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\*\*\*\*THIS IS A NEW APPENDIX. – PLEASE READ CAREFULLY.\*\*\*\*

## ALUMINUM LIGHT POLES REGULAR AND ANODIZED

### SCOPE

Aluminum Light Poles shall meet the requirements of ASTM B221, Alloy 6061, T6 temper or the requirements of ASTM B229, Alloy 6061, T6 temper for extruded structural pipe and tube and ASTM B209, Alloy 5086, temper H34 for aluminum alloy sheet and plate and the requirements of article 4185 of the standard specifications. Anodizing shall be performed in accordance with the requirements of ASTM D3933

### BASIS OF ACCEPTANCE

1. Fabrication shall be performed by an approved fabricator. Approved fabricators are listed in [IM 557 Appendix C](#)
2. Certified mill test reports indicating the complete chemical composition limits and the complete mechanical property limits.
3. The certified mill test reports shall reference the ASTM, the alloy designation, the temper and the nominal thickness.
4. Marking identification- spot marking, one location on each pole, showing ASTM, alloy, temper and the rolling mill
5. Certification statement shall indicate that the aluminum material is from and domestic origin and melted and manufactured in the USA.
6. Each pole shall be inspected to determine compliance and conformance to the specified requirements.
7. Aluminum transformer basis (when specified) shall be painted on the inside and outside surfaces with two coats of approved zinc-rich paint ([Article 2523.03i](#))
8. Shop drawings shall be submitted for approval prior to the start of the fabrication process.

### Welding and Welding Requirements

- A. Structural welding code. AWS D 1.2/ D1.2 M 2003
- B. Iowa DOT standard specification requirements for aluminum welding [article 2423](#).
- C. Welding process. Gas metal arc welding (GMAW)

- D. Weld procedure specification (WPS) shall be required and shall be submitted for approval. The WPS, shall be prepared in accordance with section 3 and Annex E of the AWS D.12 structural welding code.
- E. The PQR shall be required and shall be in accordance with section 3 part C using base metal. Procedure qualification records, joint preparation, surface preparation, cleaning and limited variables from part c, section 3.14 of the AWS D.1.2 structural welding code
- F. Electrodes shall be of the type specified on the plans or in the AWS D 1.2/D1.2 M: 2003 listed in the table 4.2 certificate of conformance shall be required and shall be submitted for review and verification.
- G. Base metal for structural pipe and tube shall conform to ASTM B221 alloy group 6061, temper T6
- H. Base metal for the plates shall conform ASTM B209 Alloy 5086, temper H34.
- I. Acceptance criteria- groove welds for plate and pipe shall be in accordance with the AWS D1.2, Section 3.6.2
- J. Acceptance criteria fillet welds for plate and pipe shall be in accordance with the AWS D1.2 Section 3.6.3
- K. Welding and tack welding shall be performed by a certified welders and tack welders in the qualified position and approved process. Welders and tack welders can be certified by the state of Iowa or by an independent/ certified third party.

### **Anodizing Requirements**

The phosphoric acid anodizing of aluminum and its alloy for structural adhesive bonding shall be performed in accordance with the requirements of ASTM D3933 by an approved processing facility. Anodizing steps processing shall be submitted for review and approval by the engineer.

The following area guidelines for state inspectors to follow for inspection and monitoring purposes.

1. Surface preparation shall be performed in separate/ dry/ facility for the purpose of anodizing only. The preparation of the metallic substrates to obtain surface with acceptable characteristics is a crucial step.
2. Great care must be exercised in the selection of the proper materials and the preparation of the surfaces of the components to be bonded.
3. Air lines or ducts shall have filters or traps or both for the removal of moisture, dust airborne dust and oil from the lines or the ducts.

4. The phosphoric acid anodizing tank shall be lined and shall be equipped with surface skimming device to remove surface contamination, and a filtering system as well as agitation system for mixing the tank contents.
5. Adequate electrical system to maintain a steady voltage ( $\pm 1.0$  Volt DC)
6. Rinse tanks shall be adequate to handle the rinsing process.
7. The makeup water and rinse water tanks shall not contain more than the recommended upper limit for fluoride and dissolved chemicals (1.7 ppm-fluoride, 500 ppm total dissolved solids). Except that chloride shall not exceed 25 ppm and the pH shall be between 5.5 and 8.0. The treating facility must provide verification of test to the state.  
Note: most potable water can meet the above indicated requirements.
8. Rinsing may be by spray or by immersion
9. Once the materials (the complete fabricated poles) are racked for alkaline cleaning, it cannot be touched and it cannot be delayed prior to anodizing.
10. Should electric current fail or otherwise be interrupted during the phosphoric acid anodizing, the anodizing may be continued for 20 – 30 minutes provided the electric current can or be re-established within the period of two minutes, then rinse and reprocess starting with the deoxidizer.
11. The adhesive primer shall be applied within 72 hours after oven drying following the phosphoric acid anodizing.
12. Parts priming shall be performed as soon as possible to minimize the possibility of contamination.