SECTION 07920 - SEALANTS AND CAULKING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes sealants and caulking, including support and backing materials, primers and accessories.

1.02 SYSTEM DESCRIPTION

A. Sealants used for joints of concrete, stone, masonry and metal panels to like substrates.

1.03 RELATED SECTIONS

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

B. Section 04000 – Unit Masonry.

C. Section 07620 - Flashing and Sheet Metal.

D. Section 07840 – Firestopping and Smokebarrier Caulking.

E. Section 08810 - Glass and Glazing.

1.04 REFERENCE STANDARDS

A. Standards: Except as otherwise specified herein or shown on the Drawings, conform to the applicable requirements of the following reference standards and codes which are hereby made a part of this Section, as they relate to sealants and caulking.

1. BOCA Building Code, latest Edition.
2. The Occupational Health and Safety Administration (OSHA) Code of Federal Regulations(CFR), Volume 29.
3. American Society for Testing and Materials (ASTM):

a. ASTM C321 – Standard Test Method for Bond Strength of Chemical-Resistant Mortars.
b. ASTM C834 – Standard Specification for Latex Sealants.
c. ASTM C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
d. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
e. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

f. ASTM C1330- Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

4. Federal Specification (FS):

a. FS TT-S-00227E (COM-NBS) – Interim Federal Specification for Sealing Compound: Elastomeric Type, Multi-Component for Caulking, Sealing, and Glazing in Buildings and Other Structures.
b. FS TT-S-00230C – Interim Federal Specification for Sealing Compound: Elastomeric Type, Single Component for Caulking, Sealing, and Glazing in Buildings and Other Structures.
c. FS TT-S-001543 (COM-NBS) – Interim Federal Specification for Sealing Compound: Silicone Rubber Base for Caulking, Sealing, and Glazing in Buildings and Other Structures.

1.05 SUBMITTALS

A. Manufacturer's published literature with names, catalog numbers, specifications, surface preparation, mixing and application directions and standard color charts. Laboratory tests or data validating product compliance with performance criteria specified.

B. Warranties covering the sealant materials for a twenty (20) year period from date of project acceptance covering joint failure and contractor's five (5) year workmanship warranty.

1. Joint failure is defined as leaks of air or water, evidence of loss of cohesion or adhesion between sealant and joint edge, fading or migration of sealant material.

C. Samples:

1. Manufacturer's Standard Color Charts: Full color range for selection by Resident.
2. Joint Fillers and Bond Breaker Tape: Small samples of each type for review.

1.06 QUALITY ASSURANCE

A. Applicator Qualifications: Contractor and job foreman must have a minimum of ten (10) years experience installing sealant.

B. Compatibility and Adhesion Test: Contractor shall be responsible for verifying with sealant manufacturer that all sealants to be used are compatible with and will satisfactorily adhere to all substrates including other system sealants which may come in contact with field applied sealant. Tests may be conducted in the field or by submission of representative substrate samples to sealant manufacturer's laboratory.

C. Mock-Up: If requested by the Resident and Contractor shall install sealant mock-up to demonstrate appearance and workmanship technique. Mock-up shall be done by those

personnel who will be assigned to the project.

D. Manufacturer: Sealant manufacturer shall have been in the business of producing the specified sealant types for a minimum of ten (10) years.

E. Provide all joint sealers of the same type from a single manufacturer.

1.07 PROJECT CONDITIONS

A. Do not use products under conditions of precipitation or freezing weather. Ensure substrate is dry. Protect adjacent work from contamination due to mixing, handling, and application of flexible epoxy joint filler.

1.08 WARRANTY

A. Upon completion and acceptance of the work required by this Section, the installation shall be warranted, on a single document, by the Manufacturer and the Applicator.

B. The installation shall be warranted against loss of waterproofing integrity, adhesive or cohesive failure, for a period of 5 years from substantial completion.

C. Provide manufacturer's 5-year standard material warranty. Include coverage for replacement of sealant materials, which fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. The following manufacturers are accepted subject to requirements of this Section:

1. Dow Corning.
2. General Electric.
3. Pecora Inc.
4. Sika Chemical Corp.
5. Sonneborn Building Products.
6. Tremco Manufacturing Co.,

B. Products of other manufacturers which meet the requirements of the Drawings and this Section will be accepted, provided application is made as specified in Sections 01600 and 01640 of these Specifications and approval is obtained from the Resident.

2.02 MATERIALS

A. General: Use self-leveling compounds for horizontal joints and non-sag compounds for all other areas except as indicated.

1. Sealants used around windows shall be compatible with the type used in the window system.

B. Sealant Color:

1. Concealed Joints: Use sealant with manufacturer's standard color having best overall performance qualities for indicated application.
2. Exposed Joints: Use sealant selected by Resident from manufacturer's standard colors unless special colors are shown.

C. Use sealants of types listed below, suitable for the joint condition determined by exposure, movement range and joint material. Determination shall be subject to approval by Resident.

1. Single Component, Non-Sag Polyurethane Sealant:

a. Description: ASTM C920, Type S, Grade NS, Class 25, FS TT-S-00230C, Type II, Class A. USDA approved; SWRI validated; UL classified (fire resistance).
b. Uses: NT(Non Traffic), M(Mortar Joint), A(Aluminum), O(Other Than Glass, Aluminum, Concrete).
c. Joint Movement Range: Plus or minus 25 percent movement capability for vertical joints.
d. Service Life: 10 to 20 years.
e. Color: As selected.
f. Equal To: Sonneborn /ChemRex “Sonolastic NP 1”

2. Two Component, Non-Sag Polyurethane Sealant:

a. Description: ASTM C920, Type M, Grade NS, Class 25, FS TT-S-00227E, Type II, Class A. USDA approved; SWRI validated; UL classified (fire resistance).
b. Uses: NT(Non Traffic), M(Mortar Joint), A(Aluminum), O(Other Than Glass, Aluminum, Concrete).
c. Joint Movement Range: Plus or minus 25 percent movement capability for vertical joints.
d. Service Life: 10 to 20 years.
e. Color: As selected.
f. Equal To: Sonneborn /ChemRex “Sonolastic NP 2”

3. Single Component, Self-Leveling Polyurethane Sealant:

a. Description: ASTM C920, Type S, Grade P, Class 25, FS TT-S-00230C, Type I, Class A. USDA approved.

b. Uses: T(Traffic), M(Mortar Joint), O(Other Than Glass, Aluminum, Concrete).
c. Joint Movement Range: Plus or minus 25 percent movement capability for vertical joints.
d. Service Life: 10 to 20 years.
e. Color: As selected.
f. Equal To: Sonneborn /ChemRex "Sonolastic SL 2"

4. Silicone Sealant:

a. Description: ASTM C920, Type S, Grade NS, Class 25, FS TT-S-001543,(COM-NBS). USDA approved.
b. Uses: NT(Non Traffic), M(Mortar Joint), A(Aluminum).
c. Joint Movement Range: Plus or minus 25 percent movement capability for vertical joints.
d. Service Life: 20 years.
e. Color: As selected.

5. Silicone Sealant:

a. Description: ASTM C920, Type S, Grade NS, Class 25, FS TT-S-001543 (COM-NBS). USDA approved.
b. Uses: NT(Non Traffic), G(Glass), A(Aluminum).
c. Joint Movement Range: Plus or minus 25 percent movement capability for vertical joints.
d. Service Life: 10 to 20 years.
e. Color: As selected.

6. Polysulfide Sealant:

a. Description: ASTM C920, Type M, Grade NS, FS TT-S-00227 (COM-NBS). USDA approved.
b. Uses: Submersed Conditions.
c. Joint Movement Range: Plus or minus 25 percent movement capability for vertical joints.
d. Service Life: 20 years.
e. Color: As selected.

7. Poured Flexible Epoxy Joint Filler:

a. Description: Two component 100 percent solids epoxy joint filler with flexible, pourable, self-leveling properties.
b. Shore A Hardness: 85 plus or minus 5.
c. Shore D Hardness: 34.
d. Elongation: 75 percent.

e. Tensile Strength: 655 pounds per square inch (4.5 MPa) plus or minus 10 pounds per square inch (0.07 MPa).
f. Mixing ratio: 1 to 1 by volume.
g. Pot Life: 40 to 55 minutes at 75 degrees F (24 degrees C).
h. Cure Time, Foot Traffic: 4 hours.
i. Cure Time, Vehicular Traffic: 24 hours.
j. Application Temperature: Minimum 55 degrees F (13 degrees C).
k. Equal to: Sonneborn/Chemrex "Epolith-P"

8. Gunned Flexible Epoxy Joint Filler:

a. Description: Two component 100 percent solids gun-grade epoxy joint filler with flexible, pick-proof properties for sloped areas.
b. Shore A Hardness: 90 plus or minus 5.
c. Shore D Hardness: 50.
d. Elongation: 50 percent.
e. Tensile Strength: 900 pounds per square inch (6.2 MPa) plus or minus 10 pounds per square inch (0.07 MPa).
f. Slant Shear Strength: 865 pounds per square inch (6.0 MPa) per ASTM C321.
g. Slant Shear Strength: 112 pounds per square inch (0.8 MPa) per ASTM C321.
h. Mixing ratio: 1 to 1 by volume.
i. Pot Life: 40 to 55 minutes at 75 degrees F (24 degrees C).
j. Cure Time, Foot Traffic: 4 hours.
k. Cure Time, Vehicular Traffic: 24 hours.
l. Application Temperature: Minimum 55 degrees F (13 degrees C).
m. Equal to: Sonneborn/Chemrex "Epolith-G"

2.03 CAULKING COMPOUND

A. One part acrylic latex, gun grade, non-sagging, white, for interior use only.

2.04 ACCESSORY MATERIALS

A. Backer Rods: Non-gassing, reticulated closed-cell preformed polyethylene foam cord rod designed for use with cold-applied joint sealants; sponge butyl cord or urethane foam strips sized for 30% compression joints. Use type recommended by sealant manufacturer for each application. Comply with ASTM C1330. Size required for joint design.

1. Soft Backer Rod Equal to: Sonneborn.Chemrex "Sonofoam Soft Backer Rod".
2. Closed-Cell Backer Rod Equal to: Sonneborn/Chemrex "Sonofoam Closed-Cell Backer Rod".

B. Bond Breaker Tape: Pressure sensitive adhesive polyethylene, Teflon, or polyurethane foam tape type in widths to suit joints. Use type recommended by sealant manufacturer to suit

application.

C. Primers: Recommended by sealant manufacturer, designed to ensure adhesion of the sealant for each type of surface.

1. Primer Equal to: Sonneborn/Chemrex “Primer No.733”, solvent base.
2. Low VOC Primer Equal to: Sonneborn/Chemrex “Primer No 766” solvent base.

D. Solvents: Oil-free recommended by sealant manufacturer.

E. Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer and compatible with joint forming materials.

1. Joint Cleaner Equal to: Sonneborn/Chemrex “Reducer 990”, non-corrosive and non-staining.

F. Joint Filler: Closed-Cell polyethylene joint filler designed for use in cold joints, construction joints, or isolation joints wider than 1/4 inch. Size required for joint design.

1. Joint Filler Equal to: Sonneborn/Chemrex “Expansion Joint Filler”.

PART 3 EXECUTION

3.01 INSPECTION

A. Contractor shall verify that all joint/bonding surfaces are clean, sound free of defects and that dimensions are within sealant manufacturer’s size requirements.

B. Inspect all areas involved in work to establish extent of work, access, and need for protection of surrounding construction.

C. Protect all surrounding from flexible epoxy joint filler including, but not limited to, floors, equipment, line striping, walkways, and drives.

D. Do not proceed with the work of this Section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

E. Commencement of sealant installation shall be evidence that contractor has verified compliance of existing conditions.

3.02 PREPARATION

A. Surface cleaning, preparation, priming, mixing, joint fillers, minimum and maximum caulking depths, application and clean up in accordance with accepted sealant and caulking manufacturer's published directions.

1. Joints specified to receive sealant or caulking shall be dry and thoroughly cleaned of oil, dust, release agents, curing compounds, water repellents or other foreign matter.
2. Prime surfaces as recommended by sealant or caulking manufacturer.

B. Remove loose materials and foreign matter which impair adhesion of joint filler.

C. Clean joints and saw cuts by grinding, sandblasting, or wire brushing to expose a sound surface free of contamination and laitance.

D. Ensure structurally sound surfaces, dry, clean, free of dirt, moisture, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing, curing and parting compounds, membrane materials, and other foreign matter.

E. Where the possibility of joint filler staining of adjacent areas or materials exists, mask joints prior to application.

1. Do not remove masking tape before joints have been tooled and initial cure of joint filler has taken place.
2. Work stained due to failure of proper masking precautions will not be accepted.

3.03 APPLICATION

A. Joint Depths and Fillers:

1. Govern depth of joints to receive sealant or caulking by width of joint and achieve by proper placement of joint filler-gaskets.

a. Joints 1/2 Inch and Less in Width: 1/4 inch deep.
b. Joints Between 1/2 Inch and 1 Inch in Width: Depth equal to 1/2 the width.
c. Joints 1 Inch and Over in Width: 1/2 inch deep.

2. Joint fillers shall be polyethylene or butyl foam cord.
3. Avoid lengthwise stretching of filler materials.
4. Install bond breaker tape at back of joints over joint fillers other than polyethylene type.

B. Epoxy Joint Filler:

1. Transfer entire contents of activator container thoroughly with entire contents of base container in separate container of appropriate size.
2. Mix only as much material as can be applied within manufacturer's recommended application time period.
3. Mix with slow-speed drill (80-100 rpm) and slotted paddle. Ensure mixing paddle reaches bottom and scrapes side of container several times. Scrape paddle several times to ensure thorough mixing. Keep paddle blade below surface to avoid

whipping air into material.

a. Mix Epolith-P for 5 to 7 minutes.
b. Mix Epolith-G for 8 to 10 minutes.

4. Pour Epolith-GP from spouted can or professional bulk-loading caulking gun.
5. Apply Epolith-G by professional bulk-loading gun.
6. Maintain minimum joint application of 2/3 joint depth or 1 inch, whichever is greater.
7. Fill joints from bottom up to exterior face by holding properly sized nozzle against joint bottom.
8. Tool joint to ensure maximum adhesion to joint sides, correct bead configuration, and a neat joint. Dry tool or dampen tool with Reducer 990. Do not use water or soapy water.
9. Apply materials only within manufacturer's specified application life period. Discard joint filler after application life is expired or if prescribed application period has elapsed.

C. Masking: Tape where required to protect adjacent surfaces. Adhere in continuous strips in alignment with joint edge and remove immediately after joints have been sealed and tooled.

D. Sealant and Caulking Finish:

1. Force material into the joint with a gun having a nozzle which fits properly.

a. Fill joints solidly, tool to compress and smooth out without thin edges, free of tool marks and flush with adjoining surfaces.
b. Remove excess compound, smears, droppings and misplaced compound before it has cured, using suitable tools and non-staining oil-free solvent.

2. Prepare sealants that require mixing; follow manufacturer's recommended procedures, mixing thoroughly.
3. Mix only as much material as can be applied within manufacturer's recommended application time period.
4. Apply materials in accordance with manufacturer's recommendations; take care to produce beads of proper width and depth, tool as recommended by manufacturer, and immediately remove surplus sealant.
5. Apply materials only within manufacturer's specified application life period. Discard sealant after application life is expired or if prescribed application period has elapsed.

E. Back-up Material:

1. Install appropriate size backer rod, larger than joint where necessary, according to manufacturer's recommendations.
2. Install polyethylene joint filler in joints wider than 1/4 inch to back-up material per manufacturer's recommendations.
3. Do not install epoxy joint filler over backer rod.

4. Install backer rod using blunt or rounded tools to assure uniform depth (+/- 1/8") without puncturing or twisting. Closed cell rod shall be a minimum 20% oversized. Open cell rod shall be a minimum 50% oversized. Install bond breaker tape in shallow joints.

F. Bond Breaker: Install bond-breaker strip in joint to be sealed on top of back-up material to prevent adhesion of sealant to back-up material; install per manufacturer's recommendations.

3.04 SEALANT AND CAULKING LOCATIONS

A. Joints around door frames, window frames, thru-wall penetrations, louvers, fans and the like.

B. Locations indicated on Drawings including open joints around interior face of door and window frames and where required to make joints weather-tight.

3.05 CLEANING

A. Clean adjacent surfaces free of sealant, caulking and soiling using solvents or cleaning agents recommended by sealant or caulking manufacturer and that will not damage the surface being cleaned.

1. Leave finished work in a neat, clean condition.
Remove all debris related to application of sealants from job site in accordance with all applicable regulations for hazardous waste disposal.

3.06 SCHEDULE OF JOINT SEALERS

A. General Purpose Interior and Exterior Applications:

1. Sealant:

a. Single component polyurethane.
b. Two component polyurethane.
c. Polysulfide.
d. Silicone.

2. Applicatios:

a. Joints and recesses between adjacent constructions and frames, sills, and subsills of windows, doors, curtainwall, storefront, and louvers.
b. Coping joints and wash joints in precast concrete, cast stone, or natural stone.
c. Masonry joints beneath shelf angles.
d. Around penetrations in exterior walls.

e. Under door thresholds and at bottom of door frames.
f. Where necessary to prevent infiltration of water or air into or through exterior building envelope.

B. Other Exterior Applications:

1. Sealant:

a. Single component polyurethane.
b. Two component polyurethane.
c. Silicone.

2. Applications:

a. Between adjacent construction and gravel stops, copings, fascias, and miscellaneous flashings.
b. Metal flashings inserted into reglet.
c. Top edges of surface mounted counterflashing.
d. Expansion and control joints in masonry where expansion joint covers are not indicated.
e. Joints between new and existing exterior construction.

C. Interior Wetted Areas:

1. Sealant: Silicone.
2. Applications: Between adjacent construction and vanities, shower stalls, bathtub and shower enclosures, sinks, counter tops, plumbing cut-outs, and plumbing fixtures.

D. Interior High-Movement Joints:

1. Sealant:

a. Single component polyurethane.
b. Two component polyurethane.
c. Polysulfide.
d. Silicone.

2. Applications:

a. At resilient joint between interior partitions and floor framing above.

E. Other Interior Applications:

1. Sealant:

a. Single component polyurethane.

b. Two component polyurethane.
c. Polysulfide.
d. Silicone.

2. Applications:

a. Between adjacent construction and equipment, shelving, casework, and furniture.
b. Perimeters of doors and window frames, access panels.
c. Between interior partitions and adjoining concrete or steel columns, walls, or other construction.
d. Other exposed locations within partitions to seal against passage of air.
e. Other interior joints of small dimension which require painting.

f. Gupsum board partitions:

(1). Between gupsum panels and metal track at floors and dissimilar walls; install sealant just prior to installation of gypsum panel.
(2). Between adjacent face layers of abutting intersection gypsum board partitions; install sealant before taping and finishing joint.
(3). Between gypsum panels and intersections. Seal around openings of ducts and pipes. Seal sides and backs of electrical boxes.
(4). Seal control joints prior to installing control joint trim.
(5). Other concealed locations within partitions to completely seal against passage of air.

3. Allow sealant to cure before painting over joint.

F. Exterior Traffic Surfaces:

1. Sealant:

a. Two component self-leveling polyurethane.
b. Single component self-leveling polyurethane.

2. Applications:

a. Control and expansion joints in sidewalks and pavements.

G. Interior Traffic Surfaces:

1. Sealant:

a. Two component self-leveling polyurethane.
b. Single component self-leveling polyurethane.

2. Applications:

    a. Control of expansion joints in floors.

H. Interior Heavy Traffic Surfaces:

1. Surface Preparation: Freshly saw-cut or blast-clean joints; blow with oil-free compressed air.
2. Sealant: Epoxy Joint Filler.

    a. Pour flush with adjacent surface in 2 pours in accordance with manufacturer's instructions.

3. Applications: Control joints in floors subject to vehicular traffic.

I. Glazing:

1. Primer: None.

    a. Glass (non-coated).
    b. Ceramic tile, quarry tile.

2. Primer: (As recommended by manufacturer).

    a. Aluminum (anodized and mill finish).
    b. Iron and steel (carbon, stainless, galvanized).
    c. Plastic (ABS, PVDF, polyurethane, PVC).
    d. Wood.
    e. Marble, slate.
    f. Concrete.

3. Sealant:

    a. Silicone.

4. Applications:

    a. Glazing, including butt and lap sheer joints, stopless glazing, and cap, head and toe bead in conventional glazing.
    b. Curtain wall.
    c. Storefront.
    d. Glass partitions.
    e. Glass blocks.
    f. Solar panels.
    g. Skylights.

END OF SECTION