

17 Group 17 - Miscellaneous Bridgeworks Items 17

17.1 Proprietary Products

Where proprietary products are specified by name on the Drawings it implies a standard and is in no way intended to preclude the use of an alternative approved by the Engineer. The product shall be used in accordance with the manufacturer ' s instructions. Where such instructions are in conflict with the Drawings or Specification the Contractor shall draw the Engineer ' s attention to the inconsistency and await the Engineer ' s direction.

17.2 Bearings

17.2.1 General

The Contractor shall supply and fit all bearings in the positions and to the details shown on the Drawings. Bearings shall be set when the ambient temperature is approximately equal to the mean temperature shown on the Drawings or advised by the Engineer.

17.2.2 Elastomeric Bearing Pads

The elastomer shall comprise natural rubber and other materials compounded and cured to give the properties specified in AS 5100.4 with IRHD 60 $\pm$ 5.

AS 5100.4

IRHD 60 $\pm$ 5

Pads and strips shall be vulcanised in a mould under pressure and shall not be extruded or cut from sheet.

Tolerances on the width and length of the bearings shall be 0 to + 3 mm and on the thickness 0 to + 2 mm, provided the bearing surfaces shall be plane and parallel to one another within a tolerance of 0.75 mm.

0.75 mm

0 +3 mm

0 +2 mm

Unless otherwise shown on the Drawings all bearings shall be bonded with approved

epoxy resin adhesive to the upper surfaces.

The Contractor shall submit test certificates to the Engineer giving physical properties and mechanical properties for each bearing. All bearings shall be indelibly marked with appropriate bearing type number and a unique number for correlation to test certificates.

The following procedure shall be used for the installation of the elastomeric bearings at abutments and piers unless otherwise detailed in the Drawings or an alternative procedure is approved by the Engineer.

17.2.3 Pot Bearings

17.2.3.1 Pot Bearing Information

The Contractor shall submit to the Engineer for approval, the following information for each bearing type he proposes for use in the Works, at least six weeks prior to its incorporation in the Works:

a.

- e. Basis of deriving the rotational stiffness used in the calculations;
- f. Calculations and methods for sealing the gap between piston and cylinder, accounting for all rotations;
- g. Evidence of internal sealing ring performance;
- h. PTFE thickness, dimpling pattern, grease type, and method of bonding to steel; PTFE
- i. Specification for machine polishing and method of attachment of stainless steel sliding surfaces;
- j. Treatment of skew and taper if applicable;
- k. Surface protection including colour, thickness and grit blasting details;
- l. Test loads, loading arrangement and evidence of accreditation of testing facilities;
- m. Lifting and transportation arrangements; and
- n. Deviations from the Drawings or Specification.

The Contractor shall send to the Engineer a certificate (including design calculations from a professional engineer experienced in the design of structural bearings) that details the information required in this Clause and which verifies that all bearings and attachments comply with the requirements of the Drawings and this Specification.

17.2.3.2 Pot Bearing Materials

- a. The bearing pot, piston, sliding plate, guide bars and all attachment plates shall be fabricated from structural steel conforming to AS/NZS 3678 and/or AS/NZS 3679.1.
AS/NZS 3678 /
AS/NZS 3679.1
- b. The sliding surfaces on the sliding plates and the guide bars shall be

manufactured from austenitic stainless steel conforming to ASTM A240M Grade 316 L with 2B-mill surface finish.

ASTM A240M 316 L

2B

- c. Bolts, nuts and washers shall conform to sub-clause 15.2.2.3.

15.2.2.3

- d. Sliding pads and strips shall be 100% virgin polytetrafluoroethylene (PTFE) conforming to ISO 13000-1 Grade 1, and etched on the side bonded to the steel.

100%

PTFE

ISO 13000-1

1

- e. The sliding pad shall be unfilled PTFE dimensionally stabilised moulded sheet that is dimpled and lubricated in accordance with Clause 14.2 of AS 5100.4 on the face in contact with the sliding surface.

PTFE

AS 5100.4

14.2

- f. The sliding strips on the guide faces shall be a durable filled PTFE with fillers being either milled glass fibre (25% maximum) or carbon fibre (25% maximum). Alternatively, sliding strips may be a multilayered composite material e.g. for a three layer composite; a bronze backing strip, a sintered interlocking porous impregnated matrix, and an overlay of PTFE/lead, graphite/lead or similar mixture.

PTFE

25%

25%

PTFE/

/

- g. The elastomer used in the elastomeric disc must comprise 100% virgin natural rubber (polyisoprene). The elastomer must be plain, not laminated or fibre reinforced. The elastomer and its testing must conform to Type 53H of Appendix B of AS 5100.4.

100%

AS 5100.4

B

53H

- h. Internal seals shall be made from rectangular brass sections conforming to AS/NZS 1567 (half-hard). Where the zinc content in the brass is greater than 15%, the brass must be inhibited against dezincification. Alternatively, internal seals may be made from stainless steel strips conforming to ASTM A240M Grade 316 L.

AS/NZS 1567

15%

ASTM A240M 316 L

- i. The lubricant used for filling the lubrication reservoirs in the dimpled face of the PTFE sliding pad, and for lubrication of the top and bottom surfaces of the elastomeric disc, must be made from silicone compounds. It must retain its consistency at room temperature over a temperature range of -40°C to $+200^{\circ}\text{C}$.

C. The lubricant must be compatible with all the components in contact with it.

PTFE

-40 ° C

+200 ° C

17.2.3.3 Protective Treatment of Pot Bearings

Unless otherwise specified all work required for the protective treatment shall comply with the requirements of AS/NZS 2312. The protective treatment shall be applied under factory conditions prior to assembly of the bearings. Repairs to damaged coatings shall be carried out in accordance with the paint manufacturer ' s recommendations. Stainless steel sliding surfaces and bearing internal surfaces must not receive protective treatment and care must be taken to protect these surfaces from being damaged or coated during the application of the protective treatment to adjacent areas.

AS/NZS 2312

17.2.3.4 Pot Bearing Replacement

The bearings shall be designed to allow removal for replacement using a maximum jacking lift of 5 mm.

5mm

17.2.4 Installation of Bearings

17.2.4.1 General

All bearing installation shall be witnessed by the Engineer. At all times during the installation operation, every bridge member shall be kept stable and safe, and the installation operation shall be carried out without any damage to the bridge member, the bearings, or any other element of the structure.

During positioning of the bearings, the Contractor shall allow for any change in dimensions of the structure under dead and erection loads and for an ambient temperature during installation different to that assumed on the Drawings.

For elastomeric bearings, the top and bottom faces of top0P FIAk.JH'.J6 temperature d9(tor)-18

underlying support surface, prior to opening the bridge to traffic.

Pot bearings shall be located such that the bearing centreline in each direction is within 3 mm of the location shown on the Drawings.

3 mm

For bridges comprising simply supported girders, bearings shall be set to the levels shown on the Drawings within a tolerance of ± 5 mm.

± 5 mm

For bearings supporting continuous superstructures, bearings shall be set to the level shown on the Drawings with a tolerance of ± 0.0001 times the sum of the length of the adjacent spans, but not exceeding ± 5 mm.

± 0.0001

± 5 mm

The bearing inclination including any attachment plates which form part of the bearing shall be within 1 in 200 of that shown on the Drawings.

5‰

17.2.4.3 Mortar Pads

Mortar to be used in mortar pads shall be approved by the Engineer. Cement mortar shall be used for mortar pads under elastomeric bearings. The mortar shall contain sufficient coarse sand to provide a rough texture on the contact face to ensure frictional restraint to the bearing. The contact face shall be flat with a surface roughness no smoother than Grade 40 sandpaper.

25mm

50mm

The mortar pad shall be cast on a surface adequately prepared and compatible with the mortar used. The edges of the mortar pad shall be inclined at an angle of less than 45 ° to the supporting surface. The compressive strength of the mortar shall be as stated on the Drawings and capable of transmitting the design loads to the structure without damage.

45 °

Temporary supports under the bearing baseplates shall not be removed until after the mortar pad has developed its specified design strength. Any voids left upon removal of the temporary supports shall be filled with the same mortar.

17.2.4.4 Fixing Elastomeric Bearings

Elastomeric bearing strips may be installed directly onto a concrete surface provided the surface is finished with a wooden float and it meets the tolerances in Clause 5.2 and any other requirements detailed on the Drawings.

5.2

Elastomeric bearing pads may be installed directly onto a concrete surface provided that the surface meets the tolerances specified in Sub-clause 17.2.4.2.

17.2.4.2

Epoxies shall not be used to fix elastomeric bearings.

Unless otherwise specified, the diameter of the recesses for anchor bolts or studs shall be at least 50 mm larger than the diameter of the bolts. The recesses shall be cleaned and the bolts set and fixed. The recesses shall then be filled with an approved grout capable of withstanding the design loads.

50mm

17.2.4.5 Fixing Pot Bearings

For pot bearings, temporary clamping devices shall be removed before bearings are required to accommodate any movement. Holes exposed on the removal of temporary clamps shall be filled with a material approved by the Engineer.

Where bearings are installed prior to forming a cast-in-place concrete deck, the formwork around the bearing shall be sealed to prevent leakage of the concrete. Bearings shall not be tilted, displaced or distorted during concreting operations. Any mortar that could contaminate the bearings shall be completely and immediately removed.

17.3 Deck Joints, Sealants and Void Formers

17.3.1 Impact Angles

Where shown on the Drawings, the concrete edges at deck level shall be protected by steel angle sections, bent, if necessary, to conform to the profile of the wearing surface, and rigidly fixed to the superstructure as shown.

Care shall be taken in placing concrete adjacent to the protection angles to ensure that it is sound, without air pockets and is properly worked into corners and/or below the outstanding legs of the angles.