SECTION 07920
JOINT SEALANTS

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

A. The general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 General Requirements, apply to work specified in this Section.

1.02 SUMMARY

A. Work Includes: Joint sealants and sealant backers. Refer to drawings and to the schedules at the end of this section for typical sealant applications included in this Section.

B. Alternates: Work of this Section is affected by the Alternates. Refer to Section 01230 for a description of Alternates and administrative requirements applicable to Alternates.

C. Related Work Specified in Other Sections:
1. Fire-stopping sealants: Section 07840, "Firestop Systems."
2. Glazing sealants and weather-seal at butt joints: Section 08800, "Glazing."
3. Concealed acoustical sealant: Section 09250, "Gypsum Board Systems."

1.03 SUBMITTALS

A. Product data: Submit technical specifications and manufacturers handling and installation instructions for each joint sealant product and accessory required.

B. Samples:

1. For selection of color, submit manufacturer's standard bead samples of actual sealant, showing full range of colors available.

2. Samples for verification: Install joint sealant samples in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.

D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners.

E. Field Test Reports: For pre-installation and post-installation testing specified in the "Field Quality Control Article."

1. Pre-Installation Testing: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates.

2. Post-Installation Testing: Include information specified in "Field Quality Control" Article.

F. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants and interpreting

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

G. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current product formulations.

H. Closeout Submittals: Special warranties specified in this Section.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who specializes in installing joint sealants similar in material, design, and extent to that indicated for this Project and whose work has resulted in joint sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant materials through one source and from a single manufacturer.

C. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturers samples of materials that will contact or affect joint sealants for compatibility and adhesion testing as indicated below. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

1. Use manufacturer's standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

2. Submit not fewer than 9 pieces of each type of material, including joint substrates, shims, joint sealant backings, secondary seals, and miscellaneous materials.

3. For materials failing tests, obtain joint sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

4. Testing will not be required if joint sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

D. Product Testing: Submit results of testing of current sealant formulations performed by a testing agency within the previous 36-month period.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.

2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.

3. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

E. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of Section 01310, "Project Management and Coordination."

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturer's written instructions to prevent deterioration or damage. Protect from moisture, temperatures outside limits set by sealant manufacturer, contaminants, and other potential causes of deterioration.

1.06 PROJECT CONDITIONS

A. Environmental Conditions: Proceed with installation of joint sealants only when substrates are dry, and when ambient and substrate temperature conditions are within the limits permitted by joint sealant manufacturer or above 40°F (4.4°C), whichever is more stringent.

B. Joint Width Conditions: Do not proceed with installation of joint sealants unless joint widths are within the range allowed by joint sealant manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.07 WARRANTY

A. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

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

B. Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Silicone Construction Sealant: 20 years from date of Substantial Completion.

2. Multi-Component Polyurethane Sealant: 5 years from date of Substantial Completion.

C. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in

addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors: As scheduled in the Sealant Schedule at the end of this Section. Where color is not indicated, Architect will select colors from manufacturer's full range of standard colors for products which are exposed to view in the finished work.

C. Elastomeric Sealant Standard: Comply with ASTM C 920, including requirements referencing ASTM C 920 classifications for type, grade, class, and uses, and with other requirements indicated for each liquid-applied chemically curing sealant.

D. Movement Capability: Where movement capability greater than ±25% is required, provide elastomeric sealants with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.

2.02 JOINT SEALANTS

A. Silicone Construction Sealant: One-part silicone sealant complying with ASTM C920, Type S, Grade NS, Class 50 or better; low-modulus, neutral cure. Choose from the following:
1. Dow Corning "790"
2. Tremco "Spectrem 1"
3. GE Silicones "Silpruf" or "UltraPruf SCS2300."
4. Sonneborn Building Products Div., ChemRex Inc., "Omniseal."

B. Multi-Part Polyurethane Sealant: 2-part polyurethane sealant complying with ASTM C920, Type M, Grade NS, Class 25 or better. Choose from the following:
1. Tremco "Dymeric 511"
2. Sonneborne Div. of ChemRex, Inc.; "Sonolastic NP 2"
3. Sika Corporation, "Sikaflex 2c-NS"

C. Pourable Polyurethane: ASTM C920, Type M, Grade P, Class 25 or better.
1. Sonneborne Div. of ChemRex, Inc.; "Sololastic SL2"
2. Tremco "THC-900" or "THC-901"
3. Sika Corporation "Sikaflex 2c SL"

D. Acrylic-Emulsion Sealant: ASTM C 834 non sag, mildew-resistant, paintable latex sealant, capable of accommodating joint movement of 5 percent in both extension and compression for a total of 10 percent. Choose one of the following:

1. "AC-20," Pecora Corp.
2. "Sonolac," Sonneborne Building Products Div., ChemRex, Inc.
3. "Tremco Acrylic Latex 834," Tremco, Inc.

2.03 JOINT SEALANT BACKING

A. General: Provide sealant backings which are non staining; compatible with joint substrates, sealants, primers and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330-96, Type B (bicellular with a surface skin) or Type C (closed cell with surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.04 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer to promote adhesion, as determined from preconstruction joint sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Non staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance.

B. Proceed with installation of joint sealants only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. In preparation for Alternate 6, should this Alternate be selected by the Owner, remove the existing sealant from concrete control joints and prepare joint substrates for new sealant under this Section.

B. Perform preinstallation field testing specified in "Field Quality Control" article. Begin installation only after testing has been completed and adjustments made to ensure adhesion.

C. Surface Cleaning: Clean out joints immediately before installing joint sealants.

1. Remove foreign material that could interfere with adhesion, including surface dirt, old joint sealant, dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), oil, grease, waterproofing, water repellents, water, and frost.

2. Clean porous joint surfaces, such as concrete and masonry, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form release agents from concrete.

4. Clean non-porous surfaces such as metal and glass with chemical cleaners or by other means that do not stain or harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

D. Joint Priming: Prime joint substrates where recommended by joint sealant manufacturer. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

E. Masking: Mask surfaces adjoining joint with masking tape to prevent contact of sealant when adjoining surfaces might be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

A. Do not begin installation of sealant until mock-up and test installation have been approved for that type of sealant.

B. Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, unless more stringent requirements apply. Maintain correct sealant depth to joint width ratio for optimum performance.

C. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

1. Identify field test sample areas as a standard for acceptable workmanship. Maintain level of workmanship approved in field test sample throughout the installation.

D. Sealant Backings: Install sealant backings of type indicated to support sealants during application, to control joint depth, and to eliminate back bond. Butt ends-to-end joints of backings snugly; do not leave gaps between ends. Do not stretch, twist, puncture or tear sealant backings.

1. Where width of joint is 1/2 in. or less, place cylindrical sealant backing so that depth of sealant bead will be approximately equal to the joint width.

2. Where width of joint is greater than 1/2 inch, place cylindrical sealant backing so that depth of sealant bead will be 1/2 inch.

3. Where joint is not deep enough to accommodate cylindrical sealant backing and proper depth of sealant, omit cylindrical sealant backing and install bond breaker tape.

4. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

E. Bond Breakers: Where cylindrical sealant backings are not used, install bond breaker tape between sealants and joint fillers or back of joints.

F. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling: Immediately after sealant application and before skinning or curing begins, tool non-sag sealants to form smooth, uniform beads with slightly concave profile, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide joint configurations of types indicated in accordance with Figures in ASTM C 1193. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

H. Preparation of Gypsum Board: Prepare interior drywall surfaces to be painted by sealing cracks and gaps at perimeter of drywall, around hollow metal frames, and at similar locations to seal out dust and provide a smooth surface for finish painting. Tool beads to insure full, firm contact with both faces of the joints, strike off excess sealant, and finish to a smooth, wrinkle-free, slightly concave surface.

I. Clean surfaces adjacent to the joint as the work progresses. Remove sealant smears by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.04 FIELD QUALITY CONTROL

A. Preinstallation 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 type of elastomeric sealant and joint substrate.

3. Notify Architect 7 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 by hand-pull method described below:

   a. Install joint sealants in 60-inch- (1500-mm-) 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 (50 mm) long at sides of joint and meeting cross cut at one end. Place a mark 1 inch (25 mm) from cross-cut end of 2-inch (50-mm) piece.

   c. Use fingers to grasp 2-inch (50-mm) piece of sealant between cross-cut end and 1-inch (25-mm) 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. Sealant will fail the test if it fails to adhere to joint substrates or if it tears before reaching maximum movement capability.

7. If sealant fails, modify substrate preparation techniques, or change to another acceptable sealant, and retest.

B. Acceptance of Workmanship: Sealant bead shall be uniform in appearance, relationship to the face of the wall, width and depth of sealant bead, straightness of bead edges, uniformity of tooled profile, surface free of drips, bulges, tears and skips, and even appearance for the entire length of the joint.

1. Remove samples which do not meet acceptance standards, clean edges of test joint, and install additional samples until workmanship is approved. Modify installation methods if necessary to achieve an appropriate degree of control and uniformity.

C. Post-Installation Field-Adhesion Testing: During and after installation, monitor quality of materials and workmanship by field-testing adhesion of sealant to joint substrates as follows:

1. Extent of Testing: Test completed elastomeric sealant joints as follows:
   a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each type of elastomeric sealant and joint substrate.
   b. Perform one test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants by hand-pull method described above.

3. Inspect joints and report on the following:
   a. Sealant completely filling joint cavities, absence of voids.
   b. Sealant dimensions and configurations complying with specified requirements.
   c. For tested joints, report on whether sealants 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. Compare these results to determine if adhesion passes sealant manufacturer's field- adhesion hand-pull test criteria.

4. Report observations during inspection and 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 to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.

D. Evaluation of Field-Test Results: Sealants which pass field adhesion testing and which comply 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.

3.05 PROTECTION AND REPAIR

A. Protect joint sealants during and after curing period from contamination and from damage, so that sealants are without deterioration or damage at time of Substantial Completion.

B. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants and repair so that repaired areas are indistinguishable from original work.

3.06 EXTERIOR SEALANT SCHEDULE

A. Install sealants at all exterior joints, including joints between new and existing construction, as necessary to make building shell construction under this Contract water-tight and air-tight at joints, to seal expansion and control joints, and generally to close gaps between different materials. As a minimum, provide sealant at locations scheduled below, and at additional locations shown on Drawings.

1. If joint materials are not listed below, consult with Architect on sealant selection.

2. If sealant color is not indicated below, match color of sealant used for same application on lower floors.

B. The following schedule specifies the type of sealant to be used at specific locations.

	Typical Applications	Joint Sealant
1.	Control joints in exterior masonry:	Silicone construction sealant; match color of brick.
2.	Perimeter joints of aluminum windows, curtain wall, and storefront framing:	Silicone construction sealant.
3.	Penetrations of exterior walls (other than EIFS) by pipe and conduit:	Silicone construction sealant
4.	Control joints in EIFS system; joints between EIFS and abutting materials:	Multi-part polyurethane, non-sag.
5.	Perimeter joints of hollow metal door frame (Door 601):	Multi-part polyurethane, non-sag.
6.	Control joints in existing concrete walls which will be coated under Alternate 6:	Multi-part polyurethane, non-sag color matching the coating.
7.	Control joints in thin brick system, Alternate 7, including terminations and penetrations:	Silicone construction joint sealant; match color of brick.

3.07 INTERIOR SEALANT SCHEDULE

A. Install sealants at all interior joints, including joints between new and existing construction, as necessary to make building interior construction under this Contract air-tight, light-tight, and water-tight where applicable. Without limitation, seal interior expansion joints and control joints, fill gaps and joints in surfaces in preparation for interior painting, and seal joints at changes of materials.

B. The following schedule specifies the type of sealant to be used at specific locations. If joint materials are not listed below, consult with Architect on sealant selection.

	Typical Applications	Joint Sealant
1.	Joints between interior wall surfaces and metal frames of exterior doors and windows:	Paintable acrylic latex sealant.
2.	Joints between interior wall surfaces and metal frames of interior doors and windows:	Paintable acrylic latex sealant.
3.	Joint between stair stringers and stairway wall:	Paintable acrylic latex sealant.

END OF SECTION 07920