.1.1 Attachment by Heat Welding (Torching)

1. Remove all of the roll tape before installing the membrane.
2. Unroll all rolls and allow them to relax prior to installation. Re-roll just prior to installation.
3. Install the first course of SBS Torch cap sheet at the low point of the roof. This could be at the edge of the roof or through the drain lines. Cap Sheet laps must not fall on top of base sheet laps. Cut bottom sheet laps at a 45° angle according to Detail MB-LS-1 prior to completing an end lap.
4. Unroll the next roll of Firestone SBS cap sheet completely and align. Remaining rolls should be unrolled approximately halfway in order to properly align the side laps and ensure the required end lap is maintained.
5. Re-roll one end of the second roll approximately half way, and align to the laying line on the first roll.
6. Heat-weld the re-rolled portion of the roll by passing the torch flame evenly across both the face of the roll and the base sheet below the roll.
   a. Heat the membrane with the torch until it develops a sheen or glossy appearance, assuring that the film backing is burned off.
   b. Apply heat to the lap of the previously installed sheet. The welding temperature is correct when a flow of bitumen, approximately 1/8" (3.2 mm) wide, is extruding from the side lap.
   c. Excessive bitumen flow of more than 1 inch (25.4 mm) during application is an indication that too much heat is being applied.
   d. Feathering the bleed-out at side laps is not acceptable.
   e. Re-roll the un-adhered half of the cap sheet and repeat the above procedure to complete the installation.

Note: When torching to a granule surfaced sheet and constructing end laps, base flashings, membrane repairs etc., embed granules on the receiving surface by heating the surface and troweling-in all granules until a uniform black surface coated with compound is achieved. To maintain aesthetics, any area of the sheet not protected with a granule surface can be covered by additional granules.

2.08.1.2 Hot Asphalt Application

A. Remove all of the roll tape before installing the SBS sheet.
B. Unroll all rolls and allow them to relax prior to installation. Re-roll just prior to installation. Laps of SBS cap sheet should never fall on top of base sheet laps. Cut bottom sheet laps at a 45° angle as shown in Firestone Detail MB-LS-1.
D. Unroll the next roll of Firestone SBS cap sheet completely and align. Remaining rolls should be unrolled approximately halfway in order to properly align the side laps and ensure the required end lap is maintained.
E. Re-roll one end of the second roll approximately half way, and align to the laying line on the first roll.
F. Apply hot asphalt to the substrate. The asphalt temperature must be a minimum of 400°F (204°C) at the point of contact with the membrane. Asphalt must be ASTM D 312 type III of IV or Firestone SEBS asphalt.
G. Roll the cap sheet into the hot asphalt using positive pressure, assuring proper side and end lap width.
H. Hot asphalt should be seen coming from the laps but should be no more than 3/4" (19 mm) wide.
I. Roll up the un-adhered half of the cap sheet and repeat the above procedure to complete the installation of the roll.
J. Continue alignment and installation of subsequent rolls to cover the roof area. All side laps must be a minimum of 3" (76.2 mm) and all end laps must be a minimum of 6" (152.4 mm).
K. Firestone recommends that granules be applied to areas of asphalt bleed-out.

2.08.1.3 Application of Sand Backed SBS in Firestone Multi-Purpose MB Cold Adhesive and/or LiquiGard.

A. Remove roll tapes prior to installation of the sheet.
B. Un-roll and relax the sheet materials prior to installation.
C. Align cap sheets in their final position, assuring that the minimum side and end laps are maintained. More than one sheet can be positioned in this step. Prior to completing an end lap, cut the bottom sheet at a 45° angle as shown in Detail MB-LS-1.
D. Fold back over roll cores or re-roll the cap sheet in half, exposing the substrate.
E. Apply Firestone Multi-Purpose MB Cold Adhesive or LiquiGard to the substrate using a 1/4" (6.4mm) notched squeegee, at a rate of 1-1/2 to 2-1/2 gallons per 100 ft^2 (0.6 to 1.0 L/m^2).
F. Fold the cap sheet into the adhesive and broom into place. The adhesive may be left open no more than 10 minutes prior to installing base sheet.
G. Repeat the process for the other half of the SBS sheet.
H. Complete the side and end laps of the SBS sheet by sealing with Adhesive or by heat fusing with a propane torch. Prior to completing an end lap, cut the bottom sheet at a 45° angle as shown in Detail MB-LS-1.
I. Firestone recommends that granules be applied to areas of adhesive bleed-out.

2.09.1 SBS LAP SPLICE REQUIREMENTS

SBS Laps must be sealed by adhering with Firestone Multi-Purpose MB Cold Adhesive or Multi-Purpose MB Flashing Cement, or with hot asphalt at the time of installation, or by heat welding with a propane torch or hot air welder. Granule surfaced cap sheet end laps must be completed by embedding the granules as in Firestone Details MB-LS-1 and MB-LS-3.

2.09.1.1 Hot Air Welded Laps

1. Using hot air to weld modified bitumen laps is not recommended as it requires different welding speeds and temperatures depending upon ambient conditions.
2. An automatic heat welder and nozzle intended for heat welding SBS modified bitumen membranes works best if heat welding must be used.
3. Each time laps are welded, a test of the lap integrity should be completed to determine proper speed and temperature.

2.09.1.2 Liquid Petroleum Gas-Heat Welded Laps

1. Using a round-tipped trowel, open the membrane lap and insert the torch burner head into the lap.
2. Heat the membrane with the torch until it develops a sheen or glossy appearance, assuring that the bitumen is heated on both the top and bottom surfaces and the burn-off film is removed.
3. The welding temperature is correct when a flow of modified bitumen, approximately 1/4" (6.3 mm) wide, is extruded from the side lap. If the bitumen starts to flow excessively during application, more than 1/2" (12.6 mm), excess heat is being applied and the membrane is being damaged.

2.10.1 MINIMIZE ROOFTOP TRAFFIC

During installation in hot asphalt or by heat welding, keep rooftop traffic to a minimum until the membrane cools to ambient temperature, in order to minimize damage.

2.11.1 PHASED CONSTRUCTION

The NRCA defines phased construction to be: "The installation of a roof system in two or more separate time intervals". Firestone does not recommend phased construction. However, the company recognizes that some amount of phased construction may be necessary on some projects.

2.11.1.1 Two-ply SBS Modified Bitumen Systems

The first layer of membrane may be exposed for two weeks before the installation of the cap sheet. Preparing the surface to receive the cap sheets is critical to the finished performance of the system. Prior to installation of the cap sheet, the membrane must be prepared as follows:

A. The contractor is responsible for the preparation of the existing membrane prior to installation of the cap sheet.
   1. **Adhesion:** The roof system must be smooth, clean, dry and free of debris prior to installation of the cap sheet. The base sheet should be primed with D-41 primer if the sheet has collected fine debris.
   2. **Insulation:** During the visual inspection above, verify that no insulation boards are wet. Curling boards may be an indication of this phenomenon.

B. The roof must not have been exposed to precipitation for 24 hours prior to installing the cap sheet. Dew must be allowed to dry thoroughly before attempting to install the cap sheet.

C. Using a rooftop blower, clean the SBS base layer to remove all accumulated loose dirt and other loose material. Areas that appear to have excessive accumulations of contaminants must be cleaned and primed to prepare the surface. Carefully inspect the areas around saddles, drains, and curbs.

D. If any noticeable bubbling occurs or steam is noticed coming off the membrane, discontinue installation and prepare the surface again, removing all evidence of debris, moisture and contaminants**.**

2.12.1 FLASHING

2.12.1.1 General

A. All flashing must be completed using Firestone SBS Membrane and any additional membrane layers as required by Firestone Details.
B. Remove existing flashings including metal flashings, roofing materials and adhesive from the existing drain in preparation for new membrane.
C. Flash penetrations in accordance with the appropriate Firestone Details (MB-P-1 through MB-P-6).
D. The flashing seal must be made directly to the penetration (except as shown in details with metal sleeves).

2.12.1.2 FLASHING - Walls, Parapets, Mechanical Equipment Curbs, Skylights, Gravel Stops, or Roof Edge Materials

2.12.1.2.1 FLASHING – Walls and Curbs with hot asphalt, or by heat welding

A. Flashing shall be installed in accordance with Firestone Details using approved Firestone Flashing sheets. Sheets may be installed in hot asphalt, Multi-Purpose MB Flashing Cement, or by heat welding Torch Grade sheets.
B. The following substrates require an overlayment of 1/2" (12. 7 mm) exterior grade plywood mechanically fastened and covered with an approved, mechanically attached base sheet in accordance with the project designer's Requirements and Firestone Details.
- Gypsum board (except 1/2" (12.7 mm) DensDeck Prime)
- Stucco
- Textured masonry
- Corrugated metal panels
- Other uneven substrates

C. Install the required base ply to the mechanically attached base.
D. After the base sheet and field membrane have been installed, cut flashing sections from the appropriate Firestone Cap Sheet as necessary. Flashing sections shall be of a size that will not allow cooling of adhesion asphalt before they can be placed into final position. Flashing must extend a minimum of 6" (152.4 mm) onto the field membrane.

Note: When torching to a granule surfaced sheet granules must be embedded before the lap is made. Granule embedment is required prior to constructing end laps, base flashings, base tie-ins and membrane repairs. Granule embedment, on the receiving surface can be accomplished by heating the surface and troweling-in all granules until a uniform black surface coated with compound is achieved in the lap area. Any area of the sheet not protected by a granule surface may be dressed with additional granules.

Specialty tools are available that aid in the embedding of the granules. Contact your Technical Coordinator at 800-428-4511 for information.

2.12.1.2.2 FLASHING – Walls and Curbs, Pipes and Penetrations with UltraFlash Flashing System

A. Flashings shall be installed in accordance with Firestone Details using Firestone UltraFlash on walls, curbs, penetrations, or roof edge materials.
B. The following substrates may be flashed with Firestone UltraFlash Flashing System in accordance with the project designer's Requirements and Firestone Details.
- DensDeck Prime
- Stucco
- Textured masonry
- Corrugated metal panels

- Other uneven substrates

C. Install UltraFlash base flashings and prepare substrates as shown in Firestone Details.

2.12.1.3 Metal Flash AL Installation

A. METAL FLASH-AL Application to Masonry.

Flash masonry parapet walls and curbs using Firestone SBS Poly Torch Base or Firestone MB Base SA and Firestone Metal Flash-AL. The Firestone SBS Poly Torch Base or MB Base SA shall have a minimum three (3) inch side laps and extend a minimum of six (6) inches onto the field of the roof in accordance with detail MB-BT-14.

1. Torch apply the SBS Smooth reinforcing sheet, fully adhering it in place. The laps of Firestone Metal Flash-AL flashing layer and the lap seams of the SBS Poly Torch Base or MB Base SA must not coincide.
2. After the final roofing ply has been applied prepare the surface area that is to receive the flashing sheet by heating the granule surface and embedding the granules.
3. Torch apply Firestone Metal Flash-AL into place using three foot widths always lapping the factory selvage edge. Extend the flashing sheet a minimum of six (6) inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height.
4. Exert pressure on the Firestone Metal Flash-AL sheet during application to ensure complete contact with the wall/roof surfaces preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on 8 inch (203 mm) centers.

B. METAL FLASH-AL APPLICATION - WOOD SURFACES.

Flash wood or plywood parapet walls and curbs using a mechanically attached Firestone MB Base M followed by a Firestone MB Base SA sheet with a layer of Firestone Metal Flash-AL flashing membrane heat welded to MB Base SA. Firestone MB Base SA shall have minimum three (3) inch side laps and extend a minimum of six (6) inches onto the base ply surface and to the top of the parapet wall curb etc.

1. Nail Firestone MB Base M through the field of the sheet to the vertical wood surface on nine (9) inch centers from the top of the cant to top of wall curb etc.
2. Apply MB Base SA over the area to be flashed and a minimum of 6 inches out on to the field roof membrane.
3. Embed granules of the field sheet a minimum of 6 inches out from the toe of the cant.
4. Torch apply Firestone Metal Flash-AL into place using three foot widths always lapping the factory selvage edge a minimum of 3 inches. Extend the flashing sheet a minimum of six (6) inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height.
5. Exert pressure on the Firestone Metal Flash-AL sheet during application to ensure complete contact with the wall/roof surfaces preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on nine (9) inch centers.

Note: Metal Flash AL is designed to function as a flashing sheet. It is not warranted for horizontal roof applications.

2.12.1.4 Special Consideration for Copper/Lead Coated Copper Edging

Special cleaning techniques must be used to prepare the metal surface to which the Firestone SBS membrane will be adhered. Firestone requires the cleaning with acetone or lacquer thinner, using clean cotton cloths. After the surface has dried, apply ASTM D-41 asphalt primer at approximately one (1) gallon per 100 square feet (0.4 l/m^2). Allow the primer to dry before installing the Firestone SBS membrane**.**

2.13.1 FLASHING PENETRATIONS

2.13.1.1 General

A. Remove existing flashings including metal flashings, roofing materials and adhesive from the existing drain in preparation for new membrane.

B. Flash all penetrations which pass through the membrane in accordance with Firestone Details MB-P-1 through MB-P-6.

C. The flashing seal may be made directly to the penetration (except as shown in details with metal sleeves).

2.13.1.1 1 Flashing Penetrations with UltraFlash

A. Remove existing flashings including metal flashings, roofing materials and adhesive from the existing drain in preparation for new membrane.

B. Flash all penetrations which pass through the membrane in accordance with Firestone Details MB-P-1 through MB-P-6 and the following.

C. If the penetration to be flashed is metal prime the metal surface with UltraFlash Primer just prior to flashing.

D. Mix UltraFlash in the appropriate container (1 gallon or 5 gallon) or by using the mixing head attached to a cartridge.

E. In a one or five gallon container, add the appropriate amount of pre-measured activator to the container of premix and mix for 3 minutes using a drill motor and mix blade.

F. Using a paintbrush or roller, apply UltraFlash to the penetration to be flashed a minimum of 6 inches up from the field of the roof and a minimum of 6 inches out onto the field of the roof.

G. Using a precut piece of UltraFlash Scrim Lay the scrim into the UltraFlash completely encircling the penetration and extending a minimum of 6 inches up the penetration and 6 inches on to the field of the roof.

H. Embed the scrim into the UltraFlash and coat it with UltraFlash compound until the pattern of the scrim is not visible.

I. Coat the area atleast two inches above the scrim on the penetration and two inches beyond the area where the scrim extends out on to the roof surface.

J. Granules may be embedded into the fresh UltraFlash compound to match the surface of the roof.

2.13.1.2 Roof Drains

These guidelines apply to installation of cast iron drains only. For acceptability of other drain types contact your Technical Representative at 8006428-5411 and Firestone Details MB-D-1 and MB-D-2.

A. Remove existing flashings (including metal flashings), roofing materials and cement from the existing drain

B. Provide a clean even finish on the mating surfaces between the clamping ring and the drain bowl.

C. Install tapered insulation around the drain to provide a smooth transition from the roof surface to the drain. Slope should not exceed 1" per foot (8.3%).

D. Install the base sheet. Cut an opening in the base sheet so that it stops short of the clamping ring area.
E. Extend the Field Base Sheet down the bowl into the clamping ring. Do not allow base sheet laps into the clamping ring.
F. Fully adhere the lead flashing in a continuous layer of Firestone Multi-Purpose MB Flashing Cement, and prime the top surface with ASTM D 41 asphalt primer.
G. Install interply sheet(s) appropriate to the desired warranty.
H. Extend the field membrane down the drain sump and into the drain bowl.
I. Make round holes in the membranes and align with clamping bolts.
J. Install the roof drain clamping ring and clamping bolts. Tighten the clamping bolts to achieve continuous compression.

2.13.1.3 Pipe Clusters and Unusual Shaped Penetrations

Flash pipe clusters and unusual shapes using the Firestone UltraFlash system. For information contact your Technical Representative at 800-428-4511 and Firestone Details MB-P-6 through MB-P-8.

2.13.1.4 Pipes

A. Flash Pipes with UltraFlash

1. Remove all existing flashings (i.e. metal, bituminous, mastic, etc.).
2. Flash all penetrations which pass through the membrane in accordance with Firestone Details MB-P-6 through MB-P-8 and the following.
3. If the penetration to be flashed is metal prime the metal surface with UltraFlash Primer just prior to flashing.
4. Mix UltraFlash in the appropriate container (1 gallon or 5 gallon) or by using the mixing head attached to a cartridge.
5. In a one or five gallon container, add the appropriate amount of pre-measured activator to the container of premix and mix for 3 minutes using a drill motor and mix blade.
6. Using a paintbrush or roller, apply UltraFlash to the penetration to be flashed a minimum of 6 inches up from the field of the roof and a minimum of 6 inches out onto the field of the roof.
7. Using a precut piece of UltraFlash Scrim, lay the scrim into the UltraFlash completely encircling the penetration and extending a minimum of 6 inches up the pipe and 6 inches on to the field of the roof. See the pipe flashing instructional photos.
8. Embed the scrim into the UltraFlash and coat it with UltraFlash compound until the pattern of the scrim is no longer visible.
9. Coat the area atleast one inch above the scrim on the penetration and one inch beyond the area where the scrim extends out on to the roof surface.
10. Granules may be embedded into the fresh UltraFlash compound to match the surface of the roof.

B. Hot Pipes:

Protect the roofing components from direct contact with steam or heat sources when the in-service temperature is in excess of 180°F (82.2°C). In all such cases, flash to an intermediate "cool" sleeve in accordance with Firestone Detail MB-P-1.

2.13.1.5 Scuppers

A. Remove existing scupper and provide a new welded watertight scupper.
B. Flash the new supper in accordance with Firestone Specification Details MB-S-1- MB-S-2.

2.13.1.6 Expansion Joints/Area Dividers

Install expansion joints and roof dividers in accordance with Firestone Specification Details MB-E-1 through 4.

2.14.1 SURFACINGS AND COATINGS

2.14.1.1 Gravel Surfacing

For every 100 sq. ft of roof surface, install approximately 500 lb (24.4 kg/sq. m) of roofing gravel or 400 lb (19.5 kg/ sq. m) of slag (both +/- 15%) applied directly over a 60 lb per 100 ft.^{2} (2.9 kg/sq. m) ± 15% flood coat of Type III or Type IV asphalt or Firestone SEBS Mopping Asphalt. No more asphalt must be spread or poured at one time than can be covered with gravel or slag before the asphalt cools. Gravel, slag or other accepted surfacing material shall comply with ASTM D 1863 and be 1/4" (6.4 mm) to 3/4" (19.1 mm) in diameter, substantially opaque, dry, and free from dust or other foreign materials.

2.14.1.2 Application of Firestone Acrylic Coating System for Asphalt

A. Firestone Acrylic Base Coat for Asphalt

The Firestone Acrylic Coating System for Asphalt is a two-coat system consisting of a first coat of Firestone Acrylic Base Coat for Asphalt followed by a second coat of Firestone AcryliTop PC-100 top coat. It is essential that the Base Coat be applied on SBS surfaces**,** as it is this coat that ensures good adhesion to asphaltic substrates and long-term performance of the two-coat system. Substrates must be clean, dry and free of foreign material and contaminants.

SBS Membranes installed in Firestone MB Cold Adhesive must cure 60 days before an AcryliTop System can be installed.

Install the Firestone Asphalt Roof System in accordance with all current Firestone specifications. Roof inspection by Firestone (with subsequent repairs and re-inspection, if necessary) is required prior to application of the Firestone Acrylic Coating System for Asphalt if a warranty is required. The membrane surfaces must be clean, dry and free of foreign material and contaminants prior to the Acrylic Base Coat for Asphalt application. The membrane surface will require additional cleaning in the areas where dirt has accumulated due to ponding water. Best results may be obtained by cleaning soiled areas with a mild detergent and water. Rinse the area thoroughly and allow it to dry before the application of the coating.

1. **Spray** apply the Acrylic Base Coat for Asphalt in a one-coat application to achieve a minimum coverage rate of approximately 1 ½ gallons per hundred (100) square feet (0.6 m^2 /L) on SBS Granule surfaced membranes, using a spray unit with an attached air compressor capable of delivering 100 psi (689.5 kPa). Check with manufacturers for their recommendations.

OR

2. **Roller** apply Acrylic Base Coat for Asphalt to achieve a coverage rate of approximately 1 1/2 gallons per hundred (100) square feet (0.6 m^2 /L) on granule surfaced SBS membranes.
3. Allow Acrylic Base Coat for Asphalt to dry to the touch before applying the AcryliTop PC-100 top coat. Dry time is approximately 24 hours depending on the ambient air conditions.
4. Inspect the application to assure that complete coverage of the membrane is achieved. Apply additional Acrylic Base Coat for Asphalt to areas with incomplete coverage.

B. Firestone AcryliTop PC-100

1. A top coat of AcryliTop PC-100 is applied in exactly the same manner as the Base Coat, at a minimum coverage rate of one gallon per 100 square feet (0.4 m^2 /L). Inspect the application to assure complete coverage of the membrane. Apply additional AcryliTop PC-100 top coat to areas where complete coverage has not been achieved. This should be visually obvious as the AcryliTop PC-100 top coat is white, tan, or gray and will be covering the yellow tint of the Acrylic Base Coat for Asphalt. Allow the AcryliTop PC-100 top coat to dry to the touch before allowing traffic on the roof. Dry time is approximately 24 hours depending on ambient conditions.
2. The coating must be regularly maintained to ensure any continuing warranty coverage and may be required to ensure continuing fire or all other code approvals.

Precautionary Information:

1. SBS Membranes installed in Firestone MB Cold Adhesive must cure 60 days before an AcryliTop System can be installed.
2. Do not contaminate the coating with foreign materials
3. Mix AcryliTop PC-100 and Acrylic Base Coat for Asphalt, thoroughly with a drill motor prior to application.
4. DO NOT apply the acrylic products when ambient air temperatures will be below 45 °F (7.2 °C) within a 24-hour period after application.
5. Do not apply acrylic products when inclement weather is expected within 24 hours.
6. Do not apply AcryliTop to membranes installed in cold adhesive until the system has cured for a minimum of 60 days.
7. Do not expose acrylic products to temperatures greater than 140°F (60°C) or lower than 35°F (1.7°C).
8. Do not thin Firestone acrylic products.
9. Recommended cleaner is water.
10. It is recommended that periodic inspections of the roof system be conducted by the owner, with the subsequent re-application of Firestone White Acrylic Coating System to areas that may need touch-ups. Where the asphalt surface is exposed, it will be necessary to re-apply a coat of Acrylic Base Coat for Asphalt before re-applying the AcryliTop PC-100 top coat.
11. Review Material Safety Data Sheets prior to using Acrylic Base Coat for Asphalt and AcryliTop PC-100 top coat.

2.15.1 MEMBRANE REPAIR

When it is necessary to repair an SBS membrane, use the following criteria:

A. A wrinkle or fish mouth must be cut and laid flat and repaired with a section of Firestone SBS granule surfaced Membrane.

B. Firestone SBS Membrane repair materials must be heat fused to the existing membrane. When a repair is performed on a granule-surfaced sheet, the granules must be embedded prior to heat welding the repair material unless the repair material is adhered in hot asphalt or Firestone Multi-Purpose MB Flashing Cement.

C. All repair pieces must extend a minimum of 6” (152.4 mm) past the boundary of the affected area in all directions. It is recommended that all corners of repair material be rounded.

D. Laps not showing the required bitumen flow must be repaired by lifting the membrane with the end of a round tipped trowel and heating both surfaces. When a slight puddling occurs, push down the seam area with the trowel so flow out is observed. Ensure that the reinforcement in the Firestone SBS Membrane is not exposed during this process. Should the reinforcement be exposed, the area shall be repaired by installing a new Firestone SBS piece over the affected area in the same manner described in C above.

2.15.2 ACRYLIC COATED MEMBRANE REPAIR

When it is necessary to repair an SBS modified bitumen membrane that has been coated with AcryliTop PC-100, use the following criteria:

A. Acrylic Coating must be removed from the area to be repaired and for 6" (152.4 mm) beyond the repair area on all sides.
B. To remove cured AcryliTop PC-100 gently heat the surface of the coated membrane with a torch until the acrylic coating softens. Remove acrylic coating with a roofing trowel, taking care not to puncture the membrane beneath.
C. When the acrylic coating has been removed from the area to be repaired, embed the granules that remain. Cover the area to be repaired with a layer of SBS Cap sheet that extends a minimum of 6" (152.4 mm) beyond the repaired area on all sides.
D. A durable repair is formed when Firestone SBS Membrane repair materials are heat fused to the existing membrane. When a repair is performed on a granule-surfaced sheet, the granules must be embedded prior to heat welding repair materials. It is not necessary to embed granules if the repair patch is to be adhered in hot asphalt or Firestone Multi-Purpose MB Flashing Cement.
E. Follow all OSHA, NFPA and NRCA provisions for safety fire protection.

2.16.1 TEMPORARY CLOSURE

A. Temporary closures must be used to prevent water from flowing beneath the roofing system during inclement weather.
   1. The roof membrane must extend at least two (2) feet (609.6 mm) over the last row of insulation (where applicable). Apply a continuous layer of asphalt or roofing cement onto the substrate and the membrane edge. Mating surfaces must be smooth, clean, dry and free of any loose foreign material and gravel.
   2. Firmly embed roof membrane into the asphalt or roofing cement and provide continuous pressure over the length of the cut-off by using sufficient weight.
B. The closure described in A above is an overnight tie-in only and is not intended for long-term use. If temporary tie-in must remain for more than one day's time, it must be checked on a daily basis to assure the tie-in remains sealed and reworked if necessary.
C. Refer to Firestone's acceptable tie-in detail when long-term tie-ins are necessary.
D. Temporary tie-ins must be completely removed providing a clean surface for the new roofing system.
E. Tie-ins, either temporary or permanent, are not warranted by Firestone.

2.16.1 ROOF WALKWAYS

A. Walkways help protect the roof system from damage due to necessary rooftop service traffic.
B. Walkways are required at all access points (ladders, hatches, doorways, etc.) to the roof and on all roofs where foot traffic is expected to occur with regularity.
C. Install an additional layer of Firestone SBS granule surfaced membrane to the finished Firestone SBS system using standard application techniques.
D. If Firestone Multi-Purpose MB Cold adhesive is used the adhesive must be allowed a minimum of 7 days to cure before walk pads can sustain foot traffic.
E. Identify walkway areas as specified by the project designer or by using material with a different colored granule.

2.17.1 SHEET METAL WORK

A. For specific installation instructions for Firestone Sheet Metal, refer to the System Design Guide and Technical or contact your Technical Coordinator at 800-428-4511.
B. For sheet metal work not supplied by Firestone, refer to fabrication and installation requirements specified by the project designer as well as industry standards.

END OF SECTION