SECTION 07 9200

JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Work if this Section consists of joint sealants and accessories.

B. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section. Other Documents and Sections that directly relate to work of this Section include, but are not limited to:

1. General provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections.
2. Section 07 8400 - FIRESTOPPING.
3. Section 08 8000 - GLAZING.
4. Section 09 2116 - GYPSUM BOARD ASSEMBLIES.
5. Division 22, PLUMBING.
6. Division 23, HVAC.
7. Division 26, ELECTRICAL.

1.2 SYSTEM DESCRIPTION

A. General System Description: Seal joints indicated; seal each joint, seam, and intersections between dissimilar materials, unless noted otherwise, including but not limited to the following:

1. Exterior Sealing:
   a. Metal to metal joints.
   b. Wood to wood and wood to metal joints.
   c. Concrete to concrete joints.
   d. Joints and cracks in paving and walks.
   e. Perimeter of all doors, windows, and all other openings or penetrations.
   f. Joint fillers for all joints.
2. Interior Sealing:
   a. Perimeters of doorframes, window frames, and metal and wood frames.
   b. Metal to gypsum drywall joints.
   c. Top of wall base along irregular walls.
   d. Between acoustical ceiling edge angle and irregular walls.
   e. Splash to counter joints and splash to wall joints at countertops.
   f. Completely around plumbing fixtures, fittings, and trim to countertops, walls and floors.
   g. Exposed acoustical sealants, at tops and bottoms of stud partition walls around mechanical rooms, elevator machine rooms, toilet rooms, and at other acoustic partitions as indicated.

B. Definitions:

1. Adhesion: Adhesion is a measure of the ability of a sealant to adhere to a substrate. Adhesion must be maintained even while the sealant material is being stretched.
2. Durometer Hardness: The relative hardness of a sealant can be used to provide an indication of flexibility. Generally, as the values increase, flexibility decreases.
3. Modulus: Modulus is a measure of the force required to stretch a cured rubber test bar to a specified elongation. It has an important bearing on the ability of the sealant to handle joint

movement. A superior sealant offers minimum resistance to such movement and therefore would have a lower modulus rating.

4. Movement: Movement measures a sealants ability to withstand repeated expansion and contraction of a joint.
5. Nontoxic: Product does not exhibit potentially harmful characteristics as defined by the Consumer Product Safety Commission regulations found at 16 CFR Chapter II, Subchapter C, Part 1500 and is not required to be labeled Toxic or Highly Toxic.
6. Sealant: Any material with adhesive properties that is formulated primarily to fill, seal, or waterproof gaps or joints between two surfaces. Sealants include sealant primers and caulks.
7. Volatile Organic Compounds (VOC): Compounds as defined by U.S. Environmental Protection Agency at 40 CFR Section 51.100(s), (s)(1).

C. Performance Criteria, Sealant:

1. Modulus force shall be measured in accordance with ASTM D412.
2. Cyclic movement shall be measured in accordance with ASTM C719.
3. Durometer hardness shall be measured in accordance with ASTM D2240.
4. Adhesion shall be measured in accordance with Mil Spec S-8802.

1.3 PRECONSTRUCTION FIELD TESTING

A. Pre-construction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:
   a. Each kind of sealant and joint substrate indicated.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
   a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
      1). For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
4. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
5. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.4 SUBMITTALS

A. Product Data: Printed descriptions of materials and systems, performance criteria, use limitations, standard details, recommendations and installation information.

B. Samples:

1. Initial for Selection: Submit samples of sealant material indicating manufacturer’s complete range to determine color, texture, shape, and/or composition for each type of material finish exposed to view.
2. Items Chosen for Final Selection: Submit products for acceptance of specifically required aesthetics.

C. Joint-Sealant Schedule: Submit for Architect's review and approval. Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

D. Quality Assurance Submittals:

1. Test Reports: Submit certified test results by a recognized testing laboratory in accordance with specified test methods for each product and/or system indicating physical, chemical and performance characteristics.
   a. Compatibility and Adhesion Test Reports
2. Certificates: Submit with manufacturer's signature certifying that each product and/or system meets the requirements of the performance characteristics, physical criteria, and applicable standards specified.
3. Manufacturer's Instructions: Installation.
4. Qualification Statements: Submit a letter, on printed letterhead and signed by an officer of the firm, for each listed quality assurance qualification listed, attesting to meeting each requirement called out.
5. Manufacturer's Instructions.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: A firm experienced a minimum five (5) years in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
2. Installer Qualifications: Perform installation with experienced and trained Installers supervised by trained personnel who shall have at least three (3) years successful experience in installations of similar size and scope.
3. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, meeting requirements of ISO/IEC Standard 17025 or ASTM E699.

B. Source Limitations: Obtain joint sealants systems from a single manufacturer for each different product required to ensure compatibility.

C. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates as follows:

1. Locate test joints where indicated or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:
   a. Each type of elastomeric sealant and joint substrate indicated.
   b. Each type of nonelastomeric sealant and joint substrate indicated.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
5. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521 - or by hand-pull method described below:
   a. Install joint sealants in 60 inch long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow

sealants to cure fully before testing.

b. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2 inch piece.

c. Use fingers to grasp 2 inch piece of sealant between cross-cut end and 1 inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.

d. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.

6. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.

7. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in unopened factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage, moisture and direct sunlight. Sequence deliveries to avoid delays, but minimize on-site storage.

1. Manufacturers, fabricators, suppliers and shippers shall provide least amount of packaging that adequately and properly protects, supports and contains the items shipped, and is reusable, returnable or recyclable.
2. Mark products with Shop Drawing location reference, unless already properly marked.
3. Sequence deliveries to avoid delays, but minimize on-site storage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Sealant Manufacturers. Subject to requirements, products that may be included in the work include, but are not limited to the following:

1. Dow Corning Corporation; 790, 791, 795 and 758.
2. GE / Momentive Performance Materials.
3. Tremco Sealants.
4. Architect acceptable equivalent.

B. Joint Backer Material Manufacturers. Subject to requirements, products that may be included in the work include, but are not limited to the following:

1. Degussa.
2. Williams Products. Inc.
3. W. R. Meadows, Inc.
4. Architect acceptable equivalent.

2.2 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Silicone-Based Sealant: One-part; Neutral cure.
2. Polyurethane-Based Sealant: One, two or three-part system.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for Project.

2.3 LATEX JOINT SEALANTS

A. Latex Sealant: Comply with ASTM C834, Type P, Grade NF.

2.4 URETHANE JOINT SEALANTS

A. Multi-component, elastomeric, sealant complying with ASTM C920, Type M, Class 25, Use T. A primer shall be used for all exterior paving, walk way, and other similar horizontally oriented joints. At exterior joints, provide primer recommended by sealant manufacturer.

2.5 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C834 and the following:

1. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.

B. Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, non-hardening, non-skinning, non-staining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.6 JOINT BACKER MATERIAL

A. Joint Backer Material: Closed cell or soft rod plastic foam rod or other compatible non-waxing, non-extruding, non-staining resilient material in dimension 25 percent to 50 percent wider than joint width as recommended by sealant manufacturer for conditions and exposures indicated.

2.7 ACCESSORIES

A. Joint Cleaner: Cleaner as recommended by sealant manufacturer for substrates indicated.

B. Joint Primer: As recommended by sealant manufacturer for substrates, conditions and exposures indicated.

C. Bond Breaker: Polyethylene tape or other adhesive faced tape as recommended by sealant manufacturer to prevent sealant contact where it would be detrimental to sealant performance.

D. Masking Tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces that is suitable for masking.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not begin installation until weather, temperature and humidity requirements are met.
2. Provide temporary weatherproof enclosure
3. Provide Temporary Ventilation: Provide temporary ventilation during Work of this Section.
    a. Coordinate interior application of joint sealants with interior finishes schedule.
4. Provide sealant system appropriate to environmental exposure.
5. Interior Work
    a. Maintain minimum interior temperature of 65 deg F during application and curing of paint, or as recommended by manufacturer.
    b. Provide adequate ventilation. Comply, at minimum, with paint manufacturer recommendations for space ventilation during and after installation. Where feasible, the following ventilation conditions shall be maintained during the paint curing period, or for 72 hours after application:
        1). When possible, supply 100 percent outside air 24 hours a day.
            a). Supply airflow at a rate of 6 ACH, when outside temperatures are between 55 deg F and 85 deg F and humidity is between 30 and 60 percent.
            b). Supply airflow at a rate of 1.5 ACH, when outside air conditions are not within the range stipulated above.
    c. To the extent practical, allow joint sealant installations to cure prior to the installation of materials that adsorb VOCs. Materials that adsorb VOCs include carpets, textiles, and acoustical finishes.

B. Compatibility:

1. Determine compatibility characteristics of sealants in contact with sealant backings Determine compatibility characteristics of sealants in contact with sealant backings by Test Method ASTM C1087.
2. Provide joint sealants, joint fillers and accessory joint materials that are compatible with one another and with joint substrates under project conditions.
3. Install joint sealants, joint fillers and related joint materials that are non-staining to visible joint surfaces and surrounding substrate surfaces.

C. Scheduling:

1. Schedule applications of waterproofing, water repellents and preservative finishes after sealant installation unless sealant manufacturer approves otherwise in writing.
2. Ensure that installed sealant is allowed to cure sufficiently prior to subsequent applications.

3.2 EXAMINATION

A. Carefully examine areas with Installer present, for compliance with requirements affecting Work performance.

1. Verification of Conditions: Verify that field measurements, surfaces, substrates, structural support, utility connections, tolerances, levelness, plumbness, humidity, moisture content level, cleanliness and other conditions are as required by the manufacturer, and ready to receive Work.
    a. Consult with sealant manufacturers to determine whether priming is necessary.
    b. Provide joints properly dimensioned to receive the approved sealant system.
    c. Provide joint surfaces that are clean, dry, sound and free of voids, deformations,

protrusions and contaminants that may inhibit application or performance of the joint sealant.

d. Test substrate as needed to verify proper conditions.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Climatic Placement Requirements, as recommended by manufacturers to install products.

1. Set Conditioned Temperature and Humidity.
2. Provide Ventilation.

B. Substrate Preparation in accordance with manufacturer’s instructions.

C. Product Handling in accordance with manufacturer’s instructions.

1. Acclimatize product to installation location.
2. Strictly adhere to manufacturer’s handling and installation safety requirements.

3.4 INSTALLATION

A. Install in complete accordance with the manufacturer’s written instructions, and per ASTM C1193, except where more stringent requirements are indicated or specified.

B. Provide the approved sealant system where shown on the Drawings, and in strict accord with the manufacturer's recommendations as approved by the Architect.

C. Install sealants immediately after joint preparation.

D. Mix and apply multi-component sealants in accord with manufacturer's printed instructions.

E. Install sealants to fill joints completely from the back, without voids or entrapped air, using proven techniques, proper nozzles and sufficient force that result in sealants directly contacting and fully wetting joint surfaces.

F. Install sealants to uniform cross-sectional shapes with depths relative to joint widths that allow optimum sealant movement capability as recommended by sealant manufacturer.

G. Tool sealants in manner that forces sealant against back of joint, ensures firm, full contact at joint interfaces and leaves a finish that is smooth, uniform and free of ridges, wrinkles, sags, air pockets and embedded impurities.

1. Dry tooling is preferred; tooling liquids that are non-staining, non-damaging to adjacent surfaces and approved by sealant manufacturer may be used if necessary when care is taken to ensure that the liquid does not contact joint surfaces before the sealant.
2. Provide concave tooled joints unless otherwise indicated to provide flush tooling or recessed tooling.
3. Provide recessed tooled joints where the outer face of substrate is irregular.

H. Remove sealant from adjacent surfaces in accord with sealant and substrate manufacturer recommendations as work progresses.

I. Protect joint sealants from contact with contaminating substances and from damages. Cut out, remove and replace contaminated or damaged sealants, immediately, so that they are without contamination or damage at time of Substantial Completion.

J. Hybrid Sealants: Install a fillet bead of liquid sealant in seismic joints or areas of seismic concern, as recommended by the manufacturer.

3.5 FIELD QUALITY CONTROL

A. Manufacturers' Field Services: Manufacturer's field representative to inspect and approve of installation prior to issuing warranty.

3.6 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
    a. Perform 5 tests for the first 500 feet of joint length for each kind of sealant and joint substrate.
    b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
3. Inspect tested joints and report on the following:
    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

END OF SECTION