PART S40 BEARINGS

CONTENTS

1. GENERAL

.1 This Part specifies the requirements for the supply, delivery and installation of elastomeric and pot bridge bearings. If the Principal has not provided a design of the bearings, the Contractor must design the bearings in accordance with AS 5100.

.2 Elastomeric bearings must be supplied in accordance with the requirements of AS 5100.4 and as shown on the Drawings. Neoprene strip bearings, detailed on the Drawings, must comply with the material requirements of AS 5100.4 Appendix B with a durometer hardness of 53.

.3 Pot bearings must be manufactured in accordance with AS 5100.4: 2004.

.4 Sliding contact surfaces must be manufactured in accordance with AS 5100.4: 2004 Clause 14: "Sliding Contact Surfaces," except where amended or added to by this Part. Materials in sliding contact surfaces must consist of PTFE (polytetrafluoroethylene) sliding on stainless steel.

.5 Documents referenced in this Part are listed below:

AS 1196	Polytetrafluoroethylene (PTFE) Moulded Sheet
AS 1554	Structural Steel Welding
AS 3678	Structural Steel - Hot-rolled Plates, Floor-plates and Slabs
AS 3679	Structural Steel
AS 5100	Bridge Design
ASTM A240M-03b	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

2. QUALITY REQUIREMENTS

.1 At a minimum, the Contractor's Quality Plan must include the following documents, procedures and/or instructions:

(a) Method of bearing installation.

.2 If not provided beforehand, the procedures must be submitted at least 28 days prior to the commencement of site work.

.3 Provision of the documents listed in this Clause shall constitute a **HOLD POINT**.

3. PROPERTIES OF MATERIALS

PTFE

.1 The PTFE sliding pad must consist of unfilled PTFE sheet. PTFE sheets must be permanently lubricated in accordance with the conditions specified in AS 5100.4, Clause 11.2 "Frictional Restraint of Sliding Surfaces."

.2 The resin used in the manufacture of PTFE sliding pads must be 100% virgin material complying with AS 1196, Grade A, with a relative density of 2.13 to 2.23 and durometer hardness of 50 to 65.

Steel Other Than Stainless Steel

.3 The steel, other than stainless steel, used in the manufacture of the bearings must conform to AS 3678 and AS 3679 and welding must conform to AS 1554.

Stainless Steel

.4 The stainless steel plate mating with the PTFE must be to ASTM A240M-03b, Type 304. The sliding surface must be polished to a bright mirror finish, less than 0.4 □m R_a (CLA) in both directions and having a Brinell hardness not less than 125.

4. PROTECTIVE TREATMENT OF BEARINGS, FIXING PLATES AND SHIM PLATES

.1 Stainless steel sliding surfaces of expansion bearings must receive no protective treatment and care must be taken to protect these surfaces from being damaged or coated during the application of the protective treatment.

.2 Remaining surfaces must be treated in accordance with Part S35 "Protective Treatment of Structural Steelwork".

5. INSPECTION OF BEARINGS

.1 The Contractor must arrange for each pot bearing to be dismantled by the manufacturer and visually inspected by a nominated third party at the manufacturer's works prior to delivery. No bearing must be separated or dismantled on site.

6. TESTING OF BEARINGS

General

.1 Where a third party is required for inspection or testing purposes, an appropriately qualified person(s) must be nominated by the Contractor for approval at least 2 weeks prior to the inspection/testing being required.

.2 One representative bearing from every 10 bearings, or part thereof, of each size and type, must be selected by the Contractor for testing. The cost of this testing must be borne by the Contractor.

Testing

.3 Testing must be carried out at a NATA approved laboratory and the method of testing the bearings must be subject to approval. The equipment for testing bearings must be capable of determining loads to an accuracy of ± 3% and deflections to ± 1%. Where necessary, to achieve the specified accuracy for testing, equipment must be calibrated and test results corrected accordingly.

.4 All testing must be carried out in the presence of the nominated third party who must be given at least 2 weeks prior notice of the testing.

.5 After load testing, pot bearing(s) must be dismantled and examined.

Test Loads

.6 Testing of elastomeric bearings for compression, compression stiffness and shear stiffness must be carried out as per Appendix D of AS5100.4

.7 Elastomeric bearings which are required to resist horizontal forces must be further tested to 1.5 times the rated serviceability state lateral capacity for the bearings specified on the Drawings while loaded in compression to the concurrent serviceability state vertical load specified on the Drawings. The load must be maintained for 3 minutes.

.8 Load testing of pot bearings must be in accordance with AS5100.4 Clause 13.2

Test for Coefficient of Friction

.9 The coefficient of friction of sliding surfaces of expansion bearings must be determined. The value of the coefficient of friction must be taken as the average result of 5 tests and must be determined for both minimum and maximum vertical serviceability state loads but the bearings may be given 2 preliminary sliding runs under load prior to taking the test readings.

.10 The friction coefficient of the sliding surfaces must not exceed the values given in Table 6.10 for the relevant stresses on the PTFE surface. Values must be interpolated for intermediate bearing pressures.

TABLE 6.10 FRICTION COEFFICIENT OF SLIDING SURFACES				
Bearing Pressure	5 MPa	10 MPa	20 MPa	30 MPa or greater
Friction Coefficient	0.08	0.06	0.04	0.03

Failure to Meet Requirements

.11 A bearing will be considered as non-conforming if it exhibits any signs of failure such as:

(a) Splitting or permanent deformation of the elastomer,

(b) for elastomeric bearings, signs of misplaced steel plates, bond failure or surface defects, such as tears or splits,

(c) Tearing, cracking or permanent deformation of the PTFE sliding surface,

(d) for pot bearings, cracking or permanent deformation of the sealing ring or other part of the bearing,

(e) for pot bearings, abrasive marks indicating abnormal contact between the metal surfaces of the bearing plates or piston, and the pot.

(f) for pot bearings, any other form of distress, warping, scoring, rubber extrusion or other effect which could affect the durability of the bearing.

.12 If a bearing is non-conforming, 2 additional bearings from the batch it represented must be tested. If both bearings meet the requirements of this Specification, the remaining bearings in the batch must be accepted. Otherwise each remaining bearing in the batch must be tested to determine its compliance with the Specification.

7. TEST CERTIFICATES

.1 At least 7 days prior to delivery to the bridge site, the Contractor must supply NATA endorsed test reports of the bearings tested. The Contractor must supply copies of the test certificates showing details of each bearing tested and the test results of each sample of elastomer. The test certificates must show whether any tolerances have been exceeded or whether any faults have been observed.

.2 Submission of this information shall constitute a **HOLD POINT**.

8. MARKING AND DELIVERY

.1 Bearings must be supplied in sets held together to prevent damage to components during transport. Pot bearings must be held together with metal erection straps to prevent misalignment or separation. The erection straps must not be removed until the time specified on the Drawings or manufacturer's instructions.

.2 Pot expansion bearings must be supplied with the sliding plate set to the correct offset. All set screws that cannot be installed with the temporary erection straps in place must be in place when the bearing is supplied.

.3 The Contractor must inspect the bearings upon delivery to verify that dimensions, bolt sizes, hole sizes, and offsets are correct. The Contractor must also verify that he is able to install each pot bearing and its components without disassembling or separating the bearing.

9. INSTALLATION

.1 Installation of bearings must be in accordance with instructions on the Drawings and with the manufacturer's instructions. Pot bearings not be be disassembled or separated once delivered to site under any circumstances. Any action that causes separation of a pot bearing at any time isnot be permitted. Any action that causes a shift in the lateral position and alignment of a bearing or bearing component at any time is not be permitted.

10. HOLD POINTS

.1 The following is a summary of Hold Points referenced in this Part:

CLAUSE REF.	HOLD POINT	RESPONSE TIME
2	Submission of Procedures	7 days
7	Submission of NATA endorsed test reports and AS 1523, Appendix B information if appropriate	2 working days