

**SECTION 07190
VAPOR BARRIER**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish labor, material, equipment and appliances required for complete execution of Work shown on Drawings and specified herein.
- B. Principal items of work include:
 - 1. Vapor barrier below structural slabs on grade.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03300 - Cast-in-Place Concrete

1.03 SUBMITTALS

- A. In accordance with the procedures and requirements set forth in Section 01300 - Submittals, submit the following:
 - 1. Manufacturer's data and installation instructions.

PART 2 - PRODUCTS

2.01 VAPOR BARRIER

- A. Vapor Barrier: A reinforced laminate membrane with a minimum tensile strength of 75 lbs/in. in accordance with ASTM D-882, vapor transmission rating of 0.02 perms in accordance with E-96, and a puncture resistance of 25 lbs in accordance with ASTM D-4833.
- B. Adhesive/Tape: Type approved by the Manufacturer of the vapor material.

PART 3 - EXECUTION

3.01 VAPOR BARRIER

- A. Vapor barrier shall be placed on top of 4 inches minimum of compacted structural fill stone, free of debris and protrusions, as shown on the Drawings for structural slabs.
- B. Lap edges 12 inches and seal with adhesive tape. Lay with seams perpendicular to and lapped in the direction of placement. Do not penetrate vapor barrier.

- C. Protect from damage until concrete is placed. Punctures and tears in vapor barrier shall be repaired using patches of the material which overlaps puncture or tear a minimum of 12 inches; seal with tape or adhesive.

END OF SECTION 07190

**SECTION 07900
SEALANTS AND CAULKING**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section includes requirements for providing sealant, caulking, and related accessories to weather seal and fill joints in accordance with the Contract Documents.

1.02 PERFORMANCE REQUIREMENTS

- A. Provide joint sealant that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.03 SUBMITTALS

- A. Submit the following information in accordance with the General Conditions:
 - 1. Manufacturer's descriptive product data and certification of compliance with referenced specification.
 - 2. Manufacturer's detailed description for handling, recommendation on intended use and installation recommendations.
- B. Submit samples in accordance with the General Conditions for the following:
 - 1. One cartridge of each type of sealant and caulking compound.
 - 2. One pint of each primer.
 - 3. One linear foot of backup material.
 - 4. One linear foot of compression seal.
 - 5. One cartridge of expansion joint material.
- C. Submit full range of manufacturer's colors of each sealant and caulking compound to be used for selection by the Engineer.

1.04 QUALITY ASSURANCE

- A. Preconstruction Compatibility and Adhesion Testing: Submit samples of materials that will contact or affect joint sealants to joint-sealant manufacturers for testing according to ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
- B. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates according to the method in ASTM C 1193 that is appropriate for the types of project joints.
- C. Mockups: Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original unopened containers with labels intact along with referenced specification number, type and class as applicable.
- B. Handle and store product in accordance with manufacturer's recommendations.
- C. Maintain sealant and caulking at a temperature of at least 70 degrees F. for a period of not less than 24 hours prior to installation.

1.06 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which installer agrees to repair or replace 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. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to furnish 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: Five years from date of Substantial Completion.

1.07 JOB CONDITIONS

- A. Environmental Requirements

Unless otherwise recommended by the manufacturer, do not apply sealant and caulking when temperature is below 40 degrees F. and when there is ice, frost or dampness visible on surfaces to be sealed.

- B. Safety Requirements

Avoid contact with skin. Wear protective clothing, goggles, gloves and/or barrier creams. Avoid breathing vapors in confined areas.

PART 2 - PRODUCTS

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.

Sealant, caulking, primers and accessories shall be the non-staining type and of a color specified or selected by the City from the Manufacturer's standard color chart.

2.01 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Single-Component Pourable Neutral-Curing Silicone Sealant:
 - 1. Type and grade: S (single component) and P (pourable).
 - 2. Class: 100/50.
 - 3. Uses Related to Exposure: NT and T (traffic).
 - 4. Uses Related to Joint Substrates: M, A, and O, as applicable to joint substrates indicated.
- D. Single-Component Neutral-Curing Silicone Sealant:
 - 1. Type and Grade: S (single component) and NS (nonsag).
 - 2. Class: 25.
 - 3. Use Related to Exposure: NT (nontraffic).
 - 4. Uses Related to Joint Substrate: M, G, A, and O, as applicable to joint substrates indicated.
- E. Single-Component Acid-Curing Silicone Sealant:

1. Type and Grade: S (single component) and NS (nonsag).
 2. Class: 25.
 3. Use Related to Exposure: NT (nontraffic).
 4. Uses Related to Joint Substrate: G, A, and O, as applicable to joint substrates indicated.
- F. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:
1. Type and Grade: S (single component) and NS (nonsag).
 2. Class: 25.
 3. Use Related to Exposure: NT (nontraffic)
 4. Uses Related to Joint Substrates: M, G, A, and O, as applicable to joint substrates.

2.02 LATEX JOINT SEALANTS

- A. Latex Sealant: Comply with ASTM C 834, Type O P, Grade NF.

2.03 PRIMERS AND ACCESSORIES

- A. Primers, where applicable, shall be in accordance with caulking/sealant manufacturer's recommendations.
- B. Provide backup materials, fillers and joint packing compatible with caulking/sealant and primer.
1. 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.
 2. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) O (open-cell material) B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer of joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 3. 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 to otherwise contribute to optimum sealant performance.

4. 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.
5. Use back-up material to control caulking/sealant depth as recommended by the caulking/sealant manufacturer.
6. Unless otherwise specified use closed-cell tube or rope shaped stock expanded polyethylene or polyurethane foam.
7. The width or diameter of backup material shall be 1-1/3 to 1-1/2 times the width of the joint.
8. Use semi-rigid vinyl or polyethylene foam, solid neoprene rod or similar approved backing for joints subject to horizontal traffic or puncture.
9. Do not use bituminous or oily product as a backup material.

2.04 MISCELLANEOUS MATERIALS

- A. 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.
- 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 joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Inspect joint surfaces before starting work. Verify surfaces are dry and meet caulking/sealant manufacturer's requirements.
- B. Clean joint surfaces immediately before installation of gaskets and sealant. Remove dirt, moisture, frost, coatings and other foreign substances that will interfere with performance of compression seal and sealant.
 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.

- a. 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. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
2. Remove laitance and form-release agents from concrete.
 - a. 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. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer.
- D. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experiences. 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.
- E. Confine primer or sealer to areas of the compression seal and sealant bond area.
- F. 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.

3.02 APPLICATION

- A. General
 1. Install material in accordance with manufacturer's recommendations for materials intended use and instructions using appropriate and approved equipment, except where more stringent requirements are shown or specified.
 2. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
 3. 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.
 - a. Do not leave gaps between ends of sealant backings.

- b. Do not stretch, twist, puncture, or tear sealant backings.
 - c. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
 4. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
 5. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - a. Place sealants so they directly contact the fully wet joint substrates.
 - b. Completely fill recesses in each joint configuration.
 - c. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
 6. 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.
 - a. Remove excess sealant from surfaces adjacent to joints.
 - b. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - c. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 7. Clean off excess sealant 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.
 8. Prevent caulking, sealant and compounds from spilling onto adjoining surfaces or to migrate into voids of exposed finishes by using masking tape or other methods. Clean spill on adjoining surfaces immediately.
- B. Sealant and Accessories
 1. Sealant shall be used on slab and wall control and expansion joints, pipe sleeves through walls and roofs, and on joints and cracks.
 2. Install backup material to control caulking depth in accordance with sealant manufacturer's instructions.
 3. Place sealant in a manner that will fill the joint without air pockets and form a smooth surface. For exposed surfaces of gun and knife grade sealant that

cannot be made smooth during initial application, smooth with tool moistened with either water or sealant solvent.

4. Prepare sealant mixtures in quantities that can be applied within the time period recommended by the manufacturer. Materials mixed and not used within this time period shall be discarded.
5. Finish joint to a smooth concave surface slightly lower than adjoining surfaces except horizontal surfaces shall have joints finished so moisture and debris will not be entrapped. Finished surface shall be free of wrinkles and sags.

3.03 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior vertical and horizontal nontraffic construction joints in cast-in-place concrete.
 1. Joint Sealant: Single-component neutral-curing silicone sealant.
 2. Joint Sealant Color: Match adjacent surfaces.
- B. Joint-Sealant Application: Exterior vertical control and expansion joints in unit masonry.
 1. Joint Sealant: Single-component neutral-curing silicone sealant.
 2. Joint Sealant Color: Match mortar color.
- C. Joint-Sealant Application: Exterior perimeter joints between masonry, concrete and frames of doors, windows and louvers.
 1. Joint Sealant: Single-component neutral-curing silicone sealant.
 2. Joint Sealant Color: As selected by the Engineer from the manufacturer's available full range of colors.
- D. Joint-Sealant Application: Exterior control and expansion joints in ceilings and other overhead surfaces.
 1. Joint Sealant: Single-component neutral-curing silicone sealant.
 2. Joint Sealant Color: As selected by the Engineer from the manufacturer's available full range of colors.
- E. Joint-Sealant Application: Vertical control and expansion joints on exposed interior surfaces of exterior walls.
 1. Joint Sealant: Single-component neutral-curing silicone sealant.

2. Joint Sealant Color: As selected by the Engineer from the manufacturer's available full range of colors.
- F. Joint-Sealant Application: Interior perimeter joints of exterior openings.
1. Joint Sealant: Single-component neutral-curing silicone sealant.
 2. Joint Sealant Color: As selected by the Engineer from the manufacturer's available full range of colors.
- G. Joint-Sealant Application: Interior joints between plumbing fixtures and adjoining walls, floors and counters.
1. Joint Sealant: Single-component mildew-resistant neutral curing silicone sealant.
 2. Joint Sealant Color: As selected by the Engineer from the manufacturer's available full range of colors.

3.04 CURING AND PROTECTION

- A. Cure joint sealers and accessories in accordance with manufacturer's instructions.
- B. Protect joint sealers during construction period to prevent damage, soiling or deterioration other than normal wear and weathering up to time of final acceptance. Replace or restore joint sealers damaged, soiled or deteriorated, as directed.

3.05 CLEANUP

- A. Clean adjacent surfaces of sealant and soiling resulting from the joint sealer operations. Use cleaning materials and methods recommended by manufacturer for the different surfaces.

END OF SECTION 07900

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