Item No. 416S
Waterstops

416S.1 Description

This item shall govern the furnishing and installation of waterstops in accordance with the details shown on the Drawings and the requirements of this item.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

416S.2 Submittals

The submittal requirements of this specification item include:

A. Type and manufacturer of proposed waterstop.

B. Certification that waterstops meet the requirements of this section.

C. Proposed method of performing splices.

416S.3 Materials

(1) General: Except where otherwise shown on the Drawings, waterstops may be manufactured from either natural or synthetic rubber or from polyvinyl chloride (PVC) as specified below.

(a) Natural Rubber. Natural rubber waterstops shall be manufactured from a stock composed of a high-grade compound made exclusively from new plantation rubber, reinforcing carbon black, zinc oxide, accelerators, anti-oxidants and softeners. This compound shall contain not less that 72 percent by volume of new plantation rubber.

Physical properties of the natural rubber for waterstops shall be as shown in Table A below.

(b) Synthetic Rubber. Synthetic rubber water stops shall be manufactured from a compound made exclusively from neoprene or butadiene styrene rubber (GRS), reinforcing carbon black, zinc oxide, polymerization agents and softeners. This compound shall contain not less than 70 percent by volume of neoprene or GRS.

Physical properties of the synthetic rubber for waterstops shall be as shown in Table A below.

(c) Polyvinyl Chloride. Polyvinyl chloride (PVC) waterstop material shall conform to the Corps of Engineers Specification Number CRD-C-572.

(2) Manufacturer's Certification: The manufacturer shall furnish test reports certified by a nationally known testing laboratory for each batch or lot of waterstops furnished under this contract, indicating compliance with this specification.

(3) Manufacturing Requirements: Natural and/or synthetic rubber waterstops shall be manufactured with an integral cross section which shall be uniform within plus or minus 1/8 inch (3.2 mm) in width. The web thickness or bulb diameter cross section shall be within plus 1/16 (1.6 mm) and minus 1/32 inch (0.8 mm). No splices will be permitted in straight strips. Strips and special connection pieces shall be well cured so that any cross section shall be dense, homogeneous and free from all porosity. All junctions in the special connections shall be full-molded.

Requirements for PVC waterstops shall be the same as for natural or synthetic rubber waterstops except that splicing of PVC shall be done by heat sealing the adjacent surfaces in accordance with the manufacturer's recommendations. A thermostatically controlled electric source of heat shall be used to make all splices. The heat shall be sufficient to melt but not to char the plastic.

416S.4 Construction Methods

Waterstops shall be of the size and shape shown on the Drawings. They shall be installed in the locations as shown on the Drawings.

The waterstops shall be accurately located in the forms and firmly held in place, both before and during concrete placement, to prevent displacement.

No field splices shall be permitted unless otherwise indicated on the Drawings. Field splices shall be either vulcanized; mechanical, using stainless steel parts; or made with a rubber splicing union of the same stock as the waterstop. All finished splices shall have a tensile strength not less than 50 percent of the unspliced material.

TABLE A: Physical Properties for Rubber for Waterstops

Original Physical Properties:	Natural (Plain) Rubber	Synthetic (Neoprene or GRS) Rubber
Hardness, ASTM D676 (Durometer)	60 ± 5	55 ± 5
Tensile Strength, Min. psi (mPa), ASTM D412	3500 (24)	2500 (17)
Elongation at Break, Min. percent	550	425
Accelerated Tests to Determine Aging Characteristics (Alternate tests):		
(1) After 7 days in air at 158° ± 2° F (70° ± -17° C), ASTM D573, or;		
(2) After 48 hours in oxygen at 158° ± 2° F (70° ± -17° C) and 300 psi (2 mPa) pressure, ASTM D572:		
Tensile Strength, percent change, max.	35	35
Maximum Elongation, percent change, max.	35	-

416S.5 Measurement and Payment

The work performed, materials furnished and all labor, tools, equipment and incidentals necessary to complete the work under this item will not be measured or paid for directly, but shall be included in the unit price bid for the item of construction in which this item is used.

End

SPECIFIC CROSS REFERENCE MATERIALS
Specification Item No. 416S, “Waterstops”

Corps of Engineers Specifications

Designation	Description
CRD-C-572	Polyvinylchloride Waterstop

RELATED CROSS REFERENCE MATERIALS
Specification Item No. 416S, “Waterstops”

City of Austin Standard Specifications

Designation	Description
Item No. 403S	Concrete for Structures
Item No. 410S	Concrete Structures
Item No. 414S	Concrete Retaining Walls
Item No. 425S	Prestressed Concrete Structures