

**A Modified Bitumen Roof Replacement For: City of Oak Ridge Water Treatment Plant FY2014-31**

To: Prime contractors and all others to whom drawings and specifications have been issued. This Addendum forms part of the Contract Documents. It supplements and modifies them as follows:

**A. Specifications:**

1. **Section 07 52 00 Modified Bitumen Roofing System:** Replace Modified Bitumen Roofing System section from the Specification dated 07/23/13 with Modified Bitumen Roofing System specification section dated 08/09/13.

**B. Clarifications and Amendments:**

1. A building permit is not required for this project, per the City of Oak Ridge Code Enforcement Division.
2. A field office, land line telephone and fax machine will not be required by the Contractor at the field.
3. Electrical power will be available to the Contractor for the project at the jobsite at no cost.
4. Staging/storage area will be available within the fenced in area at the job site. The exact location of the area will be at an agreed upon location determined before construction begins.
5. Section "07 52 00 3.2 A" has been modified to not require mechanical attachment of insulation.

**End of Addendum**



## **SECTION 07 52 00 . MODIFIED BITUMEN ROOFING SYSTEM**

### **PART 1 . GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. Additional Sections contained within this Project Manual may also be related to this Section as they may contain corresponding materials and/or methods, ancillary requirements and/or coordination necessities.

#### **1.2 SUMMARY**

- A.** Furnish and install an SBS FR Class A mineral surface modified bitumen roofing system, including but not limited to; preparation of the roof deck, installation of roofing insulation, installation of new cover board, installation of a new membrane system, flashing, sheet metal, expansion joints, counter flashing and other related items.

#### **1.3 SUBMITTALS**

- A.** Submit manufacturer's product and application data on products specified.
- B.** Product test reports.
- C.** Manufacturer's 20-year warranty, no dollar limit.
- D.** Submit samples of roof membrane.
- E.** Submit manufacturer's shop drawing for tapered insulation. Shop drawing shall show complete layout of the tapered insulation system including outline of roof, locations of drains, scuppers, gutters, downspouts, profile of tapered insulation components, indications of minimum and maximum insulation thicknesses and the average "R" value of the completed insulation system.
- F.** Submit letter from the tapered insulation manufacturer that the roofing system to be installed is approved by the tapered insulation manufacturer for use with the roofing system.

#### **1.4 QUALITY ASSURANCE**

- A.** Engage an experienced installer who has completed roofing applications similar in material, design, and extent to that indicated for the project that have resulted in construction with a record 5 years of successful in-service performance.
- B.** Entire system shall be provided by a single manufacturer.
- C.** System supplier must have ISO 9002 certification.
- D.** Materials and/or equipment containing asbestos are prohibited.
- E.** Standards:
  - 1. ASTM C1330-02 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants
  - 2. ASTM D1622-98 Standard Test Method for Apparent Density of Rigid Cellular Plastics
  - 3. ASTM D1621-00 Standard Test Method for Compressive Properties Of Rigid Cellular Plastics
  - 4. ASTM D2126-99 Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging

5. International Building Code and ASCE-7 for wind design
6. ANSI/SPRI ES-1 for all edge securement system installation
7. Underwriters Laboratories, Inc. (UL): Class A Fire Hazard Classification

## **1.5 ENVIRONMENTAL CONDITIONS**

- A.** Sequencing and Scheduling: Coordinate the modified bitumen roofing and flashing with other work to ensure secure anchorage and watertight seals of connecting work.
- B.** Environmental Requirements: Do not apply modified bitumen roofing and flashing materials to damp or wet surfaces. Apply materials when ambient temperature is above 20 degrees F. When temperatures are below 45° F, consult cold weather application installation criteria.
- C.** Protection: Take necessary precautions against fire and other hazards during delivery, storage and installation of flammable adhesives, solvents and other materials specified herein. Comply with local ordinances and fire regulations in the Installation of materials specified under this section.

## **1.6 DELIVERY AND STORAGE**

- A.** Deliver materials in manufacturer's unopened containers fully identified to show name, brand, type, grade, and thickness.
- B.** Store, protect and keep materials dry and out of direct sunlight. Determine manufacturer's recommended maximum storage and use temperature and protect materials against temperatures exceeding that limit

## **PART 2 . PRODUCTS**

### **2.1 ROOFING INSULATION**

- A.** Base layer insulation; rigid boards, minimum density 2 lbs/cu.ft. Complying with ASTM C-1289, Type II, Class I, Grade 2, ASTM C-1330 and ASTM D-1621, polyisocyanurate with fiberglass perforated facer sheet, 20-psi compressive strength complying with ASTM D1 621. Dimensional stability shall comply with ASTM D-2126-87. Provide 2.5" x 48" x 96" size.
  1. EnergyGuard™ Polyiso by GAF.
  2. Energy 3 polyisocyanurate by Johns Manville, Inc.
  3. ISO 95 + polyisocyanurate insulation as manufactured by Firestone.
- B.** Tapered insulation for saddles; sloped 1/4 "/ft, tapered perlite panels.
  1. EnergyGuard™ Tapered Polyiso by GAF
  2. Tapered Energy 3 Board by Johns Manville Inc.
  3. Tapered ISO 95 + polyisocyanurate insulation as manufactured by Firestone.
- C.** Insulation Adhesive
  1. Base, Intermediate and Top Layers: Two part polyurethane adhesive (Part A is isocyanate side and Part B is polyol side) designed to attach insulation to approved decks.
    - a. Oly-Bond 500 by GAF
    - b. MBR Bonding Adhesive
    - c. I.S.O. TWIN or ISO Stick by Firestone

### **2.2 ROOFING COVERBOARD**

- A. Roof Coverboard; uniform density roof insulation consisting of glass mat facer on a core of non-combustible, water resistant, silicone treated gypsum meeting ASTM C 165. Provide 1/2" x 48" x 96" size.
  - 1. GP Dens-Deck Roof Board or by GAF
  - 2. JM Securock Glass Mat Roof Board by Johns Manville, Inc.
  - 3. Firestone 1/2" Dens-Deck Prime Roof Coverboard by Firestone

## 2.3 ROOFING MEMBRANE

- A. Provide a fire-rated, white mineral surfaced modified bitumen cap sheet membrane.
  - 1. RUBEROID 30 FR by GAF
  - 2. DYNALASTIC 180 FR by Johns Manville, Inc. in cold adhesive with heat welded seams
  - 3. SBS Premium FR CAP by Firestone in cold adhesive with heat welded seams
- B. Base sheets with continuous strand fiberglass mat 58 lb/inch minimum average tensile strength in both machine and cross machine directions.
  - 1. Approved fiberglass base sheet:
    - a. Rubberoid 20 by GAF
    - b. Dynabase sheet by Johns Manville
    - c. SBS Base Modified Bitumen Base Sheet by Firestone
- D. Flashing membrane: Two ply system consisting of a base ply and SBS cap sheet as manufactured by the membrane manufacturer to be installed and meeting ASTM D 5147.
- E. Cold Adhesive: Multi-purpose Cold Adhesive consisting of an asphalt matrix blended with fibers and selected performance additives designed to meet adhesion characteristics necessary for horizontal applications. Conform to ASTM D 3019 and ASTM D 4479.

## 2.4 MISCELLANEOUS MATERIALS

- A. Fasteners: as approved by roof system manufacturer. Provide fastener length sufficient to anchor base layer of insulation and penetrate through the deck 3/4" minimum to achieve a FM 1-90 classification. Fasteners shall be approved for use with the insulation used.
- B. Copings, gutters, downspouts, scuppers, etc. as indicated on drawings.
- C. Sealant: As provided by membrane manufacturer.
- D. Termination bars: 0.040 mil finished aluminum with 3 1/2" vertical drop and 1/2" top caulk receiver. Fasten 12" o.c.
- E. Sump pans: Recessed 20 ga. Metal.
- F. Drain and Stack vents: Provide one of the following:
  - 1. 4 lb. Desilverized pig lead flashing.
  - 2. Portals plus "Alumi-Flash" XT with C-126 caps.
  - 3. Portals Plus "Pipe Portal System" with RC-4A ABS cover and C-126 cap.

- G. Single Pipe Penetrations (Natural gas and electric): Provide one of the following:
  1. Portals plus "Alumi-Flash" XT with EPDM cap sized to fit pipe.
  2. Portals Plus "Pipe Portal System" with ABS cover and EPDM cap sized to fit pipe.
  3. Pate Pipe Curb with ABS cover #pcc-2 and PVC cap sized to fit pipe.
  4. Liquid applied two part polyurethane/urethane elastomer. UltraFlash Liquid Flashing by Firestone
- H. Condensate Drains (where internal piping is required): Provide Portals plus Alumni-Flash with C-1 26 cap or Pate Pipe Seal #pps-3 with spun aluminum base. Plastic cement: Conform to FS SS-C-153C or ASTM D-4586 type II
- I. Traffic Pads: Provide SBS granule surface sheet (adhered to finished roof surface) or approved equal as supplied by the manufacturer of the membrane being installed. Remove smooth, selvage edge if left exposed. Color to contrast with roof surface. See roof plan for areas of walkway.

### **PART 3 . EXECUTION**

#### **3.1 INSPECTION**

- A. Examine the substrates and adjoining construction, and the conditions under which the work is to be installed. Do not proceed with the work until unsatisfactory conditions detrimental to the proper and timely completion of the work have been corrected.
- B. Provide a final inspection of the roofing system by a Technical Representative employed by the roofing system manufacturer.
  1. Technical Representative shall not perform any sales functions
  2. Contractor shall complete any necessary repairs required for issuance of warranty

#### **3.2 INSTALLATION OF THE INSULATION**

- A. Adhere, with manufacturer approved adhesive as described above, the first layer of any multi-layered insulation in compliance with FM Class I construction and 1-90 Windstorm Classification. Install base layer with long dimension of board perpendicular to any deck flutes. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof, apply no more insulation than can be covered with membrane in same day.
- B. Install the coverboard with long dimension perpendicular to the long direction of base layer and parallel to the deck flutes. Offset insulation joints 6" minimum between top and bottom layers.
- C. Apply adhesive only when ambient temperatures and deck surfaces range between 50° F minimum and 110° F. Adhesive shall be a minimum of 70° F during dispensing.
- D. Apply beads of adhesive on the substrate in the specified patterns and coverage rate in accordance with the application specifications for adhesive. In general, an increased number of beads will be required at the perimeter of the roof, depending on the building's overall height and parapet. Each bead of adhesive shall be continuous, and ¾" – 1" in diameter.

#### **3.3 INSTALLATION OF THE MEMBRANE**

- A. Install asphalt primer undiluted unless recommended by producer. Apply by brush, spray or roller at the rate of ¾ to 1-1/4 gallons per 100 square feet. Allow to dry before resuming work in primed area.

- B. Apply cold adhesive with 1/4" notched neoprene squeegee at a rate of 1-1/2 to 2 gallons per 100 square feet, or per manufacturer's recommendations.
- C. Starting at the low point of the roof, embed one ply of SBS Base Sheet in a uniform application of Modified Bitumen MB Cold Adhesive. Embed the a full width of SBS Base Sheet in cold adhesive at a rate of 1-1/2 to 2 gallons per 100 square feet. Apply the cold adhesive using a 1/4" notched neoprene squeegee. Apply adhesive over the lap area as well before installing subsequent rolls of base sheet. Keep sheet free of wrinkles, buckles and fish mouths. Brooming in may be required to eliminate voids and obtain proper embedment. Lap fiberglass base sheets 19" in such a manner that a two ply configuration is attained over all roof areas.
- D. Starting at the low point of the roof, embed one ply of SBS Base Sheet in a uniform application of Modified Bitumen Cold Adhesive. Embed the a full width of SBS Base Sheet in Modified Bitumen cold adhesive at a rate of 1-1/2 to 2 gallons per 100 square feet. Apply the cold adhesive a 1/4" notched neoprene squeegee. Apply adhesive over the lap area as well before installing subsequent rolls of base sheet. Keep sheet free of wrinkles, buckles and fish mouths. Brooming in may be required to eliminate voids and obtain proper embedment.
- E. Heat fuse side and end laps using automatic heat welding equipment in accordance with Manufacturer's recommendations.
- F. Apply granules to areas of bleed out while it remains hot.
- G. Apply modified bitumen membrane only over all areas of base ply in strict accordance with manufacturer's requirements.
- H. Apply and secure walkway pads in strict compliance with manufacturers recommendations as shown on the drawings. Walkway membrane shall have granules colored different from the field membrane for identification.
- I. Terminate the flashings of all roof curb corners with transition flashing or cover with three courses of roofing cement and fabric reinforcement. All exposed roofing cement shall be protected with granules.

### **3.4 FLASHING**

- A. Coordinate the installation of flashing materials and roof accessories so as to provide a complete watertight system complying with the combined recommendations of manufacturers and installers involved in the work. Fasten termination bar 12" o.c.
- B. Extend flashings as shown to provide a complete membrane over the area indicated to be flashed. Seal to all projections through the sheet and seal all seams. Bond vertical and horizontal surfaces.
- C. Pipes, bars or projections through roof not considered curbs shall be flashed using liquid applied flashings from roofing manufacturer. Follow all manufacturer directions for reinforcement and 2 part component application.
- D. Base flashings may be applied with cold adhesive or torched directly to non-combustible surfaces that have been primed. Combustible surfaces require the application of a mechanically fastened base sheet prior to the application of the base flashing cap sheet.
- E. Base flashings may be adhered to Base Sheet using Modified Bitumen Flashing cement.
- F. Where flashing laps onto field cap sheet, the lap area shall be completed by heat fusing in accordance with manufacture's requirements.

**NOTE:** When torching granulated Modified Bitumen sheet, areas such as end laps, base flashings, and patches that have granules on receiving surface embed granules in underlying sheet. Embed granules with a hot trowel by heating surface and troweling-in all granules until a uniform black surface coated with compound is achieved in lap area. Any area of the sheet not protected with a granule surface should be dressed with additional loose granules or patched with an additional piece of granule surfaced modified.

### **3.5 CLEANING**

- A.** Repair or replace defaced or disfigured finishes caused by work of this section.

### **3.6 PROTECTION**

- A.** Protect building surfaces against damage from roofing work. Where traffic must continue over finished roof membrane, protect surfaces.

**END OF SECTION**