



**SAN JACINTO RIVER AUTHORITY  
PURCHASING DEPARTMENT**

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**WOODLANDS DIVISION  
WATER PLANT NO. 1 ROOF REPLACEMENT**



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**Disclosure Requirements**

Chapter 176 of the Texas Local Government Code mandates the public disclosure of certain information concerning persons doing business or seeking to do business with the San Jacinto River Authority, including affiliations and business and financial relationships such persons may have with San Jacinto River Authority officers. An explanation of the requirements of Chapter 176, applicable forms and a complete text of the new law are available at: <http://www.sjra.net>. If you are unable to obtain such information online, please contact the San Jacinto River Authority Purchasing Department, 1577 Dam Site Road, Conroe, Texas 77304 or call (936) 588-3111.

**BY DOING BUSINESS OR SEEKING TO DO BUSINESS WITH THE SAN JACINTO RIVER AUTHORITY, YOU ACKNOWLEDGE THAT YOU HAVE BEEN NOTIFIED OF THE REQUIREMENTS OF CHAPTER 176 OF THE TEXAS LOCAL GOVERNMENT CODE AND THAT YOU ARE SOLELY RESPONSIBLE FOR COMPLYING WITH THEM.**

## **Water Plant No. 1 – 11439 Slash Pine Dr., The Woodlands, TX 77380**

### **Scope of Work: Water Plant 1 TPO Roof Replacement Single Layer Adhesive Roof System – 2,553 SF (69 ft x 37 ft)**

#### **Instructions:**

1. Install (2) roof top safety davits and cables to ensure 100% tie-off while working on the roof.
2. Remove all existing roofing down to the metal decking. Properly dispose of in contractor supplied trash dumpster.
3. Mechanically attach a base layer of 2.5" polyisocyanurate insulation into the steel deck. Over the base layer of insulation, supply and install new ¼" per foot tapered polyisocyanurate insulation into the metal deck using #14 heavy-duty fasteners and insulation plates. Direct slope to exterior gutters.
4. Supply and install new TPO membrane to entire surface (per spec and manufacturer's instructions) of the roof by fully adhering in a solid layer of bonding adhesive. Weld side and end laps per spec and manufacturer's instructions.
5. Raise existing curb mounted roof equipment to a height of approximately 8" above the field of the roof.
6. Install new TPO membrane base-flashing to all curb mounted rooftop equipment by fully adhering in a solid layer of bonding adhesive.
7. Install all required T-Joints and corners to complete the roof system.
8. Supply and install new TPO pipe boot to plumbing pipe penetrations.
9. Remove the existing perimeter edge gutter and downspouts. Fabricate and install new 22-gauge galvanized metal exterior mounted box gutter and downspouts.
10. Fabricate and install new metal edge flashing along the perimeter edge. Strip-in metal flange into the field of the roof with a layer of the TPO flashing.
11. Install TPO walk-pad at rooftop access point and around curb mounted rooftop equipment.

12. Clean-up and dispose of all roof related debris.
13. Must include a minimum of a 2-year Labor and Material Workmanship warranty.
14. Contactor must choose either TPO materials where noted. Mixing of the two materials will not be permitted.

**TPO MEMBRANE ROOFING - FULLY ADHERED**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Section Includes:

1. Roof insulation.
2. Membrane roofing, cover board, and base flashings.
3. Vapor retarder.
4. Insulated curbs for roof penetrations of ductwork or piping.

**1.2 MEASUREMENT AND PAYMENT**

- A. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

**1.3 QUALITY ASSURANCE**

A. Qualifications:

1. Manufacturer shall have a minimum of 10 years continuous recent experience in the manufacture of membrane roofing systems similar to system specified.
  - a. Manufacturer to have similar systems in place that meet or exceed warranty length as specified.
2. Applicator factory trained and approved in writing by roofing manufacturer.
3. Applicator shall have a minimum of 10 years experience installing membrane roofing systems similar to system specified.
  - a. Minimum of five (5) years of the 10 years experience shall have been spent installing roof systems manufactured by company proposed for use.
  - b. Applicator shall have minimum of five (5) years installation experience using heat welded seaming equipment and testing of heat welded seams for seam integrity.
4. Manufacturer's Technical Field Representative shall have minimum 10 years experience in field installation and applicator training and approval process.

**1.4 DEFINITIONS**

A. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

**1.5 SYSTEM DESCRIPTION**

- A. All components fully adhered beginning with one (1) ply reinforced TPO (thermoplastic polyolefin) membrane system over cover board, over insulation, over sheathing (where indicated), over vapor retarder, over metal roof deck, or concrete deck as indicated.

**1.6 SUBMITTALS**

A. Shop Drawings:

- 1. Product technical data including:
  - a. Acknowledgement that products submitted meet requirements of standards referenced.
- 2. Fabrication and/or layout drawings:
  - a. Computer generated, scaled outline of roof areas for all buildings showing:
    - 1) Slopes and tapered roof insulation layout.
      - a) Provide tapered insulation Shop Drawing illustrating installation patterns and dimensions for each tapered module.
    - 2) Edge details.
    - 3) Penetrations and details.
      - a) Identify each penetration.
    - 4) Any special conditions.
    - 5) Seam locations.
  - b. Manufacturer's complete installation drawings, including details.
  - c. If manufacturer's standard detail drawings are used as part of the Submittal information, the standard details shall be enhanced to show the actual project conditions of the substrate including insulation, cover board, vapor retarder, decking material, wall construction, parapet construction and height and coping condition
- 3. Certifications for final close-out:
  - a. Written report prepared by manufacturer's Technical Field Representative stating that roof has been inspected for deficiencies, a listing of all deficiencies and corrections that have been made, and roofing system has been properly installed and is warrantable for period required by the Specifications.
  - b. Final Warranty documents signed by manufacturer's authorized representative.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store membrane rolls lying down on pallets and fully protected from the weather with clean canvas tarpaulins.
  - 1. Unvented polyethylene tarpaulins are not acceptable.
- C. Store adhesives at temperatures recommended by manufacturer.
- D. Replace all materials that become damaged during storage prior to installation.
  - 1. Remove damaged material from the Site.
- E. Protect insulation from direct exposure to sunlight.

**1.8 WARRANTY**

- A. Manufacturer's minimum 10 year system warranty.
  - 1. Warranty to cover roofing membrane, insulation, and roofing manufacturer provided accessories.
  - 2. Warranty to cover manufacturer's authorized applicator workmanship applied to the roof membrane.
  - 3. Warranty period to commence on date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
  - 1. TPO roofing membrane:
    - a. Garland/DBS
    - b. Johns Manville
    - c. Firestone
    - d. GAF
  - 2. Insulation:
    - a. Sika Sarnafil, Inc.
    - b. Atlas Building Products.
    - c. Hunter Panels.
    - d. Fibertight XT.
    - e. I.B. Systems.
  - 3. Vapor retarder:

- a. Fire retardant:
    - 1) Griffolyn.
    - 2) Sika Sarnafil, Inc.
    - 3) Fibertight XT.
    - 4) I.B. Systems.
  - b. Non-fire retardant:
    - 1) Griffolyn.
    - 2) Sika Sarnafil, Inc.
    - 3) Fibertight XT.
    - 4) I.B. Systems.
  - 4. Other materials:
    - a. Manufacturers as noted.
- B. Submit request for substitution.

## **2.2 DESIGN CRITERIA**

- A. Roof Assembly:
- 1. Fire resistance: UL 790, Class A.
  - 2. Hail and wind uplift resistance: FM 4470, Class 1-60 minimum.

## **2.3 COMPONENTS**

- A. Membrane:
- 1. Reinforced TPO (thermoplastic polyolefin) sheet with lacquer coating.
    - a. Meet requirements of ASTM D6878.
    - b. Thickness: 60-mil.
      - 1) Sheet width to be determined by manufacturer.
      - 2) Provide widest sheet possible.
      - 3) ASTM plus or minus tolerance for membrane thickness is not acceptable.
        - a) Provide certification of specified mil thickness.
    - c. Color:
      - 1) White.
      - 2) Reflectivity: 0.83.
      - 3) Emissivity: 0.92.
      - 4) Solar reflective index (SRI): Greater than 104.
- B. Insulation:

1. Rigid, HCFC free, isocyanurate foam insulation boards with approved faces for adhered membrane application.
  - a. Size:
    - 1) 4 FT x 4 FT with 2 IN thick base layer at roof drain locations and scupper openings unless noted otherwise on the Drawings.
    - 2) 4 FT x 8 IN boards acceptable on mechanically attached applications.
  - b. Total thickness as indicated on the Drawings.
  - c. ASTM C1289, Class 1, Type II, faced rigid cellular polyisocyanurate.
  - d. Density: 2 pcf.
  - e. Compressive strength: 25 psi.
  - f. Board edges: Square.
  - g. Thermal value: R value (long term thermal resistance) minimum 6.2.
  - h. Moisture vapor transmission: Less than 1.0 perm.
  - i. Tapered insulation: Same material as base layer of insulation tapered to provide 1/4 IN per foot of slope.
- C. Vapor Retarder:
  1. Over concrete decks (non-fire rated):
    - a. Class A rated.
    - b. Water vapor permeance: 0.03 maximum.
    - c. Tensile strength: 275 LB.
    - d. Puncture strength: Minimum 72 LB.
  2. Over metal deck (fire rated):
    - a. Water vapor permeance: 0.03 maximum.
    - b. Tensile strength: 180 LB.
    - c. Puncture strength: 47 LB.
- D. Cover Board:
  1. Thickness:
    - a. 1/4 IN.
    - b. Size: 4 x 4 FT or 4 x 8 FT.
  2. Non-structural glass mat faced, water resistant, non-combustible silicone treated gypsum core panel approved for use as a substrate under fully adhered TPO roofing membranes.
    - a. Top surface shall be pre-primed to enhance adhesion.
  3. Georgia Pacific Corp. "Dens-Deck Prime."

- E. Adhesives:
  - 1. Proper type as required for substrate and service being adhered.
  - 2. Only solvent base adhesives are acceptable.
  - 3. Provide primers as required for all adhesives.
- F. Vent Pipe Flashing, Sealants, Prefabricated Inside and Outside Flashing Corners, Termination Bars and Batten Strips:
  - 1. Provide manufacturer's standard premolded, prefabricated TPO product that best suits the condition encountered.
  - 2. Provide aluminum termination bars.
    - a. Size: 2-1/4 IN deep by 0.10 IN thick extruded bar with predrilled holes at 8 IN OC.
  - 3. Batten strips:
    - a. Minimum 14 GA channel shaped steel bar, galvanized, ASTM A653.
    - b. Fastener holes predrilled prior to galvanizing process.
- G. Pitch Pocket Filler: Two-part urethane sealant/filler made specifically for filling in voids.
- H. Miscellaneous Fasteners and Anchors: Provide all miscellaneous fasteners and anchors as required for a free draining, water and air tight roofing system.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Applicator to verify that area to be roofed is free of ice/snow, water, dirt, incompatible materials, sharp objects, and miscellaneous debris that may damage the membrane or the vapor retarder.

### **3.2 INSTALLATION**

- A. Install all materials in accordance with manufacturer's written instructions.
- B. Manufacturer's installation procedures take precedence over this Specification Section.
- C. Vapor Retarder:
  - 1. Install over metal decking or concrete decking as applicable using adhesive recommended by the manufacturer.
  - 2. Cut around roof penetrations and seal vapor tight.
  - 3. Extend vapor retarder up face of parapet wall to top of roof insulation.
  - 4. Lap side joints minimum 4 IN, lap end joints minimum of 6 IN and seal all laps with adhesive then tape raw edge of lap.

5. Repair all damage, tears, holes, and nicks in accordance with vapor retarder manufacturer's recommendations.
  - a. Verify compatibility of adhesive with vapor retarder patching method and materials.
6. Do not piece vapor retarder together using scraps.

**D. Installation of Insulation:**

1. Cut insulation neatly to fit around all roof penetrations, projections, and changes in thickness of concrete topping.
2. Before installation is started, remove trash, debris, grease, oil, water, moisture and contaminants from substrate to receive insulation.
  - a. Prepare all surfaces according to applicable Specification Sections.
3. Bottom layer of insulation shall be installed with all joints tightly butted and end joints staggered 12 IN minimum.
  - a. Additional layers shall be installed over preceding layers with all joints tightly butted and end joints staggered 12 IN minimum.
4. Butt joints tightly.
5. Attach insulation using fasteners in accordance with manufacturer's recommendations for uplift rating specified.
6. Provide tapered insulation where shown on the Drawings or where required.
7. Provide crickets behind all roof penetrations larger than 12 IN.
8. Do not install boards that have been damaged and/or broken into pieces unless the area to be insulated requires a smaller piece.
  - a. Trim damaged boards prior to use to provide straight edges and square corners.

**E. Installation of Cover Board:**

1. Lay cover board over top of insulation tightly butted and cut to fit around all penetrations.
  - a. Stagger end joints 12 IN minimum.
2. Attach cover board using mechanical fasteners or insulation adhesive in accordance with manufacturer's recommendations for uplift rating required.
3. Calk around all penetrations with sealant acceptable to insulation and roof membrane manufacturer.
4. Do not install boards that have been broken into pieces smaller than 4 FT x 4 FT unless the area to be covered requires a smaller piece.
  - a. Trim damaged boards prior to use to provide straight edges and square corners.

**F. Installation of Roofing:**

**TPO MEMBRANE ROOFING - FULLY ADHERED**

1. Install roof membrane and flashing using adhesives recommended by roofing manufacturer.
2. Extend roofing to face of parapet wall and secure.
  - a. Install flashing up parapet wall over top of wood blocking on top of parapet wall and down opposite face to bottom of wood blocking unless noted otherwise.
  - b. Provide in one (1) piece with no horizontal joints.
  - c. Extend flashing onto roof surface as required by manufacturer.
3. Install flashing at all vertical surfaces, roof interruptions and penetrations.
  - a. Flash all roof penetrations in accordance with roofing manufacturer's standard details unless indicated otherwise on the Drawings.
4. Heat weld and test all seams the same day they are laid.
5. Install walking surface where indicated.
  - a. Heat weld into place.
  - b. Use only full size pieces of walking surface unless the torn pieces can be heat welded together with no tripping hazards created.
  - c. Provide breaks in walking surface to avoid ponding of water on sloped portions of roofing.

**3.3 FIELD QUALITY CONTROL**

- A. Manufacturer's Technical Field Representative shall inspect all roofing, flashing, and spot test welded seams at completion, generate punch list and provide copy of punch list to Owner's Representative.
  1. Include all applicable costs.
- B. Protect installed insulation from water using water cut-offs in bad weather and at end of work period.
- C. Remove and replace wet and/or damaged insulation and cover board.
- D. On-site quality reviews of all welded seams shall be performed by Applicator prior to stopping work each day:
  1. Provide subsequent report identifying the location(s) of all seam failures and repairs made to that seam.
    - a. Manufacturer's guidelines shall be followed and all protocol shall be maintained if a seam fails the quality review.

**3.4 OWNER TRAINING (NOT USED)**

**END OF SECTION**

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