GUARANTEED TECHNICAL PARTICULARS FOR GALVANIZED STEEL MONOPOLES

GTP GSMP 66/132KV

ITEM	TECHNICAL PARTICULAR	KPLC REQUIREMENT	SUPPLIERS OFFER
1.	Name and address of Supplier;		
1.1.	Name and address of manufacturer;		
2.	Reference standards		
	ASTM – American Society for Testing and Materials (OR Equivalent international Standards)		
	• A 36 / 36 M: Standard Specification for Structural Steel, Book 01.04 • A 123: Specification for Zinc (Hot-Dip Galvanized) Coatings on iron and Steel Products, Book 01.06, 15.08. • A 153: Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware, Book01.06.15.08. • A 572/572M: Specification for High-Strength Low Alloy Columbium Vanadium Steels of Structural Quality. • A 780: Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.		
	AWS – American Welding Society.		
	• D1.1-92: Structural Welding Code – Steel. Specification for Carbon Steel Covered Arc-Welding Electrodes. • A5.17-89: Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc-Welding		
	ASCE – American Society of Civil Engineers.		
	• ASCE SEI 48-11 -Design of Steel Transmission Pole Structures.		
	ISO – International Standards Organization.		
	• ISO 9001 -Quality System Model for Quality Assurance in Design/Development, Manufacture and Testing. • ISO 9002 -Quality System Model for Quality Assurance in Production, installation and Servicing. • ISO 3834-2 -Quality requirement for Welding of Metallic Materials.		
	IEC - International Electrochemical Standards		
	• IEC 60652 – 2002, Full scale factory testing.		
3.	**Requirements**		
	Line parameters to be considered for Pole design		
	• Voltage Level	132Kv	

	• No. of circuits	Single or Double Circuit	
	• Conductor	ACSR 300SQMM, Goat	
	• Basic wind velocity for design	Actual site data	
	• Clearances Poles shall maintain the minimum clearances between conductors and steel structures for 220Kv as per the standards		
	• Pole types to be used	DD - 60 Degree DE - 90 Degree	
	• Normal Span	132 kV DC Poles @ 200 m	
	• Extension poles	+1.5, +3, +4.5. +6	
	• Deflection Limit 1. Ultimate load condition 3.0% of the height of pole 2. Safety Normal condition 1.5% of the height of pole		
	W/T Ratio for Design		
	1. D/T Ratio and the W/T Ratio should be maintained at an adequate level to avoid buckling under load and ovality of the individual sections. 2. The allowable stress of Steel should not get reduced more than 10% of its designated strength		
	Conductor Tension for Design Final conductor tension at 37°C and without wind shall be 22% of the ultimate tensile strength of the conductor.		
	Manufacture experience		
	Manufacturer should have proven experience at least 5 years in design, manufacturing, supply and testing of above voltage class steel poles.		
4	**Steel poles design**		
	1. Steel poles design shall be the responsibility of the pole manufacturer. 2. Structures shall be designed so that member unit stress does not exceed the yield point stress of the material. The ratio of major axis of tubular diameter to wall thickness shall be such that local buckling does not govern member design. 3. Elastic methods of analysis shall be used 4. Structural design of the pole shall be done using proper internationally accepted design software. 5. The allowable stresses for tubular members, and connection bolts shall comply with the requirements of ASCE SEI 48-11, Design of Steel Transmission Pole Structures. 6. Steel pole shall be designed to withstand critical loading conditions; These loads are to be factored 2.5 on normal conditions and 1.5 on broken wire condition.		

	Cross section of the pole 1. Cross section of the pole shall be 12-sided polygons and shall be tapered from top to the base. 2. Cross arm member shall be of polygonal cross section with taper.		
	Members Minimum overlap Minimum overlap shall be 1.5 times the maximum inside diameter of outer section at the telescopic joint or as per design calculations, whichever is higher.		
	Circumferential welds and Longitudinal Welds Shaft-to-shaft, pole shaft-to-base plate, and pole shaft-to-flange shall be full penetration welds. Arm shaft-to-arm bracket shall be partial penetration groove weld with fillet overlay, sized to develop the full strength of the shaft. Other accessories (Lugs and plates for grounding, jacking, climbing and identification) shall be fillet and/or groove welds sized to develop the loading requirements of the attachment. Longitudinal welds in outer section of slip joints and within 76.2 mm (3") of a full penetration weld shall be full penetration. Longitudinal welds shall be a minimum of 60% penetration in other locations.		
	Pole Slip Joint. Pole section shall be made with telescopic slip joints for easy assembly either in air or on the ground at the construction site. Overlapping shall not be less than 1.5 times the maximum inside diameter of outer section at the telescopic joint or as per design calculations, whichever is higher. Manufacturer to clearly mark “Minimum” & “Designed” slip positions on the pole sections in RED Paint. At site, slip joints shall be done using proper devises of suitable capacity only to ensure proper joining of the sections. The taper of each section at a slip joint should match the taper of the adjacent section to provide proper splice tolerances. No circumferential weld within a shaft section shall be permitted. Other type of connection will not be permitted.		
5	**Materials**		
	AII materials shall comply with the requirements of ASTM specification unless otherwise specified. Material to be welded shall comply with the requirements of ANSI/AWS D1.1. Contractor shall furnish copies of certified mill test reports covering chemical and mechanical properties of the structural steel. Stock material may be used with purchaser's concurrence where stock can be satisfactorily identified with the specified ASTM specification. Contractor shall furnish all shop test reports for purchaser's review and records.		
	Structural plates		

	1.Structural plate less than or equal to 31.75 mm (1.25 in.) in thickness shall conform to ASTM A36, ASTM A572, ASTM A 633 or ASTM A871. ASTM A36, ASTM A572, ASTM A 633 or ASTM A871. 2. Yield strength of Plates used for manufacturing the shafts & cross arms shall be confirming to Gr 65 of ASTM A572 or equivalent grades. The silicon content of plates used for the pole shaft shall be limited to less than 0.06 % to have a better quality of Galvanizing. 3. Yield strength of Plates used for manufacturing, the Base Plates shall be confirming to Gr 50 of ASTM A572 or equivalent grades. 4. Material for anchor bolts shall conform to grade 8.8. Exposed portion of the Anchor bolts shall be galvanized in accordance with ASTM A 153. Material for headed bolts shall be of grade 8.8 and shall be galvanized in accordance with ASTM A 153. Threaded rod shall be of grade 8.8. Anchor bolts for the pole shall be provided with top and bottom templates to form a cage at job site. This is to get a proper alignment of bolts during casting of foundation.	
	Weld Material	
	The material used for making welds shall be compatible with the parent material, as defined by ANSI/AWS D1.1-92 and shall meet the impact requirements for the lowest toughness requirements of the plates being joined.	
6	**Fabrication and Marking & supply**	
	Fabrication shall be performed in strict compliance with PURCHASER's approved detail drawings. The pole shaft shall present the most pleasing appearance possible. Pole shall be continuously tapered from top to bottom with a uniform slope. No multi-ply steel plates will be allowed. Pole shaft shall be made with number of sections as indicated in the PURCHASER's approved detail drawings. AII parts of poles shall be appropriately marked or numbered. AII markings shall be indelible and clearly visible after galvanizing. Each pole shaft shall have a welded identification tag at 1.5m above ground level, which includes customer name, structure type, manufacturer name, year and month of fabrication. Each pole shaft section, cross arm and other separate pieces of structure shall have a welded identification tag marked with part number and serial number. All letters and numbers on identification tags shall have a minimum height of 15mmand be legible after galvanizing.	

	The writtings property of kplc shall be on all poles shaft sections A design software installation and training shall be furnished to justify design acceptance to the project team	
7	**Galvanizing**	
	All structural steel shall be hot-dip galvanized after fabrication in accordance with ASTM A 123. Fabrication and preparation of material for galvanizing shall conform to the requirements of ASTM A143. Galvanizing shall be done with single dipping method. The bidder is required to indicate the size of galvanizing baths in Pre-qualification. Bolts, nuts and washers shall be galvanized in accordance with ASTM A 153.Bolts, nuts shall be assembled after galvanizing and shall fit with finger pressure only, and nuts shall be interchangeable on any bolts without shake. Full length including the exposed threaded portion shall be galvanized in case of foundation Anchor bolts. AII materials shall be cleaned or washed after galvanizing to remove traces of flux, flux inclusions, pre-flux slats, acid ash, dross or other extraneous materials. The presence of wet storage stain (White Rust) shall be cause for rejection.	
8	**Full scale tests**	

	Manufacturer shall conduct full scale testing of the poles to ensure the satisfactory design and manufacture of steel poles and its components in accordance with the applicable standard IEC 60652 – 2002. Full scale testing shall be conducted at independent accredited Laboratory/Test Centre. Selected test center must have previous experience of testing power transmission steel tubular/polygonal poles. Contractor shall submit for purchaser's approval his proposed method and facilities of applying and measuring the loads on the structure The Contractor shall furnish two (2) copies of a test report in English Language. Loads shall be applied in increments and shall be held constant for a period of five (5) minutes before increasing or removing the loads. Deflection readings shall be recorded for the "before-load" and "Load-off “conditions.	
9	**Foundation**	

	Material for anchor bolts shall conform to grade 8.8. Exposed portion of the Anchor bolts shall be galvanized in accordance with ASTM A 153. Material for headed bolts shall be of grade 8.8 and shall be galvanized in accordance with ASTM A 153. Threaded rod shall be of grade 8.8. Anchor bolts for the pole shall be provided with top and bottom templates to form a cage at job site. This is to get a proper alignment of bolts during casting of foundation. Structural design of the pole foundation shall be done using proper internationally accepted design software. The allowable stresses for Anchor bolts, and connection bolts shall comply with the requirements of ASCE SEI 48-11, Design of Steel Transmission Pole Structures. Reinforced concrete class C30/20 with cement strength of 42.5 N/mm2 Steel pole foundations shall be designed to withstand critical loading conditions; These loads are to be factored 2.5 on normal conditions.	
10	Preliminary/conceptual design Bidder to conduct a case to case assessment on the 5 site scenareos ,apply drone/geospatial/aerial methods to have factual infomation on existing line sag,clearance,valleys and Fully Submit filled Table 2.	