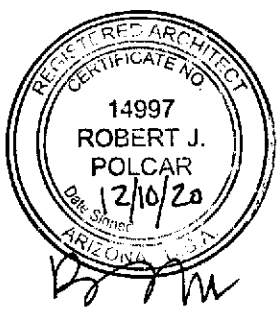
CANON ELEMENTARY SCHOOL DISTRICT #50

CANON ELMENTARY SCHOOL
BUILDING WEATHERIZATIONS AND ROOF RESTORATIONS

DECEMBER, 2020

SFB Project Numbers: 130350101-9999-012-BRG
130350101-9999-013-BRG



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1. PROJECT SITE

1.1 The School is located at 34630 South School Loop Road, Black Canyon City, Arizona 85324.

2. SCOPE OF THE WORK

2.1 This project involves work at the following buildings on the Canon Elementary School Campus: Annex Building (SFB #1001), Gymnasium Building (SFB #1002) and Classroom Building (SFB # 1004).

Clean all exterior surfaces, including concrete, masonry, exterior plaster (stucco), 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.

Framed enclosure at Annex Building (SFB #1001), east side: Remove existing, weathered plywood wall sheathing and associated trim from exterior. Properly dispose offsite. Inspect wood framing and repair as needed. Remove batt insulation and install new. Install new building felt, sheet metal flashing, T1-11 plywood sheathing, trim and battens. Prep, prime and paint.

Damaged doors at Annex Building (SFB #1001): Replace where indicated.

Wood canopies and overhangs at Annex Building (SFB #1001): Make structural repairs to canopy framing. Replace all wood fascia at entire perimeter. Prep, prime and paint.

Repair, prepare, block fill and coat all concrete masonry and stucco 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 and factory finished trim excluded.

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

Buildings 1002 and 1004: 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 of the Gymnasium Building (SFB #1002): Remove existing built-up roof system to the structural deck and properly dispose. Clean, inspect and repair deck as necessary. Install new water tight Single Ply PVC Membrane Roofing System including new glass-mat faced gypsum cover board, rigid insulation and walk pads. Assure positive drainage throughout. Install new terminations, flashings and trim. Install new curbs at all

through roof ducted mechanical units, ventilation hoods and skylights. Lift mechanical units for proper termination of new roof system. Install new steel platforms at all through wall ducted mechanical units. A twenty year manufacturer's material warranty and a two year contractor's warranty are required. Provide new roof access ladders.

Steep slope roof areas of the Classroom Building (SFB #1004): Inspect existing reinforced fiberglass shingle systems and repair as required for a water tight, wind resistant system.

Low slope roof areas of the Classroom Building (SFB #1004): Repair, prepare and prime existing roof surface. Cut out and repair blisters and damaged areas. Apply new seamless roof coating system to entire roof surface, surrounding walls, backs of parapets and three-course over tops of parapet copings. Install new curbs where indicated. Provide new roof blocks and traffic surfaces. Pressure test roof drains and repair as needed. Provide new roof access ladders.

Soffits, high roof of Building 1004: Remove existing plywood soffit panels. Inspect and repair existing wood soffit panel support framing as needed. Install new Fiber Cement Soffit Panels and trim. Paint.

Windows, high walls of building 1004: Remove existing and replace with new. Refinish surrounding interior and exterior surfaces.

Wood Panel Fascia, Building 1002: Remove existing textured wood siding and trim. Repair framing, install new building felt, fiber cement siding and trim. Paint.

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

01 31 19
PROJECT MEETINGS

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 Lumbermans' 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

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 of 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

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Vertical Ladders.

1.2 PRIOR APPROVALS

A. Prior Approval requests shall include item B from Section 1.3 SUBMITTALS.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets indicating materials of construction and compliance with ANSI A14.3.

C. Shop Drawings: Drawings prepared for this specific project, showing ladder configuration, dimensions, location and method of anchorage.

1.4 REFERENCES

A. American National Standards Institute (ANSI)
   1. ANSI A14.3 – Ladders, Fixed, Safety Requirements.

B. American Society for Testing and Materials (ASTM) Publications:
   1. ASTM B209 – Aluminum-Alloy Sheet and Plate.
   2. ASTM B221 – Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.

1.5 QUALITY ASSURANCE

A. Access ladders shall be designed and installed to comply with ANSI A14.3 and OSHA 1910.27.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. A manufacturer specializing in the production of fixed aluminum ladders.

B. Comply with "Request for Approval" in the "Special Terms and Conditions of the IFB".

2.2 COMPONENTS

A. Ladders: Provide ladders that comply with OSHA and local building codes, with all edges rounded, clean and smooth burr free, dimensions as indicated in drawings.

B. Ladder Treads: Extruded aluminum, 6063-T5 alloy, with self cleaning serrated top surface with rounded front and back edges. They are fastened to rails with concealed stainless steel screws capable of withstanding and exceeding all OSHA load requirements per tread without damage. Rung cross section for vertical ladders is minimum 2 inches horizontal and 1 nominal inch vertical.

C. Vertical Ladder Rails (supporting treads): Custom extruded aluminum, 6063-T5 alloy, with rounded corners, approximately 4 inches deep; mounted so that the center line of the tread is minimum 7 inches from face of wall. Wall brackets are bent aluminum strap 2 inches wide by 3/16 inch thick. Base brackets are 2"x2"x2" x 1/8" aluminum angles. Bottom Wall Mount brackets include an additional diagonal angle brace of the same material.

D. Extended Rails: Aluminum tubing 0.875 inches diameter is formed with two parallel tubes for each length of rail with radius corners assembled with stainless steel fasteners.

1. Walk through hand rails: At top of ladders leading to roofs, hand rails extend a minimum 42 inches vertically above the top of the parapet and project a minimum of 10 inches past the edge of the roof.

E. Anchor Bolts: Hot-dipped galvanized or stainless steel bolts. Diameter as specified by the ladder manufacturer. Fastener length as required to provide adequate anchorage to substrate provided by project contractor as determined by the project engineer.

F. Landing Platforms: Typically constructed of 2 inch by 1 inch ladder treads placed flush adjacent to each other to form desired typical platform size. Custom sizes or other decking materials are available when required.

G. Security Door: For vertical ladder the sheet aluminum enclosure is from 6 inches to 102 above the floor or grade. Hinged for access to ladder with full height aluminum piano hinge secured with adjustable staple and hasp for padlock.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation to be in accordance with the manufacturer's printed instructions.

B. Anchor securely using fasteners recommended by the manufacturer or other of equivalent or greater strength at locations specified and into substrate.

END OF SECTION 05 51 33.13

SECTION 07 01 50.61
ROOF RE-COATING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the repair and recoating of the existing Cementitious Surfaced SPF roof system at Canon Elementary School with a High Solids Silicone Roof Coating for both the horizontal surfaces and vertical SPF surfaces. Repair materials are to include 50 psi compressive strength SPF roof insulation, silicone sealant, silicone mastic, polyester fabric, surface primers and cleaners as required.

1.3 PRIOR APPROVALS

A. Product Data: For each product specified herein submit a current technical data sheet
B. 15 Year Sample Warranty: Submit copy of Manufacturer 15 Year NDL Material & Labor Warranty to be issued for this project.
C. Approved Contractor Certificate: Signed by Silicone Coating Manufacturer certifying that the Roofing Contractor is currently approved to install a 15 Year NDL Material & Labor Warranty with Manufacturer's Silicone Roof Coating Restoration System.
D. Provide proof of Class B fire classification from Underwriters Laboratories or another recognized ASTM certified fire testing facility. Test in accordance with ASTM E108 or UL 790 test standard for the Silicone Roof Coating.
E. Test report from independent ASTM accredited testing facility validating that the Silicone Roof Coating complies with ASTM D6694.
F. Letter of Intent to Warrant from Silicone Coating Manufacturer per the terms and conditions of the Warranty specified for this project. Letter shall include project name, address and SFB Project number.
G. Submit adhesion pull test results for Canon Elementary School on the Silicone Coating Manufacturer's letterhead.
H. List of 5 projects in Arizona where the proposed coating has been installed, including project name, project size, address, owner contact and year applied on Silicone Coating Manufacturer letterhead.
I. Manufacturer's letter indicating they will provide field inspection no less than one (1) day each week during construction until all work is completed and accepted by the Architect and Owner.
I. Copies of the manufacturer's final inspection report upon completion of the work and prior to issuance of the manufacturer's warranty.

1.4 QUALITY ASSURANCE

A. Installer/Applicator Qualifications: Roofing contractor and its silicone applicator(s) for this project shall have experience in the application of high solids silicone.
B. Manufacturer of foam, coating or cementitious traffic topping shall not own or operate any portion of the roofing contractor's company.
C. Manufacturer's authorized representative shall conduct pre-start deck inspection and in progress inspections as required. Manufacturer shall provide technical assistance as requested.
D. Silicone Coating Manufacturer shall provide weekly site inspections and provide a written report with photographs to the Roofing Contractor and Architect that document the progress of project to date.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original containers with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for storing and mixing with other components.
B. Store materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer. Protect stored materials from direct sunlight.
C. Remove and replace material that cannot be applied within its stated shelf life.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Apply Silicone Coating Restoration System products within the range of ambient and substrate temperatures recommended by roofing material manufacturers. Do not apply to damp or wet surfaces. Do not apply when relative humidity exceeds 95 percent or when temperatures are less than 5°F above dew point.
   1. Do not apply roofing materials in snow, rain, fog, or mist, or when such weather conditions are imminent during the application and curing period.
   2. Do not spray apply roofing materials when wind conditions result in overspray conditions or surface finish textures not complying with requirements.

B. Protection of building and occupants:
   1. All surfaces not to receive system specified shall be protected from overspray hazard i.e. windows, doors, exterior and vehicles. Protective coverings shall be secured against wind and shall be vented if used in conjunction with applications preventing collection and moisture.
   2. Contractor is to post signs noting potential overspray hazard within 400' (121.90 meters) of applications.
   3. All air intake ventilation equipment shall be turned off to prevent fumes from entering building.
   4. Surfaces damaged during application shall be restored at no expense to the owner.
   5. Comply with *"ARS 15-156 – Liquid Roofing Systems; violation; classification; definition."* A Class 2 misdemeanor may apply if materials containing diisocyanate are applied in the presence of a teacher or student. Contractor shall be familiar with this statute.
   6. No smoking signs to be posted as mandated by local fire officials.

C. Substrate: Proceed with work as specified only after substrate construction preparation and detail work has been completed.
D. Equipment: All equipment used during operations shall be located so as not to adversely affect the daily operations or endanger occupants, structure or materials on-site. All spray equipment must be grounded during operations.

1.7 WARRANTY

A. Warranty in which Silicone Coating Manufacturer agrees to repair or replace new roofing materials installed that do not remain watertight within specified warranty period at no charge to the building owner. Warranted failures include roof leaks, blisters, ponding and loss of granules.
   1. Manufacturer's Warranty Period: The Silicone Coating Restoration System shall be warranted for 15 years, NDL, from date of Substantial Completion, against leaks due to faulty installation or defective roof coating.
   2. Contractor shall warrant the installation for a period of two (2) years.

PART 2 - PRODUCTS

2.1 MATERIALS AND MANUFACTURERS

A. Manufacturers: Silicone Roof Coating Manufacturer shall submit documents listed in 1.3 of this specification to the Professional Registrant 14 days before the bid date to have their Silicone Roof Coating considered for use on this project. All materials are to be provided by or approved by the Silicone Roof Coating Manufacturer. All materials are to be warranted by the Silicone Roof Coating Manufacturer.

B. SPF Roof Insulation (Repairs): SPF Roof Insulation shall be UL723 fire-rated and a minimum of 50 psi compressive strength.

C. Silicone Roof Coating:
1. Silicone Roof Coating shall comply with ASTM D6694 and meet the following physical property requirements:

Minimum Physical Properties

Tensile Strength	ASTM D-2370	160 psi
Elongation	ASTM D-2370	170%
Tear Strength	ASTM D-624	20 lbs. pli
Solids by Volume	ASTM D-2697	90% minimum
Adhesion	ASTM D-903	2.0 pli minimum
Solar Reflective Index	ASTM E-1980	>100 (Initial)

2. No Private Label Silicone Coating Manufacturers allowed.

B. Aggregate (Repairs): # 6 sized sieve roof granule for horizontal repair areas only.

C. Cementitious Coating (Repairs):
1. Material shall be UL Listed and approved by Silicone Roof Coating Manufacturer
2. Part A shall consist of a dry, cementitious, asbestos free powder compound.
3. Part B shall be a pure acrylic emulsion containing no styrene or styrene butadiene.
4. Traffic Topping shall be applied in two separate passes resulting in an average 1/8-1/4" thickness.

Physical Properties

Color		White
Reflectance	ASTM E424-71	.85
UV Resistance	ASTM D-822	2,000 hrs/No Effect
High Temperature Stability	ASTM D-794	No Effect

D. Silicone Sealant shall be warrantied by Silicone Roof Coating Manufacturer for 15 Years

H. Polyester Fabric three course with silicone coating at SPF blister repairs or other repairs to roof System. Fabric shall be warrantied by Silicone Roof Coating Manufacturer for 15 years.

I. Silicone Liquid Flashing Mastic shall be warrantied by Silicone Roof Coating Manufacturer for 15 years.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine existing surfaces to receive Work and report detrimental conditions in writing to Owner's Representative.
   1. Prior to the application of roofing materials, the Silicone Coating Manufacturer Representative and Roofing Contractor shall examine the existing roof system, flashings, and other surfaces that are to receive roofing materials to ensure that surfaces are in proper condition to receive the silicone roof coating system.
   2. All penetrations through roofing including drains, scuppers, miscellaneous pipe and vent penetrations, and electrical conduits shall be completed prior to the starting of work.
   3. Silicone Coating Manufacturer and/or Roofing Contractor shall report in writing to the Owner's Representative anything or condition not to their satisfaction prior to proceeding with the work of this section.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 SURFACE PREPARATION

A. Surface Preparation of Vertical Roof Areas
   1. Clean all vertical surfaces with biodegradable cleaner/water solution and rinse per manufacturers application instructions.
   2. Repair any blisters, damage or deteriorated vertical areas of the cementitious foam roof system as recommended by the Silicone Roof Coating Manufacturer. These repairs may include a combination of applications of deck primer, SPF Roof Insulation, Silicone Roof Coating, Silicone Sealant, Polyester Fabric and Silicone Liquid Mastic.
   3. Ensure all vertical surfaces are clean, dry and tight before resurfacing commences.

B. Surface Preparation of Horizontal Roof Areas
   1. Clean existing horizontal roof area with a biodegradable cleaner/water solution and rinse per manufacturers application instructions. This roof has had an acrylic roof coating applied over it. The coating is loose in areas. Remove all loose acrylic coating and/or all acrylic coating as required by the Silicone Roof Coating Manufacturer.
   2. Remove all existing SPF Roof Insulation blisters beyond blistered area back to an area that is tightly adhered to the existing substrate or polyurethane insulation. Grind foam at a 45˚ angle into the existing SPF insulation to allow for proper repair with SPF insulation. Complete foam blister repairs in accordance with SPFA AY-104 tech bulletin.
   3. Repair all punctures, damage or deterioration to the existing roof per Silicone Roof Coating Manufacturer requirements.
   4. All horizontal roof areas shall be dry, clean and tight before coating application commences. Allow existing horizontal roof a minimum of 72 hours drying time or longer if recommended by the Silicone Roof Coating Manufacturer after washing the surface before proceeding with application of new Silicone Roof Coating Restoration System.
   5. Existing areas of smooth cementitious shall be ground off before resurfacing and treated as recommended by the Silicone Roof Coating Manufacturer.

C. Other Surfaces
   1. Contact Silicone Roof Coating Manufacturer for recommendations on surface preparations for other surfaces to receive Silicone Roof Coating System.

3.3 INSTALLATION

A. Install materials in conformance with Silicone Roof Coating Manufacturer's printed recommendations and these specifications. If a conflict exists, inform Owner's Representative in writing prior to start of installation.

B. Sprayed polyurethane Insulation - Repair Areas:
   1.. Sprayed SPF Roof Insulation shall be metered to SPF Roof Insulation manufacturers' specifications through proportioning equipment, which provides thermostatically controlled material temperatures. Hoses between the proportioner and spray gun shall be temperature controlled.

2. Refer to Environmental Limitations above. Foam shall not be applied when wind velocities exceed 10 miles per hour, as measured by a wind velometer, unless suitable wind barriers are employed.
3. Surface texture of installed foam shall range from a smooth to medium coarse (orange peel) finish. Surface textures that may be defined as "popcorn" or "tree bark" are not acceptable.
4. Installing SPF insulation to such items as parapet walls, vents, or roof mounted equipment, shall provide a relatively smooth transition to the roof deck, shall be of uniform cross-section thickness and shall meet all other SPF insulation surface texture requirements.
5. Areas which fail to meet Specification requirements with respect to thickness and foam quality shall be repaired per Silicone Roof Coating Manufacturers recommendation.
6. Mask off metal and other surfaces not to receive foam.
8. Provide all procedures or means as required to prevent damage from fugitive overspray of polyurethane foam insulation. Caution shall be taken to protect those areas not to receive spray foam, including vehicles nearby.
9. Application of SPF Roof Insulation shall not take place when the building is occupied with students or teachers.

D. Silicone Roof Coating System:
1. Vertical Areas:
   a. Install Silicone Roof Coating as recommended by the Silicone Roof Coating Manufacturer to achieve the total dry mil thickness required for this project.
   b. Total dry thickness of Silicone Roof Coating shall be 40 dry mil thickness or greater if required by the Silicone Roof Coating Manufacturer.
   d. Parapet coping shall be coated to the top outside edge with Silicone and coping joints treated as recommended by the Silicone Roof Coating Manufacturer.
2. Horizontal Roof Areas:
1. Install surface primer as recommended by the Silicone Roof Coating Manufacturer.
2. Install Silicone Roof Coating by spray or roller at the rate and in the number of applications recommended by the Silicone Roof Coating manufacturer to achieve dry mil thickness required. Flashing details shall be installed per the Silicone Roof Coating Manufacturer's written instructions.
3. Total dry mil thickness required is 40 mils or greater if required by the Silicone Roof Coating Manufacturer.
4. Walk Pad: Apply one coat of Silicone Roof Coating Manufacturer's walk pad at a rate of 4 gallons per 100 sq. ft. (64 wet mils); Broadcast Silicone Roof Coating Manufacturer's safety granules into wet coating at a rate of 0.5 lb. per 100 square feet to help ensure good traction.
5. **Note:** Tape off walk pad area using duct tape. Remove duct tape while coating is still wet.
6. Apply only a walk pad system supplied by or approved for use by the Silicone Roof Coating Manufacturer.
7. No traffic shall be permitted on completed roof surface for minimum of three days.
8. Clean all excess materials from roof area and project site.

E. The final inspection to provide the 15 Year NDL Warranty will be performed by an inspector approved in writing by the Silicone Roof Coating Manufacturer.

3.4 PROJECT CLOSEOUT

A. Submit warranty as specified in Paragraph 1.7 above. Warranty shall be signed by Manufacturer and indicate start date.
B. Provide Silicone Roof Coating Manufacturer's Roof Maintenance Manual to Owner along with repair materials to be used for minor touch up. Manuals shall include recommendations for periodic inspection and maintenance of all roofing work.
C. Provide "As-Built" documents to Owner.
D. 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 07545

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cementitious jointed panel with accessories. Hot Humid Climate Zone.

1. Soffits – flat, non-vented soffit panel
2. Fascia – flat, textured siding/ fascial panel

1.2 RELATED SECTIONS

A. Section 09 91 13 – Exterior Painting

1.3 REFERENCES

A. ASTM International (ASTM):

1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
2. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
3. ASTM D4585 - Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation.
4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
5. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
6. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00 - Submittals

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Installation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Manufacturer's best practice guide.
4. Technical data sheet.
5. Standard drawings
6. A letter from the manufacturer indicating the manufacturer’s intent to issue the specified warranty upon successful completion of the project.

C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cladding junctions and penetrations which are outside the scope of the standard details and specifications provided by the manufacturer.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

1.5 QUALITY ASSURANCE

A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store siding flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Manufacturer's Warranty: Provide Manufacturer’s Product Warranty, with 30-year limited product warranty against manufacturing defects.

1. Application Warranty: Application limited warranty for 2 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: A manufacturer of fiber-cement building products in continuous operation and providing top quality materials for more than 30 years.

2.2 PRIOR APPROVALS

A. Prior Approval requests shall include items listed in PART 1.4 SUBMITTALS, paragraph B above.

2.3 SOFFIT PANELS

A. Cement Cladding Panels: Non-Asbestos Fiber Cement Panels 1/4 inches thick, 144 inches long; manufactured in 12”, 16”, 24” and 48” widths. Product shall be engineered for climate conditions at the location of the project. Specifically designed and fabricated for soffit application. Non-vented, smooth texture.

1. Manufacturer's Climate Zone Product: For hot humid and wet climates with an appropriate (yellow tint) primer.

B. Code Compliance Requirement for Siding Materials:

1. Fiber-cement siding, complies with ASTM C 1186 Type A Grade II.
2. Fiber-cement siding, complies with ASTM E 136 as a noncombustible material.
3. Fiber-cement siding, complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
5. Fiber-cement siding, tested to ASTM E330 for Transverse Loads.
6. Intertek Warnock Hersey Product Listing.
7. Manufacturer's Technical Data Sheet.

2.4 FASCIA/ SIDING PANELS

A. Cement Cladding Panels: Non-Asbestos Fiber Cement Siding Panels 0.312 inches thick, 96 inches long, 48” wide. Product shall be engineered for climate conditions at the location of the project. Specifically designed and fabricated for fascia application. “Cedarmill” like raised wood grain texture.

1. Manufacturer's Climate Zone Product: For hot humid and wet climates with an appropriate (yellow tint) primer.

B. Code Compliance Requirement for Siding Materials:

1. Fiber-cement siding, complies with ASTM C 1186 Type A Grade II.
2. Fiber-cement siding, complies with ASTM E 136 as a noncombustible material.
3. Fiber-cement siding, complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
5. Fiber-cement siding, tested to ASTM E330 for Transverse Loads.
6. Intertek Warnock Hersey Product Listing.
7. Manufacturer's Technical Data Sheet.

2.5 WEATHER BARRIER

A. Weather Barrier: At vertical conditions, No weather barrier at horizontal soffit panels.

B. Physical Requirements for Weather Barrier:

1. Water repellent breather type cellulose fiber building felt.
2. 30# Underlayment.
3. ASTM D 4869 Type lV and ASTM D 226 Type ll.

2.6 ACCESSORIES

A. Trims: Reveal Trims manufactured specifically for the fiber-cement panels in the following profiles supplied by the panel manufacturer. Aluminum alloy 6063-T5 with a minimum thickness of 0.050 inch. All reveal trims are 8 feet in length.

1. Recess vertical trim.
2. Recess inside corner trim.
3. Recess outside corner trim.
4. Recess drainage flashing.

B. Finishes Trims:

1. Primed for field painting; coating tested to ASTM D3363, ASTM D3359, D2794, D4585, D523, and D1308.

2.7 FASTENERS

A. Fasteners: For attaching fiber-cement panels to framing provide the following:
1. Wood Framing, Countersunk Screws: No 8 by 0.39 inch head diameter by 1-5/8 inch long
2. Fasteners shall be of high quality stainless steel to ensure resistance to corrosion. For field painting, fasteners shall be treated to accept paint adhesion.
a. Alternatives must be approved by the architect. e.g. decorative screws, nails, bugle head screws, and similar items.

2.8 FINISHES

A. Factory Primer: Provide factory applied universal primer.

1. Primer: Factory applied sealer/primer by fiber-cement panel manufacturer. Apply flat sheen finishes to panels. Include application to both sides and edges.
2. Topcoats: Refer to Section 09 91 13 – Painting, Exterior Finish Schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Ensure that drainage plane in intact and all penetrations are sealed.

3.3 INSTALLATION

A. Existing Wood Framing: Nominal 2 inch by 4 inch (51 m by 102 mm) wood framing. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned. Inspect to verify that existing work complies. Maximum 24” O.C. spacing; install new framing as required.

1. Install water-resistive barriers and claddings to dry surfaces.
2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
3. Install water-resistive barriers in a ship-lap fashion to shed water.
4. Protect siding from other trades.

D. Installation: Install materials in strict accordance with manufacturer's installation instructions.

1. Fastening Method: Countersunk and filled.
2. Place fasteners no closer than 3/4 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.
3. Use fasteners as specified in the Manufacturer’s data sheet and Panel Installation Instruction.
4. Install panel using 1/2 inch (13 mm) spacers at horizontal joints. Leave bottom edge of panel above all horizontal trims exposed, no caulking shall be placed at this overlap of horizontal flashing. Factory primed edge shall always be used.
5. Specific framing and fastener requirements - refer to the applicable building code compliance reports.

3.4 FINISHING

A. Finish factory primed siding with exterior flat grade paint within 60 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

B. Field cut edges shall be coated during the installation process using an exterior grade primer/sealer that is compatible with the type of paint to used on project.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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, PVC Single-Ply Membrane roofing system.
2. Removal and legal disposal, offsite, of all existing BUR system to the deck substrate. Verify if existing insulation can be saved prior to roof demolition of each section (see bid form).
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 wood 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”.
6. Provision and installation of pre-engineered polyisocyanurate crickets at twice the slope of the deck to direct water flow past equipment curbs and to prevent ponding throughout the roof area.
7. Retention of the reglet for reuse, where possible, 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 reglets where needed and new sheet metal counter flashing in the reglets.
8.

B. Section Includes:

1. Adhered polyvinyl chloride (PVC) roofing system.
2. Adhered polyvinyl chloride (PVC) membrane flashings.
3. Mechanically fastened polyisocyanurate rigid insulation.
4. Cover board.
5. Walkways.

1.3 DEFINITIONS

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

1.4 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, deck Installer, air barrier Installer, 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.

1.5 PRIOR APPROVALS

A. For Prior Approval, submit the following:

1. Manufacturer's technical data and tested physical and performance properties. Submissions that do not clearly demonstrate adherence to articles 2.1 Performance Requirements and 2.2 Polyvinyl Chloride Roofing 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 B fire listing of the PVC roofing system over the existing wood 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.
9. Manufacturer’s letter indicating they will provide field inspection no less than one (1) day each week during construction until all work is completed and accepted by the Architect and Owner.

B. Products will not be considered if:

1. Product or method of major waterproofing field components to be considered do not have a minimum of five (5) years of successful performance in roofing and reroofing applications in Arizona.
2. The independent test data does not meet or exceed the minimum performance standards specified.
3. Acceptance will require substantial revision of Contract Documents.
4. Architect/ Owner reserves the right to be the final authority on the acceptance or rejection of any and all products.

1.6 ACTION SUBMITTALS

A. Product Data: For adhesives and sealants, indicating VOC content.

B. Product Data: For single ply membrane PVC

C. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Base flashings and membrane terminations.
2. Flashing details at penetrations.
3. Tapered insulation thickness and slopes.

D. Samples for Verification: For the following products:

1. Roof membrane and flashing, of color required.
2. Walkway pads or rolls, of color required.

E. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1. Provide Manufacturers recommended wind uplift mechanical attachment and fully adhered attachment patterns

1.7 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

2. Letter of Intent to Warrant: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

B. Field quality-control reports shall be provided by the membrane manufacturer weekly.

C. Sample Warranties: For manufacturer's special warranties.

D. Installer Qualifications: Provide a letter or document stating that the installer is approved to install the system specified to receive manufacturer’s warranty upon successful completion of the project.

E. Research/ Evaluation Reports: For components of roofing system.

F. Roof deck fastener pullout tests.

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

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals. Manuals shall include recommendations for periodic inspection and maintenance of all roofing work.

1.9 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed and FM Global approved for 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 PVC 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.

E. Test Reports:

   1. Roof deck fastener pullout test.
   2. Exterior Fire Test Exposure: Roof system submitted shall achieve a UL, Intertek-WH or FM Class rating. Rating must meet state and local codes.

F. Perform all work in accordance with NRCA Roofing and Waterproofing Manual.

G. Perform all work in accordance with federal, state and local codes.

1.10 ROOF SYSTEM MANUFACTURER RESPONSIBILITIES

A. 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.

   1. Manufacturer shall provide weekly job site inspection for the duration of the project.

1.11 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.

1.12 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.

1.13 WARRANTY

A. Material and labor, special Platinum NDL Roof Warranty (full systems warranty): Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Such failures include roof leaks, blisters, ponding and sliding materials.

1. Warranty Period: 20 years from date of Substantial Completion.
2. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of roofing system.
3. The maximum wind speed coverage shall be for peak gusts of 120 mph measured at 10 meters above the ground.
4. Coverage for hail damage shall be for hail up to 1” in diameter.

B. Special Warranty Submit Roofing Installer's warranty, on contractor’s warranty form or contractor company letterhead signed by Installer, covering the Work of this Section, including all components of roofing system such as roof membrane, base flashing, fasteners, cover boards and walkway products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 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. Roof system and flashings shall remain watertight.

1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272/D 4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 Field of roof uplift pressure: -45 lbf/sq. ft. (ultimate wind pressure) = -30 lbf/sq. ft. (allowable wind pressure).
2. Zone 2 Perimeter uplift pressure: -60 lbf/sq. ft. (ultimate wind pressure) = -40 lbf/sq. ft. (allowable wind pressure).
3. Zone 3 Corner uplift pressure: -80 lbf/sq. ft. (ultimate wind pressure) = -50 lbf/sq. ft. (allowable wind pressure).

D. Solar Reflectance Index (SRI): Initial SRI not less than 97 and an aged SRI of 80 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.

E. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class B for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

F. Source Limitations: Obtain components including roof insulation, cover board, fasteners, adhesives, coatings and sealants for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 POLYVINYL CHLORIDE (PVC) ROOFING

A. PVC Sheet: ASTM D 4434/D 4434M, Type III, non-wicking polyester scrim reinforced and fabric backed.

1. Product: Subject to compliance with requirements, provide high-performance polyester scrim reinforced PVC field membrane with a heavy fleece/felt back

a. Thickness Over Scrim: 30 mils (0.76 mm).
b. Membrane Minimum Thickness: 60 mils (1.5 mm).

2. Exposed Face Color: White

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesives and Sealants: Comply with VOC limits of authorities having jurisdiction.

B. Sheet/Base Flashing: Manufacturer pre-approved non-fleece/felt backed **polyester scrim** PVC membrane of the same type, thickness, and color as the field membrane.

C. Prefabricated Pipe Flashings (Boots):

D. Prefabricated Corner Flashing:

1. Membrane Manufacturers recommended inside or outside corners.
2. Color: White

E. Flashing Bonding Adhesive: Solvent based.

1. Membrane Manufacturers recommended solvent based bonding adhesive for vertical applications

F. Low-Rise, Urethane, Field Membrane Adhesive: Roof system manufacturer's standard spray-applied, low-rise, two-component urethane adhesive formulated for compatibility and use with fabric-backed membrane roofing.

1. Membrane Manufacturers recommended low rise foam adhesive

2. Adhesive to be applied in a splatter patter. Bead application not acceptable.

A. Vinyl-Coated Metal Edge: Vinyl-coated edge metal with a factory-applied roofing manufacturer’s PVC membrane.

B. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

C. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1-inch-wide by 0.05-inch-thick (25 mm wide by 1.3 mm thick), pre-punched.

D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.

E. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by PVC roof membrane manufacturer**.**

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 or Type II, Class 2, Grade 2, felt or glass-fiber mat facer on both major surfaces.

1. Compressive Strength: 20 psi (138 kPa).
2. Size: 48 by 48 inches (1219 by 1219 mm)

C. Polyisocyanurate Board Full Tapered Insulation System: ASTM C 1289, Type II, Class 1, Grade 2 or Type II, Class 2, Grade 2, felt or glass-fiber mat facer on both major surfaces.

1. Compressive Strength: 20 psi (138 kPa).
2. Size: 48 by 48 inches (1219 by 1219 mm)
3. Minimum thickness: 0.5 Inch

2.5 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M fiber-reinforced gypsum board.

1. Thickness: 1/4 inch (6 mm)
2. Surface Finish: Factory primed.

2.6 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway **pads or rolls**, approximately 3/16 inch (5 mm) thick and acceptable to roofing system manufacturer.
1. Color: Contrasting with roof membrane.

PART 3 - EXECUTION

3.1 PREPARATION

A. Demolition: Remove the existing roofing membrane down to the substrate.

B. All roof top penetrations including the top of mechanical curbs must extend a minimum of 8 inches above the finished roof. All penetrations that do not meet this requirement must be raised where needed.

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 wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

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 system 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.

3.4 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.5 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Installation Over Wood Decking:
1. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to **wood** decks.
    a. Mechanically attach insulation to substrate using mechanical fasteners recommended by system manufacturer and the fastening pattern that meets or exceeds the wind uplift requirements as provided by the system manufacturer.
    b. Contractor may Mechanically attach or fully adhere subsequent layers of insulation as recommended by membrane manufacturer.
    c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
    d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
    e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
        1) Trim insulation so that water flow is unrestricted.
    f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
    g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

3.6 INSTALLATION OF COVER BOARDS

A. Install 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.

1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
2. At internal roof drains, conform to slope of drain sump.
    a. Trim cover board so that water flow is unrestricted.
3. Cut and fit cover board tight to nailers, projections, and penetrations.
4. Adhere cover board to insulation / substrate using specified low rise foam adhesive as per manufacturers adhesive pattern that meets or exceeds wind uplift requirements.
    a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 ADHERED ROOFING INSTALLATION

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Fabric-Backed Roof Membrane Adhesive: Apply to substrate / cover board at rate required by manufacturer, and install fabric-backed roof membrane.
1. Increase beads at corners and perimeters as need per manufactures recommendations.

E. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.

F. Apply roof membrane with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.8 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive at required rate. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with reinforced sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products according to manufacturer's written instructions.

1. Install flexible walkways at the following locations:
   a. Perimeter of each rooftop unit.
   b. Top of each roof access ladder.
   c. Locations indicated on Drawings.
   d. As required by roof membrane manufacturer's warranty requirements.

2. Provide 6-inch (76-mm) clearance between adjoining pads.
3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.

B. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.11 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 system 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.

3.12 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 075419

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 PRIOR APPROVALS

A. Prior Approval requests shall include item B from Section 1.3 SUBMITTALS and sample warranty for Parapet Coping.

1.3 SUBMITTALS

A. Submittals are required in accordance with Section 01 33 00.
B. Submit Product Data for all counter-flashings, reglets and vent flashings.
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.

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. Tum 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 PRIOR APPROVALS

A. Prior Approval requests shall include item B from Section 1.3 SUBMITTALS.

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, Channel Support:

1. Support blocks for piping, conduits, duc twork.
2. Recycled rubber, UV resistant.
3. Galvanized metal channel, non- corrosive hardware.
4. 10 year manufacturer's warranty.

B. Slipsheet support, wide base:

1. Support pads for piping, conduits.
2. Superior stability.
3. Provide slipsheet gasket to match roofing material (white PVC).
2. Recycled rubber, UV resistant.
3. 14 gauge galvanized channel strut.
4. 10 year manufacturer's warranty.

C. Extendable Channel Support:

1. Support channels for piping, conduits, duct work.
2. Recycled rubber, UV resistant.
3. Galvanized metal channels, non-corrosive hardware.
4. Minimum height 5-1/2"
5. 10 year manufacturer's warranty.

G. 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.
F. Submit warranty with Project Closeout documents at completion of 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 10 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. A Manufacturer specializing in the production of Construction Sealants as described in this specification.

B. Prior Approvals: Comply with "Request for Approved Equal" in the "Special Terms and Conditions of the IFB".

2.2 MATERIALS

A. SILYL-TERMINATED POLYETHER (STPE), S, NS, 50, NT: 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.

B. Accessories:
1. Soft Backer Rod: as recommended and provided by sealant manufacturer.
2. Closed Cell Backer Rod: as recommended and provided by sealant manufacturer.
3. Porous Substrate Primer: as recommended and provided by sealant manufacturer.
4. Cleaner: as recommended and provided by sealant manufacturer.

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

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 receivced 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 40ºF (5ºC) 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^{o} to 170^{o}F (-40^{0} to 77^{0}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 SECTION INCLUDES:

A. This specification covers all labor, materials, equipment and services necessary to furnish and install all hollow metal doors, as specified on the plans and/or in the specifications.

1.2 REFERENCES

A. All articles and services covered by this specification shall comply with provisions of the following specifications and standards, of latest edition, to the extent indicated by subsequent references.
   1. National Association of Architectural Metal Manufacturers (NAAMM), "Hollow Metal Technical and Design Manual."
   2. American Society for Testing and Materials (ASTM), Designations and Standard Specifications.
   3. Steel Door Institute (SDI).
   4. American Welding Society (AWS).
   5. Underwriter's Laboratories, Inc. (UL).
   6. Frame and door manufacturer shall be the same.
   7. Where provisions of pertinent codes, specifications, or standards conflict with this Section, the more stringent provisions shall govern.

1.3 SUBMITTALS

A. Shop Drawings

   1. Provide the following information on all doors and other related materials specified in the construction documents:

      a. Elevation of all doors.
      b. Hardware reinforcing details of doors.
      c. Door location schedule.
      d. Complete door descriptive nomenclature.
      e. Material description and gauges.
      f. Methods of anchorage.
      g. Hardware preparation locations.
      h. Louver details (if applicable).
      i. Cross-reference Shop Drawings to Construction Documents.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements

   1. OSHA Compliance - All articles and services covered by this specification shall meet or exceed the safety standards established under the Federal Occupational Safety and Health Act, latest edition, together with all amendments in effect as of the date of this specification.

B. Certification

   1. Fire Rated Assemblies - Submit manufacturer's written statement that construction of

doors is in accordance with requirements for label rating indicated on drawings and/or as required by code.

2. Product Data - Submit manufacturer's literature for prime paint and description of shop painting method and system for approval.

1.5 DELIVERY, STORAGE AND HANDLING

A. Package, deliver, store and handle doors in a manner to prevent damage and deterioration.

B. Store doors upright in a protected dry area, above ground, with each unit separated at least 1/4" for air circulation.

C. Deliver metal doors in a timely manner to permit orderly progress of the work. Stockpile all items sufficiently in advance to ensure their availability when required.

D. Follow any special storage and handling requirements of manufacturer.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Hollow Metal Doors
1. Hollow metal doors shall be flush type, 1-3/4" thick.
2. Hollow metal door face sheets shall be 18 gauge on all doors. Sheet steel shall be cold or hot rolled conforming to ASTM A366 or A569.
3. Door stiffeners (or cores) - Doors shall be stiffened by one of the following:
   a. Vertical stiffeners, 20 gauge steel; 6" on center, full height of doors. Weld to face sheets 4" on center. Sound deadening insulation between ribs, consisting of noncombustible fiberglass, rock wool or equivalent.
   b. Water-resistant resin-impregnated kraft honeycomb core stiffener, laminated to both face sheets with water-resistant adhesive.
   c. Expanded foam core, self-extinguishing; resistant to vermin, mildew and rot. Bonded to face panels with thermosetting adhesive.
4. End channels - 16 gauge steel.
5. Reinforcements
   a. For surface hardware - 3/16" thick steel.
   For strikes - 12 gauge steel or equal thread depth metal reinforcement.

2.2 FABRICATION

A. Provide doors of size and design indicated. Doors shall be "full flush" type. With “flush cap”.

B. Fabrication shall conform to NAAMM or SDI standards and/or modifications contained in Construction Documents.

C. Accurately form metal to required sizes and profiles, including astragals where required.

D. Form and weld with sharp arises, edges and corners; surfaces shall be free from warp, waves, buckles, dents or other defects.

E. Close top and bottom edges by flush welding channels at exterior doors. Provide "breather" holes in door bottoms.

F. Return face sheets on vertical edges of doors.

G. Welding
   1. All welding shall conform to applicable AWS standards for hollow metal work.
   2. Weld all connections between component metal parts.
   3. Weld exposed joints and seams continuously full and grind smooth. No visible joints or seams on face or vertical edges.

H. Labeled doors - Conform with UL requirements for all labeled door construction. Doors shall bear label for fire-resistive rating indicated in schedules. Locate label on hinge edge of door.

I. Preparation for Hardware
   1. Reinforce and prepare doors for specified hardware.
   2. Make cutouts and mortises for mortise hardware. Drilling and tapping for mortise hardware shall be done in the factory to approved hardware templates.
   3. Provide 3/16" thick steel reinforcement for hinges.
   4. Provide 14 gauge reinforcement for surface applied hardware.
   5. Reinforce all doors for door closers.
   6. Bevel lock stiles 1/8" in 2" unless otherwise noted.
   7. Drilling and tapping for surface applied hardware will be done in field by door installer.

J. Clearances
   1. Head - 1/8"
   2. Stiles - 3/32"
   3. Meeting stiles (pair doors) - 1/8"
   4. Over threshold - 3/16" or as detailed
   5. Over finish floor material - 3/8"

2.3 FINISHES

A. Door pieces shall be processed through a power spray washer to clean and phosphatize the steel.

B. After the power wash, the door pieces shall be dried in a forced hot air dry-off oven and then painted with a primer in a dip priming tank. The pieces shall be completely immersed in the paint, then withdrawn, allowed to drain and then oven baked. The minimum dry film thickness for one coat of prime paint shall be 0.7 mil.

C. The primer shall be lead-free and contain rust inhibiting pigments and exhibit excellent adhesion to the base metal. The purpose of the primer coat is to provide a preparatory base for finish painting and to protect the metal surface until the top coat is applied.

D. The baked primer shall meet ANSI Standard A224.1-1980 for salt spray test of 120 hours, humidity test of 240 hours with 20 inch lbs direct impact (1/2" ball).

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be installed. Verify that work of other trades is sufficiently complete and in the proper condition to receive the work of this Section.

B. Coordinate with other trades as required to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.2 INSTALLATION

A. Install standard steel doors and accessories in accordance with final Shop Drawings and manufacturer's data and as herein specified.

B. Fit hollow metal doors accurately in frames, within clearances specified in SDI-100 and in this specification. Fitting by reducing metal thickness shall not be acceptable.

C. Place fire-rated doors with clearances as specified in NFPA Standard No. 80 and UL requirements.

D. Install hardware in accordance with drawings and hardware manufacturer's templates and instructions.

E. Adjust operable parts for correct function.

F. Remove hardware, except prime-coated items, tag, box and reinstall after finish painting has been completed.

3.3 ADJUSTING

A. Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

3.4 CLEANING

A. Prime Coat Touch-up - Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer. Remove all rust before above specified touch-up is applied.

B. When work of this Section has been completed, and at such other times as may be directed, remove all trash, debris, surplus materials, tools and equipment from site.

C. Protect completed work.

END SECTION

PART 1 – GENERAL

1.1 SUMMARY
- A. Section includes:
  1. Aluminum-Framed Storefront
     a. Arcadia, Inc., AG451T Series, 2” x 4-1/2” Thermally broken; center glazed system, screw spline, shear block, compensating stick or punched opening fabrication for 1” glass.
- B. Related Sections:
  1. 07 92 00 Joint Sealants
  2. 07 62 00 Sheet Metal Flashing and Trim
  3. 08 81 23 Exterior Glass Glazing

1.2 REFERENCES
- B. American Architectural Manufacturers Association (AAMA)
- C. American Society for Testing and Materials (ASTM)
- D. Aluminum Association (AA)

1.3 SYSTEM DESCRIPTION
- A. General: In addition to requirements shown or specified, comply with:
  1. Applicable provisions of AAMA Aluminum Storefront and Entrance Manual for design, materials, fabrication and installation of component parts.
- B. Design Requirements: Basis of design product Arcadia AG451T Series is a framing system that provides for flush glazing on all sides without projected stops, with glass in the center of the frame. Framing system suitable for outside or inside glazing.
- C. Performance Requirements:
  1. Limit air leakage through assembly to 0.06 CFM/min/sq. ft. (.00003 m^3/sm^2) of wall area at 6.24 PSF (300 Pa) as measured in accordance with ASTM E283.
  2. Water Resistance: No water leakage when measured in accordance with ASTM E331 with a static test pressure of 12PSF(480 Pa).
  3. Limit mullion windload deflection of L/175 with full recovery of glazing materials, when measured in accordance with ASTM E 330.
  4. System shall not deflect more than 1/8” at the center point, or 1/16” at the center point of a horizontal member, once deadload points have been established.
  5. System shall accommodate expansion and contraction movement due to surface temperature differential of 180 degrees F.
  6. Seismic testing shall conform to AAMA recommended static test method for evaluating performance of curtain walls and storefront wall systems due to horizontal displacements associated with seismic movements and building sway.
  7. Thermal Performance – When tested in accordance with AAMA 1503.1 the following results should be attained: U-Maximum .63/CRF – minimum of 59.
  8. National Fenestration Rating Council (NFRC) specific application evaluation.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Manufacturer Qualifications: A manufacturer capable of providing aluminum-framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Single Source Responsibility:
  1. Obtain window systems, and finish through one source from a single manufacturer.
- D. Provide test reports from AAMA accredited laboratories certifying the performances as specified in 1.3.

1.5 PRIOR APPROVALS

A. Product Data: Submit for approval during bidding phase. Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed storefront system indicated.
B. Shop Drawings: May be submitted after bid is awarded. Include plans, elevations, sections, details, hardware, and attachments to other work, flashing and drainage, operational clearances and installation details. Show connection to and continuity with adjacent thermal, weather, air and vapor retarders.
C. Samples for Initial Selection: May be submitted after bid is awarded. For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
D. Sample Warranty. Submit for approval during bidding phase.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
    1. Failures include, but are not limited to, the following:
        a. Structural failures including, but not limited to, excessive deflection.
        b. Noise or vibration created by wind and thermal and structural movements.
        c. Deterioration of metals, metal finishes and other materials beyond normal weathering.
        d. Water penetration through fixed glazing and framing areas.
        e. Failure of operating components.
    2. Warranty Period: Five years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with the requirements, provide Arcadia AG451T Series or comparable product by one of the following:
    1. Kawneer North America
    2. U.S. Aluminum
    3. Pre-Approved Equal
B. Source Limitations: Obtain all components of aluminum storefront system, including framing and accessories, from single manufacturer.

2.2 FRAMING MATERIALS AND ACCESSORIES

A. Framing members, transition members, mullions, adaptors, and mounting: Extruded 6063-T6 aluminum alloy (ASTM B221 – Alloy G.S. 10a T6).
B. Screws, fastening devices, and internal components: Aluminum, stainless steel, or zinc-plated steel in accordance with ASTM.A-164. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from aluminum.
C. Glazing Gasket
    1. Compression-type design, replaceable, molded or extruded, or ethylene propylene diene monomer (EPDM).
    2. Shall be of type that locks securely into the glazing reglet to prevent glazing gaskets from disengaging.

2.3 FINISH

D. Finish all exposed areas of aluminum and components as indicated.
    1. An Architectural Class II or I anodic coating conforming with AA-M12C22A31/AA-M12C22A41.
        a. Anodized aluminum finish shall be Arcadia #11 Clear AC-2.

2.4 SYSTEM FABRICATION

A. Continuous sub-sill shall be provided under sill members to collect water infiltration and divert from the interior of the system.
B. Framing members shall be internally reinforced and secured at head and sill as necessary for structural performance requirements, for hardware attachment, and as indicated.
C. Fasteners shall be so located as to ensure concealment from view in the final assembly.

PART 3 – EXECUTION

3.1 EXAMINATIONS
A. Examine conditions and verify substrate conditions are acceptable for product installation.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION
A. Install in accordance with Drawings, Specifications Reviewed Shop Drawings and manufacturers installation instructions.
B. Fit joints to produce hairline joints free of burrs and distortion.
C. Rigidly secure non-movement joints.
D. Seal perimeter and other joints watertight unless otherwise indicated.

3.3 METAL PROTECTION
A. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.4 FIELD QUALITY CONTROL
A. Test the storefront for water leaks in accordance with AAMA 501.2. Conduct test in the presence of the Architect. Correct deficiencies observed as a result of this test.

END OF SECTION 08 41 13

SECTION 08 71 00
FINISH HARDWARE

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.

1. Door hardware for steel (hollow metal) doors.
2. Keyed cylinders as indicated.

B. Related Sections:
1. Division 8: Hollow Metal Frames.
2. Division 8: Hollow Metal Doors.

C. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.

1. Builders Hardware Manufacturing Association (BHMA)
2. NFPA 101 Life Safety Code
3. NFPA 80 -Fire Doors and Windows
4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
5. UL10C – Positive Pressure Fire Test of Door Assemblies
6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
8. IBC – International Building Code

D. Intent of Hardware Groups

1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
2. Where items of hardware aren’t definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to be submitted to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

1.2 SUBSTITUTIONS:

A. Comply with Division 1.

1.3 SUBMITTALS:

A. Comply with Division 1.

B. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.

C. Product Data: Manufacturer's specifications and technical data including the following:

1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.

3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
4. Submit 6 copies of catalog cuts with hardware schedule.

D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.

1. List groups and suffixes in proper sequence.
2. Completely describe door and list architectural door number.
3. Manufacturer, product name, and catalog number.
4. Function, type, and style.
5. Size and finish of each item.
6. Mounting heights.
7. Explanation of abbreviations and symbols used within schedule.
8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.

E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.

1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.

F. Samples: (If requested by the Architect)

1. 1 sample of Lever and Rose/Escutcheon design, (pair).
2. 3 samples of metal finishes

G. Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.

1. Operating and maintenance manuals: Submit 3 sets containing the following.

a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Name, address, and phone number of local representative for each manufacturer.
d. Parts list for each product.

2. Copy of final hardware schedule, edited to reflect, "As installed".
3. Copy of final keying schedule
4. As installed “Wiring Diagrams” for each piece of hardware connected to power, both low voltage and 110 volts.
5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

A. Comply with Division 1.

1. Statement of qualification for distributor and installers.
2. Statement of compliance with regulatory requirements and single source responsibility.
3. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.

a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
b. Hardware Schedule shall be prepared and signed by an AHC.

4. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
5. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.

a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.

6. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Comply with Division 1.

1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Package hardware to prevent damage during transit and storage.
3. Mark hardware to correspond with "reviewed hardware schedule".
4. Deliver hardware to door and frame manufacturer upon request.

B. Storage and Protection: Comply with manufacturer's recommendations.

1.6 PROJECT CONDITIONS:

A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.

B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 WARRANTY:

A. Refer to Conditions of the Contract

B. Manufacturer’s Warranty:

1. Closers: Lifetime
2. Mortise Locksets: Lifetime
3. All other Hardware: Two years.

1.8 OWNER'S INSTRUCTION:

A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.9 MAINTENANCE:

A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.

1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
3. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra service materials.

B. Maintenance Service: Submit for Owner's consideration maintenance service agreement for electronic products installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1. Manufacturer shall be in accordance with Owner's facility standards. Match existing building standards.

Item:	Manufacturer:	Approved:
Hinges	Stanley	Owner's Standard
Locksets	Best	Owner's Standard
Cylinders	Best	Owner's Standard
Closers	Stanley QDC	Owner's Standard
Door Shoes/ Sweeps	Pemko	Owner's Standard
Threshold & Gasketing	Pemko	Owner's Standard
Latchguards	Rockwood	Owner's Standard

2.2 MATERIALS:

A. Hinges: Shall be Five Knuckle Ball bearing hinges

1. Template screw hole locations
2. Bearings are to be fully hardened.
3. Bearing shell is to be consistent shape with barrel.
4. Minimum of 2 permanently lubricated non-detachable bearings on standard weight hinge and 4 permanently lubricated bearing on heavy weight hinges.
5. Equip with easily seated, non-rising pins.
6. Non Removable Pin screws shall be slotted stainless steel screws.
7. Hinges shall be full polished, front, back and barrel.
8. Hinge pin is to be fully plated.
9. Bearing assembly is to be installed after plating.
10. Sufficient size to allow 180-degree swing of door
11. Furnish five knuckles with flush ball bearings
12. Provide hinge type as listed in schedule.

13. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
14. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
15. UL10C listed for Fire rated doors. Base material to be steel.

B. Door Closers shall:

1. Tested and approved by BHMA for ANSI 156.4, Grade 1
2. UL10C certified
3. Provide 9001-Quality Management and 14001-Environmental Management.
4. Closer shall have extra-duty arms and knuckles
5. Conform to ANSI 117.1
6. Maximum 2 7/16 inch case projection with non-ferrous cover
7. Separate adjusting valves for closing and latching speed, and backcheck
8. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
9. Full rack and pinion type closer with 1½“ minimum bore
10. Mount closers on non-public side of door, unless otherwise noted in specification
11. Closers shall be non-handed, non-sized and multi-sized.

C. Weatherstripping: Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.

1. Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
2. UL10C Positive Pressure rated seal set when required.

D. Door Shoes/ Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.

1. Door seal shall be resilient seal of (Neoprene, Polyurethane, Silicone)
2. UL10C Positive Pressure rated seal set when required.
3. Incorporate rain drip in exterior.

E. Thresholds: Thresholds shall be aluminum beveled type with maximum height of ½” for conformance with ADA requirements. Furnish as specified. Provide fasteners and screws suitable for floor conditions.

2.3 FINISH:

A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products

B. Powder coat door closers to match other hardware, unless otherwise noted.

C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYS AND KEYING:

A. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system

or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.

B. Cylinders, removable and interchangeable core system: Best CORMAX™ Patented 7-pin.

C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."

D. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.

E. Keying Schedule: Arrange for a keying meeting, and programming meeting with Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.

1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 HARDWARE LOCATIONS:

A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.

1. Recommended Locations for Builder’s Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).

2. Recommended locations for Architectural Hardware for flush wood doors (DHI).

3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.3 INSTALLATION:

A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

B. Conform to local governing agency security ordinance.

C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.

1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.

D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use “Riv-Nuts” or similar products.

3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.

1. Check and adjust closers to ensure proper operation.

2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.

   a. Verify levers are free from binding.
   b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.

3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.5 SCHEDULE OF FINISH HARDWARE:

Manufacturers and finishes are indicated here only to establish a level of quality and function. Consult with Owner and comply with Owner’s facility standards for hardware manufacturer and finish. Match existing hardware finish at facility.

Manufacturer List

Code	Name
BE	Best Access Systems
NA	National Guard
SH	Stanley Commercial Hardware
T	Stanley
PK	Pemko

Finish List

Code	Description
AL	Aluminum
630	Satin Stainless Steel
689	Aluminum Painted
US32D	Stainless Steel, Dull
SN	Satin Nickel Anodized Aluminum

Option List

Code	Description
B4E	Beveled 4 Edges

CSK Counter Sunk Screw Holes

Hardware Set

Hardware Group #1

All Doors:

3	Hinges	FBB199 4 1/2 X 4 1/2 NRP	US32D	ST
1	Lever Lockset	Classroom Security	630	BE
1	Door Closer -	Cush Stop, Hold-Open	689	SH
1	Weatherstrip	Head & Jambs		PK
2	Door Shoe	Rain Drip and Sweep	630	PK
1	ADA Threshold		AL	PK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Glass and glazing units for the following products and applications, and glazing requirements referenced by other sections:
   1. Windows.
   2. Storefront framing.

B. Glazing accessories.

1.2 RELATED SECTIONS

A. 07 24 19 Exterior Insulation Finish System.

B. 07 62 00 Sheet Metal Flashing and Trim.

C. 07 92 00 Joint Sealants.

D. 08 41 13 Aluminum Framed Entrances and Storefronts.

1.3 REFERENCES

A. American Architectural Manufacturers Association:
   1. AAMA 800 - Voluntary Specifications and Test Methods for Sealants.

B. American National Standards Institute:
   1. ANSI Z97.1 – American National Standard for Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.

C. ASTM International (ASTM):
   1. ASTM C162 - Standard Terminology of Glass and Glass Products.
   2. ASTM C 509 - Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
   3. ASTM C 864 - Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
   4. ASTM C 920 - Specification for Elastomeric Joint Sealants.
   5. ASTM C 1036 - Specification for Flat Glass.
   6. ASTM C 1048 - Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
   7. ASTM C 1087 - Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
   8. ASTM C 1115 - Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
   9. ASTM C 1172 - Specification for Laminated Architectural Flat Glass.
   10. ASTM C 1281 - Specification for Preformed Tape Sealants for Glazing Applications.
   11. ASTM C 1330 - Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
   12. ASTM C 1376 - Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
   13. ASTM E 774 - Specification for the Classification of the Durability of Sealed Insulating Glass Units.
   14. ASTM E 1300 - Practice for Determining Load Resistance of Glass in Buildings.
   15. ASTM E 2188 - Standard Test Method for Insulating Glass Unit Performance.
   16. ASTM E 2189 - Standard Test Method for Testing Resistance to Fogging in Insulating
   17. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

D. Code of Federal Regulations:
   1. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

E. Glass Association of North America (GANA):
   1. Glazing Manual.
   2. Laminated Glass Design Guide.
   3. Engineering Standards Manual.
   4. Sealant Manual

F. The Insulating Glass Manufacturers Alliance (IGMA):
   1. IGMA TB-3001 - Sloped Glazing Guidelines.
   2. IGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units.

G. Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; Building Technologies Department; Windows & Daylighting Group, windows.lbl.gov/software:
   1. "LBNL Window 5.0 (or higher) - A PC Program for Analyzing Window Thermal and Optical Performance.

H. National Fenestration Rating Council (NFRC):
   1. NFRC 100 - Procedure for Determining Fenestration Product Thermal Properties.
   2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence.
   3. NFRC 300 - Procedures for Determining Solar Optical Properties of Simple Fenestration Products.

I. National Fire Protection Association (NFPA):
   1. NFPA 80 - Fire Doors and Windows.
   2. NFPA 252 - Fire Tests of Door Assemblies.
   3. NFPA 257 - Fire Test for Window and Glass Block Assemblies.

1.4 DEFINITIONS

A. Manufacturers of Primary Glass: Firms that produce primary glass, as defined in referenced industry publications.

B. Manufacturers/Fabricators of Glass Products: Firms that utilize primary glass in the production of glass products that may include coated glass, laminated glass, and insulating glass.

C. Sealed Insulating Glass Unit Surfaces:
   1. Surface 1: Exterior surface of outer lite.
   2. Surface 2: Interspace-facing surface of outer lite.
   3. Surface 3: Interspace-facing surface of inner lite.
   4. Surface 4: Interior surface of inner lite.

1.5 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems that will withstand loads and normal thermal movement without failure, including loss or glass breakage resulting from defective manufacture, fabrication, or installation; failure of glazing systems to remain watertight and airtight; or deterioration of glazing materials.

B. Glass Design: Glass thicknesses indicated are minimums. Select actual glass lite thicknesses by analyzing loads and conditions. Provide glass lites in the thicknesses and in strengths required to meet or exceed the following criteria:
   1. Glass Thicknesses: Comply with ASTM E 1300, as follows:
      a. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set within 15 degrees of vertical and under wind load for a load duration of [3] seconds.
      b. Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow loads for a duration of [30] days.
      c. Thickness of Tinted Glass: Provide the same thickness for each tint color for all applications.

C. Thermal Movements: Allow for thermal movements of glazing components and glass framing members resulting from a temperature change range of 120 deg F ambient and 180 deg F material surfaces.

D. Thermal and Optical Performance Properties: Provide glass meeting specified performance properties, based on manufacturer's published test data for units of thickness indicated, and the following:
   1. Center-of-Glass Values: Per LBNL Window 5.0 (or higher) analysis, as follows:
      a. U-Factors: NFRC 100 expressed as Btu/sq. ft. x h x deg F.
      b. Solar Heat Gain Coefficient: NFRC 200.
      c. Solar Optical Properties: NFRC 300.

1.6 SUBMITTALS

A. Product Data: Manufacturer’s data sheets for each glass product and glazing material.

B. Samples: 12-inch-square, for each type of glass product, other than monolithic clear float glass [or clear float glass only set in insulated glass units].

C. Glazing Schedule: Prepare schedule using designations used on Drawings.

D. Product Certificates: Signed by manufacturers/fabricators of glass products certifying that products furnished comply with project requirements.

E. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer, based on submitted samples or acceptable data from previous testing of current formulations with similar products.

F. Qualification Information: For Installer firm and Installer’s manufacturer/fabricator-trained field supervisor.

G. Warranties: Submit sample meeting warranties requirements of this Section.

1.7 QUALITY ASSURANCE

A. Manufacturer/Source: Obtain each type of glass product from a single primary glass manufacturer and a single manufacturer/fabricator for each glass product type.
   1. For glass sputter-coated with solar-control low-e coatings, obtain glass products in fabricated units from a manufacturer/fabricator certified by the primary glass manufacturer.

B. Installer Qualifications: Experienced Installer with minimum of 5 successful completed projects of similar materials and scope, approved by glass product manufacturer/fabricator.

C. Preconstruction Adhesion and Compatibility Testing: Submit glass units, glazing materials, and glass-framing members with applicable finish to elastomeric glazing sealant manufacturer for determination of sealant compatibility, priming, and preparation requirements for optimum adhesion and performance.

D. Glazing for Fire-Rated Door and Window Assemblies: Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.

E. Safety Glazing Products: Comply with size, glazing type, location, and testing requirements of 16 CFR 1201 for Category I and II glazing products, and requirements of authorities having jurisdiction. Each pane of safety glazing and/ or tempered glass installed in hazardous locations shall be identified by a manufacturer’s designation specifying who applied the designation, the manufacturer or installer and the safety glazing standard with which it complies. The designation shall be acid etched, sand blasted, ceramic fired, laser etched, embossed or of a type that once applied, cannot be removed without being destroyed.

F. Glazing Industry Publications: Comply with glass product manufacturers’ recommendations and the following:

1. GANA Publications: GANA Laminated Division's 'Laminated Glass Design Guide' and GANA's 'Glazing Manual.'
2. IGMA Publication for Insulating Glass: IGMA TM-3000, 'Glazing Guidelines for Sealed Insulating Glass Units.'

G. Insulating-Glass Certification Program: Indicate compliance with requirements of Insulating Glass Certification Council on applicable glazing products.

H. Mockups: Prior to installing glazing, build mockups to demonstrate materials and workmanship. Coordinate with mockup requirements of related sections.

I. Preinstallation Conference: Conduct conference at Project site in compliance with Division 01 requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials during shipping, handling, and storage to prevent breakage, scratching, damage to seals, or other visible damage. Deliver, unload, store, and erect glazing materials without exposing panels to damage from construction operations.
1. Comply with manufacturer’s venting and sealing recommendations for shipping and handling of insulating glass units exposed to substantial altitude change.

1.9 WARRANTY

A. Warranty for Coated-Glass Products: Manufacturer's standard form, signed by coated-glass product primary manufacturer or manufacturer/fabricator, as applicable, agreeing to replace coated-glass units that display peeling, cracking, and other deterioration in metallic coating under normal use, within 10 years of date of Substantial Completion.

B. Warranty for Insulating Glass: Manufacturer's standard form, signed by insulating-glass product manufacturer/fabricator, agreeing to replace insulating-glass units that exhibit failure of hermetic seal under normal use evidenced by the obstruction of vision by dust, moisture, or film on interior surfaces of glass, within 10 years of date of Substantial Completion.

C. Installer’s Warranty: Form acceptable to Owner, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or deterioration of glass or glazing products due to faulty installation, within 2 years of date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Glass product selections are based upon the primary glass manufacturer below. Provide basis of design product, or, subject to compliance with requirements, a comparable product of a listed manufacturer approved by the Architect prior to bid:
1. Vitro Architectural Glass, primary – Basis of Design.
2. Oldcastle BuildingEnvelope.
3. Guardian Industries.
4. Pilkington.
5. Pre-Approved Equal.

2.2 GLASS PRODUCTS

A. Annealed Float Glass, General: ASTM C 1036, Type I, Quality-Q3, class indicated.

B. Heat-Treated Float Glass, Heat-Strengthened: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; Kind HS, of class and condition indicated: where indicated, or where needed to resist thermal stresses and where required to comply with performance requirements.

C. Heat-Treated Float Glass, Fully Tempered: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; Kind FT, of class and condition indicated: where safety glass is indicated. Safety glazing must comply with ANSI Z97.1 and CPSC 16CFR-1201

D. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process following primary glass product manufacture.

E. Insulating-Glass Units: Factory-assembled units consisting of dual-sealed lites of glass separated by a dehydrated interspace, with manufacturer's standard spacer material and construction, per ASTM E 2190.

2.3 GLAZING ACCESSORIES

A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

B. Glazing Tape: Butyl-based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation, complying with ASTM C 1281 and AAMA 800 for application.

C. Glazing Tape: Closed cell polyvinyl chloride foam, maximum water absorption by volume 2 percent, designed for 25 percent compression for air barrier and vapor retarder seal, black color, coiled on release paper over adhesive on two sides; widths required for specified installation, and complying with AAMA 800.

D. Glazing Gaskets:
   1. Dense Compression Gaskets: ASTM C 864, neoprene or EPDM, or ASTM C 1115, silicone or thermoplastic polyolefin rubber, as recommended by glazing product manufacturer for application, molded or extruded shape to fit glazing channel retaining slot; black color.
   2. Soft Compression Gaskets: ASTM C 509, Type II, black, molded or extruded, neoprene, EPDM, silicone or thermoplastic polyolefin rubber, of profile and hardness required to maintain watertight seal.

E. Setting Blocks: ASTM C 864, neoprene, 80 to 90 Shore A durometer hardness; length 4 inches, width of glazing rabbet space less 1/16 inch, height required for glazing method, pane weight, and pane area.

F. Spacer Shims: ASTM C 864, neoprene, 50 to 60 Shore A durometer hardness; length 3 inches, one half height of glazing stop, thickness required for application, one face self-adhesive.

G. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

H. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.4 FABRICATION OF GLAZING UNITS, GENERAL

A. Fabricate glazing units in dimensions required, with edge and face clearances, edge and surface conditions, and bite in accordance with glazing product manufacturer/fabricator's instructions and referenced glazing publications.

2.5 INSULATING-GLASS UNIT(S)

A. Double Glazed Tinted Solar Control Insulating Glass Unit - Solarban® 70 on Solarbronze® 1/4" (6mm) (2) Air 1/2" (12.7mm) | Clear 1/4" (6mm).
   1. Conformance: ASTM E 2190
   2. Outdoor Lite: Bronze Tinted Float Glass as manufactured by Vitro Architectural Glass
      a. Conformance: ASTM C 1036, Type 1, Class 2, Quality q3.
      b. Glass Thickness: 6mm (1/4")
      c. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
      d. Coating: Solarban® 70XL on Surface # 2
      e. Heat-Treatment: None, unless Safety Glazing is indicated. For Safety Glazing, Tempered; ASTM C 1048, Kind FT; Safety Glazing meets ANSI Z97.1 and CPSC 16CFR-1201.
   3. Interspace Content: Air 1/2" (12.7mm)

4. Indoor Lite: Clear float glass as manufactured by Vitro Architectural Glass
    a. Conformance: ASTM C 1036, Type 1, Class 1, Quality q3.
    b. Heat-Treatment: None, unless Safety Glazing is indicated. For Safety Glazing, Tempered; ASTM C 1048, Kind FT; Safety Glazing meets ANSI Z97.1 and CPSC 16CFR-1201.
    c. Glass Thickness: 1/4" (6mm)
5. Performance Requirements:
    a. Visible Light Transmittance: 40 percent minimum.
    b. Winter Nighttime U-Factor: 0.28 (Btu/hr*ft^2*°F) maximum.
    c. Summer daytime U-Factor: 0.26 (Btu/hr*ft^2*°F) maximum.
    d. Shading Coefficient: 0.25 maximum.
    e. Solar Heat Gain Coefficient: 0.21 maximum.
    f. Outdoor Visible Light Reflectance: 7 percent maximum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that glazing channels are clean and ready to accept glazing installation, and that weeps are unobstructed. Confirm that minimum required face and edge clearances will be maintained. Do not proceed with glazing until unsatisfactory conditions have been corrected.

B. Examine glazing units prior to setting. Reject units that display edge or face damage that may impede performance of unit or that will be visible when installed.

3.2 PREPARATION

A. Clean glazing channels and other framing members to receive glass with recommended solvent and wipe dry. Apply primers to joint surfaces to ensure adhesion of sealants, unless preconstruction sealant-substrate testing indicates no primer is required.

3.3 GLAZING INSTALLATION

A. General: Install glass and glazing materials in accordance with instructions of manufacturers and requirements of GANA Glazing Manual.
    1. Install setting blocks of size and in location required by glass manufacturer. Set blocks in bed of approved sealant.
    2. Provide spacers for glass lites as recommended, based upon size of glass unit.
    3. Comply with glass manufacturer’s limits on edge pressures.
    4. Ensure that glazing units are set with proper and consistent orientation of glass units toward interior and exterior.
    5. Provide edge blocking where recommended.
    6. Install sealants in accordance with requirements of Division 07 Section 'Joint Sealants.' Verify compatibility of all sealants.

B. Gasket Glazing: Fabricate gaskets to fit openings exactly. Allow for stretching of gaskets during installation.
    1. Set soft compression gasket against fixed stop or frame, secure, with bonded miter cut joints at corners.
    2. Set glass lites centered in openings on setting blocks.
    3. Install removable stops, and insert dense compression gaskets at corners, working toward centers of lites, compressing glass against soft compression gaskets and to produce a weathertight seal. Seal joints in gaskets. Allow gaskets to protrude past face of glazing stops.

3.4 CLEANING AND PROTECTION

A. Protect installed glass from damage. Attach streamers or warning tape to framing members, away from contact with glass. Remove nonpermanent labels.

B. Protect glass from contact with contaminating substances during construction. Immediately clean glass exposed to contamination using methods recommended by glass manufacturer.

C. Within 5 working days prior to inspection for Substantial Completion, clean all exposed glass surfaces using methods recommended by manufacturer. Remove glazing compounds from framing surfaces.

D. Remove and replace broken or damaged glass.

END OF SECTION 08 81 23

SECTION 099113 - EXTERIOR PAINTING

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. Section includes surface preparation and the application of paint systems on exterior substrates.

B. Related Requirements:
   1. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on exterior wood substrates.
   2. Section 09 96 53 "Elastomeric Coatings" for acrylic elastomeric coatings.

1.3 DEFINITIONS

A. MPI: Master Painters Institute.

B. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 2: Not more than 10 units at 60 degrees and 35 units at 85 degrees, according to ASTM D 523

D. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

E. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

F. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

G. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

H. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

I. EG: Ethylene Glycol. Ethylene glycol is listed as a hazardous air pollutant (HAP) by the U.S. EPA.

J. Blocking: Two painted surfaces sticking together such as a painted door sticking to a painted jamb.

K. RAVOC: Reactivity adjusted VOC ‘Reactivity’ means the ability of a VOC to promote ozone formation.

L. PDCA: Painting & Decorating Contractors of America www.pdca.org

M. SSPC: Scopes of SSPC Surface Preparation Standards and Specifications. www.sspc.org.

N. Green Wise: Green Wise products are tested in an ISO accredited laboratory to meet environmentally determined performance standards established by Coatings Research Group,

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials**,** from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: Provide not less than 1 gallon of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F or more than 120 degrees F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 90 deg F.

B. Do not apply paints 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.

C. Painting contractor should follow proper painting practices and exercise judgment based on his or her experience and project specific conditions as to when to proceed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. A manufacturer specializing in the production of premium quality painting systems as described in this specification and as approved by MPI.

B. Products: Subject to compliance with requirements, provide products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. VOC Content: For field applications, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 50 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Primers, Sealers, and Undercoaters: 100 g/L.
5. Rust-Preventive Coatings: 100 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Shellacs, Clear: 730 g/L.
9. Shellacs, Pigmented: 550 g/L.

D. Colors: As selected by Owner from manufacturer's full range.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.
3. Masonry (Clay and CMUs): 12 percent.
4. Wood: 15 percent.
5. Portland Cement Plaster: 12 percent.
6. Gypsum Board: 12 percent.

C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

D. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 11.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed surface of window frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

a. Equipment, but not including panelboards and switch gear. Mask all data plates from being coated.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written instructions, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Steel and Iron Substrates:

1. Water-Based Light Industrial Coating System **MPI EXT 5.1B:**

a. Prime Coat: Primer, zinc rich, inorganic, **MPI #19**.

b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.

c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5)**, MPI #163**.

B. Galvanized-Metal Substrates:

High Performance Architectural Latex System **MPI EXT 5.3M**:

a. Prime Coat: Primer, galvanized, water based**, MPI #134**.

1) Surface preparation: Manufacturer's recommended cleaning/ etching solution for galvanized steel.

b. Intermediate Coat: High Performance Architectural Latex, exterior, matching topcoat.

c. Topcoat: High Performance Architectural Latex, exterior, velvet (MPI Gloss Level 3/4)**, MPI #315**.

C. Wood Substrates: Exposed framing.

1. Latex over Latex Primer System **MPI EXT 6.2M**:

a. Prime Coat: Primer, latex for exterior wood**, MPI #6**.

b. Prime Coat: Bonding Primer, latex for previously painted exterior wood, **MPI #17**.

c. Intermediate Coat: Latex, exterior, velvet like, matching topcoat.

d. Topcoat: Latex, exterior, velvet like (MPI Gloss Level 2)**, MPI #214**.

1) Manufacturer's ultra-premium line.

D. Wood Substrates: Wood trim, Doors, Windows, Smooth Fascias, Wood board siding**.**

1. High Performance Architectural Latex over Latex Wood Primer System **MPI EXT 6.3P**:

a. Prime Coat: Primer, latex for unpainted exterior wood**, MPI #6**.

b. Prime Coat: Bonding Primer, latex for previously painted exterior wood, **MPI #17**.

1) Manufacturer's premium line.

c. Intermediate Coat: Latex, exterior, high performance architectural, low sheen, matching topcoat.

d. Topcoat: Latex, exterior, high performance architectural, low sheen (MPI Gloss Level 4)**, MPI #315**.

1) Manufacturer's ultra-premium line.

E. Wood Substrates: Wood-based panel products (Plywood).

1. High Performance Architectural Latex over Latex Primer System **MPI EXT 6.4M**:

a. Prime Coat: Primer, latex for unpainted exterior wood**, MPI #6**.

b. Prime Coat: Bonding Primer, latex for previously painted exterior wood, **MPI #17.**

1) Manufacturer's premium line.

c. Intermediate Coat: Latex, exterior, high performance architectural, low sheen, matching topcoat.

d. Topcoat: Latex, exterior, high performance architectural, low sheen (MPI Gloss Level 4)**, MPI #315**.

1) Manufacturer's ultra-premium line.

F. Portland Cement Plaster Substrates at Soffits:

1. High Performance Architectural Latex over W.B. Alkalai-Resistant Primer System **MPI EXT 9.1K**:

a. Prime Coat: Primer, alkali resistant, water based**, MPI #3**.

1) Manufacturer's premium line.

b. Intermediate Coat: Latex, exterior, high performance architectural, matching topcoat.

c. Topcoat: Latex, exterior, low sheen, high performance architectural, (MPI Gloss Level 4)**, MPI #315**.

1) Manufacturer's ultra-premium line.

G. Fiber-Cement Panels

1. High Performance Architectural Latex over W.B. Alkalai-Resistant Primer System **MPI EXT 3.3K**:

    a. Prime Coat: Primer at field cut edges, alkali resistant, water based**, MPI #3**.
        1) Manufacturer's premium line.
    b. Intermediate Coat: Latex, exterior, high performance architectural, matching topcoat.
    c. Topcoat: Latex, exterior, low sheen, high performance architectural, (MPI Gloss Level 3)**, MPI #315**.
        1) Manufacturer's ultra-premium line.

H. Exterior Gypsum Board Substrates at Soffits:

1. High Performance Architectural Latex over Latex Primer/ Sealer System **MPI EXT 9.2B**:

    a. Prime Coat: Primer, latex primer sealer**, MPI #50**.

        1) Manufacturer's premium line.

    b. Intermediate Coat: Latex, exterior, high performance architectural, matching topcoat.

    c. Topcoat: Latex, exterior, low sheen, high performance architectural, (MPI Gloss Level 1)**, MPI #315**.

        1) Manufacturer's ultra-premium line.

END OF SECTION 099113

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Elastomeric Coating system for exterior concrete unit masonry and portland cement plaster (stucco)

1.2 RELATED REQUIREMENTS

A. 07 62 00 – Sheet Metal Flashing and Trim

B. 07 92 00 – Joint Sealants

1.3 REFERENCES

A. Northwest Masonry Institute – National Masonry Systems Guide

1.4 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

1.5 PRIOR APPROVALS

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

B. 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.

1.6 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 at Cement Plaster: Stepped sample on a concealed location no smaller than 8 x 8 inches showing each coat including primers, fillers and intermediates.

F. LEED Submittals: For components of this section submit the following

1. IEQ 4.2: 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.

1.7 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

1.8 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.

1.9 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

1.10 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.

1.11 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 aterial 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.

1.12 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. CMU Substrate – Smooth
   b. Portland Cement Plaster (Stucco) Substrate – Match existing
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, Mortar and Portland Cement Plaster:

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. Portland Cement Plaster (Stucco) Substrate Repair:

1. Evaluate the plaster system to determine the extent of damage and how much must be repaired or replaced. All bulging, delaminated, unsound, soft or cracked areas will require repair.

2. Inspect all wall areas, identify and mark all cracks in existing substrate. Identify and mark all weep locations in weep screed.

3. Use mechanical abrasion/ wire wheel and wire brush to remove all loose paint.

4. Remove damaged plaster and damaged components of the system. Repair plaster as needed in accordance with Portland Cement Association's "Repair of Portland Cement Plaster (Stucco)".

5. Clean repair area well, prime with bonding adhesive and repair cementitious areas with Mason Mix. Use wet brush to smooth repair areas and blend.

6. Three course all parapet caps and horizontal projections. Prime bare areas and cementitious repairs in accordance with Manufacturer's printed instructions.

7. 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.

8. Prime areas repaired with cementitious materials in accordance with Manufacturer's printed instructions..

9. Prime corner to corner all wall areas repaired with epoxy primer for color consistency.

10. Prime all other previously coated surfaces with Manufacturer's recommended primer.

G. 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