SECTION 03 15 00 – CONCRETE ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Waterstops.
2. Joint fillers.

1.2 REFERENCES

A. ASTM International (ASTM):

1. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
2. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
3. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
4. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
5. ASTM D747 - Standard Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam.
6. ASTM D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
7. ASTM D2240 - Standard Test Method for Rubber Property – Durometer Hardness.

B. American National Standards Institute (ANSI):

1. ANSI A135.4 - Basic Hardboard.

C. U. S. Army Corps of Engineers (USACE):

1. CRD-C-572, Specification for Polyvinyl Chloride Waterstop.

1.3 SUBMITTALS

A. Product Data:

1. Polyvinyl chloride waterstops: Complete physical characteristics.
2. Preformed expansion joint material: Sufficient information on each type of material for review to determine conformance of material to requirements specified.

B. Samples:

1. Polyvinyl chloride waterstop.

C. Laboratory test reports: Indicating that average properties of polyvinyl chloride waterstops material and finish conform to requirements specified in this Section.

D. Quality control submittals:

1. Certificates of Compliance:

a. Written certificates that polyvinyl chloride waterstops supplied on this Project meet or exceed physical property in accordance with USACE CRD-C-572 and the requirements of this Section.

2. Manufacturer's instructions: For materials specified in this Section that are specified to be installed with such instructions.

1.4 QUALITY ASSURANCE

A. Mock-ups:

1. Welding demonstration:

a. Demonstrate ability to weld acceptable joints in polyvinyl chloride waterstops before installing waterstop in forms.

B. Field joints:

1. Polyvinyl chloride waterstops field joints: Shall be free of misalignment, bubbles, inadequate bond, porosity, cracks, offsets, and other defects which would reduce the potential resistance of the material to water pressure at any point. Replace defective joints. Remove faulty material from the site and disposed of by the CONTRACTOR at its own expense.

C. Inspections:

1. Quality of welded joints will be subject to acceptance of the ENGINEER.
2. Polyvinyl chloride waterstop: The following defects that represent a partial list that will be grounds for rejection:

a. Offsets at joints greater than 1/16 inch or 15 percent of the material thickness, at any point, whichever is less.
b. Exterior crack at joint, due to incomplete bond, which is deeper than 1/16 inch or 15 percent of the material thickness, at any point, whichever is less.
c. Any combination of offset or crack which will result in a net reduction in the cross section of the waterstop in excess of 1/16 inch or 15 percent of the material thickness, at any point, whichever is less.
d. Misalignment of the joint, which will result in misalignment of the waterstop in excess of 1/2 inch in 10 feet.
e. Porosity in the welded joint as evidenced by visual inspection.
f. Bubbles or inadequate bonding.

PART 2 - PRODUCTS

2.1 WATERSTOPS

A. Waterstops - Polyvinyl chloride (PVC):

1. Manufacturers: One of the following or equal:

a. Vinylex Corporation.
b. Greenstreak Plastic Products Company, Inc.

2. Type: Ribbed waterstop:

a. Construction joints: 6-inch wide ribbed type. Vinylex R638, Greenstreak 679, or equal.
b. Construction joints for slab to wall intersections: 4-inch wide ribbed type. Vinylex R4316T, Greenstreak 781, or equal.
c. Expansion joint for wall penetrations for concrete encased electrical duct banks: 6-inch ribbed type with hollow center bulb. Vinylex RB638H, Greenstreak 732, or equal.
d. Expansion joints: 9-inch wide ribbed type with hollow center bulb or tear web. Vinylex RB938H, Greenstreak 735, or equal for expansion joints 1 inch and narrower, Vinylex TWB938, Greenstreak 739 or equal for expansion joints wider than 1 inch.

3. Dumbbell type waterstop will not be allowed unless otherwise specified or indicated on the Drawings.
4. Provide polyvinyl chloride waterstops complying with following requirements:
   a. Manufactured from prime virgin polyvinyl chloride plastic compound containing the plasticizers, resins, stabilizers, and other materials necessary to meet the requirements of this Section.
   b. No scrap or reclaimed material shall be used.
5. Properties as indicated in the following table:

Physical Characteristics	Test Method	Required Results
Specific Gravity	ASTM D 792	Not less than 1.3.
Hardness	ASTM D 2240	70 to 90 Type A15 Shore durometer.
Tensile Strength	ASTM D 638	Not less than 2,000 pounds per square inch.
Ultimate Elongation	ASTM D 638	Not less than 300 percent
Alkali Extraction	CRD-C-572	7 day weight change between minus 0.1 percent and plus 0.25 percent. Hardness change within 5 points.
Low Temperature Brittle Point	ASTM D 746	No sign of cracking or chipping at -35 degrees Fahrenheit minimum.
Water Absorption	ASTM D 570	Not more than 0.15 percent after 24 hours.
Accelerated Extraction Tensile	CRD-C-572	Not less than 1,600 pounds per square inch.
Stiffness in Flexure	ASTM D 747	Not less than 600 pounds per square inch.
Tear Resistance	ASTM D 624	Not less than 225 pounds per inch.
Thickness	–	3/8 inch
Center Bulb		
6 inch Waterstops	–	7/8 inch or 1-inch nominal outside diameter.
9 inch Waterstops	–	1-inch nominal outside diameter. For expansion joints 1 inch and narrower and 2 inches for expansion joints wider than 1 inch.
Allowable Tolerances		
Width	–	Plus or minus 3/16 inch.
Thickness	–	Plus or minus 1/32 inch.

2.2 JOINT FILLERS

A. Hardboard: 1/8-inch minimum thickness, in accordance with ANSI A135.4 Class 2.

B. Preformed expansion joint materials:

1. General:

a. Use specific type in applications as indicated on the Drawings.
b. No scrap or recycled material shall be used.

2. Bituminous fiber expansion joint material:

a. Manufacturers: One of The following or equal:

1) Tamms Industries, a division of Euclid Chemical Company: Hornboard/fiber.
2) Approved equal.

3. Synthetic sponge rubber expansion joint material:

a. Manufacturers: One of the following or equal:

1) Tamms Industries, a division of Euclid Chemical Company: Cementone.
2) Approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Waterstops - General:

1. Waterstops shall be stored so as to permit free circulation of air around the waterstop material and to prevent direct exposure to sunlight.
2. Install waterstops in concrete joints where indicated on the Drawings.
3. Carry waterstops in walls into lower slabs and join to waterstops in slabs with appropriate types of fittings.
4. In water-bearing structures: Provide all joints with waterstops, whether indicated on the Drawings or not.
5. Provide waterstops that are continuous and in longest lengths practical.
6. Set waterstops accurately to position and line as indicated on the Drawings.
7. Hold and securely fix edges in position at intervals of not more than 24 inches so that they do not move during placing of concrete.
8. Position the waterstop so that symmetrical halves of the waterstop are equally divided between the concrete pours. The center axis of the waterstop shall be coincident with the centerline of the joint.
9. Do not drive nails, screws, or other fasteners through waterstops in vicinity of construction joints.
10. Use wires at not more than 24 inches on centers near outer edge of the waterstop to tie waterstops into position.
11. Special clips may be used in lieu of wires, at contractor's option.
12. Terminate waterstops 3 inches from top of finish surfaces of walls and slabs unless otherwise specified or indicated on the Drawings.
13. When any waterstop is installed in the concrete on one side of a joint, while the other half or portion of the waterstop remains exposed to the atmosphere for more than 2 days, suitable precautions shall be taken to shade and protect the exposed waterstop from direct rays of sunlight during the entire exposure and until the exposed portion is embedded in concrete.

14. When placing concrete at waterstops in slabs, lift the edge of the waterstop while placing concrete below the waterstop. Manually force the waterstop against and into the concrete. Then cover the waterstop with fresh concrete.

B. Polyvinyl chloride waterstops:

1. Install waterstops so that joints are watertight.
2. Weld joints such as unions, crosses, ells, and tees, with thermostatically controlled equipment recommended by waterstop manufacturer:

   a. The material shall not be damaged by heat sealing.
   b. Make joints by overlapping then simultaneously cut the ends of the sections to be spliced so they will form a smooth even joint. Heat the cut ends with the splicing tool until the plastic melts. Press the 2 ends together until the plastic cools.
   c. The continuity of the waterstop ribs and tubular center axis shall be maintained.
   d. The splices shall have a tensile strength of not less than 60 percent of the unspliced materials tensile strength.

3. Butt joints of the ends of 2 identical waterstop sections may be made while the material is in the forms.
4. Joints for crosses and tees shall be factory prefabricated by the manufacturer.

C. Joints:

1. Construct construction, and expansion joints as indicated on the Drawings.
2. Preformed expansion joint material: Fasten expansion joint strips to concrete, masonry, or forms with adhesive. No nailing will be permitted, nor shall expansion joint strips be placed without fastening.

D. Hardboard:

1. When indicated on the Drawings, face surface of joint filler with hardboard.
2. Other facing materials may be used provided they furnish equivalent protection and the material is acceptable to ENGINEER.
3. Hold boards in place by nails, waterproof adhesive, or other means acceptable to the ENGINEER.

END OF SECTION