

## SECTION 615 STANDARD SIGNS

### Special Provisions

**615-2.01 MATERIALS.** Under item 1, delete the first sentence and substitute the following: Unless Shop Drawings have been provided in the Contract, submit shop drawings for all signs that require the use of the Alaska Sign Design Specifications (ASDS), the Department of Transportation and Public Facilities - Sign Face Fabrication Requirements, and the Alaska Traffic Manual, letter width and spacing charts for approval before fabrication.

Add the following subsections:

**615-2.02 WELDING.** Apply the following requirements to all welding done to manufacture and install pipe piles, poles, and mast arms.

All welding and the non-destructive examination (NDE) specified in the Plans and specifications shall conform to AWS D1.1, Structural Welding Code-Steel.

The Department will only allow a one-time repair of a defective weld. If a repair is required, provide additional NDE for the length of the repair plus a length on both sides of the repair equal to 10% of the outside circumference.

Furnish all quality control (QC) inspection necessary to ensure the materials meet contract requirements and to complete the NDE specified in the following subsections. Repair all defects in welding revealed by the QC and quality assurance inspections according to AWS D1.1 without additional compensation. Submit all completed QC inspection documents to the Engineer.

For each welding process, submit a welding plan and the mill certification reports for all steel materials to be welded to the Engineer for review. Do not begin welding until he has returned the submittal approved in writing. Each welding plan shall consist of:

- a. Welding Procedure Specifications,
- b. Procedure Qualification Records,
- c. Welder Performance Qualification Records,
- d. NDE personnel qualification records, and
- e. The name of the quality control (QC) manager with documentation of qualifications.

If a manufacturer must wait until fabrication begins to provide the mill certification reports, the Department will withhold approval of the finished product until it has approved the mill certification reports.

**615-2.03 CANTILEVERED SIGN POLES.** Design, fabricate, and install cantilevered sign poles according to the following requirements. Furnish poles that have the appearance of the "slanted single post cantilever" shown on Standard Drawing S-22.00. See the Plans for the size of sign each pole must support, their span, and mast arm heights.

1. Design Requirements. A registered professional engineer shall design each cantilevered sign pole according to the following requirements. He shall submit his stamped calculations and shop drawings to the Engineer for review. The shop drawings shall include the details of the features specified in the fabrication requirements subsection and the specifications cited below.

Design the cantilevered sign poles according to the 2001 edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (referred to hereafter as the Standard Specs for Structural Supports) for the following design parameters.

- a. Use non-tapered tubes with a round cross section that features a maximum 32-inch outside diameter.
- b. Design for the basic wind speed shown in Standard Specs for Structural Supports or for 100 mph, whichever is greater.
- c. Design all poles for a 50-year design life.
- d. Use a gust effect factor of 1.14.
- e. Design all poles using fatigue category I importance factors.
- f. Design all poles to resist galloping forces, vortex shedding, and truck-induced loads. Use an average truck speed of 40 mph in the design.

Design the poles and mast arms using steels that meet the requirements of ASTM A709 plus the fracture critical Charpy V-notch impact test requirements for zone 3 service temperatures listed in the supplement of ASTM A709.

Design each sign pole with a one-piece mast arm that bolts to a one-piece structural support. Indicate the diameter, length, and wall thickness of both pieces on the shop drawings. Provide details of the plates and bolts that attach the mast arm to the structural support. If you need a pick point to lift a pole or mast arm, weld a tab onto the structure; do not cut holes in the structure. Remove the tab and repair the finish when you no longer need the pick point. Include the total weight of each pole on the shop drawings.

Design the pole's base plate using a 42-inch diameter bolt circle and 2-1/2"-inch diameter anchor bolts to match the foundation detailed in the Plans. Use anchor bolts that conform to ASTM F1554, grade 55 and meet the Charpy V-Notch impact strengths listed in subsection S4 of F1554.

Include two reinforced hand holes that measure 5.5-inches wide by 7.5-inches high. See the fabrication requirements subsection for the location of these hand holes.

Furnish a pole installation plan that documents the proper assembly of the pole and mast arm, the location and width of dunnage supports during assembly, and the recommended number and location of lift points during pole installation.

2. Fabrication Requirements. Fabricate the various pole components according to the following requirements.

Fabricate the mast arms and structural supports according to the following requirements:



- a. Fabricate each piece from one piece of steel.
- b. Make all welds continuous.
- c. Wherever a longitudinal seam intersects a circumferential weld, provide a complete joint penetration (CJP) weld in the longitudinal seam at least 12-inches long.
- d. For all remaining longitudinal seams, complete welds that provide at least 60% penetration.
- e. Discard all pieces that vary more than  $\frac{3}{4}$ -inch from a straight line throughout their length after they are hot-dip galvanized.

Fabricate tubes with a single longitudinal seam; the Department will not accept laminated tubes or tubes with spiral-shaped seams.

Bend one end of the structural support 80 degrees into a circular arc with a radius that measures 12 feet to the centerline of the tube.

Provide a minimum nine-inch diameter electrical access hole centered in the base plate and in the plates that connect the mast arm to the structural support. Attach these plates to the tube sections with CJP welds.

Install two hand holes in the pole. Locate one a foot above the base plate at 90 degrees to the mast arm, measured clockwise in the plan view. Locate the other in the mast arm, one-foot from the mast arm connector plate on the same side of the pole as the other hand hole. Attach the hand hole frames to the tube sections with CJP welds.

NDE 100% of the CJP welds by radiographic testing (RT); NDE at least 25% of the partial joint penetration welds by magnetic particle testing (MT); and NDE 100% of the fillet welds by MT. Show the NDE symbols for the test type on the shop drawings.

Do not hot-dip galvanize the poles until the Contractor gives notice that the Engineer has approved the QC and QA test results. Hot-dip galvanize each pole section according to AASHTO M 111 and these specifications. In one dip, completely submerge each section in a kettle of concentrated zinc ammonium chloride flux solution heated to 130°F. Then, in one dip, completely submerge each section in a separate kettle of prime western grade zinc heated to approximately 825°F. Furnish all bolts and fasteners hot-dip galvanized according to AASHTO M 232.

3. Construction Requirements. Submit a package that consists of stamped engineering calculations, shop drawings, mill certifications, welding plan, and pole installation plan to the Engineer for approval.

Assemble the pole sections, furnish and install all required dunnage, and lift the assembled pole according to the manufacturer's pole installation plan.

Furnish all required sign mounting hardware per Standard Drawing S-22.00.

**615-2.04 SIGN POLE FOUNDATIONS.** Install the cantilevered sign pole foundation detailed in the Plans according to the following requirements.

All longitudinal and circumferential welds made to manufacture and install the piles shall provide complete joint penetration (CJP).

1. Materials.

NDE 100% of all longitudinal and circumferential welds made to fabricate the piles. Use the acceptance criteria for cyclically loaded non-tubular connections using radiographic, radio scope, real time imaging systems, or ultrasonic methods to complete the NDE.

Furnish steel pipe piles that feature the diameter and wall thickness shown on the Plans. Only furnish seamless piles or piles with a single longitudinal seam; the Department will not accept piles with spiral-shaped seams.

Provide pipe piles that are a minimum forty feet long and conform to ASTM A 252 Grade 3, modified as follows:

- a. The carbon equivalency (CE) shall not exceed 0.45 as defined in AWS D1.1, Section XI5.1 and the sulfur content shall not exceed 0.05%.
- b. The circumference of the pile shall not vary more than plus or minus 0.375 inches from the circumference computed from the pile diameter shown on the plans.
- c. The maximum allowable deviation in the edge alignment for the piles is 0.1875 times the wall thickness or 0.063 inches whichever is less.
- d. Pipe straightness shall conform to the requirements of API 5L, Section 7.6 "Straightness".
- e. The Department will only accept those piles made by either an automatic fusion or electric resistance weld process that results in CJP.

Use the number, size, and length of ASTM F1554, grade 55, anchor bolts, nuts, and washers as shown in the cantilevered sign pole foundation detail included on the Plans. Furnish bolts that also meet the Charpy V-Notch impact strengths listed in subsection S4 of ASTM F1554.

2. Fabrication Requirements. Fabricate the reinforcing steel cage to ensure the anchor bolts tied into it are equally spaced and form a circle with the diameter shown on the Plans. Use a steel template to ensure the anchor bolts will match the base plate with no modifications.

3. Construction Requirements. Install pipe piles open ended according to Section 505. The Engineer will only accept piles cut from a longer piece.

Secure the anchor bolts to ensure they do not move during concrete placement. Replace, with no additional compensation, all finished concrete pile caps that feature anchor bolts that do not match the base plate of the pole or are out of plumb. The Department will not allow modification of the anchor bolts or base plate to get the base plate set on the leveling nuts.

Embed a two-inch rigid metal conduit in the foundation. Terminate one end two inches above the top of the foundation and near the center of the foundation and the other end in a Type 1A junction box.

Install a grounding electrode conductor in the foundation according to subsection 660-2.03, Foundations. Complete all bonding and grounding according to subsection 660-2.11, Bonding and Grounding.

Complete all Class A Portland cement concrete and reinforcing steel work according to Sections 501 and 503, respectively.

Install the bottoms of the bottom leveling nuts in a level plane within one inch of the top of concrete pile cap. Generously lubricate the bearing surface and internal threads of all top nuts with beeswax and tighten the top nuts according to the anchor bolt tightening procedure included in the appendices.

**615-3.01 CONSTRUCTION REQUIREMENTS.** Delete item 7 and substitute the following:

7. Notify the Engineer five (5) days prior to beginning sign salvage activities. At that time, the Engineer will physically identify those signs to be salvaged. For each sign so designated, disconnect signpost from panel. The panels shall then be grouped together in a manner to preclude damage. Posts shall also be grouped together as with hardware in a workmanlike manner. Deliver sign panels, posts and hardware to the State Maintenance Yard located on Tudor Road. Do not deliver salvaged materials until they have been inspected and approved by the Engineer. Replace all panels, posts and hardware damaged during salvaging or delivery with new panels, posts and hardware at no additional cost to the Department.

Remove and dispose of project signs and/or parts designated for removal and not selected for salvage.

Dispose of foundations from salvaged existing signs in a manner approved of by the Engineer (remove and dispose, abandoned in place, or otherwise dispose of). If they are abandoned in place, the tops of the foundations, reinforcing steel, anchor bolts, and conduits shall be removed to a depth of not less than 12 inches below roadway subgrade or unimproved ground, whichever applies. All signs and posts at a single installation shall be considered as one unit.

**615-3.02 SIGN PLACEMENT AND INSTALLATION.** Add the following: Do not remove existing signs without authorization from the Engineer.

**615-4.01 METHOD OF MEASUREMENT.** Add the following to the second paragraph: Concrete used for sign bases are considered subsidiary to other work under this section.

Add the following:

Item 615(11), Slanted Single Post Cantilevered Signs. By each, complete in place

**615-5.01 BASIS OF PAYMENT.** Delete the first sentence and substitute the following: Sign posts, bases, mounting hardware and concrete used for sign bases are subsidiary.

Add the following: No separate payment for keeping existing signs in service until they are no longer needed, or temporary relocation of existing signs will be made. This work is subsidiary to Item 615(1), Standard Sign.

No separate payment for removal of existing sign post foundations, or work required to abandon them in place will be made, but shall be subsidiary to Item 615(1), Standard Sign.

No separate payment for salvaging activities detailed in Subsection 615-3.01 will be made. This work will be subsidiary to Item 615(1), Standard Sign. (11/06/02)R50USC02

Slanted Single Post Cantilevered Signs. The contract price includes all legend bearing sign panels, rigid metal conduit and fittings (from Load center 'A' to sign foundation), Type 1A junction box installed adjacent to the sign foundation, galvanized steel pipe support, sign foundation, galvanized steel anchor bolts, nuts, and washers, and associated hardware required for a complete installation.

Add the following pay item:

<u>Pay Item</u>	<u>Pay Unit</u>
615(11) Slanted Single Post Cantilevered Signs	Each