# SECTION 07 90 20

# GARAGE WATERPROOFING SYSTEMS

## PART 1 - GENERAL

### 1.1 DESCRIPTION

A. This section includes the following:

1. Traffic deck coating system.
2. Slab and deck control joint sealant system.
3. Structural expansion joint system.
4. Architectural building joint sealing system

### 1.2 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-place Concrete."
2. Division 7 Section "Joint Sealants."
3. Division 9 Section "High Performance Coatings."

### 1.3 SUBMITTALS

A. General: Submit the following in accordance with the Conditions of the Contract and Division 1 Specification sections.

B. Product Data: For each product indicated.

C. A detailed statement describing the deck waterproofing system to be installed, as well as the installation methods to be employed, shall be submitted for approval prior to installation. Literature, details, samples, shop drawings, warranties, etc., shall be included in the submittal as requested.

D. A manufacturer's written acceptance and approval of the intended system applicator shall be required.

E. Qualification Data: For Installer and Testing Agency.

F. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

G. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that products comply with requirements.

H. Warranties: Special warranties specified in this Section.

## 1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of waterproofing systems required for this Project.

B. Source Limitations: Obtain each type of product through one source from a single manufacturer.

C. A site inspection shall be made by applicator prior to commencing installation of the system for purposes of reviewing related conditions affecting performance requirements of this specification.

D. All products described in this section must be used with adequate ventilation and personal protection. Refer to the Material Safety Data Sheet which accompanies each product shipment for detailed health and safety information prior to use.

E. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use 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.
2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

F. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period preceding the Notice to Proceed with the Work.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.

2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, 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 C 920 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.

G. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:

   a. Each type of elastomeric sealant and joint substrate indicated.
   b. Each type of nonelastomeric sealant and joint substrate indicated.

3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

   a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or ASTM C 1521-08, Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

      1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

## 1.5 PERFORMANCE REQUIREMENTS

A. Provide products that establish and maintain watertight and airtight continuous waterproofing system without staining or deteriorating joint substrates.

## 1.6 PROJECT CONDITIONS

A. Do not proceed with installation of waterproofing systems under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## 1.7 WARRANTY

A. The system manufacturer and the approved applicator shall furnish a written performance joint warranty that, subject to certain specific exclusions as described in such joint warranty, the system provided will be free of defects related to workmanship or material deficiency. The following conditions shall be specifically covered under the joint warranty:

1. Cohesive or adhesive failure of materials.
2. Weathering deficiencies resulting in failure of the system to provide its intended function.
3. Abrasion or tear failure of the system resulting from normal traffic use. (Abrasive maintenance equipment, truck and construction traffic are not normal traffic use and related problems are exempted from the warranty.)
4. Joint Warranty Period: Refer to Section 1.7.C.1 below for joint warranty period requirements.

B. The system manufacturer and the approved applicator shall submit to the Owner for approval a detailed joint warranty statement consistent with the terms of this specification prior to construction. The approved joint warranty shall represent the sole warranty statement and warrant obligation for the project relating to this trade. Where an apparent conflict is found to exist with respect to the warranty language of this section and the detailed warranty statement, the more stringent warranty requirement shall supersede and control.

C. Special Manufacturer and Installer Joint Warranty: Manufacturer's standard form in which the Manufacturer and Installer jointly agree to furnish and repair or replace the product(s) that do not comply with

performance and other requirements specified in this Section within specified warranty period.

1. Joint Warranty Period for all products listed in Part 2 of this Section, unless noted otherwise: Five years from date of Substantial Completion.

D. Special joint warranty specified in this article exclude deterioration or failure from the following:

1. Movement caused by structural settlement or errors attributable to design or construction resulting in stresses exceeding the manufacturer's written specifications for elongation and compression.
2. Disintegration from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

### 2.2 MATERIALS, GENERAL

A. Compatibility: Provide waterproofing systems including backings, and other related materials that are compatible with one another and with substrates under conditions of service and application, as demonstrated by the system manufacturer, based on testing and field experience.

B. Traffic Deck Coating:

1. Traffic deck coating systems specified herein shall be complete systems with a minimum of three coats of compatible materials. Components of systems shall include a primer, a base coat and a top coat and all sealants, flashing, aggregates and miscellaneous materials as required by the manufacturer to complete the system.
2. The following heavy duty deck coating materials are approved for usage under this section:

a. Hybrid Systems (base bid): This system shall consist of a urethane base coat and epoxy top coat to provide flexibility against water leakage and toughness against traffic abrasion.

1) "Vulkem 350/345/345/346 Deck Coating System", Tremco, Inc.
2) "Conipur E", BASF Building Systems.
3) "Kelmar TE or FWC Systems, Exposure III", Technical Barrier Systems, Inc.

b. Methyl Methacrylate Systems (alternate bid): This system shall consist of a high viscosity, 100% reactive, flexible mortar resin, capable of providing a crack and abrasion resistant, resilient surface. It MUST also fast-drying primers to allow substrate preparation, priming and coating application to be completed on the same day.

1) "Flexible MMA Systems #692/#693", Epoxy Systems, Inc.
2) "Alsan RS PMMA Systems", Soprema, Inc.
3) "Degadeck Traffic Deck System", BASF Building Systems.

3. Apply Traffic Deck Coating to the following areas:

a. At entire top tier of the parking deck and as shown on the Drawings.

C. Slab and Deck Control Joint Sealant System:

1. Sealants specified under this section shall be a complete system of compatible materials designed to produce waterproof, traffic-bearing control joint seals as detailed in the drawings. Primers, backer rods and related miscellaneous materials shall be used as recommended by the manufacturer.
2. All materials specified herein shall be unmodified polyurethanes containing no adulterants and shall meet the standards defined in federal specification ASTM C920, Type M or S, Class 25, self-leveling and non-sag sealants.
3. The following materials are approved for usage under this section:

a. Sealant for Horizontal (Non-Cove) Joints:

1) "Iso-Flex 880GB/881/830", LymTal International Inc.
2) "Dynatred", Pecora Corporation.
3) "Sonolastic SL-2", BASF Building Systems.
4) "THC900/THC901" or "Vulkem 45 SSL", Tremco, Inc.
5) "Sikaflex-2C SL", Sika Corporation.

b. Sealant for Vertical and Cove joints:

1) "Iso-Flex 881/830", LymTal International Inc.
2) "Dymeric 240FC", Tremco, Inc.
3) "Sikaflex-2C NS", Sika Corporation.
4) "Dynatrol II", Pecora Corporation.
5) "Sonolastic NP-2", BASF Building Systems.

4. Apply Sealant System to all joints as noted on Drawings

D. Structural Expansion Joint Sealing Systems:

1. The expansion joint sealing system shall be a complete system of compatible materials designed to produce waterproof, traffic bearing expansion joint seals as detailed on Drawings.

   a. Nosing, traffic plates, blockout fillers, bond breakers, primers and miscellaneous materials required for installation shall be recommended by the system manufacturer.

2. Ribbed Extruded Elastomeric Expansion Joint System.

   a. The following extruded elastomeric seal systems are used singularly or in combination as detailed on the drawings and are approved for usage under this section:

      1) "Thermaflex TCR Series Expansion Joint Sealing System", Emseal Corporation.
      2) "ZB Series Expansion Joint System", C/S Group.
      3) "MM LokCrete Membrane System", MM Systems Corporation.
      4) "Iso-Flex J30L Winged Expansion Joint System", LymTal International, Inc.
      5) "Wabo ME Series Expansion Joint System", Watson Bowman Acme, BASF The Chemical Company.
      6) "CS Series Chambered Seal System", Balco, Inc.
      7) "Polycrete CR Series Membrane System", Erie Metal Specialties.
      8) "Vulkem WF Series Vehicular Expansion Joints", Tremco, Inc.

   b. Approved extruded elastomeric expansion joint sealing systems shall meet the following requirements:

      1) The expansion joint seal shall be heavy-duty, impact absorbing extruded rubber membrane gland with ribbed and perforated flanges capable of resisting heavy duty traffic.
      2) The exposed surface shall be non-metallic, skid resistant and resistant to ultra-violet rays and chemicals.
      3) Seal gland shall be heat weldable to ensure continuity of seal throughout.
      4) The polyurethane elastomeric concrete nosing shall be reinforced with compatible aggregates for compressive strength and abrasion-resistance while preserving its flexibility during joint movements.
      5) The elastomeric gland shall be fully embedded in the concrete nosing thereby encapsulating the perforated flanges and creating watertight seal throughout.
      6) Joint Seal Directional Changes - At all changes in direction provide seals with factory heat welded splices such as 90° corners, tees and crosses. The seal shall extend a minimum of 2′-0″ in each direction from the factory splice. Only straight, butt splice connections

shall be allowed on the jobsite following manufacturers written instructions. All factory and field fused connections shall incorporate bonding of the complete seal profile. This includes fusing of all internal and external web configurations.

c. Use ribbed extruded elastomeric expansion joint system to replace the existing expansion joints at Levels B, C, and D; and as shown on the Drawings.

3. Bolt-Down, Extruded Elastomeric Seal Expansion Joint System.

a. The following extruded elastomeric seal systems are used singularly or in combination as detailed on the drawings and are approved for usage under this section:

1) "Wabo Elastoflex Expansion Joint System", Watson Bowman Acme, BASF The Chemical Company.
2) "MM Elastolok Membrane System", MM Systems Corporation.
3) "Iso-Flex Dura-Block System", LymTal International, Inc.
4) "RB Series Heavy-Duty Rubber Block System", Balco, Inc.

b. Approved bolt-down extruded elastomeric expansion joint sealing systems shall meet the following requirements:

1) The expansion joint seal shall be heavy duty, shock absorbing steel reinforced anchor block capable of resisting heavy duty traffic. No exceptions to this requirement will be considered.
2) The exposed surface shall be non-metallic, skid resistant and resistant to ultra-violet rays and chemicals.
3) Seal gland shall be heat weldable to ensure continuity of seal throughout.
4) The elastomeric seal shall be mechanically bolted down to the concrete surface beneath using epoxy anchors over a continuous, full width bedding compound creating watertight seal throughout.
5) Joint Seal Directional Changes - At all changes in direction provide seals with factory heat welded splices such as 90° corners, tees and crosses. The seal shall extend a minimum of 2’-0” in each direction from the factory splice. Only straight, butt splice connections shall be allowed on the jobsite following manufacturers written instructions. All factory and field fused connections shall incorporate bonding of the complete seal profile. This includes fusing of all internal and external web configurations.

c. Use bolt-down extruded expansion joint system strictly to replace existing expansion joints exposed to snow plows at Level A and as shown on the Drawings.

1) Exercise extreme care not to damage existing P/T tendons when core drilling the bolt holes by predetermining locations of the tendons prior to coring.
2) No drilling shall be allowed without approval from the Resident Engineer that the tendons were properly located as required.

E. Architectural Building Joint Sealing System:

1. The expansion joint sealing system shall be a complete system of compatible materials designed to produce waterproof joint seals as detailed on Drawings.

a. Bond breakers, primers and miscellaneous materials required for installation shall be recommended by the system manufacturer.

2. Expansion Joint Sealing System.

a. The following joint sealing systems are used singularly or in combination as detailed on the drawings and are approved for usage under this section:

1) "Colorseal Joint Sealing System", Emseal Joint Systems Ltd.
2) "Evazote Phyzite System", Capital Services.
3) "Everlastic Wide Joint Seal", Williams Products, Inc.
4) "MM Color Joint/ESS or SIF Series", MM Systems Corporation.
5) "Wabo WeatherSeal Colorable Expansion Joint System", Watson Bowman Acme, BASF The Chemical Company.
6) "BCSW Series Pre-compressed Seal System", Balco Inc.
7) "CS Series Foam Seal System", Erie Metal Specialties.
8) "VF Series Expansion Joint System", C/S Group.

## 2.3 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 C 1330, 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, select from the following types:

1. Type C (closed-cell material with a surface skin).
2. Type B (bicellular material with a surface skin)

C. 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.

D. 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.

## 2.4 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

## 3.1 GENERAL

A. All work shall be installed in strict accordance with system manufacturer's recommendations employing trained installers utilizing proper tools and equipment and working under the direct supervision of a technically competent and experienced supervisor. An authorized technical representative shall attend a pre-installation conference, be present for the first day of installation and provide a minimum of three field inspection reports to the Architect during the duration of the installation.

B. All surfaces related to work under this section shall be inspected by the applicator prior to commencing work. Any conditions discovered which render the substrate unsuitable shall be reported and satisfactorily corrected prior to installation of the specified system.

C. Coordinate and verify that related work items meet the following requirements:

1. All surfaces shall be clean, dry and of sound substrate at time of application. Surfaces shall be provided free of voids, ridges and sharp projections.
2. Concrete surface finishes shall be subject to approval of the manufacturer.
3. Concrete surfaces shall be water cured or cured with a compatible curing compound as recommended by the manufacturer.
4. Concrete surfaces shall have cured for an acceptable period as recommended by the system manufacturer for the various components of the applicable system.

D. Environmental Conditions:

1. System application shall be at temperatures as recommended by the system manufacturer.
2. The deck surface shall be dry at time of application according to ASTM D4263, Standard Test Method for Indicating Moisture in Concrete.
3. Provide adequate ventilation in accordance with system manufacturer's recommendations during installation of the deck waterproofing system.

E. Protect all work areas from traffic until fully cured.

## 3.2 EXAMINATION

A. Examine joints indicated to receive waterproofing system, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting product performance.

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

## 3.3 TRAFFIC DECK COATING SYSTEM

A. Traffic deck coating application shall be done in a phased sequence such that daily operation between the deck and the main hospital building shall be maintained with minimal disturbance.

B. Existing deck had received several coating applications in the past and remnants of such applications must be completely removed as necessary to install new system. Acceptable methods include sweeping, blowing, vacuuming, pressure washing, water blasting, acid etching, sand blasting, or shot blasting as required to remove all laitance and surface contaminants to insure proper adhesion of the deck coating.

C. Exercise extreme care not to damage any existing P/T tendons during the surface preparation.

D. All traffic deck coatings are to be applied to acceptable clean, dry, sound substrates. Clean surfaces to be treated in accordance with the system manufacturer's recommendations.

E. Surface preparation shall produce a surface profile matching CSP 4 or higher per ICRI 03732, as required to meet the requirements of the selected deck coating. Sweep and vacuum roughened surface to remove debris followed by low-pressure water cleaning. Coordinate surface preparation with the surface preparation for the corrosion-inhibiting treatment, as applicable.

F. Select and install a test area prior to general application to establish procedures, verify adhesion and acceptable appearance.

G. Notify Architect 7 days prior to completion of the surface preparation. Meet with the Architect and manufacturer’s representative to review surface preparation, joint preparation and crack preparation, as applicable. All joint and crack preparation shall be included in the cost of the traffic deck coating system.

1. Seal all underlying control and construction joints.
2. Cracks grater than 1/16”

a. All static cracks shall be routed (V-groove) and gravity fed with a polymer sealer. Fill cracks with oven-dried sand before applying the polymer sealer per the manufacturer’s requirements. After application of the polymer sealer, broadcast dry silica sand to refusal evenly over the crack.
b. All dynamic cracks shall be routed (U-groove) and receive bond breaker and sealant as detailed.

3. Detail all joints and cracks, including cracks less than 1/16”, with liquid flashing a distance of 3" on each side of the joint/crack to yield a total thickness of 30 dry mils.

H. Other detailing work including sealing around drains, penetrations, curb, column and wall bases, etc., shall be accomplished in accordance with system manufacturer's recommendations prior to general application.

I. Provide a grid system marked on the deck surface to designate the area for which a container of material must be used evenly applied to obtain the desired average dry mil film thickness. A wet mil gauge shall also be used to randomly verify that mil thickness at application is consistent with system manufacturer's recommendations.

J. Broadcast clean, dry silica aggregate into membrane system to provide a durable and skid resistant surface as recommended by system manufacturer.

K. Application shall be by squeegee, roller or power sprayer.

L. Install the Elastomeric Traffic Deck Coatings in accordance with a "wear-rated" heavy duty system per Section 2.2.B.2.

## 3.4 SLAB AND DECK CONTROL JOINT SEALANT SYSTEMS

A. All sealants are to be applied to clean, dry, sound substrates. Follow system manufacturer's recommendations for cleaning and preparation of joints. Tooled control joints provided by the Goldblatt Groover #06-314-M7 shall be prepared by grinding with V-shaped wheel prior to sealing.

B. Select and install a test section prior to general application to verify adhesion and acceptable appearance.

C. Backer rods, bond breakers and primers shall be used in accordance with system manufacturer's recommendations.

D. Care shall be taken to completely fill joints without overflowing the joint or smearing adjacent surfaces.

E. Exposed joints shall be filled with sealant and tooled to a slightly recessed configuration to avoid direct contact with wheel traffic.

F. Sealant shall not be applied until after concrete curing procedures has been completed (normally at least 7 days after concrete has been poured).

## 3.5 STRUCTURAL EXPANSION JOINT SEALING SYSTEM

A. General:

1. Submit product data of expansion joint system to be used.
2. Coordinate expansion joint system with other related work before installation of such work.
3. Provide 6-inch vertical return upwards at column or wall termination as applicable.

B. Installation of the Ribbed and Perforated Elastomeric Expansion Joint System:

1. Provide blockouts in the concrete surface, of sufficient width and depth to receive the specified system, to be formed at the expansion joint by the concrete contractor.
2. Layout the extruded gland at maximum length possible and set the gap dimension according to the manufacturer's recommended installation temperature. Embed glands fully in the polymeric concrete nosing including perforations.
3. Fill concrete blockouts with approved polymeric nosing material flush to the top of the extruded gland and the driving surface.
4. Install secondary seal where applicable.

C. Installation of the Bolt-Down Elastomeric Expansion Joint System:

1. Provide blockouts in the concrete surface, of sufficient width and depth to receive the specified system, to be formed at the expansion joint by the concrete contractor.

2. Install the anchor bolts at proper spacing and set the gap dimension according to the manufacturer's recommended installation temperature. Seal all gaps including boltholes using heat weldable sealing gland.
3. Fill concrete blockouts with approved polymeric nosing material flush to the top of the metal edge anchor strips and the driving surface.

## 3.6 ARCHITECTURAL BUILDING JOINT SEALING SYSTEM

A. General:

1. Submit product data of expansion joint sealing system to be used.
2. Coordinate expansion joint sealing system with other related work before installation of such work.

B. Installation of the Architectural Building Joint Sealing System:

1. Place and adhere the joint sealing system in the joints in accordance with procedures recommended by the system manufacturer, taking care to make the surface flush with the surface of the adjacent structure.

## 3.7 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed elastomeric sealant joints as follows:

   a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
   b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.

2. Test Method: ASTM C 1193, Appendix X1.1.

   a. As appropriate for type of joint-sealant application indicated, test joint sealants according to one of the following:

      1) Method A, Field-Applied Sealant Joint Hand Pull Tab
      2) Method B, Exposed Surface Finish Hand Pull Tab
      3) Method C, Field-Applied Sealant Joint Hand Pull Flap
      4) Method D, Water Immersion.

   b. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
4. Inspect tested joints and report on the following:

    a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
    b. Whether sealants filled joint cavities and are free of voids.
    c. Whether sealant dimensions and configurations comply with specified requirements.

5. 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.
6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field Test Results: Products not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove products that fail to adhere to substrates during testing or to comply with other requirements. Retest failed applications until test results prove products comply with indicated requirements.

## 3.8 CLEANING

A. 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.

## 3.9 PROTECTION

A. Protect waterproofing systems during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so systems 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 products immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 90 20