

**SECTION 705 - JOINT MATERIALS FOR CONCRETE STRUCTURES**

**705.01 Joint Filler.** Prefomed (also referred to as premolded) joint filler for expansion joints shall conform to AASHTO M 33, AASHTO M 153, or AASHTO M 213.

The Engineer will reject entire lot or shipment when 10 percent or more of material is of non-uniform or improper construction.

**705.02 Joint Mortar for Pipe.** Joint mortar for pipe shall consist of one part of portland cement, two parts of accepted fine aggregate by volume, and water in quantity necessary to attain right consistency. Mortar shall be used within 30 minutes after preparation.

**705.03 Flexible Watertight Gasket.** Gasket shall be bitumen sealant or butyl rubber sealant conforming to AASHTO M 198.

**705.04 Joint Sealer.** Joint sealer material shall conform to following:

**(A) Poured Joint Sealer.**

**(1) Hot Poured Sealer.** Hot poured joint sealer shall conform to AASHTO M 173, AASHTO M 282, AASHTO M 301, or ASTM D 3581.

**(2) Cold Poured Sealer.** Cold poured joint sealer shall conform to ASTM D 5893.

**(B) Backer Rod.** Backer rod shall conform to ASTM D 5249.

**(C) Prefomed Joint Sealer.** Prefomed joint sealer shall conform to AASHTO M 220. Lubricant used to install prefomed compression sealer in concrete pavement shall meet ASTM D 2835. Dimensions and shape of prefomed joint sealer shall be submitted for the Engineer's acceptance before installation.

**705.05 Flashing Compound.** Flashing compound for angled construction joints between retaining wall stems and footings shall be asphaltic mastic, asbestos free, conforming to ASTM D 4586. Product furnished shall adhere to damp concrete and masonry surfaces.

Flashing compound for flush construction joint waterproofing shall conform to ASTM D 4586 as plying cement in construction of membrane waterproofing systems. Fabric shall conform to ASTM D 1668 (asphalt type). Product furnished shall adhere to damp concrete and masonry surfaces.

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**705.06 Waterproofing.**

- (A) Asphalt Primer.** Asphalt primer shall conform to AASHTO M 116.
- (B) Fabric.** Fabric for waterproofing shall conform to ASTM D 1668.
- (C) Asphalt.** Asphalt for waterproofing shall conform to AASHTO M 115.

**705.07 Waterstop.** Waterstop shall be rubber or polyvinyl chloride (PVC).

Certificate of Compliance shall be submitted by the Contractor before installation to show that waterstop proposed for use conforms to the contract requirements and test results.

- (A) Rubber Waterstop.** Rubber waterstop shall be plain or synthetic rubber.

Plain rubber waterstop shall be made from high-grade compound consisting of new plantation rubber, reinforcing carbon black, zinc oxide, accelerators, antioxidants, and softeners. Compound shall contain more than 72 percent new plantation rubber by volume.

Synthetic rubber waterstop shall be made from compound comprised of neoprene or GR-S, reinforcing carbon black, zinc oxide, polymerization agent, and softener. Compound shall contain more than 70 percent neoprene or GR-S by volume.

Physical properties of rubber waterstop shall conform to Table 705.07-1.

Waterstop shall be molded or extruded with integral cross section. Section shall be uniform with permissible variation in dimensions of 1/32 inch plus or minus. The Engineer will not permit splices in straight strips. Strips and special connection pieces shall be cured completely so that cross section is dense, homogeneous, and free of porosity. Junctions in special connection pieces shall be fully molded. During vulcanizing, joint shall be held securely by suitable clamps. Material at splices shall be dense and homogeneous throughout cross section.

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TABLE 705.07-1 – PHYSICAL PROPERTIES OF RUBBER WATERSTOP		
PHYSICAL PROPERTIES	PLAIN RUBBER	SYNTHETIC RUBBER
Shore Durometer, ASTM D 2240	55 – 65	50 - 70
Tensile Strength, minimum psi, ASTM D 412	3,500	2,500
Elongation at Break, minimum percent	550	425
Unit Stress, minimum psi at 300 percent elongation	1,100	---
Unit Stress, minimum psi at 500 percent elongation	2,800	---
Tensile Strength and Elongation, minimum percent of original ASTM D 572 after 7 days in air at 158 degrees F $\pm$ 2 degrees F, or after 4 days in oxygen at 158 degrees F $\pm$ 2 degrees F, and 300 psi pressure	65	65

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Molds shall be cast iron or mild steel, suitably constructed for continuous production. Cavities shall be unfinished but reasonably smoothed to produce uniform section with permissible variation in dimensions of 1/32 inch plus or minus. Molds can be constructed in such manner that they may be used for casting other different sections by blanking certain portions of molds.

Field splice shall be fully molded. Splice face shall be beveled at angle of 45 degrees or flatter. Finished splice shall have tensile strength of more than 50 percent of that of unspliced material.

**(B) PVC Waterstop.** PVC waterstop shall conform to Corps of Engineers' Specification No. CRD-C572.

Field splice for PVC waterstop shall be made by heat-sealing adjacent surfaces in accordance with manufacturer's recommendations. Thermostatically controlled electric source of heat shall be used to make

**705.07**

106 splices. Apply only enough heat to melt plastic.

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108 **705.08 Mortar for Manhole.** Mortar shall conform to Section 601 - Structural  
109 Concrete. Mortar shall be used before attainment of initial set. Retempering of  
110 mortar with water will not be allowed.

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112 **(A) Mortar for Water System and Storm Drain Manholes.** Mortar shall  
113 include one part of portland cement and two and a half parts of fine  
114 aggregate by volume.

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116 **(B) Mortar for Sanitary Sewer Manhole.** Mortar shall include one part of  
117 portland cement and three parts of fine aggregate by volume.

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119 Fine aggregate containing no calcareous sand shall be used when  
120 mortar comes in direct contact with sewage or sewage gases.

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122 **705.09 (Unassigned)**

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124 **705.10 (Unassigned)**

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126 **705.11 Jointing Compound for Sewer Pipe.** Jointing compound shall consist of  
127 filled hydrocarbon plastic material containing 57 to 62 percent inorganic matter.  
128 Joint compound shall be easily pourable at temperatures above 430 degrees F and  
129 shall maintain its filler in suspension during use.

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131 **(A) Resistance to Water, Acids, and Alkalis.** Jointing compound shall  
132 show no visual or other evidence of surface attack after prolonged exposure  
133 to water and to solutions consisting of 5 percent H<sub>2</sub>SO<sub>4</sub>, 5 percent NaOH,  
134 and 5 percent NaOCl.

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136 **(B) Adhesion and Tensile Strength.** Jointing compound shall meet the  
137 following tension test requirements:

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139 **(1)** Providing test blocks of fired sewer pipe material shaped to be  
140 able to clamp into tension testing machine,

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142 **(2)** Providing test surface area of one square inch in plane  
143 perpendicular to direction of pull, and

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145 **(3)** Joining test blocks by compound to be tested and leaving about  
146 1/2 inch thickness of compound between blocks.

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148 Allow compound to solidify, and then soak entire assembly in water at  
149 77 degrees F for 24 hours. While compound is still wet, break compound into  
150 at least three samples under average breaking tension of 200 pounds per  
151 square inch or greater. Let breaks be through compound itself and not at  
152 interface between compound and blocks.

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154           **(C) Hardness.** When testing jointing compound for hardness conforming  
155 to ASTM D 5, with exceptions of using untapered needle with diameter of 2  
156 millimeters and maintaining load of 2,000 grams on specimen for period of  
157 four hours, penetration shall be less than 2.5 millimeters after four hours of  
158 testing.

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160 **705.12 Expanded Polystyrene and Hardboard.** Expanded polystyrene shall be  
161 commercially available polystyrene board having:

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163           **(1)** Flexural strength of 35 pounds per square inch minimum conforming  
164 to ASTM C 203.

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166           **(2)** Compressive yield strength between 16 and 40 pounds per square  
167 inch at 5 percent compression.

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169           Hardboard shall have minimum thickness of 1/8 inch and conform to Federal  
170 Specification LLL-B-810, any type. Boards shall be held in place by nails,  
171 waterproof adhesives, or other method acceptable to the Engineer.

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**END OF SECTION 705**