

**INSTRUCTIONS FOR EDITING
AND COORDINATION
SECTION 07510**

4-PLY BUILT-UP ROOFING WITH GRAVEL BALLAST AND INSULATION

1. Page 07510-1, paragraph 1.03: Edit description of work to correlate with project scope; depending upon whether the work includes new construction, re-roofing of existing deck (tear-off complete or partial) project, or both. Note: Where a roof tear-off is required, verify the extent of tear-off and if the scope of tear-off requires both the removal of an existing recover membrane as well as the original 20-year roof membrane. Coordinate with Design and Construction to ascertain the roofing history of the school. Where applicable, visual inspection of the roof edge may indicate if both an original roof and a roof recover are present (if both exist, the original gravel stop/fascia will be overlaid with a recover gravel stop/fascia). In some cases, coring of the existing roof may be required to identify the membrane composition.
 - A. Ensure that roof demolition plans clearly indicate that all or partial existing roofing membranes, roof insulation, and related flashings and accessories shall be removed in the area of re-roofing.
2. Page 07510-10, paragraph 3.03: Delete reference to vapor barrier installation unless project scope involves roofing over acoustical deck (gymnasium).
3. Page 07510-6, paragraph 2.06: Edit as required:
 - A. Delete entire section if the scope is a new construction, re-roofing of existing deck (tear-off) project or both.
 - B. Leave section and edit accordingly if the scope is for re-roofing jobs only.

SECTION 07510

4-PLY BUILT-UP ROOFING WITH GRAVEL BALLAST AND INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 RELATED WORK

- A. See Roof Plans and Details
- B. Section 07600-Flashing and Sheet Metal

1.03 DESCRIPTION OF WORK

- A. Extent of built-up roofing system work is indicated on drawings and by provisions of this section and is defined to include roofing membrane, insulation flashing and stripping and roofing accessories integrally related to roof installation.
- B. The work consists of new built-up roofing over new decks or over existing decks where tear-off of all or partial existing layers of membrane, insulation and flashings shall be performed. Refer to drawings for scope of work and field verify all existing conditions. Any repairs or replacement to existing decking, wood blocking or other parts of the building structure will be done as directed by a Fairfax County Public Schools (FCPS) inspector on a time and material basis.

1.04 QUALITY ASSURANCE

- A. Single Source Manufacturer: Provide primary products, including each type of roofing sheet (felt), bitumen, insulations, composition flashings, produced by a single manufacturer. Provide secondary products only as recommended by manufacturer of primary products for use with roofing system specified.
- B. Installer Qualifications: A single Installer ("Roofer") shall perform the work of this section; and shall be a firm with not less than ten (10) years of successful experience in installation of built-up roofing systems similar to those required for this project. The roofer shall be a certified installer for the approved roofing system. The Roofer must have an office, warehouse with supplies, and permanent roofing crews within a 50-mile radius of the City of Fairfax, Virginia. Roofer shall have had Soprema, Firestone "Red Shield", GAF Master Select or Johns Manville approval in this area for at least eight (8) years from manufacturer, and shall perform a minimum of five (5) of these built-up roofing manufacturer guarantees per year.
- C. Pre-Roofing Conference: As soon as possible after award of built-up roofing work, contractor shall schedule and attend a meeting with Roofer, Manufacturer's

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Representative, installers of substrate construction (decks) and other work adjoining roof system, including penetrating work and roof-top units; Architect, Owner, and representatives of other entities directly concerned with performance of roofing system. Review requirements of Contract Documents, submittals, status of coordinating work, availability of materials and installation facilities and proposed installation schedule, requirements for inspections, testing, certifications, forecasted weather conditions, governing regulations, insurance requirements, and proposed installation procedures.

- D. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.
- E. UL Listing:
 - 1. Provide built-up roofing system and component materials which have been tested for application and slopes indicated on Drawings and are listed by Underwriters Laboratories, Inc. (UL) for Class A external fire exposure.
 - 2. Provide roof covering materials bearing Classification Marking (UL) on bundle, package or container indicating that materials have been produced under UL's Classification and Follow-up Service.
- F. Product and Application Guides: Soprema or Firestone manufacturer's "Roofing Manual for Commercial/Industrial Roofing Solutions."

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required. Include data substantiating that materials comply with requirements.
 - 1. For asphalt bitumen: provide label on each container or certification with each load of bulk bitumen, indicating flash point (FP), finished blowing temperature (FBT), softening point (SP) and equiviscous temperature (EVT).
 - 2. Expansion Joints: Follow FCPS specified details.
- B. Shop Drawings: Submit shop drawings showing plan layouts of all roofing assembly types, materials, roof top equipment, tapered insulation, crickets and drains. For additional information and requirements see section 01340.
- C. Samples, Built-Up Roofing System: Submit 2-pound samples of aggregate surfacing material.

1.06 JOB CONDITIONS

- A. Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.

1.07 DELIVERY, STORAGE AND PRODUCT HANDLING

- A. Deliver specified materials and accessories in unopened rolls, containers and packaging with manufacturer's original labels intact bearing name, source of product and delivery, storage date of manufacture. Cover all materials with waterproof tarps or two layers of plastic. Original material covering is not accepted as a single covering.
- B. Store and handle roofing felts in a manner that will ensure that there is no possibility of significant moisture pick-up.
- C. Store in a dry, well ventilated, weather-tight place. Unless protected from weather or other moisture sources, do not leave unused felts on the roof overnight or when roofing work is not in progress. Store rolls of felt and other sheet materials on end, on pallets or other raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck. Materials that are found to have been exposed to moisture-related weather will be marked or designated as deficient and must be removed and not used on any FCPS project.
- D. Stockpiles of aggregate on roof surface shall only be set on areas which have been coated with asphalt, in order to protect the underlying membrane.
- E. Roof Loading: Do not store materials on roof decks or position installation equipment on roof decks in concentrations or locations exceeding design live loading for structural roof system.
- F. All roofing materials shall be covered with weatherproof tarps or two layers of plastic.

1.08 WARRANTIES

- A. Manufacturer's Guarantee (Project): Submit three (3) executed copies of full 20 year "NDL" (no dollar limit) "Manufacturer's Roofing Guarantee" on form approved by Owner, covering work of this section to include roofing membrane, composition flashing, roof insulation, and roofing accessories.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

- A. Insurance and Code Requirements: Provide materials complying with governing regulations and which can be installed to comply with the following:
1. Underwriters Laboratories "Fire Classified" and "Class 90" wind uplift resistance.

2.02 ROOF INSULATION

A. TYPE 1 New Construction and Complete Tear Off Of All Existing Roofing:

1. Polyisocyanurate Insulation (Bottom Layer): 2 layers of 2.5" both layers staggered in all directions," Rigid, closed cell polyisocyanurate foam, faced with a fiberglass, reinforced mat. Meets requirements of ASTM C1289-02, Type II, Class 1, Grade 2. R value: 6.0/inch over the expected life of the insulation. Thickness: Total thickness: 5" R-value of 28.8 (LTTR).
2. ½ " Fiberboard or Perlite (Top Layer), with R-value of 1.32, and shall comply with ASTM C728.

B. TYPE 2 Partial Tear Off Of Existing Roof Where Existing Insulation is to remain:

1. Polyisocyanurate Insulation – 1 layer of 2.8" (R-Value 16.2) (staggering all joints over the existing insulation) to be mechanically attached to the existing layers of insulation, Rigid, closed cell polyisocyanurate foam, faced with a fiberglass, reinforced mat. Meets requirements of ASTM C 1289-02, Type II, Class 1, Grade 2. R-Value: 6.0/inch over the expected life of the insulation. Thickness: Total to meet minimum R value of 28.72 (LTTR).
2. ½ " Fiberboard or Perlite (Top Layer), with R value of 1.32, and shall comply with ASTM C728.

C. TYPE 3 Partial Tear Off Of Existing Roof Where Existing Insulation is to remain:

1. 1 layer of ½" Fiberboard or ½" Perlite (staggering at joints over the existing insulation) to be mechanically attached through the existing insulation to the deck.
2. 1 layer of ½" Fiberboard or ½" Perlite (staggering at joints over the previous layer of ½" fireboard) set in a full mapping of Type III asphalt.

D. TYPE 4 Partial Tear Off Of Existing Roof Where Existing Insulation and Cap Sheet is to remain:

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1. Polyisocyanurate Insulation- 1 layer of 2.8" (R-Value 16.2) (staggered at joints over the prime coated existing insulation) set in a full mopping of hot asphalt, rigid, closed cell polyisocyanurate foam, faced with a fiberglass, reinforced mat. Meets requirements of ASTM C 1289-02, Type II, Class1, Grade 2. R Value: 6.0 /inch over the expected life of the insulation. Thickness: Total to meet minimum R value of 28.72 (LTTR).
 2. ½" Fiberboard or Perlite (Top Layer) with R value of 1.32, and shall comply with ASTM C 728.
- E. Tapered polyisocyanurate or tapered perlite panels roof insulation for slopes, tapered edge strips, and crickets.

2.03 BUILT-UP ROOF MEMBRANE SYSTEM

- A. Insulated-Deck Asphalt/Glass-Fiber/Aggregate Roofing: Provide built-up aggregate-surfaced roof system with asphalt bitumen and 4 plies of glass fiber felts for lay-up as indicated.
1. Primer: Asphalt cutback primer complying with ASTM D41.
 2. Ply Felts: 4 plies of asphalt-impregnated glass-fiber felts, Type 4 of Firestone, Soprema, GAF or Johns Manville ASTM D2178.
 3. Bitumen: Roofing asphalt, complying with ASTM D312, Type III."Low Odor"/"Low Fume Only"
 4. Paint all base flashing seams: Firestone – 1 coat base and 1 coat top
 - a. Firestone – 1 coat base and 1 coat top
 - b. Soprema – Alsan Finish
 - c. GAF-1 coat Unibase Primer and1 coat Roof Mate top coat.
 - d. JohnsManville – 1 coast base and 1 coat top.
 5. Broom all felts
- B. Comply with NRCA Roofing and Waterproofing Manual, 5th edition, Specification Plate #BU-4-I-A-A or latest edition, Diagram B; except 4 plies.
- C. Products: Subject to compliance with requirements, provide the following BUR System: NO SUBSTITUTIONS ALLOWED!
1. Soprema
 2. Firestone
 3. GAF
 4. Johns Manville
- D. Base Flashings

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1. Firestone- 1 ply SBS Premium base mopped only and 1 ply Ultra White Granual SBS FR torched or mopped.
 2. Soprema- 1 ply Sopralene Sandes PS mopped only and 1 ply Sopra Star Flame torched or mopped.
 3. GAF- 1 ply rubberoid mop smooth 1.5 and 1 ply Siplast Pavator 30 BW.
 4. Johns Manville- 1 ply Dyna Base PR and 1 ply Dyna Glas FR CR G.
- E. Strippling Piles: For gravel stops, vent pipe flashings, pitch pockets, and "B" vent type flashing install 2 plies type 4 felt set in hot asphalt. At gravel stop/drip edge flashing install 1 ply SBS Ultra White gravels. For Firestone, 1 ply Sopra Star white for Soprema and Johns Manville Dyna Glas FR CR G.

2.04 BUR EDGE/PENETRATION MATERIALS (As recommended by manufacturer)

- A. Roofing Cement: Asphaltic cement; comply with ASTM D4586, (non-asbestos containing).
- B. Glass Fiber Fabric: 1.5-pound minimum sheet of woven glass fiber, impregnated with asphalt (ASTM D 1668).
- C. Lead Flashing: 4-pound sheet of common desilverized pig lead. All sides primed that come in contact with built-up roofing.
- D. Preformed Edge Strips: Rigid insulation units matching roof insulation, or asphalt-impregnated organic fiber insulation units, molded to form 3-1/2" x 3-1/2" x 45 deg cant strips and 1-5/8" x 18" tapered edge strips, as shown to receive roofing ply-sheet courses and lift edges above main roofing surfaces. (Set in asphalt.)
- E. Cant strips: Fiber or perlite (Set in asphalt.)

2.05 SHEET METAL ACCESSORY MATERIALS

- A. Stainless Steel: ASTM A 167, AISI 302/304, No. 2D finish, temper as required for forming and performance; 0.015" thick (28 gage), except as otherwise indicated.
- B. Copper: ASTM B 370, cold-rolled unless soft temper required for forming and performance; 16-ounce (0.0216" thick), except as otherwise indicated.
- C. Aluminum: ASTM B 209, alloy 3003, temper H 14 unless harder temper required for forming and performance, with "Kynar" fluorocarbon enamel finish; 0.032" thick (20 gauge), except as otherwise indicated. Color as selected by Architect.
- D. Solder for Sheet Metal: Except as otherwise indicated or recommended by metal manufacturer, provide 50/50 tin/lead type (ASTM B32) for tinning and soldering joints; use rosin flux. All joints shall be soldered.

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1. Solder stainless steel joints with 60/40 tin/lead type solder; use acid-chloride flux, except use rosin flux on tinned surfaces.

2.06 ROOF DRAINS (THIS SECTION TO BE REMOVED BY EDIT FOR OTHER THAN ROOFING ONLY JOBS)

- A. Josam, J.R. Smith, Wade, Watts or Zurn Equipment matching existing pipe size to be approved by FCPS (as indicated on drawings).
 1. All roof drains assemblies shall be removed and replaced with new Josam, J.R. Smith, Wade, Watts or Zurn. Replacement drains shall be large bowls with new drain deck pans.
 2. Provide new 1" hard wrap insulation at drain bowls sealed to decking. Replace any pipe insulation that has been removed for drain replacement.

2.07 MISCELLANEOUS MATERIALS

- A. Surfacing Aggregate: Crushed stone, free of sharp edges and complying with ASTM D 1863. Color: White. Texas #7- NO SUBSTITUTIONS
- B. Wood Members: Provide wood pressure treated with water-borne preservatives for above-ground use, complying with AWPB LP-2 as indicated on drawings.
- C. Provide High Temperature "Ice and Water Guard" at all metal roof and wall panel areas including covering all fascia and perimeter edge wood. Provide one of the following: Carlisle "WIP 300" or Soprema "Lasto Bond Shield HT".
- D. Mastic Sealant: Polysio-butylene (plain or bituminous modified), non-hardening, nonmigrating, nonskinning and nondrying.
- E. Asphaltic Primer: Comply with ASTM D 41.
- F. Mechanical Fasteners: To comply with FM approval Guide 1-28 for I-90 classification; provide industry-standard types of mechanical fasteners for BUR system work, tested by manufacturer for required pull-out strength where applicable and compatible with deck type and roofing products used. Provide either 1" diameter nail heads or 1-3/8" diameter x 30-gage sheet metal caps for nails used to secure felts or insulation boards of roofing system.
 1. Metal Decks: Soprema Fastening System, Firestone, or GAF approved equal. Note: Where acoustical deck is used, fasteners shall not protrude below the bottom of the rib profile. Should this occur, the protruding portion of the fastener shall be cut.
 2. Gypsum Concrete Decks: Soprema, Firestone, GAF, or Johns Manville Specialty Systems.

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- G. Vapor Retarders: (Acoustical Deck): Provide self adhering "Blueskin PE 200 HT" vapor retarding, high temperature roof underlayment by Henry Company, 800-486-1278. Vapor retarding underlayment shall be 40 mils thick, SBS rubberized asphalt compound laminated to a non-slip coated, polyethylene film top layer and a silconizes kraft paper bottom layer.
- H. Expansion Joints: Install new expansion joints and replace existing expansion joints at locations shown on the drawings in details as indicated.

2.08 FABRICATION OF SHEET METAL ACCESSORIES

- A. SMACNA and NRCA Details: Work shall conform with details shown, and with applicable fabrication requirements of "Architectural Sheet Metal Manual" by SMACNA. Comply with installation details of "Roofing and Waterproofing Manual" by NRCA.
- B. Provide 4" wide flanges for all accessories for setting on BUR membrane with concealment by composition stripping.
- C. Fabricate work with flat-lock soldered joints and seams; except where joint movement is necessary provide 1" deep interlocking hooked flanges, filled with mastic sealant.
- D. Fabricate penetration sleeves with minimum 8" high stack of diameter 1" larger than penetrating element. Counter flashing is specified as work of Section 07600, Flashing and Sheet Metal.
- E. All metal copings shall have standing seam joints (per manufacturer's recommendation).
- F. All masonry associated counterflashing will use existing through wall assembly or provide new through wall assembly per the plans and specifications.

PART 3 - EXECUTION

3.01 INSPECTION OF SUBSTRATE

- A. Examine substrate surfaces to receive roofing system and associated work and conditions under which roofing will be installed. For re-roofing projects, examine existing conditions (such as deck substrate, edge construction, curb openings and other roof penetrations) and verify that such conditions will allow proper installation of the roof membrane assembly. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer and complying with manufacturer's standards. Existing decking will be cleaned completely of all debris including deck flutes.

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- B. Final determination of existing conditions will be that of FCPS Design and Construction. Any repair or replacement of existing structure will be directed by FCPS inspector on a time and material basis.
 - 1. Verify that flatness and fastening of metal roof decks comply with the following:
 - a. Top Flanges: No concavity or convexity in excess of 1/16" across any 3 adjacent flanges.
 - b. Side Laps: Minimum 2" laps located over and fastened to supports.
 - c. Deck secured to each supporting member in every other rib (maximum spacing of 12" o. c.) with puddle welds or approved mechanical fasteners.
 - 2. Deck infiller replacement shall follow FCPS specification details.

3.02 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with manufacturer's published specifications for ply lapping, asphalt application, fastener recommendations, roof edge details and base flashing details. NOTE: FCPS specifications may supersede the minimum manufacturer requirement.
- B. Cooperate with inspection and test agencies engaged or required to perform services in connection with BUR system installation.
- C. Protect other work from spillage of BUR materials and prevent liquid materials from entering or clogging drains and conductors. Replace and restore other work damaged by installation of BUR system work.
- D. Insurance/Code Compliance: Install BUR system for (and test where required to show) compliance with governing regulations and with the insurance requirements of this Section.
- E. Coordinate the installation of insulation, roofing felts flashings, stripping, coatings and surfacings, so that insulation and felts are not exposed to precipitation nor exposed overnight. Provide cut-offs at end of each day's work, to cover exposed felts and insulation with a course of coated felt with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work. No phasing of roofing will be accepted unless approved by FCPS.
- F. Asphalt Bitumen Heating: Heat and apply bitumen in accordance with Equiviscous Temperature Method ("EVT Method") as recommended by NRCA. Do not raise temperature above minimum normal fluid-holding temperature necessary to attain EVT ("25 degrees F or 14 degrees C, at point of application) more than one hour prior to time of application. Discard bitumen that has been held at temperature exceeding Finished Blowing Temperature (FBT) for a period

exceeding 3 hours. Determine flash point, FBT and EVT of bitumen, either by information from bitumen producer or by suitable tests, and determine maximum fire-safe handling temperature and do not exceed temperature in heating bitumen. In no case shall bitumen be heated to a temperature higher than 25 degrees F (14 degrees C) below flash point. For aggregate-surfaced pour coats of bitumen, limit application temperature to minimum required for proper embedment of aggregate, and maximum which will permit retention of a coating of weight required, depending upon slope of surface. Tankers only will be used on all FCPS roof projects.

- G. Bitumen Mopping Weights: For interply mopping and for other moppings except as otherwise indicated, apply bitumen at the following rate:

Asphalt: 25-lbs. of asphalt (25% on a total-job average basis) per roof square (100 square feet) between plies, but not less than 23 pounds per square per ply, applied within the EVT range.

- H. Substrate Joint Penetrations: Do not allow bitumen to penetrate substrate joints and enter building or damage insulation, vapor barrier (retarders) or other construction. Where steep asphalt is applied directly to a substrate, hold mopping back 2" from both sides of each joint.

- I. Cut-Offs: At end of each day's roofing installation, protect exposed edge of incomplete work, including ply sheets and insulation. Provide temporary covering of 2 plies of No. 15 roofing felt set in full moppings of hot bitumen; remove at beginning of next day's work. Do not glaze coat ply sheets in the interim before surfacing.

- J. Cold Weather Application: Fully comply with manufacturer's written guidelines for cold weather roof installation when work shall be performed in temperatures below 45°F.

- K. Newly installed roofing that is left unsurfaced for a period of time that will exceed that of what is recommended by the manufacturer will be coated with asphalt at a rate that is recommended by that manufacturer.

- L. At all times provide an odor eliminator additive – use “desent” by Arrmaz Custom Chemicals or approved equal.

- M. For roof replacement remove loose gravel by power vacuuming only.

3.03 VAPOR BARRIER APPLICATION/ACOUSTICAL DECK INSTALLATIONS (GYMNASIUM)

- A. Install preformed sound absorbing glass fiber insulation strips supplied under Section 05230, in acoustical wide rib deck flutes. Install in accordance with deck manufacturer's instructions.

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- B. Prior to commencing installation, ambient and deck surface temperature shall be not less than 40 degrees and rising.
- C. Install self adhering single layer vapor retarding underlayment in shingle fashion parallel to metal deck flutes in accordance with manufacturers written instructions. All edges (sides and end laps) shall be lapped not less than 2 ½" and sealed with manufacturers recommended sealing compound.
- D. Extend vapor retarder under cant strips and blocking. Lap flexible flashing over vapor retarder or wall construction to provide continuity of vapor barrier envelope.
- E. Vapor retarding underlayment shall be fully covered by roofing system within six weeks of installation. Exposed underlayment shall be protected from foot and equipment traffic as recommended by manufacturer.

3.04 INSTALLATION OF INSULATION

- A. General: Comply with insulation manufacturer's instructions and recommendations for the handling, installation and bonding or anchorage of insulation to substrate.
- B. Secure insulation: to deck using mechanical fasteners specifically designed and sized for attachment of specified board type insulation to deck type shown. Fasten all layers of insulation over entire area of roofing at spacing as required by manufacturer.
- C. Three-Layer Installation: Install required thickness in three layers with joints of second layer staggered from joints of first layer a minimum of 12" each direction.
- D. Mecanically attach the first two layers together. Install third layer staggered from the second layer in full mopping of hot Type III asphalt, applied within temperature range of EVT " 25°F (14°C) and at average rate of 25 pounds. ("25% on total-job basis) per 100 square foot.
- E. Tapered insulation will be installed at all roof drains, crickets, tapered areas and on the high sides of all units as per the drawings and specifications.
- F. Tapered Insulation: Installation shall be as recommended by manufacturer.
- G. Install one-ply of #15 lb. felt laid in dry at all walls, roof edges and penetrations prior to installing roofing plies. #15 felt should be set under 1st layer of new insulation.
- H. Insulation required inside roof curbs shall match the R-value and thickness of the surrounding roof area.

3.05 ROOF MEMBRANE INSTALLATION

- A. Shingling of Plies: Except as otherwise indicated, install membrane with ply sheets shingled uniformly to achieve required number of thickness of membranes

throughout. Shingle in proper direction to shed water on each large area of roofing. Drainage flow shall be over or parallel to, but not against the lap. Lightly broom felts as directed on all roofing plies. **GLAZE COAT PLIES IF SURFACE IS NOT INSTALLED WITHIN 60 DAYS.**

- B. Cant Strips/Tapered Edge Strips: Except as otherwise shown, install preformed 45° insulation cant strips at junctures of BUR membrane with vertical surface. Provide preformed tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces. Set all edge strips and cant strips in hot asphalt.
- C. Inter-Ply Felts: Provide the number and type(s) of felts indicated, lapped (shingled) as required to form a continuous, uniform membrane with bitumen moppings between sheets so that ply sheet does not touch ply sheet. Except as otherwise indicated, glaze-coat top of ply-sheet membrane with 10-pound mopping of same bitumen, integrally with operation of laying up membrane.
1. Mop base directly to substrate.
 2. Extend BUR membrane to 2" (nominal) above top edge of cant strip, solidly adhered, without bridging or buckling.
 3. Provide a folded-back envelope at edges and penetrations of BUR membrane where it is not turned up on a tapered strip, so as to provide positive protection against flow of bitumen into building or off the edge. Extend base sheet to form envelope or, where no base sheet is provided, install one ply or coated felt set in steep asphalt with joints sealed. Seal corners and other interruptions of envelope with large beads of roofing cement to provide positive protection against flow of bitumen.
 4. Nail edges of roofing membrane to wood blocking at perimeter edges of roof prior to installing metal gravel stops/fascias. Space recommended fasteners at minimum 6" o. c. with staggered rows through one-inch (1") diameter metal discs, unless otherwise noted.
- D. Set-on Accessories: Where small roof accessories are set on BUR membrane, set metal flanges in a bed of roofing cement, and seal penetration of membrane with bead of roofing cement to prevent flow of bitumen from membrane.
- E. Roof Drains: All roof drains shall have a tapered insulation sump area consisting of a minimum 12' x 12' total area. The sump shall be a minimum of 6' in each direction from the center of the roof drain. Sump area may need to be larger depending on the thickness of new insulation. Insulation should have a gradual slope to drain not to exceed ¾" per foot or approved by FCPS. Fill clamping ring base with a heavy coat of roofing cement. Set lead flashing sheet in a bed of roofing cement over completed ply sheet course. Lead sheet shall be primed with asphalt primer, clamped in roof drain ring, and extended a minimum of 24" onto the roof. Cover lead sheet with two plies of Type 4 felt. Finish by covering the entire sump area with SBS White Modified Bitumen sheet specified under the base flashing section, extending a minimum of 6" out onto the roofing field.

1. Lead flashing sheet: Minimum 30" x 30" in size.
- F. Allow for Expansion: of running metal flashing and edge trim that adjoins roofing. Do not seal or bond BUR membrane or composition flashing and stripping to metal flanges over 3'-0" in length.
- G. Flashings: Two-ply flashings shall not be applied until the roof membrane (excluding surfacing) has been installed. Provide a temporary seal at ply terminations until flashing can be installed.
1. Prime masonry surfaces and wood cant and expansion joint with recommended asphalt primer at the rate of one (1) gallon per 100 square feet.
 2. Apply asphaltic primer to all sheet metal that shall come into contact with bituminous materials (top and bottom).
 3. Embed flashings into a solid mopping of steep asphalt extending at least eight inches (8") up the curb or wall, and extending at least four inches (4") beyond the cant strip onto the roof.
 4. Seal all nail heads, inside and outside corners with roof cement. Provide a three- (3) course seal using glass fabric embedded into and covered with roofing cement under all surface-mounted counter flashing.
 5. Cover all wood blocking/plywood not covered by the B/U/R with ice/wwater shield.
- H. Counter Flashings: Counter flashings, cap flashings, expansion joints, through wall receiver metal are "all" stainless steel and "all" similar metal work to be coordinated and will become part of the BUR work.
- I. Roof Accessories: Miscellaneous sheet metal accessory items, including, and major items of accessories to be coordinated with BUR work, are specified in other sections of these specifications.
1. Sheet metal flashing flanges and through wall shall have all seams (base and up seams) soldered. Prime coat all parts that come into contact with roofing membrane. Set in bed of roofing cement prior to concealment by composition stripping.
- J. Aggregate Surfacing: Promptly after completion of BUR membrane, edge treatment and set-on accessories in each substantial area of roofing, flood-coat surface as indicated and while each small area is hot and fluid, cast the following approximate weight of aggregate in a uniform course. NOTE: ALL AREAS THAT SHALL RECEIVE AGGREGATE SHALL BE INSPECTED BY OWNER'S REPRESENTATIVE AND ROOFING MANUFACTURER'S REPRESENTATIVE PRIOR TO INSTALLING AGGREGATE.

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1. Flood Coat: 60 pounds per square into hot steep asphalt.
2. Aggregate: Texas #7 White Stone ONLY! No Substitutions

Roof surface shall be clean, free of dirt, dust, and moisture prior to applying aggregate. Install aggregate so that at least 50% of the aggregate is solidly adhered in the asphalt.

- K. Do not install flood coating of bitumen and aggregate surface source at edges of roofing until composition flashing and stripping work has been completed. Glaze-coat ply sheet courses where surfacing cannot be installed on the same day. Delay aggregate surfacing only as long as necessary to substantially complete edge work and tests where required.
- L. Allow 5% of extra asphalt and stone for ponded water areas.

3.06 CORRECTION OF DEFECTIVE OR DAMAGED WORK

- A. Owner reserves the right to direct that roof cuts (samples) be taken in any area of the work whenever defective work is suspected. Owner's Representative will notify Contractor and Roofing Manufacturer's Representative, when such action is deemed necessary in the opinion of the Owner.
- B. "Fishmouths" (non-adhered arched ply edges). Cut out plies which are not properly embedded in bitumen; replace the cut area with the minimum number of plies specified for the roofing system, plus one (1) additional ply using the "feather out" method recommended by the Manufacturer for cut-out repair. Embed each ply in a solid, uniform 23 to 35 pounds per square mopping of hot bitumen. No dry laps shall be permitted. Feather felts 2" over preceding layers.
- C. Physical damage resulting from construction activity: Cut out damaged plies and insulation. Install new insulation and repair the cutout in accordance with the procedures outlined in paragraph A above.
- D. Non-adhered laps: Secure laps by embedding each ply in a solid, uniform 23 to 35 pounds per square mopping of hot bitumen.
- E. Other defective or non complying work discovered as a result of Manufacturer's audit for guaranty requirements shall be corrected in accordance with manufacturer's recommended procedures for each type of defect encountered.

3.07 CLEANING

- A. Remove excess materials, equipment, trash and debris associated with the roofing activities from the project area and dispose of legally.
- B. Repair damage to adjacent work of other trades which has resulted from roofing activities; remove stains and drippage resulting from bitumen application.

3.08 PROTECTION OF ROOFING

- A. Upon completion of roofing work, including associated work, Roofer shall advise Contractor of recommended procedures for surveillance and protection of roofing during remainder of construction period. At end of Construction period, or at Contractor's option, at a time when remaining construction work will in no way affect or endanger roofing, Roofer shall make a final inspection of roofing and prepare a written report, directed to Contractor with copy to Owner describing nature and extent of deterioration of damage found in the work.
- B. Roofer shall repair or replace deteriorated or defective work found at time of final inspection. Roofer shall be engaged by Contractor to repair damages to roofing that occurred subsequent to roofing installation and prior to final inspection. Repair or replace the roofing and associated work to a condition free of damage and deterioration at time of substantial completion.
- C. Repair all damaged side walks, grounds and all other damaged surfaces to match existing.

END OF SECTION