SP- 150210
(New)

SPECIAL PROVISIONS
FOR
HANGER ASSEMBLY

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.

150210.01 DESCRIPTION.
This item includes all furnishing, fabricating, testing, and installing of the hanger assemblies in accordance with the details shown on the plans and these special provisions. Hanger assemblies shall consist of structural strands, anchor sockets, pins, cotter pins, and nylon washers.

150210.02 MATERIAL.

A. Structural Strand.

1. Provide structural strand conforming to ASTM A 586 Class A coating inner wires, Class C coating outer wires. Prestretch all strands to 55% of the breaking strength in accordance with ASTM A 586. Any kinked or damaged strands will be rejected. Straightening of bent wires will not be permitted.

2. Perform a test for modulus of elasticity and breaking strength for each manufactured length of strand in accordance with ASTM A 586. The gauge length of the specimen shall be 100 inches. Attach the anchor socket to each end of the strand and load the strand through the sockets. Use identical socketing procedures for the test specimen and assemblies shipped to site. If the test specimen fails to meet the minimum breaking strength requirement, cut another test sample from the same manufactured length and test it. Should it also fail, the manufactured length of strand may be rejected by the Engineer. If rejected, furnish new strand length that is subject to the same testing and approval procedures outlined herein. No compensation will be made for the cost of the rejected strand, including testing costs. Submit all test results to the Engineer for review and approval.

3. Make specimens that are cut from both ends of each single length or coil of zinc-coated wire for the tests for breaking strength. The Engineer will witness as many of these tests as desired. When requested by the Engineer, perform a test for tensile strength in conformance with the requirements of ASTM A 586 of any coils selected at random by the Engineer. For

making these tensile tests, the Engineer will preferably select the coils from among those which have not been tested in the Engineer's presence.

4. Perform tests for galvanizing (weight and adherence) on samples of not less than 5% of the coils of any lot of wire. The percentage of coils tested for galvanizing may be increased at the request of the Engineer. If tests of any of these coils fail to meet the requirements, then perform tests on all of the coils in the lot. Unless at least 80% of the coils pass the test, the entire lot will be rejected. Any coil failing to meet requirements will be rejected.

B. Anchor Sockets.

1. Provide anchor sockets labeled in the plans as open strand socket and Type 7 socket conforming to the requirements of ASTM A 148 and Federal Specification RR-S-550D, unless modified herein. Provide Type 7 sockets with internal threads to accommodate jacking. Galvanize the anchor sockets in accordance with ASTM A 123.

2. Provide all anchor sockets and socketed zinc connections that are at least Grade 105/85 and meet or exceed 110% of the breaking strength of the designated structural strand attached. Proof load each socket to be installed as part of the structure to 55% of the breaking strength of the attached structural strand following attachment of the structural strand.

3. Subject each socket type to radiographic inspection in accordance with the following frequency: first, eighth, eighteenth, thirty-eighth, sixty-eighth, and one hundred and eighth socket. Submit radiographic shot schedule of castings to the Engineer for review and approval for each socket type. Radiographic inspection shall be performed by the Contractor and witnessed by the Engineer in accordance with the following ASTM Specifications, as applicable:

a. ASTM E 94 - Standard Guide for Radiographic Examination.

b. ASTM E 446 - Standard Reference Radiographs for Steel Castings up to 2 inches in Thickness.

4. Perform and provide certification for radiographic inspections to the Engineer for review and approval. Inspections shall be performed by approved American Society for Nondestructive Testing ASNT-TC-1A examiners.

5. Fully inspect all sockets by the magnetic particle method conforming to the requirements of ASTM E 709 and acceptance standard ASTM E 125.

6. Charpy V-notch impact test the anchor sockets in accordance with ASTM A 781, Supplemental Requirement S9. Perform the testing at the same frequency as for the radiographic testing. The samples shall withstand an impact of 25 foot-pounds(force) at 40°F.

7. Large sand spots, inclusions and blow holes, as determined by the Engineer, shall be cause for rejection of the casting.

8. Defects exceeding the severity levels shown in the following table shall be cause for rejection of a socket.

Category	Defect	Severity Level Permitted
A	Gas Porosity	3
B	Sand Slag Inclusions	3
C	Shrinkage:	
	Type 1	3
	Type 2	3
	Type 3	3
	Type 4	3
D	Crack	Not Permitted
E	Hot Tear	Not Permitted
F	Insert	Not Permitted
G	Mottling	Not Permitted

9. If a socket is rejected, radiographically inspect all other sockets from the same heat at no additional expense.

10. Rejected castings may be repaired at the sole discretion of the Engineer. If approved by the Engineer, perform repairs at no additional expense. Minor defects may be removed by grinding or chipping without welding repair, provided the following requirements are complied with:

- The depth of the defect does not exceed 3% of the specified dimension.
- The removal of metal does not appreciably affect the strength of the casting, as determined by the Engineer.
- The remaining wall thickness is equal to or greater than the required minimum wall thickness.
- The surrounding metal is ground to a smooth contour with the elimination of apparent stress risers.

11. Defects exceeding those defined above may be repaired by welding if approved by the Engineer. Submit all proposed repair procedures to the Engineer in writing and include a description of the defect, the size and shape of the excavation, the welding specification, and the amount of preheat and post heat to be utilized.

12. Line bore pin holes for open strand sockets in accordance with Article 2408.02 M of the Standard Specifications. Provide a pin hole diameter that does not exceed that of the pin by more than 0.0625 inch as measured on the galvanized surfaces. Do not exceed a galvanizing thickness of 0.03125 inch on the inside surface of the pin hole where it contacts the pin.

13. Pin holes not meeting these requirements may be rejected at the Engineer's discretion. Replace anchor sockets at no additional expense.

C. Pins.

1. Provide pins connecting the open strand sockets to the anchor plate conforming to the requirements of ASTM A 668, Class H. Supplemental Requirements S6 and S7 shall apply. Perform ultrasonic testing at the same frequency as for the radiographic testing of the anchor sockets.

2. Charpy V-notch impact test the pins in accordance with ASTM A 673, P frequency. The samples shall withstand an impact of 25 foot-pounds(force) at 40°F.

3. Fabricate pins in accordance with Article 2408.02, D of the Standard Specifications. Galvanize the pins in accordance with ASTM A 123. Do not exceed a galvanizing thickness of 0.03125 inch on the pin.

4. Pins not meeting these requirements may be rejected at the Engineer's discretion. Replace pins at no additional expense.

D. Cotter Pins.
Provide cotter pins comprised of stainless steel Type 316.

E. Nylon Washers.
Provide nylon washers that are comprised of glass-reinforced nylon resin or other approved material, with a minimum of 33% glass loading, a minimum elastic modulus of 1,000,000 psi, and a minimum tensile strength of 20,000 psi.

150210.03 FABRICATION.

A. Socket the structural strand in the anchor sockets using zinc conforming to prime western grade or higher purity zinc as defined by ASTM B 6. Preheat the basket of the sockets to expel moisture and to prevent the molten zinc from congealing before it has completely filled the narrow lower end of the basket. Strands will be rejected if the socketing procedure results in bare wires within the sockets.

B. Measure and mark the structural strand under well-defined uniform temperature conditions, under cover, or at night, and while the strand is held under dead load tension.

C. Upon fabrication of the complete hanger assembly, position the bottom of the spanner nut midway in available travel on the Type 7 socket and measure the final length of each socketed hanger strand as the distance between the bottom of the spanner nut in the Type 7 socket and the centerline of the pin in the open strand socket. Record this length to within 0.001 of a foot at a measuring tension equivalent to the dead load tension as shown on the plans. The actual length, as measured above, shall not vary more than +/- 1/2 inch from the designed/calculated length shown in the plans (including any temperature adjustment). Calculate and record this deviation between the design/calculated length and actual length for each hanger assembly and stamp onto each respective Type 7 socket of the completed hanger assembly.

D. Any deviation over the specified limits of +/- 1/2 inch shall be rejected and replaced with a new hanger assembly.

E. At the time the structural strands are measured, place a permanent paint stripe on the top surface along the full length of the strand which shall be referenced to eliminate any change in length of the hanger strand due to twisting.

F. Preassemble all hanger assemblies and deliver to the site as complete units. Package the hanger assemblies on reels with a minimum diameter of 5 feet.

G. After the structural strand is prestretched, do not pull it into a curve that is smaller than 5 feet.

H. Store the hanger assemblies in a clean, dry area.

I. Submit certification of the following:
- Manufacture of strand to this specification.
- Tensile strength of strand.
- Modulus of elasticity of strand.
- Actual breaking strength.
- Prestretching, measuring, and proof loading.

- Material certification of sockets, pins, and washers.

J. Prior to commencing work, submit working drawings for all hanger assemblies for review and approval by the Engineer.

150210.04 INSTALLATION.

A. Install the hangers without twist.

B. Adjust the distance between the bottom of the spanner nut of the Type 7 socket and the centerline of the pin in the open strand socket by moving the bottom of the spanner nut a distance equal to the deviation stamped on the Type 7 anchor socket from its location at midway in available travel.

150210.05 METHOD OF MEASUREMENT.
Lump Sum. No method of measurement.

150210.06 BASIS OF PAYMENT.
Payment for the Hanger Assemblies is full compensation for furnishing, fabricating, testing, and installing the hanger assemblies, including structural strand, anchor sockets, pins, washers, cotter pins, and galvanizing.