SECTION 03150 — WATERSTOPS FOR CONCRETE JOINTS — rev. 08/18/18
***** MasterFormat™ 2004 — Section 03 15 13 *****

Note to Designer: Earth Shield®® Chemical Resistant Waterstop is manufactured from proprietary compounds. It is strongly suggested that you specify Earth Shield® as a sole source. There are no equals.

This specification is available in a variety of computer formats on CD-ROM or DVD. Contact Earth Shield® Technical Sales for more information. It can also be found on the web at www.earthshield.com.

Suggested Short Form Guide Specification

Chemical Resistant HDPE Waterstop for Concrete Joints
Waterstop indicated in drawings and specifications for contraction (control), expansion, and construction joints shall be Earth Shield® High Density Polyethylene (HDPE) **Part No. ####** [Designer insert appropriate part number here] as manufactured and available from **J P Specialties, Inc.** — Murrieta, CA, USA 92562 — Phone 800-821-3859; 951-763-7077; Fax 951-763-7074; www.earthshield.com; E-mail davidp@earthshield.com

1. *High Density Polyethylene (HDPE) Waterstop shall conform to EPA Title 40 CFR Section 265.193. The suitability of the waterstop for a specific application should be determined by specific testing for that particular requirement per ASTM D 471. Project-specific certification to be provided by the manufacturer.*
2. *No equals or substitutions allowed.*

HDPE Waterstop Shop Made Fittings for Directional Changes
Intersection and change of direction waterstops shall be factory fabricated as manufactured and available from **J P Specialties, Inc.** — Murrieta, CA, USA 92562 — Phone 800-821-3859; 951-763-7077; Fax 951-763-7074; Web www.earthshield.com; E-mail davidp@earthshield.com and installed at all locations on the drawing by the Contractor. The Contractor shall only weld straight lengths of waterstop with all change of directions (fittings) being fabricated and supplied by Manufacturer.

1. *No equals or substitutions allowed.*

Suggested Long Form Guide Specification

PART 1 GENERAL

1. Provision Includes
   - A. Embedded waterstop in concrete including contraction, expansion and construction joints creating a continuous diaphragm to prevent the passage of fluid.
   - B. The use of nonmetallic waterstops for use in concrete joints subjected to chlorinated water, sea water, oils, solvents, acids, salts, fuels and many other aggressive chemicals and fluids.

1. References

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

- A. American Society for Testing and Materials (ASTM)
  1. ASTM D 412 — Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers — Tension.
  2. ASTM D 471 — Test Method for Rubber Properties – Effects of Chemicals.
  3. ASTM D 746 — Test Method for Brittleness Temperature of Plastics by Impact.
  4. ASTM D 792 — Test Method for Specific Gravity (Gravity Density) and Density of Plastics by Displacement.
  5. ASTM D 2240 — Test Method for Shore Hardness.
- B. Federal Specifications
  1. COE CEGS-03250 July 1995 Guide Specification for Military Construction.

2. EPA Title 40 CFR Section 265.193.

C. American Concrete Institute
1. ACI 350.2R-04 — Concrete Structures for Containment of Hazardous Wastes.

D. Canadian Council of Ministers of the Environment
1. Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.

3. Submittal Procedures

A. Chemical Resistant HDPE Waterstop
1. Earth Shield® HDPE Waterstop submittal shall contain the following:
   a. Samples of each size and shape to be used.
   b. Plate drawings of the waterstop profile indicating all dimensions.
   c. Shop drawings of shop made fittings to be provided by the manufacturer or prepared by the contractor.
   d. Manufacturer's Literature, MSDS sheets, installation, safety, and splicing instructions.

2. Chemical Resistant HDPE Waterstop and Splices — Specimens identified to indicate manufacturer, type of material, size, quantity of material, and shipment or lot represented. Each sample shall be not less than 6 inches long of each type, size, and lot furnished. One splice sample of each size and type for every 50 splices made in the shop and every 10 splices made at the job site. The splice samples shall be made using straight run pieces with the splice located at the mid-length of the sample and finished as required for the installed waterstop. The total length of each splice shall be not less than 12 inches long.

4. Delivery and Storage

Material delivered and placed in storage shall be stored off the ground and protected from moisture, dirt, and other contaminants.

PART 2 PRODUCTS

1. Chemical Resistant HDPE Waterstop

Intersection and change of direction waterstops shall be factory fabricated.

A. Manufacturer:
J P Specialties, Inc. — Murrieta, CA, USA 92562 — Phone 800-821-3859; 951-763-7077; Fax 951-763-7074; Web www.earthshield.com; E-mail davidp@earthshield.com

B. Chemical Resistant Non-Metallic Waterstops — Non-metallic waterstops shall be manufactured from High Density Polyethylene (HDPE), containing no plasticizer, mineral fillers, scrap or reclaimed material.
1. High Density Polyethylene (HDPE) Waterstop shall conform to EPA Title 40 CFR Section 265.193. The suitability of the waterstop for a specific application should be determined by specific testing for that particular requirement by ASTM D 471.

High Density Polyethylene (HDPE) Waterstop shall conform to the following typical physical properties:

Property	Test Method	Required Results
Specific Gravity	ASTM D 792	0.943
Shore A Hardness (5 sec.)	ASTM D 2240	90±3 at 25°C (77°F)
Tensile Strength	ASTM D 412	5,100 psi
Ultimate Elongation	ASTM D 412	750%
Softening		207°F
Brittle Point	ASTM D 746	-100°C (-148°F)

Property	Test Method	Required Results
Chemical Resistance	ASTM D 471	Meet or exceed specific testing standards for contained fluids as required by Owner and *certified* by Manufacturer.

Unless otherwise specified or indicated on the drawings provide the following types:

1. **Part No. PE436** — 4” x 3/16” ribbed centerbulb, as manufactured by **J P Specialties, Inc.** *(all-purpose waterstop; if specified with factory installed brass eyelets use part no. EYPE436)*
2. **Part No. PE636** — 6” x 3/16” ribbed centerbulb, as manufactured by **J P Specialties, Inc.** *(all-purpose waterstop; if specified with factory installed brass eyelets use part no. EYPE636)*
3. **Part No. PE936** — 9” x 3/16” ribbed centerbulb, as manufactured **J P Specialties, Inc.** *(all-purpose waterstop; if specified with factory installed brass eyelets use part no. EYPE936)*
4. **Part No. PE678** — 6” x 3/16” ribbed tear web, as manufactured by **J P Specialties, Inc.** *(for extreme joint movement; if specified with factory installed brass eyelets use part no. EYPE678)*
5. **Part No. PE978** — 9” x 3/16” ribbed tear web, as manufactured by **J P Specialties, Inc.** *(for extreme joint movement; if specified with factory installed brass eyelets use part no. EYPE978)*
6. **Part No. PE211** — 9” x 3/16” base seal, as manufactured by **J P Specialties, Inc.** *(for runway and pavement applications)*
7. **Part No. PE320L** — 3” x 3/16” tear web retrofit, as manufactured by **J P Specialties, Inc.** *(for joining concrete to existing surface; if specified with factory installed brass eyelets use part no. EYPE320L)*
8. **Part No. PE336L** — 3” x 3/16” retrofit, as manufactured by **J P Specialties, Inc.** (*for joining concrete to existing surface; if specified with factory installed brass eyelets use part no. EYPE336L)*
9. **Part No. PE621L** — 4-1/2” x 3/16” large movement retrofit, as manufactured by **J P Specialties, Inc.** (*for joining concrete to existing surface; large shear movements)*
10. **Part No. PE325T** — 3” x 3/16” T-shaped retrofit, as manufactured by **J P Specialties, Inc.** *(for joining concrete to existing surface; if specified with factory installed brass eyelets use part no. EYPE325T)*
11. **Part No. PE450T** — 5” x 3/16” T-shaped retrofit, as manufactured by **J P Specialties, Inc.** *(for joining concrete to existing surface; if specified with factory installed brass eyelets use part no. EYPE450T)*
12. **Part No. PE647** — 6” x 1/4” dumbbell, as manufactured by **J P Specialties, Inc.** *(for construction joints)*
13. **Part No. PE648** — 6” x 3/8” dumbbell, as manufactured by **J P Specialties, Inc.** *(especially designed for Carollo Engineers [construction joints])* NSF
14. **Part No. PE948** — 9” x 3/8” dumbbell, as manufactured by **J P Specialties, Inc.** *(for construction joints)*
15. **Part No. PE949** — 9” x 3/8” dumbbell centerbulb, as manufactured by **J P Specialties, Inc.** *(especially designed for Carollo Engineers [expansion joints])*
16. **Part No. PE1149** — 12” x 3/8” dumbbell centerbulb, as manufactured by **J P Specialties, Inc.** *(especially designed for Carollo Engineers [expansion joints])*

PART 3 EXECUTION

1. Waterstop, Installations and Splices — Waterstops shall be installed at the locations shown to form a continuous fluid-tight diaphragm. Adequate provision shall be made to support and completely protect the waterstops during the progress of the work. Any waterstop punctured or damaged shall be repaired or replaced. Exposed waterstops shall be protected during application of form release agents to avoid being coated. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued. Splices shall be made by certified, trained personnel using approved equipment and procedures.

A. Non-Metallic Shop Made Fittings — Fittings shall be shop made using a machine specifically designed to mechanically weld the waterstop. A miter guide, proper template (profile dependent), and portable power saw shall be used to miter cut the ends to be joined to ensure good alignment and contact between joined surfaces. The splicing of straight lengths shall be done by squaring the ends to be joined and using an ST-10® waterstop splicing tool. Continuity of the characteristic features of the cross section of the waterstop (ribs, tabular center axis, protrusions, etc.) shall be maintained across the splice.

B. High Density Polyethylene Waterstop — The splicing of straight lengths shall be done by squaring the ends to be joined and using an ST-10® waterstop splicing tool utilizing a thermoplastic splicing iron with a non-stick surface specifically designed for waterstop welding. The correct temperature (410°F to 430°F) shall be used to sufficiently melt without charring the plastic. The spliced area, when cooled, shall show no signs of separation, holes, or other imperfections when bent by hand in as sharp an angle as possible.

2. Preparation
   A. Uncoil waterstop 24 hours prior to installation for ease of handling and fabrication.
   B. Position waterstop to ensure proper distance from steel reinforcing bars to prevent rock pockets and honeycomb (see installation section 3.04).
   C. Protect waterstop from damage during progress of work.
   D. Clean concrete joint after first pour to remove debris and dirt.

3. Examination/Inspection
   A. Prior to placement of concrete notify engineer for field inspection approval.
   B. Inspect waterstop and field splices for defects and conformance to Quality Assurance Standard section 3.05.
   C. Upon inspection of waterstop installation, replace any damaged or unacceptable waterstop and dispose of defective material.

4. Installation
   A. Position waterstop in joint as indicated on drawings.
   B. Center waterstop on joint, with approximately one-half of waterstop width to be embedded in concrete on each side of the joint.
   C. Allow clearance between waterstop and reinforcing steel of a minimum two times the largest aggregate size. Prevent rock pockets and air voids caused by aggregate bridging.
   D. Ensure centerbulb is not embedded at expansion joints.
   E. Secure waterstop in correct position using optional factory-installed brass eyelets (or JPS hog rings crimped between last two ribs on 12 inch maximum centers), and wire tie to adjacent reinforcing steel. Center-to-center spacing may be increased upon written request and approval from ENGINEER.
   F. Carefully place concrete without displacing waterstop from proper position.
   G. Thoroughly and systematically vibrate concrete in the vicinity of the joint, and to maximized intimate contact between concrete and waterstop.
   H. After first pour, clean unembedded waterstop leg to ensure full contact of second concrete pour. Remove laitance, spillage, form oil and dirt.

5. Quality Assurance — Edge welding will not be permitted. Centerbulbs shall be compressed or closed when welding to non-centerbulb type. Waterstop splicing defects which are unacceptable include, but are not limited to the following:
   A. Tensile strength not less than 60 percent of parent sections.
   B. Free lap joints.
   C. Misalignment of centerbulb, ribs, and end bulbs greater than 1/16 inch.
   D. Misalignment which reduces waterstop cross section ore than 15 percent.
   E. Bond failure at joint deeper than 1/16 inch or 15 percent of material thickness.
   F. Misalignment of waterstop splice resulting in misalignment of waterstop in excess of 1/2 inch in 10 feet.

G. Visible porosity in the weld.
H. Charred or burnt material.
I. Bubbles or inadequate bonding.
J. Visible signs of splice separation when cooled splice (24 hours or greater) is bent by hand at sharp angle.

All information is presented in good faith and the results are believed to be accurate. All testing was done independently of Earth Shield® and J P Specialties, Inc.; therefore, neither Earth Shield® nor J P Specialties, Inc. makes any guarantee as to the testing data accuracy or the results obtained.

END OF SECTION