SECTION 1038

BEARING PADS FOR STRUCTURES

1038.1 Scope. These specifications cover elastomeric bearing pads of neoprene, of rubber and fabric and of rubber and fiber. Elastomeric bearing pads as herein specified shall include plain bearings (consisting of elastomer only) and laminated bearings (consisting of layers of elastomer restrained at their interfaces by bonded laminates).

1038.2 Elastomeric Bearing Pads.

1038.2.1 Material. The elastomer shall be 100 percent virgin chloroprene (neoprene) compound meeting the requirements listed in Table I. The pads shall be of the Durometer Grade specified on the plans. If test specimens are cut from the finished product, a 10 percent variation in "Physical Properties" will be allowed.

TABLE I

ASTM Standard		Durometer Grade		
		50	**60**	**70**
D 2240	Hardness	50±5	60±5	70±5
D 412	Tensile Strength, psi (MPa), min	2500 (17.2)	2500 (17.1)	2500 (17.2)
D 412	Ultimate Elongation, percent, min	400	350	300
D 573 70 hours @ 212 F (100 C)	Heat Resistance Change in Durometer Hardness, Points, max Change in Tensile Strength, percent, max Change in Ultimate Elongation, percent, max	 +15 -15 -40	 +15 -15 -40	 +15 -15 -40
D 395 Method B	Compressive Set 22 hours at 212 F (100 C), percent max	 35	 35	 35
D 1149	Ozone 100 pphm ozone in air by volume, 20 percent strain 100F ± 2F (37.7 ± 1C), 100 hours, mounting procedure ASTM D 518 Procedure A	 No Cracks	 No Cracks	 No Cracks
D 429 Method B	Adhesion Bond made during vulcanization, lb per in (N/m)	 40 (7.010)	 40 (7.010)	 40 (7.010)
D 746, Procedure B	Low Temperature Test Brittleness at -40 F (-40 C)	No Failure	No Failure	No Failure

Laminates shall be rolled mild steel sheets, of ASTM Grade A 36 equivalent or better, conforming to ASTM A 569, A 570 Grade 36, A 611 Grade D or A 607 Grade 50.

1038.2.2 Manufacturing Requirements. Plain bearings may be molded individually, cut from previously molded strips or slabs or extruded and cut to length. Cut edges shall be at least as smooth as ANSI 250 (6 µm) finish. Unless otherwise shown on the plans, all components of a laminated bearing shall be molded together into an integral unit and all edges of the laminations shall be covered by a minimum of 1/8 inch (3 mm) of elastomer except at laminate restraining devices and around holes that will be entirely closed on the finished structure. The following values shall be met under laboratory testing conditions of full size bearings.

(a) Compressive strain of any layer of an elastomeric bearing shall not exceed 7 percent at 800 pounds per square inch (5.5 MPa) average unit pressure or at the design dead load plus live load pressure, if so indicated on the plans.

(b) Shear resistance of the bearing shall not exceed 50 pounds per square inch (345 kPa) for 50 durometer, 75 pounds per square inch (520 kPa) for 60 durometer or 110 pounds per square inch (760 kPa) for 70 durometer compounds at 25 percent strain of the total effective elastomer thickness after an extended 4-day ambient temperature of -20 F (-29C).

1038.2.3 Tolerances. For both plain and laminated bearings, the permissible variation from the dimensions and configuration shown on the plans shall be as follows:

	Inch (Millimeter)
Overall Vertical Dimensions	
Average total thickness 1 1/4 inches (32 mm) or less	-0, +1/8 (-0, +3)
Average total thickness over 1 1/4 inches (32 mm)	-0, +1/4 (-0, +6)
Overall Horizontal Dimensions	
36 inches (914 mm) and less	-0, +1/4 (-0, +6)
Over 36 inches (914 mm)	-0, +1/2 (-0, +12)
Thickness of Individual Layers of Elastomer (Laminated bearings only)	±1/8 (±3)
Variation from a Plane Parallel to the Theoretical Surface (as determined by measurements at the edges of bearings)	
Top	1/8 (3)
Sides	1/4 (6)
Individual non-elastic laminates	1/8 (3)
Position of Exposed Connection Members	1/8 (3)
Edge Cover of Embedded Laminates or Connection Members	-0, +1/8 (-0, +3)
Size of Holes, Slots or Inserts	-0, +1/8 (-0, +3)
Position of Holes, Slots or Inserts	±1/8 (±3)

1038.3 Rubber and Fabric Pads.

1038.3.1 Rubber and fabric bearings pads shall be manufactured of new material and be composed of multiple layers of prestressed cotton duck weighing not less than 8.1 ounces per square yard (0.2746 kg/m^2). The duck warp count shall be 50 threads plus or minus one thread per inch (25 mm) and filing count 40 threads plus or minus two threads per inch (25 mm), each with two yarns per thread. The finished pads shall have 64 plies per inch (25 mm) of thickness. The duck material shall be impregnated and bound with a high quality rubber compound containing rot and mildew inhibitors and anti-oxidants, compounded into resilient pads of uniform thickness.

1038.3.2 The pads shall withstand compressive loads perpendicular to the plane of laminations of not less than 10,000 pounds per square inch (69 MPa) without separation of

bond or detrimental deformation. Load deflection properties, determined in accordance with procedures of Military Specifications MIL-C-882B, shall not exceed the following percentages of total pad thickness: 10 percent at 1000 pounds per square inch (6.9 MPa), 15 percent at 2000 pounds per square inch (14 MPa). When loaded to 1500 pounds per square inch (10 MPa), permanent set as load is removed in accordance with procedures of MIL-C-882B, shall be not more than 2.5 percent of the original "zero point" thickness. Type A Durometer hardness shall be 87 to 95. The ratio of lateral expansion to vertical deflection shall not exceed 0.25 when loaded to 1500 pounds per square inch (10 MPa). The material shall not lose effectiveness throughout a temperature range of -65 F to 150 F (-54 to 66 C). The thickness shall not vary more than 5 percent from that shown on the plans. There shall be no visible evidence of damage or deterioration resulting from environmental effects of sunshine, humidity, salt spray, fungus or dust in accordance with MIL-E-5272.

1038.4 Rubber and Fiber Pads.

1038.4.1 Rubber and fiber bearing pads shall consist of a rubber body and fabric fibers for insulation under aluminum rail posts. They shall be made from new unvulcanized rubber and unused fabric fibers. Fibers and rubber shall be in proper proportion to maintain specified strength and stability.

1038.4.2 Type A durometer surface hardness of the pads shall be 70 to 90. Pads of the specified thickness shall be capable of withstanding compressive loads of not less than 7000 pounds per square inch (48 MPa) without excessive extrusion or detrimental reduction in thickness.

1038.5 Dimensions. Bearing pads shall be furnished to the specified dimensions with all anchor bolt holes accurately located.

1038.6 Certification. The contractor shall furnish a manufacturer's certification in triplicate, showing typical test results representative of the material and certifying that the material supplied conforms to all of the requirements specified.