

**SECTION M.17
ELASTOMERIC MATERIALS**

M.17.01--Elastomeric Bearing Pads:

Elastomeric bearing pads shall be of the compound known as neoprene. All laminated bearings, and unlaminated bearings more than 25 mm thick, shall be individually cast in molds under pressure and heat and shall be of the size and grade indicated on the plans. Unlaminated bearings of 25 mm or less in thickness may be cut from sheet stock. All elastomeric bearing pads shall meet the requirements listed herein. Test specimens shall be in accordance with ASTM Method D 15, Part B.

1. Elastomer:

(a) Physical Properties

Grade (Durometer)	50	60	70
Original Physical Properties Hardness ASTM D 2240	50±5	60±5	70±5
Tensile strength, minimum MPa ASTM D412	17	17	17
Elongation at break, minimum %	400	350	300
Accelerated Tests to Determine Long-Term Aging Characteristics Oven Aged-70 hrs./100°C., ASTM D573			
Hardness, points change, maximum	+15	+15	+15
Tensile strength, % change maximum	-15	-15	-15
Elongation at break, % change, maximum	-40	-40	-40
Ozone-1PPM in Air by Volume- 20% Strain - 38±1 °C- ASTM D 1149* 100 Hours	No cracks	No cracks	No cracks
Compression Set-22 Hrs./100 °C, ASTM D 395-Method B, % maximum ASTM D 746- Procedure B	35	35	35
Brittleness at -40°C.	No failure	No failure	No failure

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

**Effective rubber thickness.

(b) Oil Swell Test: The volume of elastomer, when submerged in ASTM Oil No. 3 for 70 hours at 100° C shall not increase by more than 120% as tested by the procedure contained in ASTM D 471.

2. Laminae:

(a) Laminae where so noted on the plans, shall be of the thickness, material and number noted. Steel laminae shall be blast cleaned before being cast integrally with the elastomer, and shall be ASTM A 36 steel or an approved steel equivalent. Aluminum laminae shall be pickled before being cast integrally with the elastomer and shall meet the requirements of AAA 6061-T6. Cut edges or perforations of the laminae shall be at least as smooth as USASI 250 finish.

(b) The length and width of the laminae shall be 9.5 mm (± 1.6 mm) less than the pad dimension. The thickness of the laminae shall be as shown on the plans +0.3 mm. The vertical dimensions for the position of the laminae shall be as shown on the plans ± 1.6 mm. The vertical dimension between the bottom of the pad and any point on a particular laminae shall not vary by more than 1.6 mm. The laminae shall have a minimum of 1.6 mm side cover after the pad is manufactured.

3. Fabricated Pads:

(a) The elastomeric bearing pads shall conform to the following requirements:

(1) The finish, flash and bond of laminated bearings shall conform to the following requirements as noted in RMA, Rubber Handbook, latest edition.

Symbol	Requirements & Reference
F3	Finish—Table V
T.063	Flash—Table VI

B2 Grade 2, Method B Rubber to Metal Bonding, Tables VII and VIII

(2) The dimensional tolerances of plain and laminated bearings shall conform to the dimensions and configurations required by the plans and these specifications with the following permissible variations.

1. Overall Vertical Dimensions	
Average Total Thickness 32 mm or less	- 0,+3.2 mm
Average Total Thickness over 32 mm	- 0,+6.4 mm
2. Overall Horizontal Dimension	
914 mm and less	- 0,+6.4 mm
Over 914 mm	- 0,+12.5 mm
3. Thickness of Individual Layers of Elastomer (Laminated Bearings Only)	
	± 3.2 mm
4. Variation from a Plane Parallel to the Theoretical Surface (as determined by measurements at the edges of the bearings)	
Top	3.2 mm
Sides	6.4 mm
Individual Non-Elastic Laminates	3.2 mm
5. Position of Exposed Connection Members	
	3.2 mm
6. Edge Cover of Embedded Laminates or Connection Members	
	- 0,+3.2 mm
7. Size of Holes, Slots or Inserts	
	±3.2 mm
8. Position of Holes, Slots or Inserts	
	±3.2 mm

Buffing, cutting, or any other attempt to alter the size of the pads, for the purpose of meeting the tolerances stated herein will not be permitted.

(b) The following values shall be met under laboratory testing conditions of full size bearings:

(1) Compressive strain of any layer of an elastomeric bearing shall not exceed 7% at 5.5 MPa average unit pressure, or at the design dead load plus live load pressure if so indicated on the plans.

(2) The shear resistance of the bearing shall not exceed 345 kPa for 50 durometer, 517 kPa for 60 durometer or 758 kPa for 70 durometer at 25% strain of the total effective rubber thickness after an extended four-day ambient temperature of -29° C.

(c) A minimum of thirty (30) days prior to the installation of the elastomeric bearing pads, the Contractor shall deliver to the job site the required number of pads for installation plus the required number of test pads. Pads shall be packed in containers holding not more than ten (10) pads. The pads in one container shall be of the same type, size and shall be for one structure only. The containers shall be plainly marked with the type and number of pads, the project number, the

bridge number, the name of the manufacturer and the lot number. A lot of elastomeric bearing pads is defined as the number of pads manufactured from one batch of elastomer. A batch of elastomer is defined as the amount of elastomer prepared and compounded at one time. The Contractor shall furnish Certified Test Reports and Materials Certificates for each lot and a Certificate of Compliance in conformance with the requirements set forth in Article 1.06.07.

(d) For structures requiring less than fifty pads, one test pad shall be furnished. For structures requiring more than fifty pads, one extra test pad shall be furnished for each additional fifty pads or part thereof. If there are two or more types of pads in one structure, and only one test pad is required, the test pad will be furnished for the type of which there are the greater number. All test pads shall be furnished without charge.

(e) All of the pads on one structure shall be manufactured by the same firm.

(f) Pad Identification: Each pad shall have embossed on it the following: the word "Conn." the project number, the manufacturer's identification code, the pad type number, and the month and year of manufacture. The pad shall also have stenciled on it, with indelible ink the bridge number, the lot number and the pad number. The location of the identification shall be as shown on the plans.

4. Adhesive for Bonding:

(a) The adhesive for bonding the elastomeric bearing pads to steel or to the concrete surfaces where indicated on plans shall be an approved type and shall be a controlled setting adhesive made of such materials that it is compatible with the elastomeric pads, steel and concrete.

(b) The adhesive shall be a two-component, contact, long-lasting, high bonding strength material and shall be an air curing adhesive meeting the following requirements:

Property	Requirement	ASTM Test Procedure
Tensile Strength, min., MPa	12.5	D412
Elongation before breaking, min., %	750	D412
Brookfield Viscosity @ 25 °C, #2 Spindle @ 10 rpm, Pa•s	2.5-3.5	D1084
Average Mass per liter, kg	0.91±5%	

The 90° peel-pull test is described in MIL-R-15058G (ships) shall exceed 241 kPa. If the adhesive which is applied to the bonded surfaces requires a primer, the primer shall be supplied by the manufacturer of the adhesive.

(c) The Contractor shall deliver the adhesive and primer (if primer is required) to the job site a minimum of thirty (30) days prior to installation. Each separate container of adhesive and primer shall be clearly tagged or marked with the manufacturer's name, trade-mark and batch number. A batch is defined as that amount of adhesive that can be prepared and compounded at one time. The Contractor shall furnish Certified Test Reports and Material Certificates for each batch and a Certificate of Compliance in conformance with the requirements set forth in the Article 1.06.07.

M.17.02--Elastomeric Compression Seal: The material shall be a polychloroprene elastomer. It shall be resistant to heat, oil, and ozone, be resilient, and shall be compatible with concrete and steel. The elastomeric compression seal shall conform to the requirements of ASTM D 3542.

The compression seal in each lot shall be plainly marked with the manufacturer's name, trade mark and lot number. A lot shall be defined as that amount of compression seal extruded from one batch of elastomeric compound for each width indicated on the plans. A batch shall be defined as that amount of elastomeric compound prepared and compounded at one time. The Contractor shall furnish Certified Test Reports and Materials Certificates for each lot and a Certificate of Compliance in conformance with the requirements set forth in Article 1.06.07.

The Contractor shall deliver the compression seal to the job site a minimum of fifteen days prior to installation. The compression seal shall be in a separate length or lengths for each joint as shown on the plans and each separate length shall be clearly marked for identification with the manufacturer's name, trade mark and lot number.

Prior to delivery of the compression seal the Contractor shall notify the Engineer of the date of shipment and the expected date of delivery. Upon delivery of the compression seal to the job site, the Contractor shall immediately notify the Engineer.

The Contractor shall furnish a 610 mm extra length of compression seal, identified by lot number, in each lot for purposes of inspection and testing by the Engineer. The Engineer may also inspect each separate piece of compression seal at each end to determine the conformance to the requirements stated herein.

The Engineer may reject any lot or portion of a lot that does not conform to the requirements stated herein. A rejected lot or portion of a lot may be resubmitted provided the Contractor has removed or corrected, in a manner acceptable to the Engineer, all nonconforming material.

Lubricant-Adhesive: The lubricant-adhesive shall be a controlled setting adhesive conforming to one of the following systems.

System A: The lubricant-adhesive shall be a one component polychloroprene compound containing only soluble phenolic resins blended together with anti-oxidents and acid acceptors in an aromatic hydrocarbon solvent mixture and shall have the following physical properties:

Average net Mass per liter	0.94 kg ± 5%
Solids Content	24% min. by mass
Brookfield Viscosity (25°C., #2 spindle at 10 RPM) or approved equal	6.5-7.5 Pa•s
The adhesive shall remain fluid from	-15°C to 49°C
Film Strength (ASTM D-412) 750% min. elongation before breaking	16 MPa min. tensile strength

System B: The lubricant-adhesive shall be a one-part moisture curing polyurethane and hydrocarbon solvent mixture and shall have the following physical properties:

Average mass per liter	0.96 kg ± 10%
Solids Content	72-74% by mass
Adhesive to remain fluid from	-15°C. to 49°C.
Film Strength (ASTM D-412)	8.5 MPa
Elongation	350%

Only one system shall be used in a project.

The adhesive shall be stored at a temperature of 10° C to 27° C.

Any adhesive not used within 270 days of its manufacture shall be unacceptable.

Each batch of the lubricant-adhesive shall be delivered in containers plainly marked with the manufacturer's name or trade mark and batch number. A batch shall be defined as that amount of lubricant-adhesive compounded at one time. The Contractor shall furnish Certified Test Reports and Materials Certificates for each batch and a Certificate of Compliance in conformance with the requirements set forth in Article 1.06.07.