

**SECTION 07 92 00**  
**JOINT SEALANTS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. Section covers all sealant and caulking materials and their application, wherever required for complete installation of building materials or systems.

**1.2 RELATED WORK:**

- A. Firestopping penetrations: Section 07 84 00, FIRESTOPPING.
- B. Control joints: Section 09 29 00, GYPSUM BOARD
- C. Mechanical Work: Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING, Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

**1.3 QUALITY CONTROL:**

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those 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 through one source from a single manufacturer.
- C. Product Testing: Obtain test results from a qualified testing agency based on testing current sealant formulations within a 12-month period.
  - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021.
  - 2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C920, 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 C920 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 elastomeric sealants, field test their adhesion to joint substrates in accordance with sealant manufacturer's recommendations:
  - 1. Locate test joints where indicated or, if not indicated, as directed by Contracting Officer.
  - 2. Conduct field tests for each application indicated below:
    - a. Each type of elastomeric sealant and joint substrate indicated.

- b. Each type of non-elastomeric sealant and joint substrate indicated.
- 3. Notify Resident Engineer seven days in advance of dates and times when test joints will be erected.

#### **1.4 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's installation instructions for each product used.
- C. Cured samples of exposed sealants for each color where required to match adjacent material.
- D. Manufacturer's Literature and Data:
  - 1. Caulking compound
  - 2. Primers
  - 3. Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- E. Schedule: If multiple sealants and caulks are submitted for the Project, provide a schedule clearly indicating the use for which each sealant is being submitted.

#### **1.5 PROJECT CONDITIONS:**

- A. Environmental Limitations:
  - 1. Do not proceed with installation of joint sealants under following conditions:
    - a. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 °C (40 °F).
    - b. When joint substrates are wet.
    - c. When moisture level in the substrate exceeds that recommended by the sealant manufacturer.
- B. Joint-Width Conditions:
  - 1. Do not proceed with installation of joint sealants where joint widths are less than or greater than those allowed by joint sealant manufacturer for applications indicated.
- C. Joint-Substrate Conditions:
  - 1. Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

#### **1.6 DELIVERY, HANDLING, AND STORAGE:**

- A. Deliver materials in manufacturers' original unopened containers, with brand names, date of manufacture, shelf life, and material designation clearly marked thereon.
- B. Carefully handle and store to prevent inclusion of foreign materials.

- C. Do not subject to sustained temperatures exceeding 5 °C (90 °F) or less than 32 °C (40 °F).

**1.7 DEFINITIONS:**

- A. Definitions of terms in accordance with ASTM C717 and as specified.
- B. Back-up Rod or Backer Rod: A type of sealant backing.
- C. Bond Breakers: A type of sealant backing.
- D. Filler: A sealant backing used behind a back-up rod.

**1.8 WARRANTY:**

- A. Warranty interior sealing against cracking, crazing, adhesion, and cohesive failure, and subject to terms of "Warranty of Construction" Article specified in Section 00 72 00, GENERAL CONDITIONS, except that warranty period shall be extended to two years.
- B. General Warranty: Special warranty specified in this Article shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

**1.9 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - C612-04 .....Mineral Fiber Block and Board Thermal Insulation.
  - C717-07 .....Standard Terminology of Building Seals and Sealants.
  - C834-05 .....Latex Sealants.
  - C919-02. .... Use of Sealants in Acoustical Applications.
  - C920-05 .....Elastomeric Joint Sealants.
  - C1021-01 .....Laboratories Engaged in Testing of Building Sealants
  - C1193-05 .....Standard Guide for Use of Joint Sealants.
  - C1311- .....Standard Specification for Solvent Release Sealants
  - C1330-02 .....Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
  - E84-07 .....Surface Burning Characteristics of Building Materials.
- C. Sealant, Waterproofing and Restoration Institute (SWRI).
  - The Professionals' Guide

**PART 2 - PRODUCTS****2.1 SEALANTS:**

## A. S-1:

1. ASTM C920 polyurethane or polysulfide or Silyl-Terminated Polyether (Hybrid).
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 15-25.

## B. S-2:

1. ASTM C920, polyurethane or polysulfide.
2. Type M or S.
3. Class 25.
4. Grade P.
5. Shore A hardness of 25-40.

## C. S-3:

1. ASTM C920 100% Acrylic.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 15-20.
6. Non-yellowing, mildew resistant.
7. Paintable.

## D. S-4:

1. ASTM C920 silicone.
2. Type S.
3. Class 25.
4. Grade NS.
5. Use must include Use M.
6. Shore A hardness of 25-30.
7. Non-yellowing, mildew resistant.

**2.2 SOLVENT RELEASE SEALANTS**

## A. R-1

1. Butyl or polyisobutylene, nondrying, nonskinning.

2. Conform to ASTM C 1311.

**2.3 CAULKING COMPOUND:**

A. C-1: ASTM C834, acrylic latex.

**2.4 COLOR:**

- A. Sealants used with exposed masonry shall match color of mortar joints.
- B. Sealants used with unpainted concrete shall match color of adjacent concrete.
- C. Sealants around door frames shall match color of door frames.
- D. Sealants for countertops and backsplashes shall match the base color of the counter top of backsplash.
- E. Color of sealants for other locations shall be light gray or aluminum, unless specified otherwise.
- F. Caulking shall be light gray or white, unless specified otherwise.

**2.5 JOINT SEALANT BACKING:**

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
  - 1. Type B, non-gasing, bicellular polyolefin with non-absorbing outer skin
- C. 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. Bond-breaker tape may be used only where it is impossible to used a Backing Rod and only with the approval of the Resident Engineer.

**2.6 FILLER:**

- A. Mineral fiber board: ASTM C612, Class 1.
- B. Thickness same as joint width.
- C. Depth to fill void completely behind back-up rod.

**2.7 PRIMER:**

- A. As recommended by manufacturer of caulking or sealant material.
- B. Stain free type.

**2.8 CLEANERS-NON POROUS SURFACES:**

- A. Chemical cleaners acceptable to manufacturer of sealants and sealant backing material, free of oily residues and other substances capable of staining or harming joint substrates and adjacent non-porous surfaces and formulated to promote adhesion of sealant and substrates.

**PART 3 - EXECUTION****3.1 INSPECTION:**

- A. Inspect substrate surface for bond breaker contamination and unsound materials at adherent faces of sealant.
- B. Coordinate for repair and resolution of unsound substrate materials.
- C. Inspect for uniform joint widths and that dimensions are within tolerance established by sealant manufacturer.

**3.2 PREPARATIONS:**

- A. Prepare joints in accordance with manufacturer's instructions and SWRI.
- B. Clean surfaces of joint to receive caulking or sealants leaving joint dry to the touch, free from frost, moisture, grease, oil, wax, lacquer paint, or other foreign matter that would tend to destroy or impair adhesion.
  - 1. Clean porous joint substrate 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.
  - 2. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. 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.  
Nonporous surfaces include the following:
    - a. Metal.
    - b. Glass.
    - c. Porcelain enamel.
    - d. Glazed surfaces of ceramic tile.
- C. Do not cut or damage joint edges.

- D. Apply masking tape to face of surfaces adjacent to joints before applying primers, caulking, or sealing compounds.
- E. Apply primer to sides of joints wherever required by compound manufacturer's printer instructions.
  - 1. Apply primer prior to installation of back-up rod or bond breaker tape.
  - 2. Use brush or other approved means that will reach all parts of joints.
- F. Take all necessary steps to prevent three sided adhesion of sealants.

### **3.3 BACKING INSTALLATION:**

- A. Install back-up material, to form joints enclosed on three sides as required for specified depth of sealant.
- B. Where deep joints occur, install filler to fill space behind the back-up rod and position the rod at proper depth.
- C. Cut fillers installed by others to proper depth for installation of back-up rod and sealants.
- D. Install back-up rod, without puncturing the material, to a uniform depth, within plus or minus 3 mm (1/8 inch) for sealant depths specified.
- E. Where space for back-up rod does not exist, install bond breaker tape strip at bottom (or back) of joint so sealant bonds only to two opposing surfaces. Do not use bond breaker tape unless first approved by the Resident Engineer.
- F. Do not leave gaps between ends of sealant backings.
- G. Do not stretch, twist, puncture, or tear sealant backings.
- H. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

### **3.4 SEALANT DEPTHS AND GEOMETRY:**

- A. At widths up to 6 mm (1/4 inch), sealant depth equal to width.
- B. At widths over 6 mm (1/4 inch), sealant depth 1/2 of width up to 13 mm (1/2 inch) maximum depth at center of joint with sealant thickness at center of joint approximately 1/2 of depth at adhesion surface.

### **3.5 INSTALLATION:**

- A. General:
  - 1. Apply sealants and caulking only when ambient temperature is between 5 degrees C and 38 degrees C (40 and 100 degrees F).
  - 2. Do not use sealant type listed by manufacture as not suitable for use in locations specified.

3. Apply caulking and sealing compound in accordance with manufacturer's printer instructions and ASTM C1193.
  4. Avoid dropping or smearing compound on adjacent surfaces.
  5. Fill joints solidly with compound and finish compound smooth.
  6. Tool joints to concave surface unless shown or specified otherwise.
  7. Finish paving or floor joints flush unless joint is otherwise detailed.
  8. Apply compounds with nozzle size to fit joint width.
  9. Test sealants for compatibility with each other and substrate. Use only compatible sealant.
- B. Where gypsum board partitions are of fire rated, or smoke barrier construction, follow requirements of ASTM C919 only to seal all cut-outs and intersections with the adjoining construction unless specified otherwise.
1. Apply a 6 mm (1/4 inch) minimum bead of sealant each side of runners (tracks), including those used at partition intersections with dissimilar wall construction.
  2. Coordinate with application of gypsum board to install sealant immediately prior to application of gypsum board.
  3. Partition intersections: Seal edges of face layer of gypsum board abutting intersecting partitions, before taping and finishing or application of veneer plaster-joint reinforcing.
  4. Openings: Apply a 6 mm (1/4 inch) bead of sealant around all cut-outs to seal openings of electrical boxes, ducts, pipes and similar penetrations. Seal electrical boxes, seal sides and backs.
  5. Control Joints: Before control joints are installed, apply sealant in back of control joint to reduce flanking path for smoke through control joint.

### **3.6 FIELD QUALITY CONTROL:**

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as recommended by sealant manufacturer:
1. Execute one pull test for each type of sealant applied to each substrate where it will be used.
  2. Repeat test for any applications that fail the initial test.
  3. 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.

4. Repair sealants or replace 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. Inspections: Inspect all installed sealants and provide a written report including:

1. Whether sealants filled joint cavities and are free from voids.
2. Whether sealant dimensions and configurations comply with specified requirements.
3. Conditions which may pose problems for the durability or future performance of the installation.

**3.7 CLEANING:**

- A. Fresh compound accidentally smeared on adjoining surfaces: Scrape off immediately and rub clean with a solvent as recommended by the caulking or sealant manufacturer.
- B. After filling and finishing joints, remove masking tape.
- C. Leave adjacent surfaces in a clean and unstained condition.

**3.8 LOCATIONS:**

- A. Vertical Exterior Joints: Type S-1, unless noted otherwise.
- B. Horizontal Exterior Joints: Type S-2, unless noted otherwise.
- C. Exterior Joint between new and existing concrete slab: Type S-4
- D. Bedding Joints:
  1. Thresholds: Type R-1
- E. Interior Caulking:
  1. Typical Narrow Joint 6 mm, (1/4 inch) or less at Walls and Adjacent Components: Type C-1 or S-3.
  2. Perimeter of Doors, Windows, Access Panels and Adjacent surfaces: Type C-1 or S-3.
  3. Exposed Isolation Joints at Top of Full Height Walls: Type S-1 or S-3

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