GENERAL TECHNICAL SPECIFICATIONS
FOR THE PURCHASE OF
STEEL TRANSMISSION POLES

JEA TECHINICAL SPECIFICATIONS REVISION: 1.3
REVISION DATE: 12/30/2016
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1. SCOPE

1.1 This specification covers the minimum requirements for the design, materials, fabrication, and delivery of tubular steel pole type structures for transmission lines. Structures furnished under this section shall be complete including arms, pole steps, vangs, brackets, connections for ground cable and attachments for insulator fastenings and guys, together with all necessary nuts, bolts and washers for a complete installation.

1.2 This specification is supplemented by project specific technical specifications which will include:

a) Pole Drawings and/or Steel Caisson drawings containing the configuration and hole drilling details of each pole/structure

b) Pole and/or Steel Caisson Attachment Details

c) A PLS-POLE backup file and/or load tree drawings containing loading data and geometry of each pole/structure

1.3 No exceptions to this specification will be permitted without written approval of the owner and engineer.

2. DEFINITIONS

Owner:	JEA
Engineer:	JEA Engineer as specified in the project specific technical specifications
Manufacturer/Fabricator:	The steel pole producer
ASCE:	American Society of Civil Engineers
AISC:	American Institute of Steel Construction
ANSI:	American National Standards Institute
ASTM:	American Society for Testing and Materials
P-Delta:	The effect of the vertical loads causing secondary moments due to their deflected position under transverse load
Taper:	The total increase of pole diameter measured in inches per foot of length.
Tip:	Reference to the top end of a tapered pole (Small Diameter)
Butt:	Reference to the bottom end of a tapered pole (Largest Diameter)

3. REFERENCES

ASCE/SEI Standard No. 48-11 “Design of Steel Transmission Pole Structures”, Latest Edition
Structural Welding Code - Steel, ANSI/AWS D1.1, American Welding Society, Miami, FL, Latest Edition
AISC, Latest Edition
ASTM A123 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A307 Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile
ASTM A325 Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

ASTM A354 Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners
ASTM A370 Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM A449 Specification for Quench and Tempered Steel Bolts and Studs
ASTM A490 Specification for Heat Treated, Steel Structural Bolts, 150 ksi (1035 MPa) Tensile Strength
ASTM A563 Specification for Carbon and Alloy Steel Nuts
ASTM A572/A573M Specification for High-Strength Low-Alloy Colombium-Vanadium Steels of Structural Quality
ASTM A588/A588M Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in. (100 mm) Thick
ASTM A633/A633M Specification for Normalized High-Strength Low-Alloy Structural Steel
ASTM A673/A673M Specification for Sampling Procedure for Impact Testing of Structural Steel
ASTM A687 Specification for High-Strength Non-headed Steel Bolts and Studs
ASTM A780 Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A871/A871M Specification for High Strength Low-Alloy Structural Steel Plate with Atmospheric Corrosion Resistance

National Electric Safety Code" (NESC), ANSI C-2, published by the Institute of Electrical and Electronics Engineers (IEEE), Inc., 2012 edition

"Good Painting Practice", Steel Structures Painting Manual, Vol. 1, Steel Structures Painting Council, Pittsburgh, PA, 1982
"Systems and Specifications", Steel Structures Painting Manual, Vol. 2, Steel Structures Painting Council, Pittsburgh, PA, 1982

4. DESIGN REQUIREMENTS

4.1 This design and manufacture of the steel structures furnished under this Specification shall be in accordance with the requirements and/or recommendations of the National Electric Safety Code (NESC), Grade B Construction; ASCE/SEI 48-11 "Design of Steel Transmission Pole Structures"; and the references listed in Section 3.

4.2 The structure design calculations shall be the responsibility of the fabricator. Design calculations and data shall be submitted to the JEA with the Bid and shall include:

a) Moment Diagram: The total applied moment at the base and joints along the pole or steel caisson, including the effects of secondary moments

b) Section Moduli: Section modulus furnished, and the w/t for polygonal or d/t for round cross sections at all splices and at least every twenty feet along the pole or caisson.

c) Ground Line Reactions: Maximum moment, shear and vertical loads at the base of the pole if the pole is to be installed on a foundation. If the pole is to be directly embedded, loads are to be provided at the ground line and at the specified point of fixity.

d) Field Splices: Details of all field splices.

e) Arms and Attachments: Details of all arms and attachments

4.3 Final Design Calculations: Final design calculations shall be submitted to JEA before fabrication commences, and shall include, in addition to the previously stipulated items:

a) The total ultimate moments at the Ground Line or bottom of pole and Point of Fixity if applicable (The location of the Point of fixity is specified in the project specific technical specifications)

b) Section modulus furnished at the connections of the arms

c) Computation of stresses in base plates, connections and attachments

d) Maximum deflection at the top of the structure for specified wind loading cases

5. POLE / STEEL CAISSON DESIGN CRITERIA

5.1 Pole designs shall be based on the attached configuration drawings, PLS-POLE backup files (containing loads and pole geometry) and/or load tree drawings, and the design load cases specified in the project specific technical specifications. The poles shall be capable of withstanding all the specified load cases, including secondary stresses induced from foundation movement and pole rotation, plus the effect of vertical loads acting on the deflected pole (the p-delta effect). In addition to the dead load of the wires, the deflected pole weight, applied at its centroid above ground, shall be included in the secondary moment calculation.

The loads shown on the attached files include the wind loads acting on the wires and the pole that was modeled. However, it is the manufacturer's responsibility to apply the specified wind pressures (provided in the PLS-POLE backup file or in the loa. file) to the pole(s) that will be provided.

Steel Caissons shall be designed to meet the loads as described in section 10 of these specifications.

5.1.1 Designs shall be made according to the provisions of Load & Resistance Factor Design (LRFD) or the provisions of Allowable Strength Design (ASD).

5.1.2 Design shall be based on the principle that no applicable strength or serviceability limit state shall be exceeded when the structure is subjected to all appropriate load combination.

5.1.3 Stability shall be provided for the structure as a whole and for each structural element. The load effects resulting from the deflected shape of the structure and individual elements shall be considered.

5.1.4 The analysis shall include all structural members in their assumed manufactured geometry and sizes.

5.2 Allowable Stresses:

5.2.1 Allowable stresses for tubular members, guys and connection bolts shall be in accordance with ASCE/SEI 48-11 and AISC.

5.2.2 Structures shall be designed so that unit stresses do not exceed the minimum specified yield point of the material under the loads shown on the loading trees, with proper consideration of buckling and deflection limitations.

5.3 Typical Details:

5.3.1 Joints:

a) Sections of steel poles shall be joined by the slip –joint or flange joint method, unless otherwise specified in the project specific technical specifications.

b) The number of joints will depend on the overall length of the poles. Poles shorter than fifty-five (55) feet shall be made out of a single section and contain no joints. Poles shorter than one-hundred (100) feet shall have no more than one (1) joint. Poles over one-hundred (100) feet may contain one (1) or two (2) joints.

c) Sections joined by telescoping splices (slip joints) shall be designed to assure a minimum lap length of 1.5 times the largest inside diameter of the outer section.

d) It is up to the manufacturer to determine the appropriate type of joint for each pole to be provided based on the loading data provided.

5.3.2 Circumferential Welds:

a) Shaft-to-shaft, pole shaft-to-flange, and shaft-to-baseplate shall be full penetration welds.

b) Arm shaft-to-arm bracket shall be partial penetration groove weld with fillet overlay, sized to develop the full strength of the shaft.

c) All other welds (lugs and plates for grounding, jacking, climbing and identification) shall be fillet and/or groove welds sized to develop the loading requirements found in the attachments of the project specific technical specifications.

5.3.3 Longitudinal Welds:

a) Longitudinal welds in outer section of slip joints and within three (3) inches of a full penetration weld shall be full penetration.

b) Longitudinal welds shall be a minimum of sixty (60) % penetration in all other locations.

5.3.4 Bolt holes: Unless otherwise indicated in the Project Specific Technical Specifications or the attachment details, all bolt holes for the poles and their attachments shall be as follows:

a) Transmission phase and shield wire attachments shall have 1-1/8” bolt holes for use with 1” bolts.

b) Distribution primary, transformer and cross-arm attachments shall have 7/8” bolt holes for use with 3/4” bolts.

c) Distribution secondary attachments shall have 3/4" bolt holes for use with 5/8" bolts.

5.4 Drawings:

5.4.1 Detailing of erection and shop (fabrication) drawings shall be the responsibility of the fabricator. The fabricator shall be responsible for the means, methods, techniques, sequences and procedures of fabrication, including safety precautions and programs.

5.4.2 After the award is made but before fabrication is begun, a set of approval drawings (in electronic PDF format) shall be furnished to the owner for review and approval. One (1) PDF file shall be submitted for each specific structure, each specific anchor bolt cage assembly (if relevant), and each specific steel caisson (if relevant). The drawings will then be reviewed and marked if necessary by JEA, and returned to the manufacturer. The Approval Drawing package shall include the Final Design calculations as well as the "Shop Drawings". The drawings shall be signed and sealed by a Professional Structural or Civil Engineer registered in the State where the design was performed.

5.4.3 Drawings shall show dimensions, weight and type of material of each structure.

5.4.4 Shop drawings shall include:

a) All the information required to fabricate components

b) All details required to manufacture the assemblies

c) All fabrication tolerances (may be referenced if reference document is provided)

d) All weld details (may be referenced if reference document is provided)

e) All shop surface preparation and finishing information.

5.4.5 Erection Drawings shall include:

a) A bill of material of all components to be assembled

b) A drawing showing location of components for assembly

c) Identification markings

d) Assembly information

e) Component weights

5.4.6 Final drawings of all structures and attachments (in PDF format) shall be issued to the owner no more than seven (7) business days after fabrication is complete and at least seven (7) business days before scheduled delivery. Separate drawings of the Anchor Bolt Cage Assemblies (if relevant) shall be issued to the owner no more than seven (7) business days after fabrication is complete and at least seven (7) business days before scheduled delivery. Separate drawings of the Steel Caissons (if relevant) shall be issued to the owner no more than seven (7) business days after fabrication is complete and at least seven (7) business days before scheduled delivery. All

drawings shall be signed and sealed by a Professional Structural or Civil Engineer registered in the State where the design was performed.

6. DIMENSION RESTRICTIONS

6.1 Poles may have maximum allowable ground-line diameters, butt diameters, or base plate restrictions. Any limitations on the size of the allowable diameters or other restrictions are specified in the project specific technical specifications.

6.2 Poles shall have a uniform taper from the pole tip to the pole butt.

6.3 Embedment depths (if relevant) of each pole are provided in the project specific technical specifications.

7. MATERIALS

7.1 All materials shall comply with the requirements of the ASTM specifications unless otherwise specified.

7.2 Material to be welded shall comply with the requirements of ANSI/AWS D1.1.

7.3 Structural Plate

7.3.1 Plate and "product of a coil" that is used to produce load carrying components shall be considered structural plate. Material used for grounding plates, identification plates, pole caps, disposable cage plates and similar components does not need to be classified as structural plate.

7.3.2 Thicknesses $\leq$ 1.25": ASTM A36, ASTM A572 or ASTM A871.

7.3.3 Thicknesses > 1.25": ASTM A36, ASTM A633 or ASTM A871.

7.3.4 Charpy Requirements -- structural plate material shall meet the Charpy impact requirements specified in Section 7.6.

7.3.5 Galvanizing Requirements -- the silicon content of plate to be galvanized shall be limited to:

a) Shaft Material - Si $\leq$ 0.06%

b) Other - Si $\leq$ 0.06% or 0.15% < Si < 0.40%

7.4 Bolts, Nuts & Washers

7.4.1 Structural Bolts: ASTM A307, ASTM A325, ASTM A490, or ASTM A449

7.4.2 Threaded Rod: ASTM FI554 GR36 or GR55, ASTM A354, ASTM A449, ASTM A588, or ASTM A687

7.4.3 Anchor Bolts: ASTM A615 GR75

7.4.4 Nuts: ASTM A563

7.4.5 Washers: ASTM F436

7.5 Weld Material

7.5.1 The material used for making welds shall be compatible with the parent material, as defined by ANSI/AWS D1.1 and shall meet the Charpy Impact Requirements specified for the lowest toughness requirements of the plates being joined.

7.6 Charpy Impact Requirements

7.6.1 Charpy impact properties shall be determined in accordance with ASTM A370 and A673.

7.6.2 Minimum energy level, test temperature, and frequency of testing:

Specified Yeild (ksi)	Plate Thickness Or Bar Diameter (inches)		Minimum Energy Level (ft-lbs)	Test Temperature ˚F	Frequency
≤ 42	≤ 0.5”	All	None Required		
	> 0.5	Quench & Tempered or Normalized	15	+40	Heat
		Other	15	+40	Plate
> 42	.05”	All	15	-20	Heat
	>0.5”	Quench & Tempered or Normalized	15	-20	Heat
		Other	15	-20	Plate

8. FABRICATION

8.1 Fabrication shall be performed in strict compliance with the shop detail drawings. Material substitutions or deviations from the approved drawings shall not be made without written approval by the owner.

8.2 The fabricator shall accurately identify all material to assure proper usage.

8.3 Material Preparation

8.3.1 Edges shall be in accordance with ANSI/AWS D1.1. Burrs or sharp notches that may be detrimental to the structure or that pose a safety hazard shall be removed. Re-entry cuts shall be rounded.

8.3.2 Care shall be taken to prevent separation of the outer surface and reduction of the cross sectional properties below those required by design. If separation occurs

during bending, it shall be repaired in accordance with ANSI/AWS D1.1. Mill scale shall not be considered as the surface. When hot bending is required; heating shall be done evenly over the entire bend area and shall be of sufficient temperature to minimize separation and necking down of the cross section. The temperature used in hot bending shall be such that the physical properties of the steel are not diminished.

8.3.3 All components shall be clearly marked by stamping. Stamped marks shall be a minimum of 0.5" high letters made prior to finish coating and readable after coating.

8.4 Welding

8.4.1 All welding shall be performed by welders, welding operators and tackers qualified for the type of welding to be performed. Qualifications shall be in accordance with ANSI/AWS D1.1.

8.4.2 All welding shall be performed in accordance with ANSI/AWS D1.1, including procedure qualification.

8.4.3 Preheat and inter-pass temperatures shall be in accordance to ANSI/AWS D1.1 or the steel manufacturer's recommendations.

8.4.4 Welding shall be done by the shield metal-arc, gas shielded flux core, gas shield metal-arc or submerged-arc processes.

8.4.5 The storage of welding consumables (welding wire, electrodes, fluxes and gases) shall be in accordance with ANSI/AWS D1.1 and the welding consumables manufacturer's recommendations.

8.5 Protective Coatings

8.5.1 All materials to be coated shall be complete in fabrication before beginning the coating process.

8.5.2 All steel items, including the pole shafts, and steel caissons shall be hot-dip galvanized.

a) Prepare surfaces to SSPC SP8 prior to galvanizing. Exposed welds shall be mechanically cleaned.

b) Members shall be galvanized in accordance with ASTM A123.

c) Fasteners (bolts, nuts and washers) shall be galvanized in accordance with ASTM A153.

d) Repair of damaged hot dip galvanized surfaces shall be in accordance with ASTM A780.

8.6 Madison Corrocote (for directly embedded poles or poles with steel caissons): Poles/ caissons shall be coated with a shop applied coating of Madison Corrocote after galvanizing. The coating shall cover the outside of the pole/caisson from butt (bottom) to the top of the corrosion sleeve; coating shall also include the bearing plate (if applicable). When coating steel caissons, the inside of the caissons must also be coated, at least near the ground line or as recommended by the manufacturer.

8.6.1 Surface Preparation: All surfaces to be coated shall be dry and free of dust, oil, grease, and other objectionable substances, and shall meet the recommendations of the coating manufacturer for surface preparation. When applying the coating over galvanizing, the surfaces shall be primed or otherwise prepared as recommended by the coating manufacturer to ensure proper coating of the galvanized surface.

8.6.2 Application: Madison Corrocote coatings shall be applied in accordance with the manufacturer's recommendations and in a neat manner with finished surface free of runs, ridges, sags, laps, and brush marks. The coating shall be applied in a manner that will produce an even film of uniform thickness. In no case shall the coating be applied at a rate of coverage per gallon which is greater than the maximum rate recommended by the manufacturer. The coating shall be applied in one or more applications which shall provide a finished, dry film thickness of not less than 25 mils. Coatings showing sags, checks, blisters, teardrops, or fat edges will not be accepted. Coatings with any of these defects shall be entirely removed and the surfaces recoated.

8.6.3 Touch-up Madison Corrocote: The pole manufacturer shall supply one (1) gallon of touch-up Madison Corrocote for every 5 poles or steel caissons ordered, to be applied by the erection contractor for repairs coating surfaces. If less than five (5) poles are ordered, one (1) quart of touch-up Madison Corrocote shall be provided per pole.

8.7 Ground Sleeves (for directly embedded poles or poles with steel caissons): Poles/caissons shall have ground sleeves. Ground sleeves shall have a minimum length of 4 feet and a minimum thickness of 3/16 inch. The ground sleeve shall be centered at the ground line and a seal weld shall be provided around the sleeve. The ground sleeves shall not be considered in strength calculations

8.8 Bearing Plates (directly embedded poles only): Poles shall have bearing plates. Bearing plates shall have a diameter not more than 2 inches greater than the maximum pole butt diameter. Galvanized poles shall have a drain hole at the bottom. The drain hole shall be six (6) to Twelve (12) inches in diameter, but shall not be more than 20% of the bottom plate surface area.

8.9 Pole Top Cap: The pole cap shall not extend more than two and a half (2.5) inches from the face of the pole at the pole tip (unless otherwise specified in the project specific specifications). This is to allow for a shield bayonet to be installed on some specific poles.

9. ANCHOR BOLTS

9.1 When poles are to be installed on concrete foundations, the following shall apply for the anchor bolt cage assemblies that are to be provided for such poles.

9.1.1 All anchor rods (bolts) shall be furnished with each structure, ready for "cast-in-place" installation during the structure foundation's construction. Post-installed anchors are not permitted. Anchor rod embedment sizing calculations shall be in accordance with Appendix "D" (Anchoring to Concrete) of the latest edition of ACI 318. Anchor rods shall be straight, and provided with double nuts at the bottom for concrete embedment. Hooked bolts (i.e. J-bolts) are not permitted. Provide two (2) bottom nuts (embedded in foundation), one (1) leveling nut and two (2) top nuts for installation at top of anchor rod. Make allowances in anchor rod lengths so that anchor rod projections, above the foundation, accommodate a free air space between

the foundation upper surface and the base plate lower surface of up to 3" maximum. The structure base plate thickness, the washers, and the leveling nuts shall be capable of achieving such free air space with a minimum projection of at least 1" and a maximum of 3" of the anchor rod above the top of the upper nut. Tack welding or damaging threads to prevent top nut back-off shall not be permitted

9.1.2 The nuts and the threaded portion of anchor rods plus a minimum of six (6) additional inches shall be galvanized in accordance with ASTM A153 or B695, Class 50, Type 1.

9.1.3 Anchor rods shall be shipped as preassembled clusters only.

9.2 All anchor bolt cage assemblies to be provided shall include, on an Anchor Bolt Details Drawing, a table and generic sketch that clearly shows the anchor rod specifications for every rod. The Table shall reference a sketch that, though not to scale, will provide a clarification of all of the following table (column) entries which shall be provided for each unique anchor bolt (by row):

9.2.1 A Mark that identifies the pattern for cross reference to the Anchor Bolt Detail.

9.2.2 A Quantity showing the total Anchor Bolt Pattern Count for each unique pattern.

9.2.3 A Quantity showing the Count of the Anchor Bolts for each unique pattern

9.2.4 A Quantity showing the total Anchor Bolt Count for each unique bolt by pattern

9.2.5 A Mark that identifies the Anchor Bolt in the Bill of Materials. Each unique bolt type shall have a unique mark and a unique row entry in the Bill of Materials.

9.2.6 The Anchor Bolt Hardware and Diameter in inches (i.e. "5HHN, 2FW, 1" Dia").

9.2.7 The Anchor Bolt overall length in feet and inches.

9.2.8 The Anchor Bolt top threaded portion in inches.

9.2.9 The Anchor Bolt bottom threaded portion in inches.

9.2.10 The Anchor Bolt intended projection (above foundation surface) in inches.

9.2.11 Whether or not the Anchor Bolts are supplied as a caged assembly.

9.3 The Anchor Bolt Details Drawing, shall provide a separate drawing detail for any caged anchor bolt assemblies, showing a detail of the top and bottom plates. The top and bottom plate details will show the dimensions of the plate, the holes in the plate, and thickness of the plate.

9.4 After the approval of the drawings, the manufacturer shall correct the drawings as needed and submit electronic copies (in PDF format) of the Anchor Bolt Plan and Detail Drawings, signed and sealed by a Professional Structural or Civil Engineer registered in the State where the design was performed, to JEA for future use.

10. STEEL CAISSONS

10.1 This section shall govern the design and fabrication of steel caissons used as foundations for steel transmission poles.

10.2 Design:

10.2.1 The Steel Caissons shall be designed to resist the ultimate foundation loads shown on the pole/caisson drawings, found within the project specific specifications. Loads are provided in the form of loading charts for each specific pole type foundation. Moments and shears shall be assumed to vary linearly between the values listed in the charts. The moments and shears at points past the last specified points in the loading trees shall be the same as those of the last specified points.

10.2.2 All steel caissons shall be capable of withstanding forces induced during handling, transportation, and erection.

10.2.3 The design calculations shall be the responsibility of the manufacturer and shall be submitted to JEA for record purposes. The calculations shall be submitted to JEA as per section 18 of these specifications.

10.2.4 Core Borings: Soils information, including core boring logs, are available from JEA upon request.

10.2.5 Unit Stresses: Steel caissons shall be designed so that unit stresses do not exceed the minimum specified yield point of the material under the loading conditions tabulated on the steel caisson drawings, with proper considerations of buckling limitations.

10.2.6 Cross Section: The cross section of the caisson shall be either round or polygonal.

a) Round: The diameter of the round caisson shall be as shown on the design drawings.

b) Polygonal: The distance across flats of a polygonal caisson shall not exceed the diameter shown for round caissons.

11. BIRTHMARK

11.1 A legible birthmark shall be welded on one (1) face of each pole and each steel caisson to be provided. The birthmark shall contain as a minimum:

a) The Letters “JEA”

b) The manufacturer’s name

c) Month and year of manufacture

d) Total pole or caisson length (as applicable)

e) Embedment depth (if applicable)

f) Actual scaled weight of pole or caisson (as applicable)

g) Ground line, pole base, or caisson flange ultimate moment capacity in foot-kips (as applicable).

h) Structure and design numbers as indicated on the Bid Sheet, found in the project specific technical specifications.

11.2 The birth mark shall be positioned at the height and face of the pole as shown on the Pole / Steel Caisson Drawings within the project specific technical specifications

11.3 The birth mark shall be fabricated of stainless steel, approximately 1/16" thick. Each corner shall be rounded to a radius of 1/4". All lettering shall 1/8" tall block text and shall be engraved. Each plate shall be rectangular, sized approximately 4" x 3" and shall include four (4) holes, approximately 3/16", in each corner, located to provide at least 1/8" of metal around the hole. Text shall be spaced at least 1/8" away from any edge or hole.

12. COMPONENT IDENTIFICATION

12.1 At a minimum, the manufacturer shall furnish and attach to each piece of each structure (or any component that needs to be assembled together in the field, including steel caissons) a temporary label that clearly identifies each piece of each structure. The purpose of this temporary label is to assure correct identification of the pieces when being off-loaded, moved, and assembled at the project site. The piece label shall meet the following requirements:

12.1.1 The label shall be securely tied to each piece with steel wire, #20 AWG or better, such that wire cutters will be required to remove the piece. The label shall be tied near an end of the structure if at all practical, preferably through a bolting hole.

12.1.2 The label and the marking method shall be manufactured of material that can survive one (1) year of outdoor exposure to inclement weather, such as is typical of Northeast Florida, without significant deterioration or loss of print.

12.1.3 The label shall include the following text, as a minimum with block printed text 1/8" in height:

<Manufacturer Name>
JEA <Project Name >
Date <Manufacturing Date>, DWG #<Manufacturers Drawing Number>
STR# <Structure Number>, PART#<Part Number>
APPROX. WT. THIS PIECE <Pounds> LBF.

13. ATTACHMENT HARDWARE

13.1 The manufacturer shall provide all brackets, vangs, grounding attachments, and other miscellaneous hardware on each pole / caisson as shown in the attachments of the project specific technical specifications.

13.2 Bolts, nuts, and/or washers required for attaching insulators, cross-arms, transforms, etc. to pole brackets / vangs / thru holes, will be supplied by JEA unless otherwise stated or indicated in the project specific technical specifications.

13.3 Bolts, nuts, and/or washers required for attaching provided steel poles to steel caisson foundations shall be the responsibility of the manufacturer.

13.4 Step lugs/ steps shall be provided as indicated in the "Pole Drawings" and the "Climbing Steps Detail" of the project specific technical specifications.

13.4.1 Steps shall be designed to support a minimum of a 300 pound worker and equipment multiplied by a load factor of 2.0. Loads shall be applied at the outer edge of the step and shall be supported without permanent deformation.

13.4.2 Step lug locations shall be as depicted in the "Climbing Steps Detail" and "Pole Drawings" of the project specific technical specifications.

13.4.3 Step lugs and steps shall be hot dipped galvanized.

14. PACKING AND SHIPPING

14.1 Each shipment shall include a detailed packing list identifying all items by part number, including hardware.

14.2 All material shall be carefully loaded for protection during shipment.

14.2.1 Small parts and fasteners shall be carefully boxed, crafted, bagged or otherwise containerized and protected for shipment.

14.2.2 Larger parts and assemblies shall be handled, loaded blocked and secured in such a manner to prevent damage, including damage to the finish. Blocks and straps shall be rust proof and properly padded to minimize abrasion.

14.2.3 All materials shall be arranged to allow safe unloading at the site.

15. INSPECTION AND QUALITY ASSURANCE

15.1 Design

15.1.1 With the bid, the fabricator shall provide the general dimensions and weights of all structural components, maximum actual moments throughout the structure and at the ground-line and the maximum deflection at the structure top.

15.1.2 After award of an order, the fabricator shall provide the owner with complete calculations showing that the design requirements have been met.

15.1.3 The fabricator shall provide the owner with one (1) PDF file of complete erection and fabrication drawings for each structure type provided no more than ten (10) business days after the award.

15.1.4 The owner shall review the calculations and drawings prior to releasing the drawings for shop fabrication. This review is for determining conformance with the contract specification. It does not relieve the fabricator of the responsibility for the accuracy of the structural detailing.

15.2 Material

15.2.1 The fabricator shall maintain a system, including records, which allows verification that the structural steel furnished meets the requirements specified. Certified test reports from the steel mills and from suppliers of bolts, welding electrodes and other materials shall constitute sufficient evidence of conformity when purchased. This information shall be provided to the owner upon request.

15.3 Fabrication

15.3.1 The fabricator shall include the following information in the test and inspection records and provide it to the owner upon request:

a) Welder qualification

b) Inspector qualification

c) Results of inspection

15.3.2 The owner has the right to request demonstration of all inspection techniques used.

15.4 Inspection

15.4.1 Inspection personnel performing nondestructive examinations (other than visual) shall be qualified in accordance with ASNT Practice No. SNT-TC-1A.

15.4.2 Each component shall be inspected for conformance to the fabrication drawings. This inspection shall include, but not be limited to:

a) Ultrasonic inspection of all base plate material prior to welding for laminations
b) Visual inspection of dimensions to assure that tolerances are met
c) Visual inspection of cut edges to ANSI/AWS D1.1 criteria
d) Visual inspection of bent surfaces for surface separations (supplemented by mag particle in questionable areas).
e) Visual inspection of bolt holes to assure that they are cylindrical, perpendicular, free of burrs, and without torn or ragged edges.
f) Visual inspection of all welds to ANSI/AWS D1.1 Section 8 criteria.
g) Ultrasonic inspection of all full penetration welds
h) Ultrasonic inspection of shaft to base plate welds after galvanizing (may be waived if routine audits show no history of defects)
i) Magnetic particle inspection of all structural partial penetration or fillet welds to ANSI/AWS D1.1 Section 8 criteria.
j) Visual inspection of finish
k) Magnetic thickness measurement of finish coatings

15.5 The owners' representative or authorized representative shall have access to the work at all times for inspection wherever the poles are in preparation or progress. The manufacturer shall provide proper facilities for such access and inspection without additional cost to the owner. All materials will be subject to "Job Site Inspection". Material may be rejected at the time of the first inspection or at any time defects are found during the progress of the erection or installation. Inspection by the owner or waiving of inspection shall not relieve the manufacturer from the responsibility for furnishing products that conform to the requirements of this IFB, nor invalidate any claim of the owner because of defective or unsatisfactory material and workmanship.

15.6 The manufacturer shall have an active in-plant Quality Assurance Program and perform daily checks and tests on the products made. The program shall cover the entire production process including the delivery of the product.

16. MANUFACTURING TOLERANCES

16.1 Product tolerances shall be limited to the following (exceptions may be granted if allowed by the JEA project Engineer):

16.1.1 Overall length of each pole shaft section: +2 " / -1"

16.1.2 Overall Pole Length w/ 1 slip joint: +12" / -6"

16.1.3 Overall Pole Length w/ 2 slip joints: +24" / -12"

16.1.4 Pole Diameter: +0.75" / -0.75"

16.1.5 Pole Sweep: Sweep is the deviation of a pole from straightness. Sweep will be allowed in one plane and one direction only. A straight line joining the edges of the structure at both the top and the butt shall not be distant from the pole surface at any point more than 0.13 inches for each ten (10) feet of length between these two points.

16.1.6 Weight: +10% / -10% of theoretical value

16.1.7 Location of a group of bolt holes from pole tip: +2" / -2"

16.1.8 Location of centerline between groups of bolt holes:+1" / -1"

16.1.9 Location of bolt holes within a group of bolt holes:+1/8" / -1/8"

16.1.10 Bolt hole diameter: One-eight (1/8)" greater than actual bolt diameter specified

16.1.11 Bolt hole alignment within a group of bolts: Within one-half (1/2) of the hole diameter from the longitudinal pole centerline in a group.

17. INFORMATION FURNISHED BY MANUFACTURER WHEN BIDDING

17.1 The manufacturer shall furnish detailed pole design calculations and anchor bolt assembly drawings (if relevant) when submitting a bid. This submittal shall include the following data for the controlling load case and deflection load case, if any, for each different pole type, height and class:

17.1.1 General dimensions of the pole structures, including tip and butt diameter, wall thickness, inside and outside tapers, and pole weight.

17.1.2 General Dimensions of the Anchor Bolt Cage Assemblies / Base Plate, including the base plate thickness, maximum bolt circle diameter, maximum cage template diameter, and anchor bolt diameter/dimensions.

17.1.3 The maximum deflection encountered at the controlling load case, including foundation rotation.

17.1.4 Final reactions, consisting of shear, moment and vertical force at the ground line (or point of maximum forces(s) if different from ground line) in order to verify adequacy of embedment depth. Manufacturer shall be prepared to furnish unit prices (on a per foot basis) in the event that a deeper burial is required by the owner.

17.1.5 Any variances encountered during the design process.

18. INFORMATION FURNISHED BY MANUFACTURER PRIOR TO STARTING PRODUCTION

18.1 Prior to commencing fabrication, the manufacturer shall furnish to the JEA engineer for approval:

a) Detailed design shop drawings of the poles

b) Detailed design shop drawings (separate form pole shop drawings) of the anchor bolt cage assemblies

c) Detailed design shop drawings (separate from pole drawings) of the steel caissons

d) Final design calculations (revised if necessary)

e) The submittal shall include any changes or alterations necessary to maintain compliance with these specifications and as directed by the JEA Engineer.