SECTION 07 92 00

JOINT SEALANTS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

B. Refer to other Divisions of these Specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

1.02 REFERENCE DOCUMENTS

A. Reference Drawings: The Work of this Section is shown on the Contract Drawings titled “Physical Education Building Exterior Renovations, Montgomery College, Germantown Campus Germantown, MD”.

B. The work shown in the Contract Documents includes the work of all trades required and all labor, equipment, and materials and supervision necessary and incidental to the work indicated. The following description of the work represents a summary and should be considered in conjunction with the Drawings and all other Specifications.

C. All work is to be done in accordance with applicable codes and regulations.

1.03 SUMMARY

A. The scope of work specified herein includes, but is not limited to, the following:

1. Grind, clean, and prepare surfaces to receive sealant. Provide sealant, primer, and backer materials at EIFS and masonry control joints, cladding penetrations, metal-to-EIFS, curtain wall frame-to-air/water barrier, curtain wall frame-to-metal, curtain wall frame-to-EIFS, and curtain wall frame-to-masonry as shown.

2. Provide exterior sealant joints where removed and other miscellaneous locations as shown on the drawings.

3. Perform initial and ongoing jobsite sealant adhesion tests.

4. Perform mockups of the work specified herein in coordination with mockups described in related Sections.

B. Coordinate the work to keep the building watertight at all times. This may require some out-of-sequence work to be scheduled with all trades to prevent the building from being exposed to the weather. Prevent water intrusion through temporary protection.

1.04 RELATED SECTIONS

A. Coordinate the work of this Section with the work of other trades under this Contract, including, but not limited to, the following:

1. Section 02 41 19 – Selective Demolition

2. Section 04 20 00 – Unit Masonry

3. Section 04 72 00 – Cast Stone

4. Section 07 24 19 – Water-Drained Exterior Insulation Finish System (EIFS)

5. Section 07 27 00 – Air and Water Barrier

6. Section 07 52 16 – Styrene-Butadiene-Styrene (SBS) Modified-Bituminous Membrane Roofing

7. Section 07 62 00 – Sheet Metal Flashing and Trim

8. Section 08 42 13 – Aluminum Framed Entrances and Storefronts

9. Section 08 44 13 – Glazed Aluminum Curtain Walls

10. Section 09 20 00 – Interior Finishes

1.05 PERFORMANCE REQUIREMENTS

A. Joint sealants, backings, and other related materials must be compatible with one another and joint substrates under service conditions and application.

B. Provide sealants with movement characteristics as required in the design documents.

C. The following Standards are incorporated into these Specifications. Unless noted otherwise, comply with the current version of these Standards.

1. ASTM (American Society for Testing and Materials) – as noted and including ASTM C1193 – Guide to Use of Joint Sealants.

1.06 SUBMITTALS

A. See Section 01 33 00 – Submittals for general submittal procedures.

B. Submit the following items in time to allow for review by the Engineer and resubmittals, if needed, without delaying the work. Do not order materials or start work before receiving the Engineer's written approval.

1. Product Data: For each item, submit information on the component materials, information on the construction and application details, information on the manufacturer’s recommendations for application and use, color chart of standard sealant colors, test data substantiating that products comply with requirements, and material safety data sheets.

2. Samples: Provide samples of the components listed in part two that will become part of the final assembly.

C. Informational Submittals: Provide the following additional submittals:

1. Written explanation to decipher code numbers used on material containers to record manufacturing dates.

2. Product Test Reports: Reports for tests made within three years of the submittal date showing compliance with ASTM C920, and the standards C920 references including C793 and C719, using the standard substrates.

3. Laboratory Test Reports: Laboratory test reports from the sealant manufacturer for adhesion-in-peel tests showing adequate adhesion to the various metal panels, metal flashing, and other substrates used on this project before and after seven days water immersion, along with the manufacturer's recommendations for cleaning and priming each substrate.

1.07 MOCKUPS

A. Build in-situ mockup of typical wall assembly with brick masonry, EIFS cladding, and curtain wall to demonstrate aesthetic effects, quality of materials, sequencing, transitions between materials and cladding, and execution. Mockups should include all typical exterior wall components, including air/water barrier, insulation, through-wall flashing, sealant joints over backer rod, and other wall components. Refer to Section 01 45 00 – Mockups.

1.08 QUALITY ASSURANCE

A. Engage experienced sealant personnel to perform work of this Section. The Contractor shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance, for a period of at least 5 yrs. The contractor shall staff the work of this Section with only qualified personnel experienced in the application of this system.

B. Conduct a quality control program that includes, but is not limited to, the following:

1. Inspection of materials to assure conformity with contract requirements, and that materials are new and undamaged.

2. Establishment of procedures for executing the work.

3. At least 6 weeks prior to the start of sealant application, apply specified sealants to each jobsite substrate following specified procedures. The tests on the brick masonry shall be carried out at the site, but do not have to be done on the face of the building. The tests on windows must be carried out on samples at the building and cured for at least 2 weeks. Notify Engineer at least 48 hrs prior to start of the installation and testing, so that Engineer can be present to observe it.

4. Construct two 10 in. long x 1/2 in. wide x 1/2 in. deep sealant joints against each substrate, including the brick masonry and the EIFS. Also, construct four 10 in. long x 1 in. wide x 3/16 in. thick strips of sealant over each substrate. Apply bond breaker tape to the substrate surface under the last 2 in. of the sealant at each end of the strips and joints to provide a tab for peel testing after curing. Prepare surface and install sealant joints and strips as described below and as will be done during the general sealant installation.

5. After curing for twenty-one days at outdoor temperatures (> 40°F), submerge two of the strip samples over each substrate in distilled water for seven days. Cure the other strip samples and sealant joints for twenty-one days at outdoor temperatures (> 40°F).

6. After curing, grasp the 2 in. tabs on the ends of the joints and the strip samples and pull the sealant at 90° to the surface.

7. For acceptable applications, the sealant shall fail cohesively (tearing within itself) with no adhesive (debonding) failure.

8. If sample debonds from the substrate, the sealant manufacturer shall make recommendations regarding changes in surface preparation or primers and submit these recommendations to the Engineer for his approval. Repeat sealant adhesion trials as many times as required to produce an acceptable application at no additional cost to the Owner.

C. Applicator Qualifications

1. Engage experienced sealant personnel to perform work of this Section. The Contractor shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance, for a period of at least five years.

2. Firm shall staff the work of this Section with only qualified personnel experienced in the application of this system.

D. Single-Source Limitation: Obtain each type of material through one source from a single manufacturer for the duration of the project. Notify Engineer of any distributer or manufacturer changes in advance. Additional adhesion testing may be required at no additional cost to the Owner.

E. Conduct a quality control program that includes, but is not limited to, the following:

1. Inspection of materials to assure conformity with contract requirements and to ensure that materials are new and undamaged.

2. Establishment of procedures for executing the work.

3. Inspect substrate conditions and coordinate with the Engineer to ensure proper substrate preparation in conformance to the contract requirements.

4. Inspection of work in progress to assure work is being done in accordance with contract requirements.

5. Inspect all completed and any corrected work for compliance with the Contract Documents and the sealant manufacturer's recommendations. Promptly correct defective work.

F. Work in conjunction with the other trades employed on the project by promptly completing the work of this Section as required to meet the project schedule and so as not to impede other trades. Coordinate the work of this Section with other trades so the intent of the Drawings and Specifications is carried out. Coordinate with other trades to maximize efficient use of scaffolding, to minimize disruption to the building, and to avoid unnecessary traffic over areas of completed Work or existing materials to remain.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site only in manufacturer's original containers, clearly marked with legible, intact labels with manufacturer's name and brand name and identifying contents of containers.

B. All materials to be new. Handle all materials to prevent damage. Place materials on pallets. Use waterproof and fireproof canvas tarpaulins (not plastic) to cover all stored materials top to bottom.

C. Protect all materials in original, unopened, labeled containers and packaging and in compliance with manufacturer's directions. Comply with manufacturer's recommendations for minimum and maximum time and temperature limits for storage.

D. Promptly remove from the site all materials rejected by the Engineer or exposed to any moisture anywhere, at any time, during transportation, storage, handling, or installation.

E. Do not stockpile materials or equipment to overload any building or site component.

F. Materials shall be marked with the date of manufacture and shelf life. Do not use products beyond the expiration of their shelf life. Store flammable materials in a cool, dry, protected area away from sparks and open flames.

1.10 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Field Measurements: Verify all site conditions and dimensions by field measurements before material fabrication or delivery and indicate measurements on Shop Drawings. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the contract drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Consider the special conditions associated with repairs to existing construction when measuring for shop drawings.

C. Coordination requirements: Coordinate installation with other trades, to help ensure proper installation sequencing for assemblies.

D. Protection

1. Protect the building and its contents from risks associated with the work in this Section. Schedule and execute work without exposing adjacent building areas to water, dust, and debris, or materials used by this Contractor. Protect adjacent areas from damage and stains with appropriate barriers and masking. Repair damage as a result of the work of this Section to its condition at the start of work, or if such cannot be determined, to its original condition. Clean stains by approved means.

2. Do not damage existing materials scheduled to remain. Provide adequate protection of all mechanical equipment to prevent breakage, scratches, staining, and any other damage during work associated with this Section.

3. Where work is performed above or near roofing surfaces, clean the work areas free of all debris including fasteners, scrap metal, and metal shards, on a daily basis. Notify the Engineer immediately if any damage to the existing or new waterproofing and roofing system is observed, regardless of the source of the damage. Ensure that all adjacent roofing is covered with plywood protection board with taped joints prior to commencing work in the area.

4. Comply with Division 1 General Requirements, OSHA, and published, approved manufacturer's recommendations.

E. Schedule and execute all work to avoid exposing the building and its contents to inclement weather. Keep water out of the building at all times.

1.11 PRECONSTRUCTION CONFERENCE

A. Attend a preconstruction conference to be held with the Owner, Owner's Agent, and Engineer, and all other involved trades to discuss and coordinate the work covered under this Section.

1.12 WARRANTY

A. Applicator Warranty: Guarantee work under this section in a document stating that if, within 2 yrs after the Date of Substantial Completion of the Work, any of the work of this Section is found to be defective or not in accordance with the Contract Documents, the Applicator shall, at its sole cost and expense, correct it promptly after receipt of a written notice from the Owner to do so, unless the Owner has previously given the Applicator a written acceptance of such condition. Also, state that the Applicator shall bear costs incurred by the Owner, including reasonable attorney's fees, court costs, and expert witness and consultant fees, to enforce Applicator's compliance with the obligations of this Guarantee. The obligations of this Guarantee shall run directly to the Owner and its successors and assigns, and may be enforced by the Owner and its successors and assigns against the Applicator, shall survive the termination of the Contract, and shall not be limited by conditions other than this contract.

B. Manufacturer's 20-yr weatherproof performance warranty for silicone and urethane sealant joints.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers' products and specifications are generally referred to for identification; except as noted below, the products of other manufacturers meeting the specifications and standards of the specified systems may be submitted for approval. The burden of proof for "equal" materials is on the Contractor who, if required by the Owner, shall bear the costs and delays involved in the Engineer's review of substitutions. Check all specified items upon contract signing and initiate submittals in time to allow early ordering so that the work is not delayed. All materials are to be new.

2.02 SEALANT MATERIALS

A. Silicone Sealant (for use at window perimeters): non-staining, single component, non-sag, neutral curing, joint sealant; ASTM C920, Type S, Grade NS, with +100% extension and -50% compression movement capability. Color as selected by the owner.

1. Basis- of-Design System: 790 Silicone Sealant by Dow Corning
2. Alternate Manufacturer: 890 Silicone Sealant by Pecora
Spectrum 1 by Tremco

B. Urethane Sealant (for use at brick masonry and EIFS): single component, non-sag; ASTM C920, Type S, Grade NS with +/- 25% min. movement capability. Color as selected by the Owner.

1. Basis- of-Design System: Sonolastic NP1 by BASF
2. Alternate Manufacturer: Dynatrol I-XL by Pecora
Dymonic by Tremco

C. Mildew-Resistant Joint Sealant (for interior applications in Pool Room): silicone joint sealant for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

1. Basis- of-Design System: 786-M by Dow Corning
2. Alternate Manufacturer: SCS1700 Sanitary by GE
Tremsil 200 by Tremco

D. Latex Joint Sealant (for interior applications): Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Basis- of-Design System: Sonolac by BASF
2. Alternate Manufacturer: AC-20 by Pecora

850A by Sherwin-Williams
Tremflex 834 by Tremco

2.03 ACCESSORIES

A. Backer Rod: Closed-cell, non-gassing, polyethylene rod; diameter of rod to be 25% in excess of joint width. Surface skin of rod shall be continuous and unbroken and of sufficient thickness to preclude outgassing and formation of voids in the overlying sealant.

1. Basis-of-Design System: HBR Closed-Cell Rod by Construction Foam Products

B. Surface Cleaner: As required or recommended by sealant manufacturer and confirmed by adhesion test results.

C. Sealant Primer: As recommended by sealant manufacturer and required by adhesion test results.

D. Bond Breaker Tape: 0.006 in. thick polyethylene, to which sealant does not bond, adhesive-backed on one side, width as required.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine all surfaces for roughness, contaminants, unsound structural substrates, or other conditions that may impair the work of this Section. Notify the Owner and Engineer in writing of any such conditions; do not commence work until all defects are remedied.

B. Verify all site conditions and dimensions by field measurement in consideration of the special conditions associated with repairs to existing construction. All engineered sealant joints shall be a minimum of 1/4 in. wide. Notify the Engineer immediately of any inconsistency between the conditions found and those shown in the Contract Drawings.

3.02 SURFACE PREPARATION

A. Do not install sealant until the substrate has first been cleaned and primed. Remove all dirt or other foreign substances, including existing sealant remnants, from surfaces to receive sealant. All surfaces shall be dry before preparation begins. The surface preparation is to be done immediately before insertion of the final backer rod or bond breaker and after any temporary rods or seals are removed.

B. Mechanical Cleaning: Cut away as much existing sealant from existing substrates as possible.

C. Solvent Cleaning: Use two clean, white, soft, lint-free, cotton cloths and clean, fresh solvent as required to clean all surfaces. Wet one cloth with solvent and wipe surface

vigorously. Use second cloth to clean surface before solvent evaporates. Pump solvent from cans onto first cloth. Do not dip cloth in solvent, to avoid contamination of solvent. Repeat this two-cloth procedure until surface does not discolor cloth, and repeat at least once. Do not solvent clean at temperatures below 45°F. Allow solvent to evaporate from non-porous surfaces before continuing.

D. Remove all dirt or other foreign substances, including existing sealant, from surfaces to receive sealant. All surfaces shall be dry before preparation begins. The solvent cleaning preparation is to be done immediately before insertion of the final backer rod or bond breaker and after any temporary rods or seals are removed.

3.03 GENERAL WORKMANSHIP FOR SEALANT

A. Configure the sealant joints as shown on the Drawings. Avoid three-sided adhesion at all sealant joints.

B. For typical butt sealant joints, place the backer rod or bond breaker so the sealant depth measured at the center of the joint after tooling is one-half of the sealant joint width, with a minimum depth of 1/4 in. and a maximum depth of 1/2 in.

C. For typical double sealant joints, separate the sealant joints, installed as specified above, by 1 in. minimum distance between sealant of the rear joint and backer rod of the front joint.

D. At fillet (triangular) joints, extend the sealant at least 3/8 in. onto the substrate beyond the bond breaker tape or backer rod and at least 5/8 in. onto the substrate perpendicular to the tape or rod. The minimum thickness between the edge of the tape or rod and surface of the sealant joint shall be at least 1/4 in.

E. INSTALL BACKUP MATERIAL

1. Unless noted otherwise, install clean, dry joint filler / backup rod or tape into all joint openings against dry substrates. Remove all wet materials from the jobsite. Replace any backer rod not sealed over by the end of each day and solvent clean surfaces again the following day.

2. Place the backer rod or bond breaker so the sealant shape will meet the joint shape requirements of this section and as shown on the Drawings.

3. Change rod sizes as frequently as required by the variation in the joint width. Do not twist rods together. Butt ends of rods tightly. Provide a full range of rod sizes at the site of all sealant work.

4. Do not touch with fingers or otherwise contaminate the substrate surfaces while inserting the backer rod or bond breaker tape.

5. Do not rupture the skin of the closed-cell backer rod during installation. Remove and replace any rod containing punctures and solvent-clean the surfaces again.

F. APPLY PRIMER

1. Apply primer to all substrates except glass after backer rod installation. Apply primer to clean, dry substrates at ambient temperatures above 45°F.

2. Pour primer into a clean container for use. Do not pour more than a 10 min. supply into container to prevent deterioration.

3. Replace cap on primer can immediately after use. Remove from the site any primer that is discolored, contains a precipitate or has thickened.

4. Apply primer with a clean brush. Do not apply primer to exposed surfaces beyond sealant. Mask all surfaces before priming, except where surface irregularities will allow the primer to wick beneath the masking tape. Use only one coat of primer. Do not apply primer in a thick layer.

5. Allow primer to dry. Do not allow primer to become wet before sealant application.

G. SEALANT APPLICATION

1. Inspect each cartridge or container of sealant before use and verify that the production date is within 6 months of the date of application. Remove from the site all sealant more than 6 months old. Each applicator shall understand the method of coding the production date on the cartridge.

2. Mask all exposed surfaces along joint before applying sealant.

3. Recheck correct backer rod and bond breaker tape positioning before applying sealant.

4. Do not install sealant during inclement weather, in strong winds, or when such conditions are expected. Surfaces must be dry and frost free.

5. Apply sealant only to clean, dry, primed surfaces at ambient temperatures above 45°F. Seal joints within 10 hrs of primer application.

6. Fill all joints solidly and continuously with sealant, neatly applied with a standard caulking gun in a continuous motion, using a slight pressure. “Push” the sealant bead ahead of the nozzle; do not “drag” the nozzle.

7. Within 5 min. of sealant application and before skin develops on sealant, dry tool the joint surface with a concave tool to insure intimate contact with substrate and to eliminate air bubbles. Do not use any liquid for tooling. Provide a smooth, uniform finished surface.

8. Remove masking tape within 10 min. of tooling. Avoid contaminating adjacent surfaces with excess sealant. Remove all traces of smears and droppings on building surfaces promptly, using a solvent recommended by the sealant manufacturer and that will not damage or discolor the building surfaces. Remove smears and droppings on porous surfaces by mechanical means after the initial cure of the sealant.

9. Coordinate work with other trades to prevent contamination of fresh sealant by dust or other debris.

10. Protect finished work from damage during subsequent work, such as impact, marring of the surfaces, and other damage. Replace or repair at no additional cost to the Owner all damaged work or materials.

3.04 FINAL CLEANING

A. Promptly remove sealant from surfaces not scheduled to receive sealant.

B. Remove excess primer, sealant, foam, and masking materials from exposed surfaces.

C. Thoroughly clean curtain wall frame, glazing and all other work areas after completion of work.

D. At the end of each workday, collect all debris, trash, etc., and place in a suitable container.

E. Keep the work areas neat and clean. Do not allow debris or construction materials to blow around or off the site.

F. Promptly remove from the site all used brushes and rollers at the end of each day. Do not place used mops in trash containers.

3.05 SITE QUALITY CONTROL

A. Manufacturer's Site Visit: A manufacturer's representative shall visit the site at least once during construction; the visit should occur within two weeks of commencement of sealant installation; subsequent visits should be made as required. During the visit, the manufacturer's representative shall perform, as a minimum, the following work:

1. Inspect installation of sealant for conformance with the manufacturer's installation instructions.

2. Perform a minimum of one adhesion test in accordance with the procedures herein.

3. Prepare a written field report summarizing each visit, pull test locations, and test results. The manufacturer's representative shall notify the Engineer immediately of any locations not meeting the manufacturer's requirements and recommend remedial action. The Contractor shall submit the written field reports to the Engineer for the project file.

B. Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and ASTM C1193, Method A, "Field-Applied Sealant Joint Hand-Pull Tab" as follows:

1. Perform five tests for first 1,000 lf of applied silicone sealant, one of which shall be at the in situ mockup, and one test for each 1,000 lf of sealant thereafter.

2. For sealants applied between dissimilar materials, test both sides of joint. Tests shall include intersections and overlaps with dissimilar sealant materials, including membrane lap sealant for air/water barrier membrane.

3. If any sample debonds from the substrate, the sealant manufacturer shall make recommendations regarding changes in surface preparation or primers and submit these recommendations to the Engineer for approval. Sealants failing adhesion test shall be removed, substrates cleaned, sealants reinstalled, and retesting performed. Repeat sealant adhesion tests as many times as required to produce an acceptable application at no additional cost to the Owner.

4. Maintain test log and submit report to Engineer indicating tests, locations, dates, results, and remedial actions.

5. Patch test areas in accordance with manufacturer's instructions.

END OF SECTION