FOR PROJECTS INITIATED
AFTER MARCH 1, 2012
REVISION 2

ITEM 437

ELASTOMERIC MATERIALS

437.1 Description. This item shall govern for the materials, testing, fabrication and placement of elastomeric materials, except as otherwise covered in other specifications.

437.2 Materials. When specified on the plans, structural members shall be seated on elastomeric bearings.

These bearings may be either "plain" (consisting of elastomer only) or "laminated" (consisting of alternating individual layers of elastomer and non-elastic laminates) as shown on the plans. Elastomeric bearings shall be specified on the plans by hardness (durometer), size, configuration and, in the case of laminated bearings, by the thickness of individual layers of elastomer and the size and position of special connection members, if any, required to be vulcanized with the bearing.

Unless otherwise shown on the plans, the elastomer for bearings shall be formulated from previously unvulcanized 100-percent virgin polychloroprene rubber polymers meeting the requirements of AASHTO M251. Rubber like polymers provided in the elastomer formulation shall be exclusively of the polychloroprene type. Bearings will not be acceptable if the elastomer provided contains previously vulcanized rubber (natural or synthetic) or other synthetic rubber like polymers.

Non-elastic laminates shall be one-sixteenth of an inch thick steel strip or sheet. Metal for special connections including sole plates and bearing plates, shall conform to ASTM A36.

Elastomer formulated from polychloroprene shall meet the requirements shown in Table No. l. Material tests shall be made in accordance with the test methods stipulated, except that all tests shall be made on the finished product. The values shown in Tables 1, pertain to tests performed on samples taken from the finished product. The apparatus employed in preparing test specimens from the finished product shall be in accordance with ASTM D15.

All components of a "laminated" bearing shall be molded together to form an integral unit free of voids or separations in the elastomer or between the elastomer and the non-elastic laminates or special connections unless specifically required or permitted by the plans or these specifications. The elastomer between the laminates or special connections and the outer surface of the bearing shall be well-vulcanized, uniform and integral such that it is incapable of being separated by any mechanical means into separate, definite, well-defined elastomeric layers. Evidence of this layered construction, either at the outer surfaces or within the bearing, shall be cause for rejection of such laminated bearing shipments.

All edges of non-elastic laminates shall be covered by a minimum of one-eighth of an inch of elastomer except that exposure of the laminates will be permitted at approved laminate restraining devices and around holes that will be entirely enclosed in the finished structure. Unless otherwise shown on the plans, all laminates shall be parallel with the bottom surface of the bearings, subject to the tolerances that follow.

Plain bearings may be molded individually, cut from previously molded strips or slabs molded to the full thickness of the finished bearings, or extruded and cut to length. The finished bearings shall have no voids or separations detectable either at the bearing surfaces or within the bearing unless specifically required or permitted by these specifications. Plain elastomeric bearings, shall be well vulcanized, uniform and integral units of such construction that the bearing is incapable of being separated by any mechanical means into separate, definite and well-defined elastomeric layers. Evidence of layered construction either at the outer surface or within the bearing, shall be cause for rejection.

Table No. 1

Hardness (Durometer)	50	60	70	80	90
Original Physical Properties Hardness					
ASTM D2240, Ty A Durometer	50±5	60±5	70±5	80±5	90±5
Tensile Strength, Minimum psi ASTM D412	2250	2250	2250	1800	1800
Elongation at Break, minimum percent	405	360	270	135	90
Accelerated Tests to Determine Long-Term Aging Characteristics Oven Aged-70 Hr. at 212 F.					
ASTM D573 Hardness, points change maximum	0to+15	0to+15	0to+15	0to+15	0to+15
Tensile Strength, % change maximum	−15	−15	−15	−15	−15

Elongation at Break, % change maximum	–40	–40	–40	–40	–40
Ozone: 100 PPHM in Air by Volume 20% Strain at 100±2 F. - ASTM D1149* 100 Hours	No Cracks	No Cracks	No Cracks	No Cracks	No Cracks
Compression Set-22 Hr at 158 F. ASTM D395 (Method B)** % Maximum	–25	–25	–25	–25	–25
Low Temperature Resistance ASTM D746, Procedure B Brittleness, at 26 C.	No Failure	No Failure	No Failure	No Failure	No Failure

Adhesion (Prequalification Only)
For laminated bearings, bond between the elastomer and laminates will be qualitatively evaluated by the procedure outlined in TxDOT Manual of Testing Procedures, Test Method Tex-601-J.

* Samples to be solvent wiped before test to remove traces of surface impurities.

** Modified in that test is performed on specimens of essentially full bearing or layer thickness with the 25-percent compression obtained through the use of appropriate spacer bars and/or shims.

INTERPOLATE BETWEEN VALUES SHOWN FOR OTHER HARDNESS VALUES

437.3 Waterstops. Waterstops shall be furnished and installed in accordance with the details shown on the plans. Except when otherwise indicated on the plans, waterstops may be manufactured from either natural (plain) or synthetic rubber or from polyvinyl chloride (PVC) as specified.

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

Synthetic rubber waterstops shall be manufactured from a compound made exclusively from neoprene or GRS, reinforcing carbon black, zinc oxide, polymerization agents and softeners. This compound shall contain not less than 70% by volume of neoprene or GRS.

The physical properties of natural or synthetic rubber for waterstops shall be as shown in Table No. 3.

Table No. 3

	Natural (Plain) Rubber	Synthetic (Neoprene GRS) Rubber
Original Physical Properties Hardness ÷ ASTM D676 (durometer)	60 ± 5	55 ± 5
Tensile Strength, Minimum psi, ASTM D412	3500	2500
Elongation at Break, Minimum Percent	550	425
Accelerated Tests to Determine Aging Characteristics:		
either - after 7 days in air at 158° (± 2) F., ASTM D573		
or - after 48 hours in oxygen (ASTM D572) at 158° (±) F. and 300 psi pressure tensile strength, Percent change maximum	35	35
Elongation, Percent Change, Maximum	35	

Polyvinyl Chloride waterstops shall conform to Corps of Engineers Specification No. CRD-C-572-60.

The Manufacturer shall furnish certified test results, indicating compliance with this specification, for each batch of waterstops furnished.

Rubber waterstops shall be manufactured with an integral cross section which shall be uniform within plus or minus one-eighth of an inch in width,

and the web thickness or bulb diameter, within plus one-sixteenth and minus one-thirty second of an inch. 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 connection pieces shall be full molded. During the vulcanizing period, the joint shall be securely held by suitable clamps.

The requirements for PVC waterstops shall be the same as 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.

When so specified on the plans, rail posts, rail members, metal shoes or minor structural members shall be insulated, leveled, shimmed or otherwise protected by elastomeric pads, sheets or washers. Such bearings may be any elastomeric material, plain, fibered or laminated, having a hardness (durometer) between 70 and 100 as certified by the manufacturer to the Engineer.

437.4 Construction Methods. Unless otherwise shown on the plans, concrete bearing seats shall be float finished to the required elevation. Variation from a level plane shall not exceed one-sixteenth of an inch within the limits of the bearing.

After erection of members of steel structures only, the horizontal distortion of the bearings shall be measured, corrected for temperature and adjusted, if necessary, so that the horizontal displacement between top and bottom of bearing at 70°F. does not exceed 15-percent of the elastomer thickness.

Welding in the vicinity of the bearings shall be done with care to avoid injury to the elastomer.

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, at the option of the Contractor. All finished splices shall have a tensile strength not less than 50-percent of the unspliced material.

437.5 Measurement and Payment. Unless otherwise specified on the plans elastomeric bearings used in conjunction with structures will be measured and paid for by each elastomeric bearing, of the type shown on the plan.

There are line code(s), description(s), and unit(s) for this item.

END OF ITEM 437