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SECTION 07 92 16

RIGID JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Security joint sealants.

B. Related Sections:
1. Section 04 20 00 Unit Masonry for masonry control and expansion joint fillers and gaskets.
2. Section 07 84 46 Fire-Resistive Joint Systems for sealing joints in fire-resistance-rated construction
3. Section 07 92 00 Joint Sealants for elastomeric and acoustical joint sealants.
4. Section 08 80 00 Glazing for glazing sealants.
5. Section 32 13 73 Concrete Paving Joint Sealants for sealing joints in pavements, walkways, and curbing.

1.02 DEFINITIONS

A. Tamperproof Sealant: Also referred to as “pickproof sealant” a sealant having a Shore D hardness greater than 40 and that is highly resistant to physical damage by individuals utilizing knives, screwdrivers, or other hard sharp objects. As rigid joint sealants, they don’t have elastomeric properties suitable for use in joints subject to dynamic movement.

B. Tamper-Resistant Sealant: Also referred to as “pick-resistant,” a sealant having a Shore A hardness greater than 200 and that is difficult to damage by individuals utilizing their hands, pens, and other improvised implements. These sealants have physical properties that permit use in joints subject to limited dynamic movement.

1.03 REFERENCE STANDARDS

A. ASTM International:

1. ASTM C 661 – Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer

2. ASTM C 719 – Standard Method for Adhesion and Cohesion of Elastomeric Joint Sealants under Cyclic Movement (Hockman Cycle)

3. ASTM C 881 – Standard Specification for Epoxy-resin-Base Bonding Systems for Concrete

4. ASTM C 1135 – Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants

5. ASTM C 1184 – Standard Specification for Structural Silicone Sealants

6. ASTM D 412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers–Tension

7. ASTM D 624 – Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

8. ASTM D 695 – Standard Test Method for Compressive Properties of Rigid Plastics

9. ASTM D 794 – Practice for Determining Permanent Effect of Heat on Plastics (withdrawn)

10. ASTM D 3960 – Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings

B. South Coast Air Quality Management District:

1. SCAQMD Rule 1168 – South Coast Air Quality Management District Adhesive and Sealant Applications; amended January 7, 2005, effective July 1, 2005.

1.04 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion Testing: Before installing sealants, test sealant adhesion to Project joint substrates in accordance with ASTM C 794.
1. Arrange for sealant manufacturer's technical personnel to conduct laboratory tests for each rigid joint sealant and joint substrate indicated.
2. Report whether sealant failed to adhere to joint substrates or tore cohesively; retest sealants that fail adhesively until satisfactory adhesion is obtained.
3. Do not use sealants that fail to adhere to joint substrates during testing.

1.05 ACTION SUBMITTALS

A. Product Data: For each joint sealant, sealant primer and joint backup material indicated; manufacturer's technical data, tested physical, performance properties and installation instructions. [**Include sustainable design data.**]

B. Samples for Initial Selection: Three color charts showing manufacturer's complete range of colors available for each product exposed to view.

C. Samples for Verification: Three strips of cured sealants of the manufacturer's standard size for each color of joint sealant required.

1.06 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer.

B. Product Test reports: For each joint sealant, tested by manufacturer.

C. Preconstruction Laboratory Adhesion Test Reports: Indicate which joint sealants and joint preparation methods resulted in satisfactory sealant adhesion to joint substrates.

D. Preconstruction Field Adhesion Test Reports: Completed Field Adhesion Test log; submit within [**10**] [__] days after completion of tests.

E. Warranties: Sample of manufacturer's [**and installer's**] warranty.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: Engage installers trained, accepted or recommended by manufacturer.

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

C. Mockups: Install sealant in mockups required by other portions of the Contract Documents that are indicated to receive specified rigid joint sealants in accordance with installation methods specified in this section.

D. Preinstallation Conference: Convene conference at Project site before start of work.

1.08 FIELD CONDITIONS

A. Do not proceed with installation of rigid joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by rigid joint sealant manufacturer.
   2. When joint substrates are wet.
   3. Where contaminants capable of interfering with adhesion have not been removed from joint substrates.

1.09 WARRANTY

A. Refer to Section 01 78 00 "Closeout Submittals for additional warranty requirements.

B. Material Warranty: Provide manufacturer's standard five-year material warranty commencing at date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer: Design is based on products manufactured by Pecora Corporation; 165 Wambold Road, Harleysville, PA 19438; Toll Free Tel: 800-523-6688; Tel: 215-723-6051; Fax: 215-721-0286; Email: techservices@pecora.com; Web: http://www.pecora.com.
   1. Substitutions: Not permitted.

2. Substitutions: Requests for substitutions will be considered under the provisions of Section 01 60 00 – Product Requirements.

2.02 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and accessory materials that are compatible with one another and with Project joint substrates.

B. VOC Content of Sealant and Primers: Provide joint sealants and sealant primers that comply with SCAQMD Rule 1168 for VOC content.

2.03 TAMPERPROOF SECURITY JOINT SEALANTS

A. [**Security Sealant #1**]: Multicomponent, Tamper-proof, Security Grade Epoxy Resin Sealant:
1. Compliance: ASTM C 881, Type I and III, Grade 3, Class B and C.
2. Properties:
a. Shore D Hardness: 70 per ASTM C 661.
b. Compressive Strength: 11,000 psi (75.84 MPa) per ASTM D 695.
c. Dynamic Movement Capability: None; 0 percent.
3. Color: [**As selected from manufacturer's complete range**] [**Custom; match Architect's sample**] [_____].
4. Product: DynaPoxy EP-1200.

2.04 TAMPER-RESISTANT SECURITY JOINT SEALANTS

A. [**Security Sealant #2**]: Multicomponent, Nonsag, Tamper-resistant, Security Grade, Polyurethane Sealant:
1. Compliance: ASTM C 920, Type M, Grade NS, Class 12-1/2, Use T(1), NT, M, O.
2. Properties:
a. Shore A Hardness: 55 to 60 per ASTM C 661.
b. Elongation: 175 to 200 percent per ASTM D 412.
c. Tensile Strength: 300 to 350 psi (2.06 to 2.41 MPa) per ASTM D 412.
3. Performance: Dynamic movement capability of 12-1/2 percent in extension and compression per ASTM C 719.
4. Sustainability:
a. Volatile Organic Compound (VOC) Content: 15 g/L, per ASTM D 3960.
b. Total Volatile Organic Compound (TVOC) Emissions: Less than 2 microgram (0.002 milligram)/cu. m), per CDPH v1.1.
5. Color: [**As selected from manufacturer's complete range**] [**Custom; match Architect's sample**] [_____].
6. Product: DynaFlex.

B. [**Security Sealant #3**]: Single-component, Nonsag, Tamper-resistant, Security Grade, Silyl-terminated Polyurethane (STPU) Sealant:
1. Compliance: ASTM C 920, Type S, Grade NS, Class 12-1/2, Use T(1), NT, M, O.
2. Properties:
a. Shore A Hardness: 55 to 60 per ASTM C 661.
b. Elongation: 225 percent per ASTM D 412.
c. Tensile Strength: 250 psi (1.72 MPa) per ASTM D 412.

3. Performance: Dynamic movement capability of 12-1/2 percent in extension and compression per ASTM C 719.
4. Sustainability:
   a. Volatile Organic Compound (VOC) Content: 15 g/L, per ASTM D 3960.
   b. Total Volatile Organic Compound (TVOC) Emissions: Less than 2 microgram (0.002 milligram)/cu. m), per CDPH v1.1.
5. Color: [**As selected from manufacturer's complete range**] [**Custom; match Architect's sample**] [_____].
6. Product: DynaFlex SC.

C. [**Security Sealant #4**]: Multicomponent, Nonsag, Polyurethane Sealant:
1. Compliance: ASTM C 920, Type M, Grade NS, Class 50, Use T(1), NT, M, G, A, O.
2. Performance: Dynamic movement capability of 50 percent in extension and compression per ASTM C 719.
3. Sustainability:
   a. Volatile Organic Compound (VOC) Content: 15 g/L, per ASTM D 3960.
   b. Total Volatile Organic Compound (TVOC) Emissions: Less than 2 microgram (0.002 milligram)/cu. m), per CDPH v1.2.
4. Color: [**As selected from manufacturer's complete range**] [**Custom; match Architect's sample**] [_____].
5. Product: DynaTrol II.

D. [**Security Sealant #5**]: Single-component, Neutral Moisture-curing, Blast- and Impact-resistant, Security Grade, Silicone Sealant:
1. Compliance:
   a. ASTM C 920, Type M, Grade NS, Class 25, Use NT, G, A, O.
   b. ASTM C 1184, Type S, Use G, O.
2. Properties:
   a. Ultimate Tensile Strength: 375 psi per ASTM C 1135.
   b. Tear Strength: 43 lbf/inch (7.53 kN/m) per ASTM D 624.
   c. Peel Strength: 45 lb/inch (7.88 N/mm) per ASTM D 794.
3. Performance: Dynamic movement capability of 25 percent in extension and compression per ASTM C 719.
4. Color: [**Black**] [**Aluminum Stone**] [**Translucent**].
5. Product: 896HIS.

2.05 ACCESSORIES

A. Joint Cleaners: Non-corrosive, non-staining cleaners recommended by manufacturers of sealants and sealant backing materials for Project substrates and sealant backings.

B. Primer: Joint sealant primer recommended by joint sealant manufacturer to promote sealant adhesion and as determined by results of preconstruction field adhesion testing.

C. Sealant Backup Materials: Nonstaining, flexible, compressible cylindrical material approved for applications indicated by joint sealant manufacturer based on field experience and laboratory adhesion, compatibility, and stain testing:
1. Compliance: ASTM C 1330 for following types:
   a. Type C closed-cell polyethylene backer rod.
   b. Type O open-cell polyurethane or soft reticulated polyethylene backer rod.
   c. Type B bi-cellular combination backer rod with open- and closed-cell skin.

2. Size: Oversized 25 to 33 percent greater than joint width.

D. Bond Breaker Tape: Polyethylene tape, approved by sealant manufacturer.

E. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine joints, seams, and substrate surfaces to receive sealants. Notify Architect if conditions are not acceptable.

B. Verify joint dimensions are as indicated on Drawings.

C. Verify that joints in [**concrete**] [**and**] **[masonry**] that are to receive rigid joint sealants have cured minimum 28 days.

D. Do not begin surface preparation or sealant application until unacceptable conditions have been corrected.

3.02 PREPARATION

A. Prepare surfaces to receive sealants in accordance with rigid joint sealant manufacturer's instructions.

B. Existing Joint Sealants: Cut away old and failed joint sealants as close as possible to the joint edge.

C. Remove joint sealants, sealant residue, sealant-backing materials, coatings, water repellants, waterproofing, laitance, form release agents, oil, grease, and other bond-inhibiting substances from joint surfaces to the depth that new sealant backings and joint sealants will be installed. Remove contaminants to expose sound, clean joint substrate materials.

D. Clean joint surfaces by one or a combination of the following methods:
1. Porous Substrates: Clean concrete, masonry, unglazed tile or glass-reinforced concrete by brushing, grinding or mechanical abrading.
2. Non-porous Substrates: Clean metal, glass and other non-porous surfaces using razor knife, followed by solvent wipe.

E. Remove frost, dust, loose particles and other foreign materials from joint substrates by vacuuming or blowing out with oil-free compressed air; make as many passes as required to result in clean joints.

F. Remove rust, mill scale, deteriorated coatings, and film-forming coatings from ferrous metals by wire brush, grinding or sandblasting.

G. Joint Priming: Apply joint sealant primer to sides of joints in accordance with manufacturer's instructions.

H. Apply masking tape where required to prevent contact of sealant primer or joint sealants with adjoining surfaces. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION

A. Apply rigid joint sealants in accordance with rigid joint sealant manufacturer's primer and joint width-to-depth ratio recommendations using methods in ASTM C 1193.

B. Measure joint dimensions and size joint backers to achieve width-to-depth ratio and surface bond area as recommended by manufacturer.
   1. Install joint sealant backings to support sealant during application and to achieve recommended joint depth and proportions.

C. Completely fill joints with sealant and ensure full contact of sealant to sides of joints.

D. Install sealant free of air pockets, foreign embedded matter, ridges or sags.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads. Tool joints to concave profile.

3.04 FIELD QUALITY CONTROL

A. Field Adhesion Testing - [**Tamperproof**] [**and**] [**Blast-resistant**]: Test installed sealants using one of the following destructive field adhesion tests:
   1. ASTM C 1193, Appendix X1.1.
   2. ASTM C 1521, Method A.
   3. Perform tests at the following rates for each type of sealant and joint substrate:
      a. Ten tests for the first 1000 feet of joint length.
      b. One test for each additional 1000 feet of joint length or one test per floor elevation.
   4. Arrange for tests to take place in presence of sealant manufacturer’s authorized personnel.
   5. Inspect joints for complete fill, absence of voids, sealant dimensions and configurations, and whether sealant adhered to joint substrate during testing or failed and mode of failure (adhesive or cohesive), if any. Include data on pull distance used to test each type of sealant and each joint substrate.
   6. Evaluate results to determine if adhesion passes manufacturer’s field adhesion hand pull test criteria.
   7. Report on test method used, whether joints were primed, sealants tested, test locations, test dates, adhesion results and percent elongation, whether sealant installation complied with specified requirements, dates sealant was installed and names of sealant installers.
   8. Sealants not experiencing adhesive failure will be considered satisfactory. Do not use sealants that do not adhere to joint substrates during testing.
   9. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

10. Repair sealants pulled from test joints immediately after evaluation and recording of results; contact original sealant with new sealant.

B. Field Adhesion Testing – Pickproof Sealants: Test installed epoxy resin sealants using destructive “hammer method” recommended by manufacturer.

3.05 CLEANING

A. Remove excess sealant or sealant smears from adjacent surfaces as application progresses using cleaning materials and methods recommended by manufacturers of rigid joint sealant and adjacent surfaces.

3.06 PROTECTION

A. Protect installed rigid joint sealants from damage until fully cured.

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A. Interior Joints in Vertical and Horizontal Surfaces:
   1. Tamperproof: Type 1.
   2. Tamper-Resistant: Type: [**2**] [**3**].

B. Joints on Animal Side of Animal Enclosures: [**1**] [**2**] [**3**].

C. Perimeters of [**plumbing fixtures**], [**lighting fixtures**], [**mirrors**][**, and**] [_____]:
   1. Tamperproof: Type 1.
   2. Tamper-Resistant: Type: [**2**] [**3**].

D. Perimeters of [**doors**] [**and**] [**windows**][**, up to 10 ft (3 m) above finished floor**]:
   1. Tamperproof: Type 1.
   2. Tamper-Resistant: Type: [**2**] [**3**].

E. Perimeters of [**doors**] [**and**] [**windows**][**, greater than 10 ft (3 m) above finished floor**]: [**4**].

F. Interior Joints in Traffic-bearing Surfaces:
   1. Control and Expansion Joints: [**2**] [**3**].
   2. High Heel Traffic: [**2**] [**3**].
   3. Heavy Equipment Traffic: [**2**] [**3**].

G. [**Blast-**] [**Impact-**][resistant] Joints: [**5**].

H. USDA-approved for Food Processing: [**1**] [**2**] [**3**] [**4**] [**5**]..

END OF SECTION