



**SPECIAL PROVISIONS
FOR
WIND TONGUES AND LONGITUDINAL RESTRAINTS**

**Scott County
IM-NHS-074-1(198)5--03-82**

**Effective Date
April 25, 2017**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150220a.01 DESCRIPTION.

- A.** This work consists of furnishing and installing the wind tongue systems and longitudinal restraint systems as per the contract documents.
- B.** Each wind tongue system consists of the wind tongue, two wind tongue receivers, two disc bearings, back-up beam, and all other connections and appurtenances necessary for a complete and functioning system, but excluding the steel items embedded in the concrete and all components of the post-tensioning systems.
- C.** Each longitudinal restraint system consists of the pin, pin retainer plate, nonmetallic bushing, two outer pin plate assemblies, two inner pin plate assemblies, and all other connections and appurtenances necessary for a complete and functioning system, but excluding the steel items embedded in the concrete and all components of the post-tensioning systems.

150220a.02 MATERIAL.

- A. Structural Steel.**
Provide all structural steel in accordance with Section 2408 of the Standard Specifications and the Special Provisions for Structural Steel.
- B. Disc Bearing.**
Provide materials in accordance with Article 2434.02 of the Standard Specifications. Provide ASTM A 709 Gr. 50W for all nonstainless steel components of the disc bearing assemblies.
- C. Fasteners.**
Provide high strength fasteners in accordance with Article 4153.06, B, of the Standard Specifications.

D. Pin.

Provide pin material conforming to ASTM A 668, Class F. Perform ultrasonic testing on pin per Supplementary Requirement S7. Perform chromium plating on the pin in accordance with SAE AMS 2460, Class 1, Type I, either mp or mc forms of deposition and at a thickness of 0.0005 inch for both nickel underplating and chromium plating.

E. Nonmetallic Bushing.

Provide a nonmetallic bushing conforming to the following:

1. HSG – High Strength GAR-MAX by GGB Bearing Technology
GGB N.A.
P.O. Box 189
700 Mid Atlantic Parkway
Thorofare, NJ 08086
Tel: (856) 848-3200
Fax: (856) 848-5115
usa@ggbearings.com
2. CJ Composite Bearings by TriStar Plastics Corporation
TriStar Plastics Corp.
906 Boston Turnpike
Shrewsbury, MA 01545
Tel: (508) 845-1111 or (800) TRI-STAR
Fax: (508) 845-1200
www.tstar.com
3. Duralon Filament Bearings by Rexnord Corporation
Rexnord Corporation
4701 W. Greenfield Avenue
Milwaukee, WI 53214
Tel: (414) 643-3000
Fax: (414) 643-3078
www.rexnord.com
4. Or approved equal that conforms to the following criteria:
 - Nonmetallic bushing comprised of a filament wound glass and epoxy backing with a high strength polytetrafluoroethylene (PTFE) fiber liner that meets the following properties:
 - Maximum load p static 35,000 psi
 - Maximum load p dynamic 20,000 psi
 - Maximum sliding speed v..... 25 ft/min
 - Maximum pv factor.....30,000 psi x ft/min
 - Maximum water absorption.....0.5%
 - Coefficient of thermal expansion Similar to steel or 7×10^{-6} in/in/°F

150220a.03 SUBMITTALS.

A. General.

1. Submit detailed shop drawings, calculations, and manuals for all work described herein. Provide shop drawings and calculations that are sealed by a Professional Engineer licensed in the state of Iowa. Do not commence work until the submittals have been approved by the Engineer.

2. All submittals are to accurately detail the actual methods, materials, equipment, etc., that will be used in the field on the project. Deviation is not permitted unless approved by the Engineer.

B. Submittals.

At a minimum, submit the following information:

1. Detailed proposed installation procedure, including any variations from the suggested installation procedure provided herein.
2. Detailed methods, calculations, and/or shop drawings for compensation of wind load for proper installation of the wind tongue systems.
3. Detailed procedure for field milling of the embedded base plates or grillage plates, including any equipment utilized and methods employed to determine the proper profile, alignment, and geometry.
4. Properties and designations (where applicable) of each of the components of the wind tongue systems and longitudinal restraint systems.
5. Detailed shop drawings for all components of the wind tongues and longitudinal restraints.
6. Shop drawings and design calculations for temporary support of the stiffening girder prior to insertion of the pin at the longitudinal restraints.
7. Detailed methods, including data for equipment utilized, employed for proper alignment and installation of the pin at the longitudinal restraints.
8. Any manufacturer's literature, where applicable.
9. Any other information required through referenced sections of the Standard Specifications or requested by the Engineer.

C. Submittal Procedures.

Unless noted otherwise, submit the above in advance of the start of construction to allow a 30 calendar day review period. All submittals not approved and requiring resubmittal shall be subject to the above review time period, with the review time beginning anew for each such submittal. Coordinate all submittals between various subordinates (contractors, suppliers, and engineers) to allow for a reasonable distribution of the review effort required by the Engineer at any given time.

150220a.04 CONSTRUCTION.

A. Fabrication and Construction.

1. Fabricate and construct wind tongue systems and longitudinal restraint systems in accordance with Section 2408 of the Standard Specifications.
2. Design, fabricate, test, and install disc bearings in accordance with Articles 2434.01, 2434.02, and 2434.03 of the Standard Specifications. Mark the bearings prior to shipping with the location on the bridge and an arrow that points upstation. Provide marks that are permanent and visible after bearing installation. Place marks on the top of the bearing.
3. Ensure that all dimensional tolerances and surface profiles on the pin, nonmetallic bushing, inner pin plates, stiffening girder web, and outer pin plate assemblies are consistent with those shown in the contract drawings and are compliant with the recommendations of the nonmetallic

bushing manufacturer. Dimensional tolerances on the pin are to be measured on the finished pin, after application of chromium plating and after the special surface profile has been obtained.

4. Mill the top surface of the embedded base plates and grillage plates in the field. In their final condition, each plate shall have a flatness within 0.015 inches of a level plane passing through the median elevation of the top of the plate. The final surface roughness of each plate shall be 125 μ m RMS. The final median elevation shall be within 0.125 inches of the elevation provided in the plans. The final thickness of the embedded base plate or grillage plate shall be no less than 2.00 inches.
5. Field apply a prime coat to the top surface of the embedded base bearing plates after milling.
6. Install wind tongues such that the disc bearings are equally compressed to 10 kips under no wind load.
7. After the full dead load has been applied to the structure, properly align the pin holes in the stiffening girder and outer pin plates and install the pin in the presence of the Engineer. Do not damage the surfaces of the pin, pin plates during installation, or the nonmetallic bushing. Damaged pins or pin plates and bushing will be rejected by the Engineer.
8. Protect the nonmetallic bushing and inside surface of the pin hole on the outer pin plate assemblies of the longitudinal restraints against damage and the effects of weather. Prior to insertion of the pin, inspect the nonmetallic bushing and inside surface of the pin hole for any damage in the presence of the Engineer. Any damage may result in rejection by the Engineer.

B. Wind Tongue System Suggested Installation Procedure.

1. The following procedure was assumed by the designer. The Contractor is responsible for procedure used during construction.
2. Commence the installation procedure described below after placement of the concrete crossbeam and embedded steel items necessary for the installation of the wind tongue receivers as performed in Design No. 817.
 - a. Mill the top surface of the embedded base plate in the field to the tolerances provided herein.
 - b. Install the two wind tongue receivers at one pier location on the pier crossbeam prior to installation of the wind tongue.
 - c. Perform post-tensioning in accordance with the Special Provisions for Post-Tensioning of Wind Tongues and Longitudinal Restraints.
 - d. Attach the wind tongue receiver end plate to the base plate embedded in the crossbeam pedestal using a field fillet weld.
 - e. Initially install the disc bearing/beveled plate assembly with Plate C and Plate D not present. Place a removable plate washer, as shown in the plans, between the head of each bolt and the standard washer. Snug-tighten the tapped bolts such that Plate B is at its maximum vertical elevation.
 - f. Install the wind tongue back-up beam assembly between the receivers. Loosen the tapped bolts to remove the removable plate washers. Hold Plate B at its maximum vertical elevation as Plate C and Plate D are installed.
 - g. Adjust the vertical position of Plate B until contact is achieved between the bearing and wind tongue. Using a jack to apply a downward force on Plate B, pre-compress each wind tongue disc bearing to the force indicated herein.
 - h. Fully tighten the tapped bolts and install the bearing weather shield.

C. Longitudinal Restraint System Suggested Installation Procedure.

1. The following procedure was assumed by the designer. The Contractor is responsible for procedure used during construction.
2. Commence the installation procedure described below after placement of the concrete crossbeam and embedded steel items necessary for the installation of the longitudinal restraints as performed in Design No. 817.
 - a. Mill the top surface of the embedded grillage plate in the field to the tolerances provided herein.
 - b. Install stiffening girder, with inner pin plates and nonmetallic bushing pre-installed, and provide temporary support, both longitudinally and vertically, to the stiffening girder until installation of the pin.
 - c. Position the outer pin plate assemblies of the longitudinal restraints and loosely install the all-thread bars.
 - d. After the full dead load has been applied to the structure, remove the longitudinal temporary support for the stiffening girder.
 - e. In the vertical direction, properly align the holes in the stiffening girder and outer pin plate assemblies by adjusting the temporary vertical support.
 - f. In the longitudinal direction, align the holes in the stiffening girder and outer pin plate assemblies by repositioning the outer pin plate assemblies to the extent permitted by the oversize holes in the embedded plate. If alignment cannot be obtained in the longitudinal direction, consult the Engineer.
 - g. Insert the pin.
 - h. Remove the temporary vertical support for the stiffening girder.
 - i. Perform post-tensioning.

150220a.05 METHOD OF MEASUREMENT.**A. Furnish and Install Wind Tongue Anchorage Assembly Systems.**

~~Lump Sum. No method of measurement.~~ Measured as each system described above and as shown in the contract documents.

B. Furnish and Install Longitudinal Restraint Anchorage Assembly Systems.

~~Lump Sum. No method of measurement.~~ Measured as each system described above and as shown in the contract documents.

150220a.06 BASIS OF PAYMENT.**A. Furnish and Install Wind Tongue Anchorage Assembly Systems.**

Payment for ~~Furnish and Install Wind Tongue Anchorage Assembly Systems~~ will be ~~per lump sum~~ made as full compensation for furnishing all materials, equipment, and labor for construction of each wind tongue system, complete and in place. Payment does not include the steel items embedded in the concrete and the components of the post-tensioning systems.

B. Furnish and Install Longitudinal Restraint Anchorage Assembly Systems.

Payment for ~~Furnish and Install Longitudinal Restraint Anchorage Assembly Systems~~ will be ~~per lump sum~~ made as full compensation for furnishing all materials, equipment, and labor for construction of each longitudinal restraint system, complete and in place. Payment does not include the steel items embedded in the concrete and the components of the post-tensioning systems.