

## **SECTION 07 92 00 – JOINT SEALANTS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes: Joint sealants.

#### **1.2 SUBMITTALS**

- A. Product Data: Manufacturer's literature for each joint-sealant product indicated, including installation instructions.
- B. Samples: Submit one sample for each type and color of joint sealant required. Samples shall be installed 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. Shop Drawings: Illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades. Drawings shall indicate type of sealant scheduled to be used at each type of joint condition.
- D. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.
- E. Qualification Data: Submit data indicating capabilities and experience for installers. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- F. Field Test Report: Submit copies of logs and test reports showing results of field adhesion testing and stain testing.
- G. Compatibility and Adhesion Test Reports: Submit reports from sealant manufacturer indicating:
  - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
  - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- H. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current product formulations.
- I. Warranties: Submit sample warranty to be signed jointly by applicator and manufacturer.

#### **1.3 QUALITY ASSURANCE**

- A. Installer qualifications: An experienced technician approved by sealant manufacturer with experience in projects similar in material, design, and extent.
- B. Project and Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
  - 1. If sealants from separate manufacturers must be used and could come in contact with each other, provide written certification from every manufacturer involved that the sealants are compatible and will adhere to each other.

- C. Product Testing: Submitted test results shall be from a qualified testing agency based on testing current sealant formulations within a 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 elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in peel, and indentation hardness.
  4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.
- D. Preconstruction Field-Adhesion Testing: Before installing sealants, perform adhesion field tests for each type of sealant and joint substrate indicated.
1. Locate test joints where indicated or, if not indicated, as directed by Architect.
  2. Notify Architect seven days in advance of dates and times when test joints will be erected.
  3. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
  4. Test Method: Test joint sealants 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 alongside 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 by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
  5. Conduct number of field adhesion tests for each type of sealant and each type of substrate as follows:
    - a. Not less than 10 tests for the first 1,000 feet of installed sealant and 1 test for each additional 1,000 feet of sealant installed, or 1 test per floor per elevation.
  6. Document results of field adhesion tests and record results in field adhesion test log.
  7. Include in log data on pull distance used to test each joint sealant.
  8. Include data on joints where material connected with pull portion of sealant failed to adhere to joint substrate or tore cohesively.
  9. Inspect joints and record data for the following:
    - a. Complete fill.
    - b. No voids.
    - c. Joint dimensions matching those of manufacturer's recommended details.
  10. 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.

11. 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.
  12. Repair sealant test areas by removing damaged materials and applying sealant to test area using same procedure used to originally install the sealant.
- E. Field Color and Workmanship Samples: Caulk a section of joint as directed, under job conditions, at least 7 days prior to start of work for review by Architect. When approved, sample shall be used as a standard of comparison for remainder of work.

#### **1.4 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 date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

#### **1.5 PROJECT CONDITIONS**

- A. Project Requirements: Do not install when weather conditions or substrate conditions are not acceptable to manufacturer.
1. Ambient and substrate temperature conditions shall be within limits as recommended by sealant manufacturer.
  2. Joint widths shall be at least the minimum width allowed by sealant manufacturer and as recommended by Structural Engineer.

#### **1.6 WARRANTY**

- A. 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: 2 years from date of Substantial Completion.
- B. Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing 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. Warranty Period:
    - a. Urethane Sealants: 5 years from date of Substantial Completion.
    - b. Silicone Sealants: 20 years from date of Substantial Completion.
    - c. Others: 2 years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Products: Subject to compliance with requirements, provide products as manufactured by one of the following:
  - 1. Pecora Corporation.
  - 2. Dow Corning Corporation.
  - 3. Sika Corporation.
  - 4. Sonneborn / Degusa.
  - 5. Tremco.

### **2.2 MATERIALS**

- A. General: The selection of proper sealant for a particular joint shall be in accordance with current published recommendations of the manufacturer.
- B. Compatibility: Provide joint sealants, backings, 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.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.

### **2.3 JOINT SEALANTS**

- A. Elastomeric Joint Sealants: Comply with ASTM C 920 and other requirements indicated.
  - 1. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products 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. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food; provide products that comply with 21 CFR 177.2600.
- B. Solvent-Release Joint Sealants:
  - 1. Acrylic-Based Solvent-Release Joint-Sealant: Comply with ASTM C 1311.
  - 2. Pigmented Narrow Joint Sealant: Provide manufacturer's standard, solvent-release-curing, pigmented, synthetic-rubber sealant complying with AAMA 803.3 and formulated for sealing joints 3/16 inch or smaller in width.
- C. Acoustical Joint Sealants:
  - 1. Acoustical Sealant for Exposed and Concealed Joints: Provide manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following:
    - a. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - 2. Acoustical Sealant for Concealed Joints: Provide manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

## 2.4 ACCESSORIES

- A. Joint Sealant Backing: Material and type that are nonstaining; are 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.
  - 1. Cylindrical Sealant Backings: ASTM C 1330, provide one of the following, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
    - a. Type O: Open-cell material.
      - 1) Product: Pecora #91 Open Cell Backer Rod.
    - b. Type C: Closed-cell material with a surface skin.
      - 1) Product: Pecora #92 Closed Cell Backer Rod.
    - c. Type B: Bicellular material with a surface skin.
      - 1) Product: Sof Rod by Nomaco or Pecora #93 Soft Foam Backer Rod.
  - 2. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
  - 3. Bond-Breaker Tape: Polyethylene tape or other plastic tape 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.
- B. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- C. 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 joint substrates and adjacent nonporous surfaces in any way and formulated to promote optimum adhesion of sealants with joint substrates.
- D. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 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.
  - 1. Substrates shall be dry and free of contaminants.
  - 2. Report unsatisfactory conditions to Architect in writing.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
    - a. Porous joint substrates: Clean surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining by vacuuming or blowing out joints with oil-free compressed air.
    - b. Nonporous joint substrates: Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
    - c. Concrete: Remove laitance and form-release agents from concrete.
- B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would 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.

### **3.3 INSTALLATION OF JOINT SEALANTS**

- A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Standards:
  - 1. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
  - 2. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.

- E. Install sealants to comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses provided for each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealants from surfaces adjacent to joint.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

### **3.4 FIELD QUALITY CONTROL**

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as follows:
  - 1. 1. Extent of Testing: Test completed elastomeric sealant joints as follows:
    - a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
    - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
  - 2. Test Method: Test joint sealants by standard hand-pull method.
  - 3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
  - 4. Inspect tested joints and report on the following:
    - a. 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 type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field- adhesion hand-pull test criteria.
    - b. Whether sealants filled joint cavities and are free from voids.
    - c. Whether sealant dimensions and configurations comply with specified requirements.
  - 5. 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.
  - 6. 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.
- B. Evaluation of Field-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.

### **3.5 CLEANING**

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- B. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

### **3.6 PROTECTION**

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

### **3.7 JOINT-SEALANT SCHEDULE**

- A. Horizontal traffic:
  - 1. Type: 2-part or 3-part (self-leveling) urethane, Type M, Grade P, Class 25, Use T.
  - 2. Conforming to ASTM C920
  - 3. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
    - a. Pecora NR-200 Urexpan Sealant or Dynatred.
    - b. Tremco THC-900/901.
    - c. Vulkem 245, Sikaflex 2c SL (self-leveling).
- B. Masonry, concrete to concrete, stucco, steel and wood:
  - 1. Locations: Expansion and Control Joints.
  - 2. Type: 3-part chemically curing polyurethane sealant, Type M, Grade NS, Class 50, Use NT, M, A, O.
  - 3. Conforming to ASTM C920.
  - 4. Movement: 50 percent in extension and compression, and sustained temperatures of 250 degrees F in service.
  - 5. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
    - a. Tremco Dymeric 240/240FC Sealant.
    - b. Pecora Dynatrol II.
    - c. Vulkem 922, Sikaflex 2c NS (non-sag).
    - d. Sonneborn NP-2.
- C. Glass (except exterior, insulating glass or special coated glass), aluminum, Natural Stone, and plastics:
  - 1. Type: One-part low modulus moisture cure silicone rubber sealant, Class A, Type S, Grade NS, Use NT, M, G, A, and O.
  - 2. Conforming to ASTM C920.
  - 3. Movement: 100 percent in extension and 50 percent in compression in service.
  - 4. Acceptable Products: Subject to compliance with requirements, provide one of the following products:



- D. Glass (including insulating glass or special coated glass), aluminum and plastics:
1. Type: One-part medium modulus neutral cure silicone rubber sealant, Type S, Grade NS, Use NT, M, G, A, and O.
  2. Conforming to ASTM C 920.
  3. Movement of 50 percent in extension and 50 percent in compression in service.
  4. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
    - a. Pecora 895.
    - b. Dow Corning 795 c. Dow Corning 791.
- E. Concrete to concrete, stucco, masonry, aluminum, steel, and wood and Mechanical (ductwork and air conditioning):
1. Locations: Non-expanding Joints.
  2. Type: Type S, Grade NS, Class 25, Use NT, M, A,O.
  3. Conforming to ASTM C920
  4. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
    - a. Sika Sikaflex 1A.
    - b. Pecora Dynatrol 1.
    - c. Tremco DyMonic FC.
    - d. Pecora 345.
    - e. Sonneborn NP-1.
- F. Plumbing Fixtures (around toilet, bath, kitchen fixtures, and food service equipment):
1. Type: Silicone rubber sealant with mold inhibitor.
  2. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
    - a. Tremco Proglaze or Tremsil 200.
    - b. Dow Corning 999.
    - c. Pecora 863 or 898.
    - d. Sonneborn Omni-Plus.
- G. Acoustical Sealant:
1. Exposed and Concealed Joints:
    - a. Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834.
    - b. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
    - c. Acceptable Products: Subject to compliance with requirements, provide PABCO Gypsum; Quiet Seal Pro.

END OF SECTION 07 90 00