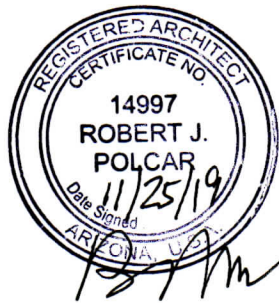


THATCHER UNIFIED SCHOOL DISTRICT NO. 4

THATCHER HIGH SCHOOL ROOF RESTORATION AND BUILDING WEATHERIZATION

NOVEMBER, 2019

SFB Project Number: 050204200-1001-016-BRG



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1. PROJECT SITE

1.1 The School is located at 601 North Third Avenue, Thatcher, Arizona 85552.

2. SCOPE OF THE WORK

2.1 This project involves work at the Thatcher High School Building.

Clean all exterior surfaces, including concrete, masonry, metal, gypsum board and low slope roof surfaces.

Remove all building sealants including those at all expansion and construction joints, window and door frames, sheet metal and flashing joints, penetrations and any other sealants where they occur. Clean, repair and prep all joints and cracks, apply new backer rod and sealant.

Excavate top three inches of soil adjacent to walls for application of coating to walls. Regrade for positive drainage after application and cure of coating.

Repair, prepare, block fill and coat all concrete masonry surfaces.

Prepare and paint all steel, steel doors, steel gates, steel columns, steel frames, ferrous metal downspouts, metal trim, and exposed flashings. Handrails, free standing canopy structures excluded and factory finished metal roof or factory finished fascia panels excluded.

Prepare, repair, spot prime and paint all paintable horizontal building surfaces such as exterior soffits.

Replace existing electrical whips and condensate piping with new at all roof top mechanical units.

Provide a third party testing firm to conduct roof pull tests to verify compliance with all wind uplift requirements.

Low slope roof areas: Remove existing ballasted built-up roof system to the structural deck and properly dispose. Clean, inspect and repair deck as necessary. Install new water tight SBS Modified Bitumen Membrane roof system including new glass-mat faced gypsum cover board, rigid insulation and walk pads. Assure positive drainage throughout. Install new terminations, flashings and trim. Verify that roof curbs comply with roof system warranty requirements; adjust if necessary. Lift mechanical units for proper termination of new roof system. A twenty year manufacturer's material warranty and a two year contractor's warranty are required.

Remove and reinstall all building mounted signs for coating of exterior walls.

Appropriate trades person to modify or extend any mechanical, electrical, plumbing, cctv, telephone, antennae, sound, or lighting facilities, etc. Found to obstruct the work of this project.

The project will take place during the school year while the campus is occupied.

END OF SECTION 01 11 00

1. REQUIRED MEETINGS

1.1 Weekly Job Progress Meetings are to be held at the jobsite. Meetings are to review progress, schedule, answer requests for information and review pay application. Contractor shall be responsible for recording and distributing meeting minutes.

END OF SECTION 01 31 19

1 CONSTRUCTION PROGRESS SCHEDULE

1.1 At the pre-construction meeting the Contractor shall submit for review a detailed construction progress schedule showing the proposed dates of commencement and completion of each portion of the Work.

2 PRODUCT CERTIFICATE

2.1 Contractor shall submit notarized certificate indicating products intended for the Work, including product names and numbers, with statement indicating that products to be provided meet the minimum of the Contract Documents.

3 QUALIFICATION DATA

3.1 Letter written by product manufacturer for this project indicating manufacturer approval of Installer to apply specified products and provide specified warranty. Submit with bid.

4 PRODUCT TEST RESULTS

4.1 Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for elastomeric coating system, joint sealants and components of roofing systems.

5 REVIEWED SUBMITTALS

5.1 The General Contractor shall keep all reviewed submittals on site and they shall be accessible at all times through the duration of the project.

6 INSPECTION REPORTS

6.1 Daily reports of Roofing Inspector. Include weather conditions, description of work performed, tests provided, defective work observed, and corrective actions required and carried out.

7 CLOSEOUT SUBMITTALS

7.1 One complete hard copy and 2 complete copies electronically on CD

7.2 Maintenance Data, to include maintenance manuals.

7.3 Warranties, executed copies of approved warranty forms.

END OF SECTION 01 33 00

1. WORK SPECIFIED HEREIN

1.1 Throughout the Contract Documents reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.

1.2 Reference to known standards within these Specifications shall mean and intend the latest edition or amendment published prior to date of these Specifications, unless specified otherwise, and to such portions of it that relate and apply directly to the material or installation called for on the Project.

1.3 Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide material and workmanship which meet or exceed the specifically named code or standard.

1.4 It is the Contractor's responsibility, when so required by the Contract Documents or by written request from the Architect, to deliver to the Architect all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Architect, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Architect.

1.5 In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.

1.6 The Architect reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements. The Architect further reserves the right, and without prejudice to other recourse the Architect may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Architect and Owner.

1.7 Applicable standards and their abbreviations listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturers Association
AGC	Associated General Contractors
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
AOSHA	Arizona Occupational Safety and Health Act
APA	American Plywood Association
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASTM	American Society for Testing and Materials
ASME	American Society for Mechanical Engineers
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWSC	American Welding Society Code
AWI	Architectural Woodwork Institute
BIA	Brick Institute of America

CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
IBC	International Building Code
ICBO	International Conference of Building Officials
MAG	Maricopa Association of Governments
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board of Fire Underwriters
NBHA	National Builders Hardware Association
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NMWIA	National Mineral Wool Insulation Association
NTMA	National Terrazzo and Mosaic Association
NWMA	National Woodwork Manufacturer's Association
OSHA	Occupational Safety and Health Act
PCA	Portland Cement Association
PCI	Precast Concrete Institute
SDI	Steel Door Institute
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SSPC	Steel Structures Painting Council
UL	Underwriters' Laboratories, Inc.
UPC	Uniform Plumbing Code
USDA	United States Department of Agriculture
WCLA	West Coast Lumbermen's Association
WCLB	West Coast Lumber Bureau
WIC	Woodwork Institute of California
WPOA	Western Plumbing Officials Association
WWPA	Western Wood Products Association

END OF SECTION 01 42 19

CUTTING AND PATCHING

1 GENERAL

1.1 This Section outlines requirements for cutting and patching of existing as well as new work.

A. Structural Work: Do not cut-and-patch structural work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio. Submit proposal and request and obtain Architect's approval before proceeding with any cut-and-patch of structural work.

B. Visual/Quality Limitations: Do not cut-and-patch work exposed to view (exterior and interior) in a manner resulting in noticeable reduction of visual qualities and similar qualities, as judged by Architect.

1. Engage the original installer/fabricator, or (if not available) an acceptable equivalent entity to perform cutting and patching.

2. Refinish entire surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection. For an assembly, refinish the entire unit.

C. Limitation on Approvals: Architect's approval to proceed with cutting and patching does not waive right to later require removal/replacement of work found to be cut-and-patched in an unsatisfactory manner, as judged by the Architect.

D. Where not more specifically described in any of the various Sections of these Specifications, workmanship shall conform to all of the methods and operations of best standards and accepted practices of the trade or trades involved, and shall include all items of fabrication, construction, or installation regularly furnished or required for completion, (including any finish), and for successful operation as intended.

E. Work shall be executed by mechanics skilled and experienced in their respective trade, and shall have proper certification or other credentials where appropriate.

F. In every case, exercise extreme care in cutting operations, and perform such operations under adequate supervision. Openings shall be neatly cut and shall be kept as small as possible to avoid unnecessary damage. Careless and/or avoidable cutting damage, etc., will not be tolerated, and the Contractor will be held responsible for such avoidable or willful damage.

G. Replacing, patching and repairing of materials and surfaces cut or damaged in the execution of the Work shall be performed by experienced mechanics of the applicable trades involved. Such replacing, repairing or patching shall be done with the applicable materials, in such manner that surfaces so replaced, etc., will, upon completion of the Work, match the surrounding similar surfaces.

H. When completed, all parts shall have been durably and substantially built and shall present a neat, workmanlike appearance.

END OF SECTION 01 73 29

1 GENERAL

1.1 This Section outlines requirements for cleaning of the Project work. This Section is complementary to the General Conditions and Supplementary General Conditions and nothing herein shall be considered to waive any requirements of the General conditions or Supplementary General Conditions.

1.2 Requirements of Regulatory Agencies; Safety and Insurance Standards: Maintain project in accordance with the following safety and insurance standards: State Industrial Commission (of Arizona), OSHA.

1.3 Store volatile waste in covered metal containers, and remove from premises daily.

1.4 Pollution Control: conduct clean-up and disposal operations to comply with local ordinances and anti-pollution laws. Burning or burying of rubbish and waste material on the project site is not permitted. Disposal of volatile fluid waste (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

2 PRODUCTS

2.1 Use only cleaning materials recommended by manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

3 EXECUTION

3.1 CLEANING

3.1.1. During Construction:

- A. During the construction period, the material to be used in the work shall be kept in an orderly manner, neatly stacked or piled.
- B. Clean up frequently (at least daily) all refuse, rubbish, scrap materials, and debris caused by operations, to the end that at all time the site of the Work shall present a neat, orderly and workmanlike appearance. Sprinkle dusty debris with water.
- C. Provide for the disposal of all waste products, trash, debris, etc., and make necessary arrangements for legal disposal of same off the site. Never throw rubbish from windows or other parts of building. Lower waste materials in a controlled manner with as few handlings as possible.
- D. Remove all surplus material, false-work, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from operations, and put the site in a neat, orderly condition.
- E. Vacuum clean building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for acceptance.
- F. Schedule cleaning operations so that dust and other contaminates resulting from cleaning process will not fall on wet, newly painted surfaces.
- G. Contractor shall provide trash gondolas or containers for use by all trades.

3.1.2. Final Cleaning:

- A. Use experienced workmen or professional cleaners for final cleaning.
- B. Besides general broom cleaning, the following special cleaning for all trades shall be done at completion of work:

- a. Remove putty stains from glass; wash, polish same, inside and outside. Exercise care not to scratch glass.
- ~~b. Clean, polish and wax woodwork.~~
- c. Clean and polish hardware for removal of stains, dust, dirt, paint and the like.
- d. Remove spots, soil, paint from tile and similar work; wash same.
- e. Clean fixtures, equipment; remove stains, paint, dirt and dust.
- f. Remove temporary floor protections.
- ~~g. Clean and polish all floors.~~
- h. Remove all temporary protections at the site.
- i. Clean exterior and interior metal surfaces, including doors and windows, of oil, stains, dust, dirt, paint and the like.
- ~~j. Clean and vacuum all carpeted areas.~~
- C. Make buildings ready for occupancy in all respects. Lay heavy building paper in main circulation areas to protect the floors until final inspection and acceptance.
- D. All existing improvements inside or outside the property, which are disturbed, damaged or destroyed by the work under the Contract, shall be restored to the condition in which they originally were, or to the satisfaction of the Architect.

END OF SECTION 01 74 00

PROJECT RECORD DOCUMENTS

1.1 RECORD DRAWINGS

- A. The Contractor shall maintain on site a set of the contract drawings showing all changes or modifications to the project during construction. At project substantial completion the contractor will provide the Architect with a complete record set of the original Construction Documents for review. Construction Change Directive and Change Order items shall be included and clearly indicated. The following shall be provided on the Drawings, as follows:
1. Any changes from the Contract Documents, secured with prior approval of the Architect, for any phase of the Work, including all Addenda, Construction Change Directives and Change Orders shall be recorded in a neat readable manner, on the record drawings. All changes from the documents originally bid shall be made by a competent drafter and "clouded". All deletions shall be made by strike-through and clouded.
 2. For plumbing; heating, ventilating and air conditioning; electrical; and fire protection Work, Record Drawings shall be maintained by the Contractor as the Work progresses and as follows:
 - a. Deviations from the sizes, locations, and from other features of installations shown in the Contract Documents shall be recorded. Shut-off valves and other controls shall be clearly marked.
 - b. In addition, it shall be possible, using these drawings, to correctly and easily locate, identify and establish sizes of all piping, directions and the like, as well as other features of the Work which will be concealed underground and/or in the finished building.
 3. Locations of underground Work shall be established by dimensions to column lines or walls, locating all turns, etc., and by properly referenced centerline or invert elevations and rates of fall.
 - a. For Work concealed in the building, sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases this may be by dimension. In others it may be sufficient to illustrate the Work on the drawings in relation to the spaces in the building near which it was actually installed. Architect's decision in this matter shall be final.
 4. Additional drawings shall be provided as necessary for clarification.
 5. Drawings shall be kept up-to-date during the entire course of the Work and shall be available upon request for examination by the Architect and, when necessary, to establish clearances for other parts of the Work.
 6. Upon substantial completion of the Work, submit one (1) copy of the Record Drawings to the Architect for review. The Architect may request additional information be included as part of the record drawing set prior to approval. The Architect shall review the Record Drawings and shall be the sole judge of the acceptability of these drawings.

1.2. OWNER'S MANUAL

Upon Substantial Completion of the Project Work, submit one (1) copy of the Owner's Manual suitably typed, indexed and labeled for ready reference to the Architect for review.

- A. Subcontractors, major suppliers list with company's names, addresses and telephone numbers.
- B. Guarantees/warranties, certifications as described in the General Conditions, Supplementary General conditions and/or the technical specification or each item or work product.
- C. Affidavit: Non-Use of Asbestos Containing Building Materials from General Contractor on use of asbestos free materials, included in this Section.
- D. Materials Receipt signed by Owner and Contractor, included in this Section
- E. Special certifications and inspections documentation.

- F. ~~Certification of building pad and finish floor elevations by a licensed surveyor.~~
- G. Training Log
- H. Other items required by the Specifications.

Upon acceptance of Owner's Manual document, the Contractor shall provide one (1) final hard copy and two (2) copies electronically on CDs to Architect for transmittal to the owner.

1.3 OPERATION AND MAINTENANCE DATA

- A. Upon Substantial Completion of the Project Work, submit one (1) copy of the Operation and Maintenance Manual and Operating Instructions including parts lists for materials, equipment and systems, electrical and control items, to the Architect for review and possible approval. Division 21 to 28 shall be contained in separate binders for each division. Unless approved, revise the Operation and Maintenance Manuals in strict accordance with the Architect's comments. Resubmit one (1) copy of the Operation and Maintenance Manual to the Architect for final review. Upon receipt of Notice of Approval, deliver one (1) hard copy and two (2) copies electronically on CDs of the Operation and Maintenance Manuals to the Architect who will transmit them to the Owner. NOTE: Failure to properly complete and submit Maintenance and Operation Manuals in a timely manner shall place responsibility for detrimental maintenance and operating procedures on the Contractor.
- B. Operating instructions shall include complete operating sequence, control diagrams, description of method of operating machinery, machine serial numbers, factory order numbers, parts, tests, instruction books, suppliers' phone numbers and addresses and individual equipment guarantees. Parts lists shall be complete in every respect, showing parts and part numbers for ready reference.
- C. Maintenance instructions shall include a written list of required and suggested maintenance for mechanical, plumbing, electrical or other equipment or features in the project. Each item shall contain a brief description of the maintenance required as well as the recommended time frame or period for the maintenance. Include lists of filter sizes for air handling equipment, indicated "washable" or "disposable" and for which unit the filter is for. Shut off valves, etc., must be clearly marked on as-constructed drawings.
- D. Assemble maintenance manual and operating instructions in hard back loose leaf binders. Suitably label and index material for ready reference.

1.4 CERTIFICATES AND AFFIDAVIT

- A. Certificates: Submit certificates from governing authorities, manufacturers and subcontractors not previously submitted at the time of Substantial Completion.
- B. Affidavit: Submit the completed "Non-Use of Asbestos Containing Building Materials".

END OF SECTION 01 77 00

SBS MODIFIED BITUMINOUS MEMBRANE ROOFING

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.

1.2 SUMMARY

A. Project Includes:

1. Replacement of existing roof system with new, water tight, SBS Modified Bitumen Membrane roofing system.
2. Removal and legal disposal, offsite, of all existing BUR system, ballast and insulation to the deck substrate.
3. Removal and legal disposal, offsite, of all existing base flashings on walls and penetrations including all lead jacks.
4. Testing, inspection and repair of existing roof deck. The existing deck is a 1-1/2" deep metal deck. Repairs to the deck shall be of the same material as existing, shall span structural framing and shall be fastened in a similar fashion as the existing deck.
5. Provision and installation of polyisocyanurate insulation:
 - a. Mechanically attached to deck. Total flat insulation thickness is to be 1-1/2" except at the roof of the gymnasium, where the total flat insulation thickness is to be 3-1/2", assembled in two layers.
6. Provision and installation of pre-engineered polyisocyanurate crickets at twice the slope rate of the deck to direct water flow to the roof drains and thru wall scuppers and to prevent ponding throughout the roof area.
7. Retention of the reglet for reuse to allow for the termination of the new wall flashings direct to the substrate. Removal of existing sealant at reglet and installation of new sealant. Provision and installation of new sheet metal counter flashing in the existing reglet.

B. Section Includes:

1. Styrene-butadiene-styrene (SBS)-modified bituminous membrane roofing system.
2. Roof insulation.

1.3 SPECIFIED MATERIALS, PRIOR APPROVALS AND SUBSTITUTIONS

- A. Comply with "Request for Approved Equal" in the "Special Terms and Conditions of the IFB".

1.4 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.5 PREINSTALLATION ROOFING CONFERENCE

- A. Conduct conference at Project site.
- B. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
- C. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
- D. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
- E. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
- F. Review structural loading limitations of roof deck during and after roofing.
- G. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
- H. Review governing regulations and requirements for insurance and certificates if applicable.
- I. Review temporary protection requirements for roofing system during and after installation.
- J. Review roof observation and repair procedures after roofing installation.

1.6 BIDDING PRIOR-APPROVAL SUBMITTALS

- A. For Prior Approvals during the bidding phase, provide the following:
 - 1. Manufacturer's technical data and tested physical and performance properties. Submissions that do not clearly demonstrate adherence to articles 2.2 Performance Requirements and 2.3 Roofing Sheet Materials below will be rejected.
 - 2. Submit listing from the Cool Roof Rating Council website (coolroof.org) to indicate initial and 3-year Solar Reflectance, Thermal Emittance and SRI values for the roofing system.
 - 3. Product Data: For adhesives and sealants, indicating VOC content.
 - 4. Product Certificates: For each component of the roofing system, certifications that products meet or exceed specified requirements.
 - 5. Submit UL Classification Label as proof of registration to Underwriters Laboratories Follow Up Inspection Service and proof of UL 790 Class A fire listing of the SBS modified bitumen membrane roofing system over existing metal roof deck.
 - 6. Submit a list of 5 projects of similar size that are a minimum of 10 years old where the proposed roofing system has been installed in Arizona. Include Project name, location, owner contact, size of project and year installed.
 - 7. Sample Warranty.
 - 8. Manufacturer's letter of intent to warrant the completed project.

1.7 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For roofing system. Include plans, details, and attachments to other work, including:
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Crickets, saddles, and tapered edge strips, including slopes.
 - 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

- C. Samples for Verification: For the following products:
 - 1. Cap sheet, of color required.
 - 2. Flashing sheet, of color required.
 - 3. Walkway pads or rolls, manufacturers standard color.

1.8 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer, and testing agency.

- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Provide a "letter of intent to warranty" specified roof system. All products included in the system must be listed by product name.
 - 2. Submit evidence of complying with performance requirements.

- C. Product Test Reports: For components of membrane roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.

- D. Research/Evaluation Reports: For components of membrane roofing system.

- E. Roof deck fastener pullout tests.

- F. Field quality-control reports.

- G. Sample Warranties: For manufacturer's special warranties.

1.9 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.

1.10 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed & FM Global approved for membrane roofing system identical to that used for this Project.

- B. Manufacturer Qualifications: Manufacturer shall employ trained technical service representatives, independent of sales.
 - 1. Trained technical service representative must visit job site regularly and be present at job start up.

- C. Manufacturer Qualifications: Manufacturer shall be an ISO 9001 registered company and provide a 'Quality Compliance Certificate (QCC)' for reporting/confirming the tested values of the SBS modified bitumen membrane materials upon request.

- D. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
 - 1. The installer contractor must have a minimum of five (5) years of experience installing a similar system as per ASFB General Roofing Performance Specification 07 30 00 revised 9/20/2018.
- E. Test Reports:
 - 1. Roof deck fastener pullout test.

1.11 ROOF SYSTEM MANUFACTURER RESPONSIBILITIES

- A. Pre-Bid Meeting: Manufacturers' representation is mandatory at all pre-bid meetings as per ASFB General Roofing Performance Specification 07 30 00 revised 9/20/2018.
- B. Inspections: The product manufacturer shall provide inspections during construction which shall occur as appropriate to the complexity and progress of the work and are in addition to those provided by the Professional Registrant and quality assurances/quality control site visits to assure an installation that will be issued a warranty, but no less than once per week. The inspection reports must be in accordance with other requirements and provision of the ASFB General Roofing Performance Specification 07 30 00 revised 9/20/2018.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.13 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.14 WARRANTY

- A. **Material and labor, no dollar limit (NDL) Roof Warranty:** Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of roofing system.
 - 2. Warranty Period: 20 years from date of Substantial Completion.
- B. As per the terms and conditions of the manufacturers labor-and-material warranty described above, Contractor shall provide an installer warranty for the period listed below:
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. A manufacturer specializing in the production of SBS modified bitumen membrane roofing systems as described in this specification that has been approved by and is inspected by Underwriters Laboratories.
 - 1. Manufacturer shall be prior approved in the bidding phase.
- B. Source Limitations: Obtain components including roof insulation, coverboard, fasteners, adhesives, and for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.
- C. Prior approvals will be considered in accordance with provisions of the "Special Terms and Conditions of the IFB."

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
 - 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 - 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Roofing System Design: Tested by a qualified testing agency to resist the following uplift pressures:
 - 1. Corner Uplift Pressure: 40 lbf/sq. ft.. Squares of 8' X 8' at corners

2. Perimeter Uplift Pressure: 30 lbf/sq. ft.. Within a strip of 8' parallel to edges (excluding corners)
 3. Field-of-Roof Uplift Pressure: 25 lbf/sq. ft.. The remaining area
- D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 ROOFING SHEET MATERIALS

- A. As per ASFB General Roofing Performance Specification Standard, 07 30 00, 2.1.12: ASTM and UL standards and specifications shall be used.
1. The Professional Registrant shall determine substantial equivalency of submissions for prior approval and substitutions.
- B. ASFB General Requirements as per Built-Up Roofing (Modified) 07 52 16:
1. All materials shall meet low VOC standards
 2. All products used shall not contain asbestos, lead, or other hazardous materials.
 3. Fastener length for mechanically attached insulation or base sheet shall not exceed manufacturer requirements.
- C. ASFB General Requirement as per Built-Up Roofing (Modified) 07 52 16, 8.3.2.1, provides for a 2-ply and a 3-ply SBS Modified System. The minimum requirements for the 3-ply system for this project are stated below.
- D. Roofing Membrane Base/ply Sheet: ASTM D 6162, Grade S, Type III SBS-modified asphalt sheet (reinforced with a combination of polyester fabric and glass fibers); or ASTM D 6163, Grade S, Type III, (reinforced with fiberglass mat or glass fibers) smooth surfaced; suitable for application method specified.
1. Application Method: Low Odor Solvent Free Cold Adhered
- E. Roofing Membrane Surface Sheet: ASTM D 6162, Grade G, Type III SBS-modified asphalt sheet (reinforced with a combination of polyester fabric and glass fibers); or ASTM D 6163, Grade G, Type III, (reinforced with fiberglass mat or glass fibers) granule surfaced; suitable for application method specified, and as follows:
1. Application Method: Low Odor Solvent Free Cold-Adhered
- F. SBS Membrane Performance Criteria for a 3-ply system: A multi-ply BUR / SBS Modified Assembly, not to exceed three plies, that meets or exceeds the minimum physical properties as follows:
1. The sum/composite of all layers must meet or exceed 1200 lbs of tear strength in both machine direction (MD) and cross machine direction (XMD) when tested in accordance with ASTM D 5147
 2. The sum/composite of all layers must meet or exceed 800 lbs of tensile strength / peak load, in both machine direction (MD) and cross machine direction (XMD) when tested in accordance with ASTM D 5147.
 3. All three plies, the base membrane, the ply membrane, and surface sheet membrane must be tested in accordance with ASTM D 6162 (reinforced with a combination of polyester fabric and glass fibers) or ASTM D 6163 (reinforced with fiberglass mat or glass fibers).
 4. In addition to the minimum physical properties listed for the 3-ply option, entire system must meet or exceed the requirements to receive the specified manufacturer's warranty.
- G. Surface Sheet Granule Color: Highly Reflective White

1. Solar Reflectance: 0.67 initial, 0.56 3 year
2. Thermal Emittance: 0.91 initial, 0.91 3 year
3. SRI: 82 initial, 67 3 year

2.4 INTERPLY & FLASHING ADHESIVE

- A. Cold-Applied Low/No VOC Adhesive: Roofing system manufacturer's solvent free, single component, asbestos free, ultra-low odor, no-VOC, cold-applied adhesive specially formulated for compatibility and use with roofing membrane and base flashings.

2.5 BASE FLASHING SHEET MATERIALS

- A. Flashing Membrane Sheet: ASTM D 6162, Grade S, Type III SBS-modified asphalt sheet (reinforced with a combination of polyester fabric and glass fibers); or ASTM D 6163, Grade S, Type III, (reinforced with fiberglass mat or glass fibers) smooth surfaced; suitable for application method specified.
 1. Low Odor Solvent Free Cold Adhered
- B. Granule-Surfaced Flashing Sheet: ASTM D 6162, Grade G, Type III SBS-modified asphalt sheet (reinforced with a combination of polyester fabric and glass fibers); or ASTM D 6163, Grade S, Type III, (reinforced with fiberglass mat or glass fibers) granule surfaced; suitable for application method specified, and as follows:
 1. Application Method: Low Odor Solvent Free Cold-Adhered
- C. The base flashings requirements listed above are the minimum standard. The base flashing system must meet or exceed the Roof System Manufacturers requirements for the specified warranty.

2.6 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Asphalt Primer: ASTM D 41/D 41M.
 1. Low VOC / Low Odor options
- C. Asphalt Roofing Cement: Asbestos free, modified bitumen mastic/cement of consistency required by roofing system manufacturer for application.
 1. LOW VOC as supplied by Roof System Manufacturer
- D. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- E. Roofing Granules: Ceramic-coated roofing granules, as supplied by roof system manufacturer, color to match roofing.
- F. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.7 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. As supplied or approved by Roof System Manufacturer
 - 2. Minimum Thickness: 1.5" (see drawings for areas requiring additional thickness and LTRR Value).
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope as indicated or where determined to be needed.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.8 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Manufacturer's Low Rise Foam Insulation Adhesive
 - a. Bead-applied, low-rise, multicomponent urethane adhesive.
- D. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- E. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- F. Cover Board: A coverboard shall be used as per ASFB 07 52 16 Modified BUR Roofing minimum requirements:
 - 1. Acceptable types of cover boards will be:
 - a. Glass-mat faced gypsum coverboard.
 - b. Minimum Thickness: 1/4" or as recommended by roof system manufacturer to obtain specified warranty.

2.9 WALKWAYS

- A. Walkway Pads: Polyester reinforced SBS modified bitumen pads with slip-resisting mineral-granule surface, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, 3/16 inch (5 mm) thick, minimum.
 - 1. Manufacturer's recommended WalkPad or Walkway membrane.
 - 2. Minimum Thickness: 3/15 inch (5mm)
 - 3. Color: To contrast to Roof membrane, manufacturers standard color

PART 3 - EXECUTION

3.1 EXISTING ROOF REMOVAL AND DECK REPAIR

- A. Tear out all base flashings, counter flashings, pitch pans, pipe flashings, vents and like components necessary for application of new membrane.
- B. Remove existing ballast and roofing system.
- C. Remove existing protection/ insulation boards to structural roof deck.
- D. Remove and replace corroded, deteriorated or damaged roof decking.
- E. Raise, (disconnect by licensed craftsmen) all HVAC units, ductwork and other equipment on the roof or supported by curbs. Conform with the following:
 - 1. Modify curbs as required to provide a minimum 8" base flashing height measured from the surface of the new membrane to the top of the flashing membrane.
 - 2. Secure top of flashing and install new metal counterflashing prior to re-installation of unit.
 - 3. Perimeter nailers must be elevated to match elevation of new roof insulation.
- F. Immediately remove all debris from roof surface. Demolished roof system may not be stored on the roof surface.

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that the roof deck is properly supported and secured.
 - 3. Verify that the roof deck is clean, smooth, free of depressions, waves or projections.
 - 4. Verify that the deck surfaces are dry and free of standing water, ice or snow.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Comply with roofing system manufacturer's written instructions.
- D. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.4 INSULATION INSTALLATION

- A. Install insulation with long joints of insulation in a continuous straight line, with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- B. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 3.0 inches (76 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- C. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- D. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- E. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
 - 2. Adhere all subsequent layers using specified Low Rise Foam Insulation adhesive. Apply low rise foam adhesive in a bead application to resist uplift pressure at corners, perimeter, and field of roof. Increase number of beads per board and adjust bead spacing as needed.
- F. Install (adhere) cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together [and fasten to roof deck.
 - 1. Adhere cover board using specified Low Rise Foam Insulation Adhesive.
 - 2. Apply ribbons of bead-applied insulation adhesive and immediately bond cover board to the substrate/insulation. Apply adhesive to resist uplift pressure at corners, perimeter, and field of roof.
 - 3. Increase number of beads per board and adjust bead spacing as needed.

3.5 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:
 - 1. Deck Type: Non-nailable, non-combustible
 - 2. Adhering Method: L (cold-applied adhesive).
 - 3. Number of SBS-Modified Asphalt Sheets: Three (depending upon manufacturer).
 - 4. Surfacing Type: M (mineral-granule-surfaced cap sheet)
- B. Coordinate installation of roofing system so insulation and other components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing sheets and insulation.

2. Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.6 BASE-SHEET INSTALLATION

3.7 SBS-MODIFIED BITUMINOUS BASE-PLY MEMBRANE INSTALLATION

- A. 3-ply System: Install 2 base plies of modified bituminous roofing base ply sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, when applicable, installing as follows:
 1. Cold-Applied: Adhere base ply to substrate in cold-applied adhesive. Adhere middle ply to base ply in cold applied adhesive
 2. Unroll roofing sheets and allow them to relax.
- B. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
 1. Repair tears and voids in laps and lapped seams not completely sealed.

3.8 SBS-MODIFIED BITUMINOUS CAP SHEET MEMBRANE INSTALLATION

- A. Install modified bituminous roofing cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, when applicable.
 1. Cold-Applied: Adhere to substrate in cold-applied adhesive.
- B. SBS Cap Sheet Installation:
 1. Unroll cap sheet and allow them to relax.
 2. Cold-Applied: Adhere to SBS base ply in cold-applied adhesive.
- C. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
 1. Repair tears and voids in laps and lapped seams not completely sealed.
 2. Apply roofing granules to cover exuded bead at laps immediately.
- D. Install roofing sheets so side and end laps shed water.

3.9 FLASHING AND STRIPPING INSTALLATION

- A. Install base flashing, where applicable, over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
 1. Prime substrates with asphalt primer.
 2. Flashing-Sheet Application: Adhere flashing sheet to substrate in approved flashing cement.

- B. Extend base flashing up walls or parapets a minimum of 8 inches (200 mm) above roofing membrane and 4 inches (100 mm) onto field of roofing membrane.
 - 1. Re-use existing reglet where possible
 - 2. Provide new counter flashing compatible with existing reglet system.
 - 3. If new Reglet is needed to achieve manufacturers minimum requirements, a surface mount 2-pc reglet and counterflashing system is acceptable.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
 - 1. Seal top termination of base flashing.
- D. Install SBS stripping ply (plies) where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.
- E. Roof Drains: Set 30-by-30-inch (760-by-760-mm) soft metal flashing in bed of flashing cement on completed roofing SBS base/inter-ply. Cover metal flashing with SBS base ply stripping ply, and extend a minimum of 4 inches (100 mm) beyond edge of metal flashing onto field of roofing membrane. Cover SBS base ply stripping ply and extend a minimum of [4 inches (100 mm)] with the SBS cap sheet, fully adhered. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.
- F. Manufacturers Liquid Flashing Membrane detail may be used at drains.
 - 1. See manufacturers approved installation guide for details

3.10 WALKWAY INSTALLATION

- A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size, according to walkway pad manufacturer's written instructions.
 - 1. Set walkway pads in flashing cement.
 - 2. Or Torch apply walkway pads.

3.11 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
 - 1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
- C. Roofing system will be considered incomplete if it does not pass tests and inspections.
 - 1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.12 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.13 PROJECT CLOSEOUT

- A. Provide specified warranty, signed by manufacturer, to Building Owner. Warranty shall indicate start date.
- B. Provide Roof Maintenance Manual and "As-Built" documents to Building Owner.
- C. Provide all written field records of all inspections, testing, construction administration and quality assurance/ quality control site visits conducted during the installation of the system.

END OF SECTION 07 52 16

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SCOPE

- A. All labor, material, equipment and services necessary to furnish and install sheet metal work as shown on plans or specified herein. The scope of work includes, but may not be limited to: flashings, counter-flashings, reglets, gutters, downspouts, vent flashing and copings.

1.2 SPECIFIED PRODUCTS AND SUBSTITUTIONS

- A. Comply with "Request for Approved Equal" in the "Special Terms and Conditions of the IFB".

1.3 SUBMITTALS

- A. Submittals are required in accordance with Section 01 33 00.
- B. Submit Product Data for all counter-flashings, reglets, vent flashings and copings.
- C. Submit layouts and details of all sheet metal fabrications.

PART 2 MATERIALS

- A. Sheet metal shall be galvanized iron that is of copper bearing steel having 2 ounce zinc coating.
- B. Galvanized iron shall be 24 gauge or as shown on the Drawings.
- C. Solder shall comply with ASTM B-32, Standard Specification for Solder Metal.
- D. Parapet Coping: Petersen Aluminum Corporation. PAC Continuous Cleat Coping or pre-approved equal. Incorporate continuous anchor cleats, concealed splice plates with neoprene sealant strips, and 12 foot continuous sections of Kynar finished 24 gauge steel coping cap. Width as required for existing parapet. Include stainless steel fasteners, pre-formed coping corners. Metal coping cap color shall be as designated by the Owner's Representative. Shall be certified to meet design pressures as indicated in current edition of SPRI's Wind Resistance Standard for Edge Systems Used with Low Slope Roofing Systems and to comply with requirements of IBC. <https://www.pac-clad.com/products/coping-systems/>

3.1 INSTALLATION

- A. Accurately form work to sizes, shapes and dimensions shown and detailed, with all angles and lines in true alignment, straight, sharp, level and in proper place.
- B. Cope and flange intersections to accurately fit and solder together.
- C. Turn back exposed edges and hem 1/2".
- D. Install sheet metal in a tight and solid manner so as to minimize the appearance and size of joints.
- E. Joints other than expansion joints shall be soldered.
- F. Materials to be used on the exterior of the structure are to be installed in a watertight and weather-tight manner.
- G. Materials are to be installed plumb and level without bulges, waves or sags.

END OF SECTION 07 62 00

PART 1 GENERAL

1.1 SCOPE

- A. All labor, material, equipment and services necessary to furnish and install roof accessories as shown on plans or specified herein. The scope of work includes, but may not be limited to: curbs, blocking, vents, and various supports.

1.2 SPECIFIED PRODUCTS AND SUBSTITUTIONS

- A. See Section 01 62 00.

1.3 SUBMITTALS

- A. Submittals are required in accordance with Section 01 33 00.
- B. Submit Product Data for all roof accessories proposed for use.
- C. Submit layouts and details of all accessories.

PART 2 PRODUCTS

A. Roof Blocks:

- 1. Support blocks for piping, conduits, ductwork, equipment.
- 2. Recycled rubber, UV resistant.
- 3. 10 year manufacturer's warranty.
- 3. Clearline Technologies C-Port C Series Roof Blocks or pre-approved equal.

B. Roof Blocks, low clearance:

- 1. Support blocks for piping, conduits, ductwork, equipment.
- 2. Recycled rubber, UV resistant.
- 3. 10 year manufacturer's warranty.
- 4. Clearline Technologies C-Port AP Series Roof Blocks or pre-approved equal.

C. Equipment Support Pads:

- 1. Utility pads for HVAC and Electrical equipment.
- 2. Recycled rubber, UV resistant.
- 3. 10 year manufacturer's warranty.
- 3. Clearline Technologies C-Port AIR-PORT UTILITY PADS or pre-approved equal.

E. Roof Curbs:

- 1. Roof Products, Inc. Phoenix, AZ, or pre-approved equal.
- 2. ASTM A 653 G90 hot-dipped galvanized steel, min. 18ga where supporting HVAC units.
- 3. Mitered and welded corners. Bolted connections not acceptable.
- 4. Internally reinforced for curbs exceeding 3 foot length.
- 5. Wood nailers, factory installed, pressure treated.
- 6. Insulation factory installed 1-1/2" thick three pound density.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Materials to be used on the exterior of the structure are to be installed in a watertight and weather-tight manner.
- B. All items to be installed per material manufacturer's instructions.
- C. Install or adjust roof curbs to match roof slope with top surface plumb and level.
- D. Curb height to be minimum 8" above finished roof level.
- E. Blocks are to be installed per manufacturer's printed instructions, unit selected based on weight to be supported.
- F. Curbs and vents to be flashed in per roof coating manufacturer's requirements.
- G. Materials are to be installed plumb and level without bulges, waves or sags.

END OF SECTION 07 72 00

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Joint sealants designed for interior and exterior above grade applications.
- B. Related Sections:
 - 1. Section 07 62 00 – Sheet Metal Flashing and Trim.
 - 2. Section 09 96 53 – Elastomeric Coatings.

1.2 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Design number of joints and joint widths for maximum of plus or minus 50 percent movement.
 - 2. Design depth of sealant to be 1/2 width of joint.
 - a. Maximum Depth: 1/2 inch (13 mm).
 - b. Minimum Depth: 1/4 inch (6 mm).
- B. Performance Requirements: ASTM C920 Type S, Grade NS, Class 50, Use NT, M, A, G and O.

1.3 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Product Data: Submit manufacturer's technical bulletins and MSDS on each product.
- C. Samples:
 - 1. Initial Selection Purposes: For each product exposed to view, manufacturer's standard bead consisting of strips of actual products showing full range of colors available.
 - 2. Verification: 2 sets of each type and color of joint sealant required. Install joint sealant samples in 1/2 inch wide joints formed between two 6 inch long strips of material matching appearance of exposed surfaces adjacent to joint sealants.
- D. Submit laboratory tests or data validating product compliance with performance criteria specified.
- E. Submit list of references from 5 projects similar in scope to this Project. Include contact name and phone number of person charged with oversight of each project.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company regularly engaged in manufacturing and marketing of products specified in this Section.
 - 1. Manufacturer Qualifications: Company shall be ISO 9001:2000 Certified.
- B. Installer Qualifications: Qualified to perform Work specified by reason of experience or training provided by product manufacturer. Contractor shall be qualified in the field of concrete/ CMU repair with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Mock-Ups:
 - 1. At start of Project, perform mock-up of required sealant Work at 1 area of building. Perform minimum of 1 mock-up for each different combination of substrates to be sealed. Coordinate mock-up areas with Architect.
 - 2. Install mock-ups and test in presence of sealant manufacturer's authorized representative and Architect to assure installation procedures are consistent with warranty requirements.

3. After sealant has achieved sufficient cure as coordinated with manufacturer's representative, conduct adhesion pull-tests, or non-destructive testing, at discretion of Architect. Conduct tests per ASTM C1521.
 - a. Confirm results of adhesion tests as acceptable by Architect, Owner or Owner's representative, and sealant manufacturer prior to proceeding with Work.
4. Leave approved mock-ups in place to establish standards and guidelines for acceptable installation of sealant Work and acceptable appearance.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in original factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets for each product.
- B. Store products in a location protected from freezing, damage, construction activity, precipitation, and direct sunlight per manufacturer's recommendations.
- C. Condition products to approximately 60 degrees F (16 degrees C) to 70 degrees F (21 degrees C) for use per manufacturer's recommendations.
- D. Handle products with appropriate precautions and care as stated on Material Safety Data Sheet.

1.6 PROJECT CONDITIONS

- A. Do not use products under conditions of precipitation, or in inclement or freezing weather. Verify that substrates are clean, dry, and frost-free. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions per manufacturer's recommendations if application during inclement weather occurs.

1.7 WARRANTY

- A. Provide manufacturer's 5 year standard material warranty.
- B. Include coverage for replacement of sealant materials which fail to achieve water tight seal, exhibit loss of adhesion or cohesion, or do not cure, provided sealant has been installed per manufacturer's recommendations.
- C. Warranty Exclusions: Failure resulting from concrete shrinkage, excessive movement structural cracks or defects, faulty construction, faulty design, faulty materials (other than joint sealants), improper installation, misuse of structure, settlement, or accident, fire, or other casualty or physical damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products from the following manufacturer:
 1. BASF Corporation
Construction Chemicals
 2. Approved equal.
- B. Substitutions: Comply with "Request for Approved Equal" in the "Special Terms and Conditions of the IFB".
- C. Specifications and Drawings are based on manufacturer's proprietary literature from BASF Building Systems. Other manufacturers shall comply with minimum levels of material, color selection, and detailing indicated in Specifications or on Drawings. Architect will be sole judge of appropriateness of substitutions.

2.2 MATERIALS

- A. A premium, very low-modulus, high-movement, non-sag, fast-curing, ready-to-use, silyl-terminated polyether sealant. ASTM C 920 compliance:
 - 1. Type and Grade: S (single component) and NS (non-sag).
 - 2. Class: 100/50 for vertical joints.
 - 3. Use Related to Exposure: NT (non-traffic).
 - 4. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - 5. For use with EIFS per ASTM C1382.
 - 6. Acceptable Product: MasterSeal NP 150 (Formerly Sonolastic 150 VLM) Technology by BASF is considered to conform to the requirements of this specification
- B. Accessories:
 - 1. Soft Backer Rod by BASF, or approved equal.
 - 2. Closed Cell Backer Rod by BASF, or approved equal.
 - 3. Porous Substrate Primer: MasterSeal P 179 (formerly Primer 2000) by BASF, or approved equal.
 - 4. Cleaner: MasterSeal 990 (formerly Reducer 990) by BASF, or approved equal.

2.3 COLORS

- A. Colors - As selected by the Architect from the manufacturer's standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Comply with Division 01 requirements.
- B. Inspect areas involved in Work to establish extent of Work, access, and need for protection of surrounding construction.
- C. Examine joints for defects that would adversely affect quality of installation.
- D. Provide additional joint preparation, beyond that outlined in Specifications, as required by sealant manufacturer and Architect's recommendations based on mock-ups and field adhesion tests.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that impair adhesion of joint sealant.
- B. Clean joints as required to expose sound surface free of contamination and laitance.
- C. Ensure structurally sound surfaces, dry, clean, free of dirt, moisture, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing, curing and parting compounds, membrane materials, and other foreign matter.
- D. Concrete, Stone, and Other Masonry:
 - 1. Clean by grinding, sandblasting, or wire brushing to expose sound surface free of contamination and laitance.
 - 2. Prime masonry.
- E. Wood:
 - 1. Do not apply over freshly treated wood; treated wood must have weathered for at least 6 months.

2. Clean new and weathered wood. Scrape away loose paint to bare wood. If coatings cannot be removed, test coatings to verify adhesion of sealant or determine appropriate.
- F. Metal:
1. Remove scale, rust, and coatings from metal to expose bright white surface. Remove protective coatings as well as chemical residue or film.
 2. Aluminum Frames: Remove clear lacquer before application of joint sealants. If coatings cannot be removed, test coatings to verify adhesion of sealant or determine an appropriate primer.
 3. Prime the following surfaces with primer recommended by joint sealant manufacturer:
 - a. Copper.
 - b. Galvanized steel.
 - c. Fluorocarbon (Kynar) coatings.
 4. Remove other protective coatings or finishes that could interfere with adhesion.
- G. Glass:
1. Remove all oil and grease with xylene.
 2. Wipe clean and dry with a clean cloth until no solvent film or fingerprints remain.

3.3 PRIMING

- A. Where circumstances or substrates require primer, comply with the following requirements:
1. Apply primer full strength with brush or clean, lint-free cloth. Apply primer to a light, uniform coating. Porous surfaces require more primer. Do not over apply, or allow primer onto face of substrate.
 2. Allow primer to dry before applying joint sealants. Depending on temperature and humidity, primer will be tack free in 15 to 120 minutes.
 3. Prime and seal on same workday.

3.4 INSTALLATION

- A. Back-Up Material:
1. Install appropriate size backer rod, larger than joint per manufacturer's recommendations, and in manner to provide concave sealant profile.
 2. Where joint depth does not permit installation of backer rod, install adhesive-backed polyethylene bond-breaker tape along entire back of joint to prevent 3-sided adhesion of joint sealant.
- B. Sealant:
1. Verify that temperature and moisture conditions are within manufacturer's acceptable limits.
 2. Using fresh sealant and equipment that is in proper working order, completely fill joint with sealant, filling from bottom up to avoid entrapping air.
 3. Using clean, dry tool with rounded edge, and of appropriate width for each joint, tool freshly installed sealant to provide preferred concave profile, to ensure intimate contact between sealant and substrate, and to provide neat appearance. Where surface aggregate does not permit proper tooling, install sealant and backer rod so that face of joint is recessed behind exposed aggregate, and sealant is bonded to firm, even surface.
 4. Use dry tooling method. Do not use tooling agents such as soapy water or solvents that have not been approved by sealant manufacturer.

3.5 CURING TIME

- A. Curing of joint sealants varies with temperature and humidity. The following times assume 75 degrees F (24 degrees C), 50 percent relative humidity, and joints 1/2 inch (13 mm) wide by 1/4 inch (6 mm).

1. Skins: Within 1 hour.
2. Functional: Within 3 days.
3. Full Cure: Approximately 1 week.

3.6 INSPECTION

- A. During execution of Work, inspect Work to assure compliance with manufacturer's guidelines, these Specifications when they exceed manufacturer's guidelines, and good construction practice.
 1. Refer to latest revision of ASTM C1521 for test methods and frequency.
 2. Allow inspections of Work and assist in testing requested by manufacturer's representative and Architect.
- B. Non-Compliant Work: If inspections reveal non-compliant Work or Work that was not installed per Specifications, and/or manufacturer requirements, remove adjacent Work until a location is reached where installation was performed properly. Assist in spot-checking of remainder of Work.

3.7 CLEANING

- A. Remove uncured sealant and joint filler with xylene, toluene, MEK, or other sealant manufacturer approved solvent.
- B. Remove cured sealant by cutting with sharp-edged tool.
- C. Remove thin films by abrading.
- D. Remove debris related to application of sealants from Project site per applicable regulations for hazardous waste disposal.

3.8 PROTECTION

- A. Protect Work from contaminating substances and damage resulting from other construction operations or other causes so that sealed joints are without deterioration or damage at time of Project completion.

END OF SECTION 07 92 00

SELF-LEVELING ELASTOMERIC JOINT SEALANTS

Part 1 - General

1.01 Summary

- A. This specification describes the sealing of joints and cracks with a one-component, self-leveling, elastomeric polyurethane sealant.

1.02 Quality Assurance

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001:2008 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Safety Data Sheets for complete handling recommendations.

1.03 Delivery, Storage, and Handling

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.04 Job Conditions

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F (5°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified sealant.

1.05 Submittals

- A. Submit two copies of manufacturer's literature, to include: Product Data Sheets, Color Samples and appropriate Safety Data Sheets (SDS).

1.06 Warranty

- A. Provide a written warranty from the manufacturer against defects of materials for a period of one (1) year, beginning with date of substantial completion of the project.

Part 2 - Products

2.01 Manufacturers

- A. Subject to compliance with requirements, Sikaflex-1c SL, as manufactured by Sika Corporation, is considered to be an acceptable product.
- B. Pre-Approved Equal.

2.02 Materials

- A. Polyurethane sealant:
 - 1. The joint sealant shall be a one-component, self-leveling, polyurethane-base material. It shall be applicable in horizontal joints. The sealant shall principally cure under the influence of atmospheric moisture to form an elastomeric substance.
- B. Backer rod or bond breaker tape as approved by Architect.

2.03 Performance Criteria

- A. Properties of the uncured polyurethane sealant:
 - 1. Initial Cure (Tack-Free Time): 1-2 hours
 - 2. Consistency: Self-leveling
 - 3. Color: As selected by Architect
- B. Properties of the cured polyurethane sealant:
 - 1. Tensile Properties (ASTM D-412) at 21 days Self-Leveling
 - a. Tensile Strength at break: minimum 150 psi
 - b. Tensile Elongation: minimum 320%
 - c. Modulus of Elasticity - 100% Elongation 110 psi, min.
 - 2. Shore A Hardness (ASTM D-2240) at 21 days:
 - a. Self-leveling: 40 +/-5
 - 3. Adhesion in Peel (ASTM C-794)
 - a. Mortar > 28 pli 0% Adhesion Loss
 - b. Aluminum > 30 pli 0% Adhesion Loss
 - c. Glass > 37 pli 0% Adhesion Loss
 - 4. Service Range: -40° to 170°F (-40° to 77°C)
 - 5. The sealant shall conform to Federal Specification TT-S-00230C, Type I, Class A.
 - 6. The sealant shall conform to ASTM C-920, Type S, Grade P, Class 25.
 - 7. The sealant shall be capable of ± 25% of the average joint width when tested in accordance to the durability bond test of Federal Specification TT-S-00230C and ASTM C-719.
 - 8. The sealant shall be non-staining.
 - 9. Final Cure: 3 to 5 days.
 - 10. VOC Content: 40 g/L

Part 3 - Execution

3.01 Surface Preparation

- A. The joint and adjacent substrate must be clean, sound and free of standing water or surface contaminants. Remove all traces of the old sealant, dust, laitance, grease, oils, curing compounds, form release agents and foreign particles by mechanical means, i.e. – sandblasting, etc., as approved by the Architect. Blow joint free of dust using compressed air line equipped with an oil trap. Can be applied to green or damp concrete 24 hours after pour or 1 hour after getting wet.

3.02 Mixing and Application

A. Joints:

1. Install approved backer rod or bond breaker tape in all joints subject to thermal movement to prevent three-sided bonding and to set the depth of the sealant at a maximum of 1/2 in., measured at the center point of the joint width. Approval of the backer rod or bond breaker tape shall be made by the Architect.
2. Joints shall be masked to prevent discoloration or application on unwanted areas, as directed by the Architect. If masking tape is used, it shall not be removed before tooling, yet must be removed before the initial cure of the sealant. Do not apply the masking tape until just prior to the sealant application.
3. Install sealant into prepared joints when the joint is at mid-point of its expansion and contraction cycle.
Self-leveling sealant: Pour or extrude the sealant into the prepared joint in one direction and allow it to flow and level as necessary. Avoid overlapping the sealant to eliminate the entrapment of air. Tool as required to properly fill the joint.
4. Adhere to all limitations and cautions for the polyurethane sealant in the manufacturer's printed literature.

B. Cracks:

1. Pour or extrude the sealant into the prepared crack in one direction and allow it to flow and level as necessary. Avoid overlapping the sealant to eliminate the entrapment of air. Tool as required to properly fill the crack.
2. Adhere to all limitations and cautions for the polyurethane sealant as stated in the manufacturers printed literature.

3.03 Cleaning

- A. The uncured polyurethane sealant can be cleaned with an approved solvent. The cured polyurethane sealant can only be removed mechanically.
- B. Leave work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

- A. All labor, materials, equipment and services necessary to paint surfaces as shown or specified.

1.2 SPECIFIED MATERIALS AND SUBSTITUTIONS

- A. Comply with "Request for Approved Equal" in the "Special Terms and Conditions of the IFB".

1.3 SUBMITTALS

- A. Submittals required in accordance with Section 01 33 00.
- B. Submit Product Data on all materials to be used, including product information sheets listing chemical composition and percentage of total volume. Submit data indicating that paint products submitted are in compliance with current county, state, and federal V.O.C. regulations.
- C. Submit color charts and Samples for the Architect's and Owner's color selections.
- D. Submit six (6) 8-1/2 x 11 samples of each color and finish gloss selected by Architect and Owner.
- E. Submit a minimum 6' x 6' sample of each color and finish gloss selected by Architect and Owner on a location of Project selected by Architect.

1.4 PROJECT CLOSE-OUT

- A. See Section 01 77 00 for general Project Close-Out requirements.
- B. Submit manufacturer's or distributor's numbered and dated invoices showing type and quantity of products used on this Project.
- C. Provide Owner with complete information for future matching of all paint products and colors used on the Project.
- D. Provide Owner with (1) one-gallon can of each paint product and color used on the Project. The cans are to be unopened and product and color marked.

PART 2 MATERIALS

2.1 MANUFACTURERS

- A. The following manufactures are approved for this Project provided they match the specified products and comply with Federal and Local Regulations governing volatile organic compounds (VOC's). Colors will be selected from the full line of colors available from the paint manufacturer. Acceptable manufacturers are: Dunn Edwards, PPG, Sherwin Williams.
- B. Painting finishes schedule. Apply the following finishes to the surfaces specified (Dunn Edwards paints are scheduled as a basis of design, provide DE paints or approved equal):

<u>SUBSTRATE</u>	<u>PRIMER</u>	<u>FINISH</u>	<u>SHEEN</u>
<u>Ferrous metal</u>			
1 st Coat	(ENPROO) ENDURA-PRIME Rust Preventative Primer		
2nd Coat		(ENCT50) ENDURA-COAT	Semi-gloss
3rd Coat		(ENCT50) ENDURA-COAT	Semi-gloss
<u>Galvanized metal</u>			
1 st Coat	(SC-ME01-1) Supreme Chemical Metal Clean & Etch		
2nd Coat	(ULGMOO) ULTRASHIELD Galvanized Metal Primer		
3rd Coat		(EVSH20-2) EVERSIELD	Velvet
4 th Coat		(EVSH20-2) EVERSIELD	Velvet
<u>Textured gypsum wallboard</u>			
1 st Coat	(VNPROO) VINYLASTIC Premium		
2nd Coat		(ASHL30) ARISTOSHIELD	Velvet
3rd Coat		(ASHL30) ARISTOSHIELD	Velvet

PART 3 INSTALLATION

- 3.1 Standards of Workmanship: Preparation, application, workmanship, completion, and acceptance shall be in accordance with this Specification, manufacturer's recommendations, and applicable provisions of the PCDA manual for "type 1 standard job".
- 3.2 Deliver paint to site in manufacturer's labeled and sealed containers. Labels shall give manufacturer's name, brand, type, batch number, color of paint and instructions for reducing. Thin only in accordance with printed directions of manufacturer. Job mixing or job tinting may be done when approved by the Architect.
- 3.3 Store materials used on the job in a single space. Such storage place shall be kept clean. Receive, store, handle and mix paint materials in this space. Make good any damage to it or to its surroundings. Remove any oily rags, waste, etc. from the building every night and take every precaution to avoid any danger of fire.
- 3.4 Inspection of Surfaces: Do not begin painting on any surface until it has been inspected and is in proper condition to receive the paint as specified. Should any surface be found unsuitable to provide a proper paint finish, notify the Architect in writing. Apply no material until the unsuitable surfaces have been made satisfactory. After acceptance of surface by application of first coat of paint, assume responsibility for and rectify any unsatisfactory finish resulting.
- 3.5 Steel and Iron: Remove grease, rust and rust scale and touch up any chipped or abraded places on items that have been shop coated. Where steel or iron have a heavy coating of scale, remove by descaling or wire brushing as necessary to produce a satisfactory surface for painting Prime welds if required.
- 3.6 Galvanized Metal: Thoroughly clean by wiping surfaces with solvent cleaner and conditioner before applying primer.
- 3.7 Do not apply exterior paint in damp, rainy weather, or until the surface has dried thoroughly from the effects of such weather. Do not apply varnish or paint when temperature is below 50 degrees F.

- 3.8 Stain or paint only when surfaces are clean, dry smooth and adequately protected from dampness. Each coat of paint shall be well brushed or rolled on, worked out evenly and allowed to dry at least 24 hours before the subsequent coat is applied.
- 3.9 Finished work shall be uniform of approved color, smooth and free from runs, sags, clogging or excessive flooding. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping. Where high gloss enamel is used, lightly sand undercoats to obtain a smooth finish coat.
- 3.10 At completion, touch up and restore finish where damaged, and leave surfaces in good condition.

END OF SECTION 09 91 00

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Elastomeric Coating system for exterior concrete unit masonry and concrete.

1.2 RELATED REQUIREMENTS

- A. 07 62 00 – Sheet Metal Flashing and Trim
- B. 07 92 00 – Joint Sealants

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.
 - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - 2. Attendees to include:
 - a. Owner's Representative
 - b. Contractor
 - c. Installer
 - d. Manufacturer's Technical Representative
 - 3. Agenda:
 - a. Review schedule
 - b. Review substrates
 - c. Review locations

1.4 PRIOR APPROVALS

- A. Products and materials shall be reviewed and approved during the bidding phase.
- B. Comply with "Request for Approved Equal" in the "Special Terms and Conditions of the IFB".
- C. Prior Approval requests shall include items A, B, F and J from Section 1.6 SUBMITTALS and items A and B of Section 1.8 QUALITY ASSURANCE.

1.5 SUBMITTALS

- A. Qualification Data: For Manufacturer and Installer.

- B. Product Data: Provide product criteria, characteristics, accessories, spreading rate, cured to uncured seaming methods, and termination conditions.
- C. Color charts for the Architect's and Owner's color selections.
- D. Sample at Masonry: Stepped sample on a face shell of the concrete masonry unit no smaller than 8 x 8 inches showing each coat including primers, fillers and intermediates.
- E. Sample Concrete: Stepped sample on a concealed location no smaller than 8 x 8 inches showing each coat including primers, fillers and intermediates.
- F. For components of this section submit the following
 - 1. For paints and coatings, documentation printed statement of VOC content.
- G. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.
- H. Manufacturer's Field Service Reports: Submit site reports on periodic visits indicating system observation before, during and after installation by manufacturer's authorized representative.
- I. Pre-Installation Conference Report: Submit report verifying project site conditions and acceptance of mock-up panels prior to installation, including special manufacturer's instructions and requirements. Include review of protection plan for surrounding areas and adjacent surfaces with report
- J. Warranty: Submit intent to warranty document from manufacturer of elastomeric coating. Prior to project closeout, ensure warranty forms have been completed in Owner's name and registered with manufacturer.
- K. Maintenance Data: For users operation and maintenance of system including:
 - 1. Methods for maintaining system's materials and finishes.
 - 2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

1.6 MAINTENANCE MATERIAL

- A. Furnish extra materials that are from same production run (batch mix) as materials applied and that are packaged for storage in unopened, factory-sealed containers and identified with labels describing contents.
 - 1. Quantity: Furnish an additional 1 gal. of each material, color, and texture applied

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualification: Company specializing in the manufacture of work specified in this section with minimum 15 years of experience manufacturing specified materials. Company shall be ISO 9001:2000 Certified.

- B. Installer Qualifications: Company specializing in performing the work of this section with minimum of 5 years of experience and authorized by the manufacturer to apply the elastomeric coating to walls.
- C. Notify manufacturer's authorized representative a least two weeks before start of work. Schedule minimum of three job site inspection by manufacturer's authorized representative, the first scheduled before application of product.

1.8 MOCK-UP

A. Visual Mock-up:

1. Construct Visual Mock-up.
2. Required area 25 square feet.
3. Obtain approval of final color and texture selection.
 - a. Prepare additional mockups if not approved until approval given at no additional cost to the Owner.
4. Obtain the manufacturer's approval of joint treatments, repairs and coating system color, appearance and workmanship standard. Manufacturer or their designated representative to perform necessary mock-up testing and analysis, as required for warranty, prior to coating installation for completed system.

B. Performance Mock-up:

1. Construct Performance Mock-up and testing.
2. Manufacturer to conduct adhesion testing in accordance with ASTM D3359, method A to confirm substrate preparation. Minimum adhesion rating of 4A required on 0 to 5 scale.
3. Manufacturer to conduct RILEM tube testing. Testing to be witnessed by Architect. Result to be presented to Owner.

C. Locate where directed.

D. If approved, mockup may remain as part of the Work.

1. Obtain Architect/ Owner written approval of field sample before start of material application, including approval of aesthetics, color texture and appearance.
2. Maintain mock-up during construction for workmanship standard

1.9 DELIVERY, STORAGE, AND HANDLING

- A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.
- B. Comply with manufacturer's ordering instructions for custom colors and lead-time requirements to avoid construction delays.

- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials tightly sealed, off of the ground and away from moisture, direct sunlight, extreme heat and freezing temperatures.

1.10 PROJECT CONDITIONS

- A. Verify substrates and ambient air temperature at project site before, during and after application to ensure compliance with manufacturer's recommendations.
- B. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 90 deg F unless otherwise permitted by manufacturer's written instructions.
- C. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces. Avoid freezing temperatures. Do not apply material if rain is expected within 24 hours of application.
- D. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before starting or continuing coating operation.

1.11 WARRANTY

- A. Manufacturer's Finish Warranty: Correct defective work within a ten year period after Substantial Completion for elastomeric coating system failure including but not limited to:
 - 1. Weathering beyond that normally expected for the coating in the climate in which it is applied.
 - 2. Failure to resist penetration of water.
 - a. Exception: Where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.
 - 3. Adhesion failure.
- B. In the case of defect, manufacturer shall provide necessary replacement material and labor at no cost to the Owner.

PART 2 - PRODUCTS

2.1 PERFORMANCE AND DESIGN CRITERIA

- A. Provide an elastomeric coating system:
 - 1. Formulated for above-grade vertical wall protection
 - 2. That will provide a flexible, breathable membrane
 - 3. Handle normal thermal movement

4. Repel wind-driven rain without penetration
5. Allow moisture vapor in the substrate to escape
6. Will not blister or delaminate due to water or vapor action.

2.2 BASIS OF DESIGN REPAIR AND COATING SYSTEM

- A. High-build, water-based elastomeric, 100 percent acrylic, waterproof coating.

2.3 MATERIALS

- A. Obtain each component of the elastomeric coating system, including associated accessories, through one source from a single manufacturer. All components and accessories shall be covered by the Manufacturer's warranty.

- B. Acrylic Elastomeric Coating System: Exterior Flat Waterborne, Pigmented Elastomeric Coating:

1. Surface Profile:
 - a. Concrete and CMU Substrate – Smooth
2. Performance Requirements, applied at 16 mils DFT:
 - a. Two-coat application at total 16 mils DFT minimum.
 - b. Density, ASTM D1475: 11.2 to 12.2 lbs per gal (1.34 to 1.46 kg/L).
 - c. Solids Content, white, ASTM D5201:
 - 1) By Weight: 64.2 percent.
 - 2) By Volume: 50 percent.
 - d. Viscosity, ASTM D562: 127 to 135 KU.
 - e. VOC Content, ASTM D3960: 0.32 to 0.42 lbs per gal (38 to 50 g/L), less water and exempt solvents.
 - f. Ultimate Elongation, ASTM D412: 344 percent.
 - g. Elongation Recovery, ASTM D412:
 - 1) After 10 Minutes: 96.9 percent.
 - 2) After 24 Hours: 98.4 percent
 - h. Ultimate Tensile Strength, ASTM D412: 220 psi (1.5 MPa).
 - i. Crack Bridging, PR EN 1062-7:
 - 1) At minus 77 degrees F (minus 60 degrees C): 12 mils (0.3 mm).
 - 2) At 32 degrees F (0 degrees C): 19.5 mils (0.5 mm).
 - 3) At 73 degrees F (23 degrees C): 27.5 mils (0.7 mm).
 - j. Low-Temperature Flexibility, ASTM D522: Pass 1/8-inch mandrel at -30 degrees F.
 - k. Adhesion, ASTM D4541: 210 psi (1.4 MPa).
 - l. Wind-Driven Rain, Federal Specification TT-C-555B: Passes.
 - m. Water-Vapor Permeance, ASTM D1653: 12 perms.
 - n. Accelerated Weathering, ASTM G23, Type D, 5,000 hours: Passes.
 - o. Visual Color Change, ASTM D1729, 5,000 hours: Passes.
 - p. Dirt Pick-Up, ASTM D3719, after 6 months exposure: 94.33 percent.
 - q. Mildew Resistance, ASTM D3273 and 3274: No growth.
3. Approximate Coverage Rate: 50 to 100 sq ft per gal (4.6 to 9.3 m²/L).
4. Wet Film Thickness (WFT):

- a. At Smooth Textures: 16 to 32 mils (406 to 813 microns).
- 5. Dry Film Thickness (DFT):
 - a. At Smooth Textures: 16 to 20 mils (203 to 406 microns).
- 6. Colors: As selected by Architect/ Owner.
- 7. Texture:
 - a. Smooth
- C. Block Filler/ Primer:
 - 1. Provided and warranted by Elastomeric Coating Manufacturer.
- D. Patching Compound:
 - 1. Provided and warranted by Elastomeric Coating Manufacturer.
- E. Biodegradable Cleaner:
 - 1. As approved by the Elastomeric Coating Manufacturer.
- F. Cementitious Repair Material:
 - 1. As approved by the Elastomeric Coating Manufacturer.
- G. Bonding Adhesive:
 - 1. As approved by the Elastomeric Coating Manufacturer.

2.4 ACCESSORIES

- A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.
 - 1. Crack filler, sealants and repair materials as recommended by the manufacturer to achieve the surface profile listed above.

2.1 MIXES

- A. Mix elastomeric coating materials in accordance with manufacturer's printed recommendations.
 - 1. The addition of additional water is prohibited unless manufacturer grants prior written permission
- B. Mix Mortar in accordance with manufacturer's printed instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions meet the manufacturer's requirements before starting work.

3.2 PREPARATION

- A. Prepare surfaces to receive work in accordance with manufacturer's instructions.
 - 1. Determine acceptable removal techniques for contaminants harmful to coating system performance, such as dust, dirt, grease, oils, curing compounds, form release agents, laitance and previous films or water repellent coatings. All surfaces must be clean, dry, frost-free and dust-free.
- B. Cleaning Concrete Masonry, Concrete and Mortar:
 - 1. General light cleaning: to remove ordinary dirt and environmental contaminants, finishes may be cleaned with a mild detergent solution or gentle commercial-grade cleaner.
 - a. Prepare the surface for cleaning by thoroughly rinsing the wall with clean water to remove surface particles.
 - b. Apply the cleaning solution to the entire area using a soft bristle brush.
 - c. Do not allow the cleaning solution to dry on the wall.
 - d. Rinse the wall thoroughly with clean water to remove all traces of loosened dirt and cleaning solution.
 - 2. Power(pressure)-Washing
 - a. Pressure wash surfaces with care
 - b. Power-washing using a low-pressure (300-500 psi) power-washing using cold water.
 - c. Direct nozzle only at right angles no closer than 2 feet from the wall surface.
 - d. Do not spray water directly at windows or doors
 - e. Do not spray water directly at flashing ends and terminations.
 - 3. Mold and Mildew
 - a. At locations where mildew has occurred, the root system and bloom must be killed to stop growth. To do this use a fungus and algae remover in conjunction with low-pressure power-washing.
 - 4. Rinse the wall thoroughly with clean water to remove all traces of cleaning products or solution
- C. Protect adjacent work areas and finished surfaces from damage during coating system installation.
- D. Remove and protect building appurtenances and hardware if possible prior to application. Protect if not possible
 - 1. Replace after coating cure period.
- E. CMU and Concrete Substrate Repair:

1. Repair per manufacturer's recommendations if they differ from those below.
2. Prepare an example of the crack repair methods described below for review and approval by the Manufacturer and Architect prior to undertaking work.
3. Inspect all wall areas, identify and mark all cracks in existing substrate.
4. Use mechanical abrasion/ wire wheel and wire brush to remove all loose paint and punky mortar.
5. For hairline cracks identified as 1/16 inch wide or less, pre-treat or pre-strip with elastomeric coating materials using heavy-brush application per coating manufacturer's recommendations.
6. For cracks that are 1/16 inch wide and less than 1/8 inch wide that are not dynamic:
 - a. Gently clean cracks and crack edges to remove loose or flaking material
 - b. Apply or pack sealant materials into crack and beyond edges of the crack margin. Use a small flexible trowel or spatula capable of working in small areas.
 - c. Feather out all edges of crack repairs to avoid telegraphing of the repairs through the elastomeric coating.
 - d. Pre-treat or pre-strip packed cracks with elastomeric coating using heavy-brush application per coating manufacturer's recommendations.
7. For dynamic cracks, repair with flexible sealant.
 - a. All cracks and joints larger than hairline shall be treated and caulked. Thoroughly clean and blow out the joint with compressed air or flush the joint with clean water to remove all grinding dust. Routed surface must be clean, dry, sound and square.
 - b. Remove all failed caulking material previously applied over cracks and clean thoroughly.
 - c. Apply bond breaker along entire length at the bottom of all routed joints, taking care to avoid applying bond breaker to the sides of the joint. Fill the full length and depth of the joint with sealant. Tool the sealant as recommended by the Manufacturer to ensure bonding, consolidation and uniform appearance. The sealant must be completely cured prior to application of the block filler, primer or elastomeric membrane.
8. For non-dynamic mortar joint and cementitious surface repairs, prime area with Bonding Adhesive and repair with Mason Mix. Use wet brush to smooth repair areas and blend. Prime repaired surface with coating manufacturer's primer. Cementitious repair materials shall only be used at joints and cracks that are not dynamic.
9. At surfaces exhibiting poor or marginal adhesion, prime in accordance with coating manufacturer's printed instructions.

F. Through Wall Penetrations:

1. Inspect all through wall penetrations, including electrical, lighting, signage, plumbing, HVAC and fire protection.
2. Repair all deficiencies with approved, compatible sealant for a watertight installation.

3.3 INSTALLATION

- A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.
- B. Prior to application over masonry block or other porous and/or highly textured surfaces, elastomeric coating manufacturer's acrylic block filler must be utilized to fill the pores and achieve a pinhole-free surface. Block filler should be applied at a rate sufficient to fill the porosity of the substrate. If spray applied, the block filler shall be back-rolled into the surface.
- C. Apply a sample application of elastomeric coating in an inconspicuous location to test for adhesion.
- D. Match the finish supplied as a sample and as constructed in the mock-up.
- E. Do not apply coating by spray methods in windy conditions or when application is deposited on surfaces beyond those that have been masked.

3.4 ELASTOMERIC COATING APPLICATION

- A. All containers shall be thoroughly mixed prior to application in accordance with the Manufacturer's directions using a power mixer capable of mixing the entire container. Mix to ensure uniform color and aggregate disbursement and to minimize air entrapment. **Do not thin the material.**
- B. In multi-pail applications, mix contents of each new pail into partially used pail to ensure color consistency and smooth transitions from pail to pail.
- C. Apply block filler to all surfaces to be coated in accordance with manufacturer's instructions to prime and fill.
- D. Apply coating in accordance with manufacturer's printed instructions as a 2-coat system.
- E. Roll Apply or spray and back roll the first coat at the rate of 80 to 100 square feet per gal. The second coat can be spray applied only at 80 to 100 square feet per gal to achieve a final minimum thickness of 16 to 20 dry mils.
- F. Maintain proper uniform wet-film thickness during application to ensure performance characteristics desired.
- G. Apply coating to achieve pinhole-free, consistent film build on coated surfaces.

3.5 FIELD QUALITY CONTROL

- A. Field Testing and Inspection: The Owner may engage the services of a qualified testing agency to verify installed thickness and water resistance of the elastomeric coatings.
 - 1. Provide manufacturer's field service consisting of periodic site visits by manufacturer's representative for observation of coating system application including the following as a minimum:
 - a. Preinstallation meeting
 - b. Review and approval of substrate preparation
 - 1) Field adhesion testing (Pull Test)

- c. Review of crack repair methods
 - d. Review of mock up
 - 2. The Owner may complete or duplicate recommended testing required by the manufacturer at completion of work to ensure warranty requirements and contract compliance are met.
- B. Field-Adhesion Testing:
- 1. Document and perform field-adhesion testing in accordance with manufacturer's recommended field-adhesion testing requirements to qualify for coating manufacturer's specified warranty program.
 - 2. Inspect and note the percent cohesive failure (percent of coating material left on the wall surface).
 - a. At least 80 percent of the coating should remain on the wall surface. If this is not achieved, clean wall surface again and retest.
- C. Final inspection: RILEM Tube Testing is to be conducted by Manufacturer and witnessed by the Architect once the final application has been fully cured. Result to be presented to Owner.
- D. Warranty Request: Manufacturer's representative will inspect finished surface preparation, application and finished coating and may require further preparation or application to achieve appropriate result. In no case will manufacturer's representative approve surface or finish if any of the following conditions are found: excessive pinholes, insufficient coating thickness, loose paint, paint with curled edges, crack treatments with loose edges, loose stucco (to be determined by sounding method), or any other condition, which, in manufacturer's representative's opinion, may cause failure of installation. Warranty applications require a minimum 15 mils film thickness.

3.6 PROTECTION

- A. Protect installed work as required by the manufacturer to maintain product performance, design criteria and warranty.
- B. At completion of the work, remove temporary coverings and protection of adjacent work areas.
- C. Immediately remove over-spray coating from areas that were not to be coated.
- D. Remove construction debris from project site and properly dispose of debris on a planned daily basis.
- E. Touch up and restore damaged or defaced coated surfaces.

END OF SECTION 09 96 53