

DIVISION 7

THERMAL AND MOISTURE PROTECTION

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ARCHITECTURE
INTERIOR DESIGN
PLANNING



SECTION 07598

ROOF PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. **Section Includes:** Repairing existing roof in accordance with manufacturer's requirements at all new penetrations and all new equipment mounts. Repairs shall be in modified bitumen with cold-applied adhesive or hot mopped. Roof patching work, sheet metal work and accessories shall maintain the watertight integrity of the existing roofing at new penetrations and new equipment curbs.
1. Modified asphalt membrane shall be fully adhered to substrate.
- B. **Related Sections:**
1. Section 05500 - Metal Fabrications: Piping, equipment supports, and related anchors.
 2. Section 07620 - Sheet Metal Flashing and Trim: Flashings and counterflashings required for new roof patching work.
 3. Section 07720 - Roof Accessories
 4. Division 15: Mechanical equipment mounted on curbs.

1.2 REFERENCE STANDARDS

- A. **Industry Standards:** The Industry Standards listed below refer to the latest date of issue or edition, unless otherwise indicated in this Section.
1. The International Building Code, 2000 Edition.
 2. ASTM: American Society for Testing and Materials
 3. FM: Factory Mutual Engineering and Research
 4. NRCA: National Roofing Contractors Association
 5. RIEI: Roofing Industry Educational Institute
 6. SBCCI: Southern Building Code Congress International
 7. SMACNA: Sheet Metal and Air Conditioning Contractors National Association
 8. SWR: Southwest Research Institute; San Antonio, TX (512) 648-5111
 9. UL: Underwriters Laboratories

1.3 SUBMITTALS

- A. **Product Data:** Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing and insulation product required. Include product certifications specified under "Quality Assurance".
- B. **Manufacturer's Letter:** If required by Owner, submit letter from the primary roofing manufacturer that holds the present roofing guaranty confirming the following:
1. That the installer is an acceptable Roofing Contractor at the highest level, authorized to work on the roof and authorized to install the proposed system.
 2. That the proposed application will comply with the manufacturer's requirements in order to qualify the project for continuing the existing guarantee.
 3. That the completed roof patching and repairs remain in compliance with the manufacturer to ensure that the warranty remains in effect

- C. **Shop Drawings:** Submit shop drawings showing details at penetrations and equipment curbs.

1.4 QUALITY ASSURANCE

- A. **Industry Standards:** Comply with the standards of the N.R.C.A. "Roofing and Waterproofing Manual" for modified bitumen systems, and with N.R.C.A. modified bitumen roofing construction details.
- B. **Installer Qualifications:** Engage an experienced Installer ("Roofing Contractor") who is approved by manufacturer of primary roofing materials.
1. Installer shall coordinate sheet metal work associated with the roofing system.
- C. **Manufacturer Qualifications:** Obtain primary products, including each type of roofing sheet and flashings, from a single manufacturer. Provide asphalt, insulation and other related products recommended by manufacturer of primary products for use with roof patching system specified.
- D. **UL Listing:** Roofing components shall have been tested for application indicated and are labeled by Underwriters Laboratories, Inc. (UL) for Class A external fire exposure.
- E. **FM Compliance:** Installation of roofing system and component materials shall comply with Factory Mutual Approved Standard 4470. The roof configuration (including fastening of base sheet, insulation, etc.) shall be approved by FM for a minimum 1A-90 wind uplift construction.
- F. **Scope Of Work:** The work to be performed under this specification shall include but is not limited to the following:
1. The Contractor shall attend necessary job meetings and shall furnish competent and full time supervision, experienced roof mechanics, all materials, tools and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification.
 2. Application shall be in strict compliance with the latest written application instructions of the manufacturer of the primary roofing products.
 3. Application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractor's Association, amended to include the acceptance of a phased roof system installation.
 4. Comply with latest edition of SMACNA "Architectural Sheet Metal Manual".
- G. **Local Regulations:** The Contractor shall conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.
- H. **Material Safety Data:** The roofing system manufacturer shall furnish Material Safety Data Sheet/Sheets (MSDS), in the OSHA-approved form current at the time data is furnished. Installer shall assure that these MSDS are available at the project site at all times until project completion.

1.5 PROJECT CONDITIONS

- A. **Weather:** Proceed with roofing work when existing and forecasted weather conditions permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.
- B. **Substrate Conditions:** Do not begin roofing installation until substrates have been inspected and are determined to be in satisfactory condition.

- C. **Water Infiltration:** If water infiltrates under or in between the roof membranes, that area of the roof shall be removed, including roof insulation that is contaminated with moisture.
 - 1. New, dry roofing components shall then be installed to that area.
- D. **Coordination:** Coordinate installation sequence and schedule of related work so that openings in existing roofing are re-roofed without delay.
- E. **Temporary Protection:** When adverse job conditions or weather conditions prevent permanent roofing and associated work from being installed in accordance with requirements, provide temporary weather protection and remove it prior to proceeding with permanent roofing work. Do not permit openings in existing roof membrane to remain unprotected overnight or when work in them is not in progress.
- F. **Temperature Restrictions - Asphalt:**
 - 1. At ambient temperatures of forty (40) degrees F and below, special precautions must be taken to ensure that the specified Type IV asphalt maintains a minimum acceptable 400 degrees F temperature at the point of sheet application.
 - 2. The asphalt must not be overheated to compensate for cold conditions.
 - 3. The use of insulated handling equipment is strongly recommended.
 - 4. Hot luggers, mop carts, and kettle-to-roof supply lines should be insulated.
 - 5. Hand mops should be constructed with a smaller yarn head to facilitate short moppings.
 - 6. Luggers and mop carts should never be more than half filled at all times.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. **Store and handle** roofing materials in a manner that will prevent significant moisture pickup. Store in a dry, well-ventilated, weather-tight place. Do not leave unprotected materials on the roof overnight or when roofing work is not in progress. Store roll materials on end on pallets or other raised surface. Handle and store materials and equipment in a manner to avoid damage to structure.
- B. **Protection:** Protect materials from temperature extremes and open flames. Store solvents and solvent-based materials not in actual use in tightly covered containers, and maintain containers in a clean condition, free of residue, solidified material, and foreign materials. Remove flammable rags and waste daily. Ensure that work areas and workers are adequately protected from hazards related to products used.

PART 2 - PRODUCTS

2.1 ROOF PATCHING MATERIALS

- A. **Modified Bitumen Membrane:** Siplast, Inc: Parafor 50 LT for flat areas and Veral Aluminum for sloped applications.
- B. **Mopping Asphalt:** Mopping asphalt shall be certified for full compliance with the requirements for type IV asphalt listed in Table I, ASTM D-312-84. Each container or bulk shipping ticket shall indicate the equiviscous temperature, EVT, the finished blowing temperature, FBT, and the flash point, FP.
- C. **Cold Adhesive:** A blend of special adhesive asphalts and safe, high-flash, quick drying solvents that meets or exceeds ASTM D 4479, TYPE II requirements.

- D. **Rigid Insulation:** Match existing type and thickness or grout solid with non-shrink grout.
- E. **Asphaltic Primer:** Comply with ASTM D 41.
- F. **Mastic:** The mastic, used as a base for setting metal flanges, shall be asphalt cutback, reinforced with non-asbestos fibers, conforming to ASTM-D 4586 Type II requirements:
- G. **Roofing Cement:** Comply with ASTM D 2822, without asbestos content, Type I or Type II as appropriate for the application.
- H. **Mastic Sealant:** Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- I. **Caulking/Sealants:** Silicone, single component, high performance, elastomeric sealant conforming to ASTM C 920 in accordance with "Section 07920 - Joint Sealants."
- J. **Ceramic Granules:** Ceramic granules of same composition and color as the modified bitumen cap sheet membrane.
- K. **Metallic Powder:** The metallic powder, used for covering of bitumen overruns over the foil surfaced membrane, shall consist of a finely graded metal dust as supplied or approved by the membrane manufacturer.
- L. **Preformed Cants:** Perlite board, ASTM C 728, 3-1/2" x 3-1/2" x 45 degrees.
- M. **Sheet Metal Materials:**
 - 1. **Prefinished Galvanized Steel Sheet:** Refer to "Section 07620."
 - 2. **Drawband:** Stainless steel with screw-clamp tightening device.
- N. **Fasteners:** Stainless steel.
- O. **Pitch Pan Filler:** A single component, cold applied urethane compound of pouring consistency, exhibiting no weathering or cracking when tested according to ASTM D 920 Type S.
- P. **Base Sheet (where required by manufacturer):** Fiberglass-reinforced asphalt-coated sheet; minimum weight of 24 pounds/square; conforming to ASTM D-4601, Type II.
- Q. **Lumber for Nailers and Blocking:** Nominal sizes are indicated except as shown by detail dimensions. Provide actual sizes as required by PS 20 for maximum 19% moisture content.
 - 1. **Grade and Species:** No. 2 grade light framing size lumber, any west coast or southern pine species; southern pine board size lumber.
 - 2. **Preservative Treatment:** Comply with applicable requirements of AWWA C2 (lumber) and AWWA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC/s Board of Review.
 - a. **Pressure-treat** all lumber with waterborne preservatives to a minimum retention of 0.40 lb/cu. ft (6.4 kg/cu. m).
 - 3. **Nailers used for edge metal securement** shall be a minimum six (6) inches wide with a thickness to match the height of the new insulation assembly.

- R. **Walkway Pads:** : Mineral-granule-surfaced, reinforced asphaltic composition, slip-resisting pads, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, 3/8 inch thick, minimum.

2.2 FABRICATION OF SHEET METAL ACCESSORIES

- A. **SMACNA and NRCA Details:** Conform work 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. **Prefabricate units** as indicated or provide standard manufactured units complying with requirements; fabricate from the sheet metal indicated.
- C. **Provide minimum 4-inch-wide flanges** for setting on roofing system membrane with concealment by built-up stripping.
- D. **Fabricate work** with flat-lock soldered joints and seams.
- E. **Fabricate penetration sleeves** with minimum 8-inch-high stack, of diameter 1/2 inch larger than penetrating element. Fabricate umbrellas so they overlap stacks.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. **Protect other work** from spillage of roofing materials, and prevent liquid materials from entering or clogging drains and conductors. Replace/restore other work damaged by built-up roofing system work.
- B. **Removal of Existing Roofing:** Verify locations and sizes of equipment support assemblies. Spud back existing gravel aggregate as required. Cut and remove existing roofing and roof insulation to minimum size necessary to permit installation of supports. Make true, straight, perpendicular, vertical cuts.
- C. **Coordinate the installation** of insulation, roofing sheets, flashings, stripping, coatings, and surfacings so that openings and uncompleted work are not exposed to precipitation or exposed overnight.
- D. **Cutoffs (if required):** 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 mastic; remove at beginning of next day's work.

3.2 ROOF MEMBRANE INSTALLATION

- A. **General:** Install modified bitumen roof patching in accordance with materials manufacturer's recommendations. Pre-cut roofing sheets to size.
- B. **Lead Pipe Flashings:** The lead flanges shall be completely primed (on both sides) and allowed to dry prior to installation.
1. After the modified bitumen base ply has been applied, the flange shall be set in mastic and stripped in using nine (9) inch wide strips of the modified bitumen base ply.
 2. The modified bitumen cap sheet membrane shall then be applied, terminating at the flange-sleeve juncture of the pipe flashing.

3. See Item "Sealant" for finish of this detail.
- C. Edge Metal:** The metal flanges shall be completely primed and allowed to dry prior to installation.
1. The modified bitumen base ply shall be turned down two (2) inches past the roof edge, over the nailer.
 2. After the base ply and continuous cleat have been installed, the flange shall be set in mastic and stagger nailed every three (3) inches on center.
 3. The flange shall be stripped in using nine (9) inch wide strips of the base ply material.
 4. The modified bitumen cap sheet shall then be applied, terminating at the gravel stop rise of the edge metal.
- D. Pitch Pans:** The metal penetration must be completely cleaned of all roofing materials.
1. The inside wall of the pitch pan must be cleaned of any residual oil shop coatings using Naptha solvent. The pitch pan wall shall then be etched using a 5% acetic acid solutions.
 2. The flange of the pitch pan shall be completely primed and allowed to dry prior to installation.
 3. After the base ply has been applied, the flange shall be set in mastic and secured to the deck.
 4. The flanges shall be stripped-in using nine (9) inch wide strips of the base ply material.
 5. The pitch pan shall be filled with non-shrink grout to a level approximately 1/2" below the top rim.
 6. Duct tape shall be installed around the pitch pan wall to act as a form for the pitch pan filler.
 7. Follow pitch pan filler manufacturer's instructions and recommendations for mixing.
 8. Slowly and carefully fill pitch pan to the top level of the duct tape ensuring the finished level is above the top rim.
 9. The cap sheet shall then be applied, terminating at the flange-pitch pan wall juncture. Refer to paragraph "Sealant" for finish of this detail.
 10. A watertight umbrella shall be installed to the penetration completely covering the opening of the pitch pan.
- E. Equipment Support Flashings:** The metal pipe flanges shall be completely primed and allowed to dry prior to installation. After the base ply has been applied, the flanges shall be set in mastic and stripped-in using nine (9) inch wide strips of the base ply material. The cap sheet shall then be applied, terminating at the flange-sleeve juncture of the pipe flashing. A watertight umbrella shall be installed to the penetration, completely covering the opening of the pipe flashing. Refer to paragraph "Sealant" for finish of this detail.
- F. Sealant:** All modified bitumen cap sheet edges exposed at gravel stops, waste stacks, pitch pans, vent stacks, etc., shall be caulked with a smooth continuous bead of approved sealant.

3.3 PROTECTION AND ADJUSTMENTS

- A. Protection:** Protect roofing during remainder of construction period. When remaining construction will in no way affect or endanger roofing, inspect roofing and prepare a written report to Architect describing nature and extent of deterioration or damage found.
- B. Protect building surfaces** against damage from roofing work.
- C. Roof Traffic:** Where traffic must continue over finished roof membrane, protect surfaces.

- D. **Adjustments:** Repair or replace (as required) damaged, deteriorated or defective work found at time of above inspection, to a condition free of damage and deterioration at time of acceptance.

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SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Flashings and counter-flashings and roof penetration flashings as indicated or as required to complete the project.
2. Miscellaneous sheet metal accessories.

B. Related Sections:

1. Section 06100 - Rough Carpentry: Treated wood blocking and nailers.
2. Section 07598 - Roof Patching: Roof patching system.

1.2 PERFORMANCE REQUIREMENTS

- A. General:** Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.
- B. Roof Edges and Copings:** Fabricate and install flashings at roof edges and copings to comply with applicable local building codes and the recommendations of FM Loss Prevention Data Sheet 1-49.

1.3 SUBMITTALS

- A. Product Data:** Submit manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and fabricated product. Include specifications for finish system.
- B. Samples:** Submit full range of available prefinished colors, for selection. Submit 8 inch square samples of prefinished sheet materials, for verification of selected color.
- C. Shop Drawings:** Show layout, profiles, methods of joining, and anchorage details, including major counter flashings, trim/fascia units, gutters, downspouts, scuppers and expansion joint systems. Provide layout at 1/4 inch scale and details at 3 inch scale.

1.4 QUALITY ASSURANCE

- A. Industry Standards:** Unless conflicting and more restrictive requirements are indicated, comply with standards and recommendations of the following industry standards:
1. N.R.C.A. "Roofing and Waterproofing Manual" and "Handbook of Accepted Roofing Knowledge", latest edition.
 2. SMACNA "Architectural Sheet Metal Manual", latest edition.
- B. Installer Qualifications:** Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.5 PROJECT CONDITIONS

- A. Coordination:** Coordinate work of this Section with interfacing and adjoining work for proper sequencing of each installation.

