PART 1 - GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:
- .1 Silicone joint sealants.
- .2 Urethane joint sealants.
- .3 Polysulfide joint sealants.
- .4 Latex joint sealants.
- .5 Solvent-release-curing joint sealants.
- .6 Preformed joint sealants.
- .7 Acoustical joint sealants.
- .8 Security grade sealants used inside secure blocks inside detention facilities.

.2 Types of items you will not find described in this Section:
- .1 Masonry control and expansion joint fillers and gaskets.
- .2 Building expansion joints.
- .3 Sealing joints in fire-resistance-rated construction.
- .4 Structural and other glazing sealants.
- .5 Plastic glazing sealants.
- .6 Sealing perimeter joints at gypsum board.
- .7 Sealing tile joints.
- .8 Sealing edge mouldings at perimeters with acoustical sealant at acoustical panel ceilings and acoustical tile ceilings.
- .9 Sealing joints in pavements, walkways, and curbing.

1.2 ACTION SUBMITTALS

.1 Product Data: For each joint-sealant product indicated.

.2 Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 13 mm wide joints formed between two 150 mm long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

.3 Joint-Sealant Schedule: 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.

1.3 INFORMATIONAL SUBMITTALS

.1 Qualification Data: For qualified Installer.

.2 Warranties: Sample of special warranties.

1.4 SUBMITTALS

.1 Product Data: For each joint-sealant product indicated.

.2 Samples for Initial Selection: Manufacturer's colour charts consisting of strips of cured sealants showing the full range of colours available for each product exposed to view.

.3 Joint-Sealant Schedule: 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 colour.

.4 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

.5 Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

.1 Installer Qualifications: An experienced installer in the installation of sealants.

.2 Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

.3 Mock-ups: Install sealant in mock-ups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

.4 Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

.1 Do not proceed with installation of joint sealants under the following conditions:
- .1 When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 5 deg C.
- .2 When joint substrates are wet.
- .3 Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
- .4 Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

.1 Special Installer's Warranty: Manufacturer'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.

.2 Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
- .1 Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
- .2 Disintegration of joint substrates from natural causes exceeding design specifications.
- .3 Mechanical damage caused by individuals, tools, or other outside agents.
- .4 Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

.1 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 joint-sealant manufacturer, based on testing and field experience.

.2 VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when:
- .1 Architectural Sealants: 250 g/L.
- .2 Sealant Primers for Nonporous Substrates: 250 g/L.
- .3 Sealant Primers for Porous Substrates: 775 g/L.

.3 Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- .1 Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

.4 Stain-Test-Response Characteristics: Where 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.

.5 Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

.6 Colours of Exposed Joint Sealants: As selected by Public Works Representative from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

.1 Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

.2 Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

.3 Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

.4 Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

.5 Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.

.6 Single-Component, Pourable, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade P, Class 100/50, for Use T.

.7 Multicomponent, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT.

.8 Multicomponent, Pourable, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type M, Grade P, Class 100/50, for Use T.

.9 Mildew-Resistant, Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

.10 Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

2.3 URETHANE JOINT SEALANTS

.1 Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

.2 Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

.3 Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

.4 Single-Component, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920. Type S, Grade NS, Class 25, for Use T.

.5 Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.

.6 Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT.

.7 Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT.

.8 Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use T.

.9 Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.

.10 Immersible, Single-Component, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Uses T and I.

.11 Immersible, Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Uses T and I.

.12 Immersible Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Uses T and I.

.13 Immersible Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920. Type M, Grade P, Class 25, for Use T and I.

2.4 LATEX JOINT SEALANTS

.1 Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

2.5 SOLVENT-RELEASE-CURING JOINT SEALANTS

.1 Acrylic-Based Joint Sealant: ASTM C 1311.

.2 Butyl-Rubber-Based Joint Sealant: ASTM C 1311.

2.6 SECURITY SEALANTS

.1 Two Part: high-strength, high-modulus, non-sag epoxy gel adhesive:
- .1 Meeting or exceeding the following:
  - .1 Consistency: 0 (no flow).
  - .2 Shore D: 90.
  - .3 Pot Life: 35 minutes at 77 25 degrees C.
  - .4 Bond Strength, 2-Day Cure: 15.4 MPa per ASTM C 882.
  - .5 Bond Strength, 14-Day Cure: 17.0 MPa per ASTM C 882.
  - .6 Water Absorption: 0.63 percent per ASTM D 570.
  - .7 Linear Coefficient of Shrinkage: 0.0007 percent.
  - .8 Compressive Strength: 77.5 MPa per ASTM D 695.
  - .9 Compressive Modulus: 1,725 MPa per ASTM D 695.
  - .10 Elongation at Break: 2.56 percent per ASTM D 638.
  - .11 Shear Strength: 24.5 MPa per ASTM D 732.
  - .12 Flexural Strength: 38.5 MPa minimum, per ASTM D 790.
- .2 Consisting of:
  - .1 Component A: Modified epoxy resin adhesive of epichlorohydrin bisphenol type A, containing suitable viscosity control agents and pigments.
  - .2 Component B: Reaction product of a selected blend of amines with an epoxy resin of epichlorohydrin bisphenol type A, containing suitable viscosity control agents, pigments and accelerators.
  - .3 Mixing Ratio: 2:1 by volume, Component A to Component B.
- .3 Acceptable Material:
  - .1 Sonocrete Epogel by Sonneborn, www.chemrex.com, tel 1.800.433.9517.
  - .2 Alternative Products: Approved by addendum in accordance with the General Instructions to Bidders.

2.7 PREFORMED JOINT SEALANTS

.1 Preformed Silicone Joint Sealants: Manufacturer's standard sealant consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.

.2 Preformed Foam Joint Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane foam with minimum density of 160 kg/cu. m and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.

2.8 ACOUSTICAL JOINT SEALANTS

.1 Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. 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.

2.9 JOINT SEALANT BACKING

.1 General: Provide sealant backings of material 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) Type O, (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing 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. Provide self-adhesive tape where applicable.

2.10 MISCELLANEOUS MATERIALS

.1 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.

.2 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.

.3 Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 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.

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

3.2 PREPARATION

.1 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.

.2 Clean porous joint substrate surfaces by brushing, grinding, 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. Porous joint substrates include the following:

.1 Concrete.

.2 Masonry.

.3 Unglazed surfaces of ceramic tile.

.4 Exterior insulation and finish systems.

.3 Remove laitance and form-release agents from concrete.

.4 Clean nonporous joint substrate 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 joint substrates include the following:
- .1 Metal.
- .2 Glass.
- .3 Porcelain enamel.
- .4 Glazed surfaces of ceramic tile.

.2 Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by 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.

.3 Masking Tape: Use masking tape where required to prevent contact of sealant or primer 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

.1 General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

.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 kind 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.

.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:
- .1 Place sealants so they directly contact and fully wet joint substrates.
- .2 Completely fill recesses in each joint configuration.
- .3 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 in subparagraphs 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 sealant from surfaces adjacent to joints.
- .2 Use tooling agents that are approved in writing by sealant manufacturer and that do not discolour sealants or adjacent surfaces.
- .3 Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
- .4 Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
- .5 Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

.1 Use masking tape to protect surfaces adjacent to recessed tooled joints.

.7 Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
- .1 Apply masking tape to each side of joint, outside of area to be covered by sealant system.
- .2 Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 10 mm . Hold edge of sealant bead 6 mm inside masking tape.
- .3 Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
- .4 Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

.8 Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.

.9 Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 CLEANING

.1 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.

3.5 PROTECTION

.1 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 original work.

3.6 JOINT-SEALANT SCHEDULE

.1 Joint-Sealant Colour: As selected by Public Works Representative from manufacturer's full range of colours.

.2 For police detachment projects use only Security Sealants inside cell block.

.3 Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
- .1 Joint Locations:
  - .1 Isolation and contraction joints in cast-in-place concrete slabs.
  - .2 Tile control and expansion joints.
  - .3 Joints between different materials listed above.
  - .4 Other joints as indicated.
- .2 Joint Sealant: any one of the following:
  - .1 Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing; Single component, pourable, traffic grade, neutral curing.

.2 Urethane Joint Sealant: Single component, nonsag, traffic grade; Single component, pourable, traffic grade; Multicomponent, nonsag, traffic grade, Class 50; Multicomponent, nonsag, traffic grade, Class 25.
.3 Preformed Joint Sealant: Preformed foam sealant.

.4 Joint-Sealant Application: Exterior joints in horizontal traffic surfaces subject to water immersion.
.1 Joint Locations:
.1 Joints in pedestrian plazas.
.2 Joints in swimming pool decks.
.3 Other joints as indicated.
.2 Joint Sealant: any one of the following:
.1 Urethane Joint Sealant: Immersible, single component, nonsag, traffic grade; Immersible, single component, pourable, traffic grade; Immersible, multicomponent, nonsag, traffic grade; Immersible, multicomponent, pourable, traffic grade.

.5 Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
.1 Joint Locations:
.1 Construction joints in cast-in-place concrete.
.2 Joints between plant-precast architectural concrete units.
.3 Control and expansion joints in unit masonry.
.4 Joints in dimension stone cladding.
.5 Joints in glass unit masonry assemblies.
.6 Joints in exterior insulation and finish systems.
.7 Joints between metal panels.
.8 Joints between different materials listed above.
.9 Perimeter joints between materials listed above and frames of doors windows and louvers.
.10 Control and expansion joints in ceilings and other overhead surfaces.
.11 Other joints as indicated.
.2 Joint Sealant: any one of the following:
.1 Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 100/50; Single component, nonsag, neutral curing, Class 50; Single component, nonsag, acid curing; Multicomponent, nonsag, neutral curing.
.2 Urethane Joint Sealant: Single component, nonsag, Class 100/50; Single component, nonsag, Class 50; Multicomponent, nonsag, Class 50.
.3 Preformed Joint Sealant: Preformed silicone; Preformed foam.

.6 Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
.1 Joint Locations:
.1 Isolation joints in cast-in-place concrete slabs.
.2 Control and expansion joints in stone flooring.
.3 Control and expansion joints in brick flooring.
.4 Control and expansion joints in tile flooring.
.5 Other joints as indicated.
.2 Joint Sealant: any one of the following:
.1 Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing; Single component, pourable, traffic grade, neutral curing; Multicomponent, pourable, traffic grade, neutral curing.
.2 Urethane Joint Sealant: Single component, nonsag, traffic grade; Single component, pourable, traffic grade; Multicomponent, nonsag, traffic grade, Class 50.
.3 Preformed Joint Sealant: Preformed foam.

.7 Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
.1 Joint Locations:

.1 Control and expansion joints on exposed interior surfaces of exterior walls.
.2 Perimeter joints of exterior openings where indicated.
.3 Tile control and expansion joints.
.4 Vertical joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
.5 Joints on underside of plant-precast structural concrete beams and planks.
.6 Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
.7 Other joints as indicated.

.2 Joint Sealant: any one of the following:
.1 Latex.
.2 Acrylic based.
.3 Butyl rubber based.

.8 Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
.1 Joint Sealant Location:
.1 Joints between plumbing fixtures and adjoining walls, floors, and counters.
.2 Tile control and expansion joints where indicated.
.3 Other joints as indicated.
.2 Joint Sealant: Any one of the following:
.1 Silicone Joint Sealant: Mildew resistant, single component, nonsag, neutral curing; Single component, nonsag, mildew resistant, acid curing.

.9 Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.
.1 Joint Location:
.1 Acoustical joints where indicated.
.2 Other joints as indicated.
.2 Joint Sealant: Acoustical.

END OF SECTION