Section 2434. Disc Bearing Assembly

2434.01 DESCRIPTION.

A. Furnish, test, and install complete in-place, factory-produced disc bearing assemblies according to details shown on the contract documents and with the requirements of this specification.

B. Ensure disc bearing assembly design, materials, shop drawings and documentation, fabrication, testing and acceptance, packaging, and installation are according to the contract documents and this specification, as well as the most recent edition of the AASHTO Standard Specifications for Highway Bridges.

2434.02 DISC BEARING ASSEMBLY DESIGN, MATERIALS, FABRICATION, AND TESTING.

A. Disc Bearing Assembly Design.

1. Ensure the Manufacturer has designed the disc bearing assemblies for the service loads and movements as shown on the contract documents. Ensure the minimum horizontal load capacity of the bearing is a minimum of 10% of the vertical capacity.

2. Polytetrafluoroethylene (PTFE) sliding surfaces for expansion bearings are designed to translate by the sliding of a PTFE surface across a smooth hard mating surface of stainless steel. Ensure the maximum coefficient of friction within the range of loads and service temperatures is 0.03.

3. Ensure the finished PTFE sheet is no less than 1/8 inch (3 mm) and no more than 3/16 inch (5 mm) thick. Ensure the PTFE sheet is recessed according to Article 18.5.3.2 Div. II of the AASHTO Standard Specifications for Highway Bridges.

B. Disc Bearing Assembly Requirements.

1. Polyether urethane structural element (disc) confined by upper and lower steel bearing plates.

2. Equipped with a shear restriction mechanism to prevent lateral movement of the disc.

3. Adequate provision for the thermal expansion and contraction, rotation, camber changes, and creep and shrinkage of structural members.

4. Supplied as guided expansion or fixed bearings, as designated on the contract documents.

5. Supplier meeting Article 18.7.4.8 Division II of the AASHTO Standard Specifications for Highway Bridges and approved by the Contracting Authority.

6. Sliding bearings stiff in shear (i.e. negligible shear displacements occurs within the load-bearing element).

C. Disc Bearing Assembly Materials.

1. **Steel components:** meet the material requirements as designated on the contract documents.

2. **Anchor bolts:** meet the material requirements as designated on the contract documents.

3. **Stainless steel mating surfaces:** conform to ASTM A 240/A 240M Type 304. Minimum No. 8 mirror finish for mating surface. Minimum 16 gauge thickness for the stainless steel plate.

4. **The PTFE sheets:** manufactured from pure virgin (not reprocessed) unfilled PTFE resin.

5. **Guiding arrangements:** PTFE to stainless steel sliding surfaces.

6. **Structural element (disc):** new and unused polyether urethane, with no reclaimed material incorporated into the finished disc bearing assembly, complying with Article 14.6.8.2 of the AASHTO Standard Specifications for Highway Bridges and tested according to ASTM D 2240.

D. Disc Bearing Assembly Fabrication.
Ensure the following:

1. Fabrication of all parts of the disc bearing assembly is done according to the approved shop drawings.

2. The surface of the stainless steel plates is protected from weld splatter during the welding procedure of the stainless steel plates to the backing plate,

3. PTFE sheet bonding is performed at the expansion bearing manufacturer's factory under controlled conditions and according to the written instructions of the manufacturer of the approved adhesive system.

4. The PTFE surface is smooth and free from bubbles after completion of the bonding operation.

E. Disc Bearing Assembly Shop Drawings and Documentation.
Ensure shop drawings are:
- Prepared according to the requirements of Article 2408.02.
- Certified by a Professional Engineer licensed in the State of Iowa.
- Submitted with design computations for review for conformance with the loads shown on the contract documents.

F. Disc Bearing Assembly Surface Coating.
Ensure that exposed surfaces of steel components of the disc bearing assemblies, except for the stainless steel surface and the masonry plate, are shop primed and painted according to the Standard Specifications. Ensure the masonry plate is galvanized according to ASTM A 123.

G. Disc Bearing Assembly Testing and Acceptance.

1. **General.**
   a. Ensure each manufactured lot of disc bearing assemblies is accompanied by a manufacturer's certificate stating that the steel, neoprene elastomer, and PTFE material meet the requirements of the materials specified above. Ensure certificates show actual test results for the materials used in the manufacture of the disc bearing assemblies.
   b. Acceptance of disc bearing assemblies will be based on satisfactory manufacturer's certification, acceptable test results, and inspection at the time of installation.

2. **PTFE Sliding Surfaces.**
   The Manufacturer is to furnish facilities for and perform the testing and inspection of the completed disc bearing assemblies or representative samples in their plant or at an independent test facility according to Article 18.7.4.2 of the AASHTO Standard Specifications for Highway Bridges.

2. **Disc Bearing Assemblies.**
   a. The Manufacturer is to supply the complete disc bearing assembly, including, but not limited to, disc bearing, sole plate, guide bars, slider plate, masonry plate, the 1/8" (3 mm) preformed masonry pads, and the anchor bolts.
   b. The Manufacturer is to furnish facilities for the Contracting Authority or an independent agency to perform the testing and inspection of the completed disc bearing assemblies or representative samples in their plant or at an independent test facility according to Article 18.7.4.8 of the AASHTO Standard Specifications for Highway Bridges. These tests include those listed below, but do not include a long-term deterioration test (Article 18.7.2.8 of the AASHTO Standard Specifications for Highway Bridges):
      - A dimensional check (Article 18.7.2.3 of the AASHTO Standard Specifications for Highway Bridges),
      - A clearance test (Article 18.7.2.4 of the AASHTO Standard Specifications for Highway Bridges),
      - A bearing horizontal capacity test (Article 18.7.2.9 of the AASHTO Standard Specifications for Highway Bridges), and
      - A short-term compressive proof load test (Article 18.7.2.5 of the AASHTO Standard Specifications for Highway Bridges).

c. Disc bearing assemblies represented by the test specimen passing the above requirements will be approved for use in the structure, subject to on-site inspection for visible defects.

2434.03 CONSTRUCTION.

A. Packaging.
Replace disc bearing assemblies damaged during handling, transporting, or storing at no additional cost to the Contracting Authority.

B. Disc Bearing Assembly Installation.

1. The bridge bearings are not designed to accept bending stresses and must be fully supported over the entire area of the bottom and upper surfaces at all times when under load.

2. Set the bearing masonry plate to line and grade. Locate the disc bearing assemblies at the proper elevation and orient them in the proper direction. Obtain the Engineer's approval for the location and orientation of the bridge disc bearing assembly. Locate the upper part of the disc bearing assembly relative to the base of the disc bearing assembly according to the Engineer's recommendations for the temperature at the time of erection.

3. Do not disassemble disc bearing assemblies without the Engineer's permission.

4. Exercise care when aligning both the base and upper part of the guided expansion bearing as detailed on the contract documents; otherwise, a wedging action will occur resulting in unsought horizontal forces.

5. Avoid scratching, gouging, or otherwise marking the PTFE or mating stainless steel surfaces of the disc bearing assemblies during handling or erection. Use whatever means necessary to protect the disc bearing assemblies from dirt, grout, or other foreign materials during the construction of other elements of the structure.

6. Modifications required to meet the height of disc bearing assemblies shown in the contract documents are the responsibility of the Contractor, with no additional cost to the Contracting Authority.

2434.04 METHOD OF MEASUREMENT.
The quantity of Disc Bearing Assemblies (each) will be shown in the contract documents.

2434.05 BASIS OF PAYMENT.
Payment for Disc Bearing Assemblies completed and in place will be at the contract unit price. Payment includes the 1/8 inch (3 mm) preformed masonry pad, anchor bolts, work and materials required to drill and fill the anchor bolt holes with approved grout, surface preparation, and painting of steel surfaces as described herein