CENTRAL EXECUTIVE COMMITTEE

Sl. No.	Name	Des	Position	Mobile	Email id
1	INDIRA K	EE	President	9446479770	indirak25@hotmail.com
2	MANOJ E	AEE	Working President	9447384883	manoj.edathikudy@yahoo.com
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12	USHA T A	AEE	Vice President	9447110434	ushaupnadh@gmail.com
13	MANOJ G	EE	Vice President	9447694860	gopa.manoj@gmail.com
14	RENJANADEVI K	EE	Vice President	9446589984	renjanadevi.krishna@gmail.com
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22	DEEPA V S	AEE	Secretary	9496368060	deepavsnair@gmail.com
23	SUMASEKHAR S	SS	Secretary	9447310973	sumasekhar@gmail.com
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25	SANIL KUMAR S R	AE	Secretary- Benevolent Fund	9447011484	saniluchackkada@gmail.com
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DISTRICT PRESIDENTS, SECRETARIES & TREASURES

District	Name of President	Mobile	Name of Secretary	Mobile	Name of Treasurer	Mobile
Thiruvananthapuram	Rajeshkumar K	7559928518	Anish D	9400848937	Sangeetha	9446751398
Kollam	Mettilda K A	9074456941	Anil Prasad S	9446469243	Krishnachandran	9037583287
Pathanamthitta	K R Venugopal	9447356560	Baiju G	9495682166	K N Shajahan	9446708774
Alappuzha	Manojkumar S	6282967906	Sujithkumar P	9447259536	Arun B	9656076719
Kottayam	Lekha S Nair	9447318473	Anoopraj V P	9846531505	Prasad N S	9447418066
Idukki	Satheeshkumar K P	9447916011	Amal Raveendran	9961874743	Manoj	9447416232
Eranakulam	Thripudi Jayan	9846223594	Russel B V	9846050117	Shahanas Begum	9495307441
Thrissur	Saradadevi A C	9447301314	Jatheendran K	9447285310	Byju A J	9495462429
Palaghat	Prakashan C K	9446496369	Renjith K R	9446454627	K V Ramaprakash	9400740024
Malappuram	Rajeev E	9746679631	Rahul S	9447384834	Sreenivasan C	9745153502
Wayanad	Sudheesh C P	9388578844	Prakasan K M	9895958564	Sajeev	7025365705
Kozhikode	C K Hajira	9447396183	D. Dwipindas	9496219050	Rasheed P P	9447333986
Kannur	Ajith N V	8891462258	Lathish M	8301090315	Vijesh A P	9447774650
Kasaragod	T P Asa	9497836833	M Bhaskaran	9447204943	M R Kesavan	9497269094
Moozhiyar	Saju P V	9447593235	B Gopakumar	9497709413	N Sudeepkumar	9447766194

IMPORTANT OFFICE TELEPHONE NUMBERS

Honorable Minister for Electricity	Sri. Krishnankutty K	9446008001	04712321228 04712517561	kkrishnankutty@niyamasabha.nic.in
Chairman & Managing Director	Dr. Rajan N Khobragade IAS	9446008002	04712442125	cmdkseb@kseb.in
Director (Finance)	Sri. Biju R (Full additional charge)	9446008003	04712448409	dfkseb@kseb.in
Director (Distribution, Supply Chain Management & Information Technology)	Sri. P Surendra	9446008004	04712445658	ddkseb@kseb.in
Director (Transmission, System Operation, Planning & Safety)	Dr. Saji Paulose	9446008850	04712446885	dtkseb@kseb.in
Director (Generation - Electrical) (REES) SOURA, Sports & Welfare)	Sri. Sajeev G	9446008005	04712514484 0471-2514301	drees@kseb.in dgekseb@kseb.in
Director (Generation, Civil)	Sri. Radhakrishnan G	9446008118	04712448720	dgkseb@kseb.in
Director Independent	Adv. Murugadas V	9446008009	9446005009	test@mail.org
Director (Ex-Officio) Principal Secretary, Power Department	Sri. K R Jyothilal IAS		04712518274	secy.pwr@kerala.gov.in
Director (Ex-Officio) Additional Chief Secretary, Finance Department	Sri. Mohammed Y Safirulla K IAS		0471-2327586	xxxx@kseb.in

Scan QR Code For Addition,
Updated Details & Information of important office

INSPECTION BUNGLOW

General Booking at Vydyuthi Bhavan, Thiruvananthapuram: 0471-2514518

Name of IB	CUG	Land No.	Name of IB	CUG	Land No.
1. Alappuzha	9496008649		22. Munnar House	9496011810	04865230324
2. Ambalappara	9496009927		23. Munnar IB	9496009438	04865231790
3. Areecode	9496010562		24. Mylatty (Kasargode)	9496011428	04672236736
4. Chithirapuram	9496009432	04865263072	25. Padinjarathara (Wayanad)	9496011554	04936274474
5. Guruvayoor	9496009931	04872554307	26. Palakkad	9744669001	04912547663
6. Idamalayar	9496009434		27. Pambla	9446110748	04735203424
	9496012039		28. Paruthippara	9446008974	04712545415
7. Kakkad (Seethathode)	9496008055	04735258150	29. Pathanamthitta		
Kakkad House (Annex)	9496008056	04735258050	(Ex. Engrs House)	9496011706	0468222267
8. Kakkayam	9496009932	04962698232	Pathanamthitta IB	8086192522	
9. Kalamassery	9496009262	04842541180	30. Poringalkuthu	9496001565	
10. Kallarkutty	9496009934	04864274405	31. Peerumade	9496009436	04869232412
11. Kaloor	9496009263	04842343037	32. Poovanthuruthu	9496008349	04812342871
12. Kannankuzhy	9496012062	04802769151	33. Sabarimala	9496008060	04735202024
13. Karimanal	9496009264	04852552294	34. Sholayar (from Gen Divsn).	9496009891	
14. Kochupampa	9496011960		35. Thariyode	9496011429	
15. Kozhikode	9496011073	04952369256	36. Thenmala	9496008051	04752344534
16. Kurumassery	9496009130		37. Thrissur	9496011552	04872382151
17. Madakkathara	9496009935		38. Vadakara	9496018619	
18. Moolamattom Circuit House	9496009433	04862252650	39. Vellathooval	9496009437	
19. Moolamattom IB	9496009435	04862252626		9496009386	
20. Moozhiyar (Booking)	9496008057		40. Vazhathope	9446012334	04862235212
Moozhiyar House	9496008058		Vytilla (No.1B)		
21. Mundayad (Kannur)	94960011427	04972721844	41. Wellington Island (Ekm)...	9496009260	04842666463

IT HELP DESK

APPLICATION	CUG	LANDPHONE	MAILID
HRIS	9496012184	0471-2514216	hris@kseb.in
SCM	9496008700	0484-2306888	scmsupport@kseb.in
ERP(North Malabar/Central/South)	9496010700/9496008700/9496018664		
SARAS	9496010700	0475-2367088	sarassupport@kseb.in
OrumaNET	9446008892, 9496012427	0471-2514648	orumanetsupport@kseb.in

POWER PROJECTS IN KERALA AS ON 31-10-2023

Sl. No	Name of Station	Plant Capcity in (MW)	Annual Generation Designed MU
I	**HEPs**		
1	Idukki	780	2398
2	Sabarigiri	340	1338
3	Idamalayar	75	380
4	Sholayar	54	233
5	Pallivasal	37.5	284
6	Kuttiyadi	75	268
7	Kuttiyadi Extension	50	75
8	Kuttiyadi Additional Exten.Scheme	100	223
9	Neriamangalam	52.65	237
10	Lower Periyar	180	493
11	Poringalkuthu	36	191
12	Sengulam	51.2	182
13	Kakkad	50	262
14	Panniar	32.4	158
15	Neriamangalam Extn Scheme	25	58.27
	Sub Total (HEP)	1938.75	6780.27
II	**Small HEPs / Thermal / Wind**		
1	Kallada	15	65
2	Malankara	10.5	65
3	PLBE	16	74
4	Peppara	3	11.5
5	Madupatty	2	6.4
6	Malampuzha	2.5	5.6
7	Lower Meenmutty	3.5	7.63
8	Chembukadavu - 1	2.7	6.59
9	Chembukadavu - 2	3.75	9.03
10	Urumi -1	3.75	9.72
11	Urumi -2	2.4	6.28
12	KTR	3.75	15
13	Poozhithode	4.8	10.97
14	Ranni-Perinadu	4	16.73
15	Peechi	1.25	3.21
16	Vilangad	7.5	22.63
17	Chimmony	2.5	6.7
18	Adyanpara	3.5	9.01
19	Barapole	15	36
20	Poringalkuthu Micro (Screw Turbine)	0.011	0.082
21	Vellathooval	3.6	12.17
22	Perunthenaruvi	6	25.77
23	Kakkayam SHEP	3	10.39
24	Chathankottunada Stage-II	6	14.76
25	Poringalkuthu	24	45.02
26	Upper Kallar	2	5.14
	Sub Total (SHEP)	152.011	500.332
	Total (Hydel)	2090.76	7280.60
	Thermal Plants		
1	BDPP	63.96	363.6
2	KDPP	96	672
	Sub Total (Thermal)	159.96	1035.60
	Wind farm		
1	Kanjikode Wind Farm	2.025	4

Sl. No	Name of Station	Plant Capcity in (MW)	Annual Generation Designed MU	
III	**IPP/CPP/ Private IN THE STATE**			
	SHEPs-IPP and owner of the plant			
1	Maniyar - (Carborandum Universal Ltd.)	12	36	CPP
2	Kuthungal - (INDSIL Hydro Power & Manganese Ltd.)	21	79	CPP
3	Ullunkal -(EDCL Power Projects Ltd.)	7	32	IPP
4	Iruttukanam - (Viyyat Power Pvt.Ltd.)	4.5	13	IPP
5	Karikkayam -(Ayyappa Hydro Power Ltd.)	15	46.52	IPP
6	Mankulam -(Mankulam Grama Panchayat)	0.11	0.29	IPP
7	Meenvallom -(Palakkad Small Hydro Co.Ltd.)	3	8.37	IPP
8	Kallar -(Idukki District Panchayat)	0.05	0.13	IPP
9	Pathamkayam -(Maniyar Renewable Eenergy Projects Pvt.Ltd.)	8	25.54	IPP
10	Deviyar Micro	0.05	0.02	IPP
11	Arippara	4.5		IPP
12	Anakkampoil	8		IPP
	Sub Total	83.21	240.87	
	Thermal			
1	PCBL - (Philips Carbon Black Ltd.)	10	70.08	CPP
2	RGCCPS-NTPC	359.58	2158	IPP
	Sub Total	369.58	3394.75	
	Wind			
1	Wind-Agali	13.8	28.95	IPP
2	Wind-Koundikkal	4.8	10.07	IPP
3	Wind-Ramakkalmedu	14.25	23.79	IPP
4	Wind- Ahalya, Kanjikode	8.4	17.42	IPP
5	Wind-INOX, Kanjikode	16	32.97	IPP
6	Wind-Kosamattom,Nedumkandam	1	1.24	IPP
7	Wind-Malayala Manorama (CPP)	10	25.31	CPP
	Sub Total	68.25	139.75	
	Solar			
1	KSEB-RTS	23.5		KSEB
2	Soura RTS (KSEB)	146.91		CPP
3	KSEB-Ground Mounted	18.6		KSEB
4	KSEB-Floating	0.51		KSEB
5	ANERT - Kuzhalmannam	2		IPP
6	HINDALCO	3		IPP
7	CIAL - Nedumbasseri	38.99		IPP
8	CIAL - Payyannur	10		IPP
9	KMRL	2.72		IPP
10	Bharat Hospital	1		IPP
11	KIAL	15		IPP
12	St Gobain	2.5		IPP
13	NTPC - Floating	92		IPP
14	Ezhimala Naval Accadamy	3		IPP
15	Agali Goat Farm	0.5		IPP
16	IPP-Solar Park (Ambalathara)	50		IPP
17	IPP-Solar Park (Paivalika)	50		IPP
18	CIAL	0.55		CPP
19	Cochin Ship yard	0.835		CPP
20	KMRL	2.67		CPP
21	Ongrid LT	348.39		CPP
22	Ongrid HT	57.31		CPP
23	Sub Total (solar)	868.25		

Sources	MW	Annual Generation Designed MU
Hydro	2179.97	7546.17
Thermal	529.54	4430.35
Wind	70.28	143.75
Solar	868.25	995.92
	3648.04	13091.50

KSEB GENERATING STATIONS

No.	Station	No. of Machines & MW Capacity of each	Total Capacity MW	Average net effective head (m)	Annual Yield MU	Water required for 1 MU genera-tion (MCM)	Full load discharge of 1 machine M3/Sec	Type of Turbine	Firm Power at 100% Load factor MW	Reservoir	Full Reservoir Level M	MDDL (M)	Effective Storage (MCM)	Dead Storage (MCM)	Years of Commis-sioning
1	Idukki (Moolomattom)	6x130	780	660	2398	0.6796	24.50	Pelton	280.2	Idukki	732.43	694.94	1459.70	536.86	1976-86
2	Sabarigiri(Moozhiyar)	2x60	340	750	1338	0.62	8.61	Pelton	152.6	Pamba	986.332	963.16	31.10	8.10	1966-67
		4x55								Kakki	981.456	908.30	446.54	7.60	
3	Kuttiyadi HER Kakkayam	3x25	75.0	640	268	0.71	8.60	Pelton	30.6	Kuttiyadi	758.037	737.62 754.86	33.99	4.40	1972
	Kuttiyadi Extn.	1x50	50	640	75	0.70	5.69	Pelton	8.56	Thariyode	775.60	737.62	33.99	4.40	2001
	Kuttiyadi Addl.Extn	2x50	100	630	223			Pelton				738.62	210	23.75	2010
4	Lower Periyar(Karimanal)	3x60	180	203.63	493	2.17	36.66	Francis	56.3	Periyar	253	237.74	4.55	0.8	1997
5	Kozhikode Diesel Power Project	6x16	96		672				102.4						1999
6	Brahmapuram Diesel Power Project	3x21.32	63.96		606	208GM ofLSHS/ KWH Or 200gm. ofDiesel per Kwh			73						1997-98
7	Neriamangalam	3x17.5	52.50	180	237	2.44	10.12	Francis	27.0	Neriamangalam	456.590	445.91	5 56	1.31	1961-63
	Neriamangalam Ext scheme	1x25	25	180	58.27			Francis		Kallarkutty	456.59	445.91	5.56	1.31	2008
8	Idamalayar	2x37.5	75.0	110	380	4.00	41.67	Francis	43.3	Idamalayar	169.00	115.00	1017.80	72	1987
9	Sholayar	3x18	54.0	300	233	1.50	7.50	Francis	20.6	Sholayar	811.682	779.37	149.23	4.25	1966-68
10	Kakkad	2x25	50.0	132.60	262	3.251	22.58	Francis	30.0	Moozhiyar Veluthodu	192.63 192.00	181.36 186.00	1.16 0.607	0.34 0.63	1999
11	Poringalkuthu	4x9	36.0	170	191	2.83	6.29	Francis	19.6	Poringalkuthu	423.976	405.69	30.30	1.70	1957-60
	Poringalkuthu LBE	1x16	16.0	170	74	2.57	11.42	Francis	9.8	Poringalkuthu					1999
	Poringalkuthu Stage 1	1x24	24	170	45.02										
12	Sengulam	4x12.8	51.2	341	182	1.27	4.23	Pelton	20.80	Sengulam	847.60	844.86	1.61		1954-55
13	Pallivasal	3x53x7.5	37.5	570	284	0.707 0.792	0.98 1.65	Pelton	32.5	Kundala Mattupetty	1758.696 1599.590	1735.84 1554.48	7.80 55.20	0.024 0.127	1940-51
14	Panniar	2x16	32	220	158	2.13	8.83	Francis	18.0	Ponmudi Anayirangal	1207.008 707.75	1188.11 676.66	48.97 47.4	0.85 4.15	1963-64
15	Kallada	2x7.5	15.0	43.0	65	9.75	20.32	Kaplan	6.05	Kallada (Thenmala)	115.824	24.38	488.53	16.14	1994

No.	Station	No. of Machines & MW Capacity of each	Total Capacity MW	Average net effective head (m)	Annual Yield MU	Water required for 1 MU generation (MCM)	Full load discharge of 1 machine M3/Sec	Type of Turbine	Firm Power at 100% Load factor MW	Reservoir	Full Reservoir Level M	MDDL (M)	Effective Storage (MCM)	Dead Storage (MCM)	Years of Commis-sioning
16	Malankara	3x3.5	10.5	12.2	65	35.5	34.5	Kaplan	5.02	Malankara	42	36	41.6	18.5	2005
17	Poozhithodu(SHP)	3x1.6	4.8	72	10.97			Francis(Horiz)		Poozhithodu					2011
18	Ranni-Perinad(SHP)	2x2	4	6.3	16.73		39.17	Kaplan(Horiz)		R-Perunad					2012
19	Kuttiadi Tail Race Scheme	3x1.25	3.75	21	17.01			Kaplan(Horiz)		Kuttiadi TailRace					2009
20	Chembukadavu 1	3x0.9	2.7	35.5	6.59	12.22	3.06	Francis(Horiz)	0.75	Chembukadavu					2004
21	Chembukadavu II	3 x1.25	3.75	55	9.03	7.75	2.70	11	1.03	-					2004
22	Urumi1	3x1.25	3.75	96.5	9.72	4.473	1.553		1.10	Urumi-1					2004
23	UrumiII	3x0.8	2.4	55	6.28	7.983	1.774	11	0.71	Urumi-2					2004
24	Lower Meenmutty	2x1.5 1x0.5	3.50	13	7.63	35.9	14.98	Kaplan	0.4	Lower Meenmutty	62.75	61.40			2006
25	Peppara	1x3	3	25	11.5	19.55	16.3	Kaplan	1.30	Peppara	110.5	87.5	67.5	2.5	1996
26	Malampuzha	1x2.5	2.5	14.4	5.6	28.24	23.14	Kaplan	0.64	Malampuzha	115.09	99.5	236.7	10.2	2001
27	Kanjikode Wind Farm Project	9x0.225 KW	2.025		4				0.40						1995
28	Maatuppetty	1x2	2		6.4			Francis	0.70	Mattuppetty	1599.59	1568.6	55.20		1998
29	Peechi	1x1.25	1.25	24	3.21	20.39	7.08	Kaplan(Horiz)	0.36	Peechi	79.25	69.70	112.6	0.62	2013
30	Vilangad	3x2.5	7.5	99	22.63		2.875	Francis		Panoth.Vbluk					2014
31	Chimmony	1x2.5	2.5	45.16	6.7	12.80	8.93	Francis(Horiz)	0.765	Chimmony	79.40	56.5	172.82	2.54	2015
32	Adyanpara	2x1.5+ 1x0.5	3.5	94	9.01	4.408	1.83	Francis(Horiz)	1.01	Adyanpara					2015
33	Barapol	3x5	15	50.2	36	8.47	11.30	Francis(Horiz)							2016
34	Vellathooval	2x1.8	3.6	12	12.7	37.8		Kaplan(Horiz)		Vellathooval	472	470			2016
35	Peringalkuthu Micro HEP	11kW	11kW	1	0.1			BladeScrew		TailraceofPLEB					2016
36	Perunthenaruvi	2x3	6		25.77	24.0	20.98	Kaplan(Stype)		Perumthenaruvi	51	48	0.6	0.4	2017
37	Kakkayam	2x1.5	3	18.36	7.34	46.66	19.44	Kaplan (Horiz)	1.2	Kuttiyadi Tail Race	88.63	81.63			2018
38	Chathankottunada	3x2	6	14.76			9.17x3	Francis(Horiz)		Poothampara/ karingad	126.3				2021
39	Upper Kallar	2x1	2	51	5.14	9.18	2.55	Francis(Horiz)		Viripara	1137.4				2021

REFERENCE STANDARDS FOR HYDRO MACHINE

Sl.No	Standards	Remarks
1	IEC 61362	Specification of hydraulic turbine control system - Speed Governor Functions
2	IEC 60308	Hydraulic Turbines Testing of control systems - Speed Governor Tests
3	IEEE 125	Equipment specifications for speed-governing of hydraulic turbines intended to drive electric generators - Speed Governor Equipment Specification
4	IEEE 421.4	Guide for the preparation of excitation system specification.
5	IEEE 421.5	Excitation system models for Power system stability studies.
7	IEEE Standards 421 and 421A	Methods of Test, Characteristics and Definitions of Excitation system
S	IEC 61850	Substation Automation
9	IEC 60870-5	Tele-control equipment and systems
10	IEC 60793 Part 1 & 2	Optical Fiber- Measurement, test procedures, product specification
11	IEC 61131	Programmable controllers
12	IEEE 1046	Application guide for distributed digital control and monitoring for power stations
14	IS 4247	Code of practice for structural design of surface hydel power stations
15	IS 12837	Guidelines for selection of hydraulic turbines for medium and large hydroelectric station
16	IS 12800	Guidelines for selection of turbines preliminary dimensioning & layout of surface hydroelectric power houses.
17	ISO 4406/NAS 1638	Hydraulic oil cleanliness standard
21	IEC 60309	Industrial Plug and Sockets
22	IS 909	Specification for Underground Fire Hydrant, service value type
23	IS/1S0 7915-5	Mechanical Vibration —In Hydraulic Power Generating And Pumping Plants
24	IS 3177	EOT crane
25	IS1079:2009 & IS 513 2008	Hot rolled carbon steel sheet and strip Cold reduced low carbon steel sheets and strips
26	IS 2629 : 1985	Recommended practice for hot dip galvanizing of iron & steel
27	ASME B31.3	Power Plant Piping system

HYDRO STANDARDS AS PER IS 12837

Type of Turbine	Range of Maximum net head available - Turbine Classification	Maximum output for continuous operation without undue cavitation -%	Permissible pressure rise %	Permis-sible speed %	Selection as per head variation in Persentage of rated of head	load variation percentage of rated out put	Special speed	peak efficiency
Pelton	Above 300m	30-50	15 to 30	20 to 45	120 to 80	50 to 100	15 to 65	90
Francis	30 to 400m	50	30 to 35	35 to 55	125 to 65	50 to 100	60 to 400	93
Kaplan	10 to 60m	30 to 40	30 to 50	30 to 65	125 to 65	40 to 100	30 to 800	92
Bulb	3 to 20m	30 to 40	30 to 50	30 to 65	125 to 65	40 to 100	600 to 1200	92
Deriaz	50 to 150m	40	20 to 45	35 to 65	125 to 65	50 to 100	200 to 400	92
Propeller	85	30 to 50	30 to 65	110 to 90	90 to 100	300 to 800	92	

CRITERIA FOR, SELECTING HYDRAULIC OILS IN HYDRO

OIL GRADE	KINEMATIC VISCOSITY	APPLICATION
ISO VG 68	68 Centistokes at 40 C	For tropical sites
ISO VG 57	57 Centistokes at 40 C	For normal temp sites
ISO VG 46	46 Centistokes at 40 C	For subzero temp sites

MAIN INLET VALVE SELECTION

1. Butterfly Valve:
   Up to 200 m head
2. Spherical Valve:
   More than 200 m head

DEGREE OF IMPACT PROTECTION (IK)
DEGREES OF PROTECTION PROVIDED BY ENCLOSURES FOR ELECTRICAL EQUIPMENT AGAINST EXTERNAL MECHANICAL IMPACTS IN ACCORDANCE WITH IEC 62262:2002 AND IEC 60068-2-75:1997

Ik00	Not protected
IK01	Protected against 0.14 joules impact. Equivalent to impact of 0.25kg mass dropped from 56mm above impacted surface.
Ik02 Ik03	Protected against 0.2 joules impact. Equivalent to impact of 0.25kg mass dropped from 80 mm above impacted surface. Protected against 0.35 joules impact. Equivalent to impact of 0.25kg mass dropped from 140 mm above impacted surface
Ik04	Protected against 0.5 joules impact. Equivalent to impact of 0.25kg mass dropped from 200 mm above impacted surface.
Ik05	Protected against 0.7 joules impact. Equivalent to impact of 0.25kg mass dropped from 280 mm above impacted surface.
Ik06	Protected against 1 joules impact. Equivalent to impact of 0.25kg mass dropped from 400 mm above impacted surface
Ik07	Protected against 2 joules impact. Equivalent to impact of 0.5kg mass dropped from 400 mm above impacted surface.
Ik08	Protected against 5 joules impact. Equivalent to impact of 1.7kg mass dropped from 300 mm above impacted surface.
Ik09	Protected against 10 joules impact. Equivalent to impact of 5kg mass dropped from 200 mm above impacted surface.
Ik10	Protected against 20 joules impact. Equivalent to impact of 5kg mass dropped from 400 mm above impacted surface.

IP RATINGS FIRST DIGIT (INTRUSION PROTECTION)

0	No special protection.
1	Protection from a large part of the body such as a hand (but no protection from deliberate access); from solid objects greater than 50mm in diameter.
2	Protection against fingers or other object not greater than 80 mm in length and 12mm in diameter.
3	Protection from entry by tools, wires etc, with a diameter of 2.5 mm or more.
4	Protection against Solid bodies larger than 1 mm (eg. fine tools / small etc.)
5.	Protected against dust that may harm equipment.
6.	Dust tight.

SECOND DIGIT (MOISTURE PROTECTION)

0	No protection.
1	Protection against condensation
2	Protection against water droplets deflected up to 15° from vertical
3	Protected against spray up to 60° from vertical.
4	Protected against water spray from all directions.
5	Protection against low pressure water jets (all directions)
6	Protection against string water jets and waves.
7	Protected against temporary immersion.
8	Protected against prolonged effects of immersion under pressure.
9	Protected against high pressure water

REFERENCE STANDARDS FOR TRANSFORMER OIL

Sl No	Test	For new oil as per IS. 335 of 1993	For unused mineral oil filled in new transformer as per IS. 1866 of 2000		
			<72.5 kV	72.5 to 170 kV	>170 kV
1	Breakdown voltage KV (Dielectric Stren) After filtration	60	40	50	60
2	Specific resistance at 27°C (Ohm cm),Minimum	1500X10^12	6X10^12		
3	Water content,Max	50PPM	20 PPM	15 PPM	10 PPM
4	Dielectric dissipation factor (Tan Delta at 90°C)	0.002	0.015		
5	Neutralisation value mg. of KOH/G of Oil,Max	0.03	0.03		
6	Inter facial tension N/m at 27°C	0.04	0.035		
7	Flash Point	140°C	140°C		
8	Total sludge after oxidation	0.1 percent by Wt.	0.1 percent by Wt.		

RECOMMENDED MINIMUM INSULATION RESISTANCE FOR TRANSFORMER WINDINGS

Sl No.	Min. Safe Insulation Resistance in Mega Ohms			
Rated voltage of the winding	*30°C	*40°C	*50°C	*60°C
66 kV and above	500	250	125	65
22kV and 33kV	400	200	100	50
6.6kV and 11 kV	300	150	75	40
Below 6.6 kV	200	100	50	25

GAS ANALYSIS OF BUCHHOLZ RELAY(IS 3638-1966)

1. Examine buchholz relay for the collection of gas.
2. Note and record the quantity and colour of gas collected. A colourless accumulation usually indicates the presence of air.
3. Release a small quantity of gas and smell. Peculiar smell other than oil smell is not desirable.
4. Prepare Silver Nitrate solution of any concentration in a woulff bottle (the solution must be clear).
5. Allow some quantity of gas to bubble through this clear solution of Silver Nitrate.
6. a) If there is no change in the colour of solution, it generally indicates that the gas is merely air.
   b) Whitish precipitation- Decomposition of paper.
   c) Yellow precipitation- Decomposition of wood.
   d) Deep grey-gas of overheated oil due to burning of iron.
   e) Black-gas of decomposed oil due to electric arc.
7. If a precipitate is obtained, thorough examination of the transformer should be made at the earliest opportunity. Get the dissolved gas analysis done before thorough inspection of transformer to detect incipient faults.

DISSOLVED GAS ANALYSIS

GAS LIMIT VALUES

Gas	< 4 yrs in service	4 - 10 yrs	> 10 yrs
Hydrogen	100 PPM	300 PPM	300 PPM
Methane	120 PPM	150 PPM	300 PPM
Acetylene	35 PPM	50 PPM	150 PPM
Ethylene	50 PPM	200 PPM	400 PPM
Ethane	65 PPM	150 PPM	1000 PPM
CO	350 PPM	500 PPM	700 PPM
Co_2	2500 PPM	5000 PPM	12000 PPM

KEY GAS METHOD

Presence of Gas	Indication
Methane, H_2	PD (Over Stressing of insulation, cavities in insulation, poor impregnation)
Methane, Ethane	Local low temperature hotspot
Ethylene	Local high temperature hotspot
Acetylene, H_2	Arcing fault (Short circuit in winding, break down between winding)
CO, CO_2	Cellulose and Paper ageing

RECOMMENDED VALUE OF EARTHING RESISTANCES

Sl. No.	Particulars	Earth Resistance Ohms
1	Power Stations	0.5
2	Major Substations	1.0
3.	Minor Substations	2.0
4.	Distribution Lines	15.0
5.	Tower Footing Resistance	10.0

RANGE OF SOIL RESISTIVITY

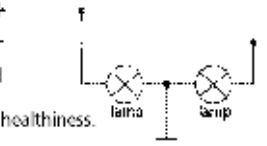
Soil Condition	Resistivity in Ohm-m
Severely Corrosive	0 to 25
Moderately Corrosive	25 to 50
Mildly Corrosive	50 to 100
Very Mildly Corrosive	above 100

CURRENT DENSITY OF EARTHING CONDUCTOR

Copper	1.18 A/mm²
Aluminium	0.73 A/mm²
Steel	0.46 A/mm²
	Minimum diameterof GI rod 16 mm

BATTERY MAINTENANCE

1. Mere availability of DC voltage is not an index of the healthiness of Battery.
2. The healthiness of the battery is to be test checked by tripping and closing the breaker circuits, with no AC supply to the charger.
3. Leakage in DC Circuits should be attended immediately by sectionalisation; then by isolation and finally by restoration.
4. Leakage indication lamps (see fig.) should be connected on charger for continuous indication of healthiness.



5. Check the cells for fracture and breaking of container and excessive rise of temperature.
6. Check the electrolyte level of the cell and top up the level if necessary with distilled water.
7. Check the specific gravity & voltage of the cells. If any of the cells is found to be having low voltage and specific gravity, bypass that cell. The cells thus removed should be charged separately and brought back into service after the attainment of voltage and specific gravity.
8. When making electrolyte for storage batteries, always pour acid into water and not vice versa as it causes an explosion. Suitable goggles or face shields should always be worn when making electrolyte.
9. Check the battery terminals for tightness, smear the terminals with vaseline (petroleum jelly).
10. HRC Fuses or MCBs are to be provided for every outgoing DC circuit.
11. Ensure the battery is in floating condition normally by adjusting the rheostat of the charger.
12. Smoking, use of matches or other open flames etc. are not permitted inside the battery room or while inspecting, filling and handling the batteries.
13. The Trickle charging current shall be AH Capacity x 2/24x100 plus regular discharge in Amps.
14. The boost charge shall not exceed "AmpHour/10"

BATTERY CHARGER TYPICAL EXAMPLE ON SIZING A BATTERY CHARGER

If a 100 AH battery is 50% discharged and it is to be recharged in 10 hours and a continuous load of 8 Amps to be supplied, ampere requirement will be $A = \frac{(100x0.5) \times 1.15}{10} + 8 = 5.75 + 8 = 13.75$ Amps.

As this is not a standard rating, the nearest rating of 15 Amps, shall be selected. If lower rate is selected it shall not be less than 95 % of the calculated value.

APPLICATION AND INTERPRETATION OF TESTS ON TRANSFORMER OIL IN SERVICE

No.	Characteristics	IS for Testing	Test Venue F-Field L- Laboratory	Suggested initial freq uency of tests	Permissible limit satisfactory for use	To be conditioned	To be reclaimed or replaced
1	Breakdown Voltage	IS: 6792-1972	F or L	Immediately prior to energising then after four months and after every year.	Above 40	30 & 40	Below 10
2.	Resistivity ohm-cm	IS: 6103-1972	F or L	Immediately prior to energising then after three months and after every year	10×10^{12}	Below $1x10^{12}$	
3	Water content	IS: 2362 1963	L	Immediately prior to energising then after three months and after every year0 ppm	Less than 40 ppm for 110 kV Less than 20 ppm for 220 kV	Greater than 40 ppm	
4	Power factor at 27^0C	IS: 6262-1972	L	Immediately prior to energising and then after every years	$\leq$ .01 at 20° C	Between 0.01 &0.05	Above 0.05
5	Neutralisation value Mg. KOH/g	Appendix X IS:1866-1963	F or L	Immediately prior to energising and then after every year	Less than 0.5	Above 0.5	Above 1.0
6	Interfacial Tension (N/M)	IS: 6109-1971	L	Immediately prior to energising and then after every year	0.02 or more	0.015 to 0.02	Below 0.015
7.	Flash Point 0°C	Appendix A IS: 1666-1963	L	Immediately prior to energising and then after every year	145 or more	Between 130 &145	Below 130
8	Sludge	Appendix B IS. 1866-1963	L	Immediately prior to energising and then after every year	Non detectable	Sediment	Precipitable Sludge

Note:
1. The full application of these recommendations to small transformers less than 1MVA and less than 33 kV is technically necessary only in case where high reliability is required.
2. The frequency of tests may vary depending on previous tests and on changed service condition.
3. When samples are reconditioned or reclaimed it may be tested for other characteristics also.

FAULT LEVEL CALCULATION

Equations:

1. System % impedance = $\frac{\text{Base MVA x 100}}{\text{Fault MVA}}$

2. Fault MVA = $\frac{\text{Base MVA x 100}}{\text{Total \% Impedance upto the point}}$

3. % impedance at Base MVA = $\frac{\text{\%Imp. at rated MVA x Base MVA}}{\text{Rated MVA}}$

4. % Line Reactance = $\frac{\text{Line reactance x Base MVA x 100}}{\text{kV}}$

5. Inductance of the line for Equilateral spacing = $(2 \log D/r + 0.5)10^{7}$ H/m where D-spacing between conductor; r-radius of conductor

Typical Example on Fault Level Calculation 110/11 kV substation

110/11 kV Transformers 2 Nos. Capacity 12.5 MVA, % Impedance 9.7; Fault level at 110 KV Bus: 1070 MVA (From KSEB fault study)

Take Base MVA as 100

System % Impedance (Source Impedance) = $\frac{\text{Base MVA x 100}}{\text{Fault MVA}} = \frac{100\text{x}100}{1070} = 9.345\%$

% Impedance of the Transformers at base MVA = $\frac{9.7\text{x}100}{12.5} = 77.6\%$

Since Transformers are in Parallel effective impedance = $\frac{77.6}{2} = 38.8\%$

Fault Level at 11 kV bus = $\frac{\text{Base MVA x 100}}{\text{\% Z upto 11kV bus}} = \frac{100\text{x}100}{(9.345 + 38.8)} = \frac{100\text{x}100}{48.15} = 207.68$ MVA

Say 208 MVA

Fault Level at 11 kV side (Is) = $\frac{208\text{x}10^{6}}{\sqrt{3}\text{x}11000} = 10.9$ K Amps

Fault Level on 433 V side

Let a 11 kV feeder be fed from the sub station through OH line of 4 kms length. Conductor ACSR Racoon 118 Sq. mm, spacing 1 metre.

Inductance of the line L = $(2 \ln (D/r) + 0.5) \times 10^{-7}$ H/m = $(4.606 \text{ Log}_{10} D/r + 0.5) \times 10^{-7}$ H/m

Inductive Reactance XL = $2\pi fl \leqslant 0.319\ \Omega$/km

For 4 kms of line = $0.319\text{x}4 = 1.276\ \Omega$

For Line Reactance = $\frac{\text{Line reactance x Base MVA x 100}}{KV^2} = \frac{1.276\text{x}100\text{x}100}{11 \text{ x } 11} = 105.45\%$

Fault level calculated at 11 kV bus of the S/s = 208 MVA

Source impedance = $\frac{\text{Base MVA x 100}}{\text{Fault MVA}} = \frac{100 \text{ x } 100}{208} = 48.08\%$

Fault level at Receiving point (11 kV) = $\frac{\text{Base MVA x 100}}{\text{(\% Z upto receiving point)}} = \frac{100\text{x}100}{(48.08 + 105.45)} = 65.13$ MVA

Let there be two transformers 11/433 V, 750 KVA of 4.8% reactance at the receiving point and 1 transformer being in operation at a time.

% Reactance of the 750 KVA Transformer at Base MVA = $\frac{\text{\% Impedance x Base MVA}}{\text{Rated MVA}} = \frac{4.8\text{x}100}{0.75} = 640\%$

Total % Reactance upto 433 V bus = $48.08 + 105.45 + 640 = 793.53\%$

Fault level at 433 V side = $\frac{100\text{x}100}{793.53} = 12.60$ MVA

Fault current at 433 V side (Is) = $\frac{12.60\text{x}10^{6}}{\sqrt{3}\text{x}433} = 16.8$ kA

Size 11kV XLPE Aluminium cable in mm^2 = $11.1 \text{ Is } \sqrt{t}$

I_s = Fault current in Kilo Amps, t = Duration of fault current in seconds

Scan QR Code For Details Information in Fault Level & updated system condition

COMPOSITE POLYMER INSULATORS FOR TRANSMISSION LINES

Voltage	Normal Suspension	Normal Tension	Voltage	Normal Suspension	Normal Tension
	UTS	UTS		UTS	UTS
66kV	45kN	50kN	220kV	90kN	120kN
110kV	70kN	90kN	400kV	160kN	165kN

ELECTRIC VEHICLES AND CHARGING STANDARDS

Charging Standard	Vehicles Supported	Vehicle Range (km)	Battery Capacity (kWh)	Charging rate (kW)	Charging time
CCS-2 (DC Charging)	Tata Nexon EV	312	30.2	25	60 min
	Tata Nexon EV MAX	437	40.5	30	56 min
	Tata Tigor EV	306	26	20	65 min
	Tata Tiago EV	250	19.2	14	57 min
		315	24	17	57 min
	Mahindra XUV 400	456	39.5	50	50 min
	Hyundai KONA	452	39.2	45	48 min
	MG ZS EV	340	44.5	50	50 min
	Kia EV6	528	77.4	350	18 min
	BYD Atto 3	521	60.48	80	50 min
	BYD E6			60	90 min
	Porsche Taycan	512	79.2	270	15 min
	Jaguar iPace	470	90	150	40 min
	Benz EQC	420	80	350	40 min
	Audi e-tron	500	93	150	30 min
Type 2 (AC Charging)	Tata Nexon EV	312	30.2	3.3	9 hr
	Tata Nexon EV MAX	437	40.5	7	6.5 hr
				3.3	15 hr
	Tata Tigor EV	306	26	3.3	8 hr 45 min
	Tata Tiago EV	250	19.2	7	2.6 hr
				3.3	5.1 hr
		315	24	7	3.6 hr
				3.3	6.4 hr
	Mahindra XUV 400	456	39.5	7	6.5 hr
				3.3	13 hr
	Hyundai KONA	452	39.2	7	6hr 10 min
				3.3	19hr
	MG ZS EV	340	44.5	7	6-8 hr
				3.3	20 hr
	Kia EV6	528	77.4	7	6-9 hr
	BYD Atto 3	420	60.48	7	5 hr
				3.3	10 hr
	BYD E6	520	71.7	40	2 hr
				7	12 hr
	Porsche Taycan	512	79.2	11	7hr
				3.3	23hr
	Jaguar iPace	470	90	22	8 hr
				7	13 hr
	Benz EQC	420	80	7	11 hr
				2	24 hr
	Audi e-tron	500	93	11	8.5 hr

Scan QR Code For Kerala Power System at a Glance

Scan QR Code For Details & Updated Information of Charging Station

Charging Standard	Vehicle Category	Vehicles Supported	Vehicle Range (km)	Battery Capacity (kWh)	Charging rate (kW)	Charging time
Bharat EV DC (GB/T)	e4W	Tata XPRES Tigor	213	21.5	15	110 min
		Mahindra e20 Plus	140	15	10	100 min
		Mahindra eVerito	181	21.2	15	1hr 30 min
	e3W	OSM Rapid EV	90	6	10	35 min
Proprietary Connector	e2W	Ola S1 Pro	181	4		6.5 hr
		Ola S1	141	2.5		5 hr
		Ola S1 AIR	101	2.5		4.5 hr
		Ather 450 Plus	85	3.7		10km in 10 min
		Ather 450 Gen 3	105	3.7		15 km in 10 min (5.4 hr to full charge)
Bharat EV AC/ Level 1 AC	e4W	Tata XPRES Tigor	213	21.5	2	11.5 hr
		Mahindra e20 Plus	140	15	10	1hr 35 min
					3	7 hr 20 min
		Mahindra eVerito	181	21.2	2	11hr 30 min
	e3W	OSM Rapid EV	90	6	2	3-4 hr
	e2W	Hero Dash	60	48V/28 Ah		4-5 hr
		Pure EV Epluto	80	1.8		4 hr

TECHNICAL SPECIFICATIONS OF 33kV COVERED CONDUCTOR

1	Voltage grade (Uo/U) kV	36 kV
2	Cross Sectional area of Aluminium	120 Sq.mm (Minimum)
3	Maximum current Amps (at conductor temperature 80^{0}C,air temperature 45^{0}C wind speed 00.5m/s ,solar radiation 1200w/m^2	345 A
4	No. of cores	Single
5	Nominal system voltage kV	33 kV
6	Highest system voltage kV	36 kV
7	System Frequency Hz	50 Hz
8	Variation in frequency	± 5 %
9	Fault level (Conductor) Maximum allowable temperature	12.1kA/1Sec
	(a) Design continuous operation at rated full load current, the maximum temperature of conductor shall not exceed	90^{0}C
	(b) The conductor temperature after a short circuit. for 1.0 sec. shall not exceed	250^{0}C
10	Lightning Input Voltage	170 kV
11	1-min. power frequency withstand voltage	75 kV
12	Leakage current	1mA
13	Stranding and wire diameter	19 Nos Aluminium conductor with Dia. 2.84mm (Minimum)
14	Approximate mass	640 kg/km (Maximum)
15	Overall diameter	20.9 to 23.4 mm
16	Calculated resistance at 20^0 C	0.261 Ohm/km
17	Appropriate calculated breaking load	34.9 kN

CONSTRUCTION TIPS FOR E.H.V. SUB STATIONS

1. Earthing switch shall be provided with line isolators. Isolators and earthing switch shall be mechanically interlocked in such a way that earthing switch can be closed only if isolator is open.
2. Isolators and controlling circuit breakers shall be electrically interlocked so that isolators can't be operated when circuit breaker is in closed position.
3. Surge diverters of appropriate rating, with surge counters, shall be provided for lines. In addition to this, separate surge diverters shall be provided for transformers.
4. 4. Minimum safety working clearance shall be provided for bare conductors and live parts as shown in table (Page-18).The safety working clearance is based on an insulation height of 2.44m, which is the height of lowest point on the insulator (Where it meets the earthed metal) from the ground. Rule 44{2)(iii) of CEA Regulation, 2010.
5. Breakers in the yard shall have remote and local operation facilities.
6. If there are more than one incomer lines, isolators shall be provided at both sides of the line breakers.
7. All the equipment in the yard shall come under lightning shield coverage.
8. Baffle walls of minimum 4 hrs fire rating shall be provided in between transformers of 2000 litres of oil or more.
9. Oil drainage facility shall be provided for transformers of 9000 litres of oil or more.
10. When two transformers are operated in parallel, directional over current relays shall be provided at secondary side of transformers.
11. All outgoing feeders shall be controlled by Circuit breakers.
12. Minimum following protections shall be provided for lines and transformers.
    EHV Lines (1) Over current and earth directional O/C fault relays having high set elements (2) Distance protection relays.
    Transformers (1) Over current and earth directional O/C fault relays having high set elements both at primary and secondary side
    (2) REF/Differential protections (3) Buchholz relay (4) Oil and winding temperature high, alarm and trip
    HV Feeders Over current and earth fault relays having high set elements
13. Adequate fire protection arrangement shall be provided for quenching the fire in the station. EHV Transformer may be protected by an automatic high velocity water spray system or by carbon dioxide or BCF (Bromo chloro difluoro methane) or BTM (Bromo tetrafluoro methane) fixed installation system. Nitrogen injection method may also be provided for quenching fire in the transformer.
14. Relays shall be properly co-ordinated.
15. Earth mat shall be provided in the EHV yard for limiting step- voltage and touch - voltage to tolerable values. EHV side and HV side earthing can be kept separate.
16. Granite jelly shall be spread uniformly in the yard and to the extend of minimum 1.5 mtr. width outside the fencing at minimum 150 mm thickness.
17. Separate cable tray shall be provided for power cables and control cables.
18. Battery room shall be kept as a separate room in control room.
19. Only explosion/flame proof fittings shall be used in battery room. Battery room shall be treated as hazardous location.

CURRENT TRANSFORMER STANDARDS

The Current Ratio Error and Phase Displacement at rated frequency shall not exceed the values given in table when secondary burden has any value from 25% to 100% of the rated burden.

Limits of Error for Standard Accuracy Classes 0.1, 0.2, 0.5 & 1								
Accuracy Class	Permissible Limit of ratio error at % of Rated Current				Permissible Limit of phase angle (in minutes) error at % of Rated Current			
	120%	100%	20%	5%	120%	100%	20%	5%
0.1	0.1	0.1	0.2	0.4	5	5	8	15
0.2	0.2	0.2	0.35	0.75	10	10	15	30
0.5	0.5	0.5	0.75	1.5	30	30	45	90
1.0	1.0	1.0	1.5	3.0	60	60	90	180

Limits of Error for Special Application Accuracy Classes 0.2S & 0.5S										
Accuracy Class	Permissible Limit of ratio error at % of Rated Current					Permissible Limit of phase angle (in minutes) error at % of Rated Current				
	120%	100%	20%	5%	1%	120%	100%	20%	5%	1%
0.2S	0.2	0.2	0.2	0.35	0.75	10	10	10	15	30
0.5S	0.5	0.5	0.5	0.75	1.5	30	30	30	45	90

Specifications of core for 110 kV Feeder / Transformer CT				
Accuracy Class	Core 1 Differential for Trfr/ Main Protection for Feeder	Core II Backup	Core III Metering	Core IV REF for transformer
Class of accuracy	PS	PS10	0.2 S	PS
Burden (Analog/Numeric)	-	-	20 VA	
Min. Knee point Voltage	900 V			900 V
Max. Exciting current at kpV	30 mA		-	30 VA
Resistance at 750 C	<4 Ω			<4 Ω

TIPS ON EARTHING (SUBSTATION)

Earthing shall generally be carried out in accordance with the provisions of CEA Regulation, 2010 and the regulations of the Electric supply authority. No addition to the current carrying system either temporary or permanent which will increase the maximum available earth fault current or its duration, shall be made until it is ascertained that the existing arrangement of earth electrodes, earth bus etc. are capable of carrying the new value of earth fault current consequent on the addition.

Design of earthing ring and number of electrodes :

In outdoor stations a main earth ring shall be provided round the station. All major apparatus such as Transformers, cables etc. shall be connected to the ring by shortest subsidiary connections.

(A) Earth Resistivity

Wenner's four electrode method is recommended for the measurement. In this method, four electrodes are driven into the earth along a straight line at equal intervals. A current I is passed through the two outer electrodes and the earth and, the voltage difference V observed between the two electrodes. If the depth of burial of the electrodes in the ground is negligible compared to the spacing between the electrode, then

$\rho = 2\pi SV/I = 2\pi SR$ where ρ = resistivity of soil in ohm metres,
S = distance between successive electrodes in meters,
R = megger reading in ohms.

(B) Size of earth ring (bus) of copper

As per IS 3043/1966

Area = $0.00541\sqrt{t}$ for sweated and riveted joint

Where I = Fault current (maximum) in Amps; t = Duration of the current flow in secs (3 to 5)

Maximum earth fault current causes when a single phase to earth fault occurs. Hence value of the current (I) is obtained by dividing the fault MVA by the phase to earth voltage

ie., $I = \frac{\text{Fault MVA}}{E/\sqrt{3}}$ Where E is the phase to phase voltage

(C) Permissible current density of electrodes

An earth electrode should have the loading capacity adequate for the system of which it forms a part ie., it should be capable of dissipating without failure of energy into the earth at the point at which it is installed under any condition of operation of the system. It should not create excessive rise of temperature at the surface of the electrode.

Maximum permissible current density D is given by the formula

$D = \frac{7.57 \times 10^3 \text{Amp/m}^2}{\sqrt{\rho t}}$ Where ρ = earth resistivity in ohm-metre
t = duration of fault in sec.

Rod electrodes

Minimum diameter	G.I.rod 16 mm, Copper rod 12.5 mm G.I pipe 40 mm (internal), M.S. pipe 35 mm (internal) Length (minimum) 2.5 M (for Sub-Stations, Generating Stations and O.H. Lines)
Strip Electrodes	
Minimum Sections	25 mm x 1.6 mm for copper 25 mm x 4 mm for iron or steel

Plate Electrodes

Where fault current is more than 6000 Amps, plate electrodes shall have the minimum size given below.

Minimum size	1.2M x 1.2M
Minimum thickness	12.5 mm (cast iron or steel); 6 mm (Copper)

(D) Design Procedure

1. Find the max. fault current
2. Find area of cross section of the earth ring as already discussed and find out a suitable conductor size taking into account future expansion also. Minimum cross section for main ring is 161 mm^2 and for branches 64.5 mm^2 if made of copper.
3. Determine the maximum permissible current density 'I_d' allowable for dissipation by earth electrodes (pipe or plates) and let I be the fault current.
4. Area of earth electrode $A = \frac{I}{I_d}$ sq. m
5. Let area per electrode be 'a' sq. metre (for two sides if plate) then number of electrodes required= A/a, Provide an additional electrode for lightning arrester and two electrodes for transformer neutral.

Earth electrodes should be uniformly distributed within the area and located adjacent to perimeter fence. Spacing between electrodes shall not be less than twice the depth of electrodes below ground level. Top of earth electrodes and conductors from earth plate etc. shall be kept at a minimum distance of 30 cm below GL to limit potential gradient.

BURDEN IMPOSED BY VARIOUS INSTRUMENTS ON CT & PT

Name of instrument	Analog meter	Digital meter
Ammeters	3 VA	0.5 VA
Current element of Wattmeters and PF Meter	5VA	0.1 VA
Current element of kWH and kVAR Meters	5VA	0.1 VA
Voltmeter	5 VA	1 VA
Voltage element of Wattmeters and P. F. Meters	5VA	0.1 VA
Voltage element of kWH and kVAR Meters	7.5 VA	0.1 VA
Voltage element of Frequency Meters	7.5 VA	1 VA

MINIMUM CLEARANCE BETWEEN OH LINES CROSSING EACH OTHER (IN METRES)

Sl.No.	Voltage	11-66kV	110-132kV	220kV	400kV	800KV
1.	Low & Medium	2.44	3.05	4.58	5.49	7.94
2.	11-66 kV	2.44	3.05	4.58	5.49	7.94
3.	110-132 kV	3.05	3.05	4.58	5.49	7.94
4.	220 kV	4.58	4.58	4.58	5.49	7.94
5.	400 kV	5.49	5.49	5.49	5.49	7.94
6.	800 kV	7.94	7.94	7.94	7.94	7.94

STATUTORY CLEARANCE - OH LINES

Voltage level	Above Ground				From Buildings		Between conductors
	Across any Street	Along any Street	Other areas		Vertical	Horizontal	
			Bare	Insulated			
	M	M	M	M	M	M	M
230 & 400 V	5.8	5.5	4.6	4	2.5	1.2	1.22
11 kV	6.1	5.8	4.6	4	3.7	1.2	1.83
22 kV & 33 kV	6.1	6.1	5.8		3.7	2.0	2.44
66 kV	6.1	6.1	6.1		4	2.3	3.05
110 kV	6.1	6.1	6.1		4.6	2.9	3.05
220 kV	7	7	7	-	5.5	3.8	3.05
400 kV	8.8	8.8	8.8	-	7.3	5.6	3.05

IS FOR TESTING POWER TRANSFORMER

2026	Specification
10028	selection, installation
1180	Specification upto 100 KVA in 11KV
335	New insulating oil
1866	Maintenance of insulating oil in service
6792	Dielectric strength of insulating oil
6103	Specific resistance of insulating oil
6262	Power factor and dielectric constant of oil
1448	Neutralisation value (Acidity), Flash point
2362	Water content in the oil
6855	Sampling of insulating oil
6104	Test for interfacial tension
9434	Dissolved gas analysis

CLEARANCE OF LINES WITH RAILWAY TRACKS, RIVER

Voltage	Distance in Metre
Upto and Including 11kV	2.90
Above 11 kV Including 33 kV	2.90
Above 33 kV Including 66 kV	3.20
Above 66 kV Including 110 kV	3.51
For 220 kV	4.11
For 400 kV	6.25

Minimum 3.48 m over the highest flood level for river which are not navigable. For navigable rivers tallest mast in consultation with authorities.

RIGHT - OF - WAY CLEARANCE

AS PER IS 5613 (PART II SECTION 2):1976

Transmission Voltage (kV)	Recommended Right-of-way (meters)
33	15
66	18
110	22
132	27
220	35
400	52

ABBREVIATIONS

OTI	Oil temperature indicator	REF	Restricted earth fault
WTI	Winding temperature indicator	RTD	Resistance temperature device
AVR	Automatic voltage regulator	PE	Protective earthing
NGR	Neutral grounding resister	PI	Polarisation index
NGT	Neutral grounding transformer	TMS	Time multiplier setting
OLTC	On load tap changer	IDMTL	Inverse definite minimum time lag
PCC	Power control centre	IR	Insulation resistance
PMCC	Power motor control centre	IP	Ingress protection
		BDV	Break down voltage

ANSI CODES - DEVICE DESIGNATION

2	Time delay relay	64	Earth fault relay
3	Checking or Interlocking relay	67/67N	Directional O/C relay / E/F relay
21	Distance relay	68	Blocking relay
25	Check synchronizing relay	74	Alarm relay
27	Under voltage relay	76	D. C Over current relay
30	Annunciator relay	78	Phase angle measuring relay
32	Directional power (Reverse power) relay	79	AC Auto reclose relay
37	Under Current or under power relay	80	Liquid or gas flow
40	Field failure (loss of excitation) relay	81	Frequency relay
46	Negative phase sequence relay	81U	Under frequency relay
49	Machine or Transformer Thermal relay	81O	Over frequency relay
50	Instantaneous Overcurrent relay	83	Automatic selective control or transfer relay
51/51N	A.C. IDMT Over current relay/E/F relay	85	Carrier or pilot wire receive relay
52	Circuit breaker	86	Lock out relay
52a	Circuit breaker Auxiliary Switch	87	Differential Protective relay
	"Normally open" ('a' contact)	87G	Generator differential relay
52b	Circuit breaker Auxiliary switch	87GT	Overall differential relay
	"Normally closed" ('b' contact)	87U	UAT differential relay
55	Power Factor relay	87 NT	Restricted earth fault relay
56	Field Application relay	95	Trip circuit supervision relay
59	Overvoltage relay	99	Overflux relay
60	Voltage or current balance relay	186A	Auto reclose lockout relay

CONTROL WIRING CABLE CODE AND OTHER PRACTICES ON PROTECTION

Lead identification

A Series (A11, A31, A51, A71 etc) - C.T secondaries for special protection (distance, differential & REF)
B Series (B11,B31,B51,B71 etc) - C.T secondaries for Bus bar protection
C Series (C11, C31, C51, C71 etc) - C.T secondaries for back up protection circuits (Over current and earth fault)
D Series (D11, D31, D51, D71 etc) - C.T secondaries for Metering circuits
E Series (E11, E31, E51, E71 etc) - Potential Transformer Secondaries
H Series (H1, H2, H3 etc) - LT AC Supply ; K Series (K1, K2, K3 etc) - Controls. Closing, Tripping etc
J Series (J1 +ve, J2 -ve etc) - DC incoming ; L series (L1, L2, L3 etc) - Alarms,Indication and annunciation

Guidelines on control & protection circuits

1. Control & protection circuit function shall not be mixed at equipment level.
2. DC & AC supply shall not be taken through different cores of same cable.
3. Independent DC cable shall be laid to each equipment and looping of DC supply from one equipment to another shall be avoided.
4. Separate batteries shall be used for primary and backup protection; In the case of single battery individual circuits having separate fuses are to be used for primary and back up protection.
5. Current Transformers with 1 Amp secondary rating shall be used where meter, protection devices etc are remotely situated with reference to equipment.
6. The C.T ratio available and adopted shall be displayed.
7. “SHORTING OF SECONDARY TERMINALS”shall be done whenever C.T cores are not used.
8. The Wiring shall be of stranded copper leads for C.T. secondaries for all cores.
9. For C.T. secondary terminations, two nuts with one spring washer and two flat washers are to be compulsorily used.
10. The wiring shall be of stranded copper leads for PT secondaries intended for protection, commercial metering.
11. The terminations of wires shall be lugged by ring shape ‘0’ lugs and not by ‘U’ shape lugs.
12. The terminal strips shall be of stud type with nuts and not screw type.
13. The cable entries near equipment, marshalling kiosk and panels shall be by use of appropriate size cable glands.
14. For indications, alarms, annunciations, controls (Closing coil, Trip coil etc) negative supply (-ve) is given directly and positive supply (+ve) is supplied only “On Commands” like trip, close, relay trip etc.
15. When breakers have two trip coils, they shall be connected for operation by primary and back up protection.
16. Lightning Arresters are to be provided on HV and LV side for transformers of all capacity and voltage class. No work shall be done on a lightning arrestor unless it is disconnected from the live circuit and grounded at both the line and ground terminals.

SALIENT DIMENSIONS OF TOWERS

Type of Tower		Height (mm)	Top X arm (mm)	Middle X arm (mm)	Bottom X arm (mm)	Bottom square (mm)	Wind span (mm)	App. weight per tower (MT)
A Tower	(33 kV)	13988	At Top	1500	900	500x500	635	0.98
B Tower	(33 kV)	13988	At Top	1500	900	510x510	635	1.68
C Tower	(33 kV)	13988	At Top	1500	900	1020x500	635	1.35
TTA	(66 kV)	21793	20726	18440	16154	3810	4572	2.74
TTB	(66 kV)	21946	19964	17526	15088	4572	5182	3.64
TTC	(66 kV)	21946	19964	17526	15088	5182	5334	4.21
D3	(110 kV)	21768	18059	15011	11963	4267	2896/3048	2.76
D30	(110 kV)	21488	16459	13411	10363	5182	2896/3200	4.22
D60	(110 kV)	22060	16549	13411	10363	5486	3200/3657	6.36
Kamani D2	(220 kV)	33775	28300	23000	17600	5300	4650/5225	5.54
D15	(220 kV)	33849	24399	19749	14424	6150	5150/5850	8.08
D30	(220 kV)	32529	25124	19974	14724	-	-	-
D60	(220 kV)	34332	25322	20032	14732	9500	5200/5600	10.67
Rockwell D2		32960	27900	22700	17500	4900	4380/4600	5.50
D15		34600	25200	20000	14800	6800	5000/5200	8.05
D60		34600	25200	20000	14800	9000	5300/6800	12.02
220 kV P Type Tower (2°)		32215	28475	23575	18675	5300	4900	4.109
220 kV Q Type Tower (15°)		31980	25440	20840	16165	7000	4000	5.979
220 kV R Type Tower (30°)		33145	25835	21015	16165	8000	4000	7.063
220 kV S Type Tower (60°)		35505	26585	21435	16175	8800	4000	10.108
110kV Special Type Tower A2 (0-2°)		34562	30852	27652	24452	4322	2896/3048	4.978
110kV Special Type Tower DD (30-60°)		29094	23540	20340	17140	5554	3200/3662	6.182

SAFE WORKING CLEARANCE IN OUT-DOOR SUBSTATION

Highest System Voltage (kV)	12	36	72.5	145	245	420	800
Safety Working Clearance (Meters)	2.6	2.8	3.1	3.7	4.3	6.4	10.3

Clearance applicable for elevations up to 1000 M

DIMENSIONS OF TRANSGRID TOWERS

		Lower Circut clearance (mm)			Upper Circut clearance (mm)				Bottom Square	Tower Weight (MT)					Conductor	
Type of Tower	Height	Bottom Cross arm	Middle Cross arm	Top Cross arm	Bottom Cross arm	Middle Cross arm	Top Cross arm	Top Cross arm peak		Wind Span	Normal	3m	6m	9m	Lower Circut	Upper Circut
MLA	60825	21750	5750	5750	7500	8000	8000	4015	9600	335	30.339	3.195	4.577	6.646	ACCC Ernad	The Great Horn Bill
MLB	60825	19120	5450	5450	7500	8000	8000	7305	10800	335	42.003	3.966	5.793	8.413	ACCC Ernad	The Great Horn Bill
MLC	60825	19120	5450	5450	7500	8000	8000	7305	10800	335	47.008	4.321	6.432	9.536	ACCC Ernad	The Great Horn Bill
MLD	60825	19120	5450	5450	7500	8000	8000	7305	12000	335	57.221	5.501	8.526	12.435	ACCC Ernad	The Great Horn Bill
GLA	47045	15480	3250	3250	7500	5750	5750	5840	8000	335	13.749	1.285	2.435	3.848	Single Panther	Twin Panther
GLB	46355	13655	3200	3200	7500	5500	5500	5500	9000	335	16.824	1.74	3.188	4.17	Single Panther	Twin Panther
GLC	46670	15655	3200	3200	7500	5500	5500	8315	10000	335	20.725	2.775	4.679	6.054	Single Panther	Twin Panther
GLD	46085	13655	3200	3200	7500	5500	5500	9580	11000	335	29.204	3.75	7.06	8.815	Single Panther	Twin Panther
KLA	46790	15450	3250	3250	7500	5750	5750	5840	5000	335	12.631	1.117	2.155	3.314	Single Panther	Twin Panther
KLB	46805	13880	3200	3200	7500	5500	5500	7800	6500	335	18.972	1.974	3.364	5.414	Single Panther	Twin Panther
KLC	46805	13880	3200	3200	7500	5500	5500	7800	6500	335	23.406	2.422	4.101	6.711	Single Panther	Twin Panther
KLD	48535	14105	3200	3200	7500	5500	5500	9530	8500	335	27.55	2.924	4.533	6.392	Single Panther	Twin Panther

DIMENSIONS OF 110 kV (SAE make) & 220kV (L&T) MULTI CIRCUIT TOWERS

Type of Tower	Height Peak (mm)	Height upto Bottom X-arm(mm)	Height upto Second X-arm(mm)	Height upto Third X-arm(mm)	Height upto Fourth X-arm(mm)	Height upto Fifth X-arm(mm)	Height upto Sixth X-arm(mm)	Bottom Square (mm)	Wing Span (mm)	Appr. Weight per Tower(MT)
110 kV Suspension M3 (O°-3°)	41615	17655	21705	25705	29655	33605	37555	9006	3450/4850	7.936
110 kV Tension M30° (3°-30°)	41675	15575	19825	23875	27775	31675	35575	9849	3500/5150	12.923
110 kV Tension M60/DE (30°-60°)	41675	15575	19775	23975	27875	31775	35675	13119	3400/5350	18.766
220 kV X Type Suspension (0°-2°)	49625	19875	24875	29875	34875	39875	44875	7600	3500	9.054
220 kV Y Type Tension (2 °-30°)	49830	17295	22295	27295	32295	37295	42295	10500	3500	13.419
220 kV Z Type tension (30°-60°)	51295	17295	22495	27695	32795	37845	42895	13200	3500	19.674

TRANSMISSION LINE PARTICULARS

Voltage	400 kV	220 kV	110 kV	66 kV
Span in M	400	300	300	280
Supports	Angle Iron Lattice Fully galvanised	Angle Iron Lattice Fully galvanised	Angle Iron Lattice Fully galvanised	Angle Iron Lattice Fully galvanised
No. of supports per km	25	34	34	34
Total Weight of towers in M.T. per 10km.	27 SC	19.4 DC	12.9 DC	7.6 DC
Insulators E M. Strength in Kg.				
Suspension	11,500		7,000	
Tension	16,500	12,000	9,000	4.500
Conductor	Moose	Kundah	Wolf	Dog
Conductor per phase	2	I/2	1	1
Total Conductor length Km	6.18 SC	6.09 DC	6.09 DC	6.09 DC
Ground wire	2	1	1	1
Strength (kg/mm^2)	100	70	70	70
Size of ground wire	7/3.66	7/3.66	7/3.66	7/3.66
Length of ground wire	2.06	1.015	1.015	1.015
Diameter of power conductor (mm)	32	26.82	18.13	14.25

DISC INSULATORS FOR TRANSMISSION LINES

Voltage	Normal Suspension		Normal Tension		Voltage	Normal Suspension		Normal Tension	
	No. of discs	UTS	No. of discs	UTS		No. of discs	UTS	No. of discs	UTS
66 KV	5	45 kN	6	50 kN	220 kV	14	90 kN	15	120kN
110 kV	7	70kN	8	90kN	400 kV	23	115 kN	2x23	165kN

WEIGHT OF TOWERS, EXTENSIONS, BEAMS, COLUMN, GIRDERS, TEMPLATES etc.

Type of Tower/Structure	Weight in Kg.	Type of Tower/Structure	Weight in Kg	Type of Tower/Structure	Weight in Kg.
220 kV D2 TOWER	4930.140	3 M EXTN	857.296	10 M SPAN GIRDER	550.980
4.5 M EXTN	926.680	4.5 M EXTN.	1154.800	9 M BEAM	482.220
TEMPLATE	497.400	TEMPLATE	591.184	8 M BEAM	445.220
220 kV D15 TOWER	7133.590	110 kV D60 TOWER	5564.057	13 M COLUMN	1323.050
4.5 M EXTN	1328.870	3 M EXTN	1098.306	110 kV ISOLATOR STRUCTURE	604.720
220 kV D30 TOWER	7236.750	4.5 M EXTN	1451.708	110 kV CT/PT STRUCTURE	405.540
4.5 M EXTN	1572.680	TEMPLATE	686.932	110 kV LA & BUS BAR SUPPORTING STRUCTURE	316.540
TEMPLATE	860.880	110 kV S.C. TOWER (Special)	2008.310	66 kV ISOLATOR STRUCTURE	481.590
220 kV D60 TOWER	10039.230	TTA TOWER (66 kV)	2528.830	66 kV LA & BUS BAR SUPPORTING STRUCTURE	291.460
4.5 M EXTN	2325.840	3 M EXTN	439.160	66 kV CT/PT STRUCTURE	373.600
220 kV P TYPE (2°)	3915.800	4.5 M EXTN	564 800	220 kV MULTICIRCUIT X TYPE TOWER	9054.00
STUB & CLEAT	193.200	TEMPLATE	321.720	Y TYPE TOWER	13419.00
3 M EXTN.	721.120	T.T.B. TOWER	3477.830	Z TYPE TOWER	19674.00
6 M EXTN.	1242.880	3 M EXTN.	640.520	110 kV MULTICIRCUIT M3 Tower	7936
TEMPLATE	473.200	4.5 M EXTN.	1010.520	3 M EXTN FOR M3	1263.99
220 kV Q TYPE TOWER (15°)	5633.700	TEMPLATE	441.520	4.5 M EXTN FOR M3	1636.52
STUB & CLEAT	345.680	T.T.C TOWER	4145.580	6 M EXTN FOR M3	2198.62
3 M EXTN.	1101.720	3 M EXTN.	788.840	9 M EXTN FOR M3	3055.87
6 M EXTN.	1906.360	4.5 M EXTN	1085.880	STUB & CLEAT FOR M3	240.62
TEMPLATE	715.720	TEMPLATE	640.480	M3 TEMPLATE	1293.7
220 kV R TYPE TOWER (30°)	6672.700	66 kV S.C. S3 TOWER	1244.954	110 kV MULTICIRCUIT M30 Tower	12923
STUB & CLEAT	390.480	5' EXTN.	136.960	3 M EXTN FOR M30	1749.82
3M EXTN.	1301.280	10' EXTN.	273 836	4.5 M EXTN FOR M30	2293.93
6M EXTN.	2180.0	15' EXTN	415.808	6 M EXTN FOR M30	2964
TEMPLATE	946.520	TEMPLATE	132.208	9 M EXTN FOR M30	4203.61
220 kV S TYPE TOWER (60°)	9464.500	66 kV S.C. S30 TOWER	1486.414	STUB & CLEAT FOR M30	630.94
STUB & CLEAT	643.280	5' EXTN	208.824	M 30 TEMPLATE	1293.7
3 M EXTN.	1598.640	10' EXTN	385.140	110 kV MULTICIRCUIT M60 Tower	18766
6 M EXTN.	2857.200	15' EXTN	561.340	3 M EXTN FOR M 60	2778.87
TEMPLATE	1133.400	TEMPLATE	154.544	4.5 M EXTN FOR M 60	3888.79
110 kV D3 TOWER	2489.377	66 kV S.C. S60 TOWER	1961.138	6 M EXTN FOR M 60	4527.18
3 M EXTN.	465.668	5' EXTN	279.684	9 M EXTN FOR M 60	6391.76
4.5 M EXTN	712.169	10' EXTN	508.276	STUB & CLEAT FOR M 60	952.56
TEMPLATE	322.848	15' EXTN	742.452	M 60 TEMPLATE	2112.28
110 kV D30 TOWER	3729.053	TEMPLATE	233.712		

1. Line Protection

Distance Relays

To ensure proper co-ordination between distance relays for power system, it is customery to choose relay ohmic setting as follows:

1.1 Zone-1 Setting

Zone -1 setting	
Reach	80%
Time	0.0Sec

1.2 Zone-2 Setting

Zone -2 setting	S/C lines	All DC Lines
Reach	120% of ZL	150% of ZL
Time	0.350 Sec if 0.2 x ZL< 0.6 x Imp of next shortest line. 0.500 Sec if 0.2 x ZL> 0.6x Imp of next shortest line.	0.350 Sec if 0.5 x ZL< 0.6xImp of next shortest line. 0.500 Sec if 0.5 x ZL> 0.6xImp of next shortest line.

Note:

- In case of LILO of one circuit of D/C line, all lines will be considered as D/C line.
- Parallel Line on single circuit towers shall not be considered as double circuit lines.
- In case of double circuit if calculated Z2 impedance value is more than Z3 value, it can be limited to 130 % of ZL.

1.3 Zone -3 Setting

Zone -3	ALL LINES
Reach	120% of (Protected lines + next longest line)
	If Zone 3 impedance covers LV side of transformer of remote station, then Zone 3 impedance can be limited to cover 70% of effective transformer impedance
Time	1.0 Second DEF shall be enabled with coordination with Z2 time.

Note: If the LV side of transformer relays are numerical, then its non¬directional high set element to be enabled with proper time delay in addition to the IDMT settings to cover bus fault in LV side.**

1.4 Reverse Zone Setting

	ALL LINES
Reach	A=10 % of XL for Line Length >100 Km, A=20 % of XL for Line Length < 100 Km subject to a minimum primary value of 1 ohm. The resistive reach should be equal to Zone -3 resistive reach
Time	750 msec 1.1 sec (If there are lines, prone to high impedance fault (eg. line running through forest area)

Note: Additional Zone may be created with Zone 1 reactive reach and Zone 3 resistive reach with a time setting of 200msec for feeders prone to high impedance faults.

1.5 Resistive Reach Setting

	ALL LINES
Zone 3	Rg shall be limited to 80% of load encroachment. Rp shall be limited to 60% of load encroachment.
Zone 2	Shall be equal to Zone 3 Resistive reach as far as possible and shall not be less than 80% of Zone 3 resistive Reach
Zone 1	Subject to R/X ratio limitations in the relays

Note: Criterion for calculation of load encroachment: $\frac{0.85V_L}{1.5I_L}$ with power factor angle 30 deg.

1.6 Auto re closure setting:

- The dead time setting for 1 ph reclose shall be 1 sec.
- The dead time setting for 3 ph reclose shall be 0.3 sec.
- The reclaim time for auto reclosing shall be 180sec based on recommendation of CB manufacturers.

Note : For 220 kV and above generally adopted Ramakrishna Commission Report which is being updated from time to time by SRPC .

Additional Features in Distance Scheme

1. Power Swing Blocking Relay
2. VT fuse failure Relay
3. Switch onto Fault Relay
4. Fault Locator
5. Auto Reclosing Scheme
6. Carrier Communication Scheme

Factors affecting Distance Relay Operation

1. Fault Resistance
2. Infeed effect
3. Branching off effect
4. Load encroachment

2. Transformer Protection

Faults that are generally ocurred in transformers are:

1. Winding & Terminal Faults
2. Core Faults
3. Tank & Transformer Accessory Faults
4. 0n load Tap changer Faults
5. Abnormal operating conditions
6. External Faults

POWER TRANSFORMER PROTECTION - GUIDELINES

Sl. NO	Description	110/ II kV	110/ 33k V	110/ 22 kV	110/ 66 kV	66/1 lkV	33/1 lk V,8MV A and above	Remarks
(a)	Main 1 - Differential pro- tection, HV Back up non directional over current earth fault protection, HV REF(low impedance), LV Non directional over current earth fault, LV REF (Low impedance	Y	Y	Y	Y	Y	Y	Ml & M2 relays shall be of dif- ferent make/ different hardware platform.
(b)	Main 2 - Differential pro- tection, HV Back up non directional over current earth fault protection,HV REF (low impedance),LV Non directional over current earth fault, LV REF(Low impedance	Y	Y	Y	Y	N	N	
(c)	Non Directional OC+ EF Protection with Breaker Failure	N	N	N	N	Y	Y	Breaker Failure shall be pro- vided from BB protection relay where it is available.
(d)	Non numerical High lmped- ance REF	N	N	N	N	Y	Y	Trip signal shall be given to Nu- merical Main relays Bl for fault event recording purpose
(f)	Buchholz, WT1 and OTI (for 1MVA and above), MOG with low oil level alarm, OSR for OLTC, PRO	Y	Y	Y	Y	N	N	1) All auxiliary trip function shall have Individual resettable flagged aux relay to give trip command. 2) Inputs shall be given to Main relays Binary Input for fault event recording purpose. 3) The main relay shall initiate Trip signal on receiving a Binary Input from aux. relays for TRF trouble. trip

NORMS OF PROTECTION NORMALLY FOLLOWED FOR TRANSMISSION & DISTRIBUTION LINES

Sl.No.	Voltage	Protection Scheme
1.	400 kV Line	Main I: Line differential protection or Numerical distance scheme with Protection coupler Main II: Line differential protection or Numerical distance scheme with Protection coupler
2.	220 kV	Main I: Line differential protection or Numerical distance scheme with Protection coupler Main II: Line differential protection or Numerical distance scheme with Protection coupler
3. a	110kV line Short lines (LL < 10km) & Lines where more than 30% portion is through UG Cable.	Main I: Numerical Line Differential with distance backup Main II: Numerical Line Differential with distance backup
3.b	Lines (LL > 10km & < 80km)	Main I: Numerical Line Differential with distance backup Main II: Numerical Distance Relay
4.	66 kV Lines	Main Protection: Distance scheme (Fed from line PT) Backup Protection: Directional IDMT O/C Relays and directional IDMT E/F relay.
5.	33 kV Lines	Directional IDMT O/C and E/F relays.
6.	11kV Lines	IDMT O/C and E/F relays with SEF element.

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Transmission & Distribution Lines

SERVICE@DOORSTEPS

Service@Doorsteps scheme allows to avail KSEB services without visiting the KSEB offices. After a consumer dials 1912, 9496001912 and registers his/her name, KSEB officials will visit consumers/applicants at their homes and attend to their requirements. Services under the new facility include new connections, transfer of ownership of connections, tariff conversion, effecting changes in connected load/contract load/phases and relocation of service line and meters.

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of Service@Doorsteps

PROPERTIES OF A.C.S.R. CONDUCTORS

Code Name	No. of Strands and dia				Diameter of Complete cable mm	Gross area of Aluminium Sq.mm	Gross area of Complete cable mm	Ultimate Strength Kg	Resistance at 20° C Ohms/Km	Current rating for 30°C temp rise above 40°C ambient	Weight Kg/Km	R_1 Ω/Km	X_1 Ω /Km	R_o Ω /Km	X_o Ω /Km
	Aluminium		Steel												
	No.	Dia mm	No.	Dia mm											
Squirrel	6	2.11	1	2.11	6.33	20.71	24.44	770	1.366	70	85.00				
Weasel	6	2.59	1	2.59	7.77	31.63	36.90	1135	0.905	100	127.70				
Rabbit	6	3.35	1	3.35	10.05	52.95	61.78	1860	0.540	148	213.00	0.56220	0.35834	0.71020	1.61934
Mink	6	3.66	1	3.66	10.98	63.06	73.57	2205	0.454	167	255.00	0.51820	0.40119	0.73814	1.48036
Racoon	6	4.09	1	4.09	12.27	77.83	91.92	2746	0.3656	197	318.40	0.4181	0.3949	0.66277	1.45318
Dog	6	4.72	7	1.57	14.15	105.20	118.80	3310	0.218	254	394.00	0.2265	0.33684	0.3745	1.59784
Tiger	30	2.36	7	2.36	16.52	131.50	162.10	5790	0.220	296	603.80	0.25170	0.39790	0.50020	1.35693
Wolf	30	2.59	7	2.59	18.13	158.10	195.00	6875	0.183	343	727.40	0.20930	0.39196	0.4466	1.35732
Lynx	30	2.79	7	2.79	19.53	183.90	226.80	7945	0.158	385	844.20	0.18020	0.38739	0.41596	1.35328
Panther	30	3.00	7	3.00	21.00	211.70	261.20	9095	0.137	427	976.00	0.15510	0.40690	0.34460	1.33840
Kundah	42	3.49	7	1.94	26.76	402.90	423.57	9550	0.074	726	1276.60	0.08200	0.40523	0.30092	1.28064
Zebra	54	3.18	7	3.18	28.67	428.9	485	13190	0.0674	795	1621	0.0868	0.4007	0.2819	1.3036
Moose	54	3.53	7	3.53	31.77	528.50	597.00	16280	0.0548	880	2001.50	0.0748	0.3992	0.2199	1.339
Finch	54	3.64	19	2.18	32.83	564.00	635.50	18235	0.0512	1000	2129.20				

FEEDER CONDUCTOR IMPEDANCE VALUES

ACSR CONDUCTOR	AMPACITY	R,X VALUES / KM				Ic, A/Km
		R1	XI	R0	XO	
STACIR-HTLS	640	0.25659	0.4243	0.56239	1.2094	
TWIN MOOSE	1400	0.02819	0.28164	0.24376	1.16279	
Twin Panther (220 KV)	750	0.086	0.3	0.371	1.081	0.484
SINGLE PANTHER (110 KV)	375	0.17	0.386	0.405	1.316	0.188
ACCC (220 KV)	1503	0.056	0.402	0.228	1.132	0.367
ACSS (400 KV)	1654	0.03	0.306	0.233	0.9	0.869

CONVERSION TIPS

1000 micron	- 1mm	1 cent	- 40.46 m^2	1 Dozen	- 12No
10 cm	- 1decimeter	1 are	- 100 m^2-2.47105 cents	1 gross	- 12Dozen
10 decimeter	- 1m	1 acre	- 4046.36 m^2-0.404680ha	1 score	- 20No
1 inch	- 2.54 cm	1 Hectare	- 2.47105 acres	1 quire	- 25 sheet
12 inches	- 1 feet-0.3048m	1 km2	- 100 Hectares	1 reem	- 20quires?
3 feet	- 1 yard- 0.9144 m	1 kgf meter	- 9.80665 N-m	20 mg	- 0.1 carat
6080 feet	- 1.000639 nautical mile	1 gallon (UK)	- 4.54609 Ltr	1 bar	- 100KPa
1852 meter	- 1 nautical mile	(°F-32)x556 (°F-32)x5/9	= °C = °C	1 Pa	- 1 N/m^2
1 mile-1760 yard	- 1.6093km	K	= °C + 273.15	1 m3	- 1000 dm^3
1 fortnight	- 14 days	1 millennium	- 1000 Calendar years	1 litre	- 1dm^3
1 pound (lb)	- 0.453592kg			1 ounce	- 28.3495 gm

CURRENT TRANSFORMER OPERATED METERS

The following points should be remembered when connecting up or checking a CT meter in the consumers premises.

1 The Voltage and current to a meter element should be connected from one and the same phase, ie. the pressure coil and current coil of each element should get power supply from the one and the same phase.

2 CT is to be connected in forward polarity.

3 All the CTs (connected to a 3 phase meter) must be of the same transformation ratio and the ratio must be recorded in the relevant records.

4 As far as possible the connection to the 3 phase meter may be effected in the forward phase sequence. The correct multiplication factor should be noted in all the records.

Multiplication factor of CT Meter $= \frac{\text{Actual CT Ratio x Dial Factor}}{\text{Rated transformation ratio on Meter}}$

If 100/5 CT is used with 300/5 Meter, the MF $= \frac{100/5 \times D.F.}{300/5} = 1/3 \times \text{Dial factor}$

In the case of CT PT sets used in HT/EHT Metering

SOURA PROJECT

Government of Kerala, launched the Soura Project, with an ambitious target to integrate 500MWp Rooftop Solar PV Power Plants to KSEBL Grid by 2022. KSEBL funded Phase I Soura has achieved a mile stone of 28 MW spanning over 2500 sites across the state, serving residential, commercial, industrial, agriculture and government sectors despite the challenges raised by the COVID-19 pandemic and weather conditions.

Soura Phase II Subsidy Project was rolled out in line with the Ministry of New and Renewable Energy, Government of India's Phase II Grid Connected Rooftop Solar Programme-2019, exclusively for the residential sector. The subsidy shall be based on the benchmark cost, valid at the time of tender process or the tender discovered rate whichever is lower. Also the subsidy shall be calculated based on the installed plant capacity (DC capacity) or the inverter capacity (AC capacity) whichever is lower. Capacity allocation for the state of Kerala for 2019 -20 was 50 MW and for 2020-21 period is 200 MW. The project is under implementation stage and have achieved 72 MW and is scheduled to be closed by March 2024. The plant capacity and the applicable subsidy is summarized in the table.

Capacity	CFA (% of bench Mark Cost)
Up to 3 kW	40%
Above 3 kW and up to 10 kW	40 % up to 3kW + 20% for each kW above 3 kW up to 10 kW
Group Housing Societies	20%

Plant Cost Details and MNRE Bench Mark rate for 2021-22

Capacity Range	Plant Cost (Per kW including GST) Rs	Bench Mark Rate(Per kW including GST) Rs
1 kW	75500	53398
Above 1-2 kW	67500	49093
Above 2-3 kW	63500	47819
Above 3kW to 10 kW	51152.12	41000

*Subsidy will be limited to MNRE Benchmark cost

For registration and more details : visit https://ekiran.kseb.in
Soura Help Desk Line: 9496018370/9496266631
MNRE National Portal for Rooftop Solar : visit https://solarrooftop.gov.in

Scan QR Code For Details & Updated Information of Soura Project

MISCELLANEOUS CHARGES FOR ELECTRICITY CONNECTION

Sl.No.		Description			Amount -₹
1	Application Fee				
	a	Service Connection			
		i L.T Supply			50
		i H.T Supply			1.000
		iii E.H.T Supply			5,000
	b	Shifting of meters, change of tariff, connecting up additional load, change of ownership, disconnection & reconnection on request, testing accuracy of meters, testing transformer oil etc. for individual benefit			10
	c	Realignment of lines, shifting of posts/lines etc. for individual benefit			
		i For LT lines			100
		ii For HT lines			500
	d	Hire & Hire purchase of materials			50
	e	Request by consumer			
		i Reduction/increase of connected load/contract demand			25
		ii Meter Reading and associated billing			50
	Note: Applications for voltage improvement, mass petition for line extension and deposit works by local bodies are exempted from remitting application fee .Petition signed by four or more peoole may be considered as a mass petition.				
	f	Solar connectivity (feasibility study)			1000
	g	Solar connectivity (Registration)			1000/KW
2	Processing Fee				
	a	For change of ownership			100
	b	For shifting of lines	For LT lines		200 per work
			For HT lines		500 per work
3	Reconnection Fee		LT	HT	EHT
	a	When the supply to installation remains disconnected for period not exceeding six months due to non-payment of eiectricity charges.	30	1,000	2,000
	b	When the supply to Installation remains disconnected for period exceeding six months due to non-payment of electricity charges or on request of the consumer (including testing fee)	100	2,000	4,000
	c	When the supply to installation remains disconnected due to fault in installation/non compliance with the provisions of the prevailing supply code (even if the period of disconnection does not exceed six months) (including testing fee)	100	3,000	6,000
4	Testing Fee				
	a	The first test and inspection of a new installation shall be carried out free of charge.			

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of Miscellaneous Charges

Sl.No.	Description	Amount - ₹

If any further test and / or inspection becomes necessary owing to any fault in the installation or due to noncompliance with Kerala Electricity Supply Code 2014 or for testing for extensions, the charges payable in advance for each additional test and/or inspection shall be as follows:

b				
	I	LT Single Phase		25
	II	LT Three Phase		50
	Ill	HT		1,000
	IV	EHT		2,000

c Testing fee for metering equipment at consumer's request per test.

I	Energy Meter		7	Single phase net meter	665/-
a	Single Phase Meter	335/-	8	Three phase net meter	2205/-
b	Poly Phase Meter	555/-	9	LT CT ToO meter	1500/-
2	Energy Meter (DISPUTE)		10	LT CT ToO Net Meter	3000/-
a	Single Phase Meter	555/ -	11	HTToO meter	2000.-
b	Poly Phase Meter	1105/-	12	HT Net Meter	4000/-
3	LT CT (Ratio/ Phase angle error at a specified burden)	225/-	13	HT/EHT data downloading (Billing and Load Survey)	2500/
4	HT CT (Ratio/ Phase angle error at a specified burden)	1105/- per range			
5	HT PT (Ratio/ Phase angle error at a specified burden)	1105/- per phase			
6	CTPT Unit (Indoor/ Outdoor)		14	EHT meter	4000/-
a	Ratio/ Phase angle error at a specified burden	8820/-	15	EHT meter (bidirectional)	8000/-
b	Ratio/ Phase angle error at a specified burden and HV Test	16540/-	16	HT/EHT ABT meter	15000/-

Note: 1) Consumer can entrust the meter testing either in the Electrical section office, or can directly submit the meter to the approved laboratories for testing. Consumer who entrust the meters (to be tested) in the Electrical section office are to remit transportation cost with packing charge of `100/- per meter in addition to testing fee mentioned above.

2) If the error in the meter is found to be beyond the limits of accuracy as prescribed in the Regulations in force from time to time, the testing fee shall be returned to the consumer.

	d	Testing of transformer oil (per sample)	200
6	Miscellaneous charges		
	a	Dismantling of service connection (on request by consumer)	100
7	Establishing credit in the meter (prepaid meter)		
	a	first credit establishment for the month	Nil
	b	Subsequent Credit establishment	100
8	Fee for appeal under Section 127-upto Rs.1,00,000 2% of the assessed amount, subject to a minimum of Rs. 500		
9	Fee for appeal under Section127-Above Rs.1,00,000 1% of the assessed amount, subject to a minimum of Rs. 2000		
10	Rate of interest for delayed payment 12% per annum, based on actual number of days of delay from the due date upto a period of 30 days & there after at the rate of 18 % per annum for the entire period of default from the due date.		
11	Energisation charges		
	For energisation of individual consumers located inside colonies, high rise buildings or commercial/ industrial residential complexes developed by promoters/builders etc at the time of applying for separate connection as per regulation 49(6) & 49(7) of Kerala Electricity Supply Code 2014		300
12	Processing fee for application as per Regulation 75{11) of supply code 2014		
	i	Load upto 5KW	150
	ii	Load above 5KW and upto 20KW	300
	iii	Load above 20KW and upto 100KVA	1,000
	iv	Load above 100KVA and upto 3000KVA	3,000
	v	Load above 3000KVA and upto 12000KVA	10,000
	vi	Load above 12000KVA and upto 20000KVA	20,000
	vii	Load above 20000KVA and upto 40000KVA	40,000
	viii	Load above 40000KVA	50,000
	Note. Processing fee shall not be applicable to the BPL category connecti ons with connected l oad of and below 1000 watts		

13 Inspection fee for inspection on Holidays/specified date of consumer as per Regulation 77{3) Supply Code 2014

		Inspection fee on working days as chosen by the consumer	I nspection fee on holidays as chosen by the consumer
i	LT Single Phase	25	50
II	LT Three Phase	50	100
Ill	HT	1000	2000
iv	EHT	2000	4000

Sl.No.	Description	Amount - ₹
14	Security Deposit of meters	
	i Single phase ToD meters	700
	ii Three phase ToD meters	2,100
	iii CT Meters ToD	2,500
	iv Single phase ToD meters with AMR and modem	700
	v Three phase ToD meters with AMR and modem	2,100
	vi CT Meters ToD with AMR and modem	2,500
	Vii Single phase AMI Compliant Meter with modem	2,000
	Viii Three phase AMI Compliant Meter with modem	4,000
	ix ABT Complaint Meter	92,817
15	Residual cost of meters	
	The residual cost of meters as per Regulation 22 of Kerala Electricity Supply Code 2014 shall be calculated on the basis of purchase cost of the meter [Cost Price (CP)]. KSEB will publish the purchase cost of all makes of meters made in all previous years for working the residual cost at the time of replacement. At the end of every year the depreciation value shall be deducted from the CP and the value thus arrived shall be considered as the Residual Price (RP) in the beginning of the subsequent year. This way the Residual cost of the meter is calculated as on the date of replacement of the meter. The rate of depreciation for meters as per the CERC Depreciation Schedule is 6% and hence it is taken as the depreciation rate per year for calculating residual cost of meter. Thus RP = CP[1-(D*n/100] where, RP = Residual Price at the time of replacement CP = Purchase Cost of meter D = Depreciation rate n = number of years elapsed from year of procurement to year of replacement; the maximum value of n being '15' If the fraction of years thus considered falls below 6 months, it is ignored and if it is above 6 months, it is taken as a full year. On completion of 15 years from the date of manufacture (which may be marked on the name plate of the meter), the residual value will be only 10% as per the CERC Depreciation Schedule.	
16	Additional charge for protected Load	
	1. 20% additional demand charges over the monthly recorded maximum demand during the period of load shedding to be levied from the consumer with protected load status as per the Regulation 48 of Kerala Electricity Supply Code, 2014.	
	2. The consumer with dedicated feeder from grid substations shall apply for and obtain protected load status. Protected load status can be applied for at any point in time and the consumer has the discretion to decide the period for which this status is required.	
	3. If such consumer consumes more energy than their eligible quota during the period of power restrictions and load shedding he shall pay charges for such excess consumption at the rates approved by the commission.	

TESTING FEE FOR INSTRUMENTS/ METERS

A. ELECTRICAL INSPECTORATE

The Fees shall be remitted in head of Account 0043-102-099

1. Energy Meter (In house testing)

a) Single Phase (4point) active energy % error ₹ 335 (ordinary), ₹ 555 (Calibration certificate as per NABL norms)

b) Poly Phase (4 point) active energy % error ₹ 555 (ordinary), ₹ 1105 (Calibration certificate as per NABL norms)

c) Tri vector meter (active and reactive energy % error) ₹ 1105

2. Energy Meter (Dispute)

a) Single Phase (active energy % error) ₹555

b) Poly Phase (active energy % error) ₹1105

c) Tri vector meter (active and reactive energy % error) ₹ 2205

3. Import / Export Meter (Net Meter)

a) Single Phase (active energy at Import and export mode % error) ₹ 665

b) Three Phase Direct Meter (active energy at Import and export mode % error) ₹ 1105

c) Three Phase active and reactive energy at Import and export mode % error at different load points) ₹ 2205

4. Initial inspection fee of electrical inspectorate

a) Extra high voltage / high voltage equipment ₹5.55 per kVA/kW/kVAr subject to a maximum of ‘33075

b) Medium voltage / low voltage equipment ₹11 per kVA/kW/kVAr

c) Earth electrodes ₹60per electrode

d) Earth mat ₹5.25 pr sq.m

e) Bus duct ₹2.50 per Ampere per 20 m length or part there of

f) Breakers /Switches / Switch board ₹2.5 per Ampere per incomer or outgoing

g) Lightning protection ₹2760 per building

h) UG Cable 11kV & above ₹100/Km

i) Over head lines / ABC ₹50/Km

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of instruments Testing Charge

COST DATA OF DISTRIBUTION WORKS APPROVED BY THE K S E R C

Annexure to B.O. 1265/2018 (KSEB/TRAC/Cost Data /R3/2018-19) dated 16 -05-2018

Cost data of Distribution works approved by the Commission for KSEBL for the Financial year 2018-19 vide order dated 27.4.2018

Sl No.	Description Of Work	Rate Approved By The Commission In Rupees
1	LT single phase weather proof service connection upto and including 5kW (using static meter with LCD facility)	1740.00
2	LT three phase weather proof service connection up to and including 10 KW (using static meter with LCD display and TOD facility)	4220.00
3	LT three phase weather proof service connection above 10kW upto and including 25kW (using static meter with LCD display and TOD facility)	14420.00
4	LT three phase weather proof service connection above 25kW & below 50kVA	21750.00
5	LT three phase weather proof service connection from 50kVA and above upto and including 100kVA .	23000.00
6	Providing support pole for weather proof service connection.	5540.00
7	LT single phase over head service connection upto and including 50m with max. 1 Post	9160 + 80per M of OH line
8	LT single phase over head service connection above 50 m upto and including 100 m with max. 2 Posts	21950 + 80 per M of OH line above 50m
9	LT single phase over head service connection above 100m up to and including 150m with max. 3 Posts	34450+80 per M of OH line above 100m
10	LT single phase over head service connection above 150m up to and including 200m with max. 4 Posts	46750 + 80 per M of OH line above150m
11	LT three phase over head service connection upto and including 50m with max. 1 Post	11550 + 160 per M of OH line
12	LT three phase over head service connection above 50m upto and including 100m with max. 2 Posts	28880+160 per M of OH line above 50m
13	LT three phase over head service connection above 100m up to and including 150m with max. 3 Posts	46600+160 per M of OH line above 100m
14	LT three phase over head service connection above 150m up to and including 200m with max. 4 Posts	64100 + 160 per M of OH line above150m

Sl NO.	DESCRIPTION OF WORK	RATE APPROVED BY THE COMMISSION IN RUPEES
15	Post insertion for LT single phase over head line (without stay)	6700
16	Post insertion for LT single phase over head line (with stay)	8170
17	Post insertion for LT single phase over head line (with strut)	13200
18	Post insertion for LT three phase over head line (without stay)	7730
19	Post insertion for LT three phase over head line (with stay)	9200
20	Post insertion for LT three phase over head line (with strut)	13850
21	Conversion of LT single phase weatherproof service connection to LT three phase weather proof service connection with connected load upto and including 10kW	4170
22	Conversion of LT single phase weatherproof service connection to LT three phase weather proof service connection with load above 10 kW up to and including 25kW	15450
23	Conversion of LT single phase weatherproof service connection to LT three phase weather proof service connection with load above 25kW and below 50kVA	22800
24	Conversion of LT single phase weatherproof service connection to LT three phase weather proof service connection with load 50kVA and above up to and including 100kVA	23800
25	Enhancement of connected load of LT three phase weather proof service connection with a max. load of 10kW into the range of 10 kW to 25 kW.	14550
26	Enhancement of connected load of LT three phase weather proof service connection with a maximum connected load of 10 kW into the range of 25 kW to 50 kVA.	22550
27	Enhancement of connected load of LT three phase service connection with a maximum connected load of 10 kW into the range of 50 kVA to 100 kVA .	24550
28	Enhancement of connected load of LT three phase service connection with load in the range of 10kW - 25 kW into the range 25 kW - 50kVA	21210
29	Enhancement of connected load of LT three Phase service connection with load in the range of 10kW - 25 kW into the range of 50 kVA -100 kVA	22510
30	Enhancement of connected load of LT three Phase service connection with load in the range of 25kW - 50 kVA into the range of 50 kVA -100 kVA	19510
31	Shifting Single Phase Energy Meters	610
32	Shifting Three Phase EnergyMeters	800
33	Shifting Three Phase CT Meters	1400
34	HT pole insertion in HT/LT line (with stay)	15870
35	HT pole insertion in HT/LT line (with strut using 8m pole)	17850
36	Providing strut using LT pole	6500
37	Providing strut using HT pole	9100
38	Providing LT stay	1750
39	Providing HT stay	2310
40	Reconductoring LT line ,with Rabbit 1 conductor	55
41	Reconductoring HT line ,with Raccoon	240
42	Reconductoring HT line ,with Rabbit	170
43	Adding one conductor (ACSR Rabbit) on the existing poles (where cross arm is available) inclusive of cost of pin,insulator etc.	85
44	Adding one conductor (ACSR Rabbit) on the existing poles (where cross arm is not available) inclusive of cost of pin, insulator etc.	100
45	Conversion of LT single phase 2 wire line to LT Three phase 4 wire line (per metre)	165
46	Conversion of LT single phase 2 wire line to LT Three phase 5 wire line	215
47	Conversion of LT single phase 3 wire line to LT Three phase 5 wire line	165
48	Drawing Single Phase 2 wire line under existing HT line	130
49	Drawing Single Phase 3 wire line under existing HT line	200
50	Drawing Three Phase 4 wire line under existing HT line	250

Sl NO.	DESCRIPTION OF WORK	RATE APPROVED BY THE COMMISSION IN RUPEES
51	Drawing Three Phase 5 wire line under existing HT line	310
52	Construction of LT single phase, 2 wire line	340
53	Construction of LT single phase, 3 wire line	400
54	Construction of LT 3 phase, 4 wire line	460
55	Construction of LT 3 phase, 5 wire line	520
56	Construction of 1Km of 11kV line using ACSR Rabbit (with out tree cutting compensation)	605
57	Construction of 1Km of 11kV line using ACSR Racoon (with out tree cutting compensation) using 24 no of poles and 21nos of stays	670
58	Laying 1KM of HT XLPE UG Cable (3x300 mm2 single run)	1770
59	Construction of 1 Km of 11kV line using ACSR Racoon with A Pole (with out tree cutting compensation)	960
60	Construction of 1Km of 11kV line using ACSR Racoon with 4 Legged tower (with out provision for tree cutting compensation)	1880
61	Installation of 1 No. 11 kV/ 433 V , 25 kVA Transformer	282000
62	Installation of 1 No. 11 kV/ 433 V , 100 kVA Transformer without stay(pole mounted)	390000
63	Installation of 1 No. 11 kV/ 433 V , 160 kVA Transformer without stay (pole mounted)	547000
64	Installation of 11KV/433V 250 kVA Transformer without stay	561000
65	Installation of 1 No.11 kV/ 433 V , 500 kVA, Transformer	874000
66	Installation of Data Acquisition compatible Extensible type Ring Main Unit without VCB -CCC (E) (Cable -Cable -Cable)	425350
67	Installation of Data Acquisition compatible Extensible type Ring Main Unit with VCB -CTC (E) (Cable -Transformer -Cable)	482000
68	Installation of Data Acquisition compatible Extensible add-on type Ring Main Unit without VCB (Single Switch C-Extension)	371500
69	Installation of Data Acquisition compatible, Extensible, add-on type Ring Main Unit with VCB (Single Switch T-Extension)	443700
70	Installation of Data Acquisition compatible Extensible type Ring Main Unit with provision for isolation and earthing facility on both sides (GCG)	338000
71	Drawing 1Km of 11 kV ABC of size 3X150 + 1X120 sqmm on 9 mts supports with an average span of 20-25 mts	1340213.03
72	Drawing 1Km of 11 kV ABC of size 3X120 + 1X95 on 9 mts supports with an average span of 20-25 mts	1197653.03
73	Drawing 1Km of 11 kV ABC of size 3X95 + 1X70 on 9 mts supports with an average span of 20-25 mts	1156073.03
74	Drawing 1Km of LT ABC of size 3X95 + 1X70 +1X16 on 8 mts supports with an average span of 20-25 mts	883334.27
75	Drawing 1Km of LT ABC of size 3X70 + 1X50 +1X16 on 8 mts supports with an average span of 20-25 mts	841754.27
76	Drawing 1Km of LT ABC of size 3X50 + 1X35 +1X16 on 8 mts supports with an average span of 20-25 mts	794894.27

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STAY WIRES (GUY WIRES) (BSS 183-1938)		
No. & Gauge of wire	Dia of wires in mm	Composite min. wt. kg/km
7/8	4.06	706
7/9	3.66	575
7/10	3.25	453
	3.15	425
7/12	2.64	299
7/14	2.03	177
7/16	1.63	114

GI WIRES		
Gauge	Metres / Kg	Kg / Metre
No. 16 SWG	42.35	0.024
No. 14 SWG	27.50	0.036
No. 12 SWG	22.73	0.44
No. 10 SWG	18.25	0.055
No. 8 SWG	9.80	0.102
No. 4 SWG	4.587	0.218

SCHEDULE OF TARIFF

LOW TENSION – I- DOMESTIC (LT- I)

The tariff applicable to supply of electrical energy for domestic purpose (both single phase and three phase)

Tariff Revision -2023				
LT I Domestic				
Monthly consumption in Units	Fixed Charges (Rs/ consumer/ month)		Energy Charges (Rs. per unit)	Remarks
	single phase	Three phase		
0-40 *	Nil	-	1.5	Telescopic
0-50	40	100	3.25	
51-100	65	140	4.05	
101-150	85	170	5.1	
151-200	120	180	6.95	
201-250	130	200	8.2	
0-300	150	205	6.40 (all units)	Non- Telescopic
0-350	175	210	7.25 (all units)	
0-400	200	210	7.60 (all units)	
0-500	230	235	7.90 (all units)	
Above 500	260	260	8.80 (all units)	
*The rate is applicable to consumers belonging to BPL category with connected load of and below 1000 Watts				

Note-1. Fixed charges shall not be applicable to consumers belonging to below poverty line (BPL) category with connected load of and below 1000 watts and monthly consumption of and below 40 units.

Note-2. BPL family having cancer patients or permanently disabled persons as family members due to polio or accidents, and consume upto 100 units per month shall be billed @Rs 1.50/unit, provided their connected load is of and below 1000 watts.

Note-3. Home stay units approved as such by Department of Tourism shall be billed under LT-I domestic.

Note-4. Domestic consumers shall be allowed to utilize electrical energy in a portion of their residence for their own use for purposes other than domestic if the connected load for the purposes other than for domestic, in their premises does not exceed 20% of the total connected load or 1000 Watts whichever is less. When connected load other than for domestic use in such cases exceeds 20% of the total connected load or 1000 Watts whichever is less,

such loads shall be segregated and separate service connection shall be obtained under appropriate tariff. When this is not done, the tariff applicable to the whole service connection shall be at the appropriate tariff applicable to the connected load used for purposes other than domestic, if such tariff is higher than the tariff for LT-I category.

Note.5: (a) The tariff for domestic consumption by the families of the victims of endosulfan tragedy in Hosdurg and Kasaragod Taluks of Kasaragod District shall be Rs.1.50 unit for a monthly consumption up to 150 units. If the consumption of the consumer, who is eligible for the above concession, exceeds 150 units per month, the consumption in excess of 150 units will be charged at the rates specified for the slabs 151-200 units or 201-250 units as the case may be. This concession will not be available for the consumers with monthly consumption above 250 units.

(b) The consumer who is eligible for this concession granted to endosulfan victims has to submit to the officer in charge at the section office of the licensee, a certificate from the revenue authorities or from the local self-government authority to prove his/her eligibility for this tariff concession.

Note-6: (a) The domestic water supply schemes approved by the Government including the following shall be charged under domestic tariff.

(i) water supply schemes under Jalanidhi, Jalandhar or Swajaladhara Projects

(ii) water supply schemes coming under water supply societies or under beneficiary committees;

(iii) water supply schemes for Scheduled Caste (SC) and/or Scheduled Tribe (ST) colonies

(iv) water supply schemes for Laksham Veedu Settlements taken over and managed by Local Self Government Institutions

(v) social drinking water supply schemes established using local area development funds of Members of Legislative Assembly (MLA) and / or Members of Parliament (MP); (vi) social drinking water supply schemes established using funds of Local Self Government Institutions;

(vii) social drinking water supply schemes under Peoples Participatory Schemes (PPS)

(viii) Rajeev Gandhi Drinking Water Schemes managed by beneficiary groups.

(b) The method for billing for the above mentioned water supply schemes solely for domestic purpose shall be as specified hereunder

(c) The total monthly consumption of electricity of the units of such water supply schemes will be divided by the number of beneficiary households and the average consumption per households will be billed under LT – I domestic tariff. The amount of electricity charges assessed for the average consumption per beneficiary household will then be multiplied by the number of beneficiary households to assess the total electricity charges to be paid by the units of such schemes.

(d) Anganwadies, if any, availing drinking water from the above water supply schemes shall also be considered as a beneficiary availing the water supply for domestic purpose and the benefit of such community drinking water schemes shall be extended to them.

LOW TENSION – II & III TEMPORARY CONNECTIONS {LT II } Tariff applicable for single or three phase temporary connections for purposes such as illumination, exhibition, festivals, public meeting and fairs.

{LT III} Applicable to temporary extension taken from the premise of existing consumers

2. LT-II Temporary connections	Rs12.50/kWh or Daily minimum of Rs.100/kW or part thereof of the connected load whichever is higher
3. LT-III Temporary Extensions	Fixed charge per day –Rs.65/kW or part thereof of the connected load plus the application fee, test fee etc. Energy charge shall be recovered from the consumer where from extension is availed, at the tariff applicable to the consumer

Note for LT II: 40% concession in the rates shall be allowed if the connection is for

(a) The exhibitions conducted or sponsored by the Government or Local Self-Government institutions or by Government educational institutions or by Public Sector Undertakings and the exhibitions conducted by recognized private educational institutions;

(b) Festivals of religious worship centres for the illumination, public address system and security lighting. (This concession is limited to the energy availed by the religious worship centres and not by other agencies who function in the premises of religious worship centres where festival is being organized).

LOW TENSION IV - INDUSTRY (LT- IV) (a) LT- IV (A) – INDUSTRY LT-IV (A) Industrial tariff is applicable for the general purpose industrial loads (single or three phase) which include,-

(i) Manufacturing units
(ii) Grinding mills, flour mills, oil mills, rice mills
(iii) Saw mills, units using electric hydraulic axe machine to break down logs into small pieces.
(iv) Ice factories
(v) Rubber smoke houses, tyre vulcanizing/re-treading units, units manufacturing rubber sheets from latex, coconut drying units
(vi) Workshops using power, mainly for production and/or repair
(vii) Public waterworks, drinking water pumping for public by Kerala Water Authority, Corporations, Municipalities and Panchayats, telemetry stations of KWA, pumping water for non- agricultural purposes, sewage pumping units
(viii) Power laundries
(ix) Screen printing of glass ware or ceramic, SSI units engaged in computerized colour printing excluding photo studios/ colour labs.
(x) Audio/video cassette/CD manufacturing units
(xi) Printing presses including presses engaged in printing dailies
(xii) Bakeries (where manufacturing process and sales are carried out in the same premises)
(xiii) Diamond- cutting units, stone crushing units, granite cutting units (where boulders are cut into sheets in the same premises)
(xiv) Book binding units with allied activities
(xv) Garment making units
(xvi) Seafood processing units, prawn peeling and processing units, granite cutting units (where large granite blocks are cut into sheets in the same premises)
(xvii) Plantations of cash crops, tea factories, cardamom drying and curing units
(xviii) Units carrying out extraction of oil in addition to the filtering and packing activities carrying out in the same premise and under the same service connection
(xix) Dairy, processing of milk by pasteurization and its storage and packing,
(xx) Soda manufacturing units, bottling plants/ packaging drinking water.
(xxi) Crematoria.
(xxii) Dewatering of agriculture land.
(xxiii) Dewatering of waterlogged areas
(xxiv) De-siltation plants
(xxv) Units engaged in cleaning, grading, blending and storage of food grains.
(xxvi) Units engaged in catering services without facility for retail sales as that of restaurants and hotels.
(xxvii) Manufacturing of concrete rings and concrete tanks

LOW TENSION – IV (B) – IT and IT Enabled Services. {LT IV (B)} Tariff applicable to Information Technology (IT) and IT enabled services including akshaya-e-centres, computer consultancy services units, call centers, software services, data processing activities, desktop publishing (DTP), software development units and such other IT enabled services.

4. LT - IV Industry	LT - IV(A) Industry		LT - IV(B) IT & IT Enabled Industries	
Connected load Slab	FC/DC	EC	FC/DC	EC
a) Connected load of and below 10 kW (Rs/ month)	140	5.80	165	6.50
b) Connected load above 10kW and below 20 kW (Rs/ kW or part thereof per month)	85	5.80	120	6.50
c) Connected load of above 20kW (Rs/kVA or part thereof per month)	200	5.85	200	6.60

LOW TENSION - V- AGRICULTURE

a. LT- V AGRICULTURE (A) {LT- V (A)} This tariff applicable to the use of electricity for: (1) pumping, dewatering and lift irrigation for cultivation of food crops, fruits and vegetables. (2) pumping, dewatering and lift irrigation for the cultivation of cash crops such as cardamom and coffee and for the cultivation of crops such as coconut, areca nut, pepper, nutmeg, cloves, cocoa and betel leaves as pure crops or as inter crops.
b. LT – V - AGRICULTURE (B) {LT -V (B)} The tariff under this category is applicable to the supply of electricity for the use of the following activities such as

iii. Livestock farms, combination of livestock farms with dairy, poultry farms, rabbit farms, piggery farms, hatcheries,
iv. Silk worm breeding units, sericulture
v. Flori culture, tissue culture, agricultural and floricultural nurseries, mushroom culture
vi. Aquaculture, fish farms including ornamental fish farms, prawn farms, other aqua farms, aquarium run by the Agency for Development of Aquaculture, Kerala, and
vii. Cheenavala without fish farming and egger nurseries.

5. LT V Agriculture	LT V(A) Agriculture	LT V(B) Agriculture
Fixed Charge (Rs/kW or part thereof per month)	20	20
Energy Charge (Rs. Per unit)	2.30	3.4

Note for LTVA

Note: 1- General conditions relating to installation of capacitors will apply. Note: 2 - The electricity for pumping and lift irrigation for the cultivation of cash crops only are included under LT V(A) agriculture tariff and the electricity for general purpose industrial loads like drying, further processing, value addition etc. of plantation of cash crops shall be billed under LT IV(A) tariff'.

Note for LTVB

Note - 1: General conditions relating to installation of capacitors will apply.

Note -2: LT-V (B) Agriculture tariff is applicable to the dairy farms, which have facilities for collection, chilling and storing of milk, till it is sent to the processing units, and also applicable to the primary milk producer's cooperative societies, the primary function of which is the collection of milk from the farmers and to sell the same to the processing units in bulk. This tariff will be also applicable for retail sales outlets if the connected load of sales outlets does not exceed 10% of the total connected load.

Note - 3: The electricity used for running electric motors for making rubber sheets from Latex by individual farmers shall be billed under LT-V- Agriculture (B) [LT-V(B)].

Note - 4: The electricity used for running Shredding machines used for powdering dry waste such as coconut leaves, coconut husk, grass etc by individual farmers.

LOW TENSION –VI GENERAL LT-VI- General (A) [LT- VI (A)] The tariff under LT-VI (A) category is applicable to,

i. Government or Government aided educational institutions; libraries and reading rooms of Government or Government aided educational institutions.
ii. Educational institutions administered by the Government such as LBS, IHRDE, CAPE etc.
iii. Primary health centres, dispensaries and hospitals under the Central Government or State Government or Local Self Government Institutions; X-Ray units, laboratories, blood banks, mortuaries and such other units attached to such primary health centres, dispensaries and hospitals; blood banks of IMA; poly clinics under Ex-servicemen Contributory Health Scheme (ECHS).
iv. Centres for religious worship such as temples, mosques and churches; institutions imparting religious education, monasteries and convents;

LT- VI GENERAL (B) The tariff under this category is applicable to

i. Offices and institutions under the State or Central Governments or under the Local Self Government Institutions, except those which are included in the category LT-VI General (C); village offices; Government Treasuries.
ii. Offices of the Corporations, Boards and other Public Sector Undertakings under State or Central Governments; (iii) Offices of the Kerala Water Authority (KWA), Kerala State Road Transport Corporation (KSRTC) and Kerala State Water Transport Corporation (KSWTC)
iii. Museum and / or zoo
iv. Hostels of educational institutions affiliated to Universities, hostels under the control of the Director of Technical Education or the Director of Medical Education or the Director of Public Instruction or such other institutions of Government, hostels run by the State or Central Government, hostels run by State Social Welfare Board, hostels run by institutions registered under the Travancore - Cochin Literary, Scientific and Charitable Societies Registration Act, 1955 (12 of 1955) or under the Societies Registration Act, 1860 (21 of 1860) or under Indian Trust Act, 1882, the donations to which are exempted from payment of Income Tax; Working women hostels operating under the scheme approved by the Ministry of Women and Child Development, Government of India, hostels under the supervision and monitoring of Department of Social Welfare, Government of Kerala
v. Pay wards and institutions of Kerala Health Research and Welfare Society (KHRWS)

vi. Travellers' bungalows, rest houses and guest houses under government; Police Clubs
vii. Type writing institutes
viii. Offices of social service organizations, offices of service pensioners' associations.
ix. Offices of political parties not approved by the Election Commission of India
x. Collection centres of 'FRIENDS'; single window service centres under Department of Information Technology
xi. Offices of Department of Posts, all post offices including extra departmental (ED) post offices
xii. Cameras at traffic signal points, surveillance cameras installed by the Local Self Government Institutions and also under Operation Kaval Kannukal
xiii. Offices of KMRL
xiv. Old age homes which charge the inmates for boarding and lodging.
xv. Offices of Railways including Railway Stations
xvi. Light houses
xvii. Offices of the document writers.

LT- VI GENERAL (C) The tariff under this category is applicable to

i. Offices or institutions under Income Tax or Central Excise and Customs Departments
ii. Offices under Motor Vehicles Department or Sales Tax department or Excise Department; Sub-Registry offices; and such other tax earning departments under State or Central Government (other than Local Self Government Institutions)
iii. Banking and / or financing institutions (excluding micro financing institutions registered and functioning as per the guidelines issued by Reserve Bank of India)
iv. ATM counters including the ATM counters of post offices.
v. Offices of Airport Authority of India except airports
vi. Insurance companies
vii. Offices of the Goods and Service Tax (GST)
viii. Microfinancing Institutions
ix. Offices of the LIC Agents
x. Offices of the pawn brokers; and
xi. Any other LT categories not included anywhere in this schedule.

LT- VI GENERAL (D) The tariff under LT-VI (D) category is applicable to

i. Orphanages
ii. Anganwadis; schools and hostels for differently abled or physically challenged persons (including mentally retarded students, deaf/dumb/blind/physically handicapped persons)
iii. Old age homes where no charges are levied for the boarding and lodging of inmates
iv. Cheshire homes; polio homes; SoS Childrens' Villages
v. Charitable centres for cancer care, pain and palliative care and HIV rehabilitation
vi. Charitable hospital guidance centres registered under the Travancore - Cochin Literary, Scientific and Charitable Societies Registration Act, 1955 (12 of 1955) or under the Societies Registration Act, 1860 (21 of 1860) or under Indian Trust Act, 1882, donations to which are exempted from payment of Income Tax
vii. Shelters exclusively for orphaned animals and birds run by charitable institutions registered under the Travancore - Cochin Literary, Scientific and Charitable Societies Registration Act, 1955
viii. Libraries and reading rooms with connected load of and below 2000 watts and monthly consumption of and below 100 units.
ix. E-toilet and public comfort stations, where no charges levied for use.
x. Dialysis centres providing free dialysis to the poor.
xi. Buds school and school for Autism.

LT VI GENERAL (E) The tariff under LT-VI(E) category is applicable to

i. Sports and / or arts clubs (with connected load not exceeding 2000 Watts)

ii. Sailing and/or swimming clubs (with connected load not exceeding 2000 Watts)

iii. Gymnasium (with connected load not exceeding 2000 W)

iv. Libraries and reading rooms excluding those which are included in LT VI-A and LT VI-D categories

v. Press clubs

vi. Offices of political parties approved by Election Commission of India

vii. E-toilet and public comfort stations, where charges are levied for use

LT VI GENERAL (F) The tariff under LT- VI (F) is applicable to

i. Computer training institutes, private coaching or tuition centres, self-financing educational institutions including the hostels run by them

ii. Cinema studios, audio/video cassette recording/duplication units, CD recording units, cinema dubbing and animation studios

iii. All construction works

iv. Installations of cellular mobile communications, satellite communications, offices and / or exchanges of telecom companies.

v. Offices or institutions of All India Radio (AIR), Doordarshan and other television broadcasting companies, cable TV networks, radio stations

vi. Hall marking centres.

vii. Offices of the advocates or chartered accountants or company secretary or consulting engineers or tax consultants or architects or cost accountants or of management consultants.

viii. Offices of the 'on line news channels and on line portals'.

ix. Printing press engaged in printing dailies along with online media channels.

LT-VI- GENERAL (G) The tariff under this category is applicable to all the private hospitals, private clinics, private clinical laboratories, private X-ray units, private mortuaries, private blood banks and private scanning canter's and such other private institutions in health care sector.

6. LT VI General {LT VI(A)}, LT VI(B) &VI(C)	VI(A)	VI(B)	VI(C)	VI(D)
Fixed Charge (Rs/kW or part thereof per month)	80	105	190	35/consumer
Energy Charge (Rs. Per unit) non-Telescopic				
Of and below 500 units (all units)	5.80	6.50	7.15	2.1
Above 500 units(all units)	6.65	7.15	8.65	2.1

LT VI(E) General	
Monthly Fixed Charges: (Rs. per consumer/ Month)	
Single phase	50
Three phase	120
Monthly consumption	Energy Charge
0 to 50 units	3.70
0 to 100 units	4.70
0 to 200 units	5.40
Above 200 units	7.10

LT VI(F) General	
Monthly Fixed Charges: (Rs/ kW or part thereof per month)	
Single phase	90
Three phase	180

Energy Charges (Rs. per unit)	
Monthly Consumption slabs	Rate
0 to 100 units	6.00
0 to 200 units	6.80
0 to 300 units	7.50
0 to 500 units	8.15
Above 500 units	9.25

LT VI (G) General	
Monthly Fixed Charges: (Rs/ kW or part thereof per month)	
Single phase	80
Three phase	165
Energy Charges (Rs. per unit)	
Monthly Consumption slabs	Rate
0 to 500 units	5.85
0 to 1000 units	6.60
0 to 2000 units	7.70
Above 2000 units	8.60

LOW TENSION - VII – COMMERCIAL LT- VII-Commercial (A) [LT- VII (A)] The tariff under LT-VII (A) category is applicable to commercial and trading establishment such as

i. Shops, showrooms, display outlets, business houses
ii. Hotels and restaurants (having connected load exceeding 2000 Watts)
iii. House boats
iv. Private lodges, private hostels, private guest houses, private rest houses, private travellers bungalows
v. Freezing plants, cold storages, milk chilling plants for the purpose of marketing the milk and milk products.
vi. Shops selling confectioneries, sweetmeat, breads and such other eatables without manufacturing process
vii. Petrol/diesel/ LPG /CNG bunks, LPG bottling plants
viii. Automobile service stations, computerized wheel alignment centres
ix. Marble and granite cutting units
x. Units carrying out filtering, packing and other associated activities of oil brought from outside
xi. Share broking firms, stock broking firms, marketing firms
xii. Godowns of Kerala State Beverages Corporations
xiii. Photo studios/ colour labs

LT- VII Commercial (B) [LT-VII-B] Tariff applicable to commercial and trading establishments such as

i. Shops, bunks, hotels, restaurants, having connected load of and below 2000 Watts.
ii. Telephone / fax / e-mail / photocopy booths and internet cafes having connected load of and below 2000 Watts. When connected load of the above mentioned consumers exceeds 2000 Watts, such consumers shall be charged under LT -VII (A) tariff. If monthly consumption of LT- VII (B) consumers having connected load of and below 2000 Watts, exceeds 300 units, the energy charges shall be realized at the rate of energy charges applicable to LT -VII (A) consumers.

LT- VII Commercial (C) [LT-VII-C] The tariff under LT VII (C) is applicable to

i. Cinema Theatres
ii. Circus
iii. Sports and arts clubs, sailing or swimming clubs and gymnasium having connected load exceeding 2000W.
iv. Stadiums, turf courts, and indoor courts.
v. Multiplexes
vi. Auditoriums.

LT VII (C) Commercial	
Monthly Fixed Charges: (Rs/ kW or part thereof per month)	
Single phase	130
Three phases	
Monthly Consumption slabs	Revised Tariff w.e.f. 1-11-2023
0 to 1000 units	6.30
Above 1000 units	7.70

LOW TENSION – VIII PUBLIC LIGHTING (LT- VIII) LT – VIII (A) Unmetered Street lights {LT VIII (A)} Tariff applicable to various categories of unmetered public lighting per lamp.

LT – VIII (B) METERED STREET LIGHTS AND TRAFFIC SIGNAL LIGHTS {LT-VIII (B)} Tariff applicable for metered street lights and tariff signal lights.

8. LT VIII (B) METERED STREET LIGHTS AND TRAFFIC SIGNAL LIGHTS	
Fixed charges (Rs/meter/month)	90
Energy charges (Rs/ Energy charge (Rs/unit)	4.80

Note: 1.- When public lighting is to be done after extension of lines, the beneficiaries shall pay the cost of the work as per the cost data approved by the Commission.

Note: 2.- In campuses where lines and lights are provided by the beneficiary, LT metered supply shall be provided at Rs. 4.80 per kWh plus fixed charge of Rs.90.00 per meter per month subject to other conditions regarding the payment of cost of the work.

Note: 3.- Supply to light houses when taken from the street mains of Kerala State Electricity Board Limited or any other licensee will be charged at appropriate public lighting tariff. Where metered independent supply is provided at low tension, the rate applicable will be Rs. 4.80 per kWh plus fixed charge at Rs.90.00 per meter per month and subject to other conditions regarding payment of cost of the work.

Note: 4.- In areas where low tension distribution lines of Kerala State Electricity Board Limited and other licensees exist, metered supply shall be given by the respective licensee for special type of lamps, for which the rates are not given in the table above, provided the lamps are installed and maintained by the local bodies at their cost. The tariff applicable in such cases shall be Rs 4.80 per unit plus fixed charge at Rs 90.00 per meter per month, subject to other conditions regarding payment of cost of the work.

Note: 5.- Separate charges shall not be collected from the consumers towards service charges for street lighting.

Note: 6.- Electricity duty is not payable for public lighting as per the provisions of Kerala Electricity Duty Act, 1963.

LT IX : DISPLAY LIGHTING AND HOARDINGS Tariff applicable to display lighting, hoarding, external illumination of buildings for publicity and sales- promotion purposes.

9. LT IX DISPLAY LIGHTING & HOARDINGS	
Fixed charges (Rs/connection/month)	
(a) Rs. /connection/month up to 1kW	700
(b) For every additional kW above 1kW	150
Energy charges (Rs/ kWh)	12.50

Note: The electricity used for the purposes of displaying the name, address, working time and such essential details of commercial, industrial or other category of consumers is allowed to be charged at same tariff applicable to the category to which such consumers belongs.

LT-X A : ELECTRIC VEHICLES CHARGING STATIONS Tariff applicable to electric vehicle charging stations at LT

10. LT-X: ELECTRIC VEHICLES CHARGING STATIONS	
Fixed Charge (Rs per kW or part thereof per month)	100
Energy Charge (Rs/kWh)	5.50

PART B – HIGH TENSION (HT) AND EXTRA HIGH TENSION (EHT) TARIFF General conditions for HT and EHT tariff

1. For the purpose of conversion from kVA to kW or vice versa, an average power factor of 0.9 shall be used.

2. Billing demand shall be the recorded maximum demand for the month in kVA or 75% of the contract demand as per the agreement, whichever is higher.

3. All the HT&EHT consumers shall be allowed to use upto 130% of the contract demand during off-peak hours without the payment of excess demand charge. However, when the recorded maximum demand during normal period or peak period in a month exceeds the contract demand as per the agreement or the recorded maximum demand during off-peak hours exceeds 130% of the contract demand, the excess demand shall be charged at a rate of 150 percent of the demand charges applicable, as per the billing procedure specified under Annexure-E to this Schedule.

4. (a) As per Section 55 of the Electricity Act, 2003 and provisions of the Central Electricity Authority (Installation and Operation of meters) Regulations 2006, consumer meter shall generally be installed and owned by the licensee.

   (b) Even if the consumer elects to purchase the meter as stipulated in proviso under Sub Section 1 of Section-55 of the Electricity Act, 2003, such meter shall be tested, calibrated, sealed, installed, operated and maintained by the licensee as provided in the said regulations.

   (c) The consumer has to purchase only such meters which are included in the list of manufactures and models which has to be provided by the licensee, as stipulated in clause (c) of Sub-Regulation (2) of Regulation 6, of the Central Electricity Authority (Installation and Operation of Meters) Regulations 2006.

   (d) If any existing consumer, having elected to purchase and supply the meter for replacement of the defective meter in his premises, fails to do so within two months, such consumer will be charged 50% extra over the prevailing rates applicable to him for both demand and energy, for the said two months and one month thereafter.

   (e) The licensee shall, in performance of its duty under Section 55 of the Act, replace the defective meter and realize the security deposit and meter rent in accordance with the provisions of Section 55 of the Electricity Act, 2003.

5. All EHT consumers (except Railway Traction) and all HT consumers (except drinking water supply pumping stations of Kerala Water Authority, Municipal Corporations, Municipalities and Panchayats) shall be billed on ToD tariff as per the formula indicated in the Annexure - A to this schedule.

6. The monthly minimum charge payable shall be the minimum guarantee amount as per Minimum Guarantee Agreement, if any, or the billing demand as per condition 2 above, whichever is higher. This applies even during the period of disconnection of power supply.

7. In the case of colony supply of HT /EHT (Industrial) consumers, the applicable tariff shall be subject to the following conditions: a. Colony Supply: Colony supply, when availed from the HT / EHT supply of the consumer, such supply shall be segregated and metered by means of a sub-meter and the consumption will be charged at 20 paise extra per kWh for HT and 10 paise extra per kWh for EHT consumers. b. If no segregation is made as specified above, the bill amount of the consumer shall be increased for demand and energy charges by 10% for both HT and EHT consumers.

8. Power factor incentives/penalties as per Annexure - B shall be applicable to all HT and EHT consumers.

HIGH TENSION- I - INDUSTRY (A) {HT- I (A)} Tariff applicable to general purpose industrial load of all classes of consumers listed in LT-IV (A) category availing supply of electricity at high tension.

HIGH TENSION-I - IT and IT Enabled Services {HT – I (B)} Tariff applicable to of all classes of consumers listed in LT-IV (B) category availing supply of electricity at high tension.

HIGH TENSION - II - GENERAL (A) {HT – II (A)} Tariff applicable to all classes of consumers listed in LT-VI (A), LT-VI (B), LT-VI (D), and LT-VI (E) categories availing supply of electricity at high tension.

HIGH TENSION – II - GENERAL (B) {HT –II (B)} Tariff applicable to all classes of consumers listed in LT-VI(C), LT-VI (F) and LT-VI (G) categories availing supply of electricity at high tension, including Airports.

HIGH TENSION –III AGRICULTURE (A) – {HT – III (A)} Tariff applicable to the classes of agricultural consumers listed in LT-V (A) category, availing supply of electricity at high tension.

HIGH TENSION - III AGRICULTURE (B) – (HT – III (B)) Tariff applicable to classes of agricultural consumers listed in LT-V (B) category, availing supply of electricity at high tension.

HIGH TENSION – IV (A) COMMERCIAL [HT – IV (A)] Tariff applicable to all classes of commercial consumers listed in LT-VII (A) and LTVII (C) categories availing supply of electricity at high tension, except those who categorize under HT-IV (B)

HIGH TENSION – IV (B) COMMERCIAL [HT – IV (B)] Tariff applicable to hotels, marriage halls, convention centers, shopping malls and multiplexes availing supply at high tension.

HIGH TENSION – V DOMESTIC (HT – V) Tariff applicable to domestic consumers and colonies availing supply of electricity at high tension.

HT- VI ELECTRIC VEHICLES CHARGING STATIONS Tariff applicable to charging stations of electric vehicles availing electricity at high tension.

HIGH TENSION- VII TEMPORARY CONNECTIONS (HT-VII) Tariff applicable availing temporary connections at HT for the purposes such as illumination, exhibition, festivals, public meetings, fairs etc.

11. HT Category			(Rs/ kVA per Demand charge month)	Energy Charge (Rs. per unit)
1	HT I (A) Industry		405	6.15
2	HT I (B) IT and IT Enabled Services		410	6.60
3	HT –II (A) General		440	6.05
4	HT –II (B) General	of and below 30000 units	525	6.80
		above 30000 units		7.80
5	HT-III (A) Agriculture		230	3.50
6	HT-III (B) Agriculture		250	4.00
7	HT –IV (A) Commercial	of and below 30000 units	500	6.80
		above 30000 units		7.80
8	HT –IV (B) Commercial	of and below 30000 units	500	6.90
		above 30000 units		7.90
9	HT –V Domestic		440	6.15
10	HT – VI Electric Vehicle charging Stations		290	6.00
11	HT – VII Temporary Connections		90 (Daily minimum Rs/ kW)	11.0
12	HT- VIII Seasonal Consumers		Shall be billed under appropriate tariff applicable to the category to which they belong for the period of use. There is no change in the general conditions applicable to this category.	

Meter rent to be levied from the consumers

Sl. No.	Description	Meter rent
1	Single phase static energy meters with LCD and To D facility and with ISI certification	6
2	Three phase static meters with LCD and To D facility with ISI certification	15
3	LT CT operated three phase four wire static energy meters (Class 0.5 accuracy) with LCD and To D facility and ISI certification	30
4	3 phase AC static tri-vector energy meters with ABT, To D facility and compliant to Device Language Message Specification (DLMS) protocol	1000

Meter rent for Renewable Energy meter

Sl. No.	Item	Meter rent
1	Renewable Energy meter - Single phase 2 wire 5-30-A,static LCD meters with TOD facility	10
2	Renewable Energy meter - Three phase 10-60A static LCDmeters with TOD facility	20
3	Renewable Energy meter - LTCT Meter DLMS Class 0.5S -/5A	25
4	Renewable Energy meter - 3 Phase 4 Wire, CT/PT Operated, HT, Static Energy Meters of Class 0.2S Accuracy + GPRS Modem	200
5	Renewable Energy Meter - 3 Phase 4 Wire, CT/PT Operated, EHT, Static Energy Meters of Class 0.2S Accuracy+ GPRS Modem	200
6	Net Meter - single phase 5-30A class 1.0	30
7	Net Meter - Three phase 10-60A class 1.0	35
8	Net Meter- LTCT meter, class 0.5S,-/5A	70
9	Net meter- CTPT operated HT meter Class 0.2S	435

EASE OF DOING BUSINESS- SERVICE CONNECTION APPLICATION PROCEDURE

In addition to the documents mentioned in Regulation 45 of Kerala Electricity Supply Code, 2014, any one of the following documents can also be accepted as proof of ownership in case of service connections.

A. Domestic Purpose

i. Residential Certificate issued by local body/National Population Register (NPR) card / most recent water or telephone or gas connection bill issued by Government company or agency / NREGP (Desiya Grameena Thozhil Urappu Padhathi) card, if the address provided on the document is same as that of site where supply is required

ii. Approved plan / building permit issued by local body

iii. Temporary Residential Certificate issued by local body [plinth area not exceeding 1500 sq.ft]

iv. Undertaking from the applicant in plain paper if plinth area is not more than 100 sq.m (1076 sq.ft

B. Construction sites

i. Approved plan / building permit issued by local body.

ii. Work order issued by competent authorities to the contractor concerned, in case of public construction works undertaken by Govt. Departments/ Govt agencies/ Local Self Governments etc.

C. Places of worship / Offices of political parties having representation in Legislative Assembly/ Libraries, Reading Rooms, Premises of Sports, Arts & Cultural Organisations

Certificate from the concerned Village Officer /Tahsildar [For Libraries/ Reading rooms / Premises of Sports, Arts & Cultural Organisations, any documentary proof in support of claim also will suffice]

D. Govt owned / Aided educational institutions

Request from the head of institution (in letter head)

E. Anganwadi

Undertaking from the concerned District Social Justice Officer or any other officer duly authorized by him

F. Premises in Govt owned land / buildings

NOC from the competent officer

G. Horticorp Bunks, Milma Booths etc.

Indemnity bond by the applicant

H. Common connections in apartments, complexes and colonies

Certificate of Registration of Association along with resolution from association

I. Agriculture (if subsidy is required)

Certificate from Agriculture Officer / Veterinary Surgeon / Asst. Director of Animal Husbandry

Scan QR Code For Details &
Updated Information of Ease of doing Bussiness

IT APPLICATION

How to Register Consumer Mobile Number

Employees can register the consumer's mobile number through

- OrumaNet at Electrical Section
- OMS application

OMS Application Login Details

- URL (Internet)- http://hris.kseb.in/oms/
- URL (Intranet)- apps.kseb.in/oms/
- All users of KSEBL can login the application with their Single Sign On User Name (Employee Code) & password.
- Roles- Designation based. Division, Circle and Region level officers can view outage details under the irjurisdiction

Modes of Complaint Registration

- Customers can register complaints through the following options I
- IVRS (Interactive Voice Response System) -1912 toll free
- wss.kseb.in -online registration
- Whatsapp
- Employees can register complaints through
- CCC-ET (Centralised Customer Care- Extended Terminal at Section)
- WhatsApp-9496001912
- Emergency Alert- 9496061061

Online Payment Facilities

Consumer can pay online via a consumer number by entering consumer number and registered mobile number. Non need to select section or enter bill number.

a. Direct Integration with Banks

Net Banking is enabled by direct integration with the following banks. There is no transaction charge for consumers for transactions through these banks.

- State Bank of India • Federal Bank • South Indian Bank • CSB Bank

b. Payment Gateways (Credit/Debit/Rupay/ Net Banking)

- Tech Process • Federal Bank-BiiiDesk • Mobile Apps
- For Debit card payments/transaction charge is free for transaction powered by Rupay card only
- Transaction charge is free for all UPI transactions
- Transaction charge is free for all debit card via Federal Bank up to Rs. 2000/-

c. BBPS

- All UPI based mobile apps like Google pay, PhonePe, Paytm, Bank UPI apps

d. Government Service Centers

- FRIENDS • Akshaya
- Apna esc (Common Service Center of Govt, of India through payment can be made from any where in India) Governmwnt portal State Service Delivary Gateway- SSDG (mKerala mobile app)

e. NACH (National Automated Clearing House

- This scheme is facilitated by National Automated Clearing House (NACH) system of National Payment Corporation of India (NPCI). M/s Corporation Bank has been selected as the sponsor bank for this venture. A customer who has account in any commercial bank, can avail this facility by filling up a mandate form available at Electrical Section Offices or branches of Corporation Bank. As the electricity bill get prepared in OrumaNet, thebill details will be shared to customer's bank and subsequently bill amount will be debited from the account by virtue of the integration between KSEB billing system and NPCI system.WW

f. NEFT/RTGS/IMPS VAN Payments via South Indian Bank

LT consumer can pay their current charges using consumer number as Virtual account number.
Virtual Account Number : KEB<13 Digit consumer Number>
Beneficiary Name : Kerala State Electricity Board Ltd.
Bank &Branch : South Indian Bank, Trivandrum Corporate
IFSC Code : SIBL0000721

g. Mobile Application- 'KSEB'

- 'KSEB' Mobile App- The official mobile app of KSEB Ltd for easy bill payment
- The 'KSEB' App developed by KSEB Ltd can be downloaded from Google Play Store. This App enables the consumers to remit their electricity bill through their mobile phones, tablets etc.

Online Portal

- Accessible from KSEBL website- www.kseb.in
- Online LT new service connection launched on Feb 2017
- Applicants for Weather Proof service connection coming under the following categories can pay Application fees (AF), Security Deposit (CD) and entire expenditure for Service connection (charges/ energisation charges) through online.
  a) LT Domestic category - connected load less than or equal to 20 kW
  b) Other LT category - connected load less than or equal to 10 kW with weather proof service connection
- SMS will be sent to AE, on successful payment of fees by applicant

SMART Application

Provides general details on Safety practices, Accident Search, Safety Regulation, Safety contacts, downloads related to safety and Help. After logging in, the application shows recent accidents reported. Details of accident can be viewed by clicking on the accident id.

Login Details

- URL (Internet)- hris.kseb.in/SafetyApp/
- URL(Intranet)- apps.kseb.in/SafetyApp/
- All users of KSEBL can login the application with their Single Sign On User Name (Employee Code) & password. Roles- Designation based. Division, Circle and Region level officers can view accident details under their jurisdiction

  The consumers whose mobile numbers are registered in the system can receive bill details through sms. Reminder messages on bill payment dates are also sent. Consumers can register their mobile number directly online through Website (www.kseb.in), KSEB Mobile app.
- Orumanet mobile application for ornament user's job assignment, field verification advanced consumer profile, reports etc is now available.

KPI Dash Board, System to rank distribution offices

Ranking of distribution offices in KSEBL is done based on following Key Performance Indicators

On line OTS ⟶ ots.kseb.in
Ammended based on line billing is completed via visiontec and Canara Bank is in swipe machine

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& Updated Information of online Applications

Sl. No.	KPI-Description	Effect Measured	Data Source	Tasks for Measurement
1	Customer Complaint Redressal	Performance in redressing complaints within Guaranteed Standards stipulated as per SOP Regulations, 2015	Customer Care Center (CCC) Data Base	All Complaints are to be registered through CCC Prompt closing of all complaints KPI will be evaluated based on CCC management
2	New Service Connection	Performance in releasing new service connection within Guaranteed Standards stipulated as per SOP Regulations, 201 5 (for applications submitted at Electrical Sections and by Online)	OrumaNET Data Base	Service Connection process shall be updated on real time in OrumaNet. KPI is to be evaluated based on OrumaNET report.
3	e-Payments	Number of collection through e-payment upon total number of collections received at sections	OrumaNET Data Base	Campaign shall be done at Section Office level to improve the percentage. KPI is to be evaluated based on OrumaNET report.
4	Safety -Zero Fatality	Attaining zero fatality	SMART (Safety Management And Reporting Tool)	All accidents shall be promptly reported through SMART. Preventive activities shall be done at Section Office level. Use of safety tools shall be strictly enforced. KPI is to be evaluated based on SMART reports.
5	SAIDI & SAIFI	System Average Interruption Duration Index as a measure of quality of power based on service restoration. System Average Interruption Frequency Index as a measure of quality of power based on no. of service outages	Outage Management System Data Base	Transformer consumer mapping shall be completed immediately. All interruptions till transformer level shall be recorded in Urja- dooth software. KPI is to be evaluated based on Urja Doothu reports.

Login Details

- URL (Internet) - hris.kseb.in
- URL(Intranet) - apps.kseb.in

Helpdesk Contact Numbers/email ids for Major Business Applications

OrumaNet 0471 2514648, 9446008892, 9496012427 orumanetsupport@kseb.in

Enrgise 0471 2514351,9496012032 htbilling@kseb.in

HRIS 9496012184, 0471-2514216 hris@kseb.in

SARAS 9496010700, 04952367088 sarassupport@kseb.in

SCM 0484 2306888, 9496008700 scmsupport@kseb.in

RAPDRP APPLICATIONS

(GIS / NA/ MDAS / EA/MIS / AMP* 9496011545, 9496011556 ithelpdesk@kseb.in AMP 0471 254415, 9496012427 amp@kseb.in

AMP* - Asset Management, Maintenance Management and Project Monitoring Piolt roll out started for selected towns.

Consumer Services Applications/DashBoards

OMS/ OMS Dashboard 0471 2514293, 9496018663, 9496018662, 9446008498 kseboms@gmail.com, dbadmin@kseb.in

CCC 0471 2514710 & 9496018365 ccckseb@gmail.com

Online Payments 0471 2514710 & 9496018365ccckseb@gmail.com

SMART 0471 2514710 smart@kseb.in

Hardware & Connectivity (FMS) /System Support (FMS)

9496011545, 9496011556 ithelpdesk@kseb.in

INSTALLATION OF TRANSFORMERS STATION GENERAL REQUIREMENTS

1. Minimum Clearance between suppliers' and consumers' 11KV installation is 3m. If it is 5m or less they should be braced together at top and middle.
2. Minimum Ground clearance to live parts of Transformer, shall be 2.6m.
3. Phase to Phase clearance at the AB Switch - 915 mm (BIS).
4. Phase to Earth clearance at the AB Switch - 610 mm(BIS).
5. Unsupported length of 11 kV Jumper-1.5m (Stranded), 2.44m(Solid)
6. Sectional clearance for 11kV -2.6 m
7. Clearance between AB Switch and fuse -2.6 m.
8. Fencing shall be provided at a height 2.5 m.
9. Lightning arrestor - between AB Switch and D.O. Fuse.
10. Group Control AB Switch - if more than one outdoor transformer.
11. Operating height of AB switch handle shall be 1.0 to1.2m
12. For indoor transformers stations –

a) Oil drainage/soak pits (as per IER and relevant BIS)
b) Indoor oil type transformers shall not ordinarily be installed in cellars or above basement floor.
c) Indoor panels should have front clearance of 1m and rear side clearance of 75cm.
d) Earthing facilities shall be provided for MV switching equipments
e) Non inflammable materials shall be used in electrical rooms.
f) Maximum operating height of equipments shall be 1.8m.
g) Minimum short time current carrying capacity of 11kV equipments should be 13.2kA for 1sec. Indoor transformers are recommended above 630kVA.
h) In the case of indoor installation only one AB SFU / Breaker common for supplier and consumer. At the request of supplier additional AB SFU can be provided to satisfy Rule 59 of IER1956.
i) Fire Proof separation wall between indoor transformer: 30 cm thickness (Brick), 20 cm thickness (RCC) Upto the height of conservator. Doors and Windows should be non inflammable. If sheet shutters are used it should be grilled shutters.
j) Minimum head room clearance of 50cm shall be provided for transformers.
k) Necessary fire fighting equipments shall be provided.

EARTHING OF TRANSFORMERS

1. All the non current carrying metal parts of the 11 kV structure shall be provided with duplicate earth connection using conductors of adequate rating.
2. Lightning arrester shall be provided with separate earth pit connection through No. 6 SWG Copper.
3. Body and Neutral of the transformer shall be provided with duplicate earth connections from two earth pit.
4. it may also be noted that covered aluminium Is also considered as a satisfactory metal for earthing.
5. Joints using Gl Conductors should be welded as far as possible and kept separated from air by a thick coating. of tar or similar- non-hygroscopic materials.
6. In case bolted joint cannot be avoided, there should be minimum of 2 bolts for sizes upto 25x4 mm, 3 bolts for sizes upto 31x6 mm conductors and zig zag bolting for larger sizes.
7. All the earth electrodes shall be inter connected using the largest size in the system. The HV and MV earthing systems shall be interconnected. In the case of EHV installation, EHV and HV earthing system can be kept independent. Separate earth electrodes shall be provided for L.A. and the same shall be interconnected with the main earthing system.

8. Generally where the fault current exceeds 6 KA, Plate earth electrodes of standard size (1.2m x 1.2m) shall be provided.
9. In locations where soil resistivity is abnormally high, high sensitive earth fault protection may be provided using suitable CT in the neutral of the transformer.
10. The rating of the CT can be 1/5th of the line CT, This provision enables the customer to get relieved of the burden of providing a very large number of earth electrodes for keeping the earth resistance at a reasonably low value.
11. The distance between earth pipes shall be 5m and that between plates shall be 8m,
12. All earthing conductors shall be Copper, Aluminium or GI of adequate size. In areas where resistivity is less than 100 ohm-m Copper conductors is to be used and above 100 ohm -m, GI earthing conductor may be used, provided the atmosphere is non corrosive. The following guidelines are to be strictly adhered to when considering the use of GI for earthing.

a) Joints of earthing conductors should be invariably done by means of welding except in such locations where intermittent disconnection of joints is necessitated for testing purpose, or for the earthing connection to the body equipments etc. all places of joints by bolts should be tinned properly.

b) Barium chromate or Zinc dichromate treatment should be done at the welds. The joint should be provided with coating alternative layers of a red oxide and aluminum at places where joints are made, to be finally covered with hot bitumen jute band covering of adequate thickness, also on the portion of earthing susceptible to higher corrosion and environmental influence.

c) It may be noted in this connection that the area of a strip electrode thus covered with bitumen and jute should not be reckoned for the calculation of area of dissipation for the fault current as well as for deciding the overall earthing resistance of the system.

d) In places where the resistivity is of very high value and atmospheric corrosion is not significant even ordinary steel conductors may be permitted in place of GI.

e) Earthing system where GI Conductors are employed, should be subjected to a through physical examination after a period of 10 years and modifications made if found necessary on such examination. In this connection

PROTECTION OF TRANSFORMERS (11KV/433V)

Rating	Method of installation	Primary Side Control and Protection	Secondary Side Control and Protection
Upto and including 630KVA	Outdoor	200/400Amps A.B. Switch, lighting arrestor, D.O. Fuse or RMU with CB	800/1200 amps ACB, draw out type, with 3O/C & 1 E/F releases and low set E/F relay using neutral DC trip or AC trip with wide range pick-up
-do-	Indoor	400 Amps ABSF Unit or 400 Amps VCB with 2O/C and 1 instantaneous E/ F relay with DC trip	-do-
Above 630KVA but below 1000KVA	Indoor only	400 Amps VCB with 2 O/C and one Instantaneous E/ F relays with DC trip or RMU with CB	1000/1600 Amps, 35 MVA, ACB, draw out type with 3 O/C & 1 E/F releases and low set E/F relay using neutral CT DC trip or AC trip with wide range pick-up.
1000KVA and above	Indoor only	400Amps VCB with 3O/ C relays having high set element and one instantaneous E/F relay, Buchholz relay, oil and winding temperature alarm and trip or RMU with CB	1600/2500 Amps, 50KA, ACB draw out type, with 3 O/C & E/F releases, 2 O/C +1 E/E REF protection relay with primary breaker trip, shall also be provided

Note: For transformer shaving OLTC, over voltage relay shall be provided at secondary side with tripping facility at primary. Oil surge relay shall also b e provided for OLTC.

VOLTAGE REGULATION CALCULATION

The voltage regulation on HT lines and LT lines can be calculated using moment method. Compute the moments on the particular line with reference to the feeding point or tapping point KVA KM

Voltage regulation (Percent) $= \frac{KVAKMxRC}{DFx100}$ Where RC is the regulation constant as per the tables given below
DF is the Diversity factor (to be assumed based upon field conditions)

REGULATION CONSTANTS

(A) HT (11 KV) LINE WITH CONDUCTOR SPACING 1.07 MTR. (RC PER 100 KVA KM)				
Power Factor	Conductor Size ACSR			
	3x300 Sqmm Cable	3x150 Sqmm ABC	Racoon 6/1/4.09	Rabbit 6/1/3.35
Unity	0.025	0.049	0.033	0.0482
0.9	0.0192	0.0497	0.0251	0.0559
0.8	0.0168	0.0493	0.0239	0.558

(B) HT (11 KV) LINE WITH CONDUCTOR SPACING 1.5 M (RC PER 100 KVA KM)				
Power Factor	Conductor Size (ACSR)			
	Mink 6/1/3.66	Rabbit 6/1/3.35	W easel 6/1/2.59	Squirrel 6/1/2.11
Unity	0.0405	0.0482	0.0808	0.1219
0.9	0.0499	0.0571	0.0869	0.1244
0.8	0.0509	0.0574	0.0841	0.1178
0.7	0.0504	0.0561	0.0798	0.1094

CASE2: LT 3 PHASE(415 V) LINE WITH CONDUCTOR SPACING 0. 438 M (RC PER KVA KM)

$$\text{Regulation} = \frac{\text{KVA km x RC}}{\text{DF}}$$

Power Factor	Conductor Size (ACSR)					
	7/3.91	7/3.66	7/3.4	7/3.1	7/2.79	7/2.21
Unity	0.2129	0.2436	0.2813	0.3393	0.4172	0.6672
0.9	0.2654	0.2940	0.3291	0.3823	0.4547	0.6833
0.8	0.2718	0.2978	0.3296	0.3780	0.4427	0.6478
0.7	0.2699	0.2931	0.3214	0.3644	0.4217	0.6027

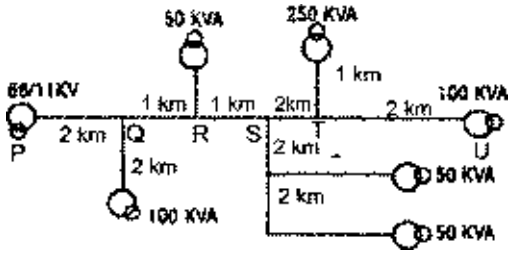
Total load on the line = 600KVA

Total KVA-KM

Portion PQ	=	600 x 2	=	1200
Portion QR	=	500 x 1	=	500
Portion RS	=	450 x 1	=	450
Portion ST	=	350 x 2	=	700
Portion TU	=	100X 2	=	200
		Total		3050

Regulation constant of 3 x 300 sq. mm XLPE UG cable : 0.01455

A SAMPLE CALCULATION FOR 11 KV LINE



Considering the P.F. as 0.9 and conductor size A.C.S.R. Rabbit, then Regulation constant as per table is 0.0559

Voltage regulation of the line at fag end (assuming Diversity Factor 2.5) $= \frac{3050 \times 0.059}{2.5 \times 100} = 0.68\%$

Allowable Voltage Regulation

(a) HT: + 6 % or - 9 % (b) LT: ±6%

RATING OF DISTRIBUTION TRANSFORMERS

Sl.No.	Rating KVA	Full Load Current		Total Weight in kg	Quantity of Oil Litre
		HT	LT		
		Amps	Amps		
1	63	3.3	84	470	149
2	100	5.25	133.3	645	205
3	160	8.40	213.3	935	255
4	200	10.49	266.7	1065	280
5	250	13.12	333.3	1190	345
6	400	21	533.3	1840	390
7	500	26.2	666.6	1960	430
8	630	33	840	2450	600
9	750	39.36	1000	2815	645
10	800	42	1067	2925	660
11	1000	52.5	1333	3270	725
12	1250	65.6	1666.5	4730	850

Scan QR Code For Voltage-Regulation Calculation

STATIC CAPACITOR RECOMMENDED VALUES

A. INDUCTION MOTORS (LT)

Sl. No	Total Motor Rating HP	KVAR rating of capacitors insisted	Sl. No	Total Motor Rating HP	KVAR rating of capacitors insisted
1	upto 3	1	8	upto 30	10
2	upto 5	2	9	upto 40	12
3	upto 7.5	3	10	upto 50	14
4	upto 10	4	11	upto 60	18
5	upto 15	5	12	upto 80	22
6	upto 20	6	13	upto 100	25
7	upto 25	7.5	14	upto 130	35

B. WELDING TRANSFORMERS (LT)

Sl. No	Rating of Welding Transformer in KVA	KVAR rating of capacitors insisted	Sl. No	Rating of Welding Transformer in KVA	KVAR rating of capacitors insisted
1	1	1	16	16	12
2	2	2	17	17	13
3	3	2	18	18	13
4.	4	3	19	19	14
5	5	4	20	20	15
6	6	4	21	upto 22	16
7	7	5	22	upto 24	17.5
8	8	6	23	upto 26	18
9	9	7.5	24	upto 28	20
10	10	7.5	25	upto 30	21
11	11	8	26	upto 35	24
12	12	9	27	upto 40	27.5
13	13	10	28	upto 45	32.5
14	14	10	29	upto 50	35
15	15	11			

RATINGS OF ACCESSORIES FOR MOTORS

Motor 3 Phase 415V 50 Hz		FL Current in Amps (approx.)	Size of Earthing conductor		Cable Size in Sq. mm		Back up fuse Amps
HP	KW		Al Sq. mm	Cu SWG	Supply side	Motor Side	
3	2.25	5	25	10	4	4	6
5	3.75	7.5	25	10	4	4	10
7.5	5.5	11	25	10	4	4	16
10	7.5	14	25	10	4	4	20
12.5	9.3	18	25	10	4	4	25
15	11	21	25	10	6	4	25
20	15	28	25	10	10	4	32
25	18.5	35	25	10	16	6	50
30	22	40	35	6	16	6	50
35	26	47	35	6	25	10	63
40	30	55	35	6	25	16	63
45	33.5	60	35	6	25	16	63
50	37.5	66	35	6	35	16	80
60	45	80	50	4	50	25	100
65	48.5	87	50	4	70	35	100
70	52	94	50	4	70	35	100
75	56	100	50	4	70	35	100
90	67.5	120	70	2	95	50	160
100	75	135	70	2	95	50	160

GENERATORS

Generator capacity in KVA	Cable size (mm^2) PVC / APVC	Earthing Conductor (Wire/Strip)
15	10	10 SWG
63	50	4 SWG
100	95	25 x 3
125	150	25 x 3
160	185	25 x 3
200	2 x 120	25 x 3
250	2 x 185	25 x 3
320	2 x 300	25 x 3
400	2 x 400 / 3 x 300	25 x 3
500	3 x 400 / 4 x 300	25 x 3
630	4 x 3.5 x 400	25 x 3

1100 VOLTS (5 CORE) WITH STREET LIGHTING CONDUCTOR

Reference Standard: Generally to IS:14255

S.L. No	Description	3x16 + 1x16 + 1x25	3x25 + 1x16 + 1x25	3x35 + 1x16 + 1x25	3x50 + 1x16 + 1x35	3x70 + 1x16 + 1x50	3x95 + 1x16 + 1x70	3x120 + 1x16 + 1x70
1.	**Power /Neutral Core :**							
1.1	**Conductors**							
	a) Nom.cross sectional area							
	(i) Phase conductors (mm^2)	16	25	35	50	70	95	120
	(ii) Street Lighting conductor (mm^2)	16	16	16	16	16	16	16
	b) Max D C resistance conductor at 20°c							
	(i) Phase conductors (Ohm/Km)	1.91	1.20	0.868	0.641	0.443	0.320	0.253
	(ii) Street Lighting(Ohm/Km)	1.91	1.91	1.910	1.910	1.910	1.910	1.910
	c) Approx, diameter of Conductor							
	(i) Phase conductor(mm)	4.4	5.5	6.8	7.9	9.6	11.3	12.7
	(ii) Street Lighting conductor (mm)	4.4	4.4	4.4	4.4	4.4	4.4	4.4
1.2	**Insulation:**							
	Minimum thickness							
	(i) Phase conductor (mm)	1.0	1.0	1.0	1.2	1.4	1.4	1.6
	(ii) Street Lighting Conductor (mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2.	**Messenger Wire (Bare):**							
	(i) Nominal Cross sectional area (Sq mm)	25	25	25	35	50	70	70
	(ii) Approx breaking load (KN)	7.4	7.4	7.4	10.3	14.7	20.6	20.6
3	**Current ratings:**							
	Continuous current carrying capacity of cable in Air at Ambient temp. 40 °c (AMP)	51	70	86	105	130	155	180
4	**Approx weight (Kg/Km)**	310	390	490	640	890	1180	1430
5	Number of cores :							
	(i) Power cores				(No.): 3			
	(ii) Neutral Core				(No.): 1			
	(iii) Bare Messenger				(No.): 1			
6	**Derating factor :**							
	Derating factors for variation in air temp							
	Air Temp (°C)	30	35	40	45	50	55	
	Rating factor		1.12	1.06	1.0	0.94	0.88	0.83
7	(i) Identification of Power core:	By providing ridges on the insulation						
	(ii) Laying:	Three power cores and one neutral core shall be suitably twisted around bare AAAC Messenger.						
8	**Details of the Power/Neutral core:**							
	(i) Conductor							
	(a) Material	Aluminium to IS: 8130/84						
	(b) Flexibility class as per IS:8130/84	Class -2						
	(c) Form of conductor	Compacted circular						
	(ii) Insulation							
	(a) Material	High Density Polyethylene to IS: 6474 - 1971						
	(b) Colour of Insulation	Black						
9	**Details of the Messenger wire (Bare)**							
	(a) Material	All Alloy Aluminium Conductor to IS:398						
	(b) Form of conductor	Stranded compacted circular						

IS STANDARDS APPLICABLE FOR AREAL BUNCHED CABLE

Following standards shall be applicable	
IS 14255	Specification for LT ABC
IS 8130	Specification for conductor for cables/wires
IS 398 (Part – IV)	Specification for Aluminum Alloy Conductor (bearer/messenger wire)

AERIAL BUNCHED CABLES TYPE TESTS AS PER IS 8130 - 1984 & IS 10810

1. Tests on Phase / Street Light Conductor:
   i) Tensile Test ii) Wrapping Test. iii) Resistance Test.
2. Tests on Messenger Conductor:
   i) Breaking Load ii) Elongation Test iii) Resistance Test.
3. Physical Tests for XLPE insulation:
   i) Tensile Strength and elongation at break. ii) Ageing in on even.
   iii) Hot Set Test. iv) Shrinkage Test. v) Water Absorbation (Gavimetric)
4. Tests for thickness insulation
5. Insulation performance (Volume resistivity) test. 6. High Voltage Test.
7. Routine Test (Conductor resistance test, High voltage test, Cold Bend test)

ABC ACCESSORIES

1. Anchor/Tension clamp
2. Suspension clamp with eye hook assembly
3. Pole clamp or steel strap and buckle
4. Piercing connector
5. Pre insulated leg
6. Distribution box
7. MVT
8. Cable Joint/termination Kit

11 KV ALUMINIUM XLPE CABLE CURRENT RATING (AS PER IS 3961)

No of cores and area	Current Rating in Ground (A)	Current Rating in Air (A)
3 x 120	216	256
3 x 150	242	288
3 x 185	273	330
3 x 240	315	387
3 x 300	354	441
3 x 400	404	512
1 x 120	222	294
1 x 150	252	331
1 x 185	284	383
1 x 240	326	450
1 x 300	365	512
1 x 400	412	594

UNDERGROUND CABLE CONNECTIONS (11KV) BY CONSUMER

1. The U.G Cable can be provided at the cost of the consumer
2. The Cable shall conform to IS 7098.
3. The laying and end termination at the consumer's cost.
4. The maintenance and replacement of defective cable and end terminals shall be done at the consumer's cost. The KSEBL will not be responsible for delay in restoration of supply due to above.
5. Supervision charges based on estimate will be collected by the Board.
6. A separate clause incoporating all conditions shall be included in the HT agreement.

CURRENT RATING OF 1100V ALUMINIUM XLPE CABLE(As per IS 3961-7)

Cable size	Current rating (A)		Overall Dia (mm)	Weight (kg/km)	Resistance (Ω/km)
	In Ground	In Air			
4x4	35	32	17.7	0.585	7.58
4x6	46	42	18.2	0.605	4.85
4x10	57	54	20	0. 695	3.01
4x16	74	69	23.4	0.865	1.92
4x25	95	93	25.5	1.065	1.102
3.5x35	114	114	27.1	1.14	0.885
3.5x50	134	138	30.5	1.45	0.614
3.5x70	164	175	33.8	1.78	0.406
3.5x95	197	216	37.2	2.18	0.326
3.5x120	223	249	39.8	2.56	0.247
3.5x150	249	284	42.8	2.93	0.209
3.5x185	282	329	47.3	3.56	0.167
3.5x240	327	392	54	4.66	0.108
3.5x300	369	452	58.3	5.31	0.108
3.5x400	420	526	67.7	7.05	0.070

Note: De rating factor for variation in Ambient temperature, Laying depth, Soil resistivity, Multi cable formation etc may also be considered.

STEEL TABLES

STANDARD CROSS SECTIONS

Designation	Size mm	Thickness of Web mm	Flange mm	Wt. per meter kg	Sectional area in sq.cm
R.S. JOISTS					
ISLB75	75X50	3.7	5.0	6.1	7.71
ISLB100	100X50	4.0	6.4	8.0	10.21
ISLB125	125X75	4.4	6.5	11.9	15.12
ISLB150	150X80	4.8	6.8	14.2	18.08
ISLB175	175X90	5.1	6.9	16.7	21.30
ISLB200	200X100	5.4	7.3	19.8	25.27
ISMB100	100X75	4.0	7.2	11.5	14.60
ISMB125	125X75	4.4	7.6	13.0	16.60
ISMB150	150X80	4.8	7.6	14.9	19.00
ISMB175	175X90	5.5	8.6	19.3	24.62
ISMB200	200X100	5.7	10.8	25.4	32.33
ISWB150	150X100	5.4	7.0	17.0	21.67
ISWB175	175X125	5.8	7.4	22.1	28.11
CHANNELS					
1SLC75	75X40	3.7	6.0	5.7	7.26
ISLC100	100 X 50	4.0	6.4	7.9	10.02
ISLC125	125X 65	4.4	6.6	10.7	13.67
ISLC150	150 X 75	4.8	7.8	14.4	18.36
ISLC175	175 X75	5.1	9.5	17.6	22.40
ISMC75	75X40	4.4	7.3	6.8	8.67
ISMC100	100 X 50	4.7	7.5	9.2	11,70
ISMC125	125 X 65	5.0	8.1	12.7	16.19
ISMC150	150 X 75	5.4	9.0	16.4	20.88
ISMC175	175 X75	5.7	10.2	19.1	24.38

GAUGES (WIRE AND SHEETS)

DIAMETER (WIRES) OR THICKNESS (SHEETS)

Gauge	British - SWG		American - AWG	
	Inches	mm	Inches	mm
0	0.324	8.230	0.3249	8.252
1	0.300	7.620	0.2893	7.348
2	0.276	7.010	0.2576	6.543
3	0.252	6.400	0.2294	5.827
4	0.232	5.893	0.2043	5.189
5	0.212	5.385	0.1819	4.620
6	0.192	4.877	0.1620	4.115
7	0.176	4.470	0.1443	3.665
8	0.160	4.064	0.1285	3.264
9	0.144	3.658	0.1144	2.906
10	0.128	3.251	0.1019	2.588
11	0.116	2.946	0.0907	2.304
12	0.104	2.642	0.0808	2.052
13	0.092	2.337	0.0720	1.829
14	0.080	2.032	0.0641	1.628
15	0.072	1.829	0.0571	1.450
16	0.064	1.626	0.0508	1.290
17	0.056	1.422	0.0453	1.151
18	0.048	1.219	0.0403	1.024
19	0.040	1.016	0.0359	0.912
20	0.036	0.914	0.0320	0.813
22	0.028	0.711	0.0250	0.640

STEEL TABLES

STANDARD CROSS SECTIONS

Designation	Angles	Size mm	Wt. Per Mtr. Kg.	Sectional Area sq.cm.
ISA	25.25	25x25x3.0	1.1	1.41
ISA	35.35	35x35x6.0	3.0	3.86
ISA	40.40	40x40x3.0	1.8	2.34
ISA	40.40	40x40x4.0	2.4	3.07
ISA	40.40	40x40x5.0	3.0	3.78
ISA	40.40	40x40x6.0	3.5	4.47
ISA	45.45	45x45x6.0	4.0	5.07
ISA	50.50	50x50x5.0	3.8	4.79
ISA	55.55	55x55x5.0	4.1	5.27
ISA	55.55	55x55x6.0	4.9	6.26
ISA	55.55	55x55x8.0	6.4	8.18
ISA	55.55	55x55x10.0	7.9	10.02
ISA	60.60	60x60x5.0	4.5	5.75
ISA	60.60	60x60x8.0	7.0	8.96
ISA	65.65	65x65x6.0	5.8	7.44
ISA	65.65	65x65x8.0	7.7	9.76
ISA	65.65	65x65x10.0	9.4	12.00
ISA	75.75	75x75x6.0	6.8	8.66
ISA	75.75	75x75x8.0	8.9	11.38
ISA	75.75	75x75x10.0	11.0	14.02
ISA	80.80	80x80x6.0	7.3	9.29
ISA	90.90	90x90x8.0	10.8	13.79
ISA	100.100	100x100x6.0	9.2	11.67
ISA	110.110	110x110x8.0	13.4	17.02
ISA	100.100	100x100x10.0	14.9	19.03
ISA	110.110	110x110x10.0	16.5	21.0
ISA	110.110	110x110x12.0	19.6	25.02
ISA	130.130	130x130x12.0	23.4	29.82

WEIGHT OF STEEL PLATES

0.7843 kg./cm per metre

BLACK SHEETS

Thickness in mm	B.G.	Wt. per sq. metre in kg
3.15	10	24.70
2.50	12	19.61
2.00	14	15.69
1.66	16	12.55
1.25	18	9.80
1.00	20	7.84
0.80	22	6.27
0.63	24	4.94
0.50	26	3.91
0.44	28	3.10

PLATES

6	47.10
8	62.80
10	78.50
12	94.20
14	109.90
16	125.60
18	141.30
20	157.00
22	172.70
25	196.25

CHEQUERED PLATE

7	61.1
10	84.6
12	1003

STEEL WIRES & CABLES

No & Gauge of wires in SWG	Overall dia in mm	Weight of 1 meter in Kg	Approximate breaking tension in Kg.		
			25 ton quality	40 ton quality	60 ton quality
4	5.893	0.214	1073.43	1716.93	2575.9
5	5.384	0.178	796.56	1433.96	2151.4
6	4.876	0.147	735.12	1085.20	1764.1
7	4.470	0.123	611.80	978.60	1467.9
8	4.064	0.102	510.60	816.70	1225.3
9	3.657	0.082	413.60	661.20	992.3
10	3.251	0.065	326.50	522.90	784.2
7/8	12.190	0.730	3574.40	5717.30	8577.5
7/9	10.970	0.590	2895.10	4628.40	6945.8
7/10	9.750	0.460	2285.60	3660.20	5491.9
7/11	8.840	0.380	1789.30	3003.10	4507.7
7/12	7.920	0.310	1511.10	2415.80	3625.3
7/13	7.010	0.240	1184.10	1892.00	2838.0
7/14	6.090	0.201	895.20	1428.50	2145.9
7/15	5.540	0.146	723.80	1155.50	1733.3
7/16	4.870	0.114	571.40	914.20	1271.4
7/17	4.270	0.091	438.10	698.40	1047.6
7/18	3.650	0.064	230.60	511.10	768.2

SQUARE AND ROUND BARS

Diameter or width mm	Weight Per Metre		Sectional Area		Perimeter	
	kg	kg	cm^2	cm^2	cm	cm
5.0	0.20	0.15	0.25	0.20	2.0	1.57
5.5	0.24	0.19	0.30	0.24	2.2	1.73
6.0	0.28	0.22	0.36	0.28	2.4	1.88
7.0	0.38	0.30	0.49	0.38	2.8	2.20
8.0	0.50	0.39	0.64	0.50	3.2	2.51
9.0	0.64	0.50	0.81	0.64	3.6	2.83
10.0	0.78	0.62	1.00	0.79	4.0	3.14
11.0	0.95	0.75	1.21	0.95	4.4	3.46
12.0	1.13	0.89	1.44	1.13	4.8	3.77
14.0	1.54	1.21	1.96	1.54	5.6	4.40
16.0	2.01	1.58	2.56	2.01	6.4	5.03
18.0	2.54	2.00	3.24	2.54	7.2	5.65
20.0	3.14	2.47	4.00	3.14	8.0	6.28
22.0	3.80	2.98	4.84	3.80	8.8	6.91
25.0	4.91	3.85	6.25	4.91	10.0	7.85
28.0	6.15	4.83	7.84	6.16	11.2	8.80
32.0	8.04	6.31	10.24	8.04	12.8	10.05
36.0	10.17	7.99	12.96	10.18	14.4	11.31
40.0	12.56	9.86	16.00	12.57	16.0	12.57
50.0	19.62	15.41	25.00	19.64	20.0	15.71

WEIGHTS OF BOLTS AND NUTS IN KG

Length of bolts (inches/mm) from under head including nut

Dia in inch	1"	1¼"	1½"	1¾"	2"	2¼"	2½"	23/4"	3"	4"	5"	6"	7"	8"	9"	10"
(mm)	(25)	(32)	(38)	(44)	(50)	(56)	(63)	(69)	(75)	(100)	(125)	(150)	(175)	(200)	(230)	(255)
¼(6)	.013	0.014	.016	.017	.019	.020	.022	.023	.024	.030	.036	.042	.048	-	-	
½(10)	.031	.034	.038	.041	.045	.048	.051	.055	.058	.072	.085	.098	.112	.125	-	
½(12)	.071	.077	.083	.089	.095	.101	.107	.113	.119	.143	.167	.191	.216	.240	.264	-
5/8(16)	-	.139	.149	.159	.169	.179	.189	.199	.209	-.249	.288	.328	.368	0.408	0.447	0.487
¾(19)	-	-	0.239	0.253	0.267	0.282	0.296	0.311	.325	.382	0.440	0.497	0.594	0.612	0.670	0.727
5/8(22)	-	-	0.299	0.318	.337	.356	.375	.394	.413	.489	.564	.640	.715	0.791	0.886	0.942
1(25)	-	-	-	.463	.488	.512	.537	.562	.586	.685	.783	.882	.981	1.080	1.178	1.277
1¼(32)	-	-	-	-	-	-	1.022	1.061	1.100	1.254	1.408	1.563	1.718	1.872	2.027	2.182
1½(38)	-	-	-	-	-	-	1.641	1.694	1.747	1.960	2.174	2.387	2.600	2.813	3.020	3.240

Shear on bolts 945 kg/sq.cm. Bearing on bolts 1890 kg/sq.cm.

Size	weight(Kg)	Size	weight(Kg)	Size	weight(Kg)
16x35mm	0.124	16x60mm	0.164	20x60mm	0.271
16x40mm	0.132	20x40mm	0.222	Spring Washer 16x3.5mm	0.009
16x45mm	0.141	20x45mm	0.234	20x3.5mm	0.0143
16x50mm	0.148	20x50mm	0.247	Packing washer 6 mm	0.033
16x55mm	0.156	20x55mm	0.259	8 mm	0.044
				10 mm	0.055

STRIPPING TIME FOR FORM WORK (REF:IS 456-2000)

No.	Type of form work	Minimum Period before striking form work
1.	Vertical formwork to columns, walls beams	16 - 24 hours
2.	Soffit formwork to slabs (Props to be refixed immediately after removal of formwork	3 days
3.	Soffit formwork to beams (Props to be refixed immediately after removal of formwork)	7 days
4.	Props to slabs a) Spanning upto 4.5m; b) Spanning over 4.5m	a) 7 days b) 14 days
5.	Props to beams and arches a) Spanning upto 6m; b) Spanning over 6m	a) 14 days b) 21 days

UNIT WEIGHT OF MATERIALS

1. Bituminous Substances
   - Asphalt ---------- 2220-2300 kg/m³
   - Bitumen ---------- 1040 kg/m³
   - Road Tar ---------- 1010 kg/m³
   - Naphtha ---------- 1010 kg/m³
   - Polyvinyl chloride ---------- 1200-1350 kg/m³
2. Fuels
   - Charcoal ---------- 300 kg/m³
   - Diesel Oil ---------- 960 kg/m³
   - Petrol ---------- 690 kg/m³
3. Rubber
   - Raw ---------- 910-960 kg/m³
   - Vulcanised ---------- 910-930 kg/m³
   - Sheet 3.2 mm ---------- 4.90-6.30 kg/m³
   - Sheet 4.8 mm ---------- 7.10-9.50 kg/m³
   - Sheet 6.4 mm ---------- 9.50-13.2 kg/m³
4. Liquids
   - Water fresh ---------- 1000 kg/m³
   - Water salt ---------- 1025 kg/m³
   - Alcohol ---------- 780 kg/m³
   - Petroleum ---------- 1010 kg/m³
   - Paints ---------- 960 kg/m³
   - Varnishes ---------- 960 kg/m³
   - Turpentine oil ---------- 865 kg/m³
   - Hydrochloric Acid ---------- 1200 kg/m³
   - Nitric Acid ---------- 1510 kg/m³
   - Sulphuric Acid ---------- 1790 kg/m³
5. Metal and Alloys
   - Aluminium ---------- 2580-2800 kg/m³
   - Copper ---------- 8790-8940 kg/m³
   - Gold ---------- 19250-19330 kg/m³

(a) Iron
   - Pig ---------- 7200 kg/m³
   - Cast ---------- 7030-7720 kg/m³
   - Wrought ---------- 7700 kg/m³
   - Lead ---------- 11340 kg/m³
   - Zinc ---------- 7030-7190 kg/m³

(b) Steel
   - Mild ---------- 7850 kg/m³
   - Rolled ---------- 7840 kg/m³

6. Timber
   - Aini ---------- 595 kg/m³
   - Benteak ---------- 675 kg/m³
   - Casuarina ---------- 850 kg/m³
   - Eucalyptus ---------- 850 kg/m³
   - Irul ---------- 850 kg/m³
   - Jack ---------- 595 kg/m³
   - Mahogany ---------- 675 kg/m³
   - Mango ---------- 690 kg/m³
   - Rosewood ---------- 835 kg/m³
   - Sandalwood ---------- 915 kg/m³
   - Silveroak ---------- 640 kg/m³
   - Teak ---------- 640 kg/m³
7. Soil and gravels

(a) Clay
   - Dry lumps ---------- 1040 kg/m³
   - Dry compact ---------- 1440 kg/m³
   - Wet compact ---------- 2080 kg/m³

(b) Earth
   - Dry ---------- 1410-1840 kg/m³
   - Moist ---------- 1600-2000 kg/m³

(c) Gravel
   - Loose ---------- 1600 kg/m³
   - Rammed ---------- 1920-2160 kg/m³
   - Silt Wet ---------- 1760-1920 kg/m³

8. Stone
   - Gneiss ---------- 2400-2690 kg/m³
   - Granite ---------- 2640-2800 kg/m³
   - Laterite ---------- 2080-2400 kg/m³
   - Marble ---------- 2720 kg/m³
   - Sandstone ---------- 2240-2400 kg/m³
   - Slate ---------- 2800 kg/m³
9. Weight of Sheets
   - Aluminium sheet 1 mm thick ---------- 2.80 kg/m²
   - Copper Sheet 1mm thick ---------- 8.70 kg/m²
   - Glass Sheet 4mm thick ---------- 10.00 kg/m²
   - Glass Sheet 5mm thick ---------- 12.50 kg/m²
   - M.S. Sheet 1mm thick ---------- 7.85 kg/m²
   - Lead sheet 1mm thick ---------- 11.00 kg/m²
   - Zinc Sheet 1mm thick ---------- 7.00 kg/m²
   - Steel - Black sheet 1mm thick ---------- 8.00 kg/m²
   - G.I. Sheet (Class 1) 1.60mm thick (16 G) --------- 13.31 kg/m²
   - G.I. Sheet (Class 1) 1.00mm thick (20 G) ---------- 8.60 kg/m²
   - G.I Sheet (class 1) 0.63mm thick (24 G) 5.70 kg/m²

10. Building materials and construction

a. Cement
   - Ordinary and aluminous ---------- 1440 kg/m³
   - Rapid hardening ---------- 1280 kg/m³

b. Broken stone - dry ---------- 1600-1870 kg/m³

c. Sand
   - Dry, clean ---------- 1540-1600 kg/m³
   - River ---------- 1840 kg/m³

d. Bricks
   - Common burnt clay bricks --------- 1600-1920 kg/m³
   - Engineering bricks ---------- 2160 kg/m³

e. A.C. Sheeting
   - Corrugated (pitch = 146mm) 6mm thick ---------- 12.00 to 13.30 kg/m²
   - Semi-corrugated (pitch=340mm) 6mm thick ---------- 12.00 to 13.00 kg/m²
   - Plain 5mm thick ---------- 3.16 kg/m²

f. Manglore pattern tiles ---------- 2.00-3.00 kg/tile

g. Cement concrete
   - Plain ---------- 2240-2400 kg/m³
   - Reinforced ---------- 2310-2700 kg/m³

h. Cement mortar ---------- 2080 kg/m³

i. Brick masonry
   - Common burnt clay bricks ---------- 1920 kg/m³
   - Engineering bricks ---------- 2400 kg/m³

j. Stone masonry
   - Dry rubble ---------- 2080 kg/m³
   - Random rubble ---------- 2400 kg/m³

k. Mangalore tile with battens ---------- 65 kg/m²

l. Terrazo paving 10mm thick ---------- 24 kg/m²

VOLUME AND SURFACE AREAS OF SOLIDS

Title	Volume	Surface
Prism	Base area x height	Perimeter of base x height
Cylinders	$\pi r^2 h$	$2\pi rh$
Sphere	$4/3\ \pi r^3 = \frac{\pi d^3}{6}$	$4\pi r^2$
Pyramid	1/3 base area x height	1/2 Perimeter x slant height
Frustum of Pyramid	$h/3\ \left(A_B + A_b + \sqrt{A_B A_b}\right)$	

REQUIREMENTS OF CEMENT FOR DIFFERENT WORKS

Brick Massonry	74kg/m3
Brick work in C.M. 1:6 with country burnt brick (19cm x 9cm x 9 cm)/(22.9cm x 11.2cm x 7cm)	56kg/m3
Brick work in C.M. 1:8 with country burnt brick (22.9cm x 11.2cm x 7cm)	
Laterite Masonry	46kg/m3
Laterite Masonry C.M. 1:5 (44cm x 24cm x 14cm)	
Rubble Masonry	
Random rubble in C.M. 1:6	86kg/m3
Plastering	
Plastering with C.M. 1:3 12mm thick one coat	68kg/10m2
Plastering with C.M. 1:4 1 2mm thick one coat	54kg/10m2
Plastering with CM. 1:4 15mm thick one coat	68kg/10m2

PROBABLE LIVE LOAD ON FLOORS

Sl. No.	Nature of Building	Floor load in KN/M^2
1	Residential building	2
2	Office-with separate storage facility	2.5
3	Office - without separate storage facility	4
4	Shops, class rooms, waiting rooms, Restaurants, Theatre with fixed seating	4
5	Shops, class rooms, waiting rooms, Restaurants, Theatre without fixed seating	5
6	Factories and warehouses	5-10
7	Stack room in libraries and book stores	10
8	Garage for light vehicle	4
9	Garage for heavy vehicle	7.5
10	Stairs, Landings balconies- not liable to over crowding	4
11	Stairs, Landings balconies- liable to over crowding	5

BARBED WIRE (TWO PLY)

Gauge of ply	Gauge of Barb	Gap between two barbs in inches	Length per 56 1b bundle in feet	Meter per kg.
12	12	3	500	6.044
14	14	3	800	9.669
12	14	4	700	8.460

STEP BY STEP METHODS TO BE TAKEN AFTER FATAL ELECTRICAL ACCIDENT

1. First report in form 2A to be submitted by Assistant Engineer to Electrical inspectorate, nearest police station, and the higher office within 24 hours .
2. SMS to safety co-ordinator at Electrical Circle and Laison Officer (safety), at the Office of the CE distribution, Director (Safety), Chief Safety Commissioner, EE (Safety)
3. Detailed accident report by Assistant Executive Engineer within 48 hours.
4. Details of accident shall be entered in 'SMART' software

Documents to be accompanied for getting Ex-gratia payment from vyduthi suraksha insurance scheme.

A. FIR of accident - attested by station house officer
B. Police inquest - attested by station house officer
C. Post-mortem report - attested by station house officer
D. Death certificate in orginal
E. Site mahazer.
F. Detailed report of accident
G. Legal heirship certificate from Tahsildar.

EXTRACTS FROM THE ELECTRICITY ACT 2003

Sl.No.	Subject	Section	Sl.No.	Subject	Section
1	Electrical accident	161	11.	Tariff	61 to 66
2	Disconnection of supply	56	12.	Notice to telegraph authority	69
3	Theft of energy, tampering of meter	135	13.	Land acquistion	165
4	Theft of Electric lines, materials	136	14.	Power to place electric lines	164
5	Receiving stolen property	137	15.	Assessment	126
6	Safety	53	16.	Appeal	127
7	Buildings and trees near OH line	68	17.	Interference with meters of works	138
8	Opening up of streets	67	18.	Compunding of offences	152
9	Meters	55	19.	Notice of Accidents & Inquiries	161
10	Standard of performance	57			

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A LIST OF INDIAN STANDARDS RELATING TO ELECTRICAL SAFETY

IS No.	YEAR	TITLE OF INDIAN STANDARDS
2551	1982	Danger notice plates
2925	1984	Specification for Industrial Safety Helmets
3521	1999	Industrial safety belts and harnesses-Specification
3696	1987	Safety code of scaffolds and ladders: Part-1 scaffolds
3696	1991	Scaffolds and Ladders - Code of Safety - Part 2 : Ladders
4770	1991	Rubber Gloves - for Electrical purposes - Specication
5216	1982	Recommendations on Safety Procedures and Practices in Electrical Work - Part I : General
5216	1982	Recommendation on Safety Procedures and Practices in Electrical Work- Part II : Life Saving lechniques
5613	1985	Code of Practice for Design, Installation and Maintenance of OverheadPower Lines - Part 1 : Lines Up to and Including 11 kV - Section 1 : Design
5613	1985	Code of practice for design, installation and maintenance of overhead power lines: Part 1 Lines upto and including 11 kV Section 2 Installation and maintenance
5613	1985	Code of practice for design, installation and maintenance of overhead power lines: Part 2 Lines above 11 kV and upto and including 220 kVSection 1 Design
5613	1985	Code of practice for design, installation and maintenance of overhead power lines: Part 2 Lines above 11 kV and upto and including 220 kVSection 2 Installation and maintenance
5613	1989	Code of Practice for Design, Installation and Maintenance for Overhead Power Lines - Part 3 : 400 kV Lines - Section 1 : Design

5613	1989	Code of Practice for Design, Installation and Maintenance of Overhead Power Lines - Part 3 : 400 kV Lines - Section 2 : Installation andMaintenance
7321	1973	Code of practice for selection, handling and erection of concrete poles for overhead power and telecommunication lines.
8095	1976	Accident Prevention Tags
8923	1978	Warning symbols for dangerous voltages
9457	2005	Safety colours and safety signs - Code of Practice
13774	1993	Gloves and mitts of insulating materials for live working
13961	1994	Insulating Poles (Insulating Sticks) and Universal Tool Attachments(Fittings) for Live Working
14993	2001	Saddles, Pole Clamps(Stick Clamps) and accessories for live working
15652	2006	Insulating mats for electrical purposes
2190	1992	Selection, Installation & maintenance of fist aid. Fire extinguishes-code of practice
8990	1978	Code of practice for maintenance & care of industrial safety clothing.
3043	1987	Code of practice for earthing

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MINIMUM REQUIREMENT OF FIRE FIGHTING EQUIPMENT AS PER CBIP RECOMMENDATION

Sl. No.	Location	CO_2 type 4.5 Kg	CO_2 type 22.5 Kg on trolley	Foam type 10 gallon (38 litre) on trolley	Remarks
1	Control room	3 Nos	1 No		The quantity mentioned is an indicative only and can vary according to the site conditions depending on the physical dimensions of the various rooms/switchyard and the equipment provided therein. The following shall be provided a) 4 Nos: sand buckets & water buckets at front entrance b) 1 No: Artificial breathing apparatus to be wall hanged at a quickly accessible point and c) 1 No: Fire detector per 10m² area with alarm in control room in cable basement area.
2	Switch gear room	2 Nos	1 No		
3	Battery room	1 No			
4	Carrier room	1 No			
5	Compressor room	1 No			
6	De watering pump house	1 No			
7	Cable basement	3 Nos			
8	Control room lobby	1 No			
9	Transformers 20MVA and above			2 Nos	
10	Transformers below 20 MVA			1 No	

TELEPHONE NUMBERS OF DEPARTMENT OF ELECTRICAL INSPECTORATE

District	Tel. Nos	District	T el. Nos	District	Tel. Nos
Trivandrum	047 -2934159	Eranakulam	0484-2976309	Kannur	0497-2700882
Kollam	0474-2743619	Thrissur	0487-2973280	Kasaragod	0499-4256930
Pathanamthitta	0468-2223123	Palakkad	0491-2548023	MTS lab	0471-2591080
Alappuzha	0477-2252229	Malappuram	0483-2590003	Head Office	0471-2331104
Kottayam	0481-2568878	Kozhikode	0495-2950002	CEIJTVM	0471-2330558
Idukki	0486-2253465	Wayanad	0493-6295002	Licencing Baord	0471-2339233

ELECTRICITY ACT 2003 SECTION 126 & 135

1 Key difference between section 126 & 135 is 'dishonest intention'. As mentioned u/s 135 'dishonest intention' is the necessary ingredient for the offense of theft of electricity.

2. For prosecuting u/s 135 a complaint or a report by police to the special court is necessary u/s 151.

3 Section 126 is for assessment of the charges for unauthorized use of electricity Those provision would also be applicable to those cases where action is taken u/s 135

4. Civil court/CGRF/CDRF shall not have jurisdiction to entertain any suitor proceeding in respect of any matter which an assessing officer referred to in section 126 or an appellate authority referred to in section 127.

5. Assistant Executive Engineer of the respective Electrical Sub-division is the only official designated as Assessing Officer in terms of Section 126(6) of the Electricity Act 2003. The order of provisional assessment shall only be issued by the respective assessing officer.

6. The external inspection team shall not issue any arbitrary or unilateral instructions or advises to the Assessing Officer.

7. Assessment should be done with retrospective effect for the entire period for which the unauthorized use was taking place, if it is reliably known. If the period of such unauthorized use is not known or cannot be reliably assessed, the period of assessment may be limited to one year.

8. The assessing officer under Section 126 of the Act or the authorized officer under Section 135 of the Act shall have the power to enter and inspect the premises of the consumer and to initiate proceedings against the offenses or other irregularities committed by the consumer or his employee or a person acting on his behalf.

9. The assessing officer shall afford to the consumer an opportunity of being heard, if the consumer files an objection against the provisional assessment order issued under Section 126 of the Act.

10. The assessing officer shall admit the objection against the provisional assessment if it is filed by the consumer within seven days of the receipt of the provisional assessment order or notice.

IMPORTANT TIPS

1. Provisional Assessment order: Within 2 working days from the date of inspection. (3 working days in special cases)
2. Objection period: Within 7 days from the date of Provisional Assessment order
3. Final Order: Within 30 days from the date Provisional Assessment order in case of objection otherwise finalise the Provisional Assessment order as final order
4. Due date for payment of Final Order: 30th day from the date of Final Order
5. Date of disconnection: 30th day from the date of Final Order(by serving a clear notice of 15 days)

SECTION 127_ APPEAL TO APPELLATE AUTHORITY

01. A person aggrieved by a final order made under section 126 of the Act, may, within 30 days of the order, file an appeal before the Appellate Authority. The fee shall be paid by way of cash or Demand Draft.

02. No appeal shall be entertained unless an amount equal to half of the assessed amount is deposited in cash or bank draft with the license and documentary evidence of such deposit has been enclosed along with the appeal.

03. The appeal shall be made in the form specified in the Schedule and shall be accompanied by a copy of the order of the assessing officer, appealed against.

04. The Memorandum of Appeal shall be signed and verified in the manner specified in the Schedule.

05. The appeal shall be accompanied by the following fee: Amount assessed Fee Up to Rs. 1,00,000. 2% of the assessed amount subject to minimum of Rs. 500. Above Rs. 1,00,000, 1% of the, assessed amount subject to minimum of Rs. 2,000.

SECTION152 (COMPOUNDING)
Fee for compounding

Nature of service	Rate/KW for LT &KVA of Contract Demand for HT
Idustrial service	Rs.20,000/-
Commercial Service	Rs.10,000/-
Agricultural Service	Rs.2,000/-
Other Service	Rs.4000/-

1. On payment of the compounding amount, any person in custody in connection with that offence U/S 135 shall be set at liberty and no proceedings shall be instituted or continued against such consumer or person in any criminal court.
2. An explicit admission of the offence along with an undertaking that the offence will not be repeated, shall be obtained from the consumer before compounding.
3. The compounding of the offence will be permitted only after collecting the civil liabilities assessed under section 126 of the Act which is due to KSEBL.
4. The compounding of offense shall be allowed only by the concerned Executive Engineer of Electrical Division or Deputy Chief Engineer of the Electrical Circle (respectively for LT and HT consumers) having jurisdiction over the premises in which theft of electricity was detected.
5. The compounding of an offence under theft of electricity shall be allowed only once for any person or consumer. Section 168. (Protection of action taken in good faith): No suit, prosecution or other proceeding shall lie against the Assessing officer. Appellate Tribunal or any public servant etc. for anything done or in good faith purporting to be done under Electricity Act 2003 or the rules or regulations made thereunder.

ADDRESS OF CONSUMER FORUMS & REGULATORY COMMISSION

CGRF KOTTARAKKARA Chairperson, Consumer Grievence Redressal Forum 2nd Floor, Vydyuthi Bhavanam KSE Board, Kottarakkara, Pin 691 506 Phone: 0474 2451300 E-mail: cgrf.ktr a@ks eb.in	KERALA STATE ELECTRICITY OMBUDSMAN State Electricity Ombudsman, Charangattu Bhavan Building No. 36/895, Mamangalam Anchumana Road, Edappally, RO. Kochi 682 024 Phone: 0484 2346488, Mob: 9567414885 E- mail: ombuds man. ele ctri city@g mai l.
CGRF ERNAKULAM Chairperson, Consumer Grievance Redressal Forum 220 kV Substation Compound, HMT Colony, RO. Kalamassery, Pin 683 503	KERALA STATE ELECTRICITY APPELLATE AUTHORITY CC 51/52, near 110kV Substation Vyttila Kochi, Pin - 682019 P h: 0484 2301965 Email: e leappk erala @gma il.co m
CGRF KOZHIKODE Chairperson, Consumer Grievance Redressal Forum Vydyuthi Bhavanam, KSE Board Gandhi Road, Kozhikode, Pin 673 032 Phone: 91495 23682720, 9496010690 Emai l.cgrfkzd@ks eb. in	KERALA STATE ELECTRICITY REGULATORY COMMISSION, KPFC Bhavanam, Vellayambalam Thiruvananthapuram Pin - 695010

IMPORTANT REGULATIONS OF KERALA ELECTRICITY SUPPLY CODE 2014

subject	Regulation	subject	Regulation
Supply Voltages for different connected loads or contract demands	8	Priority and waiting list of applicants	87
Wiring in the premises of the consumer	15	Procedure for providing temporary connection	88
Installation of Irrigation pump set	17	Procedure for conversion of service	93
Harmonics dumping	23	Procedure for shifting of electrical line or plant of the licensee	95
Provision for load shedding and power restriction	25	Supply of electricity for street lights	102
Obligation of the licensee to supply on request	27	Consequence of the meter inaccessible for reading	111
Recovery of Expenditure	32	Cost of replacement of defective meter	117
Expenditure for distribution system to be borne by the licensee (Extension/Upgradation)	35	Replacement of lost meter	119
Expenditure for distribution system to be borne by the consumer (Extension/Upgradation)	36	Procedure for billing when meter not accessible	124
Recovery of arrears related to the previous consumer	40	Disputed bills	130
Transfer of service connection	41,91	Undercharged bills and overcharged bills	134
Supply of electricity to divided premises	42	Grounds for disconnection	138
Supply of electricity in the case of reconstruction of existing promises	43	Termination of agreement for supply of electricity	143
Electricity connection to high rise building. colony and to residential, commercial and industrial complexes	49	Grounds for dismantling of service	144
Space for installation of service line,meter and other equipment	54	Inspection of the premises and electrical installations	150
Single point supply and sharing of electricity charges	56	Preparation of mahazar	151
Delay on the part of the applicant to take supply	59	Anomalies attributable to the licencee , detected at the primises of the consumer	152
Accident at the installation of the consumer	65	Estimation and regularization of Unauthorized additional load	153
Security for supply of electricity	67	Provisional assessment under section 126 of the Act.	155
Calculation of security deposit	69	Prosecution for theft of electricity	159
Refund of security deposit	71	Reporting theft in police	161
Review of security deposit	73	Procedure in case of suspected theft	162
Submission of application for new service connection	75	Compounding as per section 152	163
Redressa!of grievance on the inspection report	80	Notice to consumer	174

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STANDARDS OF PERFORMANCE AND AMOUNT TO BE PAID TO CONSUMERS FOR DEFAULT

Sl. No.	Name of Service		Standards of Performance (Indicative maximum time limit for rendering service)	Compensation to consumer in case of failure to achieve (₹)
1	Normal fuse-off calls	Urban Rural Difficult	Within 6 hours of recording of complaints Within 8 hours of recording of complaints Within 10 hours of recording of complaints	25/-
2	Line Breakdowns Offline / OH Cable	Urban Rural Difficult	Withing 8 hours Within 12 hours in all cases Within 16 hours	25/-
3	Distribution Transformer Failure	Urban Rural Difficult	Within 24 hours of reporting of failure of transformers Within 36 hours of reporting of failure of transformers Within 48 hours of reporting of failure of transformers	25/-
4	Line Brakdown UG Cable	Urban Rural Difficult	Within 24 hours of reporting of failure of transformers Within 48 hours of reporting of failure of transformers Within 48 hours of reporting of failure of transformers	25/-
5	Period of Scheduled outage Maximum duration in a single stretch Restoration of supply		Not to exceed 12 hours	25/-
6	Meter complaints Inspect and check correctness (LT & HT) Replace slow, creeping or stuck meters (LT) Replace slow, creeping or stuck meters (HT)		Within 5 days Within 7 days for CT, VT, CVT meter if not available additional 30 days "	25 /- 50/-
7	Application for new connection/additional load Release of supply where service is feasible from existing line without system deviation (Weather proof connection only) Release of supply where extension of line, netwrok expansion/enhancement required for providing connection		Within one month or receipt of application incomplete shape and remittance of CD and connection charges. As specified in Kerala Electricity Supply Code Regulations, 2014	50/- (For each day of default)
8	Erection of substation for release of supply (Time lines approved by the Commission in the investment new proposal)		As specified in Kerala Electricity Supply Code Regulations, 2014. Applicable for those who have remitted cost as per Section 46 of the Ele. Act, 2003.	100/- (-do-)
9	Transfer of ownership and change of category		Within 15 days of receipt of application in complete shape	50/- (-do-)
10	Conversion of LT single phase to LT three phase service connections		Within 45 days from the date of payment of charges if no additional line or substation is involved	50/- (-do-)
11	Conversion from LT to HT		As per Kerala Electricity Supply Code Regulations, 2014	50/- (-do-)
12	Resolution of complaints on consumer's bills If no additional information is required If addional information is required		Within 24 hrs working days of receipt of complaint Within 7 days of receipt of complaint	25/- (-do-)
13	Reconnection of supply following disconnection		Within 24 hours of payment of past dues of the applicable charges	50/- (-do-)
14	Payment of Exgratia in case of electric accidents if it is established that accident is not due to the fault of the victim In other cases		Within 30 days without waiting for the report from CEIG Within 30 days after receipt of report from CEIG	50/- (-do-)
15	Refund of deposits		Within 30 days after receipt of request and deposit receipt settlement of all dues by over	50/- (-do-)

For item no. 1, 2 (for differences only) and 3, 4, 6 pm to 8 am on the next day will not be considered as delay for calulation of compensation
For item 4 required for obtaining approvals from complaint authorities for breaking open of public pathways

COST OF TENDER FORMS-WORKS / PURCHASE OF MATERIALS

PAC/PURCHASE AMOUNT etc.	COST OF FORMS ORIGINAL COPY	COST OF ADDITIONAL COPY
Upto 50,000	₹ 300 + GST	₹ 150 + GST
Above 50,000/- upto 10 lakhs	0.20% of the estimated PAC rounded to the nearest multiple of 100, subject to a minimum of ₹ 500 and maximum of ₹ 2000 + GST	50% cost of original, upper rounded to the nearest multiple of 100 + GST
Above 10 lakhs iii) upto 2 Crores iv) upto 5 Crores v) upto 10 Crores vi) Above 10 Crores	iii) ₹ 5000 + GST iv) ₹ 7500 + GST v) ₹ 10,000 + GST vi) ₹ 15,000 + GST	50% of the cost of original, upper rounded to the nearest multiple of 100 + GST

Note: For tender above 5 Lakhs e-tenders shall be done.

COST OF TENDER FORMS FOR SCRAP DISPOSAL

₹ 100 + GST for tender forms of SR amount upto ₹ 1,00,000/-
₹ 200 + GST for tender forms of SR amount exceeding ₹ 1,00,000/- GST for cost of tender form is 12% but for e-tendering the rate is 18%

EMD FOR WORKS

EMD for works: 2.5% of PAC subject to 5 lakhs upper limit

NORMS FOR PUBLICATION OF NOTICES INVITING TENDERS, QUOTATIONS ETC.

PAC		Mode of Publicity	Remarks
1. For works/supply costing PAC upto and including ₹ 5,00,000		No publication in details Notice on the notice board of the AE, AEE, EE, Village and Panchayath Office	
2. Above ₹ 5,00,000	e-tender +	The tender notice shall be published in one Malayalam daily having wide circulation in the district and nearby district, KSEB Website Govt. Website.	Dy. CE can arrange publication
3. Above ₹ 25,00,000	e-tender +	The tender notice shall be published in two Malayalam daily having wide circulation in the district and near by district, KSEB Website Govt. website.	PRO arrange publication
3. Above ₹ 75,00,000	e-tender +	Two Malayalam dailies, one English daily, KSEB and Government Website	-Do-

EXPENDITURE TO BE MET IN CONNECTION WITH KSEB'S FUNCTIONS

SUCH AS FOUNDATION STONE LAYING, INAUGURATION AND COMMISSIONING OF NEW OFFICES ETC.

1. Laying foundation stone, commissioning & inauguration of major substation (66 KV & above) Generating stations & State level inauguration of new projects — **₹ 1,00,000/-**
2. Laying foundation stone, commissioning and inauguration of 33 KV substation and district level inauguration of new projects — **₹ 60,000/-**
3. Inauguration of new section offices and local function — **₹ 45,000/-**
   as per bo dt 5.7.22 new projects/constructions below the estimate of 3 crore, no public function

INCOME TAX

INCOME TAX RATES FOR INDIVIDUALS

Particulars	Rate of Income Tax			
	Option I : Old Scheme			Option II: New Scheme
	General	Sr. Citizen (60 to 79 Years)	Super Sr. Citizen (80 years or more)	General
Upto Rs. 2,50,000	0	0	0	0
Rs.2,50,001 - Rs. 3,00,000	5%	0	0	0
Rs.3,00,001 - Rs. 5,00,000	5%	5%	0	5%
Rs.5,00,001 - Rs. 6,00,000	20%	20%	20%	5%
Rs.6,00,001 - Rs. 9,00,000	20%	20%	20%	10%
Rs.9,00,001 - Rs. 10,00,000	20%	20%	20%	15%
Rs.10,00,001 - Rs. 12,00,000	30%	30%	30%	15%
Rs.12,00,001 - Rs. 15,00,000	30%	30%	30%	20%
Rs.15,00,001 - Above	30%	30%	30%	30%
Deductions & Exemptions available:				
Interest paid on Housing Loan	√	√	√	X
Standard Deduction of Rs.50,000/-				
Mediclaim, LIC, Medical Treatment, Pension Scheme, Tuition fees, etc	√	√	√	X
Donations (including political party)	√	√	√	X
80CCD(2) - employer's contribution to NPS	√	√	√	√
Rebate u/s 87A (Rs.12,500/-)	√	√	√	√

- Education Cess @ 4% on Income Tax
- Individual not having business income can change their option every year.

Deduction under Chapter VIA

- Section 80C, 80CCC & 80CCD - Rs. 1,50,000/- (combined)
- Section 80CCD(1B) - Additional contribution to NPS - Rs. 50,000/-
- Section 80D - Medical Insurance premium, Medical Expenses (for Sr.Citizen only)

For self, spouse and Children - Rs. 25,000/-
For parents (less than 60 years old) - Additional Rs. 25,000/-
For parents (Senior citizen) - Additional Rs. 50,000/-

- Section 80DD - Medical treatment

Normal - Rs. 40,000/-
For Senior citizen - Rs. 1,00,000/-

- Section 80E - Interest on Education Loan - 100% - Maximum for 8 years
- 80CCD (1B) - NPS additional contribution - Rs. 50,000/-
- 80GGB / 80GGC - Donations to Political Parties (other than cash)

GST IN KSEBL - MAJOR RATES (APPLICABLE TO KSEBL)

<table>
<tr><td>0%</td><td>12%</td><td>18% most of other goods and services</td></tr>
<tr><td>• Electricity
• Usufructs
• Firewood
• Transmission or Distribution of Electricity</td><td>• IB Rent</td><td rowspan="3">• Renting of movable & immovable properties
• Street Light maintenance charges
• Light Fittings (including LED bulbs)
• Pole Rent
• E-Tender Fees/Tender Forms
• Live Tree Auction
• Work Contract Services
• PSC/RCC Poles
• E-Waste
• All other Scraps
• Renting of residential buildings for non- residential purposes</td></tr>
<tr><td>5%</td><td>28%</td></tr>
<tr><td>• Scrap of Rubber, Plastic, Paper, Glass
• Rent a Cab Services</td><td>• Battery except lithium Ion Battery
• Cement</td></tr>
<tr><td colspan="3">Solar Plant Installation Turnkey Contracts
• On 70% of Contract value – 12%
• On 30% of Contract Value – 18%
• Net effective GST Rate – 13.80%</td></tr>
</table>

Characteristics /Highlights of GST:

- GSTIN of KSEBL and GST Registration Certificate should be exhibited in front of every office
- All Invoices received by KSEBL should include the GSTIN of KSEBL
- E-way bill mandatory for Inter store or Inter office transfer of goods where value of Goods transported exceeds Rs.50,000/-

Reverse Charge applicable on -

- Payment to Goods Transport Agency (GTA) services (other than to a Company)
- Renting of Passenger Vehicle for a specified period of time – day(s)/month, etc)
- Rent on immovable property to Government/Local authority
- Directors' remuneration including sitting fee, other than in the nature of Salary
- Government Services (in nature of support services, like Insurance premium to State Insurance Corporation, etc.)
- Rent paid by KSEBL for any residential dwellings rented for residential purpose

No GST on

- Services provided by KSEBL to employees
- Fees or Charges under RTI Act
- Services received by KSEBL from Advocates/Firm of Advocates
- Transportation of Goods by Road
- Fees for Registration/testing/calibration/safety check/certification required under any Law.
- Penalty, Liquidated Damages, SD/EMD forfeiture, etc (except Pole Rent interest)
- Renting of residential dwellings for residential purpose to an unregistered person.

<u>TDS on GST</u>

- GST TDS to be deducted at 2% (1% CGST, 1% SGST or 2% IGST) on all payments where contract value excluding GST >Rs.2.50 Lakhs, and where the contractor/supplier is GST registered person.
- GST TDS not applicable for payments to Government, Local Bodies and PSUs who are liable to deduct GST TDS

Time Scales of Pay of officers in KSEBL

Master Scale:

59100-2300/1-61400-2500/6-76400-3000/8- 100400-3400/6-120800-3600/6-142400-4000/6- 166400 (33 years)

Sl. No	Designation	Scales of pay
(1)	(2)	(3)
1	Assistant Engineer/ Senior Superintendent/ Divisional Accounts Officer/ Senior Confidential Assistant/ Fair Copy Superintendent/ Foreman Grade 1	59100-2300/1-61400- 2500/6-76400- 3000/8-100400- 3400/5-117400 (20 years)
2	Assistant Executive Engineer/ Assistant Accounts Officer/ Assistant Finance Officer/ Junior Personal Assistant/ Senior Fair Copy Superintendent/ Regional Personnel Officer/ Public Relations Officer	73900-2500/1-76400- 3000/8-100400- 3400/6-120800- 3600/3-131600 (18 years)
3	Accounts Officer/ Finance Officer/ Personal Assistant	76400-3000/8- 100400-3400/6- 120800-3600/6-142400-4000/1- 146400 (21 years)
4	Executive Engineer/ Personnel Officer	82400-3000/6- 100400-3400/6- 120800-3600/6-142400-4000/2- 150400 (20 years)
5	Senior Accounts Officer/ Senior Finance Officer/ Deputy Chief Accounts Officer	85400-3000/5- 100400-3400/6- 120800-3600/6-142400-4000/3- 154400 (20 years)
6	Deputy Chief Engineer/ Chief Personnel Officer/ Chief Accounts Officer	97400-3000/1- 100400-3400/6- 120800-3600/6-142400-4000/4- 158400 (17 years)
7	Chief Engineer/ Financial Adviser/ Chief Internal Auditor	114000-3400/2- 120800-3600/6- 142400-4000/6-166400 (14 years)

Cadre Pay
The Cadre Pay of the officers is revised as given below

Designation	Rate Per month
Chief Engineer /Financial Adviser/ Chief Internal Auditor	Rs.3500/-
Deputy Chief Engineer /Chief Personnel Officer/ Chief Accounts Officer/Senior Accounts Officer /Senior Finance Officer/ Deputy Chief Accounts Officer	Rs.2500/-
Accounts Officer/ Finance Officer/ Executive Engineer/ Personnel Officer/ Personal Assistant	Rs.750/-
Assistant Executive Engineer/ Assistant Accounts Officer/ Assistant Finance Officer/ Junior Personal Assistant/ Regional Personnel Officer/ Senior Fair Copy Superintendent / Public Relations Officer	Rs.600/-
Assistant Engineer/ Senior Superintendent / Divisional Accounts Officer/ Senior Confidential Assistant/Fair Copy Superintendent/ Forman Grade-I	Rs.500/-

Cadre pay will be reckoned as part of pay having eligibility for DA, HRA, other allowances and pensionary benefits. However, no junior / senior fixation will be allowed on the basis of Cadre pay.

LEAVE RULES

Earned Leave 1/11th of the period spent on duty subject to a maximum of 300 days. Maximum earned leave that may be granted at a time shall not exceed 120 days. 30 days EL surrender is admissible in a Financial year Maximum Terminal Surrender admissible is 300.

Half Pay Leave 20 days for each completed year of service. Half pay Leave will not be earned during LWA taken for foreign assignments (Rule 82, KSR).

Commuted Leave Half the number of half pay leave due. When commuted leave is taken twice the number of such leave should be debited against the half pay leave due.

Leave not due This is half pay leave granted in advance. It will be debited against the half pay leave which the officer earns subsequently. Leave not due that can be sanctioned without medical certificate is 90 days at a time and 180 days during the entire service. Leave not due is granted if there is reasonable prospect of the officer returning to duty and earning an equal amount of half pay leave there after.

Leave without allowance There is no Limit to the amount of leave without allowances admissible to officers in permanent service or others who have completed 3 years of continuous service. Period of leave without allowances granted on Medical certificate will count for increments. Maximum period of leave without allowance for employment abroad/ within India and joining spouse that can be allowed to an employee of KSEBL in his/her service shall be 10 years.

Special Disability leave Special disability leave may be granted to an officer who is disabled by injury intentionally inflicted or caused in consequence of the due performance of his official duties or in consequence of his official position on the following conditions.

1. The disability should have manifested within 3 months of its occurrence. Maximum 24 months subject to conditions. Can claim salary up to 45 days before getting sanction
2. Period of leave is limited to the period covered by Medical Certificate.

The period of special disability leave shall not be debited to the leave account.

Leave Surrender (1) Employees will be permitted to surrender earned leave at their credit, at the time of retirement subject to a maximum of 300 days. (2) Encashment of Earned leave for 30 days in a financial year w.e.f. 01.04.2007

Paternity Leave: Paternity leave to a male KSEBL Servant 10 days each for two Children during at the time of delivery of his wife, ie. upto 10 days before or upto 3 months from the date of delivery of the child, subject to the production of a certificate from the medical practitioner stating the exact date of delivery.

Special Casual Leave (Mentally/physically challenged children): Special casual leave for a period upto 15 days in a year to the employees having physically/mentally challenged children on production of certificate from the authority.

JOINING TIME

1.	When there is no change of Office	:	No joining time
2.	When there is no change of stations	:	One day, a holiday or Sunday
	(Change of Office situated within 8 kms)	:	Counts as a day for this purpose
3.	When the distance between two stations exceeds 8 kms	:	Preparation time 6 days plus journey time.
	And in continuation journey time as follows		
1.	Air Crafts	:	Actual journey time. Portion of day treated as one day.
2.	Railway 500 km		
3.	Ocean Steamer 350 km journey.	:	One day each or any longer time actually taken for
4.	River Steamer 150 km		A day is allowed for any fraction or portion of a journey.
5.	Motor vehicle or any other public conveyance 150 km		
6.	In any other way 25km		

A sunday does not count as a day for calculation of joining time. But it will be counted for calculating the maximum period of joining time admissible, which is 30 days.

Travel by Road not exceeding 8 kms, from or to a railway station at either end does not count for joining time.

T.A. RULES

1. Minimum one daily allowance is given for journeys beyonds 8 Kms.
2. Actual Bus fare plus incidentals are paid for journeys by Road if the total distance travelled is 32 kms or more. This incidental is subject to a minimum of half Daily Allowance (Rule 31, 62(a), 110 of Part II K.S.R) minimum one D.A.
3. If the journey does not extend to more than 200 kms, onward journey is to be performed on the day on which official duty is to be performed and return journey is to be performed on the day on which the official business is completed. (B.O. No. 462/2001 PSI/3434/96 dt. 23.02.2001).
4. When two journeys are performed within a period of 24 hours, the period of absence from H.Q is treated as one day irrespective of the fact that journey is performed in two calendar days (Rules 56).
5. When journey by Road and Rail is performed together, one D.A can be claimed for Road portions if the distance travelled is less than 32 kms. (Rule 62(b).
6. When Auto Rickshaw/Taxi is used for journeys to/from Residence/Railway Station to/from office Auto/ Taxi fare can be claimed subject to a maximum 8 kms.

Departmental Vehicles

7. Incidental expense subject to a minimum of half Daily allowance (Rule 110-note 2).
8. Incidentals plus D.A. for halt is limited to one D.A. in cases where the officer returns to Head Quarters on the same day (within 24 hours).
9. If the period of halt in several outstations exceeds 6 hours, D.A. as per rule is given for halt.

Journey by Train

10. Train fare plus incidentals (incidental is subject to minimum half D.A. (Rule 18, 20).

Daily Allowance (Rule 63)

11. Half D.A. for halt exceeding 6 hours.
12. Full D.A. for halt exceeding 12 hours.
13. When halt exceeds 24 hours, one D.A. for every 24 hours each and as above for part.

Journey Along Hilly Tracts

14. Additional 25% of the D.A and mileage allowance admissible in Class I Hilly Tract and 12.5% in Class II Hilly Tract. (Note 1 Rule 44).
15. The trainees at PETARC Moolamattom are not eligible to claim DA for halt.

TRANSFER T.A.

Family : Wife/husband, children, stepchildren residing with and dependent

Transfer journey by rail or road between places connected by rail

Officer : Grade I & II one eligible class fare + 3 incidental at 25 ps per km/20ps per km incidental each subject to a minimum of ½ DA.

Family : Each adult (12 years & above) one fare. Each child (between 5 and 12) ½ fare. Below 5 no fare. No incidental to family.

Personal effects : Goods train fair for transporting + loading and unloading.

Officer Grade Ia(i), Ia(ii), Ib, Ic : 2240 kg + ₹ 330 + ₹ 330

Grade II officer and workman Gr II(a), and II(b) : 1120kg + ₹ 170 + ₹ 170

Others : 560kg + ₹ 140 + ₹ 140

T.A. LIMITS (Applicable to Journeys withing Jurisdiction)

	Monthly Limit	Quarterly Limit	Remarks
1. Assistant Engineer/Senior Suptd	₹ 1150/-	₹ 3450/-	As per B.O (FM) No.755/2011 dated 11.03.2011,the TA claims shall not exceed 50% of the revised monthly / quarterly ceiling in the case of officers allotted with department Vehicle
2. Asst. Executive Engineer/ AAO/AFO	₹1300/-	₹ 3900/-	
3. Executive Engineer/RAO AO/FO	₹ 1550/-	₹ 4650/-	
4. Deputy Chief Engineer	₹ 1800/-	₹ 5400/-	
5. Chief Engineer	₹ 2500/-	₹ 7500/-	

Exemption from limit to RAO offices, Relay and PET Sub divisions, MT Sub divitions, PMD Moolamattom, LMS Sub divitions and sections, Communication wing, Scada, TNMS, ESCOT, office of the CE DAM Safety, Deputy R&D Pallom, Innovation group, EE working in the office of CE (D) (Regional Safety Officer), Meter repairing Unit, APTS & Drivers, System admins and system supervisors.

T.A. & D.A. RATES AND CLASSIFICATION OF EMPLOYEES

(B.O. No. (FB) No. 1772/08 (PSI/1303/08) dated 17.07.2008)

Grade	Pay Range	Class of Travel	Daily Allowance		Incidental Rate (Road & Rail)			Loading Un-loading charge for luggage on transfer	Incidental for Air Journey
			Inside Kerala	Outside Kerala	Rail per K.M.	Deptl Conveyance per KM	Public Conveyance per KM		Rate/ Journey
I(a) (i)	Actual Pay exceeds ₹ 35,265/-	I AC	150	220	0.25	0.25	Applicable bus fare + incidental rate eligible for departmental conveyance	₹ 330 at each end	₹ 220
I(a) (ii)	Actual Pay ₹19,875 to ₹ 35,265/-	II AC	150	220	0.25	0.25		-do-	₹ 220
I(b)	Actual Pay ₹ 17,665/- to ₹19874	II AC	150	220	0.25	0.25		-do-	₹ 220
I(c)	Actual pay ₹ 16,365/- to ₹17,664/-	I Class, If the train does not have, I Class, II AC	150	220	0.25	0.25		-do-	₹ 220
II	Actual pay below ₹16,365/-	If the train doesn't have I class, III AC	120	170	0.20	0.18		₹ 170 at each end	₹ 170
II(a)	Actual pay ₹12,615/- and above	I Class	120	140	0.20	0.18		-do-	₹ 170
II(b)	Actual pay below ₹12,615/- and maximum scale of pay ₹12,615 and above	I Class	120	140	0.20	0.18		-do-	₹ 140
III	Scale of pay with maximum of ₹10,305/- and above but below ₹12,615/-	II Class	100	110	0.15	0.15		₹ 140 at each end	₹ 110
IV	Scale of pay with maximum less than ₹10305	II Class	100	110	0.15	0.15		-do-	₹ 110

- Mileage allowance is received @ ₹ 0.80 per km for all categories of employees
- Transportation of personal effect-The existing system will continue
- Travel by Special Conveyance-The KSEBL Officers drawing actual pay of ₹ 18,315/- p.m. and above will be permitted to travel by Special Conveyance including places connected rail @ ₹ 2.00 per Km. The taxi should be availed only on non-availability of departmental conveyance which should be certified by the controlling officer concerned. Special conveyance allowance shall be limited to the fare and incidental expences admissible for journeys by public conveyance in the appropriate class.

RATE OF DAILY ALLOWANCE AND ROOM RENT OUTSIDE KERALA (₹)

Designation	* Outside the State In Bombay, Delhi, Culcutta, Madras, Bangalore and Hyderabad	In other places Outside Kerala	If Boarding is permitted free		Night Out Allowance	
			In Bombay, Delhi, Culcutta, Madras, Bangalore and Hyderabad	In other places Outside Kerala	In Bombay, Delhi, Culcutta, Madras, Bangalore and Hyderabad	In other places Outside Kerala
1. Chairman and Full Time Members (Boarding & Lodging)	Actuals as per documents submitted	Actuals as per documents submitted	₹ 200 + Actual room rent	Actuals as per documents submitted	₹ 938/-	₹ 625/-
2. Secretary, Chief Engineer, FA/CIA CVD, LA & DEO, DPR, CIA	-do- (limited to hotels, 3 star status & below	-do- (limited to hotels, 3 star status & below	₹ 150 + Actual (limited to 3 star hotels and below)	-do-	₹ 875/-	₹ 563/-
3. Dy. Chief Engineer, Chief Personnel Officer, Public Relations Officer	₹ 250/- + actual room rent with ceiling of ₹ 1200/- per day	₹ 100/- + actual room rent with ceiling of ₹ 600/-	₹ 50/- + actual room rent with ceiling of ₹ 1200/-	₹ 50/- + actual room rent with ceiling of ₹ 600/-	₹ 750/-	₹ 500/-
4. Chief Engineer, Dy. CAO, Spl. Officer (Revenue), Dy. Secretary, Chief Foreman, Accounts Officers,Personnel Officer, Welfare Officer, Vig. Officer, AO, FO	₹ 200/- + actual room rent with ceiling of ₹ 900/- per day	₹ 100/- + actual room rent with ceiling of ₹ 500/-	₹ 100/- + actual room rent with ceiling of ₹ 900/-	₹ 50/- + actual room rent with ceiling of ₹ 500/-	₹ 625/-	₹ 438/-
5. Asst. Exe. Engineer, AAO, PA to AM, DA I & II RPO, Sr. Supdt, RCA Supdt, General Foreman, Asst. Engineer and FC Supdt., RPO	₹ 175/- + actual room rent with ceiling of ₹ 700/- per day	₹ 80/- + actual room rent with ceiling of ₹ 400/-	₹ 75/- + actual room rent with ceiling of ₹ 700/-	₹ 35/- + actual room rent with ceiling of ₹ 400/-	₹ 500/-	₹ 375/-

* If Lodging is permitted free then only the eligible D.A. shown above will be applicable.
* DA plus room rent is not admissible, where consolidate night out allowance is claimed

DELIGATION OF POWERS- OFFICERS

Executive Officer B.O (DB) No. 449/2022 (PLNG-AEE2/2022/31) Tvpm 26-05-2022 , Ministerial Officer B.O (DB) No. 751/2021 (Estt. II/4242/2021) Tvpm 08-10-2021

Sl. No.	Particulars	Chief Engineer	Dy. Chief Engineer	Executive Engineer	Asst: Exe: Engineer	Asst: Engineer	FA	CIA	Sr. AO/Sr. FO/ DyCAO	CPO	RAO	Remark
I. Administrative Power												
1. Appointments												
(a)	Appointing/ Disciplinary Authority	1. Of and below AEE/AAO 2. Temp. recruitment in the above post up to 179 days through Empl.Exch. (For 1&2 above, DOP for CE(HRM) only)	1. Of and below AE/SS within the Circle* against sanctioned post 2. Appointment of EW (DOP for DyCE of Dist. HQ only)	Of and below SE/SA within the Division* against sanctioned post								*Appointment on temporary basis. More than 60 days need concurrence of CE(HRM)
(b)	To sanction Pensionary claims including arrears	Below EE or Eq. Cat. (DOP for CE(HRM) only)	Of and below AEE/AAO (DOP for DyCE, HRM II)						All classes up to Overseer (Sr. AO (CE,HRM)			
(c)	To sanction higher grade	Below EE/AO/FO and Eq. Cat. (DOP for CE(HRM) only)										
(d)	To approve nomination of officers for promotion	Up to AEE and Eq. Cat. (DOP for CE(HRM) only)										
(e)	To sanction NRA and Temp. Adv. From GPF	1. Of and below DyCE in ARU of CE(HRM) (DOP for CE(HRM) only) 2. To all employees working in his/her ARU*	1. Of and below EE/AO in ARU of CE(HRM) (DOP for DyCE (HRM II) only) 2. To all employees working in his/her ARU*	To all employees working in his/her ARU*								*The sanctioning authority for NRA of the ARU head shall be the next higher authority
2. Transfer & Posting												
	Transfer & posting	Of and below AEE/AAO (DOP for CE(HRM) only)										
3. Leave												
(a)	To sanction all kinds of Leave (except study leave):	1. Below EE/AO in General Establishment. 2. To DyCE& EE and Eq. Cat. up to 6 months at a time 3. LWA to workmen for employment abroad and joining spouse up to 10 years 4. Up to DyCE or equivalent categories in General Establishment (For 1 to 4 above, DOP for CE(HRM) only)	To all employees working under him/her other than Study Leave, Spl. Disability Leave and LWA for more than 4 months at a time. (DOP for DyCE). EL, Spl. Disability Leave and LWA to employees below the rank of AEE in ARU of CE(HRM). (DOP for DyCE(HRM)	To all employees working under him/her other than Study Leave, Spl. Disability Leave and LWA for more than 4 months at a time.								

Sl. No.	Particulars	Chief Engineer	Dy. Chief Engineer	Executive Engineer	Asst: Exe: Engineer	Asst: Engineer	FA	CIA	Sr. AO/Sr. FO/ DyCAO	CPO	RAO	Remark
(b)	Additional Charge and Charge Allowance	1.To all officers below EE and Eq. Cat. 2.ToDyCE and EE and Eq. Cat. Up to 6 months at a time (For 1 & 2 above, DOP for CE(HRM) only)	To all officers below EE and Eq. Cat. Up to 3 months at a time				Charge arrangements up to 3 months at a time, to all offices working under him	Up to 3 months at a time to all officers upto RAO/AO in cooperate office working under him			Up to 3 months at a time to all officers working under him	
(c)	To sanction journeys for official purpose	1. To all employees working under him within the State and to neighbouring Districts of adjacent States and Mahe 2. To Executive Officers to go outside the State for factory inspections and testing up to 10 days	To all employees (working under him) beyond their jurisdiction but within the Region	1.To all employees (working under him) beyond their jurisdiction but within the Region 2.To all employees (working under him) within the State for attending Conf./ Collecting materials 3.Journeys of Drivers within the State	To all his subordinates beyond his jurisdiction but within the Division concerned							
(d)	To sanction journeys abroad	1.Up to EE and Eq. Cat. for not taking employment other than LWA up to 2 months 2.Up to EE and Eq. Cat. for visiting their children other than LWA up to 2 months										
4. Financial Power												
1	Administrative Sanction	5 Cr (15 Cr by CE Level Committee)	2.5 Cr (3.5 Cr by Circle Level Committee)	1 Cr (1.5 Cr by Division Level Committee)	25 L	5 L						
2	Technical Sanction	25 Cr (Above 25 Cr by CE Level Committee)	5 Cr (15 Cr by Circle Level Committee)	2.5 Cr (3.5 Cr by Division Level Committee)	1 Cr	25 L						
3	Invitation and Acceptance of Tender	W/o Limit	15 Cr	3.5 Cr	1Cr	25 L	W/o Limit Sub. to budject provision	Up to 5 L				
4	Acceptance of Tender Excess Over Estimate*	Up to 5% above PAC for PAC up to 15 Cr	Up to 3% above PAC for PAC up to 5 Cr	Up to 2% above PAC for PAC up to 1 Cr								*Remarks of DA/AFO/ FO shall be obtained/ Remarks of FA for works above 3.5 Cr

Sl. No.	Particulars	Chief Engineer	Dy. Chief Engineer	Executive Engineer	Asst: Exe: Engineer	Asst: Engineer	FA	CIA	Sr. AO/Sr. FO/ DyCAO	CPO	RAO	Remark
5	Excess Quantities/ Extra Items*	1.Up to net excess over 15% subject to a maximum 4 Cr, for PAC above 15 Cr 2.Up to net excess over 20% subject to a maximum 3 Cr, for PAC above 10 Cr and up to 15 Cr 3.Up to net excess over 25% subject to a maximum 2 Cr, for PAC up to 10 Cr	Up to net excess over 25% subject to a maximum 1 Cr	Up to net excess over 25% \ subject to a maximum 75 Lakh	Up to net excess over 25% subject to a maximum 25 Lakh	Up to net excess over 25% subject to a maximum 5 Lakh						*Remarks of DA/AFO/ FO shall be obtained/ Remarks of FA for works above 3 Cr
6	Revised Working Estimate	1.Up to 25% over the TS amount, limited to Rs.2 Crore, for works having TS up to Rs.10 Crore 2.Up to 20% over the TS amount, limited to Rs.3 Crore, for works having TS above Rs.10 Crore and up to Rs.15 Crore 3.Up to 15% over the TS amount, limited to Rs.4 Crore, for works having TS above Rs.15 Crore	Up to 25% over the TS amount, limited to Rs.1 Crore	Up to 25% over the TS amount, limited to Rs.75 Lakh	Up to 25% over the TS amount, limited to Rs.25 Lakh	Up to 25% over the TS amount, limited to Rs.5 Lakh						Revised estimate is to be sanctioned if there is 10% excess due to execution of excess quantities / extra items. Revised estimate shall be prepared based on revised quantity with original estimate rates In case of R&M, the TS amount is the Original Estimate amount
7	To sanction Completion Reports of works	Having PAC up to the TS limit of CE (By CE level committee for PAC above TS limit of CE	Having PAC up to TS limit	Having PAC up to TS limit	Having PAC up to TS limit							
8	Deposit Works	10 Cr	5 Cr	3 Cr	25 L	2 L						
9	Labour/Work contract on Quotation	-	-	-	2 L	1 L						Execution of agreement exempted up to 1 Lakh
10	Tender for Purchase	5 Cr w/o yearly limit* All stock articles on GeM portal	25 L with yearly limit of 3 Cr All stock articles on GeM portal	10 L with yearly limit of 2 Cr All stock articles on GeM portal	10 L with yearly limit of 20 L	3 L with yearly limit of 6 L						*For centrally procured items, iron & steel for fabrication works, CE(SCM) will exercise the DOP For purchase above 75 L, comments of FA to be obtained. Two-part tender process for purchase above 1 Cr
11	Works & Purchase on Short Tender / Quotation/ Waiver of Tender calls	20 L	10 L	5 L	2 L	1 L	50,000	50,000				e-tender for works & purchase above 5 L

Sl. No.	Particulars	Chief Engineer	Dy. Chief Engineer	Executive Engineer	Asst: Exe: Engineer	Asst: Engineer	FA	CIA	Sr. AO/Sr. FO/ DyCAO	CPO	RAO	Remark
12	Works/ Purchase without Quotation	50,000 at a time, Annual Limit 5 L For spares/ accessories for urgent repair works 75,000 at a time, Annual limit 5 L For proprietary spare parts for generators/transformers/control panels etc. directly from the manufacturers or authorised dealers up to Rs. 50 L For service charges to OEM officials up to 25 L, Annual limit 1 Cr	25,000 at a time, Annual limit of 3 L For spares/ accessories for urgent repair works 50,000 at a time, Annual limit 3 L For proprietary spare parts for generators/ transformers/ control panels etc. directly from the manufacturers or authorised dealers up to Rs.15L For service charges to OEM officials up to 10 L, Annual limit 50 L	20,000 at a time, Annual limit of 2 L For spares/ accessories for urgent repair works 30,000 at a time, Annual limit 2 L	10,000 at a time, Annual limit of 1.5 L	5,000 at a time, Annual limit of 75,000	15,000 at a time annual limit of 1.5 L	15,000 at a time annual limit of 1.5 L	15,000 at a time annual limit of 50,000		5,000 at a time annual limit 25,000	
13	Purchase of T&P, Furniture and Office Equipment	1. Up to 25 L* except c omputers subject to norms and budget provision 2. Up to 3 L for purchase of computers (desktop/laptop) and software packages subject to budget provision 3. Up to 3 L per annum for purchase / replacing of office furniture in existing offices** 4. Up to 1 L for purchase of computer peripherals, Annual limit 10 L	1. Up to 5 L* except computers subject to norms and budget provision 2. Up to 1 L for purchase of computers (desktop/ laptop) and software packages subject to budget provision 3. Up to 1.5 L per annum for purchase / replacing of office furniture in existing offices** 4. Up to 50,000 for purchase of computer peripherals, Annual limit 3 L	1. T&P, Furniture, Office Equipment up to 1.5 L subject to norms and budget provision 2. Up to 50,000 per annum for purchase / replacing of office furniture in existing offices** 3. Up to 25,000 for purchase of computer peripherals, Annual limit 2 L	1. T&P, Furniture, Office Equipment up to 40,000 subject to norms and budget provision 2. Up to 15,000 for purchase of computer peripherals, Annual limit 1 L	1. T&P, Furniture, Office Equipment up to 10,000 subject to norms and budget provision 2. Up to 10,000 for purchase of computer peripherals, Annual limit 50,000	Up to 1 L 1. Per Annum for purchase of furniture including office equipments (Office under his control) sub. to budjet provision 2. Purchase of computer system, ups, peripherals, printers up to 2 L at a time sub. to annual limit 5 L inviting limited quotation	1. Purchase of furniture including office settlement sub. to monitory limit Rs. 1 L per year & budjet provision 2. Up to 2 L for purchase of computer system, UPS, computer peripherals and printer (annual limit 5 L)				*Up to 40 L for CE(Gen) and 25 L for DyCE(Gen) **For purchase of furniture for new offices this limit will not apply EE shall allocate budget provision for AEE & AE
14	Repair of Vehicle	Up to 1 L subject to rules and budget provision	Up to 75,000 subject to rules and budget provision	Up to 50,000 subject to rules and budget provision	Up to 25,000 subject to rules and budget provision							
15	Re-appropriation of funds	Funds within the same service and account heads	To distribute budget grant for TA and contingencies									Funds within the same service and account head from one region to another by Director Funds from one account head to another by FA

Sl. No.	Particulars	Chief Engineer	Dy. Chief Engineer	Executive Engineer	Asst: Exe: Engineer	Asst: Engineer	FA	CIA	Sr. AO/Sr. FO/ DyCAO	CPO	RAO	Remark
16	Operation, Repair & Maintenance Expenses (subject to budget provision)	R&M works of all equipment such as generator, transformer, switchgear, transmission/ distribution/ communication line etc. including associated civil works up to 3 Cr R&Mof buildings up to 5 L subject to budget provision R&M of T&P, furniture and office equipment including IT equipment up to 1 L subject to budget provision R&M as well as running & maintenance of dams and appurtenant structures, R&M of roads and other civil engineering structures, running & maintenance of H&M stations, seismic stations, colonies, IBs etc. without limit, subject to budget provision Up to 10 L for manufacturer's service engineers/technicians towards service charges, Annual limit 20 L R&M of plant and equipment up to 10 L, Annual limit 40 L	R&M works of all equipment such as generator, transformer, switchgear, transmission/ distribution/ communication line etc. including associated civil works up to 25 L R&Mof buildings up to 2 L subject to budget provision R&M of T&P, furniture and office equipment including IT equipment up to 50,000 subject to budget provision Up to 5 L for manufacturer's service engineers/technicians towards service charges, Annual limit 8 L All modification works of temporary nature (for customer amenities like enquiry counter, cash counter, parking area etc.) in section offices up to 1 L, annual limit 6 L Repair to gates, embedded parts etc. provided in dams and for repair of water conductor systems up to 50 L	R&M works of all equipment such as generator, transformer, switchgear, transmission/ distribution/ communication line etc. including associated civil works up to 12 L R&M of T&P, furniture and office equipment including IT equipment up to 25,000. Annual Limit 2 L Up to 25,000 for manufacturer's service engineers/ technicians towards service charges, Annual limit 2 L Repair to gates, embedded parts etc. provided in dams and for repair of water conductor systems up to 20 L	All R&M up to 2L R&M of T&P, furniture and office equipment including IT equipment up to 10,000. Annual Limit 1 L	All R&M up to 50,000 R&M of T&P, furniture and office equipment including IT equipment up to 5,000. Annual Limit 20,000	R&M of T&P, furniture and office equipment including IT equipment and vehicles up to 50,000, subject to budget provision	R&M of T&P, furniture and office equipment including IT equipment and vehicles up to 50,000, subject to budget provision	Sanction and arrange repairs of furniture and office equipments up to 25,000 at a time	Arrange repairs of furniture and office equipments up to 25,000 at a time	Repair of furniture, computer peripherals and printer subject a maximum of 25,000 per annum	
17	Survey Reports, Auction and Disposal											
(1)	To sanction of survey report and disposal of	All unserviceable items including imported items without limit by Scrap Disposal Committee (SDC) that are delegated to it, subject to rules										
(2)	To sanction survey reports and disposal of	All unserviceable items (except those delegated to SDC), having assessed value up to 10 L* Buildings and other civil structures having assessed value up to 25 L	All unserviceable items (except those delegated to SDC), having assessed value up to 2 L To conduct auction of all unserviceable items, without limit	All unserviceable items (except those delegated to SDC), having assessed value up to 1 L To conduct auction of all unserviceable items having assessed value up to 2 L	All unserviceable items (except those delegated to SDC), having assessed value up to 50,000	All unserviceable items (except those delegated to SDC), having assessed value up to 10,000	Unserviceable furniture and office equipments including IT equipment having accessed value up to 50,000	Unserviceable furniture and office equipments including IT equipment having accessed value up to 50,000	Unserviceable furniture and office equipments having accessed value up to 10,000 (Sr. FO/DyCAO)			*Up to 50 L for CE(Gen) In the case of fused bulbs, tubes and damaged insulators, the EEs concerned are empowered to sanction the disposal irrespective of the amount involved

Sl. No.	Particulars	Chief Engineer	Dy. Chief Engineer	Executive Engineer	Asst: Exe: Engineer	Asst: Engineer	FA	CIA	Sr. AO/Sr. FO/ DyCAO	CPO	RAO	Remark
(3)	To sanction confirmation of auction	1.Without limit, provided the bid amount is not less than 75% of the assessed value. 2.Up to assessed value of 10 Lakh, provided the bid amount is not less than 60% of the assessed value. 3.Up to assessed value of 5 Lakh, provided the bid amount is not less than 50% of the assessed value.	1.Up to assessed value of 5 L, provided the bid amount is not less than 75% of the assessed value. 2.Up to assessed value of 2 L, provided the bid amount is not less than 60% of the assessed value.	Up to assessed value of 2 L, provided the bid amount is not less than 75% of the assessed value								
18	Write off bad Debts and Lossess	Up to 1 L for write off due to theft of Board's property, damages, accidents and natural causes Up to 40,000 for write-off of irrecoverable arrears of revenue from consumers with the recommendation by Circle level committee	Up to 50,000 for write off due to theft of Board's property, damages, accidents and natural causes	Up to 10,000 for write off due to theft of Board's property, damages, accidents and natural causes			75,000 at a time		Losses due to theft, damages & accidents up to 25,000(Sr. FO/DyCAO)			Obtain remarks of DA/FO/FA of the ARU concerned, before writing off the bad debts
19	Refund											
(1)	To sanction refund of	1. Revenue up to 2L 2. EMD*/SD collected for works/ purchase 3. Excess amount collected towards estimated cost of distribution works/deposit work above the limit of DyCE	1. Revenue up to 50,000 2. EMD*/SD collected for works/purchase 3. Excess house rent collected from employees 4. Excess amount collected towards estimated cost of distribution works/ deposit work within competency**	1. EMD**/SD collected for works/ purchase 2. Excess house rent collected from employees 3. Excess amount collected towards estimated cost of distribution works/ deposit work within competency** 4. Registration fee for solar installation based on the recommendation of SNO, SOURA			Unlimited					*EMD received shall promptly be remitted to Board's account **The next higher authority who has powers to sanction the estimate will be competent to sanction the refund
20	Expenses for Meetings, Seminars and Training											
(1)	KSEB's inaugural functions	2 L	1 L	50,000								
(2)	Office contingency for arranging publicity, conducting conferences, seminars, trainings etc.	50,000	25,000	10,000	5,000	2,000	50,000	50,000	10,000 (Sr. FO/ DyCAO)	25,000		
(3)	Taking Photographs	10,000	6,000	3,000	2,000	1,000		10,000	Up to 3,000 at a time			

Sl. No.	Particulars	Chief Engineer	Dy. Chief Engineer	Executive Engineer	Asst: Exe: Engineer	Asst: Engineer	FA	CIA	Sr. AO/Sr. FO/ DyCAO	CPO	RAO	Remark
21	Advances											
(1)	Emergency Medical Advances for Life threatening diseases/ accidents during work	5 L	2 L*	1 L*	25,000*	10,000*						*For accidents during work only
(2)	Advance payment for purchase for Steel from SAIL/ VSP	All cases										
(3)	All statutory payment to Govt./PSUs like Road Restoration, PTCC etc.	All cases										
22	Purchase of Stationary & Printing											
(1)	Stationary	Up to Budget Limit	30,000	20,000	7,500	3,000	Up to Budget Limit	Up to Budget Limit	10,000	20,000	5,000 at a time (annual limit 25,000)	
(2)	Printing	Up to Budget Limit	1 L	20,000	7,500	3,000			10,000	50,000 (annual limit 5 L)		
23	Land Phone/ Internet Connection	To offices under him/her as per approved pattern fixed by the Board										
24	Reimbursement of Medical Charges	All cases of eligible reimbursement (for CE with ARU)	1 L (DyCE HRM-I) 50,000 (DyCE with ARU)	10,000 (EE with ARU)								
25	Purchase of Medicine	Limited to Budget Provision	1 L									
26	To sanction rent for Building and renting out KSEB buildings to 3rd parties	1. Office building up to 50,000 per month 2. Godownsup to 100 sq.m. as per PWD schedule of rates	Office building up to 40,000 per month	Office buildings up to 20,000 per month								
27	Workmen's compensation		To sanction payment of workmen's compensation as fixed by the Commissioner for Workmen's Compensation/Regional Personnel Officer/Personnel Officer/Chief Personnel Officer as per stipulation in the Workmen's Compensation Act, 1923									

Sl. No.	Particulars	Chief Engineer	Dy. Chief Engineer	Executive Engineer	Asst: Exe: Engineer	Asst: Engineer	FA	CIA	Sr. AO/Sr. FO/ DyCAO	CPO	RAO	Remark
28	Purchase of Books and Periodicals for official use	1L (P.A.)	40,000(P.A.)	25,000(P.A.)	5,000(P.A.)	2,000(P.A.)	Up to Budget provision	Up to Budget provision	10,000	10,000 at a time	5,000 at a time (Annual limit 25,000)	
30	Connectivity/ Power Supply/ Solar Connectivity Agreement											
	(1) EHT (Licensees) (2) EHT (Other than Licensees) (3) HT (4) Public Lighting (5) LT	<u>EHT (Licensees)</u> Connectivity/ Solar Connectivity Agreement by CE(Trans) Power Supply Agreement by CE(Comm. & Tariff)	<u>HT</u> To sanction Service Connection and Execute Service Connection/Solar Connectivity Agreement by DyCE(Ele) with the recommendation of EE(Ele)	<u>HT</u> To Recommend	<u>LT</u> To sanction Service Connection and Execute Service Connection/ Solar Connectivity Agreement for all LT consumers above 50 kW and LT consumers fall under Demand Based Tariff	<u>LT</u> To sanction Service Connections and Execute Solar Connectivity Agreement up to 50 kW including agricultural and industrial consumers but excluding consumers who fall under Demand-Based Tariff						
		<u>EHT (Other than Licensees)</u> Connectivity/ Solar Connectivity Agreement by CE(Trans) Power Supply Agreement by CE(Dist)		<u>Public Lighting</u> To sanction Service Connection and Execute Service Connection Agreement by EE(Ele)								
31	Hiring of Vehicles	1.To arrange hire of vehicles and to execute agreement as per relevant BO 2.To sanction rate of hire charges above the limit of DyCE as per relevant BO 3. To sanction excess km above 10% and up to 25% run by vehicle with proper justification	1.To arrange hire of vehicles under the control of the officer and to execute agreement for the same 2.To sanction excess km above 5% and u p to 10% run by vehicle with proper justification	1.To arrange hire of vehicles under the control of the officer and to execute agreement for the same 2.To sanction payment of hire charges to vehicles 3.To sanction excess km up to 5% run by vehicle with proper justification	To sanction hire charges of vehicles not exceeding Rs.10,000 at a time for hiring vehicles in emergency cases	To sanction hire charges of vehicles not exceeding Rs.5,000 at a time for hiring vehicles in emergency cases	Arrange hiring vehicle and sanction hire charges				To sanction hire charges for vehicle, not exceeding Rs. 2,000 at time in emergency cases	
32	Permanent Imprest	50,000	30,000	25,000	20,000	20,000	50,000	50,000	10,000	25,000	15,000	
33	Advertisement Charges	50,000	25,000	10,000								
34	To sanction Demurrage Charges	25,000	10,000	5,000								
35	Valuation of buildings and other structures (applicable to Civil Engineers)	Unlimited	75 L	30 L	10 L	5 L						
36	Miscellaneous											

Sl. No.	Particulars	Chief Engineer	Dy. Chief Engineer	Executive Engineer	Asst: Exe: Engineer	Asst: Engineer	FA	CIA	Sr. AO/Sr. FO/ DyCAO	CPO	RAO	Remark
(1)	To draw and disburse all establishments, TA bills and contingent bills for employees in his/her establishment.	The DyCE or any other authorized officer in CE's office and TA or any other authorized officer in Circle/Division are authorized for the same in respect of all employees in respective offices and subordinate offices										
(2)	To sanction instalment for remittance of current charge arrears		Up to Rs. 5 L due from LT consumers to a maximum of 6 monthly instalments	Up to Rs.3 L due from LT consumers to a maximum of 6 monthly installments	Up to Rs.1 L due from LT consumers to a maximum of 3 monthly installments							Subject to realization of applicable surcharge
(3)	To sanction ex-gratia payment in connection with electrical accident			All cases								
(4)	To execute lease agreement for premises taken on rent			All cases								
(5)	To execute agreement with Cable Operators for rent of poles			All cases								
(6)	To sanction advocate's fees and expenses including allowable advances		As per norms for conduct of cases except in respect of arbitration cases and cases filed before the High Court and Supreme Court and subordinate Courts outside Kerala				Payment of legal fees, consultancy charges to tax consultant, advocates, etc. engaged by him up to 25,000			Sanction advocate fee up to 25,000 at a time		
(7)	To waive Security Deposit in case of purchase of proprietary materials/urgent works/spares from OEM	50,000	30,000									
(8)	To waive LD and penalty clause *	For total amount spent up to 6 L										*for procurement of essential spares from OEM in warranted cases
(9)	To sanction expenditure towards registration *	At prevailing rates for which the land value is approved by the Board										*of land such as registration charges, stamp duty, documentation fee, charges for legal scrutiny etc.

DELEGATION OF POWERS OF MINISTERIAL OFFICERS

[ANNEXURE TO B.O. (DB) NO. 751/2021 ESTT.LI]424212021) DATED, THIRUVANANTHAPURAM 08.10.2021

(A) CORPORATE OFFTCE

1	ADMINSTRATIVE POWERS
1.1	Financial Adviser
1.1.1	To depute employees other than officers working in Finance/Accounts wings for training not exceeding 2 weeks under intimation/report to Chief Engineer (HRM).
1.2	Chief Internal Auditor
1.2.3	To communicate with Government/Accountant General/Legislative Secretariat on matters related to Inspection Reports of AG, Draft Paras, Committee on Public Undertakings/Committee on Public Accounts etc.
1.3	Company Secretary
1.3.2	To exercise administrative and functional control over all the wings and employees of the Corporate Secretarial department.
1.3.6	To order charge arrangements for a period not exceeding 3 months at a stretch to all officers working in Corporate Secretarial department.
1.3.7	To communicate the decision of Board of Directors and Committee of Full Time Directors in the form of Board Orders.
1.4	Chief Personnel Officer
1.4.1	To handle matters relating to personnel management / industrial relations / labour welfare or other matters relating to the functioning of the Personnel Department.
1.4.3	To appear before any authority under the Government/Labour/ Subordinate Courts or conciliation / adjudication i arbitration or any judicial fora on behalf of the Company in matters dealt within the Personnel Department.
1.4.4	To administer KSEB Employees Welfare Fund as per its regulations
1.6	Special Officer (Revenue)
1.6.1	To file claim petition, sign relevant documents and perform all legal proceedings before National company Law Tribunals in matters connected with HT/EHT consumers
1.7	Legal Adviser & Disciplinary Enquiry Officer
1.7.1	To make final approval of statement of facts and written statements where KSEBL is a party.
1.7.5	To supervise Legal Liaison offrce, Eryakulam and Liaison office, Derhi.
1.8	Senior Law Officer
1.8.1	Supervision / conduct of cases before the Lok Ayukfha, High Court and Supreme Court as delegated by LA&DEO.
1.9	Senior Accounts Officer(Audit)
1.9.1	To approve pay fixation related to Junior-Senior Fixation of all employees.
1.10	Senior Accounts Officer, O/o the Chief Engineer (HRM)
1.10.1	To sanction non-refundable advance and temporary advance from GPF as per rules to all employees others than officers working in the ARU of chief Engineer (HRM).
1.10.3	To sanction pension, gratuity and commutation of pension to all classes of pensioners up to Overseer.

1.10.4	To sanction all kinds of leave to all employees other than officers working in the ARU of Chief Engineer (HRM), other than the following: i. Study Leave ii. Special Disability Leave iii. Leave without Allowance for a period more than 4 months at a time
1.12	Chief Public Relations Officer
1.12.1	To handle matters relating to communications with Press, Radio, FM, Social Media, Web Channels, New Media & Local Networks, press releases, press communiques, advertisements and other matters relating to Public Relations or Public Information System
1.13	Resional Personnel Officer
1.13.2	To appear before conciliation / adjudication / arbitration authorities or Workmen's Compensation Courts or other authorities under any labour law on behalf of the Company.
1.15	Law Officer - I
1.15.1	Communication of all CDRF cases, CDRC cases, CGRF, Ombudsman,Appellate Authority, PLA cases to field offices / other offices.
1.15.2	To refer files to the Chief Engineers and other Heads of Departments and offices under the Board for advice. remarks and to make interim references in all cases and to all for additional information from them and their subordinate officers.
1.17	Accounts Officer. GPF. O/o the Chief Internal Auditor
1.17.1	To verifr & approve employee code, GPF account number, maintenance of individual GPF accounts of officers and staff, transfer of PF balance of employees who join KSEBL from other departments/offices and vice versa.
1.21	Accounts Officer, Pension Audit, O/o the Chief Internal Auditor
1.21.1	To conduct post audit and issue audit approval for pension sanction
1.22	Accounts Officer, Arrear Clearance Cell' O/o the Chief Internal Auditor
1.22.1	Review, monitoring and reporting of Arrear details of LT/HT/EHT consumers.
1.22.3	To monitor OTS Scheme approved by KSERC at the corporate office leve!
1.23	Accounts Officer, Pay Fixation, O/o the Chief Internel Auditor
1.23.1	To scrutinize and approve pay fixation of all employees
1.26	Accounts Officer (Pension Authorization), O/o the Chief Engineer (HRM)
1.26.2	To authorize pension, gratuity and commutation of pension to all classess of pensioners
1.27	Accounts Officer (Pension Sanction), O/o the Chief Engineer (IIRM)
1.27.1	Preliminary verification of pension papers and final pension calculation
1.28	Accounts Officer (Bill Section), O/o the Chief Engineer (HRM)
1.28.2	To authorize all establishment, TA claims and loans & advances to the employees working in the ARU of Chief Engineer (HRM) as delegated by the Senior Accounts Officer / Deputy Chief Engineer (HRM-II).
1.29	Administrative officer / Accounts officer, o/o the chief Engineer (HRM)
1.29.1	To function as State Public Information Officer for O/o the Chief Engineer (HRM) as per the Right to Information Act, 2005.
1.29.2	To monitor recruitment, promotion, transfer & posting and disciplinary action up to the cadre of Assistant Executive Engineer / Assistant Accounts Officer

1.30	Assistant Accounts Officer & State Nodal Officer G{PS)
1.30.1	Sanction and authorisation of Terminal Claims (Gratuity) of retired NPS employees. Maintenance ofRee-isters & Service Book for safe custody and record purpose.
1.31	Regional Audit Officer
1.31.1	To monitor all cases of Electrical Section offices, Electrical Sub Division offices in respect of revenue, com-pliance of standard of performance regulations, APTS Bills, monitoring of cases, stores verification, Asset Register verification, System Maintenance Register etc.
1.31.2	To conduct audit ofall the aspects ofrevenue and expenditure account including stores verification of Elec-trical Circle and Electrical Division offices including PMUs and other ARUs in distribution wing.
1.31.6	To propose NLC of Cashiers to the Executive Engineer concerned and issue concurence to ARU heads for issuing NLC to Assistant Engineer and Senior Superintendqgt of Electrical Sections.
3	**FINANCIAL POWERS**
3.1	Financial Adviser
3.1.2	To waive objections and forego recovery of irregular expenditure not exceeding Rs. 50,000/- in each case.
3.1.10	To sanction payment oflegal fees, consultancy charges to tax consultants, advocates etc. engaged by him up to Rs. 25,000/-
3.2	Chief Internal Auditor
3.2.1	To waive objections and forego recovery of irregular expenditure not exceeding Rs. 50,000/- in each case.
3.2.3	To sanction temporary imprest up to Rs. 50,000/- to RAOs for conducting training, Regional Audit meet-ings.
3.4	Chief Personnel Officer
3.4.8	To sanction compensation in respect of Company employees / contract workers , general public / domestic cattle to the extent payable as per the provisions of the Act as decided by the Company from time to time.
3.4.9	To sanction reimbursement of medical expenses to accident victims during the course of emplyment.
3.8	Senior Accounts Officer (Audit)
3.8.1	To sanction write off of bad debts in respect of audit objections up to Rs. 30,000/- at a time.
3.10	Chief Public Relations Officer
3.10.7	To sanction advertisement charges at lowest commercial rates in dailies and periodicals for classified and display advertisements subject to budget provision and pass all the bills for payment and sign the pay order in bills/payment vouche
3.11	Legal Adviser & Disciplinary Enquiry Officer
3.11.2	To settle cases before subordinate courts having monetary value not exceeding Rs. I lakh in adalath
4	**INVITING TENDERS**
4.1	Financial Adviser
4.1.1	To invite tenders and accept tender subject to budget provision.
4.1.2	To sanction waiver of tender calls up to and including Rs. 50,000/- for reasons to be recorded.
4.2	Chief Internal Auditor
4.2.1	To sanction waiver of tender calls up to and including Rs. 50,000/- for reasons to be recorded'
4.2.2	To invite tenders and accept tender up to Rs. 5 lakhs subject to budget provision
4.3	Company Secretary
4.3.1	To invite tenders for Secretariat Audit and other consultancy works relating to Company law matters.

4.4	Secretary (Administration)
4.4.1	To invite tenders and accept tender up to Rs. 5 lakhs subject to budget provision
	(B) FIELD OFFTCES
13	**ADMINISTRATIVE POWERS**
13.1	Finance Officers / Assistant Finance Officers in ARUs
13.1.1	To sanction Earned Leave Surrender to all staff and officers working under the ARU.
13.1.2	To sanction periodical increments, grade promotion to all staff and officers of and below the cadre of Assistant Executive Engineers working under the ARU.
13.2	Assistant Administrative Officers in the O/o the Chief Engineer (Distribution) and Electrical Circles
13.2.3	Sanctioning of pay bills, TA bills and other establishment claims of all staff working in Electrical Circle, except that of Deputy Chief Engineer
13.2.4	Matters relating to Right to Information Act. AAO of Electrical Circle may be designated as Public Information Officer
13.3	Senior Superintendents in Electrical Circles
13.3.1	SS (Revenue) - Coordination for giving reply to LA Interpellations and duties already assigned to them.
13.4	Divisional Accounts Officer in Electrical Divisions
13.4.1	Financial audit of work bills.
13.4.2	Monitoring and compilation of accounts.
13.4.3	Matters relating to cable TV.
13.5	Senior Superintendents in Electrical Divisions
13.5.1	SS (Estt): i. Sanctioning / approval of pay bills and other establishment claims of all staff working in various offices under Electrical Division, except that of Executive Engineer. ii. Assistant Public Information Officer in matters relating to Right to Information Act and duties already assigned to them.
13.5.2	SS (Revenue): i. Coordination for giving reply to LA Interpellations and duties already assigned to them. ii. Monitorins revenue accounts and GeneralBranch work
13.5.3	SS (GB) - Sanctionins of pension claims and duties already assisned to them
13.6	Senior Superintendents in Electrical Sections
13.6.1	To monitor collection accounts. .
13.6.2	Public Information Officer as per Right to Information Act, 2005
13.6.3	Administrative control of Revenue Wing including sanctioning leave in consultation with the Assistant Engineer.

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& Updated Information
of Delegation of Power

Chief Engineer 1) Can sanction land phone and internet connection to offices. 2) Power intensive units-pri approval of KSEBL required
Dy. Chief Engineer 1) Can sanction advocates fees and expenses including allowable advance as per norms for conduct of cases to advocates 2) Sanction payment of workmen's compensation.
Executive Engineer 1) To lease out usufructs. 2) To sanction payment of hire charges of vehicles on emergencies.
3) To Sanction ex-gratia payments including on the spot payments in fatal Electrical Accidents. 4) Sanction payment of workmen's compensation. 5) Execute lease agreement for rented building. 6) To sanction instalments in current charge arrears due from LT Consumers.
Asst. Executive Engineer 1) To Sanction hire charges of vehicles upto Rs. 2000/- in emergency cases.
2) To Sanction 6 instalments of current charge arrears upto 1 Lakh due from LT Consumers.
Permission for visiting aboard for personal / private purpose not exceeding 4 months in respect of EL, HPL, CML &
LWA FTD: Officers of and above Dy.CE & equ. categories. CE's All officers of and below Exe. Eng/AO & equ. categories. Secretary (Admn): All employees of VB, Tvm except officers of and above Dy. CE & equ. categories.

LEAVE TRAVEL CONCESSION - RLULES / GUIDE LINES

Government have introduced LTC (Leave Travel Concession) to state government employees as per reference number GO (P) No. 713 - 2012 - Fin dtd 31.12.2012. Government have issued rules by guideline in respect of the LTC Sanctioned to the state government employees & teachers vide reference number GO (P) No. 5 - 2013 - Fin dtd 02.01.2013.
Main points to remember

1. The rules shall apply to the person appointed to state government service also abide to KSEB Ltd.
2. Family includes employees wife / Husband, their surviving unmarried children - step children - legally adopted children.
3. Fare calculated on shortest route .
4. Employees must complete 15 years of regular continuous service.
5. Admissible to maximum period of 15 days including holidays
6. The period of absence on account of availing LTC shall be regularised by granting earned leave, half pay leave, commuted leave or LWA under rule 88 Part 1 of KSR.
7. Originals of Train tickets / Bus tickets / Should be produced with the claims.
8. Maximum distance (to and from 6500 kms)
9. Place of visit to be declared in advance before his controlling authority.
10. 100% Actual expenses of rail / road / steamer will be reimbursed. But incidental expenses and DA for halt as admissible on tour TA, will not be granted.
11. Advance will be granted up to 90% of estimated fare.
12. Final bill be preferred within 1 Month (Advance), 3 Months (if no advance) of the completion of journey.
13. When both husband & wife are employed in State Government Service, LTC claim should be preferred by any one of them only. The controlling officers are authorised to sanction TC.

CHARGE ALLOWANCE

1. @ 4 % of minimum of Basic Pay maximum period to 3 months for holding full additional duty
2. @ 2 % of minimum of Basic Pay, maximum period for 3 months for discharge of current duties (minimum period for eligibility 14 working days)

RIGHT TO INFORMATION ACT- 2005

Sl No	Office	Asst. Public Inf m. Officer (APIO)	Public Information Officer (PI O)	Appellate Authority (AA)
1	Ele. Section	Sub Engineer in independent centre	Senior Supdt.	Asst. Exe. Engineer
2	Ele. Sub Division	Sub Engineer	Asst. Exe. Engineer	Exe. Engineer
3	Ele. Division	Senior Supdt. (EB)	Exe. Engineer	Deputy Chief Engineer
4	Ele. Circle	Senior Supdt. (EB)	Asst. Admn. Officer	Deputy Chief Engineer
5	Office ofCE	Asst. Engineer/Asst. Exe. Engineer (As designated by CE)	Exe. Engineer	Chief Engineer/Dy. CE
6	For all offices in Corporate offices, Vydyuthi Bhavanam other than those mentioned in Sl. No.5 above	Joint Director (MIS) Assistant State Public Information Officer	Director (MIS) State Public Information Officer	Chief Engineer (Corporate Planning)
7	All other Offices of KSEBL not included in any of the categories above but having an Independence office	The Head offices concerned shall designate himself or any other officers of that office as the PIO, a junior level officer as APIO and the respective higher level officer (controlling officer) shall be designated as appeallate authority, who shall be senior in rank to the designated PIO.		