

TECHNICAL SPECIFICATIONS

ITEM 00680 STEEL MAST ARM AND STEEL STRAIN POLE ASSEMBLIES

680.1 Description. This specification will supplement the requirements found in the Standard Strain Pole Assembly Drawings for Traffic Signal Support Structures (Standard Drawing) for the design, fabrication, and delivery of single or dual steel mast arm assemblies and steel strain pole assemblies with span wires for use in mounting of traffic signals. Either assembly shall also require a 15 ft. luminarie arm as shown in the project drawings. The designs shall conform to the AASHTO Standard Specifications for Structural Supports for Traffic Signals with Luminaries and Traffic Signals.

This specification, instructions in the project drawings, and the Standard Drawings constitute the only acceptable design for the assemblies.

680.2 Mast arms. If required, shall be fabricated with a rise in the unloaded condition unless otherwise shown in the project drawings.

Fabrication and welding shall be in accordance with American National Standard Institute (ANSI) and American Welding Society (AWS) latest revision. All welded joints shall develop the full-required strength of the member.

Shop drawings will not be required since the assemblies are to be fabricated as shown in the standard drawings. The standard drawings will also show the quantity of each pole designation to be fabricated in the Shipping Parts List table for the associated assembly. Any deviation from this standard drawing will require submission of four sets of shop drawings of the complete assembly including anchor bolts in accordance with the Item "Steel Structures" of the standard specifications. Shop drawings, when required, are to be submitted directly to the attention of the Traffic Engineer. The Traffic Engineer will review the general design features including the number of each type of pole required, the number and length of mast arms, vertical clearance above pavement and number of structures with or without luminaries, and type of base mountings. The Traffic Engineer will then refer all four copies of the shop drawing to the Project Engineer for review and approval of the structural design features.

The assembly shall be re-fabricated to the design wind speed specified in the project drawings and this wind speed shall be identified permanently on a surface visible after erection of the pole base plate and mounting mast arm plate.

680.3 Anchor Bolts. Anchor bolts shall conform to the requirements in the standard drawings and shall comply with ASTM A193-B7, A687, or A36M55. Dimensions shall be based on the foundation size required for the arm lengths, number of arms, and design wind speed specified in the project drawings.

The anchor bolts shall have the standard nut anchorage. Nuts shall comply with the requirements of ASTM A563 Grade A or better, heavy hex.

Two circular steel templates shall be provided for each assembly but they may be shipped without the anchor bolts attached. The lower nut shall be tack welded to the lower template. The upper template may be re-used providing it stays in place until the concrete has achieved its initial set.

Anchor bolts shall be galvanized the full length; nuts and washers shall also be galvanized.

Thread for anchor bolts shall be rolled or cut threads of unified coarse thread series except for ASTM A193-B7 bolts which shall be 8 pitch thread series. If rolled, the diameter of the unthreaded portion shall not be less than the minimum pitch diameter nor more than the maximum major diameter of the threads. Threads shall have Class 2 fit tolerances. Galvanized nuts shall be tapped after galvanized.

Threads of anchor bolts shall be coated with pipe joint compound prior to installation of upper nuts when erecting pole. After poles are plumbed and in permanent alignment, the exposed upper threads of painted bolts are to be cleaned and an additional coating of the zinc-rich paint applied to seal the bolt thread-nut joint.

680.4 Poles and Mast Arms. The shaft for the pole or mast arm may be round or octagonal and shall be tapered. Bolt slip joints are permissible in mast arms 40 feet or longer. Circumferential welds, other than at the ends of the shafts, are not permitted.

The exterior of longitudinal seam welds shall be ground or otherwise smoothed to the same appearance as other shaft surfaces. Longitudinal seam welds for pole or mast arm sections shall have 80 percent minimum penetration except longitudinal seam shall be complete penetration when within six inches of circumferential base welds. A maximum of two longitudinal seam welds may be made in pole sections and only one longitudinal seam weld is permitted in mast arms. Low hydrogen electrodes of the equivalent in wire and flux for automatic welding, will be required for all welds. Preheat will be required for welding pole or mast arm shafts to their respective bases in accordance with American Welding Society (AWS) latest revision.

Material for pole or mast arm shafts shall conform to the requirements in the standard drawing and shall comply with the requirements of ASTM A570 Grade 50, or A572, or A670 Grade 50 or A595 Grade A, Structural Steel for Signal and Luminaries Support Structures. Material supplied under the A570 Grade 50 or A595 Grade A specifications must meet their associated chemical and bend test requirements with the further stipulation that the materials must meet a minimum yield of 50 ksi and a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches prior to break or tube forming operations. A570 Grade 50 material in thicknesses up to 5/16 inch is also acceptable providing it meets the above stated chemical, and mechanical test, yield, and elongation requirements. A593 Grade A material which can be shown by tests to have a minimum of 50 ksi yield adjacent to base welds after fabrication will also be acceptable.

Mill test reports and/or laboratory test certifications shall be provided to show that the materials conform to these requirements. The second arm of dual mast arm assembly shall be capable of being positioned at any angular location in respect to the first arm. A metal cap at the top of all poles shall be secured using galvanized or stainless steel set screws.

680.5 Luminarie Arm. The 15 ft. luminarie arm, if shown in the project drawings, shall be as shown on the standard drawings. The connections to the pole shall be as shown on the Standard Assembly Drawing for Luminarie Support Structure and be in accordance to AASHTO Standards.

680.6 Finish. The mast arm assembly shall be galvanized in accordance with ASTM 123 unless otherwise specified on the drawings.

All sheared or cut edges and all other exposed edges to be painted or galvanized shall be rounded or chamfered to an approximate one-sixteenth inch.

Hot-Dip Galvanizing. Assemblies required to be hot-dip galvanized shall be so designed as to provide proper filling, venting, and draining during the cleaning and galvanizing operations. All parts shall be hot-dip galvanized after fabrication in accordance with ASTM A123. All screws, nuts, bolts, washers, shims, and the full length of the anchor bolts shall be galvanized in conformance with the specifications of ASTM A153, Class C or D, unless otherwise specified. All nuts shall be tapped after galvanizing. Any part of the mast arm assembly, from which the galvanizing has been

knocked or chipped to bare metal in fabrication or transit, shall be repaired by application of galvanizing-repair compounds in accordance with the manufacturer's recommendations. The galvanizing repair shall be applied so as to provide a final assembly which is neat in appearance.

680.7 Delivery. Each mast arm assembly shall be delivered as complete unit with fittings either installed or packaged in such a manner that all parts remain with their associated major components during shipment and delivery.

The use of the standard drawings does not relieve the supplier of the responsibility for providing proper fit of mast assembly components.

The supplier shall furnish four copies of mill certificates reflecting the physical and chemical properties of the base metal of the pole and mast arm shafts, base plates, luminaire and anchor bolts. Also, four certified copies of the galvanizing test report shall be provided.

All items of a shipment shall be identified with weatherproof tag. This tag shall minimally identify manufacturer, contract number, and date and destination of shipment.