

SECTION 403 - STEEL STRUCTURES

403.01 DESCRIPTION

[Include the following with any Contract requiring Bearings:]

Add the following:

Pot Bearings and Disc Bearings shall not be used.

403.02 MATERIALS.

[Include the following with any Contract requiring Bearings:]

Delete the Materials reference for "Pot Bearings and Disc Bearings."

Delete the last paragraph of this Subsection in its entirety.

403.09 SETTING ANCHOR BOLTS AND EXPANSION BEARINGS.

[Include the following with any Contract requiring Bearings:]

In Paragraph (B), delete the 7th to last paragraphs in their entirety.

403.18 MEASUREMENT

[Include the following with any Contract requiring Bearings:]

Delete the 2nd paragraph in its entirety.

Replace the 3rd paragraph with the following:

Under contracts containing an item for structural steel, all metal parts, including structural steel, steel expansion dams, stud shear connectors, bridge drainage metal work, and all other metalwork necessary for the complete fabrication, erection and completion of the structure will be paid for as structural steel unless otherwise noted, stipulated or listed as separate pay items in the Proposal.

NOTE TO DESIGNER:

The following section is “non-standard”. It shall be numbered consecutively in the supplementary specifications starting with number 428 regardless of the number shown. For example, if you want to use section 431 - Vertical Realignment of Deck Joint at Structure, but no other non-standard section, it shall be renumbered 428. If another non-standard section is required, it shall be numbered 429., etc.

NOTES TO DESIGNER:

All Applications:

As per the provisions of this Specification, the Contractor bears responsibility for the final detailing and furnishing of masonry plates, sole plates, anchor bolts, hardware, and bearing pads as required or as shown on the Plans. It is the responsibility of the Designer to provide adequate information to the Contractor so that these attachment details can be completely detailed by the Contractor or Contractor’s engineer. This may be accomplished via furnishing of appropriate as-built documents as reference drawings, or by providing supplementary details in the Contract Plans. The Designer shall fully design and detail masonry plates, sole plates, and their connections to the girders and bearing seats. These designs shall consider the use of all Approved Manufacturers. Documented coordination with the Approved Manufacturers verifying the suitability of these details for bearing fitment shall be obtained and documented.

Retrofit Applications:

Special attention should be paid to placement of proposed layout of anchor bolts so that they clear existing reinforcing bars in the piers intended to remain in service and also clear above girder flanges, diagonal bracing, diaphragm / floorbeam elements, or other superstructure features which may restrict anchor bolt drilling equipment headroom.

Some older structures contain asbestos transite ducts encasing existing bearing anchor bolt embedments. As-Built plans should be thoroughly reviewed to ensure that asbestos elements are identified and the Contractor is alerted to their presence on the Contract Plans. Requirements for the removal and disposal of transite ducts shall be provided to the Contractor.

Many older structures contain lead paint in the canvas pads beneath the existing bearing masonry plates. As-Built plans should be thoroughly reviewed to ensure that lead paint coated canvas pads are identified and the Contractor is alerted to their presence on the Contract Plans. Handling and Disposal procedures shall be part of the Lead Health and Safety Plan as per Section 411 of these Specifications.

[Include the following Section with any Contract requiring HLMR Bearings:]

SECTION 439 – HIGH-LOAD MULTI-ROTATIONAL BEARINGS

439.01 DESCRIPTION

High-Load Multi-Rotational (HLMR) bearings shall be defined as bearings that consist of an element that allows rotation about any horizontal axis, and may in addition have sliding surfaces to accommodate translation. Translation may be constrained to a specified direction by guidance mechanisms. Bearings may be furnished by any of the Qualified Manufacturers. However, only one type of bearing from one Qualified Manufacturer (Manufacturer) shall be used on a structure.

This work shall consist of the design, furnishing, and fabrication of HLMR bearings. Installation of the bearings shall be the responsibility of the Contractor, in accordance with the Manufacturer's recommendations. Bearings shall be designed based on the loads and movements as described on the Plans. All designs for all elements shall conform to the latest editions (with interims) of the AASHTO-LRFD Bridge Design Specifications, the NJTA Design Manual and these Specifications.

This work shall also include the furnishing, and fabrication, and installation of masonry plates, sole plates, anchor bolts, hardware, and bearing pads as shown on the Plans, described herein, recommended by the Manufacturer, or otherwise required to furnish completely installed and functioning HLMR bearings.

Where applicable, this work shall also include the bearing seat preparation including existing anchor bolt removals, as indicated on the Plans or as otherwise required to install the new HLMR bearings.

This work shall also include on-site supervision and technical support furnished by the Manufacturer to assist the Contractor with the installation of the HLMR bearings.

Materials, testing, and fabrication/construction operations not specifically denoted on the Plans and in these Specifications shall be in accordance with the current AASHTO LRFD Bridge Construction Specifications.

439.02 MATERIALS

Steel used for the fabrication of bearing assemblies shall conform to ASTM A709, Gr. 36, Gr. 50, or Gr. 50W, or an approved equivalent, except for steel that is used for guidance or shear restriction mechanisms. The guidance and shear restriction mechanisms shall be in accordance with the Manufacturer's specifications as approved by the Engineer.

Materials not otherwise specified in this Section shall conform to the following Subsections:

<i>Bolts and Bolting Materials</i>	<i>909.02</i>
<i>Bearing Pads.....</i>	<i>923.02(C)</i>

439.03 QUALIFIED MANUFACTURERS

Where High-Load Multi-Rotational bearings are noted on the Plans for use, approved products from any Qualified Manufacturer may be provided. The following Manufacturers are qualified for use:

- 1. R.J. Watson, Inc.
78 John Glenn Drive
Amherst, NY 14228
Telephone: 716-691-3301*
- 2. The D.S. Brown Company
300 East Cherry Street
North Baltimore, OH 54872
Telephone: 419-257-3561*
- 3. AMSCOT Structural Products Corp.*

241 East Blackwell Street
Dover, NJ 07801
Telephone: 973-989-8800

4. **Earthquake Protection Systems**
451 Azuar Drive; Building 759
Mare Island, Vallejo, CA 94592
Telephone: 707-644-5993

439.04 **WORKING DRAWINGS**

Working drawings, including design calculations, shall be furnished to the Engineer in accordance with Subsection 104.08. The following information shall be included:

1. *The total quantity of each kind of bearing required (fixed, guided expansion, or non-guided expansion), grouped first according to load range and then by actual design capacity.*
2. *Plan view and section elevation including all dimensions required for fabrication.*
3. *Details of all components and sections showing all materials incorporated into the bearing.*
4. *All ASTM, AASHTO, and other applicable material designations.*
5. *The maximum design coefficient of friction for all sliding surfaces.*
6. *Details of any welding process used in the bearing manufacture that does not conform to the approved processes of the current ANSI/AASHTO/AWS D1.5 Bridge Welding Code or the ANSI/AWS D1.6 Structural Welding Code – Stainless Steel.*
7. *Vertical, horizontal, rotation, movement, and load capacities.*
8. *A schedule of all bearing offsets, where required, to ensure proper bearing alignment under full dead load.*
9. *Alignment plans.*
10. *Paint or coating requirements, as required.*
11. *Installation scheme.*
12. *Complete design calculations verifying conformance with the provisions of this Section.*
13. *Anchorage details.*
14. *Bearing pre-set details.*
15. *Location of the fabrication plant.*
16. *The Manufacturer's name and the name of its representative responsible for coordinating production, sampling and testing, and field supervision of bearing installation(s).*
17. *The Manufacturer's certification package, according to Subsection 105.04, that shall contain the following:*
 - a. *Material test reports for all steels used except AISI C1018 and C1020 for which a mill conformance certificate is acceptable.*
 - b. *Certificate of Compliance for all non-ferrous metals.*
 - c. *Material test reports for any elastomeric components.*
 - d. *Certificate of Compliance for PTFE and any adhesive used.*
 - e. *A Certificate of Compliance for the bearings, executed by an officer of the Manufacturer.*
 - f. *Certificate of Compliance for any dowels or bolts supplied.*
 - g. *Test reports for the performance tests.*
18. *Completed as-built bearing table.*

The design calculations and working drawings shall be signed and sealed by a Professional

Engineer licensed in the State of New Jersey. The working drawings must be approved by the Engineer before fabrication of the bearings begins. Such approval shall not relieve the Contractor of any responsibility under the contract for the successful completion of work.

439.05 FABRICATION OF HLMR BEARING ASSEMBLIES

(A) Fabrication

Section 18 – Bearings of the AASHTO LRFD Bridge Construction Specifications shall be followed for the fabrication of HLMR Bearing assemblies.

(B) Coating of Steel Surfaces

All surfaces, except those defined below shall be coated. The surfaces to be coated shall be shown on the working drawings. Coatings shall not impair the clarity of the bearing identification markings. All flame cut edges of the bearing plates shall be ground to reduce hardness and facilitate blast cleaning. All corners of the sole plate shall be rounded to a 1/16 inch radius. All exposed plain steel surfaces shall be blast cleaned to a near white finish. For all bearings, the pot cavity and all sliding surfaces shall not be coated.

(1) Bearings for Steel Superstructures:

Bearings shall be painted in accordance with Specification Section 411. Quality assurance inspection of coatings will be in accordance with Specification Section 411.

(2) Bearings for Concrete Superstructures:

Bearings shall either be galvanized in accordance with ASTM A-123 or ASTM A-153, as appropriate, or zinc metalized in accordance with AWS C2.2 to a finished coating minimum thickness of 10 mil. Quality assurance inspection will be performed by using magnetic thickness gauges.

(C) Testing

Testing shall be performed in accordance with the LRFD Bridge Construction Specifications prior to installation of the bearings, and in the presence of the Engineer. The following provisions shall also apply:

(1) The Long Term Deterioration Testing:

(a) Bearing Design Configurations- Testing shall be conducted on two full size bearings placed back-to-back. Bearing design configurations which comply with these provisions based on prior testing will be considered as prequalified for use without the need for further long term deterioration testing.

(b) Bearing Materials – Testing shall be conducted on samples of materials used in the fabrication of each lot of 25 or less bearings.

(D) Packing and Shipping

(1) Bearings shall be securely banded together, as units, by the Manufacturer. They shall be shipped to the project site and stored without relative movement of the bearing parts or disassembly at any time. The bearings shall be wrapped in moisture resistant and dust resistant material to protect them against shipping, weather, job site conditions, and all other normal hazards.

(2) Each bearing shall be marked in a permanent fashion that will be visible after application of any paint coatings. The marking shall consist of the letters "N.J.T.A.", the location, orientation, order number, lot number, bearing

identification number, bridge number, and month and year of manufacture. Unless otherwise specified in the Contract Documents, the marking shall be on a face which is visible after erection of the bridge.

- (3) The bearings shall be inspected within one week after arriving on the project. They shall not be disassembled unless the Manufacturer's representative is present. Following the inspection, they shall be re-wrapped and kept clean until installation.
- (4) The services of an on-site technical representative, to assist and provide guidance prior to the initial installation of the bearing assembly, shall be provided by the Manufacturer.
- (5) When installed, bearings shall be clean and free of all foreign substances.
- (6) The sole and top plates of the bearings shall not be removed for separate attachment to the structure except under the direct supervision of the Manufacturer.
- (7) With each shipment, a copy of the materials, fabrication and testing compliance certifications shall be enclosed. For all materials used, the Manufacturer shall supply certification data consisting of test reports on the bearing performance tests, for any forgings, castings, or hardened material, mill certificates for all other steel used, a certificate of compliance for the bearing as a whole, and for all anchor bolts, dowels or other accessories, as required.
- (8) The Manufacturer shall supply a separate sheet showing the materials, critical dimensions, and clearances for each bearing.

439.06 MEASUREMENT

High-Load Multi-Rotational (HLMR) bearings shall be measured by the number of each installed bearing.

439.07 PAYMENT

Payment will be made under:

PAY ITEM	PAY UNIT
HLMR Bearing, ___ Kips to ___ Kips, Type _____	Each

Payment for HLMR bearings shall include all work associated with design, fabrication, delivery, and construction support required to install the bearings and associated hardware. No separate payment will be made for bedding material, anchor bolts, sole plate, masonry plate, coatings, or field welds required to install the bearings.

No Separate payment will be made for costs required to provide on-site construction support to the Contractor.

DIVISION 900 – MATERIALS

SECTION 923 - MISCELLANEOUS

[Include the following with any Contract requiring Bearings:]

923.27 POT AND DISC BEARINGS.

Delete this Subsection in its entirety.