

SECTION 02060 - ROOFING DEMOLITION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Work under this section consists of furnishing of all labor, materials, equipment and services necessary for the complete demolition and proper disposal of existing roofing, drip edge, flashing and existing underlayment, for both existing membrane and asphalt shingle roofing, where shown on the drawings and as specified herein.
- B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General and Supplementary Conditions, and Sections of Division I of these specifications.
 - 1. Section 06100 - Rough Carpentry
 - 2. Section 07310 - Asphalt Roofing and Accessories
 - 3. Section 07312 - Slate Roofing
 - 4. Section 07532 - Fully Adhered EPDM Roofing

1.02 SCOPE OF WORK

- A. Strip off all of the existing asphalt roofing shingles, slate roofing shingles, single ply membrane roofing, nails, felt or membrane underlayment, metal drip edge, metal drip edge/fascia, existing ridge vents and other flashing on all buildings listed in the Summary of Work and legally dispose of all debris. Verify that the existing sheathing is in good condition, identifying for examination by the Architect all areas that show evidence of damaged sheathing. Should there be areas of sheathing or framing deterioration as determined by direct examination and in consultation with the Architect these areas will be replaced at a price listed in the schedule of Unit Prices.
- B. Gutters and downspouts are to be protected and returned to operating condition at the end of the Work. The Contractor will be required to replace any gutters or downspouts damaged during the project. Replacement gutters and downspouts shall be new.
- C. Patching and Repairs- Perform all necessary patching and repairs to the items scheduled to remain.

1.03 QUALITY ASSURANCE - Use skilled workers thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

- A. Requirements of Regulatory Agencies: Perform demolition work in accordance with applicable rules, regulations, codes, and ordinances of local, state and federal authorities, and in accordance with the requirements of public utility corporations having jurisdiction over the work.
- B. Obtain and pay for necessary permits, licenses and certificates and give notices as required during the performance of the demolition work.

PART 2 - MATERIALS (Not Used)

PART 3 - EXECUTION

3.01 PREPARATION AND PROTECTION

- A. The building will be occupied at all times during this contract.
- B. Provide, erect and maintain catch platforms, lights, barriers, weather protection, warning signs and other items as required for the protection of the workers engaged in demolition operations, public, adjacent construction and occupants of the building.
- C. Provide fire protection in accordance with local fire department requirements.
- D. Do not close or obstruct streets or sidewalks without the proper permit. Conduct operations with minimum traffic interference.
- E. Maintain at least one unobstructed means of egress at all times. The contract shall sequence the Work to insure this at all times.
- F. Protect public and private property adjacent to and on the job site, including landscaping, vents, utility lines, streets, sidewalks, light standards, hydrants, street signs, mail boxes and fire alarm boxes. Make repairs to the complete satisfaction of the owner of the damaged property.
- G. Make such explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal work.
- H. Provide and maintain temporary protection of the existing structure designated to remain where demolition and removal work is being done, connections made, materials handled or equipment moved, including but not limited protecting areas where roofing has been re-moved and new work has not be made the existing weather tight.

3.02 DEMOLITION

- A. The building will be occupied at all times during this contract.
- B. Remove from the Owner's property and legally dispose of materials or items demolished and not designated to become the property of the Owner.
- C. Perform the work in a careful and orderly manner, with the least possible disturbances to the public.
- D. The Contractor shall have at least one person in charge of operations on the ground below all roofing removal operations. This person shall be cognizant of residents, building occupants and other persons in the work area and shall remove debris that may obstruct passage or otherwise present a danger to all.

END OF SECTION

SECTION 06100 - ROUGH & FINISH CARPENTRY FOR ASPHALT ROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Work under this section consists of furnishing of all labor, materials, equipment and services necessary for the complete installation of all rough carpentry, where shown on the drawings and as specified herein.
- B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General and Supplementary Conditions, and Sections of Division I of these specifications.
 - 1. Section 02060 - Asphalt Roofing Demolition
 - 2. Section 07310 - Asphalt Roofing and Accessories

1.02 SCOPE OF WORK

- A. Fasten existing sheathing to insure substrate meets the shingle manufacturer's requirements and that it is fastened in accordance with the requirements of the most recent edition of the Vermont Fire Prevention and Building Code.
- B. Verify that the existing sheathing is in good condition, identifying for examination by the Architect all areas that show evidence of damaged sheathing. Should there be areas of sheathing or framing deterioration as determined by direct examination and in consultation with the Architect replace sheathing or framing based on the price listed in the schedule of Unit Prices.
- C. Some exterior trim is clearly rotten. For base bid purposes, assume replacement of rotten trim that is obvious when viewed from the ground. Whenever rotten sections are replaced, replace entire board back to next closest joint, using material specified in this section, and matching the size of the material being replaced.

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled carpenters who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed to complete the work of this Section.
- B. Lumber Grading Rules and Wood Species shall be in conformance with PS 20. Reject any lumber which is not straight and true and which is visibly warped, twisted or has knots with any dimension greater than 1-1/2".
- C. Grading rules of the following associations apply to the materials furnished under this section:
 - 1. National Lumber Grades Authority (NLGA)
 - 2. West Coast Lumber Inspection Bureau (WCLIB)
 - 3. American Plywood Association (APA)
- D. Grade Marks:
 - 1. Identify lumber, oriented strand board and plywood by official grade mark.
 - 2. Lumber:
 - a) Grade stamp shall contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded where applicable, and conditions of seasoning at time of manufacture.

- b) S-Dry: Maximum 19% moisture content.
- c) MC-15: Maximum 15% moisture content.
- 3. Sheathing: Each construction panel shall be identified with the appropriate trademark of the American Plywood Association and shall meet the requirements of the latest edition of the U.S. Product Performance Standards.

1.03 CODES AND REFERENCES

- A. Wood construction shall conform to the requirements of the "National Design Specifications for Stress Grade Lumber and its Fastenings" of the National Forest Products Association, and to the requirements of the 2012 International Building Code (IBC).

1.05 DELIVERY, STORAGE AND HANDLING

- A. Immediately upon delivery to job site, place materials in area protected from weather.
- B. Store materials a minimum of 6" above ground on framework or blocking and cover with a protective waterproof covering providing adequate air circulation and ventilation.
- C. Do not store seasoned materials in wet or damp portions of the building.
- D. Protect materials from corner breakage and surface damage during unloading and storing.

1.05 UNIT PRICES

- A. Provide Unit Prices as required where scope and description of unit prices to the Contract requirements are given.

PART 2 - PRODUCTS

2.01 ROUGH LUMBER

- A. Framing Lumber:
 - 1. Wood members 2X6 and larger shall be Sitka Spruce or Spruce-Pine-Fir No. 2 grade or better, or as specified on the structural drawings. Average moisture content of 15%.
 - 2. Wood members 4" wide or less shall be Sitka Spruce or Spruce-Pine-Fir Construction Grade, or as specified on the structural drawings. Non-load bearing stud framing may be stud grade. Average moisture content of 19%.

2.02 EXTERIOR SYNTHETIC TRIM: Boral, as manufactured by Boral Composites Inc., 200 Mansell Court East, Suite 305, Roswell, Georgia 30076, or approved equivalent. Toll Free 888-926-7259. www.BORALTRIM.com.

- A. Composition:
 - 1. Post-Industrial Recycled Content: Minimum 68 percent, by weight.
 - 2. Post-Consumer Recycled Content: Minimum 2 percent, by weight.
 - 3. Rapidly Renewable Content: Minimum 5 percent, by weight.
 - 4. Total Recycled and Rapidly Renewable Content: Minimum 75 percent, by weight.
 - 5. Pigments and dyes.
- B. Physical Properties:
 - 1. Density, ASTM C 1185: 40 to 50 pcf.
 - 2. Water Absorption, ASTM D 570: Less than 1.5 percent.
 - 3. Fungi Rot, AWWPA E10:
 - a) White Rot: Negligible loss.
 - b) Brown Rot: Negligible loss.

4. Termite Resistance, AWP AE1: Greater than 9.0, with 10 being impervious.

C. Mechanical Properties:

1. Flexural Strength, ASTM C 1185: Greater than 1,600 psi.
2. Nail Withdrawal, ASTM D 1761: Greater than 40 lbf/in.

D. Thermal Properties:

1. Coefficient of Linear Expansion, ASTM D 6341, Typical: 1.40E-05 in/in/degree F, tested at minus 30 to 140 degrees F.
2. Flame Spread, ASTM E 84: Less than 25.
3. Smoke Developed, ASTM E 84: Less than 450.

E. Trim Sizes:

1. Refer to drawings and details for required sizes. Boral trim is available in the following sizes (nominal, actual): 1 by 4, 3/4" by 3-1/2"; 1 by 6, 3/4" by 5-1/2"; 1 by 8, 3/4" by 7-1/4"; 1 by 10, 3/4" by 9-1/4"; 1 by 12, 3/4" by 11-1/4"; 5/4 by 4, 1" by 3-1/2"; 5/4 by 6, 1" by 5-1/2"; 5/4 by 8, 1" by 7-1/4"; 5/4 by 10, 1" by 9-1/4"; 5/4 by 12, 1" by 11-1/4".
2. Manufacturing Tolerances:
 - a) Width: Plus or minus 1/16 inch.
 - b) Length: Plus 2 inches, minus 0 inch.
 - c) Thickness: Plus or minus 1/16 inch.
 - d) Edge Cut: Plus or minus 2 degrees.
3. Exposed Texture: Smooth.

2.03 PLYWOOD

- A. Sheathing: Exterior Type, Standard Grade with exterior glue; Douglas Fir, 5 ply thickness to match the existing sheathing. Note: 4 ply, southern yellow pine plywood is not acceptable.
- B. Plywood Grading: Comply with Product Standard PS 1, "Construction and Industrial Plywood".
- C. Certification and Marking: The producer shall include a Certificate of Inspection with each shipment. Grade mark each panel in compliance with applicable standards of Product Standard PS 1.
- D. Moisture Content: Provide plywood which has been seasoned by kiln drying to a moisture content not to exceed 19%.

2.04 ANCHORS, FASTENERS, AND PLATES

- A. Bolts, Replacement Plywood Clips, Nuts, Studs, Rivets: FS FF-B-575, FF-S-1362 and FF-R-556.
- B. Expansion Shields: FS FF-S-325; group, type, class and style best suited for the purpose.
- C. Lag Screws and Bolts: FS FF-B-561; type and grade best suited for the purpose.
- D. Nails: FS FF-N-105; type and size best suited for the purpose. Hot dipped galvanized for exterior use.
- E. Toggle Bolts: FS FF-B-588; type and class best suited for the purpose.
- F. Wood Screws: FS FF-S-111; style best suited for the purpose. Hot dipped galvanized for exterior use.
- G. Primer: Shop primer for ferrous metal; zinc chromate with a synthetic resin vehicle.

- H. Steel Plates and Shapes: ASTM A36, galvanized for exterior use.

PART 3 - EXECUTION

3.01 CONDITION OF SURFACE

- A. Examine substrates, adjoining construction, and conditions under which the work is to be installed. Notify the Owner of any deteriorated condition. Do not proceed with the work until unsatisfactory conditions detrimental to the proper and timely completion of the work have been corrected.
- B. Whenever rough carpentry is fitted to other work, obtain measurements of such other work, verify dimensions shown and the shop drawing details.

3.02 ROUGH FRAMING

- A. Frame to fit closely, and set accurately to required lines and levels; secure rigidly in place in accordance with details and best recommended industry practices.
- B. Use shims of PT wood, slate or steel for leveling wood members on concrete or masonry.
- C. Cut and fit to accommodate other work as required and in a neat workerlike manner.
- D. Set joists with crown edge up.
- E. Nail in accordance with National Forest Products Association publication "Manual for House Framing", Table I - Recommended Nailing Schedule.
- F. Provide blocking and nailers between framing members and at masonry, concrete or steel as shown or required for fastening of sheathing, roofing, roof accessories, or attachment of fixtures, equipment and other such items.

3.03 FINISH CARPENTRY

- A. Jointing:
 - 1. Produce joints which are true, tight and well nailed with all members assembled in accordance with the Drawings.
 - 2. Make joints to conceal shrinkage; miter exterior joints; cope interior joints; miter or scarf end-to-end joints.
 - 3. Install trim in pieces as long as possible, jointing only where solid support is obtained.
- B. Fastening:
 - 1. Install items straight, true, level, plumb, square and firmly anchored in place.
 - 2. Where blocking is required, coordinate with other trades to ensure proper placement of same in a timely manner.
 - 3. Nail trim with finish nails of proper size to hold the member firmly without splitting the wood. On exposed work, set nails for putty.
- C. Priming: All cut ends of exterior carpentry items shall be primed prior to installation. Use 100% alkyd primer.

3.04 PLYWOOD SHEATHING REPLACEMENT

- A. Replacement sheathing shall be installed in accordance with the recommendations of the APA the Engineered Wood Association and the requirements of the most recent edition of the Vermont Fire Prevention and Building Code.
- B. Panel Size: Replacement panels shall be a minimum of 12" wide and shall span a minimum of two rafter/truss bays.
- C. Spacing: Perimeter space around new panels shall be a minimum of the diameter of a 10d common nail.
- D. Fasteners: Minimum 8d common nails spaced at least 6" o.c. at the support edges and 12" o.c. at intermediate supports. Fasteners shall be a minimum 3/8" from all panel edges. In high wind areas additional fasteners shall be installed if requested by the Owner.
- E. All panels shall be properly oriented so that panel grain runs perpendicular to the supports. check trusses and rafters so that all new panels are install true and in a level plane. Shim trusses and/ or rafters as required to prevent bows, bellies or other out of plane installations.

END OF SECTION

SECTION 07310 - ASPHALT ROOFING SHINGLES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Work under this section consists of furnishing of all labor, materials, equipment and services necessary for the complete installation of all asphalt roofing and related materials and accessories, where shown on the drawings and as specified herein.
- B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General and Supplementary Conditions, and Sections of Division I of these specifications.
 - 1. Section 02060 - Asphalt Roofing Demolition
 - 2. Section 06100 - Rough & Finish Carpentry for Asphalt Roofing

1.02 SCOPE OF WORK

- A. The general scope of work consists of replacement of the asphalt shingle roofing system including but not limited to asphalt roof shingles, underlayment, rubberized membrane underlayment, drip edge, and other sheet metal flashings, ridge vents, starter strips, nails and other fasteners, and plastic cement and other items required for a complete watertight installation.
- B. Shingles, flashing and drip edge shall be completely removed and replaced as specified in Section 02060.
- C. New drip edge shall be installed on all edges including rakes and eaves.
- D. If required, cut existing plywood roof sheathing and install new ridge vent on all roofs.

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled roofers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed to complete the work of this Section.

1.04 SUBMITTALS - In addition to the requirements of Section 01340, comply with the following:

- A. Product data:
 - 1. Provide certificate of compliance from shingle manufacturer for ASTM and UL Standards, indicating conformance with Contract requirements.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Shop Drawings or catalog illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades.
 - 4. Manufacturer's current recommended installation procedures which, when reviewed by Owner, will become the basis for accepting or rejecting actual installation procedures used on the Work. Maintain one (1) copy of manufacturer's application instructions on site.

1.05 DELIVERY, STORAGE AND PRODUCT HANDLING

- A. In addition to the requirements of Section 01640, deliver materials in manufacturer's unopened, labeled bundles, rolls or containers. All shingles shall bear the Lot Number.

- B. Store materials to avoid water damage and store rolled goods on end. Comply with manufacturer's recommendations for job-site storage and protection.
- C. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations. Sequence deliveries to avoid delays, but minimize on-site storage.

1.06 PROJECT CONDITIONS

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive specified materials.
- B. Substrate: Proceed with shingle work only after substrate construction and penetrating work have been completed.
- C. Weather Conditions: Proceed with shingle work only when weather conditions are in compliance with manufacturer's recommendations and when substrate is completely dry. No work shall be performed in the rain or when the air temperature is below 32° F.

1.07 WARRANTY

- A. The manufacturer's standard warranty shall be lifetime from date of substantial completion.
- B. The Contractor shall provide the Owner with a copy of the Bill of Sale for the Shingles clearly indicating the product, quantity, purchase date, and a note indicating the project for which the product is intended.
- C. Warranty Supplement - Shingle Manufacturer shall provide supplemental warranty covering labor and materials for a period of five (5) years from the date of substantial completion.
- D. Satisfactory delivery of warrantees shall be precedent to final payment.

PART 2 — PRODUCTS

2.01 ASPHALT SHINGLES

- A. Double layer, fiberglass mat; ceramically colored/UV resistant mineral granules across entire face of shingle; 240 lb/square; color to be selected by Architect; complying with the following standards.
 - 1. ASTM D 3018, Type 1.
 - 2. ASTM D 3462 Tear Resistance.
 - 3. ASTM E 108 Fire Resistance: Class A.
 - 4. ASTM D 316 Wind Resistance: Type 1.
 - 5. UL 790 Fire Resistance: Class A.
 - 6. UL 997 Wind Resistance: 90 mph.
 - 7. 2012 International Building Code.
 - 8. Algae resistant.
- B. Subject to compliance with contract requirements, products which may be incorporated into the work include the following:
 - 1. CertainTeed Landmark (Limited Lifetime Warranty), color selected by the Owner;
 - 2. GAF Timberline (Limited Lifetime Warranty), color selected by the Owner;
 - 3. Owens Corning Duration TruDefinition Shingles (Limited Lifetime Warranty), color selected by the Owner;

4. Or approved equivalent, as approved by the Owner.
- C. Ridge and hip caps - Provide matching ridge and hip cap shingles as furnished by the manufacturer. Do not use field fabricated caps.
- D. Starter strips - Provide matching starter strips as furnished by the manufacturer. Inverting a course of shingles is NOT an acceptable starter course.
- E. Contractor shall expect to provide 1 color of shingle as directed by the Owner.

2.02 ROOFING UNDERLAYMENT

- A. Cold-applied, mechanically-attached underlayment composed of spunbonded polypropylene base sheet coated on both sides with UV stabilized polyolefin, complying with the following standards:
 1. ASTM D4533 (tear strength): MD 58 lbs; CD 77 lbs.
 2. ICC-ES AC48 (accelerated aging): pass (no damage, cracking, chipping).
 3. ICC-ES AC48 (ultraviolet resistance): pass (no damage, cracking, chipping, flaking).
 4. ASTM D779 (water ponding): pass (no percolation).
 5. ASTM D226 (pliability): pass (no cracks).
 6. ASTM D226 (water transmission test): pass.
 7. ASTM D828 (tensile strength): MD 96 lbs; CD 116 lbs.
 8. ASTM D3767 (thickness): 12 mil.
- B. Subject to compliance with contract requirements, products which may be incorporated into the work include the following:
 1. Grace Tri-Flex, as manufactured by W. R. Grace & Co.–Conn., Grace Construction Products, Cambridge, MA;
 2. Or approved equivalent, as approved by the Owner.

2.03 MEMBRANE FLASHING

- A. Provide cross laminated, high density self adhering polyethylene membrane, 40 mils thick, 36" wide, with non skid surface. Membrane must be compatible with shingles and asphalt saturated felt underlayment.
- B. Subject to compliance with contract requirements, products which may be incorporated into the work include the following:
 1. W.R. Grace - Ice and Water Shield - 40 mil.
 2. CertainTeed - Winter Guard.
 3. GAF – Storm Guard.
 4. Owens Corning - Deck Dri.
 5. Or approved equivalent, as approved by the Owner.

2.04 RIDGE & HIP VENTS

- A. Provide continuous ridge and hip vents complete with end caps. Type shall be the "shingle-over" type. Use roofing manufacturer's Distinctive Ridge Caps designed for use with the Specified Product. Net free vent area equal to 18 sq. in./LF. NOTE: existing hips have vents, although it's not clear whether there is solid framing below them, rendering them non-functional. Provide the lineal foot (LF) credit to delete hip vents if field inspection reveals they are not useful. Subject to compliance with contract requirements, products which may be incorporated into the work include the following:
 1. Shinglevent II by Air Vent, Inc.;
 2. Easy-Up Single-Over Ridge Vent;
 3. ALCOA - ROVAR;

4. VenturiVent Plus;
5. Cor-A-Vent V-400;
6. Or equivalent, as approved by the Owner.

2.05 METAL ACCESSORIES - All drip edge, step and counterflashing materials shall be fabricated from sheet stock aluminum, treated with non-chromate chemical conversion to insure paint adhesion. Finish shall be Kynar 500 finish, or approved equivalent. Color shall be selected by the Owner.

- A. Drip edge: minimum .024" aluminum sheet style-D drip edge, brake-formed to provide a minimum 1¼" inch flange with 3/8" drip at lower edge by minimum 6 1/2" roof deck flange. Refer to details on drawings. Furnish in 8' or 10' lengths. Do install drip edge in pieces shorter than 24".
- B. Metal Flashing: minimum .027" prefinished aluminum.
 1. Step flashing: typically 7" x 10" bent to 7" x 5" or cut to sizes and configurations required for the job.
 2. Counterflashing: as detailed on the drawings, in no case less than 4" vertical leg. Do install in pieces shorter than 24".

2.06 FASTENERS

- A. Hot-dip galvanized 11 or 12-gage, sharp pointed, conventional roofing nails with barbed shanks, minimum 3/8" diameter head and of sufficient length to penetrate through sheathing. Nails shall meet ASTM A-153 Hot Dip Galvanizing Spec.

2.07 ROOF PLUMBING VENT FLASHINGS

- A. Furnish and install new plumbing vent flashings, sized to fit existing vent stack(s), at all plumbing vent penetrations. Provide Oatey Aluminum Base no-caulk Plumbing Pipe Penetration Flashing with black neoprene base, IPS Adjustable Multi-size Roof Flashings, Aztec Washer Company Res Lead Master Flash Plumbing Vent Flashings, or approved equivalent, as approved by the Owner.

2.08 OTHER MATERIALS

- A. Asphalt Plastic Cement: Rubber reinforced asphalt cement with mineral fibers complying with ASTM D-4586 Type 1, ASTM D 3409 and federal Spec SS-C-153 Type 1 (Asbestos-Free) designed for trowel application. Material shall be Karnak #19 Ultra Rubberized Flashing Cement,
- B. APOC 128 All Pro SBS Rubberized Flashing Cement, BLACK JACK Premium Rubberized, or equivalent approved by the Owner.
- C. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the roofing system manufacturer as compatible, subject to review of the Owner.

PART 3 — EXECUTION

3.01 SURFACE CONDITIONS

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Applicator shall examine the areas and conditions under which roofing work will be performed.
 1. Verify conformance with manufacturer's requirements;
 2. Report unsatisfactory conditions in writing to the Architect;
 3. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Clean substrate of any projections and substances detrimental to shingling work. Cover knotholes or other minor voids in substrate with sheet metal flashing secured with roofing nails. Sweep substrate clean before application of underlayment and membrane.
- B. Coordinate installation of shingles with flashing and other adjoining work to ensure proper sequencing. Do not install shingle roofing until all vent stack and other penetration flashing through roofing have been installed and are securely fastened against movement.

3.03 ROOFING INSTALLATION

- A. General: Comply with instructions, installation details and recommendations of shingle manufacturer and the NRCA Steep Roofing Manual, except to the extent more stringent requirements are required herein.
- B. Membrane Flashing at eaves: Furnish and install continuous strip of specified rubberized ice protection underlayment along eaves to a point 36" minimum inboard of the heated wall line. Provide sufficient protection membrane around vent pipes, chimneys, and any other roof penetration. Provide 2" laps where required.
- C. Membrane Flashing at Valleys: For cut valleys first place one 36" wide ply of specified rubberized membrane flashing, centered over the valley. Lap joints a minimum of 6" with laps headed downward. Follow membrane manufacturer's installation instructions.
- D. Membrane Flashing at Roof Vents: Cover metal flanges of roof vents with strips of rubberized membrane (minimum 12" wide), starting at the bottom and lapping sides and top a minimum of 3".
- E. Underlayment:
 - 1. Install the product directly on a clean, dry, continuous structural deck. Remove dust, dirt, and loose nails. Protrusions from the deck area must be removed. Decks shall not have any voids, damaged, or unsupported areas. Repair deck areas before installing the product.
 - 2. Apply one layer, free of wrinkles, over entire surface, lapping succeeding courses 2" minimum and 6" minimum at side laps, fastening with sufficient nails to hold in place until shingle application. Stagger side laps at least 24" at each consecutive layer. Follow underlayment manufacturer's installation instructions.
- F. Shingles: Install manufacturer's starter strip or a course of the specified shingles with tabs removed; fasten shingles in pattern, weather exposure and number of fasteners per shingle as recommended by manufacturer. Use horizontal and vertical chalk lines to ensure straight coursing. NOTE: inverting a course of shingles is NOT an acceptable starter course.
- G. Flashing and Drip Edge Protection: Install metal flashing, vent flashing and drip edge, as indicated and in compliance with details and recommendations of the NRCA Steep Roofing Manual.
- H. Flashing at Vertical Walls: Build in step flashing at each course of shingles as work progresses. Apply plastic cement at roof surfaces of each piece of flashing.
- I. Valley Treatment: Provide a closed cut valley.
 - 1. Lay shingles on both sides of valley, carrying them past valley centerline and trim shingles by cutting 2 inches back from valley center line. Nail no closer than 6 inches to the centerline of the valley.

- J. Vent Pipe Flashing and Roof Jacks: Protect and re-use existing plumbing penetration flashings. Bind in pipe flashing or roof jacks by applying shingles up to pipes. Cut hole in shingles for pipe in next course. Place a bed of roofer's cement around opening and set shingle in mastic.
 - 1. Apply rubberized membrane over and around metal flashing. Cut shingles in next course around opening and bed into mastic.
- K. Flashing at Chimneys, roof exhaust fans and at intersecting roofs: Protect and re-use existing flashings and/or replace as required. Cut shingles to step and counter flash each course. Place a bed of asphalt plastic cement around opening and set shingle in mastic.
- L. Ridge Vents: Install in accordance with manufacturer's instructions. Contractor shall provide cap shingles on all ridges and hips, with or without vent.

3.04 PROTECTION AND CLEAN-UP

- A. Promptly remove material of membrane system material from adjacent surfaces which will be exposed in the completed work. Leave work area in broom clean condition.

END OF SECTION

SECTION 07312 - SLATE ROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Work under this section consists of furnishing of all labor, materials, equipment and services necessary for the complete installation of all slate roofing and related materials and accessories, where shown on the drawings and as specified herein.
- B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General and Supplementary Conditions, and Sections of Division I of these specifications.
 - 1. Section 02060 - Roofing Demolition
 - 2. Section 06100 - Rough & Finish Carpentry for Asphalt Roofing

1.02 SCOPE OF WORK

- A. The general scope of work consists of a complete slate roofing system including but not limited to new and salvaged slate shingles, underlayment, rubberized membrane underlayment, drip edge, and other sheet metal flashings, hip and ridge caps, snow guards, nails and other fasteners, and plastic cement and other items required for a complete watertight installation.
- B. Existing shingles, flashing and drip edge shall be completely removed as specified in Section 02060. Removal of existing slates shall be carefully done, saving all full size and sound shingles for re-use in conjunction with new slate shingles.
- C. New drip edge shall be installed on all edges including rakes and eaves.
- D. If required, cut existing plywood roof sheathing and install new ridge vent on all roofs.

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled roofers who are thoroughly trained and experienced in the necessary crafts of installing natural slate roof systems and who are familiar with this specification and the methods required for a warrantable roof. Workers shall have not fewer than five years of documented experience.

1.04 REFERENCES

- A. ASTM:
 - 1. ASTM B 101 - Specification for Lead-Coated Copper Sheet and Strip for Building Construction.
 - 2. ASTM B 370 - Specification for Copper Sheet and Strip for Building Construction.
 - 3. ASTM C 406 - Specification for Roofing Slate, Grade S1.
 - 4. ASTM C 920 - Specification for Elastomeric Joint Sealants.
 - 5. ASTM D 4586 - Specification for Asphalt Roof Cement, Asbestos-Free
 - 6. ASTM D 1079 - Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials
 - 7. ASTM D 1970 - Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
 - 8. ASTM D 4869 - Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing.
- B. North Country Slate - Slate Roofing Installation Manual, Fifth Edition, and Slate Roofs, published by the National Slate Association in 1926.

- C. NRCA - The NRCA Roofing and Waterproofing Manual, Definitions and Roofing Terminology.
- D. Sheet Metal & Air Conditioning Contractors National Association - Architectural Sheet Metal Manual.

1.05 SUBMITTALS - In addition to the requirements of Section 01340, comply with the following:

- A. Product data:
 - 1. Manufacturer's specifications and other data needed to prove compliance with the specified requirements. The manufacturer shall furnish a certificate stating that materials used for the project strictly adhere to the provisions of these specifications.
- B. Shop Drawings: Details for specially configured metal flashing, jointing methods and locations for flashing, and other roofing system details.
- C. Selection samples:
 - 1. Pieces of actual slate shingles, illustrating complete range of colors available, for Architect's selection.
 - 2. Pieces of actual metal ridge cap, 12 inches (300 mm) long and full width.
 - 3. Actual snow guard, full size.
- D. Verification samples:
 - 1. Actual slate shingles in color selected, illustrating full range of color variation to be expected in finished work.
 - 2. Membrane underlayment, minimum 12 inches (300 mm) square.
- E. Installer's Qualifications: Installer's natural roofing slate project references; not fewer than four.

1.06 DELIVERY, STORAGE AND PRODUCT HANDLING

- A. Deliver shingles to project site in distributor's crates/pallets, labeled with data indicating source.
- B. Handle shingles to prevent chipping, breakage, soiling, or other damage. Protect edges with wood or other rigid material.
- C. Place and stack crates/pallets to distribute weight evenly and to prevent breakage or cracking.
- D. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double stack rolls.
- E. Protect unused underlayment from weather, sunlight and moisture when left overnight or when roofing work is not in progress.
- F. Stage roofing materials on the building in a manner to avoid significant or permanent damage to the roof deck or structural supporting members.

1.07 PROJECT CONDITIONS

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive specified materials.
- B. Substrate: Proceed with shingle work only after substrate construction and penetrating work have been completed.

1.08 WARRANTY

- A. Slate Shingle Distributor's Warranty: Submit slate shingle distributors warranty, signed by the distributor and covering the slate shingles described in this section, in which the distributor agrees to replace slate shingles that fail in materials. The duration of this warranty shall be established by ASTM C406 and grade indicated in this specification.
- B. Roofing Installer's Warranty: Submit roofing installer's warranty, signed by roofing Installer and covering Work of this Section, in which roofing Installer agrees to repair or replace slate roofing that fails in materials or workmanship within the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.

1.09 EXTRA MATERIALS

- A. Provide an additional one square of material, for Owner's use in roof maintenance. Not more than 1/3 of this shall be salvaged slates.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A. Subject to compliance with requirements, provide slate as furnished by Vermont Structural Slate Company, Box 98 · 3 Prospect Street · Fair Haven, VT 05743, or equivalent approved by the Owner.

2.02 SHINGLES

- A. Slate Shingles: Hard, dense, sound rock, with chamfered edges, punched or drilled for two nails each. Slate shingles shall be punched or drilled back to front, and on the thinner end when there is variation in thickness along the length of the shingle.
- B. No slate shingles with broken corners shall be installed when either the base or leg of the right triangle piece broken off is greater than 1-1/2 inches (38 mm). No broken corners on covered ends which sacrifice nailing strength or laying a watertight roof. Broken corners are acceptable for cutting stock. Not more than 1 percent (1%) of broken slates, including those having cracks materially precluding ringing when sounded, shall be accepted.
- C. Slate shall be free of any visible inclusions of oxidizable iron pyrite.
- D. Curvature or twist in slate shingles shall not exceed 1/8 inch in 12 inches (3 mm in 100 mm). Curved slate shingles shall be trimmed and punched to permit them to be laid with convex side up. Knots, knurls and cramps are acceptable on the exposed slate shingle face. Knots, knurls and cramps on the back or covered portion of slate shingles, which prevent close contact of slate shingles or the laying of a watertight roof, will not be accepted.
- E. Slate shingles shall be trimmed with 90-degree square corners. Face dimensions of slate shingles shall not differ from those specified by more than 1/8 inch (3 mm).
 - 1. Source: Obtain slate required for the project from a single quarry, with consistent color range, physical properties and texture throughout.
 - 2. Grade: ASTM C 406 Grade S1: Expected service life in excess of 75 years.
 - 3. Thickness: standard, nominal 3/16 inch (5 mm). Slates shall be free from ribbons.
 - 4. Size: match existing.
 - 5. Cut Butt Shape: standard square cut. Starter slate size: Length of starter slates to be the exposure of the field slates plus the specified headlap and rounded up to the nearest full inch. Starter slates are to be front-side punched and installed chamfered edge down.

6. Color: match existing.
7. Natural Cleft: match existing.

2.03 ROOFING UNDERLAYMENT

- A. Cold-applied, mechanically-attached underlayment composed of spunbonded polypropylene base sheet coated on both sides with UV stabilized polyolefin, complying with the following standards:
 1. ASTM D4533 (tear strength): MD 58 lbs; CD 77 lbs.
 2. ICC-ES AC48 (accelerated aging): pass (no damage, cracking, chipping).
 3. ICC-ES AC48 (ultraviolet resistance): pass (no damage, cracking, chipping, flaking).
 4. ASTM D779 (water ponding): pass (no percolation).
 5. ASTM D226 (pliability): pass (no cracks).
 6. ASTM D226 (water transmission test): pass.
 7. ASTM D828 (tensile strength): MD 96 lbs; CD 116 lbs.
 8. ASTM D3767 (thickness): 12 mil.
- B. Coated Felt Underlayment: ASTM D 2626, asphalt-saturated and coated organic felt, mineral surfaced, unperforated, No. 40.
- C. Subject to compliance with contract requirements, products which may be incorporated into the work include the following:
 1. Grace Tri-Flex, as manufactured by W. R. Grace & Co.–Conn., Grace Construction Products, Cambridge, MA;
 2. Or approved equivalent, as approved by the Owner.

2.04 MEMBRANE FLASHING

- A. Provide cross laminated, high density self adhering polyethylene membrane, 40 mils thick, 36" wide, with non skid surface. Membrane must be compatible with shingles and asphalt saturated felt underlayment. Areas to be sheeted with membrane are hips, eaves, low slope areas, all slope changes or tie-ins and protrusions through the roof.
- B. Subject to compliance with contract requirements, products which may be incorporated into the work include the following:
 1. W.R. Grace - Ice and Water Shield - 40 mil.
 2. CertainTeed - Winter Guard.
 3. GAF – Storm Guard.
 4. Owens Corning - Deck Dri.
 5. Or approved equivalent, as approved by the Owner.

2.04 SHEET METAL FLASHINGS

- A. Flashing: ASTM B 370 copper, cold rolled, 16 oz/sq ft (0.56 mm thick), natural finish.
- B. Salvage existing hip caps and peak termination cap to use as templates for new components to be fabricated from 16 oz copper.

2.05 FASTENERS

- A. Hot-dip galvanized 11 or 12-gage, sharp pointed, conventional roofing nails with barbed shanks, minimum 3/8" diameter head and of sufficient length to penetrate through sheathing. Nails shall meet ASTM A-153 Hot Dip Galvanizing Spec.

2.06 ACCESSORIES

- A. Snow Guards: Fabricated from non-ferrous metal, designed to be installed without penetrating slate shingles, and complete with predrilled holes or hooks for anchoring. Provide Zaleski Model No. 4, using 0.020 thick cold rolled copper, formed to double thickness as manufactured by Zaleski Snow Guards for Roofs, Inc., PO Box 700, New Britain, CT 06050, Tel. 860-225-1614, Fax. 860-225-1060, www.snowguards.com.
- B. Slating Nails for Non-Preservative Treated Plank or Plywood Deck and Nailers: Slater's copper smooth shank nails, 0.120 inch (3 mm) or No. 11 gauge Stubs, not less than twice the nominal slate thickness plus 1 inch (25.4 mm) in length, with 3/8 inch (9 mm) head. Point should penetrate through underside of deck except where the underside of roof deck is exposed to view, where shorter nails are acceptable. Nails 1/2 inch (13 mm) or longer than field slate nails for slate hip and ridge installation.
- C. Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized steel wire nails with low-profile capped heads or disc caps, 1 inch (25 mm) minimum diameter.
- D. Polymer Sealant: ASTM C 920 silicone sealant of type, grade, class, and use classification required to seal joints in slate-shingle roofing and remain watertight.

2.07 FLASHING FABRICATION

- A. Form flashing to profiles indicated on drawings and as required to protect roofing materials from physical damage and shed water.
- B. Form sections square and accurate in profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

2.08 OTHER MATERIALS

- A. Underlayment Attachment: Roofing asphalt ASTM D 312, Type III or IV as recommended by slate installer for application.
- B. Butyl Rubber Sealant: ASTM C 1311, single-component, solvent-release; polyisobutylene plasticized; heavy bodied.
- C. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the roofing system manufacturer as compatible, subject to review of the Owner.

PART 3 — EXECUTION

3.01 SURFACE CONDITIONS

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section. Verify that roofing penetrations and plumbing stacks are in place and properly flashed to deck surface.
- B. Applicator shall examine the areas and conditions under which roofing work will be performed.
 - 1. Verify that roof openings are correctly framed.
 - 2. Verify that deck surfaces are sound, smooth, properly secured; and free of ridges, depressions and voids; properly sloped and dry.
 - 3. Verify conformance with manufacturer's requirements.
 - 4. Report unsatisfactory conditions in writing to the Architect.

5. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Clean substrate of any projections and substances detrimental to shingling work. Cover knotholes or other minor voids in substrate with sheet metal flashing secured with roofing nails. Sweep substrate clean before application of underlayment and membrane.
- B. Coordinate installation of shingles with flashing and other adjoining work to ensure proper sequencing. Do not install slate roofing until all vent stack and other penetration flashing through roofing have been installed and are securely fastened against movement.
- C. Confirm that a minimum deck of 5/8 inch (15 mm) APA approved plywood , or roof decking of 1-1/2 inch (25 mm) nominal thickness, well seasoned tongue-and groove wood sheathing boards are acceptable for slate roofing. A 3/4 inch (19 mm) thick APA approved plywood deck is recommended by NRCA.

3.03 ROOFING INSTALLATION

- A. General:
 1. Proceed with installation only after written approval and acceptance of all materials and accessories has been issued by the architect.
 2. Comply with instructions, installation details and recommendations of slate manufacturer and the NRCA Steep Roofing Manual, except to the extent more stringent requirements are required herein.
- B. Membrane Flashing at eaves: Install self-adhering sheet underlayment wrinkle free. Apply from roof edge to a line that when projected to the horizontal is not less than 24 inches (610 mm) inside of interior wall line. Install lapped in direction to shed water. Lap sides not less than 3 1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm), staggered 24 inches (600 mm) between courses. Roll laps with roller. Proceed with installation only within the range of ambient and substrate temperatures recommended by manufacturer.
- C. Membrane Flashing at Valleys: For cut valleys first place one 36" wide ply of specified rubberized membrane flashing, centered over the valley. Lap joints a minimum of 6" with laps headed downward. Follow membrane manufacturer's installation instructions.
- D. Membrane Flashing at Roof Vents: Cover metal flanges of roof vents with strips of rubberized membrane (minimum 12" wide), starting at the bottom and lapping sides and top a minimum of 3".
- E. Underlayment:
 1. Install the product directly on a clean, dry, continuous structural deck. Remove dust, dirt, and loose nails. Protrusions from the deck area must be removed. Decks shall have not have any voids, damaged, or unsupported areas. Repair deck areas before installing the product.
 2. Install underlayment over entire deck surface. At hips, valleys, and ridges, install additional 36 inch (915 mm) width of underlayment, centered on the valley or ridge.
 3. Apply one layer, free of wrinkles, over entire surface, lapping succeeding courses 2" minimum and 6" minimum at side laps, fastening with sufficient nails to hold in place until shingle application. Stagger side laps at least 24" at each consecutive layer. Follow underlayment manufacturer's installation instructions.
 4. On overhanging eaves that require more than a single 36-inch (915 mm) width of underlayment, overlap not less than 6 inches (150 mm), assuring that overlapped area is located on overhang, outside wall line.

- F. Sheet Metal Flashing: Install as indicated and in compliance with details and recommendations as published in the North Country Slate: Slate Roofing-Installation Manual, Fifth Edition; Slate Roofs (1926 Edition); and Sheet Metal & Air Conditioning Contractors National Association: Architectural Sheet Metal Manual.
1. Install flashing at all locations where roof intersects other roofs, sidewall or parapet walls, chimneys, ventilators, and similar projections, and at gable edges. Ensure that dissimilar sheet and fastener metals are galvanically separated.
 2. Open Valley: Install minimum 20 inch (510 mm) wide open valley sheet metal flashing over 36 inch (915 mm) wide underlayment, with field underlayment lapped over edges of flashing not less than 4 inches (100 mm). Fasten metal with cleats. Overlap metal a minimum of 8 inches (200 mm).
- G. Slate Grading: Sort new and existing slates according to thickness into a minimum of three grades. Install thickest slates beginning at the eaves and introduce consecutive thickness grades as installation proceeds up the roof slope, creating a smooth overall appearance. Blend slates from all crates/pallets and salvaged slates together to achieve a uniform color and texture to the roof.
- H. Wood Nailer and Cant Strips:
1. Cant Strip: Install 2 inch (50 mm) wide by 48 inch (1220 mm) long wood cant strips at eaves. Nominal thickness of cant strip shall be equal to the slate thickness specified. Attach with hot-dip galvanized steel nails. Apply eave flashing and underlayment over cant strip.
- I. Head Lap:
1. Slate shall be installed at standard 3 inches (75 mm) headlap.
- J. Shingles: Install as indicated and in compliance with details and recommendations as published in the North Country Slate: Slate Roofing - Installation Manual, Fifth Edition; Slate Roofs, published by the National Slate Association in 1926; and The NRCA Roofing and Waterproofing Manual, Definitions and Roofing Terminology.
1. Double shingles at eaves and cornice line. Beginning at eaves, project shingle 2 inches (50 mm) beyond perimeter with no gutters or troughs, or 1 inch (25 mm) with gutters or troughs. Lay shingles in horizontal courses. Provide at least the specified head lap between succeeding courses of shingles and stagger joints between courses a minimum of 3 inches (75 mm). Provide 1-1/2 inch (38 mm) projection of shingles at gable and rake edges.
 2. Joint Spacing: Slate shingles in each course to be installed with 1/16 - 1/8 inch (1.6 - 3.2 mm) joint spacing.
 3. Cut and fit shingles neatly around vents, pipes, ventilators, and other roof projections.
 4. Slate shingles overlapping sheet metal shall have nails placed so as to avoid penetrating the sheet metal.
 5. Nail slate shingles so nail heads touch shingle lightly, without producing strain on the slate. The slate shall be loose when fully nailed. If this is not executed properly, building movement could draw the nail head through the slate.
 6. Exposed nails are only permissible at the top courses where unavoidable. Exposed nail heads shall be covered with elastic cement. Hip slates and ridge slates shall be laid in elastic cement spread thickly over unexposed surface of under courses, nailed securely in place, and pointed with elastic cement.
 7. All penetrations such as pipes and ventilators shall have slate neatly fitted around them.
 8. Entire surfaces of all roofs, except as noted, shall be covered with slate in a proper and weatherproof manner. Upon completion, all slates must be sound, whole and clean. The roof must be left watertight and neat in every respect, and subject to the architect's approval.
- K. Hips:
1. Install slate shingles at hips with approved metal hip caps per manufacturer's installation instructions. Metal caps shall match profile of original caps.

- L. Peak termination:
 - 1. Install approved peak termination cap as per manufacturer's installation instructions. Cap piece shall match original in size and type.
- M. Snow Guard Installation: Install snow guards in rows at locations indicated according to manufacturer's written installation instructions. Space snow guards in each row, offsetting by half this dimension between succeeding rows. Hook unit over head edge of slate without nailing.

3.04 ADJUSTING & CLEAN-UP:

- A. Remove and replace damaged or broken slates using slate repair hooks or nail and bib repair procedure where standard nailing is not possible.
- B. Remove excess materials and debris from the Project site.

3.05 PROTECTION

- A. Lay out progression of work to prevent other trades from working on or above completed roofing.
- B. Minimize traffic over finished roof surface. If necessary, wear soft-soled shoes and walk on the 'butt' of the shingles in order to avoid breakage.

END OF SECTION

SECTION 07532 - FULLY ADHERED EPDM ROOFING SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

- A. General: Preceding job start up, contractor shall decide to his/her satisfaction that all specifications contained herein are workable.
 - 1. Contractor shall perform all work by competent, trained, and properly equipped personnel in strict accordance with good roofing practices and applicable industry standards.
 - 2. Contractor shall observe all published safety prevention policies and practices relating to application of roofing system and related work. All federal, state, and local codes shall be followed.
 - 3. Contractor shall follow application, safety, etc. information as published in the most current edition of the manufacturer's Technical Specification.
- B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General and Supplementary Conditions, and Sections of Division I of these specifications.
 - 1. Section 06100 - Rough Carpentry
 - 2. Section 07620 - Metal Flashings
 - 3. Section 07720 - Roof Accessories
 - 4. Section 07920 - Sealants
 - 5. Section 15420 - Drainage and Vent Systems

1.02 SCOPE OF WORK

- A. Strip off all of the existing membrane roofing, underlayment, metal drip edge/fascia, and other flashing on all buildings listed in the Summary of Work and legally dispose of all debris. Existing copper counter flashing embedded in existing masonry shall not be disturbed and shall be reused under this scope of work. Verify that the existing sheathing is in good condition, identifying for examination by the Architect all areas that show evidence of damaged sheathing. Should there be areas of sheathing or framing deterioration as determined by direct examination and in consultation with the Architect these areas will be replaced at a price listed in the schedule of Unit Prices.
- B. Provide and install fully adhered single ply EPDM roofing systems with their required accessories, where shown on the drawings, as specified herein, and as required to provide a complete installation. Provide and install all related items of work as noted herein or indicated on the drawings or otherwise required to complete the specified elements of work and provide the necessary warranties for this work, including substrate preparation, wood nailer installation, membrane installation and membrane flashing installation.
 - 1. Work under this section covers the demolition of existing single ply roofing and installation of a new fully adhered EPDM roofing system. Where the existing roofing is fully adhered, repair any damage to underlying substrates; where existing roofing is ballasted, remove and dispose of existing ballast (coordinate with Owner in the event owner desires to direct disposal of ballast to City-owned property). In addition, contractor shall include all related items of work as noted herein or indicated on the drawings or otherwise required to complete the specified elements of work and provide the necessary warranties for this work.
 - 2. All excess materials shall be disposed of properly. All material removal shall comply with state and local codes and requirements and shall be disposed of in accordance with all local, state and federal requirements.
- C. Where required by the drawings or owner's scope of work requirements, provide rigid insulation as specified in Part 2.

1.03 DEFINITIONS

- A. American Society for Testing and Materials (ASTM).
- B. Roofing Terminology: Refer to ASTM D1079 for definition of terms related to roofing work not otherwise defined in the section.

1.03 SYSTEM DESCRIPTION

- A. Non-reinforced elastomeric sheet roofing, fully adhered to insulation with system manufacturer's bonding adhesive.

1.04 SUBMITTALS

- A. In addition to the requirements of Section 01340, the roofing contractor shall submit the following items in one comprehensive package:
 - 1. Copies of specification.
 - 2. Samples of all materials to be used that are part of the roofing system.
 - 3. Proposed roofing system's printed product data.
 - 4. Specimen copies of proposed roofing system's warranty.
 - 5. Certificates of Compliance from insulation and roofing component manufacturers that all materials to be supplied comply with all pertinent industry standards.
 - 6. Submit copies of Technical Information Sheets (TIS) for primary products used including roof membrane, insulation adhesive, and flashing materials.
 - 7. Submit copy of job related details including flashings, base tie-ins, roof edges, terminations, penetrations, drains, and any other relevant details.
- B. Submit a "pre-Job Survey" to the manufacturer's technical department for approval prior to the job start to enable the Technical Department to approve and assign a project number to the job. This survey must be filled completely and accurately and must include a roof drawing showing all dimensions and roof penetrations.
 - 1. Contact the roofing system's manufacturer prior to project bid to coordinate any requirements related to the required warranty.

1.05 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed to complete the work of this Section.
- B. Manufacturer:
 - 1. Company specializing in manufacturing the roofing membrane specified in this section with ten years of roof product manufacturing experience.
 - 2. Manufacturer must be able to provide the project with the membrane and polyisocyanurate insulation that is produced in its own facilities. Complete system of compatible components shall be from a single manufacturer.
 - 3. The installed roofing system shall be inspected by an authorized representative of the manufacturer, in accordance with the applicable inspection policies, but no less than a final inspection upon completion.
- C. Applicator:
 - 1. The single ply roofing system shall be installed by a subcontractor authorized and licensed by the manufacturer of the submitted product.
 - 2. Shall have at least five years experience in installing the specified or similar system.

3. It is the roofing contractor's responsibility to adhere to all applicable building codes (local and national) for roofing system installation requirements and limitations that are applicable at the time of bid.
- 1.06 REGULATORY REQUIREMENTS - Conform to applicable local and state building code requirements.
 - 1.07 QUALITY INSPECTION/OBSERVATION
 - A. Inspection by Manufacturer: Provide a final (minimum) inspection of the roofing system by a Technical Representative employed by roofing system manufacturer.
 1. Technical Representative shall not perform any sales functions.
 2. Contractor shall complete any necessary repairs required for issuance of warranty.
 - 1.08 PRE-INSTALLATION CONFERENCE - Before start of roofing work, attend a conference to discuss the proper installation of materials. Attendees shall include all parties directly affecting work of this Section.
 - 1.09 DELIVERY, STORAGE AND HANDLING
 - A. Deliver products in manufacturer's original containers dry, undamaged, seals and labels intact and legible.
 - B. Store all materials clear of ground and moisture with weather protective covering.
 - C. Keep all combustible materials away from ALL ignition sources.
 - 1.10 ENVIRONMENTAL REQUIREMENTS
 - A. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice.
 - B. Do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application. Comply with manufacturer's Technical Specifications on cold weather application.
 - 1.11 WARRANTY
 - A. Type/Term:
 1. Provide 25 year Red Shield Medallion Roofing System Warranty. Warranty shall include membrane, roof insulation, and all other products supplied by roof system manufacturer and cover wind speeds up to 72 MPH.
 - B. Coverage:
 1. Red Shield Warranty:
 - a) Limit of liability: No Dollar Limitation.
 - b) Scope of coverage: Repair any leak in the EPDM Roofing System caused by the ordinary wear and tear of the elements, manufacturing defect in brand materials, and the workmanship used to install these materials, all at no cost to the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Single-ply membrane system, composed of non-reinforced elastomeric sheet roofing panels, and all required accessories, shall be manufactured by Firestone Building Products Co., 525 Congressional Blvd., Carmel, IN 46032-5607, or equivalent approved by the Owner.

1. For fully adhered installation, membrane shall be fully adhered to protection board which shall be fully adhered to the existing insulation.

2.02 NAILERS FOR FLANGES AND ROOF ACCESSORIES

- A. Description: Structural Grade No. 2 or better Southern Pine, Douglas Fir, or Exterior Grade plywood. All wood shall be pressure treated for rot resistance.
 1. Nailer width: Minimum 3 1/2 in. (nominal) wide or as wide as the nailing flange of each roof accessory.
 2. Nailer thickness: Thickness of roof insulation.
- B. Reference Standards:
 1. Southern Pines: PS 20; SPIB Grading Rules.
 2. Western Woods: PS 20; WWPA Grading Rules.
 3. Plywood: PS 1; APA Grade Stamps.

2.03 ELASTOMERIC SHEET ROOFING AND FLASHING MEMBRANE

- A. Description: Non-reinforced, cured, synthetic single-ply membrane composed of Ethylene Propylene Diene Terpolymer (EPDM) conforming to the following physical properties:
 1. Membrane Type: .060 LSFR

Property:	Specification:
Specific Gravity	1.15 +/- 0.05
Tensile Strength, Minimum, psi (MPa)	1305 (9)
Elongation, Minimum, %	300
Tear Resistance, lbf / in (kN / M)	150 (26.3)
Ozone Resistance, 166 hours @ 100 pphm @ 104°F with 50% extension	No Cracks
Heat Aging, 28 days @ 240°F	
Tensile Strength, Minimum psi (MPa)	1205 (8.3)
Elongation, Minimum %	200
Brittleness Point, max., °F, °C	-49 (-45)
Water Absorption, change in weight after immersion in water for 166 hours @ 158°F, %	+8, -2
Tolerance On Nominal Thickness, %	+/- 10
Water Vapor Permeability, Perm-Mils	2.0

- B. Reference Standards:
 1. ASTM D4637-96: Standard Specification for EPDM Sheet used in single-ply roof membrane
 2. ASTM D297: Methods for Rubber Products, Chemical Analysis.
 3. ASTM D412, Die C: Test Methods for Rubber Properties in Tension.
 4. ASTM D471: Test Methods for Rubber Property, Effect of Liquids.
 5. ASTM D573: Test Method for Rubber, Deterioration in an Air Oven.
 6. ASTM D624, Die C: Test Method for rubber property-Tear Resistance

7. ASTM D746: Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
8. ASTM D751: (Grab Method) Method of Testing Coated Fabrics.
9. ASTM D816: (Modified) Methods of Testing Rubber Cements.
10. ASTM D1149: Test Method for Rubber Deterioration, Surface Ozone Cracking in a Chamber.
11. ASTM D2240: Test Method for Rubber Property - Durometer Hardness.

2.04 POLYISOCYANURATE ROOF INSULATION

- A. Description: Roof insulation consisting of closed cell polyisocyanurate foam core and a perforated black glass reinforced mat laminated to the face.
1. Nominal Thickness: 3"/sheet. Minimal thickness shall be 4.5" (5" including 1/2" of tapered insulation) at low points sloping up to perimeter edges; minimal average shall be as required to achieve minimum overall R-value of 38.
 2. Nominal Size: 48 in. x 96 in.
 3. Tapered products shall be furnished as required to accomplish minimum 1/8"/LF slope to drains.
 4. Product/Producer: ISO 95+ Polyisocyanurate Insulation by Firestone, or approved equivalent in accordance with Section 01000, Item 18.
- B. Reference Standards:
1. FS HH-I-1972/Gen.
 2. FS HH-I-1973/3.
 3. ASTM C 209 - Water Absorption.
 4. ASTM E 96 - Water Vapor Transmission of Materials.
 5. ASTM D 1621 - Compressive Strength.
 6. ASTM D 1622 - Density.
 7. ASTM D 2126 - Dimensional Stability.
 8. ASTM E 84 - Flame Spread

2.05 ELASTOMERIC SHEET ROOFING SYSTEM COMPONENTS

- A. Roof Flashing (Gravel Stops):
1. Description: Semi-cured 45 mil EPDM membrane laminated to 35 mil EPDM tape adhesive.
- B. Elastomeric Uncured Flashing: Non-reinforced, self curing, synthetic, single-ply flashing composed of Ethylene Propylene Diene Terpolymer (EPDM) conforming to the following physical properties as indicated by ASTM D4811-90 standard specification for Non-vulcanized rubber sheet used as roof flashing.
1. Nominal Thickness: .060 inch
- C. Lap Splice Tape: 6" 35 mil EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer.
- D. Adhesive Primer: High-solids, butyl based primer formulated for compatibility with EPDM membrane & tape adhesive.
- E. Splice Adhesive: Butyl-based, formulated for compatibility with EPDM membrane.
- F. Bonding Adhesive: Neoprene-based, formulated for compatibility with EPDM membrane & a wide variety of substrate materials, including masonry, wood, and insulation facings.
- G. Pourable Sealer: 2-Part urethane , 2-color for reliable mixing.
- H. Seam Plates, Batten Strips and Insulation Plates: Steel with a Galvalume coating.
1. Reference Standard: Corrosion-resistant to meet FM-4470 criteria.

- I. Termination Bar: 1.3" X 0.10" thick aluminum bar with integral caulk ledge.

2.06 METAL GRAVEL STOP

- A. Edge Metal:
 1. Provide .040 aluminum with Kynar finish, Unaclad metal manufactured by Firestone Metal Products. Color shall be selected from standard color chart.

- ## 2.07 ACCESSORIES
- Provide all other accessories, including 1/2" high density protection board (DENS-DECK or approved equivalent), etc. where required by the drawings, site conditions, or necessary to provide a complete warranted system.

PART 3 EXECUTION

3.01 EXAMINATION

- A. For re-roofing applications only: remove existing roof system components as specified.
- B. The surface must be clean, dry, smooth, free of sharp edges, fins, loose or foreign materials, oil, grease and other materials which may damage the membrane. All roughened surfaces which could cause damage shall be properly repaired before proceeding.
- C. All surface voids of the immediate substrate greater than 1/4" wide must be properly filled with an acceptable insulation or suitable fill material.

3.02 PROTECTION OF OTHER WORK

- A. Protect metal, glass, plastic, and painted surfaces from adhesives and sealants.
- B. Protect neighboring work, property, cars, and persons from spills and overspray from adhesives, sealants and coatings.
- C. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.

3.03 MATERIAL STORAGE AND HANDLING

- A. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.
- B. Consult container labels and Material Safety Data Sheets (MSDS) for specific safety instructions.

3.04 WOOD NAILER LOCATION AND INSTALLATION

- A. Total wood nailer height shall match the total thickness of insulation being used and shall be installed with a 1/8" gap between each length and at each change of direction.
- B. Wood nailers shall be firmly fastened to the deck. Mechanically fasten wood nailers to resist a force of 200 lbs. per lineal foot.

3.05 ROOF INSULATION APPLICATION

- A. GENERAL
 1. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.
 2. Lay roof insulation in courses parallel to roof edges.
 3. Miter roof insulation edges at ridge, valley and other similar non-planar conditions.

4. Mechanically fasten as per manufacturer's requirements.

- B. First layer: Neatly fit insulation to all penetrations, projections, and nailers. Insulation shall be fit tightly, with gaps not greater than 1/4". Seal all gaps with compatible spray foam insulation. Tapered insulation shall be installed around roof drains so as to provide proper slope for drainage.
- C. Second layer: Stagger second layer of insulation at 24" offset from first layer. Neatly fit insulation to all penetrations, projections, and nailers. Insulation shall be fit tightly, with gaps not greater than 1/4". Tapered insulation shall be installed around roof drains so as to provide proper slope for drainage.

3.06 MEMBRANE PLACEMENT AND ATTACHMENT

- A. Beginning at the low point of the roof, place the membrane without stretching over the acceptable substrate and allow to relax a minimum of 30 minutes before attachment or splicing. As ambient air temperatures decrease, the relax time will increase.
- B. After making sure the sheet is placed in its final position, fold it back evenly onto itself so as to expose the underside.
- C. Sweep the mating surface of the membrane with a stiff broom to remove excess dusting agent (if any) or other contaminants from the mating surface.
- D. Apply Bonding Adhesive at about the same time to both the exposed underside of the sheet and the substrate to which it will be adhered so as to allow approximately the same drying time. Apply Bonding Adhesive so to provide an even and uniform film thickness. Do not apply bonding adhesive to areas that will be subsequently spliced.
- E. Allow Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. As you are touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating.
- F. Starting at the fold, roll the previously coated portion of the sheet into the coated substrate slowly and evenly so as to minimize wrinkles.
- G. Compress the bonded half of the sheet to the substrate with a stiff push broom.

3.07 MEMBRANE LAP SPLICING

- A. General
 1. Position the sheet at the splice area by overlapping membrane 5 inches. Once the membrane is in place, mark the bottom sheet 1/2" to 3/4" from the edge of the top sheet every 4 to 6 feet. Tack the sheet back with Firestone QuickPrime at 5' centers and at factory splices or as necessary to hold back the membrane at the splicing area.
 2. Remove excess amounts of dusting agent on the sheet and at factory splices using a stiff push broom. Stir Firestone QuickPrime thoroughly before and during use. Dip the QuickScrubber into the bucket of QuickPrime, keeping the QuickScrubber flat. Apply the QuickPrime using long back and forth type strokes with pressure along the length of the splicing area until surfaces become a dark gray in color. Apply QuickPrime to both surfaces at the same time to allow the same flash off time. Change the scrub pad each 200 feet of 3 inch field splice, or when the pad will no longer hold the proper amount of QuickPrime. Additional scrubbing is required at areas that may have become contaminated or have excess amounts of dusting agent, and at all factory splices.

3. Position the QuickSeam Splice Tape on the bottom sheet, aligning the edge of the release paper with the markings. Immediately roll the splice tape with a 3"-4" wide silicone or silicone sleeved steel hand roller or a short nap 3" paint roller.
4. When the QuickSeam Splice Tape has been installed for the entire splice length allow the top sheet to rest on top of the tape's paper backing. Trim the top sheet as necessary to assure that 1/8"-1/2" of the QuickSeam Splice Tape will be exposed on the finished splice.
5. To remove the paper backing from the tape, first roll back the RubberGard membrane sheet, then peel the paper backing off the QuickSeam Splice Tape by pulling against the weight of the bottom sheet at approximately a 45 degree angle to the tape and parallel with the roof surface. Allow the top sheet to fall freely onto the exposed QuickSeam Splice Tape. Broom the entire length of the splice as the release paper is being removed.
6. Roll the splice using a 1-1/2"-2" wide silicone or silicone sleeved steel hand roller, first across the splice, and then along the entire length of the splice.

3.08 MEMBRANE SECUREMENT

- A. Secure membrane at all locations where the membrane terminates or goes through an angle change greater than 2" in 12" except for round pipe penetrations less than 18" in diameter and square penetrations less than 4" square.
- B. Mechanically fasten reinforced perimeter fastening strips per manufacturer's specifications and details.

3.09 FLASHING - PENETRATIONS

- A. General:
 1. At area of re-roofing, remove all existing flashings (i.e. lead, asphalt, mastic, etc.).
 2. Flash all penetrations passing through the membrane.
 3. The flashing seal must be made directly to the penetration.
- B. Pipes, Round Supports, etc.
 1. Flash with Pre-Molded EPDM Pipe Flashings where practical.
 2. Flash using FormFlash when Pre-Molded EPDM Pipe Flashing is not practical.
- C. Roof Drains:
 1. At area of re-roofing, remove all existing flashings, drain leads, roofing materials and cement from the existing drain in preparation for membrane and Water Block Seal. Furnish and install new drain inserts into existing drains.
 2. Provide a clean even finish on the mating surfaces between the clamping ring and the drain bowl.
 3. Taper insulation around the drain to provide a sump area from the roof surface to the drain. Use pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope. Slope shall not exceed manufacturer's recommendations.
 4. Position the RubberGard membrane, then cut a hole for the roof drain to allow 1/2" -3/4" of membrane extending inside the clamping ring past the drain bolts.
 5. Make round holes in the RubberGard membrane to align with clamping bolts. Do not cut the membrane back to the bolt holes.
 6. Place Water Block Seal on top of drain bowl where the clamping ring seats below the membrane
 7. Install the roof drain clamping ring and clamping bolts. Tighten the clamping bolts to achieve constant compression.
- D. Pipe Clusters and Unusual Shaped Penetrations
 1. Fabricate penetration pockets to allow a minimum clearance of 1" between the penetration and all sides.
 2. Secure penetration pockets per manufacturer's details.

3. Fill penetration pockets with Pourable Sealer, so as to shed water. Pourable Sealer shall be a minimum of 2" deep.
- E. Hot Pipes - Protect the rubber components from direct contact with steam or heat sources when the in-service temperature is in excess of 180° F. In all such cases flash to an intermediate insulated "cool" sleeve per manufacturer's details.
- F. Flexible Penetrations
 1. Provide a weathertight gooseneck set in Water Block Seal and secured to the deck.
 2. Flash in accordance with manufacturer's details.
- G. Scuppers
 1. Provide welded watertight scuppers.
 2. Set welded watertight scupper in Water Block Seal and secure to the structure.
 3. Flash in accordance with manufacturer's details.
- 3.10 FLASHING - WALLS, PARAPETS, MECHANICAL EQUIPMENT CURBS, SKYLIGHTS, etc.
 - A. General: Using the longest pieces practical, flash all walls, parapets, curbs, etc., a minimum of 8" high per manufacturer details.
 - B. Evaluate Substrate: Evaluate the substrate and overlay per manufacturer specifications as necessary.
 - C. Complete the splice between flashing and the main roof sheet with Splice Adhesive before adhering flashing to the vertical surface. Provide lap splices in accordance with manufacturer details.
 - D. Apply Bonding Adhesive at about the same time to both the flashing and the surface to which it is being bonded so as to allow approximately the same flash off time. Apply Bonding Adhesive in a uniform coating per manufacturer specifications.
 - E. Allow Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. While touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating. Flash off time will vary depending on ambient air conditions.
 - F. Roll the flashing into the adhesive evenly and carefully so as to minimize wrinkles. After rolling FormFlash, peel off the release sheet and discard. FormFlash must be contoured to fit the substrate to which it is bonded to minimize bridging or gapping. Use a silicone or silicone sleeved steel roller for rolling in FormFlash. Ensure proper contact of flashing by brooming in place.
 - G. Provide termination directly to a vertical substrate as required by manufacturer's specifications and details.
 - H. Install T-Joint covers at field and flashing splice intersections as required by manufacturer's specifications and details.
 - I. Install intermediate flashing attachment as required by manufacturer's specifications and details.
- 3.11 FLASHING - GRAVEL STOPS OR ROOF EDGE METALS
 - A. Apply QuickPrime to the metal edging and membrane as described in manufacturer specifications.

- B. Place the roll of QuickSeam Flashing on the roof a few feet ahead of the application starting point, positioned so that it unrolls from the top of the roll. Remove approximately 2'-3' of release paper and apply to the metal flange and RubberGard membrane. Lap adjacent rolls of QuickSeam Flashing a minimum of one inch.
- C. Roll the QuickSeam Flashing to ensure proper adhesion. Additional attention must be given to factory splice intersections and to any change in plane.
- D. Apply 6" length of QuickSeam Flashing, a QuickSeam Joint Cover, or 6"x6" FormFlash to the inside edge of the QuickSeam Flashing at all overlaps.
- E. Apply 6" length of QuickSeam Flashing, a QuickSeam Joint Cover, or 6"x6" FormFlash at all intersections between the QuickSeam Flashing and field fabricated splices.
- F. Where QuickSeam Flashing will not completely cover the metal flange, an additional piece of QuickSeam Flashing must be applied to the metal edge laps. Apply Seam Edge Treatment at the intersections of the flashing sections.
- G. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, an additional piece of QuickSeam Flashing shall be applied over the metal lap to the top of the gravel stop, after the initial application of QuickSeam Flashing. SeamEdge Treatment shall be applied at the intersections of the two flashing sections.

3.12 TEMPORARY CLOSURE

- A. Temporary closures which ensure that moisture does not damage any completed section of the new roofing system are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

3.13 SHEET METAL WORK

- A. Install manufacturer supplied sheet metal as shown on roof drawings.
- B. All metalwork shall be fabricated and installed according to SMACNA and National Roofing Contractors Association (NRCA) guidelines.

3.14 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed as required by the manufacturer.
- B. Correct identified defects or irregularities.

3.15 CLEAN-UP

- A. Clean all contaminants and remove trash, debris and equipment from building, project site and surrounding areas.
- B. Repair or replace damaged building components or surrounding areas to the satisfaction of the Owner.

END OF SECTION

SECTION 07720 - ROOF ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide and install factory fabricated roof hatch where shown on the drawings, as specified herein, and as required for a complete and proper installation.
- B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General and Supplementary Conditions, and Sections of Division I of these specifications.
 - 1. Section 05500 - Metal Fabrications
 - 2. Section 07225 - Roof Insulation
 - 3. Section 07532 - Fully Adhered EPDM Roofing

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM), ASTM A 36-93a: Standard Specification for Structural Steel

1.03 SUBMITTALS

- A. Comply with Section 01340 and the following:
 - 1. Product Data: Provide manufacturer's product data for all materials in this specification.
 - 2. Shop Drawings: Show profiles, accessories, location, and dimensions.
 - 3. Samples: Manufacturer to provide upon request; sized to represent material adequately.
 - 4. Contract Closeout: Roof hatch manufacturer shall provide the manufacturer's Warranty prior to the contract closeout.

1.04 PRODUCT HANDLING

- A. Comply with Section 01640 and the following:
 - 1. All materials shall be delivered in manufacturer's original packaging.
 - 2. Store materials in a dry, protected, well-vented area. The contractor shall thoroughly inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.
 - 3. Remove protective wrapping immediately after installation.

1.05 SUBSTITUTIONS

- A. Refer to Section 01000, Item 18 for substitution requirements.

1.06 JOB CONDITIONS

- 1. Verify that other trades with related work are complete before installing roof hatch(s).
- 2. Mounting surfaces shall be straight and secure; substrates shall be of proper width.
- 3. Refer to the construction documents, shop drawings, and manufacturer's installation instructions.
- 4. Coordinate installation with roof membrane and roof insulation manufacturer's instructions before starting.
- 5. Observe all appropriate OSHA safety guidelines for this work.

1.07 WARRANTY/GUARANTEE

- A. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. The BILCO Company, P.O. Box 1203, New Haven, CT 06505; Babcock-Davis, 9300 73rd Avenue, Brooklyn Park, MN 55428; or approved equivalent in accordance with Section 01000, Item 18.

2.02 ROOF HATCH

- A. Furnish and install a metal roof hatch where indicated on the drawings. Bilco Type S or Babcock-Davis B-RHG3030. Size: width, 2'6" (762 mm) x length, 2'6" (762 mm), to fit existing rough opening. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.
- B. Performance characteristics:
 - 1. Cover shall be reinforced to support a minimum live load of 40 psf (195 kg/m²) with a maximum deflection of 1/150th of the span or 20 psf wind uplift.
 - 2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
 - 3. Operation of the cover shall not be affected by temperature.
 - 4. Entire hatch shall be weathertight with fully welded corner joints on cover and curb.
- C. Cover shall be 11 gauge aluminum with a 3" (76 mm) beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
- D. Cover insulation shall be fiberglass of 1" (25.4 mm) thickness, fully covered and protected by a metal liner of 18 gauge aluminum.
- E. Curb: Shall be 12" (305 mm) in height and of 11 gauge aluminum. The curb shall be formed with a 3-1/2" (89 mm) flange with 7/16" (11.1 mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip™ flashing system, including stamped tabs, 6" (153 mm) on center, to be bent inward to hold single ply roofing membrane securely in place.
- F. Curb insulation: Shall be rigid, high-density fiberboard of 1" (25.4 mm) thickness on outside of curb.
- G. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.
- H. Hardware
 - 1. Provide with heavy pintle hinges.
 - 2. Cover shall be equipped with a spring latch with interior and exterior turn handles.
 - 3. Roof hatch shall be equipped with interior and exterior padlock hasps.
 - 4. The latch strike shall be a stamped component bolted to the curb assembly.

5. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25.4 mm) diameter red vinyl grip handle to permit easy release for closing.
6. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed. Springs shall have an electrocoated acrylic finish for corrosion resistance.
7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

- I. Finishes: Factory finish of all components exposed to the exterior shall be mill finish aluminum.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that roof hatch installation will not disrupt other trades. Verify that the substrate is dry, clean, and free of foreign matter. Report and correct defects prior to any installation.

3.02 INSTALLATION

- A. The installer shall check as-built conditions and verify the manufacturer's roof hatch details for accuracy to fit the application prior to fabrication. The installer shall comply with the roof hatch Manufacturer's installation instructions. Install unit in roof opening where indicated on the drawings, in accordance with the manufacturer's instructions and the reviewed shop drawings.
- B. The installer shall furnish mechanical fasteners consistent with the roof requirements.
- C. Orient opening direction of hatch as directed by Owner.

END OF SECTION