

**SECTION 07 5419**  
**PVC ROOFING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 DESCRIPTION OF WORK**

- A. Perform localized rehabilitation work and restore the existing PVC roofing system to a watertight condition.
- B. Install new flashings at the new roof drains and other locations indicated.
- C. Provide any mechanical, electrical, hoisting and other work needed, and remove, adjust, modify, reset and reconnect all roof-mounted and roof-penetrating devices.

**1.3 RELATED WORK SPECIFIED ELSEWHERE**

- A. Masonry -Section 04 5000
- B. Sheet Metal Flashing & Accessories - Section 07 6200
- C. Roof Specialties - Section 07 7200

**1.4 CODE APPROVAL REQUIREMENTS**

- A. Install roofing and insulation system components to meet the following minimum requirements:
  - 1. New York State Uniform Fire Prevention and Building Code.
  - 2. Underwriters Laboratories Inc. Class A fire rating for Roof Covering Materials.
- B. Provide written certification from the material Manufacturer, before beginning work, to confirm the roofing system meets these requirements.

**1.5 QUALITY ASSURANCE**

- A. Installer Qualifications:
  - 1. A firm (Installer) with at least 5 continuous years of experience performing PVC roofing work similar to that required for this project, employing skilled personnel.
    - a. The Installer shall directly employ the personnel performing the work of this section.
    - b. The Installer shall have a full-time supervisor/foreman on the roof when roofing work is in progress. The Supervisor shall have a minimum of 5 years experience in roofing work similar in nature and scope to this project, and speak fluent English.
  - 2. The Installer shall provide a reference list of at least three projects of comparable size and similar design, where he has installed PVC roofing within fifty miles of this project, which may be observed by representatives of the Owner:
    - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
    - b. The Installer shall provide the reference list prior to contract award if requested.
  - 3. The Installer shall be acceptable to or licensed by the Manufacturer of the primary roofing materials, and provide written certification from the Manufacturer to confirm this prior to award if requested.
- B. Material Quality: Obtain each product, including PVC roofing, flashing, primers and adhesives, from a single Manufacturer which has manufactured the same products in the United States of America for not less than 5 continuous years.
- C. Pre-Work Conference: Meet at the project site approximately one week prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:
  - 1. How the building will be kept watertight as work progresses.
  - 2. How the repairs will be coordinated.
  - 3. Generally accepted industry practice, the Manufacturer's instructions for handling and installing his products, and specified work requirements.

4. The condition of the existing roofing, curbs, penetrations and other preparatory work needed.
5. Submittals, both completed and yet to be completed.
6. The construction schedule, forecast weather, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
7. A schedule for Architect inspections.

#### **1.6 SUBMITTALS**

- A. Submit the following items far enough in advance to obtain approval prior to performing any work:
  1. Pre-work site and building inspection report with photos to document conditions before work starts.
  2. Written certification from the Manufacturer which states that the Installer is acceptable or licensed to install the specified roofing; if not previously provided.
  3. Manufacturer's installation instructions and technical data sheets for each material component of the roofing system. Material sample submittals are not needed.
  4. Sample of the Contractor's guarantee.
  5. Material Safety Data Sheets.
- B. Simultaneously provide all Material Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders.
- C. Simultaneously provide all technical submittals needed for this project, for all technical sections, collated by section.
  1. Technical submittals shall be prepared and made by the firm that will perform the actual work.
- D. Payment requisitions will not be processed until all submittals are received and approved.

#### **1.7 JOB CONDITIONS (CAUTIONS & WARNINGS)**

- A. Do not use oil base or plastic roof cement with PVC roofing. Do not allow waste products, (petroleum grease or oil, solvents, vegetable or mineral oil, animal fat) or direct steam venting to come in contact with any roofing, insulation or flashing product. Do not expose PVC roofing and accessories to a temperature in excess of 175 degrees Fahrenheit.
- B. Splice cleaner, primers, cements and bonding adhesives are flammable. Do not breathe vapors or use near fire or flame or in a confined or unventilated area. Dispense only from a UL listed or approved safety can.
- C. Remove empty adhesive and solvent containers and contaminated rags from the roof daily and legally dispose of them daily.
- D. Do not apply adhesives adjacent to open ventilation system louvers, or windows. Temporarily cover the louvers and windows with 6 mil fire retardant polyethylene and prevent adhesive odors from entering the building. Remove temporary covers at the end of each days work.

#### **1.8 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, bearing labels which identify the type and names of the products and Manufacturers, with the labels intact and legible.
- B. Cover all stored materials, except rolls of PVC and sealed cans of adhesives, with watertight tarpaulins installed immediately upon delivery.
- C. Immediately remove any insulation which gets wet from the job site.
- D. Do not overload the structure when storing materials on the roof.
- E. Store and install all material within the Manufacturer's recommended temperature range.

#### **1.9 GUARANTEE**

- A. Provide a Contractor's written Guarantee which warrants that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:

1. Defective work includes but is not limited to the following types of failure: leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, and undue expansion.
2. The Contractor's Guarantee shall provide that the Contractor will make the repairs and modifications necessary to enable the work to perform as warranted at his own expense:
3. The Guarantee shall include the removal and replacement of items or materials installed as part of the original work, if removal is needed to affect guaranteed repairs.
- B. Provide one Contractor's Guarantee that covers "all work performed" when a single contract is awarded for work specified in multiple Sections.
- C. Contractor's Guarantee shall be issued no more than 30 days before the satisfactory completion of punch list work.
- D. Guarantees shall include the removal and replacement of items or materials superimposed over the PVC roof as part of the original work, if removal is needed to make warranty repairs.
- E. Guarantee coverage may be cancelled, for the affected portion of the roof, if the work is damaged by winds in excess of 72 mph, by hail, lightning, insects or animals, by failure of the structural substrate, by exposure to harmful chemicals, by other trades on the roof, or by vandalism, or if the Owner fails to maintain the roof in accordance with, or makes roof alterations contrary to, the Manufacturers printed recommendations.
- F. Guarantee coverage shall be reinstated, for the remainder of the original term, if the Owner restores the roof to the condition it was in prior to the damage occurring.
- G. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.

#### **1.10 SUBSTITUTIONS**

- A. The following factors will be considered when evaluating a possible alternative to the roofing system specified:
  1. The wording and intent of the warranty to be issued.
  2. The financial status, numbers of years in business and stability of the entity that will issue the warranty.
  3. A reference list of at least five completed similar projects of comparable size, with a successful functional history of at least five years, within an approximate fifty mile radius of the Project.
  4. Technical aspects of the system, especially relating to durability, serviceability and performance.
  5. The capacity and history of the Manufacturer in providing technical response, on-site inspections and assistance.
  6. The availability and prior experience of local authorized applicators to install and maintain the proposed alternate system.
  7. The willingness and history of the Manufacturer in responding to warranty claims previously made by the Owner, Architect or any Consultant involved in this project.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL**

- A. PVC system components are specified as products of Sika Sarnafil Inc. to establish a standard of quality. Equal products and systems will be considered, if offered as a substitute with sufficient data to establish that the substitute meets the criteria established in this specification.
- B. Primary products required for this project include:
  1. Roof insulation
  2. PVC roofing
  3. Primers and adhesives
  4. Sealants
  5. PVC flashing
  6. Fasteners

**2.2 MATERIALS:**

- A. Insulation: Isocyanurate: Rigid cellular polyisocyanurate boards with fibrous felt/fiberglass mat facers, minimum compressive strength 20 psi, meeting ASTM C1289-01, Type II, Class 1, Grade 2, as manufactured by Sarnafil under the trade name Sarnatherm, thickness to match existing.
- B. Insulation adhesive: Two component low rise elastomeric foam adhesive, installed with a mixing extruding dispenser (a Pace Cart or Heated Pleural Extruding Spray Rig) intended for application at the temperatures that will be encountered.
- C. PVC: .060 inches thick, fire retardant, fiberglass reinforced, PVC (polyvinyl chloride) G410 lacquer coated sheet membrane conforming to the following minimum physical properties:

<u>Properties</u>	<u>ASTM Test Method</u>	<u>Minimum Property</u>
Fiberglass Reinforcing Material		
Overall Thickness, min., inches	D638	0.060
Tensile Strength, min., psi	D638	1500
Elongation at Break, min. (machine x transverse)	D638	250% X 230%
Seam strength, min. (% of tensile strength)	D638	75
Properties after Heat Aging per D3045		
Tensile Strength, min. % of original	D638	90
Elongation, min. % of original	D751	90
Tearing Resistance, min., lbf	D1004	10
Low Temperature Bend @ -40°F	D136	Pass
Accelerated Weathering Test, Xenon Arc		
Cracking @ 7x magnification	-	None
Discoloration by observation	-	Negligible
Crazing @ 7 x magnification	-	None
Linear Dimensional Change, max.	D1204	0.10%
Weight Change after Immersion in Water, max.	D570	± 3.0%
Static Puncture Resistance, 33 lbf	D5602	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf	D5635	Pass
Color: white		
UL Class A External Fire Rating		

**2.3 RELATED MATERIALS**

- A. Cleaners, adhesives, sealants, caulking and fasteners furnished by the PVC system Manufacturer and as listed below. Use low VOC adhesives and cleaners as required by regulations in effect at the time of application.
  1. Wall and Curb Flashing: G410 fiberglass reinforced PVC, color to match the color of the roof
  2. Pitch Pocket Filler: Two component urethane sealant.
  3. Corners: Prefabricated outside and inside flashing corners made of 60 mil thick unreinforced PVC, color to match the color of the roof.
  4. Sealant: One component acrylic-based resin blended with solvent and inorganic adhesives.
  5. PVC Adhesive: Solvent-based reactivating-type adhesive, Sarnacol 2170.
  6. Insulation Plates: 3 inch square, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating.
  7. Fasteners: #14 corrosion-resistant screws.
  8. Aluminum Tape: 2 inch wide pressure-sensitive aluminum tape.
  9. Solvent Cleaner: One component liquid for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface and to clean seam areas prior to hot-air welding.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Perform localized rehabilitation work as indicated on the drawings to restore the existing roof to a water tight condition.
- B. Perform work in areas with roof mounted mechanical equipment, so the work coincides with equipment shutdown periods and does not affect building occupants. Temporarily cover and protect equipment openings, and windows adjoining the work area, with 6 mil fire retardant polyethylene, so dirt, dust and odors do not enter the equipment or building. Remove covers at the end of each workday, and as soon as roof work is complete.
- C. Clean the surface on which roofing system components will be applied, of all laitance, dirt, oil, grease or other foreign matter which would in any way affect the quality of the installation.
- D. Install components of the roof system on dry surfaces only. Do not install any items when weather conditions and outside temperatures are not suitable in accordance with the Manufacturer's recommendations.
- E. Complete all work in sequence as quickly as possible so that as small an area as practicable is in the process of construction at any one time. Complete the entire area of work begun each day, the same day, and make all exposed edges watertight at the end of each day's work.

### **3.2 ROOF CLEANING AND INSPECTION**

- A. Carefully power-wash all roof areas to remove dirt and algae growth from the existing PVC roofing.
- B. Carefully inspect the PVC roofing and rework open seams, failed stripping and flashings, holes, cuts, and any other damage. Replace previous patches made with non-PVC products, using heat welded target patches, and restore the roof to a water tight condition.
- C. Refer to the drawings for the locations, extent and quantity of repairs to be included in the Base Bid.
- D. Immediately notify the Architect and Owner by telephone and in writing if additional defects are found that require repairs above what is specified.
- E. Maintain the building watertight in the interim, but do not proceed with additional work unless authorized by the Architect or Owner.

### **3.3 PVC REPAIRS**

- A. General:
  - 1. Clean the existing PVC surfaces prior to hot-air heat welding new PVC flashings, stripping or target patches. Weld dry surfaces only.
  - 2. Hot-air weld all new PVC roof and flashing, stripping or target patches with seams that finish 3 inches wide when automatic machine welded and 4 inches wide when hand welded.
  - 3. Use welding equipment that is provided by or approved by the material Manufacturer.
  - 4. Perform welding only using personnel that have successfully completed a training course provided by a Manufacturer's Technical Representative.
  - 5. Allow hot air welding equipment to warm up for at least one minute prior to welding.
- B. Hand Welding:
  - 1. Complete hand welded seams in two stages.
  - 2. Form a narrow but continuous weld to close the back edge of the seam, and prevent loss of hot air during the final welding.
  - 3. Insert the nozzle into the seam at a 45 degree angle to the edge of the membrane. Heat the PVC until it begins to "flow," then press the PVC sheets together, and use a hand roller to rub the seam.
  - 4. Use a 1-1/2 inch wide nozzle for straight seams. Use a 3/4 inch wide nozzle for corners and compound seams.
- C. Machine Welding:

1. Form machine welded seams using automatic welding equipment. Follow the machine Manufacturers instructions and local codes for electric current supply, grounding and over current protection. Utilize a dedicated circuit if connected to house power, or provide a dedicated portable generator. Do not run other equipment off the generator used to power the automatic welding machine.
  2. Use metal tracks laid on the membrane, under the machine welder to eliminate wrinkles.
- D. Quality Control of Welded Seams:
1. Visually inspect all seams as they are formed, and then check the entire length of each seam for continuity using a rounded cotter pin removal tool.
    - a. Evidence that welding is proceeding correctly, is visible smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of a small amount of dark gray material from the underside of the top PVC sheet.
  2. Evaluate all welded seams each day as they are formed, and at locations as directed by the Owner's or the Manufacturer's representatives.
    - a. Cut and examine 1 inch wide cross section samples of welded seams at least three times a day. Correct welds display failure from shearing of the PVC sheet, prior to separation of the weld. Install a target patch over each test cut.

### **3.4 FLASHING REHABILITATION WORK**

- A. Cut out and remove areas with damaged flashings and flashings with bridging. Allow the exiting PVC roofing to relax before fastening.
- B. Fasten the existing PVC roofing along the base transition with a continuous termination bar positioned either on the wall or curb, or on the deck, secured with the appropriate fasteners spaced 12 inches on center.
- C. Fully adhere the new flashings to compatible, dry, smooth, and clean surfaces, by applying adhesive in smooth, even coats with no gaps, globs or similar inconsistencies. Press the sheet firmly in place and thoroughly roll it with a hand roller.
- D. Do not apply adhesive on seam areas that are to be welded. Overlap edges of adjoining flashing sheets a minimum of 4 inches. Hot air weld all flashing seams.
- E. Install factory prefabricated corners on all inside and outside corners.
- F. Mechanically fasten the top edge of all flashings 6 inches on center.

### **3.5 MISCELLANEOUS**

- A. Provide any miscellaneous roofing, flashing, caulking, and metal work needed to leave the work complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.
- B. Perform work on mechanical and electrical items using mechanics skilled and licensed in these trades. Provide new material, couplings, transition pieces, blocking, fasteners and the like needed to complete the work.

### **3.6 CLEANING, PROTECTION AND WATERTIGHTNESS**

- A. Inspect the interior and exterior of the building and grounds, and submit a written report with photos to document any existing leakage or damage, prior to performing any other work.
- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leakage or damage which was not documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather which may occur unexpectedly. Make all work areas watertight at the end of each day's work.

- E. Frequently clean up all refuse, rubbish, scrap materials and debris so the work site presents a neat, orderly and workmanlike appearance.
- F. Carefully clean the roof to remove all residual debris when work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

**END OF SECTION**