f) Manufacturer's undertaking to ensure adequacy of the design, adherence to applicable standards/specification, good workmanship and good engineering practice in the manufacture of the transformers for The Kenya Power and Lighting Company Limited;
g) Packaging details (including packaging materials and marking and identification of component packages).

The drawings to be submitted by the supplier to KPLC for approval before manufacture shall be in standard format clearly indication drawing number, parts list with material details & quantities, standard of manufacture, ratings, approval details and identify of the manufacturer (as per manufacturer's authorization submitted during tendering).

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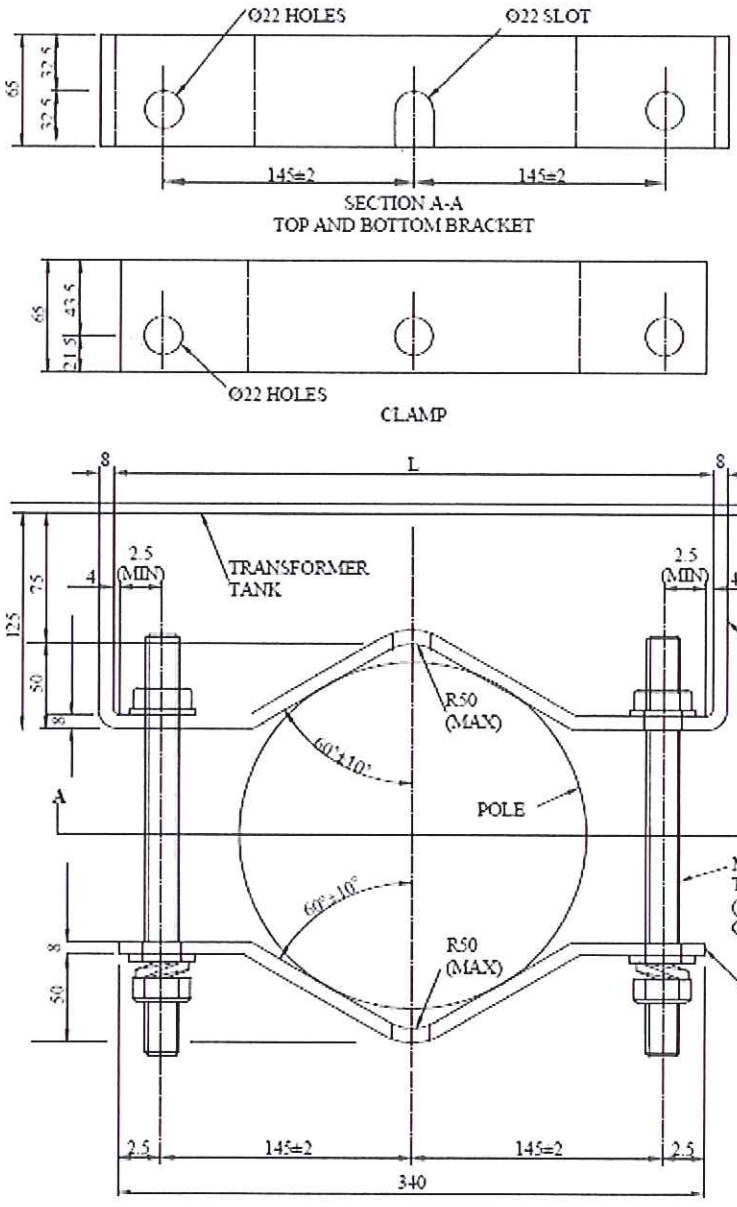

NOTE
1. DIMENSIONS ARE SUBJECT TOA TOLERANCE OF ±mmUNLESS OTHERWISE STATED
2. MATERIAL ROD HOT DIPPED GALVANISED MILD STEEL

Drawing No. TSP/10/001-01: General Arrangement – Pole Mounting Bracket

ANNEX A: Guaranteed Technical Particulars *(to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, customer reference letters, details of manufacturing capacity, the manufacturer's experience and copies of type test certificates and type test reports for tender evaluation, all in English Language)*

TENDER NO. .....BIDDER'S NAME & ADDRESS .....

Clause Number	Description	BIDDER'S OFFER			
		5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
-	Name and address of the Manufacturer				
	Country of manufacture				
	Manufacturer's Letter of Authorization				
	Model/Type Reference No. of the offered transformer				
	Manufacturer's warranty and guarantee for the offered transformer				
1.	Scope: a) Design, manufacture, test, ship and deliver pole mounted single phase distribution transformer to KPLC store/site as per specification and terms of contract. b) Ensure adequacy of the design, good workmanship, good engineering practice and adherence to standards, specifications and applicable regulations in the manufacture of the transformers for The Kenya Power & Lighting Company Ltd				
2	Applicable Standards				
3	Terms and Definitions				
4.1.1	Operating Service Conditions				
4.1.2.1 to	System Characteristics				

Clause Number	Description	BIDDER'S OFFER			
		5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
4.1.2.3					
4.2	General Requirements				
4.2.1	Outdoor, oil type, ONAN, core or shell type				
4.2.2	Design Service Life				
4.2.3	Two winding, single phase integral unit				
4.2.4	Hermetically sealed, 60mm gas cushion, bolted top cover				
4.2.5	Design to facilitate operation, inspection, maintenance & repairs				
4.2.6	Safety & Regulatory Requirements				
4.2.7	All materials shall be new and of best quality and class				
4.2.8	Corresponding parts to be interchangeable				
4.2.9	Fittings & accessories secured from inside or have small openings that do not allow oil siphoning				
4.2.10	No water pockets, rain water does not collect on top cover, gasket concealed by overlap between top cover & tank flange				
4.2.11	All connections & contacts of ample section and surface for required currents				
4.2.12	Designed to minimize short circuits by birds & vermin				
4.2.13	Materials do not lead to acidity in oil				
4.2.14	State value of maximum noise level (NEMA TR.1)				
4.2.15	Brackets for single pole mounting, on concrete & wooden poles				

Clause Number	Description		BIDDER'S OFFER			
			5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
4.2.16	Drawings of offered transformer					
	Overall dimensions of offered transformer (length, width & height) in mm					
4.2.17 a) to g)	Design drawings for approval before manufacture					
4.3	Ratings		-	-	-	-
4.3.1	KVA, no-load voltage ratings and frequency					
4.3.2 (a)	Temperature Rise at 2200m asl	Top Oil				
		Windings				
4.3.2 (b)	Temperature Rise Test					
4.3.3	Fault level for 2 seconds					
4.3.4	Demonstration of thermal ability of offered transformer design to withstand short circuit (submit detailed calculation in accordance with clause 4.1.2 and 4.1.5 of IEC 60076-5)					
	Value of symmetrical short-circuit current I as per clause 4.1.2 of IEC 60076-5					
	Duration of the symmetrical short-circuit current as per clause 4.1.3 of IEC 60076-5					
	Maximum permissible values of the average temperature of each winding after short circuit as per clause 4.1.4 of IEC 60076-5					
	Short circuit current density (A/mm^2) HV winding					
	Short circuit current density (A/mm^2) LV winding					
	Average temperature θ_1 attained by each winding					

Clause Number	Description		BIDDER'S OFFER			
			5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
	after short circuit (calculation of temperature as per clause 4.1.5 of IEC 60076-5)					
	Overload capacity for 2 hours after continuous full load run (indicate clause of standard)					
	Thermal time constant in hours					
4.3.5	Type test report for ability of offered transformer to withstand dynamic effects of short circuit					
4.4	Windings and connections		-	-	-	-
4.4.1	Voltage variations					
4.4.2	Windings & connections					
4.4.3	Required details for primary & secondary windings					
4.4.4	Separation of windings for cooling and ease of repair					
4.4.5	Windings & connections braced?					
4.4.6	Drying in vacuum & impregnating with hot oil					
4.4.7	Material of spacer blocks					
4.4.8	All joints to be brazed/ crimped					
4.4.9	Active parts submerged in oil by at least 60mm from minimum oil level mark					
4.4.10	Stage inspection by KPLC					
4.4.11	Current density, A/mm^2	HV winding				
		LV winding				
	Material of winding	HV winding				
		LV winding				
	Conductor area mm^2	HV winding				
		LV winding				

Clause Number	Description		BIDDER'S OFFER			
			5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
	Resistance at 20^0C	HV winding				
		LV winding				
4.5	Tapping		-	-	-	-
4..5.1	Tapping range					
4.5.2	Tapping method and design					
4.6	Core and Flux Density		-	-	-	-
4.6.1	Grade of core steel					
	Thickness of lamination					
	Stack factor/Building factor					
	Specific loss in watts/kg (indicate designed flux density)					
4.6.2	Static discharges & local heating					
4.6.3	Assembled core free from distortion					
4.6.4	Cooling for core					
4.6.5	Movement of core during transportation or service					
4.6.6	Core clamping					
4.6.7	Lifting lugs for core, winding and complete transformer. Factor of safety at least 2.					
4.6.8	Oil pockets & trapping of air					
4.6.9	Insulation withstand of core to bolts and core to frame					
4.6.10	Effect of primary voltage variations on flux density					
4.6.11	Maximum flux density					
4.6.12	Allowable maximum flux density for one minute and for five seconds					
4.6.13	Flux density at which core saturates					
4.6.14	To furnish magnetization curve and design calculations					
4.7	Impendence Voltage, %					
	Resistance at 75^0C of HV Winding in ohms					

Clause Number	Description	BIDDER'S OFFER			
		5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
	(at normal & extreme taps)				
	Resistance at 75°C of LV Winding in ohms				
4.8.1	Minimum efficiency at full load (unity power factor), at 75°C				
	Minimum efficiency at 50% load (unity power factor), at 75°C				
4.8.2	Total losses (no-load + load losses) at full load at 75°C & unity power factor				
	Total losses (no-load + load losses) at 50% load at 75°C & unity power factor				
4.8.3	No-load Losses at 75°C				
	Load Losses at 50% load, 75°C				
	Load Losses at 75% load, 75°C				
	Load Losses at 100% load, 75°C				
	I^2R component of load losses at 100% load, 75°C				
	Load Losses at 125% load, 75°C				
	Stray Losses at 50% load, 75% load, 100% load and 120% load, all at 75°C				
	No increase in no-load and load losses after award, during factory acceptance testing and during inspection and acceptance to stores				
4.9	Bushings and Clearances	-	-	-	-
4.9.1	Open, outdoor & weatherproof bushings to IEC 60137				
4.9.2	Bushings to be changed				

Clause Number	Description	BIDDER'S OFFER			
		5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
	without opening transformer				
4.9.3	HV & LV bushings shall be two part, bottom in toughened epoxy and top in porcelain, brown				
	HV & LV bushings on top cover				
4.9.4	LV neutral identical to LV phase terminal bushing				
4.9.5	Spacing & clearances				
4.9.6	Creepage distance of bushings: HV, LV, N				
4.9.7	Clamp type bushing terminals for aluminium conductor				
	Materials, size and drawings for terminal connectors				
4.9.8	Marking and method of marking of terminals				
4.9.9	Air Clearances	-	-	-	-
4.9.9.1	Lightening impulse and power frequency withstand voltage rating of bushings offered (indicate for HV, LV & LV-N)				
4.9.9.2	Positioning & external connections				
4.9.9.3	Minimum external air clearances: LV – phase to phase, phase to earth, mm				
	Minimum external air clearances: 11kV – phase to phase, phase to LV and phase to earth, mm				
	Minimum external air clearances: 33kV – phase to phase, phase to LV and phase to earth, mm				
4.9.10	Size and material of removable jumper between				

Clause Number	Description	BIDDER'S OFFER			
		5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
	top cover & tank				
4.10	Insulation Levels (internal)				
	11kV: Lightning impulse & power frequency withstand voltages				
	33kV: Lightning impulse & power frequency withstand voltages				
	LV: power frequency withstand voltage				
	External insulation level and altitude correction (indicate offered and altitude correction applied)				
4.11	Transformer Tank & Tank Cover				
4.11.1	Bolted top cover design				
	Minimum thickness of top cover, bottom and sides of offered transformer				
4.11.2	Inside clearance and painting				
4.11.3	Pressure test of tank and test report				
4.11.4	Lifting lugs and factor of safety				
4.11.5	Steel radiators/corrugations				
4.11.6	Top cover design, gasket & non-standard bolts and nuts				
4.12	Paint Work	-	-	-	-
4.12.1	Method of cleaning before painting				
4.12.2	Final colour of exterior surfaces and paint thickness				
4.12.3	Cleaning and painting of interior of tank and other oil filled chambers				
4.12.4	Degreasing & treatment of radiators with anti-rust inhibitor				

Clause Number	Description	BIDDER'S OFFER			
		5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
4.12.5	Final colour of exterior of radiators & paint thickness				
4.13	Fittings and Accessories	-	-	-	-
4.13 (a)	Pressure Relief Device & location				
4.13 (b)	Oil Level Gauge & location				
4.13 (c)	Earthing Terminals: location & to be stainless steel				
4.13 (d)	Separate Lifting lugs for core, top cover & complete transformer				
4.13 (e)	Off-circuit tap changer & location				
4.13 (f)	Tinned copper jumper size and materials				
4.13 (g)	Pole mounting brackets and drawings				
4.13 (h)	Rating and diagram plate				
4.13 (i)	Clamp Connectors				
4.13 (j)	Surge arrester mounting brackets and drawing				
4.14	Transformer Oil	-	-	-	-
4.14.1	ONAN				
4.14.2	Transformer to be supplied filled with new oil				
4.14.3	Class and standard of oil				
	Quantity of oil in liters				
4.15	Surge Arresters Mounting Brackets				
4.15.1	Drawing				
4.15.2	Universal type				
4.15.3	Galvanized to ISO 1461				
4.16	Quality Management System	-	-	-	-
4.16.1	Quality Assurance Plan to be based on ISO 9001:2008				
4.16.2	Declaration of conformity to IEC 60076				
	Copy of ISO 9001:2008 certificate submitted				

Clause Number	Description	BIDDER'S OFFER			
		5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
5.	Tests and Inspection	-	-	-	-
5.1	Test Standard				
	Responsibility of testing transformer & manufacturer's capability				
5.2	Copies of type test reports to IEC 60076				
	Lightning impulse withstand test				
	Short circuit withstand test				
	Temperature rise test				
5.3	Acceptance tests at manufacturers premises				
5.3.1	Routine tests to IEC 60076				
5.3.2	Type tests to IEC 60076				
	Temperature rise test				
	Lightning impulse withstand test				
5.3.3	Additional tests (sample test)				
5.4	Contact details for testing authority				
5.5	Complete test reports for approval before shipment				
5.6	Inspection or test by KPLC during delivery before acceptance to stores				
6.	Marking, Labelling & Packing				
6.1	Packing				
6.2	Dispatch fully assembled, oil filled and complete with surge arrester mounting brackets				
6.3	Method of marking to ensure it is permanent and legible				
6.4	Content of marking				
6.5	Marking of Type of core steel & letters KPLC on opposite sides of tank				
7	Documents with tender				
	Documents for approval				

Clause Number	Description	BIDDER'S OFFER			
		5KVA 11/0.242kV	15KVA 11/0.242kV	25KVA 11/0.242kV	25KVA 33/0.242kV
	before manufacture				
Other details required with the tender	Weight of complete transformer, kg				
	Weight of tank, kg				
	Material of tank				
	Weight of oil, kg				
	Weight of core, kg				
	Weight of windings (without insulation), kg				
	Weight of insulation, kg				
	Customer reference list and reference letters				
	Manufacturer's experience				
	Manufacturer's capacity (number of units per month)				
	Manufacturer's warranty and guarantee				
	Detailed list of all the required fittings and accessories indicating type/model number, manufacturer and quantities				
	List catalogues, brochures and technical data submitted to support offer				
	Deviations from tender specifications (indicate supporting documents submitted)				

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Manufacturer's Name, Signature, Stamp and Date