MICHIGAN-
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TRAFFIC SIGNAL MAST ARM POLE AND MAST ARM

SIG:EMS 1 of 3 APPR:RWS:MJF:06-07-21
FHWA:APPR:06-07-21

a. Description. This work consists of furnishing, fabricating, and erecting a traffic signal mast arm pole and mast arm as shown on the plans, in accordance with the standard specifications, and as specified herein. This special provision is for an anchor base type steel mast arm pole, including mast arms, and other associated hardware required to complete the work.

b. Material. Provide material in accordance with sections 906 and 908 of the Standard Specifications for Construction and this special provision.

Material specifications for the traffic signal mast arm pole and mast arm are included in Table 1.

Table1: Material and Coating Specifications

Component	Specifications
Pole Tube	*ASTM A595/A595M GR A or ASTM A572/A572M GR 50*
Mast Arm Tube	*ASTM A595/A595M GR A or ASTM A572/A572M GR 50*
Mast Arm Clamp	*ASTM A36/A36M*
Gusset Plate	*ASTM A36/A36M*
Hand Hole Frame	*ASTM A705/A705M GR 50* or *ASTM A572/A572M GR 50*
Lifting Pipe	*ASTM A53/A53M GR B or ASTM A501/A501M*
Handhole Cover	*ASTM A1011/A1011M GR 36*
Pole Top	*ASTM B26/B26M (356F or 43)*
Stainless Steel Hardware	*AISI 300 SERIES (18-8)*
Luminaire Arm High Strength Bolts	*ASTM F3125/F3125M GR A325*
Mast Arm Studs	*ASTM A449*
“ANCO” Lock Nuts or Equivalent	*ASTM A563 GR DH*
Flat Washers	*ASTM F436/F436M*
Lock Washers	*ANSI B18.21.1*
Steel Plate and Shape Finish	*ASTM A123/A123M*
Hardware Finish	*ASTM A153/A153M*
Telescopic Field Splice Bolt	*ASTM A307*
C-Hook	*ASTM A36/A36M*
J-Hook	*ASTM A36/A36M*

Use high strength bolts, nuts, and washers in accordance with subsection 906.07 of the Standard Specifications for Construction.

Structural steel material used to fabricate the traffic signal mast arm pole and mast arm is required to be accepted based on “Fabrication Inspection” per the *Materials Quality Assurance Procedures (MQAP)* manual.

c. Fabrication. Fabricate and weld in accordance with section 707 of the Standard Specifications for Construction and the *American Welding Society (AWS) D1.1*, *Structural Welding Code – Steel* (as modified by 20SP-707A - Structural Steel and Aluminum Construction), hereafter called *AWS D1.1*, except as modified herein). Fabricator must possess an active *American Institute of Steel Construction (AISC)* - Bridge Component QMS Certification (CPT) and Sophisticated Paint Endorsement (SPE) if painting steel surface areas greater than 500 square feet. The Engineer will accept *Society of Protective Coatings (SSPC) QP3* - Standard Procedure for Evaluating the Qualifications of Shop Application Firms.

1. The pole and arm tubes must have a uniform taper.

2. Tolerance for overall length of pole tube and arm tube(s) is ±1/8 inch. Tolerance for sweep and camber of pole tube and arm tube(s) is 1/8 inch per 10 foot. Tolerance for twist of pole tube and arm tube(s) is ±10 degrees.

3. The pole tube and arm tube cannot have more than one longitudinal seam weld. Roll or grind flush the longitudinal seam weld. Transverse welds in the pole and arm tubes are prohibited.

4. Attach the arm tube to a connection plate by a full penetration weld. Bolt the arm tube to the pole tube as shown on the plans. Control distortion of flange plates for flatness to assure full contact between mating surfaces in an unbolted, relaxed condition.

5. Weld the longitudinal arm seam on the male and female sections of the telescopic (i.e. slip-type) field splice with a complete joint penetration (CJP) weld a minimum of 36 inches long. When the field splice is erected and in its final position the lap of the arm sections cannot extend beyond the longitudinal arm seam CJP weld.

6. All welds must be 100 percent visual test (VT) inspected by an *AWS* Certified Welding Inspector (CWI).

7. All fillet welds must be 25 percent magnetic particle test (MT) inspected by a technician qualified in accordance with *American Society for Nondestructive Testing (ASNT)* Level II. Perform MT in accordance with *ASTM E709* with dry powder using the yoke method.

8. All partial joint penetration (PJP) longitudinal seam welds must be 10 percent MT inspected by a technician qualified in accordance with *ASNT* Level II. Perform MT in accordance with *ASTM E709* with dry powder using the yoke method.

9. All complete joint penetration (CJP) welds must be 100 percent ultrasonic test (UT) inspected by a technician qualified in accordance with ASNT Level II per subsection 918.10 of the Standard Specifications for Construction, except the acceptance/rejection criteria for material thickness equal to or greater than 5/16 inch will be in accordance with the cyclicallys loaded nontubular connections in tension criteria stated in *AWS Clause 6*.

10. Evenly space the pole base plate holes so the pole may be bolted to a concrete foundation as shown on the plans. Finish the lower surface of the base plate flat and at 90

degrees to the pole axis.

11. Provide a hand hole opening and cover. Weld a reinforcing frame to the pole for the handhole opening. Ensure the placement of the handhole does not reduce the strength of the pole. Securely fasten the handhole cover using stainless steel hex head cap screws or by an approved locking device.

12. Provide a suitable pole top with means for securing it to the top of the pole.

13. Provide a hook or other suitable device for the support of cable on the inside of the pole near the top.

14. Weld square stock that has been drilled and tapped to the inside of the hand hole so that it is readily accessible from the hand hole for grounding purposes.

15. Fabricate the arm to pole upright connection to compensate for mast arm deflection. Show this detail on shop drawings for approval by the Engineer.

d. Erection. Tighten anchor bolts in accordance with subsections 810.03.N.2 and 810.03.N.3 of the Standard Specifications for Construction.

Tighten pole cap, mast arm cap, and luminaire arm high strength bolts to a snug tight condition in accordance with 707.03.E.6.c of the Standard Specifications for Construction.

Ensure all installation procedures are witnessed by the Engineer.

e. Construction. Ensure all work complies with sections 819, 820, and subsection 810.03 of the Standard Specifications for Construction, the applicable signal construction plan sheets, and this special provision.

For repair coating, apply a coating 1½ times the thickness or thickness equivalent specified for galvanizing on the item, but not less than 5 mils. Use zinc-based solder, zinc-rich primer, or zinc metallizing in accordance with *ASTM A780/A780M*. Obtain the Engineer's approval before using zinc metalizing.

f. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

Pay Item	**Pay Unit**
Mast Arm Pole, Cat __	Each
Mast Arm, __ foot, Cat __	Each

Mast Arm Pole, Cat __ and **Mast Arm, __ foot, Cat __** includes furnishing all materials, fabrication, shop cleaning, galvanizing, shipping, and erection.

No extension of time or additional compensation will be granted due to obtaining the proper *AISC* certifications and/or endorsements required for this project.

Construction of the foundation will be included in other items.