

SECTION 03 15 00
CONCRETE JOINTS AND ACCESSORIES

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
 - a. A36/A36M, Specification for Carbon Structural Steel.
 - b. A615/A615M, Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - c. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - d. A767/A767M, Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
 - e. C920, Specification for Elastomeric Joint Sealants.
 - f. D226, Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
 - g. D227, Specification for Coal-Tar Saturated Organic Felt Used in Roofing and Waterproofing.
 - h. D994, Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 - i. D1056, Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.
 - j. D1171, Standard Guide for Evaluating Nonwoven Fabrics.
 - k. D1751, Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - l. D1752, Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
 - m. D2240, Standard Test Method for Rubber Property – Durometer Hardness.
2. Corps of Engineers (COE): CRD-C-572, Corps of Engineers Specifications for Polyvinylchloride Waterstop.
3. NSF International (NSF): 61, Drinking Water System Components - Health Effects.

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
 - a. Waterstop: Details of splices, method of securing and supporting waterstop in forms to maintain proper orientation and location during concrete placement.
 - b. Construction Joints, Expansion Joints, and Control Joints: Layout and location for each type. Include joint locations shown on the Drawings, additional required joint locations, and any proposed alternate locations.
2. Product Data:
 - a. Waterstops.
 - b. Bond breaker.
 - c. Premolded joint fillers.
 - d. Pourable joint fillers.
 - e. Preformed control joints.
 - f. Epoxy-coated dowels.
 - g. Roofing felt.
 - h. Accessories not specified in other sections.
3. Samples: PVC waterstop splice, joint, and fabricated cross of each size, shape, and fitting of waterstop.

B. Informational Submittals:

1. Certification:
 - a. Letter stating compatibility between liquids being contained and materials used for:
 - 1) Waterstops.
 - 2) Joint fillers.
 - b. Manufacturer's application instructions for:
 - 1) Bonding agent.
 - 2) Bond breaker.
2. Manufacturer's written instructions for product shipment, storage, handling, installation/application, and repair for:
 - a. Waterstops.
 - b. Bond breaker.
 - c. Bonding agent.
 - d. Premolded joint fillers.
 - e. Pourable joint fillers (sealant proportions not required as products used only as a filler).
 - f. Preformed control joints.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site: Verify delivered materials are in accordance with Specifications, regulatory agencies, and Manufacturer's product data sheets prior to unloading and storing onsite.
- B. Storage: Store materials under tarps to protect from oil, dirt, and sunlight or as required by Manufacturer.

PART 2 PRODUCTS

2.01 PLASTIC (PVC) WATERSTOP

- A. Manufacturers and Products:
 - 1. Sika-Greenstreak, St. Louis, MO; Style 732 (6 inches by 3/8 inch) and Style 735 (9 inches by 3/8 inch).
 - 2. Or equal.
- B. Physical Characteristics:
 - 1. Extruded from elastomeric plastic compound of which basic resin shall be prime virgin polyvinyl chloride (PVC). Compound shall not contain scrapped material, reclaimed material, or pigment.
 - 2. Specific Gravity: Approximately 1.37.
 - 3. Shore Durometer Type A Hardness: Approximately 80.
 - 4. Type Required in All Expansion, Contraction, and Control Joints: 6 inches wide or 9 inches wide with center bulb and parallel longitudinal ribs or protrusions on each side of strip center, as indicated on the Drawings.
 - 5. Type Required in Construction Joints: Flat ribbed, 6 inches wide or 9 inches wide with parallel longitudinal ribs or protrusions on each side of strip center. Center bulb is optional.
 - 6. Corrugated or tapered type waterstops are not acceptable.
 - 7. Thickness: Constant from bulb edge (or center of waterstop) to outside stop edge.
 - 8. Minimum Weight per Foot of Waterstop:
 - a. 1.60 pounds for 3/8 inch by 6 inches.
 - b. 2.30 pounds for 3/8 inch by 9 inches.
 - 9. Factory Fabrications: Use only factory fabrications for intersections, transitions, and changes of direction.
- C. Functional Characteristics: None.
- D. Performance Characteristics: Performance Requirements: COE Specification CRD-C-572.

2.02 HYDROPHILIC WATERSTOP

A. Manufacturers and Products:

1. Sika-Greenstreak Plastic Products, St. Louis, MO;
Hydrotite CJ-1020-2K with Leakmaster LV-1 adhesive and sealant.
2. Or equal.

B. Physical Characteristics:

1. For use at construction joints only, where new concrete is placed against existing concrete and as shown on the Drawings.
2. Material shall be a nonbentonite hydrophilic rubber compound.
3. Cross-section: 0.39 inches by 0.79 inch.

C. Functional Characteristics: None.

D. Performance Characteristics: Shore A Hardness, 50 minimum, in accordance with ASTM D2240.

2.03 BOND BREAKER

A. Tape for Joints: Adhesive-backed glazed butyl or polyethylene tape. Same width as joint that will adhere to premolded joint material or concrete surface.

B. Use bond prevention material as specified in Section 03 30 00, Cast-in-Place Concrete, except where bond breaker tape is specifically called for on the Drawings.

2.04 PREMOLDED JOINT FILLER

A. Bituminous Type: ASTM D994 or ASTM D1751.

B. Sponge Rubber:

1. Polychloroprene, closed cell, expanded; ASTM D1056, Type 2C5, with compression deflection, 25 percent deflection (limits), 119 kPa to 168 kPa (17 psi to 24 psi) minimum. Use in joints for potable and nonpotable water containment structures.
2. Manufacturers and Products:
 - a. Monmouth Rubber and Plastics, Corp, Long Branch, NJ;
Durafoam DK5151.
 - b. Or equal.

2.05 POURABLE JOINT FILLERS

- A. General: Although product is a sealant, it is being specified as a filler to prevent debris accumulation and allow expansion and contraction under shrinkage and thermal loads. It does not need to meet proportional sealant geometry requirements.
- B. Filler for Potable or Non-Potable Water Containment Structures:
 - 1. Multicomponent sealant, self-leveling, or nonsag as required for level, sloping, or vertical joints.
 - 2. Color: White.
 - 3. Manufacturers and Products:
 - a. Sika Corp., Lyndhurst, NJ; Sikaflex-2c.
 - b. Or equal.

2.06 ACCESSORIES

- A. Joint Sealant: Polyurethane as specified in Section 07 92 00, Joint Sealants.
- B. Roofing Felt: ASTM D226, Type II, 30-pound asphalt-saturated or equal weight of ASTM D227 coal-tar saturated felt.
- C. Steel Reinforcement: As specified in Section 03 21 00, Steel Reinforcement.
- D. Nails: Galvanized, as required for securing premolded joint filler.
- E. Galvanized Rebar at Control Joints: ASTM A767/A767M and ASTM A615/A615M Grade 60 prior to galvanizing.
- F. Ties for PVC Waterstop: "Hog Rings" or grommets for each edge at 12-inch maximum spacing.

PART 3 EXECUTION

3.01 GENERAL

- A. Commence concrete placement after joint preparation is complete.
- B. Time Between Concrete Pours: As specified in Section 03 30 00, Cast-in-Place Concrete.

3.02 SURFACE PREPARATION

- A. Construction Joints: Clean concrete surface prior to placement of abutting concrete.
 - 1. Remove laitance and spillage from steel reinforcement and dowels.
 - 2. Roughen surface to minimum of 1/4-inch amplitude:
 - a. Sandblast after concrete has fully cured.
 - b. Water blast after concrete has partially cured.
 - c. Green cut fresh concrete with high-pressure water and hand tools.
 - 3. If present in joint, do not damage waterstop.
- B. Construction Joint with Hydrophilic Waterstop:
 - 1. Follow hydrophilic waterstop manufacturer's written instructions.
 - 2. Concrete surface along which waterstop will be installed must be smooth, clean, and dry. Grind concrete as required.
 - 3. Clean debris, dirt, dust, and foreign material from concrete and waterstop surfaces.

3.03 INSTALLATION OF WATERSTOPS

- A. General:
 - 1. Continuous waterstop shall be installed in all construction joints in walls and slabs of liquid-containing basins and channels and in walls of belowgrade structures, unless specifically noted otherwise.
 - 2. Join waterstop at intersections to provide continuous seal.
 - 3. Center waterstop on joint.
 - 4. Secure waterstop in correct position. Tie waterstop to steel reinforcement using grommets, "Hog Rings," or tiewire at maximum spacing of 12 inches. Do not displace waterstop during concrete placement.
 - 5. Repair or replace damaged waterstop.
 - 6. Place concrete and vibrate to obtain impervious concrete in vicinity of joints.
 - 7. Joints in Footings and Slabs:
 - a. Ensure that space beneath horizontal waterstop is completely filled with concrete.
 - b. During concrete placement, make visual inspection of waterstop area.
 - c. Limit concrete placement to elevation of waterstop in first pass, vibrate concrete under waterstop, lift ribbed waterstop to confirm full consolidation without voids, then place remaining concrete to full height of slab.

B. Plastic (PVC) Waterstops:

1. Install in accordance with manufacturer's written instructions.
2. Splice in accordance with waterstop manufacturer's written instructions using PTFE-coated thermostatically controlled heating iron at approximately 380 degrees F.
 - a. Allow at least 10 minutes before new splice is pulled or strained in any way.
 - b. Finished splices shall provide cross-section that is dense and free of porosity with tensile strength of not less than 80 percent of unspliced materials.
 - c. Use only factory made waterstop fabrications for all intersections, changes of directions and transitions.
 - d. Field splice permitted only for straight butt welds.
 - e. Edge welding not permitted.
 - f. Additional splicing defects which are unacceptable and are cause for rejection:
 - 1) Misalignment of center bulbs and ribs greater than 1/16 inch or where waterstop cross-section is reduced by more than 15 percent.
 - 2) Charred or burnt material.
3. Wire looped plastic waterstop may be substituted for plastic waterstop.

C. Hydrophilic Waterstop:

1. Install in accordance with manufacturer's written instructions.
2. Provide minimum of 2-1/2 inches of concrete cover over waterstop. When structure has two layers of steel reinforcement, locate centered between layers of steel or as shown.
3. Apply adhesive to concrete surface and allow to dry for specified time before applying waterstop strip.
4. Lap ends of waterstop strip together at splices and corners and join with sealant.
5. Verify that waterstop is anchored firmly in place before placing concrete. Do not allow vibrator to come into contact with waterstop.
6. Lap hydrophilic waterstop 2 feet minimum with intersecting plastic waterstops.

D. Injection-Type Waterstop:

1. Install re-injectable waterstop hose in accordance with manufacturer's instructions.

2. After concrete has been placed and cured for a minimum of 28 days, inject specified injection material into re-injectable waterstop hose in accordance with manufacturer's instructions.
 3. Upon completion of injection process, clean out remaining injection material in hose in accordance with manufacturer's instructions to allow for future injections.
- E. Split Face PVC Waterstop: Install split face PVC waterstop in accordance with manufacturer's instructions.

3.04 CONTROL JOINT INSTALLATION

- A. Locate steel reinforcement as shown.
- B. Install waterstop.
- C. Vibrate concrete thoroughly along the joint form to produce a dense, smooth surface. Do not roughen surface.
- D. Install bond breaker to concrete surfaces above and below waterstop.

3.05 PREFORMED CONTROL JOINTS

- A. Use only where specifically shown; do not use in water-holding basins.
- B. Locate slightly below top of slab.
- C. Install in accordance with manufacturer's written instructions in straight, full-length pieces.
- D. Steel Strip Type with Preformed Groove: Brace to withstand pressure of concrete during and after placement using only approved stakes and other secondary installation materials.

3.06 MANUFACTURER'S SERVICES

- A. Provide manufacturer's representative at Site for installation assistance, inspection, and certification of proper installation for products specified.

3.07 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

- A. Contractor-Furnished Quality Assurance, in accordance with IBC Chapter 17 requirements, is provided in the Statement of Special Inspections Plan in Supplement located at end of Section 01 45 33, Special Inspection, Observation, and Testing. Contractor responsibilities and related information are included in Section 01 45 33, Special Inspection, Observation, and Testing.
- B. Contractor-Furnished Quality Control: Inspection and testing as required in Section 01 40 00, Quality Requirements.

END OF SECTION

