
	ISO 9001:2008 QMS	Ref No:	KP1/6/ID/1/2/F1
	WORK INSTRUCTION		
	LOCATION: Construction Sites		
		Issue No:	1
	Date	11th Feb. 2013	
	SUBJECT: Quality Construction Checklist; 11, 33, 66KV		2 Pages
Team/Contractor's Name:		Supervisor:	
Scheme title :		Ref No:	
Area:		Date:	
Scope:			
Item No.	Description	Standards Expected	
11KV, 33KV & 66KV LINES			
1	Pole condition in general		
	HT Pole erection condition		
	(a) Hole depth & back filling properly done	See Table 1	
	(b) Pole Alignment ok?	No leaning / Vertical	
	(c) Line Alignment ok?	Not Zig zag (As per design proposal)	
	(d) Has pole been interfered with by chopping some portions, band-it tape, Anti-split plate	No interference	
	(e) Dressing		
	i) Pole caps	Cover top of pole	
	ii) Nuts complete with washers	Both round & square washers	
	iii) Anti-climbing device height/barbed wire	3 meters from ground level (10ft)	
	iv) Danger/hatari plate height	3 meters from ground level (10ft)	
	v) Pole number height	3 meters from ground level (10ft)	
	(f) Span length	As per design. Basic Span for 75sqmm cond = 100m (Max 120m on single pole structure); Basic Span for 150sqmm & 300sqmm cond. = 80m on single pole structure.	
	g) Adherence to pole schedule	As per design proposal	
2	HT Conductor stringing		
	a) Tensioning & sagging	No waves	
	b) Conductor kinks, frays	None	
	c) Mid-span joints quality	Neat joint	
	d) T-Off Connection	Neat with U-loop for 11&33KV. Use V/Sect for 66KV T-off.	
	e) Ground clearance	As per KPLC standards (See Table 5)	
	f) Conductor spacing	See Table 3	
	g) Jumping & termination	Compression joints	
	h) Line separation	See Table 4	
3	HT Insulator installation		
	a) Conductor binding on insulators	Neat	
	b) Conductor termination to dead end clamps (gun clamps)	Neat	
4	HT Bush clearing 11,33,66KV	Clearance from centreline = 3.0m on either side ie (total 6m corridor) for 11/33KV and 10m corridor for 66KV, with Y-formation.	
5	Stays(Normal, flying, outrigger, struts)		
	a) Support angle (at the pole)	$30^{\circ} \leq \alpha \leq 45^{\circ}$	
	b) Distance of stay hole from pole	Determined by support angle (Between (approx) half pole length and full pole length) based on wayleaves availability	
	c) Support point in-relation to load on pole.	Closest possible point to the loaded point	
	d) Stay hole depth (shoe shaped)	1/2 ft deeper than respective pole hole (with shoe - shaped bottom)	
	e) Anti-climbing device/barbed wire	2 metres spread with make-off as the middle point	
	f) Size of stay wire and rod/pole used	See Table 2	
	g) Vertical Distance of stay insulator from ground level	3meters (10ft)	
	h) Spans supported	As per design. (Not more than one for Outrigger)	
6	Continous Aerial Earth	Every 4th pole; Value $\leq 20\Omega$	
7	ABS Installation		
	a) Operating handle level	1.2m from ground level with Permalli	
	b) Earth Matt	Installed - 2.5ftX2.5ft; Max 150mm depth	
8	MV/HT Cable installation		
	a) Depth	As per KPLC standards (Min 600mm/2ft)	
	b) Backfilling / Reinstatement	River sand / redsoil. Surface - as per Local authority requirement	
	c) Hatari slabs	Laid on entire cable length, back-to-back	
	d) Cable guard	Installed	
	e) Cable isolation / Protection installed	ABS / Taplins / Powder fuses/RMU (correct rating)	
	f) Earthing	On armour - both ends ; Value $\leq 20\Omega$	
	g) Surge Diverter installation	On both ends	

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Construction Checklist Reference Tables

NB. All manually dug holes shall be square 2ft by 2ft and shall be uniform from top to bottom. Any hole found to be wider at the top than at

TABLE 1

Pole Size (M)	Min recommended pole hole depth
11 m(36ft)	6ft (1.8m)
12 m(40ft)	7ft (2.0m)
14 m(45ft)	7ft (2.0m)
15 m(50ft)	8ft (2.4m)
17 m(55ft)	8ft (2.4m)

TABLE 2

Recommendation For Stay work	Size Stay Rod	Size Stay wire
LV Single phase	5/8" X 6'	4/8
75MM2 ACSR, Three phase	3/4" X 7'	3/4
150MM2 ACSR	1" X 8'	19/10
300MM2 AAAC	1" X 8'	19/10
Note: You can use a higher stay size for a lower conductor, but never vice versa		
You can also use more stays as the situation demands		

TABLE 3

Conductor spacing

Conductor spacing, m & ft

	11KV	33KV	66KV
Standard (Sections, angles & other formations)	0.9144m, 3' 0"	1.2192m, 4'	6ft
Interpoles - Horizontal formation (Alternating pole separations)	0.6604m, 2' 2"	1.1176m, 3' 8"	6ft
	0.8636m, 2' 10"	1.3208m, 4' 4"	6ft

TABLE 4


Line separations for different voltages


	LV	11KV	33KV	66KV	≥132KV
Neutral	1 ft	-	-	-	-
LV	1ft	4ft	4ft	U/G*	U/G*
11KV	4ft	3ft	4ft	6ft	U/G*
33KV	4ft	4ft	4ft	6ft	U/G*
66KV	U/G*	6ft	6ft	6ft	U/G*
≥132KV	U/G*	U/G*	U/G*	U/G*	U/G*

U/G* As per design. Underground the lower of the two voltages or provide guard net

TABLE 5

GROUND CLEARANCE	Min. Clearance (Height) that must be achieved
Type of facility (Public rds etc)	
Public Roads	20ft (6M)
Railways crossings	30ft (9.2M)
Private land	17ft(5.2M)

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Item No.	Description	Standards Expected	
II	LV		
1	LV Pole erection		
	(a) Hole depth & back filling properly done	See Table 1	
	(b) Pole Alignment ok?	No leaning	
	(c) Line Alignment ok?	Not Zig zag	
	(d) Has pole been interfered with by chopping some portions, band-it tape, Anti-split plate	No interference	
	(f) Dressing		
	(j) pole caps	Cover pole top	
	(i) Nuts c/w washers	Both round and square washers	
	(ii) D-iron,	Neat	
	(e) Span length	Basic span length =50m (Max=60m)	
	Adherence to pole schedule	As per design proposal	
2	LV Conductor stringing		
	a) Tensioning & sagging	No waves	
	b) Conductor kinks, frays	None	
	c) Mid-span joints quality	Neat joint	
	d) Ground clearance	See table 5	
	e) Conductor spacing	1ft	
	f) Jumping & termination	Compression joints	
	g) Neutral conductor double line tapped	Compulsory	
	h) Shackle insulator c/w bolt & nut	Neat	
	i) Conductor properly bound on insulator & on pole	Neat	
	j) Line separation	See Table 4	
3	LV Bush clearing	Clearance from centreline = 1.5m either side ie (total 3m Corridor) for LV	
4	Stays(Normal, flying, outrigger, struts)		
	a) Support angle (at the pole)	$30^{\circ} \leq \alpha \leq 45^{\circ}$	
	b) Distance of stay hole from pole	Determined by support angle (Between (approx) half pole length and full pole length) based on wayleaves availability	
	c) Support point in-relation to load on pole.	Closest possible point to the loaded point	
	d) Stay hole depth (shoe shaped)	1/2 ft deeper than respective pole hole (5.5ft with shoe shaped bottom)	
	e) Anti-climbing device/barbed wire on stay and struts	2m spread with make-off as the middle point	
	f) Size of stay wire and rod/pole used	See Table 2	
	g) Vertical Distance of stay insulator from ground level	10ft (3m)	
	h) Spans supported	As per design (Not more than one for Outrigger)	
5	PME Installation		
	a) Testing point distance from ground level	1.5m (5ft)	
	b) PVC earth slat	Neat	
	c) Earth electrodes	Not exposed	
	d) Location	Installation on every terminal pole and fourth LV pole from TX (≤ 10 ohms)	
6	Service cable installation		
	a) General quality of service cable installation	Neat	
	b) Proper termination and joints	Neat	
	c) Cable guard	Installed	
	d) Backfilling	Redsoil/excavated soil unless unsuitable	
	e) Trench depth and ducting	2ft deep	
	f) Hatari slabs	Joining back to back	
	g) Angle iron	Firm anchorage; 15ft/4.5M ground clearance; Terminate with D-Iron & Shackle insulator; Intake conduit bent to $< 90^{\circ}$	

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		2 pages	

Construction Checklist Reference Tables

NB. All manually dug holes shall be square 2ft by 2ft and shall be uniform from top to bottom. Any hole found to be wider at the top than at the bottom (Tapered) shall be rejected.

TABLE 1

Pole Size (M)	Min recommended pole hole depth
10 m(32ft)	5ft (1.6m)
11 m(36ft)	6ft (1.8m)
12 m(40ft)	7ft (2.0m)
14 m(45ft)	7ft (2.0m)
15 m(50ft)	8ft (2.4m)
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Conductor spacing, m & ft

	11KV	33KV
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Interpoles - Horizontal formation (Alternating pole separations)	0.6604m, 2' 2"	1.1176m, 3' 8"
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Neutral	1 ft	-	-	-	-
LV	1ft	4ft	4ft	U/G*	U/G*
11KV	4ft	3ft	4ft	6ft	U/G*
33KV	4ft	4ft	4ft	6ft	U/G*
66KV	U/G*	6ft	6ft	6ft	U/G*
≥132KV	U/G*	U/G*	U/G*	U/G*	U/G*

U/G* As per design. Underground the lower of the two voltages or provide guard net

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Team/Contractor's Name:	Supervisor:
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Item No.	Description	Standards
		Expected
III	S/STN	
1	Dressing	
	(a) HT Leads	
	i) Loops	U-loop
	ii) Droppers	Neat with pilot insulators; delta connection on HT for single phase bank: spare loop
	(b) Channels	Leveled and firmly fixed
	(c) MV fuses	Neat and as per rating designed
	(d) LV fuses	Neat and as per rating designed; with covers
	e) L V wiring	Neat and colour coded; star connected in case of s/phase bank
	f) Ground clearance	Project eng to guide on anti vandalism installation. Level for Ground mounted - As per KPLC drawing
	g) S/S. numbering & hatari plates	Installed 10ft from Ground level
	h) Surge diverters installed & at the correct position	As close as possible to TX (below isolation)
3	Earthing	
	a) MV earthing	≤ 20 ohms
	b) LV earthing (insulated and at least 9m away from HT earths - normally one span away)	≤ 10 ohms
	c) Surge Divertor earthing	≤ 20 ohms
	d) MV & LV earthing	separate
	e) Test point	1.5m (5ft) from ground
4	Tx mounting	
	a) Transformer anchorage	Tied and welded
	b) Transformer condition (no parts damaged during installation); No leakage	Neat / no damage during transportation and Installation / no leakage