

MAHARASHTRA JEEVAN PRADHIKARAN

(Government of Maharashtra Undertaking)



SCHEDULE OF RATES FOR YEAR 2023-24

(EFFECTIVE FROM 20/06/2023)

APPLICABLE IN
ALL REGIONS OF MAHARASHTRA

ELECTRICAL AND MECHANICAL WORKS

SD/-
MEMBER SECRETARY
MAHARASHTRA JEEVAN PRADHIKARAN



**MAHARASHTRA JEEVAN PRADHIKARAN
ELECTRICAL & MECHANICAL CSR 2023-24
CONTENTS**

Section No.	Name of Section	Page Nos.	
		From	To
	Notes	(i)	(ii)
1	PM Pumps	1	11
2	SP Solar Pumps	12	12
3	VA Valve Actuators	13	14
4	PW Pipe Work and Vessels	15	18
5	LF Lifting Equipments	19	22
6	SS H.T. Sub-station Equipments	23	23
7	TR Transformer and Voltage Stabilizer	24	34
8	LT L.T.Panel	35	35
9	CP Capacitor	36	37
10	LG LT Switchgear and Protection	38	42
11	HG HT Switchgear and Protection	43	47
12	CB LT Cable	48	53
13	HT HT Cable	54	56
14	MO LT Motors	57	60
15	MO HT Motors	61	63
16	TL Tools	64	66
17	EC Electro Chlorination System & GC Fully Automatic Gas Chlorination System	67	78
18	WM Water Meter	79	113
19	SA SCADA & Automation	114	155
20	LB Removing, Dismantling, Assembling & Re-erection	156	157
21	Cable Selection Chart & HP V/s Current	158	159
22	Recommended Height of Pump House	160	160
23	Capacitor Chart	161	161
24	Transformer Losses Chart	162	163

MAHARASHTRA JEEVAN PRADHIKARAN

MJP ELECT./MECH.CSR 2023-24

NOTES

1. The rates in this CSR are applicable for Electrical and Mechanical Works in Maharashtra Jeevan Pradhikaran.
2. The rates in this schedule are exclusive of GST. Add GST on overall estimate at actual.
3. The rates in the schedule are inclusive of routine tests at manufacturer's works, packing, forwarding, loading, transportation including head load carting upto 0.5 km., unloading, storing and insurance and overhead charges wherever applicable.
4. The rates in this schedule do not include charges payable to M.S.E.D.Co. Ltd for power supply.
5. Following increase on rates in this CSR is admissible on account of the following-

Admissible increase on Rates for	Supply Part	Erection Part
a) Notified hilly and inaccessible area / tribal area as detailed in Civil CSR of MJP for respective regions (except Matheran)	2%	20%
b) For additional lead for head load carting above 0.5km(except Matheran)	2%	10%
c) Matheran and its pumping stations	5%	20%
d) Test and Inspections	As per MJP	Circular
i) Manufacturer's inspecting agency's charges for routine and performance test of pump, motor, transformer and other equipments at manufacturer's works to be witnessed by M.J.P	0.16% OR	minimum Rs.3,000/-
ii) Inspection charges of third party agency approved by MJP for any or all test at manufacturer's work.	0.16% OR	minimum Rs.3,000/-

6. The rates of items not included in this schedule shall be adopted as follows-
 - i) The rates if included in CSR of civil works of MJP.
 - ii) If not included in the Civil CSR of MJP, the rates as per CSR of Electrical wing of Public Works Department of Govt. of Maharashtra.

- iii) If not included in both (i) and (ii) above the rates as per CSR of MIDC (E &M).
- iv) If not included in both (i),(ii) and (iii) above,the same shall be worked out on the basis of budgetary offer / price lists of manufacturers as given below.

	For Equipments manufactured out of Maharashtra	For Equipments manufactured in Maharashtra
1) Budgetary offer/pricelist		
2) Add for Goods and Service Tax (GST)	As rate applicable	As rate applicable
3) Add for packing, forwarding, transit insurance, loading, unloading, transportation, insurance upto completion of work	5%	5%

- 7. Rate of valves shall be as per Civil CSR of MJP and makes of valves shall be as per Elect./Mech. approved list of MJP.
- 8. Erection rate mentioned in this CSR shall not be applicable for leftover works for which separate analysis covering actual expenses shall be prepared.
- 9. Consider rise of 10% rates on individual items for estimate of Maintenance & Repair works only.

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 1 - PM [PUMPS]				
	PM1	Providing, erecting and giving test of submersible pump set conforming to IS 8034 and motor conforming to IS 9283, with water proof winding. Pump shall be suitable for various delivery head and discharge with stainless steel shaft. Motor suitable for working on 415 V \pm 10%, 3 Ph, 50 Hz A.C. Supply, with cable guard, thrust carbon/fiber bearing to withstand entire hydraulic thrust. The pump set shall be suitable for direct coupling, with suitable suction strainer. Pump should have suitable discharge out let as per manufacturer's design. Antithrust stream lined non return valve shall be provided with the pump. 3 m submersible copper conductor cable in single / double run and 2 pairs of suitable size erection clamp 10 mm thick shall be provided with each pump.				
	PM 1-1	Submersible Pump set 100 mm dia (with Polypropylene / Noryl Impeller) up to 20 stages				
	PM 1-1-1	1.5 HP	Each	21275	4330	25605
	PM 1-1-2	2.0 HP	Each	22062	4330	26392
	PM 1-1-3	3.0 HP	Each	24875	4330	29205
	PM 1-1-4	4.0 HP	Each	26083	4330	30413
	PM 1-1-5	5.0 HP	Each	33682	4330	38012
	Note 1	Supply rate should be increased per stage for pump with more than 20 stages		273		273
	PM 1-2	Submersible Pump 150 mm dia (with Bronze / Stainless steel (CF8M) Impeller) up to 8 stages				
	PM 1-2-1	1.5 HP	Each	28538	4330	32868
	PM 1-2-2	2.0 HP	Each	30039	4330	34369

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 1-2-3	3.0 HP	Each	32263	4330	36593
	PM 1-2-4	4.0 HP	Each	33425	4330	37755
	PM 1-2-5	5.0 HP	Each	35145	4330	39475
	PM 1-2-6	6.0 HP	Each	38530	5638	44168
	PM 1-2-7	7.5 HP	Each	40268	5638	45906
	Note 2	Supply rate should be increased per stage for pump with more than 8 stages		820		820
	PM 1-2	Submersible Pump 150 mm dia (with Bronze / Stainless steel(CF8M) Impeller) up to 12 stages				
	PM 1-2-8	8.0 HP	Deleted			
	PM 1-2-9	9.0 HP				
	PM 1-2-10	10.0 HP	Each	49173	6271	55444
	PM 1-2-11	11.0 HP	Deleted			
	PM 1-2-12	12.5 HP	Each	53458	7251	60709
	PM 1-2-13	15.0 HP	Each	56533	7251	63784
	Note 3	Supply rate should be increased per stage for pump with more than 12 stages		759		759
	PM 1-2	Submersible Pump 150 mm dia (with Bronze / Stainless steel(CF8M) Impeller) up to 15 stages				
	PM 1-2-14	17.5 HP	Each	62132	8233	70365
	PM 1-2-15	20.0 HP	Each	72963	8233	81196
	PM 1-2-16	22.5 HP	Each	90058	8233	98291
	Note 4	Supply rate should be increased per stage for pump with more than 15 stages for Borewell only.		820		820
		For other use 200 mm dia pump shall be preferred over 150 mm dia with more than 15 stage pump.				
		For 150 mm dia energy efficient pumps add as below				
		a. upto 8 stages 3% of supply rates				
		b. upto 12 stages 4% of supply rates				
		c. upto 15 stages 5% of supply rates				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 1-3	Submersible Pump 200 mm dia (with Bronze / Stainless steel (CF8M) Impeller) up to 5 stages of category A & B				
	PM 1-3-1	7.5 HP	Each	39480	5638	45118
	PM 1-3-2	10.0 HP	Each	46008	6271	52279
	PM 1-3-3	12.5 HP	Each	50301	7251	57552
	Note 5	Supply rate should be increased per stage for pump with more than 5 stages		2596		2596
	PM 1-3	Submersible Pump 200 mm dia (with Bronze /Stainless steel (CF8M) Impeller) up to 8 stages of category A & B				
	PM 1-3-4	15.0 HP	Each	69446	8233	77679
	PM 1-3-5	17.5 HP	Each	73583	8233	81816
	PM 1-3-6	20.0 HP	Each	81379	8233	89612
	PM 1-3-7	22.5 HP	Each	91401	8233	99634
	PM 1-3-8	25.0 HP	Each	91477	8233	99710
	PM 1-3-9	27.5 HP	Each	106551	8233	114784
	Note 6	Supply rate should be increased per stage for pump with more than 8 stages		2596		2596
	PM 1-4	Submersible Pump 250 mm dia (with Bronze / Stainless steel(CF8M) Impeller) up to 8 stages of category A & B				
	PM 1-4-1	15.0 HP	Each	71826	8233	80059
	PM 1-4-3	22.5 HP	Each	98264	8233	106497
	PM 1-4-4	25.0 HP	Each	102821	8233	111054
	PM 1-4-5	30.0 HP	Each	104695	8238	112933
	PM 1-5	Submersible monoblock Pump set (with Bronze / Stainless steel(CF8M) Impeller) Horizontal / Vertical - up to 3 stages				
		(Motor with water lubricated bearing to accept entire hydraulic thrust)				
	PM 1-5-1	3.0 HP	Each	18470	4330	22800
	PM 1-5-2	5.0 HP	Each	20538	4983	25521
	PM 1-5-3	7.5 HP	Each	37458	5638	43096
	PM 1-5-4	10 HP	Each	44918	5638	50556
	PM 1-5-5	12.5 HP	Each	45699	5638	51337
	PM 1-5-6	15.0 HP	Each	59003	5638	64641

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 1-5-7	17.5 HP	Each	61434	5638	67072
	PM 1-5-8	20.0 HP	Each	63867	5638	69505
	Note 7	Erection rates for submersible pump set are considering drop pipe length up to 15 m. The erection rates shall be increased for additional length of drop pipe by 50% of the rate of erection of respective dia of GI pipe for more than 15 m drop pipe. Refer Civil CSR for the rates of erection of GI pipes.				
	Note 8	For turbid water use of submersible pump shall be avoided, however for emergency situation mechanical seal of TCTC construction shall be provided with the motor and adequate screen to prevent floating material shall also be provided in addition to supply rate.		9075		9075
	PM 2	Centrifugal Monoblock Pump set				
		Providing, erecting and giving test of Centrifugal Monoblock pump set conforming to IS 9079 operating at 2900 RPM with CI impeller, priming funnel, cock, suitable flanges at suction and delivery side. Pump shall have common shaft for pump and motor. Motor shall be suitable for working on 415 V \pm 10%, 3 Ph, 50 Hz A.C. Supply. Motor shall be TEFC type. Pump set shall be suitable for working at various discharge and head requirements. Pump shall be erected on Provided C.C. foundation block with suitable foundation bolts grouted in C.C. foundation block.				
	PM 2-1	Centrifugal Monoblock Pump set (Single Stage)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 2-1-1	2.0 HP	Each	16341	3044	19385
	PM 2-1-2	3.0 HP	Each	19808	3044	22852
	PM 2-1-3	5.0 HP	Each	24214	4002	28216
	PM 2-1-4	7.5 HP	Each	29500	4002	33502
	PM 2-1-5	10.0 HP	Each	39077	4002	43079
	PM 2-1-6	12.5 HP	Each	47626	4983	52609
	PM 2-1-7	15.0 HP	Each	51978	4983	56961
	PM 2-1-8	20.0 HP	Each	74937	4983	79920
	PM 2-1-9	25.0 HP	Each	98571	4983	103554
	PM 2-1-10	30.0 HP	Each	122044	4983	127027
	PM 2 -2	Centrifugal Monoblock Pump set (Two Stage)				
	PM 2-2-1	5.0 HP	Each	27440	4002	31442
	PM 2-2-2	7.5 HP	Each	33334	4002	37336
	PM 2-2-3	10.0 HP	Each	44190	4002	48192
	PM 2-2-4	12.5 HP	Each	54551	4983	59534
	PM 2-2-5	15.0 HP	Each	64890	4983	69873
	PM 2-2-6	20.0 HP	Each	72347	4983	77330
	PM 3	Centrifugal Coupled Pump set				
		C.S.R. for centrifugal coupled set is not prepared due to wide variation in rates per horse power as per duty conditions and type of material. The rates required shall be worked out on basis of quotations, offers from manufacturers, distributors, dealers in individual case.				
	PM 4	Centrifugal Coupled Pump set -- Erection charges				
		Erecting and giving test of centrifugal coupled pump set with foot mounted motor excluding base plate coupling and foundation bolts, etc. on provided concrete foundation / RSJ with accurate levelling with shims and proper alignment.				
	PM 4-1	15 to 30 HP	Each		5763	5763

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 4-2	31 to 50 HP	Each		6896	6896
	PM 4-3	51 to 100 HP	Each		8218	8218
	PM 4-4	101 to 150 HP	Each		9847	9847
	PM 4-5	151 to 200 HP	Each		11477	11477
	PM 4-6	201 to 250 HP	Each		13128	13128
	PM 4-7	251 to 300 HP	Each		15747	15747
	PM 4-8	More than 300 HP	HP		73	73
	PM 5	Vacuum Pump set (Monoblock)				
		Providing, erecting Kirloskar make or other approved make Mono block Vacuum pump set with base plate excluding C.C. foundation / cross channels / RSJ frame and foundation bolts etc complete.				
	PM 5-1	1 HP, single Ph (Type kV 20)	Each	25382	3044	28426
	PM 5-2	3 HP, three Ph (Type kV 30)	Each	47593	3044	50637
	PM 6	Vacuum Pump set (Coupled)				
		Providing, erecting Coupled Vacuum pump set with horizontal foot mounted TEFC squirrel cage motor working on three phase 50 Hz, 415 Volts +/- 10% with base plate including cost of flexible couplings, coupling guard etc complete.				
	PM 6-1	5 HP (Type DV 40)	Each	97499	4400	101899
	PM 6-2	10 HP (Type DV 50)	Each	120898	4400	125298
	Note 9	Cost of starters, cable, switches, suitable GI Pipe with coupling and specials, valves etc shall be added as per CSR.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 7	V.T. Pumps, Water / Oil lubricated				
		C.S.R. for Vertical Turbine Pump set is not prepared due to wide variation in rates per horse power as per duty conditions, number of stages, column pipe size and length required and type of material. The rates required shall be worked out on basis of quotations, offers from manufacturer, distributors, dealers in individual case.				
	PM 8	V.T. Pump erection charges (For column length up to 6 m)				
		Erecting, commissioning and giving test of Vertical Turbine Pump (Water Lubricated) including bowl assembly and discharge head etc on provided channel / RSJ / RCC beam including erecting on provided sole plate with blue matching.				
	PM 8-1	Up to 30 HP	Each		7088	7088
	PM 8-2	31 HP to 100 HP	Each		10570	10570
	PM 8-3	101 HP to 200 HP	Each		14617	14617
	PM 8-4	201 HP to 300 HP	Each		19505	19505
	PM 8-5	above 300 HP	HP		72	72
	Note 10	For column length more than 6m additional rate per column joint				
		100 mm dia column pipe	Joint		214	214
		150 mm dia column pipe	Joint		402	402

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		200 mm dia column pipe	Joint		447	447
		300 mm dia column pipe	Joint		611	611
		350 mm dia column pipe	Joint		798	798
		400 mm dia column pipe	Joint		985	985
		450 mm dia column pipe	Joint		1219	1219
		500 mm dia column pipe	Joint		1313	1313
		600 mm dia column pipe and above	Joint		1571	1571
	Note 11	Add 5 % for erection of oil lubricated pumps				
	Note 12	Generally self water lubricated VT pumps shall be preferred. In exceptional cases, oil lubricated VT pumps shall be selected with prior approval from Superintending Engineer (Mech).				
	Note 13	Above rates shall not be applicable where supply part is over and erection part is left. In such cases erection and testing charges shall be worked out separately.				
	PM 9	Sewage Pump				
		Sewage Pumps -Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
		Head upto 10 Mtrs				
	PM 9-1-1	1 HP (Up to 9000 LPH)	Each	78898	5708	84606
	PM 9-1-2	2 HP (Up to 12000 LPH)	Each	79469	5708	85177
	PM 9-1-3	3 HP (Up to 18000 LPH)	Each	106440	5708	112148
	PM 9-1-4	5 HP (Up to 35000 LPH)	Each	123368	5708	129076
	PM 9-1-5	7.5 HP (Up to 72000 LPH)	Each	129106	5708	134814
	PM 9-1-6	10 HP (Up to 90000 LPH)	Each	183617	5708	189325
	PM 9-1-7	15 HP (Up to 132000 LPH)	Each	222349	5708	228057
	PM 9-1-8	20 HP (Up to 192000 LPH)	Each	315592	5708	321300
	PM 9-1-9	25 HP (Up to 228000 LPH)	Each	380145	5708	385853
	PM 9-1-10	30 HP (Up to 240000 LPH)	Each	456175	5708	461883
	PM 9-1-11	35 HP (Up to 276000 LPH)	Each	480249	7485	487734
	PM 9-2	Head upto 20 Mtrs				
	PM 9-2-1	7.5 HP (Up to 36000 LPH)	Each	123727	5708	129435
	PM 9-2-2	10 HP (Up to 48000 LPH)	Each	164969	5708	170677
	PM 9-2-3	15 HP (Up to 60000 LPH)	Each	222349	5708	228057

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 9-2-4	20 HP (Up to 90000 LPH)	Each	315592	5708	321300
	PM 9-2-5	25 HP (Up to 120000 LPH)	Each	380145	5708	385853
	PM 9-2-6	30 HP (Up to 168000 LPH)	Each	436430	5708	442138
	PM 9-2-7	35 HP (Up to 216000 LPH)	Each	499045	7485	506530
	PM 9-3	Head upto 30 Mtrs				
	PM 9-3-1	10 HP (Up to 18000 LPH)	Each	167837	5708	173545
	PM 9-3-2	15 HP (Up to 27000 LPH)	Each	235715	5708	241423
	PM 9-3-3	20 HP (Up to 36000 LPH)	Each	270605	5708	276313
	PM 9-3-4	25 HP (Up to 54000 LPH)	Each	380145	5708	385853
	PM 9-3-5	30 HP (Up to 78000 LPH)	Each	436430	7485	443915
	PM 9-3-6	35 HP (Up to 120000 LPH)	Each	476089	7485	483574
	PM 10	Sewage Pump, Erection charges				
		Erection and giving test and trial for directly coupled sewage pump set on provided foundation.				
	PM 10-1	Up to 30 HP	Each		5708	5708
	PM 10-2	31 HP to 100 HP	Each		7485	7485
	PM 10-3	101 HP to 200 HP	Each		10570	10570
	PM 10-4	201 HP to 300 HP	Each		14290	14290
	PM 10-5	Above 300 HP	HP		72	72
	Note 14	Add 25 % to above rates in case of submersible sewage pump set including guide rail etc or extended shaft of sewage pump.				
	Note 15	Erection of pumpset (Above 100 HP) must be done in presence & guidance of manufacturers representative.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 11	Pressure gauges				
		Providing, erecting Pressure gauge of required range complete with syphon tube, isolating cock suitable for 12 mm dia G.I. Pipe. Pressure gauge shall be installed as directed, with tapping on rising main.				
	PM 11-1	Pressure gauge (100 mm dia)	Each	818	84	902
	PM 11-2	Pressure gauge (150 mm dia)	Each	940	84	1024
		Glycerine Filled Pressure gauge Bourdon's type as IS 3624:1987		0		
		Mounting - direct bottom, stainless steel body, toughened glass window		0		
	PM 11-3	Pressure gauge 100 mm dia (black & red marking)	Each	1303	84	1387
	PM 11-4	Pressure gauge 150 mm dia	Each	1926	84	2010
	PM 12	Vacuum / Combination gauge				
		Providing, erecting Vacuum Gauge / Combination gauge of required range complete with syphon tube, isolating cock suitable for 12 mm dia G.I. Pipe. Vacuum / Combination gauge shall be installed as directed, with tapping on main lines.				
	PM 12-1	Vacuum / Combination gauge - 100 mm dia	Each	951	84	1035
	PM 12-2	Vacuum / Combination gauge - 150 mm dia	Each	1075	84	1159
	PM 13	Foot Valve				
		Providing, erecting C.I. foot valve having single leather flap and gunmetal seating. Valve shall be fixed on suction side of pump as per requirement including jointing material and hardware.				
		Screwed Type				
	PM 13-1	50 mm	Each	474	156	630

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 13-2	65 mm	Each	630	156	786
	PM 13-3	80 mm	Each	807	156	963
	PM 13-4	100 mm	Each	1241	298	1539
	PM 13-5	125 mm	Each	1911	298	2209
	PM 13-6	150 mm	Each	2778	298	3076
		Flanged Type				
	PM 13-7	50 mm	Each	1279	562	1841
	PM 13-8	65 mm	Each	1506	562	2068
	PM 13-9	80 mm	Each	1713	562	2275
	PM 13-10	100 mm	Each	2351	730	3081
	PM 13-11	125 mm	Each	3929	730	4659
	PM 13-12	150 mm	Each	5733	730	6463

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 2 - SP				
		[SOLAR PUMPS]				
	SP	Designing, Supplying, Installing, Testing and commissioning of SPV water pumping system with required accessories as per following: 1.Solar panel with stand 2.Controller 3.Protection 4.Battery based back up 5.Sufficient size & Length of cable and with comprehensive contract for 5 years.				
	1	Solar pumps - SPV DC type				
	1.1	1 HP (900 Wp) Surface pump				
	1.2	2 HP (1500 Wp) Surface pump				
	1.3	3 HP (3000 Wp) Surface pump				
	1.4	1 HP (675 Wp) Sub. pump				
	1.5	2 HP (1800 Wp) Sub. pump				
	1.6	2.3 HP (2400 Wp) Sub. pump				
	1.7	3 HP (3000 Wp) Sub. pump				
	1.8	4 HP (4200 Wp) Sub. pump				
	1.9	4.8 HP (5600 Wp) Sub. pump				
	2	Solar pumps - SPV AC type				
	2.1	1 HP (900 Wp) Surface pump				
	2.2	1 HP (900 Wp) Sub. pump				
	2.3	1.5 HP (1500 Wp) Sub. pump				
	2.4	2 HP (1800 Wp) Sub. pump				
	2.5	2.5 HP (2400 Wp) Sub. pump				
	2.6	3 HP (3000 Wp) Sub. pump				
	2.7	4 HP (4200 Wp) Sub. pump				
	2.8	5 HP (5600 Wp) Sub. pump				

As per PWD CSR

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 3- VA				
		[VALVE ACTUATOR]				
	VA	Providing, erecting Electric Valve Actuator for non rising spindle type sluice valve of PN 1 & PN 1.6 rating, totally enclosed, weather-proof and dust proof construction with IP-67, protection class suitable for installation in any position without lubrication, leakage or other operational difficulty with special grease filled gear box and hand wheel for emergency manual operation which will automatically dis-engage on restoration of power to motor and with 10 watt single phase space heater and continuous local mechanical position indicator and individually replaceable counter gear assembly and with two torque and four limit switches with S.S. flap and				
		operated with gear driven cams and of rating 250 Volt, 5 Amp, AC/DC, torque switch dial and with TEFC squirrel cage induction motor working on 440 Volts +/- 10%, 3 phase, 50 Hz AC of intermittent duty rating S-2, insulation class "F" and temp rise restricted to class "B" with IP - 67 protection class suitable for DOL starting and with three thermostat and 30% over load margin. The torque rating of reduction gear box shall be atleast 1.5 times max. torque required for opening and closing of valve with integral starter for ON & OFF operation.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	VA -1	Electric Valve Actuator for non rising spindle type sluice valve, PN 1 & PN 1.6 rating For Valve Size				
	VA 1-1	50 mm dia	Each	78955	3872	82827
	VA 1-2	65 mm dia	Each	78955	3872	82827
	VA 1-3	80 mm dia	Each	80067	3872	83939
	VA 1-4	100 mm dia	Each	83959	3872	87831
	VA 1-5	125 mm dia	Each	87584	3872	91456
	VA 1-6	150 mm dia	Each	89519	3872	93391
	VA 1-7	200 mm dia	Each	93188	3872	97060
	VA 1-8	250 mm dia	Each	99305	3872	103177
	VA 1-9	300 mm dia	Each	106147	3872	110019
	VA 1-10	350 mm dia	Each	109035	3872	112907
	VA 1-11	400 mm dia	Each	111924	3872	115796
	VA 1-12	450 mm dia	Each	116784	3872	120656
	VA 1-13	500 mm dia	Each	127401	3872	131273
	VA 1-14	600 mm dia	Each	143325	3872	147197
	VA 1-15	700 mm dia	Each	149314	3872	153186
	VA 1-16	750 mm dia	Each	152203	3872	156075
	VA 1-17	800 mm dia	Each	156157	3872	160029
	VA 1-18	900 mm dia	Each	169679	3872	173551
	VA 1-19	1000 mm dia	Each	179556	3872	183428

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 4 - PW				
		[PIPE WORK AND VESSELS]				
	PW 1	G.I. Bend "B" Class				
		Supplying and erecting "B" class G.I. Bend in position with necessary material				
	PW 1-1	15 mm dia	Each	61	29	90
	PW 1-2	25 mm dia	Each	90	29	119
	PW 1-3	40 mm dia	Each	117	29	146
	PW 1-4	50 mm dia	Each	180	42	222
	PW 1-5	65 mm dia	Each	262	42	304
	PW 1-6	75 mm dia	Each	423	42	465
	PW 1-7	100 mm dia	Each	845	64	909
	PW 2	G.I. Tee "B" Class				
		Supplying and erecting "B" class G.I. Tee in position with necessary material				
	PW 2-1	15 mm dia	Each	38	29	67
	PW 2-2	25 mm dia	Each	80	29	109
	PW 2-3	40 mm dia	Each	161	29	190
	PW 2-4	50 mm dia	Each	254	42	296
	PW 2-5	65 mm dia	Each	473	42	515
	PW 2-6	75 mm dia	Each	676	42	718
	PW 2-7	100 mm dia	Each	1107	64	1171
	PW 2-8	150 mm dia	Each	1205	64	1269
	PW 3	G.I. Coupling / Nipple "B" Class				
		Supplying and erecting "B" class G.I. Coupling / Nipple in position with necessary material				
	PW 3-1	15 mm dia	Each	23	8	31
	PW 3-2	25 mm dia	Each	46	8	54
	PW 3-3	40 mm dia	Each	84	21	105
	PW 3-4	50 mm dia	Each	143	21	164
	PW 3-5	65 mm dia	Each	233	21	254
	PW 3-6	75 mm dia	Each	348	21	369
	PW 3-7	100 mm dia	Each	565	29	594
	PW 3-8	150 mm dia	Each	692	29	721

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PW 4	G.I. Union (Heavy Duty)				
		Supplying and erecting Heavy Duty G.I. Union in position with necessary material				
	PW4-1	15 mm dia	Each	64	8	72
	PW 4-2	25 mm dia	Each	117	8	125
	PW 4-3	40 mm dia	Each	226	21	247
	PW 4-4	50 mm dia	Each	348	21	369
	PW 5	G.I. Elbow (Heavy Duty)				
		Supplying and erecting Heavy Duty G.I. Elbow in position with necessary material				
	PW 5-1	15 mm dia	Each	20	15	35
	PW 5-2	25 mm dia	Each	61	21	82
	PW 5-3	40 mm dia	Each	130	21	151
	PW 5-4	50 mm dia	Each	201	21	222
	PW 6	Dismantling Joints				
		Providing, erecting and commissioning M.S. Dismantling joint as per requirement and Department's approved drawing and specifications, including machining and rubber rings and suitable for 16 kg/cm ² working pressure with required flanges of suitable size with nut bolts etc complete. The joint should have through long bolts so that during normal working pressure there should be no sliding movement of sliding flanges. L.O.F. (length over flange) should not be less than 75% of dia.				
	PW 6-1	100 mm dia Joint	Joint	7423	932	8355
	PW 6-2	150 mm dia Joint	Joint	11471	932	12403
	PW 6-3	200 mm dia Joint	Joint	11639	932	12571
	PW 6-4	250 mm dia Joint	Joint	16139	1194	17333
	PW 6-5	300 mm dia Joint	Joint	19554	1253	20807
	PW 6-6	350 mm dia Joint	Joint	26692	1642	28334
	PW 6-7	400 mm dia Joint	Joint	35694	2043	37737
	PW 6-8	450 mm dia Joint	Joint	43252	2523	45775

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PW 6-9	500 mm dia Joint	Joint	52455	2756	55211
	PW 6-10	600 mm dia Joint	Joint	64558	3280	67838
	PW 6-11	700 mm dia Joint	Joint	84733	3556	88289
	PW 6-12	750 mm dia Joint	Joint	100252	3899	104151
	PW 7	Surge/ Air Vessels				
		Providing, fabricating, erecting, testing and commissioning as per IS 2825 (code for unfired pressure vessels) Surge vessel / Air Vessel fabricated in boiler quality plate conforming to grade I of IS 2002 with radiography testing on provided foundation including epoxy painting.				
	PW 7-1	Boiler quality Plate	Kg	343		343
	PW 8	Pressure Vessels				
		Providing, fabricating, erecting, testing and commissioning pressure vessel fabricated in M.S. plate on provided foundation including epoxy paint.				
	PW 8-1	M.S. Plate	Kg	236		236
	PW 9	Sole Plate				
		Providing, fabricating, erecting, Sole Plate of required size and thickness with both side machined to match the surface area not less than 60%.				
	PW 9-1	Sole Plate	Kg	154		154

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PW 10	M.S. Flanges				
		Providing, fabricating, erecting, M.S. Flanges sleep on type (all tables) of required size and thickness with both side machined.				
	PW 10-1	Up to 300 NB	Kg	171		171
	PW 10-2	Above 300 NB	Kg	160		160

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 5 - LF				
		[LIFTING EQUIPMENT]				
	LF 1	Chain Pulley Block				
		Providing, erecting triple spur gear type Chain Pulley Block suitable for capacity as below with 6 m lift complete with load chain and hand chain suitable for above lift, tested to 50% over load as per IS 3832 carrying ISI mark.				
	LF 1-1	1 Tonne Capacity	Each	16594	251	16845
	LF 1-2	2 Tonne Capacity	Each	23302	312	23614
	LF 1-3	3 Tonne Capacity	Each	32756	467	33223
	LF 1-4	5 Tonne Capacity	Each	42943	668	43611
	LF 2	Travelling Trolley				
		Providing, erecting Travelling Trolley of capacity as below with 6 m lift, tested to 50% over load				
	LF 2 -1	1 Tonne Capacity	Each	13037	190	13227
	LF 2 -2	2 Tonne Capacity	Each	16344	251	16595
	LF 2 -3	3 Tonne Capacity	Each	21982	312	22294
	LF 2 -4	5 Tonne Capacity	Each	31231	423	31654
	Note 1	Add for Additional 1 m load chain for Chain pulley block as under				
		For 1 Tonne	Mtr	719		719
		For 2 Tonne	Mtr	1377		1377
		For 3 Tonne	Mtr	1427		1427
		For 5 Tonne	Mtr	1720		1720
	Note 2	Add for Additional handling chain for Chain pulley block & Travelling Trolley				
		For 1 Tonne	Mtr	415		415
		For 2 Tonne	Mtr	415		415
		For 3 Tonne	Mtr	691		691
		For 5 Tonne	Mtr	691		691
	LF 3	Hand Operated Circular or Rectangular Travelling Crane (Single Girder)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Providing , erecting and commissioning Single Girder Hand Operated Circular / Rectangular Travelling Crane with 6 m lift complete with chain pulley block ISI marked and travelling trolley both tested for 50 % overload including arrangement for longitudinal travel / circular travel and cross travel with wheel, hand chain, etc complete.				
	LF 3-1	3 Tonne Capacity				
	LF 3 -1-1	Up to 5 m span	Each	231287	20530	251817
	LF 3 -1-2	Above 5 m upto 6 m span	Each	250154	21371	271525
	LF 3 -1-3	Above 6 m upto 8 m span	Each	292557	23318	315875
	LF 3 -1-4	Above 8 m upto 10 m span	Each	342433	23928	366361
	LF 3-2	5 Tonne Capacity				
	LF 3 -2-1	Up to 5 m span	Each	296678	20530	317208
	LF 3 -2-2	Above 5 m upto 6 m span	Each	318365	21371	339736
	LF 3 -2-3	Above 6 m upto 8 m span	Each	367583	23318	390901
	LF 3 -2-4	Above 8 m upto 10 m span	Each	445119	25516	470635
	Note 4	The rates are exclusive of corbel / rail / square bar and track girders for supporting rails.				
	LF 4	Electric Operated Circular or Rectangular Travelling Crane (Single Girder)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Providing, erecting and commissioning single girder Electrically Operated Rectangular Over head Travelling Crane with 6 m lift complete with wire rope hoist, class II duty, all three motions electrically operated by suitable rating motor IP 54, control panel and down pendant control block.				
	A	3 Tonne Capacity				
		Upto 6 mt span	Each	720720	16975	737695
	i	Above 6 m upto 8 m span	Each	765765	22334	788099
	II	Above 8 m upto 10 m span	Each	825825	27631	853456
	LF 4-1	5 Tonne Capacity				
	LF 4-1-1	Upto 6 mt span	Each	981732	16975	998707
	LF 4-1-2	Above 6 m upto 8 m span	Each	1053443	23747	1077190
	LF 4-1-3	Above 8 m upto 10 m span	Each	1120677	29379	1150056
	LF 4-2	7.5 Tonne Capacity				
	LF 4-2-1	Upto 6 mt span	Each	1197781	24722	1222503
	LF 4-2-2	Above 6 m upto 8 m span	Each	1280365	29379	1309744
	LF 4-2-3	Above 8 m upto 10 m span	Each	1362967	32472	1395439
	LF 4-3	10 Tonne Capacity				
	LF 4-3-1	Upto 6 mt span	Each	1319395	27630	1347025
	LF 4-3-2	Above 6 m upto 8 m span	Each	1409309	32472	1441781
	LF 4-3-3	Above 8m upto 10 m span	Each	1499266	35566	1534832
	Note 5	For D.S.L. (Down Shop Lead) system for above crane Add per m length of longitudinal travel.			2652	2652

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	LF 5	Square Bar / Rail				
		Providing, erecting and fixing square bar of EN 8 as rail for over head crane on provided track, girder / continuous corbel beam, including supporting plate and "J" bolts.				
	LF 5 -1	50 X 50 mm (EN 8)	Mtr	2421	32	2453
	LF 5 -2	40 X 40 mm (EN 8)	Mtr	1543	32	1575

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 6 - SS				
		[H.T. SUB STATION EQUIPMENTS]		As per PWD CSR		

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 7 - TR				
		[TRANSFORMER AND VOLTAGE STABILIZER]				
	TR-1	Power Transformer (With Off Load Tap Changer)				
		Providing, erecting and commissioning out door type copper wound transformer as per IS 1180 (Part I) : 2014 Level I (as per amendment no.(4) to IS 1180 (Part I) : 2014) continuously rated for 3 Ph, 50 Hz, at full load and temp. rise not exceeding 45° C by thermometer in oil and 50°C by the resistance in winding after continuous run resistance in winding after continuous run at full load rating, the transformer should have oil immersed winding having vector group DY 11, HT side connected in Delta and LT side connected in Star with neutral brought out connected to provided				
		separate earthing. The transformer shall have power terminal arrangement, bushings / cable end box on HT side and cable end box on LT side. 2 Nos. channels with stoppers shall be provided and fixed on the provided plinth for mounting the transformer. The transformer should have following standard fittings. Transformer shall				
		be of latest manufacturing standards as per amended IS specifications and the Load & No Load losses shall be as per IS.(as per amendment no.(4) to IS 1180 (Part I) : 2014) 1) Oil conservator with filling hole with cap and plain oil level gauge.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		2) Silica gel dehydrating breather charged with Silica Gel.				
		3) Oil drain valve.				
		4) Oil filter valve.				
		5) Lifting eyes / hooks.				
		6) Two earthing terminals.				
		7) Diagram and rating plate				
		8) Air Vent.				
		9) Explosion Vent.				
		10) 100 mm dia thermometer with thermometer pocket				
		11) Four bi directional plain roller.				
		Power Transformer 11000 / 433 Volt				
		With off load Tap Changer - 12.5% to +2.5% in steps of 2.5%				
	TR 1-1	63 kVA	Each	As per PWD Electrical CSR		
	TR 1-2	100 kVA	Each			
	TR 1-3	160 kVA	Each			
	TR 1-4	200 kVA	Each			
	TR 1-5	250 kVA	Each			
	TR 1-6	315 kVA	Each			
	TR 1-7	500 kVA	Each			
	TR 1-8	630 kVA	Each			
	TR 1-9	800 kVA	Each			
	TR 2	Power Transformer 22000 / 433 Volt and other specification as per TR-1				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		With off load Tap Changer - 12.5% to +2.5% in steps of 2.5%				
	TR 2-1	63 kVA				
	TR 2-2	100 kVA				
	TR 2-3	160 kVA				
	TR 2-4	200 kVA				
	TR 2-5	250 kVA				
	TR 2-6	315 kVA				
	TR 2-7	500 kVA				
	TR 2-8	630 kVA				
	TR 2-9	800 kVA	Each	1903230	23195	1926425
	TR 3	Power Transformer 33000 / 433 Volt and other Specification as per TR-1				
		With off load Tap Changer - 12.5% to +2.5% in steps of 2.5%				
	TR 3-1	63 kVA	Each	412594	13922	426516
	TR 3-2	100 kVA	Each	495112	13922	509034
	TR 3-3	160 kVA	Each	637646	13922	651568
	TR 3-4	200 kVA	Each	900205	13922	914127
	TR 3-5	250 kVA	Each	1050239	13922	1064161
	TR 3-6	315 kVA	Each	1260286	13922	1274208
	TR 3-7	400 kVA	Each	1350306	13922	1364228
	TR 3-8	500 kVA	Each	1425323	23195	1448518
	TR 3-9	630 kVA	Each	1875426	23195	1898621
	TR 3-10	800 kVA	Each	2062968	23195	2086163

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TR-4	Power Transformer (With On Load Tap Changer)				
		Providing, erecting and commissioning out door type copper wound transformer as per per IS 1180 (Part I) : 2014 Level I (as per amendment no.(4) to IS 1180 (Part I) : 2014) continuously rated for 3 Ph, 50 Hz, at full load and temp. rise not exceeding 45° C by thermometer in oil and 50°C by the resistance in winding after continuous run resistance in winding after continuous run at full load rating, the transformer should have oil immersed winding having vector group DY 11, HT side connected in Delta and LT side connected in Star with neutral brought out connected to provided separate earthing.				
		The transformer shall have power terminal arrangement, bushings / cable end box on HT side and cable end box on LT side. 2 Nos. channels with stoppers shall be provided and fixed on the provided plinth for mounting the transformer.				
		The transformer should have following standard fittings. Transformer shall be of latest manufacturing standards as per amended IS specifications and the Load & No Load losses shall be as per IS.(as per amendment no.(4) to IS 1180 (Part I) : 2014)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		1) Oil conservator with filling hole with cap and plain oil level gauge. 2) Silica gel dehydrating breather charged with Silica Gel. 3) Oil drain valve. 4) Oil filter valve. 5) Lifting eyes / hooks. 6) Two earthing terminals. 7) Diagram and rating plate. 8) Air Vent. 9) Explosion Vent. 10) 100 mm dia thermometer with thermometer pocket 11) Four bi directional plain roller. 12) Bucholtz relay. 13) Resistance Temp. detector. 14) Marshalling box. 15) Automatic Voltage Regulator (AVR). 16) Remote Tap Changing Controller (RTCC).				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Transformer 11000 / 433 Volt				
		With On Load Tap Changer - 15% to +5% in steps of 1.25% with RTCC, AVR and marshalling box, and other specification as per TR-1				
	TR 4-1	800 kVA	Each	2366659	23195	2389854
	TR 4-2	1000 kVA	Each	2481176	23195	2504371
	TR 4-3	1250 kVA	Each	2748377	23195	2771572
	TR 4-4	1600 kVA	Each	3420205	23195	3443400
	TR 4-5	2000 kVA	Each	3702676	23195	3725871
	TR 5	Transformer 22000 / 433 Volt				
		With On Load Tap Changer - 15% to +5% in steps of 1.25% with RTCC, AVR and marshalling box, and other specification as per TR-4				
	TR 5-1	800 kVA	Each	2331956	23195	2355151
	TR 5-2	1000 kVA	Each	2477704	23195	2500899
	TR 5-3	1250 kVA	Each	2696325	23195	2719520
	TR 5-4	1600 kVA	Each	3352188	23195	3375383
	TR 5-5	2000 kVA	Each	3643683	23195	3666878
	TR 6	Transformer 33000 / 433 Volt				
		With On Load Tap Changer - 15% to +5% in steps of 1.25% with RTCC, AVR and marshalling box, and other specifications as per TR-4				
	TR 6-1	800 kVA	Each	2481176	23195	2504371
	TR 6-2	1000 kVA	Each	2633863	23195	2657058
	TR 6-3	1250 kVA	Each	2862894	23195	2886089

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TR 6-4	1600 kVA	Each	3572892	23195	3596087
	TR 6-5	2000 kVA	Each	3893535	23195	3916730
		H.T. TRANSFORMER				
	TR 7	Transformer 11000 / 3300 Volt				
		With On Load Tap Changer - 15% to +5% in steps of 1.25% with RTCC, AVR and marshalling box, and other specification as per TR-4				
	TR 7-1	1000 kVA	Each	1922579	23195	1945774
	TR 7-2	1250 kVA	Each	2226577	23195	2249772
	TR 7-3	1600 kVA	Each	2440197	23195	2463392
	TR 7-4	2000 kVA	Each	3081056	23195	3104251
	TR 7-5	2500 kVA	Each	3483647	23195	3506842
	TR 7-6	3000 kVA	Each	3656186	23195	3679381
	TR 8	Transformer 22000 / 3300 Volt				
		With On Load Tap Changer - 15% to +5% in steps of 1.25% with RTCC, AVR and marshalling box, and other specification as per TR 4				
	TR 8-1	1000 kVA	Each	2075164	23195	2098359
	TR 8-2	1250 kVA	Each	2394421	23195	2417616
	TR 8-3	1600 kVA	Each	2617900	23195	2641095
	TR 8-4	2000 kVA	Each	3168618	23195	3191813
	TR 8-5	2500 kVA	Each	3671444	23195	3694639
	TR 8-6	3000 kVA	Each	4214181	23195	4237376

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TR 9	Transformer 33000 / 3300 Volt				
		With On Load Tap Changer - 15% to +5% in steps of 1.25% with RTCC, AVR and marshalling box, and other specification as per TR-4				
	TR 9-1	1000 kVA	Each	2154978	23195	2178173
	TR 9-2	1250 kVA	Each	2490197	23195	2513392
	TR 9-3	1600 kVA	Each	2713676	23195	2736871
	TR 9-4	2000 kVA	Each	3272374	23195	3295569
	TR 9-5	2500 kVA	Each	3743278	23195	3766473
	TR 9-6	3000 kVA	Each	4309956	23195	4333151

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TR 10	Servo Controlled Automatic Voltage Stabilizer				
		Providing, erecting Servo Controlled Automatic Voltage stabilizer suitable for out put voltage of 415 Volt +/-1%, 3 Ph, 50 Hz, with copper wound transformer (air/oil cooled) as mentioned below. The stabilizer shall function satisfactorily even if incoming supply is unbalanced between phases within range of 10%. The stabilizer should be constructed in cubical box, with bi-directional wheels for easy handling, necessary monitors and user's controls on front panel such as indication, alarm, volt meter and selector switch for measuring input and				
		out put voltage, Auto/Manual selector switch, Raise/Low push buttons etc. Suitable capacity termination strips and bus bars for incoming and out going cable should be provided. All three phases shall be independently monitored and corrected. Following protections and indications shall be incorporated Over Voltage / Under Voltage				
		Single Phasing				
		Cut off contactor with electronic output sensing unit				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TR 10-1	Servo Controlled Automatic Voltage Stabilizer (Out put 415 +/-1%)				
	TR 10-1	Input 220 to 460 Volt				
	TR 10-1-1	3 kVA Air cooled	Each	56252	312	56564
	TR 10-1-2	5 kVA Air cooled	Each	65132	405	65537
	TR 10-1-3	7.5 kVA Air cooled	Each	73416	620	74036
	TR 10-1-4	10 kVA Air cooled	Each	96141	932	97073
	TR 10-1-5	12.5 kVA Air cooled	Each	105678	1240	106918
	TR 10-1-6	15 kVA Air cooled	Each	115213	1240	116453
	TR 10-1-7	20 kVA Air cooled	Each	125485	1548	127033
	TR 10-1-8	25 kVA Air cooled	Each	138105	1857	139962
	TR 10-1-9	30 kVA Air cooled	Each	167936	2167	170103
	TR 10-1-10	40 kVA Air cooled	Each	184275	2475	186750
	TR 10-1-11	50 kVA Oil cooled	Each	249101	2475	251576
	TR 10-1-12	60 kVA Oil cooled	Each	302006	2475	304481
	TR 10-1-13	75 kVA Oil cooled	Each	315798	2475	318273
	TR 10-1-14	100 kVA Oil cooled	Each	355853	3403	359256
	TR 10-1-15	125 kVA Oil cooled	Each	442039	4026	446065
	TR 10-2	Servo Controlled Automatic Voltage Stabilizer (Out put 415 +/-1%)				
		Input 280 to 460 Volt				
	TR 10-2-1	3 kVA Air cooled	Each	47873	312	48185
	TR 10-2-2	5 kVA Air cooled	Each	57785	620	58405
	TR 10-2-3	7.5 kVA Air cooled	Each	62182	620	62802
	TR 10-2-4	10 kVA Air cooled	Each	66355	932	67287
	TR 10-2-5	12.5 kVA Air cooled	Each	80067	1240	81307

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TR 10-2-6	15 kVA Air cooled	Each	89514	1240	90754
	TR 10-2-7	20 kVA Air cooled	Each	102416	1548	103964
	TR 10-2-8	25 kVA Air cooled	Each	111296	1857	113153
	TR 10-2-9	30 kVA Air cooled	Each	125600	1968	127568
	TR 10-2-10	40 kVA Air cooled	Each	147775	2475	150250
	TR 10-2-11	50 kVA Air cooled	Each	164420	2475	166895
	TR 10-2-12	60 kVA Air cooled	Each	187565	2475	190040
	TR 10-2-13	60 kVA Oil cooled	Each	224321	2475	226796
	TR 10-2-14	75 kVA Oil cooled	Each	232626	2475	235101
	TR 10-2-15	100 kVA Oil cooled	Each	279143	3403	282546
	TR 10-2-16	125 kVA Oil cooled	Each	321198	4026	325224
	TR 10-2-17	150 kVA Oil cooled	Each	330722	4333	335055
	TR 10-2-18	175 kVA Oil cooled	Each	379839	4333	384172
	TR 10-2-19	200 kVA Oil cooled	Each	414814	5571	420385
	Note 1	For oil cooled stabilizer, the supply cost is excluding cost of transformer oil.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 8 - LT		As per PWD CSR		
		[L.T. PANEL]				
	Note 1	For Labour charges for internal wiring of panels including all material Add as below				
		1) Up to 5 HP twin set panel Rs.			1995	1995
		2) 6 to 10 HP twin set panel Rs.			2658	2658
		3) 11 to 30 HP twin set panel Rs.			3323	3323
		4) For connected load more than 60 HP Add per HP			61	61

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 9 - CP				
		[CAPACITOR]				
	CP 1	All Polypropylene Capacitors (APP)				
		Supplying and erecting bank of All Polypropylene capacitors with the standard capacities of 1, 2, 3, 5, 7, 12.5, 15, 20 and 25 KVAR units of power factor correction for operation on 3 phase, 50 Hz, 400 V+/- 10% with externally discharging resistances, earthing terminals and built on angle iron or channel iron frame work and provided with terminal cover box complete erected and tested.	KVAR	376	32	408
	CP 2	Metalized polypropylene Capacitors (MPP)				
		Supplying and erecting bank of Metalized polypropylene Capacitors with the standard capacities of 1, 2, 3, 5, 7, 12.5, 15, 20 and 25 KVAR units of power factor correction for operation on 3 phase, 50 Hz, 400 V+/- 10% with externally discharging resistances, earthing terminals and built on angle iron on channel iron frame work and provided with terminal cover box complete erected and tested.	KVAR	347	32	379

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	CP 3	H.T. Capacitors				
		Supplying and erecting bank of All Polypropylene capacitors with the standard capacities of 75,84,116,133 and 167 KVAR units of power factor correction for operation on 3 phase, 50 Hz, 3300 V+/- 6% with externally discharging resistances, earthing terminals and built on angle iron on channel iron frame work and provided with terminal cover box, H.T. bushing bus bar and HRC fuses etc complete erected and tested.	KVAR	626	84	710

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 10 - LG				
		[L.T. SWITCHGEAR AND PROTECTION]				
	LG 1	D.O.L. Starter				
		Supplying and erecting DOL starter to operate squirrel cage induction motor working on 380-440 Volt, 3 phase, 50 Hz with no volt coil and over load element with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.				
	LG 1-1	Up to 7.5 HP	Each	2375	104	2479
	LG 1-2	Up to 10 HP	Each	3869	220	4089
	LG 2	Assembled D.O.L. Starter				
		Supplying and erecting assembled DOL starter in provided cubical panel, with ON-OFF push buttons, no volt coil, over load element and required power and control wiring complete.				
	LG 2-1	Up to 7.5 HP	Each	2245	127	2372
	LG 2-2	Up to 10 HP	Each	2909	249	3158

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	LG 3	F.A.S.D. Starter				
		Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.				
	LG 3-1	> 7.5 HP & Up to 12.5 HP	Each	9347	224	9571
	LG 3-2	> 12.5 HP & Up to 20 HP	Each	11427	224	11651
	LG 3-3	> 20 HP & Up to 25 HP	Each	13293	249	13542
	LG 3-4	> 25 HP & Up to 35 HP	Each	30660	249	30909
	Note 1	Contactor rating should be same for STAR, LINE and DELTA Connection.				
	LG 4	F.A.S.D. Starter (Assembled)				
		Supplying and erecting, assembled Fully Automatic Star Delta starter, in a provided cubical panel to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load relay and ON-OFF push buttons, with necessary material and connected to supply, etc complete.				
	LG 4-1	> 7.5 HP & Up to 12.5 HP	Each	9213	249	9462
	LG 4-2	> 12.5 HP & Up to 20 HP	Each	11160	249	11409
	LG 4-3	> 20 HP & Up to 30 HP	Each	21655	281	21936
	LG 4-4	> 30 HP & Up to 35 HP	Each	30546	281	30827

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	Note 2	Contactors rating should be same for STAR, LINE and DELTA Connection.				
	LG 5	Auto transformer Starter with air break contactor (Locally Fabricated)				
		Providing erecting and giving test and trial of Fully Automatic, Auto Transformer Starter with Air Break Contactor, assembled locally with contactors of approved make in 14 SWG sheet steel fabricated, floor mounted type cubical panel, suitable for operation on 380 - 440 Volts, 3 Phase, 50 Hz, fitted with accessories as below. The incoming and outgoing cable end boxes shall be on either sides of main panel. The cable entries from auto transformer shall be totally enclosed in sheet metal. The starter shall have screened louvers on both sides.				
		1) Oil immersed copper wound auto transformer with 50%,65%, and 80% tapping including first fill of oil.				
		2) All Air Break Contactors of AC 3 duty of suitable rating as mentioned.				
		3) Bimetallic overload relay.				
		4) Timer ON and OFF delay.				
		5) Master timer.				
		6) Ammeter with CTs and selector switch.				
		7) No Volt release.				
		8) Motor 'ON', "OFF" and "TRIP" indication lamp.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		9) Motor Protection Relay, solid state with protection CTs.				
		10) Thermostat with 1 NO + 1 NC for Oil temperature.				
		11) Door interlock switch with 1 NO + 1 NC.				
		12) Control fuse.				
		Starter for Motor HP / Contactor Rating " Main/ Start/ Run".				
		Cubical Panel Size				
		1.25 m height X 0.75 m width X 0.45 m deep.				
	LG 5-1	40 HP (110 / 40 / 40)	Each	78383	3403	81786
	LG 5-2	60 HP (200 / 70 / 70)	Each	109736	3403	113139
	LG 5-3	80 HP (200 / 110 / 110)	Each	133252	3403	136655
	LG 5-4	100 HP (200 / 110 / 110)	Each	172546	3403	175949
	LG 5-5	120 HP (300 / 150 / 150)	Each	219472	3403	222875
		Cubical Panel Size				
		1.5 m height X 0.9 m width X 0.5 m deep.				
	LG 5-6	150 HP (300/150/150)	Each	223074	6806	229880
	LG 5-7	180 HP (400/170/170)	Each	256005	6806	262811
	LG 5-8	200 HP (400/200/200)	Each	278895	6806	285701
	LG 5-9	220 HP (400/200/200)	Each	350033	6806	356839
	LG 5-10	250 HP (400/300/300)	Each	362076	10205	372281
	LG 5-11	270 HP (630/300/300)	Each	375337	10205	385542
	LG 5-12	300 HP (630/300/300)	Each	389917	10205	400122

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	LG 6	FCMA / HFSR Electrical Soft starter				
		Providing erecting and giving test and trial of FCMA fully Automatic, Starter with DOL Soft Starter complete with main Contactor, VAF meter , PLC and HMI , push buttons and indications,FCMA module with bypass contactor and its control circuitry etc complete.				
	LG 6-13	100 HP (200)	Each	179500	3403	182903
	LG 6-14	120 HP (300)	Each	200014	3403	203417
	LG 6-15	150 HP (300)	Each	226636	6806	233442
	LG 6-16	180 HP (400)	Each	249544	6806	256350
	LG 6-17	200 HP (400)	Each	268048	6806	274854
	LG 6-18	220 HP (400)	Each	295595	6806	302401
	LG 6-19	250 HP (400)	Each	316939	10205	327144
	LG 6-20	270 HP (630)	Each	336119	10205	346324
	LG 6-21	300 HP (630)	Each	393296	10205	403501
	LG 7	Electronic Motor Protection Relay (for LT motors)				
		Providing, installing in panel EMPR for protection like overload, phase failure, locked rotor, phase reversal with trip indication and adjustable over current function, DIN rail mounted.	Each	8679	2675	11354

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 11 - HG				
		[H.T. SWITCHGEAR & PROTECTION]				
	HG 1	Providing and erecting Vacuum Circuit Breaker out door type excluding cost of CT, PT and control relay panel.				
		Vacuum Circuit Breaker (Out door type)				
	HG 1-1	11 kV system 630 Amp 25 kA	Each	214398	17007	231405
	HG 1-2	22 kV system 630 Amp 25 kA	Each	220830	17007	237837
	HG 1-3	33 kV system 630 Amp 25 kA	Each	227455	17007	244462
	HG 1-4	11 kV system 1250 Amp 25 kA	Each	230889	17007	247896
	HG 1-5	22 kV system 1250 Amp 25 kA	Each	237816	17007	254823
	HG 1-6	33 kV system 1250 Amp 25 kA	Each	244951	17007	261958
	HG 2	Providing and erecting Vacuum Circuit Breaker panel Indoor type including CT of required ratio for metering and protection including 3 O/C and E/F relay and high speed trip relay.				
	HG 2	Vacuum Circuit Breaker (Indoor type)				
	HG 2-1	3.3 kV system 630 Amp 25 kA	Each	414844	17007	431851
	HG 2-2	6.6 kV system 630 Amp 25 kA	Each	414844	17007	431851
	HG 2-3	11 kV system 630 Amp 25 kA	Each	414844	17007	431851
	HG 2-4	22 kV system 630 Amp 25 kA	Each	722577	17007	739584
	HG 2-5	33 kV system 630 Amp 25 kA	Each	722577	17007	739584
	HG 2-6	3.3 kV system 1250 Amp 25 kA	Each	429661	17007	446668
	HG 2-7	6.6 kV system 1250 Amp 25 kA	Each	429661	17007	446668

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	HG 2-8	11 kV system 1250 Amp 25 kA	Each	429661	17007	446668
	HG 2-9	22 kV system 1250 Amp 25 kA	Each	882831	17007	899838
	HG 2-10	33 kV system 1250 Amp 25 kA	Each	882831	17007	899838
	HG 3	Providing and erecting draw out type Vacuum Contactor Panel Indoor type including CT of required ratio for metering and motor protection relay with High speed trip relay.				
	HG 3	Vacuum Contactor Panel (Indoor Type)				
	HG 3-1	3.3 kV system (25 kA)	Each	341177	17007	358184
	HG 3-2	6.6 kV system (25 kA)	Each	392430	17007	409437
	HG 4	Providing and erecting Resin Cast Indoor single phase double core CT of required ratio and VA burden for metering and protection purpose.				
	HG 4	Resin Cast Indoor Single Phase, Double Core CT of required ratio				
	HG 4-1	C.T. for 3.3/ 6.6 / 11 kV 15 VA Class 1/10-P-10	Each	10591	1548	12139
	HG 4-2	C.T. for 22 /33 kV 15 VA Class 1/10-P-10	Each	17236	1548	18784
	HG 5	Providing and erecting Resin Cast Indoor single phase Single core PT of required ratio and VA burden for metering purpose.				
		Indoor Type Single Core PT of 100 VA capacity				
	HG 5-1	(11 kV / $\sqrt{3}$) / (110 Volt / $\sqrt{3}$)	Each	10591	1548	12139

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	HG 5-2	(22 kV / $\sqrt{3}$) / (110 Volt / $\sqrt{3}$)	Each	15788	1548	17336
	HG 5-3	(33 kV / $\sqrt{3}$) / (110 Volt / $\sqrt{3}$)	Each	16986	1548	18534
	HG 6	Protection and auxiliary relays				
		Providing and erecting following type protection and auxiliary relay as required for Vacuum Circuit Breaker Panel / control relay panel.				
	HG 6-1	Motor Protection Relays (CT Operated) Providing, installing numerical motor protection relay for motors controlled through circuit breaker / with vacuum cotactor, providing instaneous 3 ph overcurrent , unbalance and single phasing ,earth fault and seperate built in stalling proction similar to ABB make type REM 601 or similar				
		REM 601	Each	65673	1631	67304
	HG 6-2	Over Current and Earth Fault Relay (C T Operated)				
		Providing, installing triple pole over current and earthfault relay , 3 O/C and 1 E / F with high set over current setting , -50% to -200% of 5 Amp . Earth fault setting , 10% to 40 % of 5 Amp				
		REJ 601	Each	20615	932	21547
	HG 6-3	High Speed Trip Relay / Master Trip Relay				
		Providing, installing in panel single element high speed trip relay with mechanical flag and hand reset contacts similar to GE / ABB				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		VAJH 13 / MVAJ053 / PQ8nCH2JS	Each	4123	84	4207
	HG 6-4	Combiflex / Electromagnetic Realy (Voltage operated) Voltage operated auxillary relay without indicator with self reset / hand reset contacts, plug in combiflex mounting similar ABB model RXP8n / RXPQ8n / VAJH 22A / VAJH 23 B	Each	4522	339	4861
	HG 6-5	Auxiliary Relay for Transformer Protection				
	HG 6-5-1	Providing, installing in panel voltage operated auxiliary relay with flag, 2 NO + 2 NC, self reset contacts similar to GE / ABB				
		MVAA 11 / CV2 D 2 J	Each	3369	84	3453
	HG 6-5-2	Providing, installing in panel voltage operated auxiliary relay with flag, 2 NO + 2 NC, hand reset contacts similar to GE / ABB				
		MVAA 31/ AVA33 / CV2D2J	Each	5827	84	5911
	HG 6-6	Power Factor Controller Relay				
	HG 6-6-1	Providing, installing static power factor controller relay with minimum 8 capacitor stages with micro-processor based capacitor switching with display of power factor	Each	DELETED		
	HG 6-6-2	14 stages	Each			
	HG 6-7	Digital Timer				
		Providing, installing static digital timer with time delay on pick-up.	Each	1720	84	1804

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	HG 6-8	Automatic Semaphore Indicator				
		Providing, installing Automatic Semaphore indicator DC / AC operated for automatic indication of the position of Circuit Breakers				
		VAM 21	Each	3614	84	3698
	HG 6-9	CTMM 501-510 static motor protection relay similar to Alstom make for motors controlled through circuit breaker,	Each	38025	932	38957
	HG 6-10	CTMM 401-410 static motor protection relay similar to Alstom make for motors controlled by fused contactors,	Each	38025	932	38957
	HG 6-11	Over Current and/or Earth Fault Relay in panel single pole non directional IDMT O/C or E/F self powered relay, flush mounted, conforming to IS 3231				
	a	CDG 11, without High set/ MC 11A	Each	27161	932	28093
	b	CDG 21, with High set/ MC 11A	Each	28465	932	29397
	HG 6-12	Triple pole non directional IDMT, 2 O/C and 1 E/F self powered relay, flush mounted, conforming to IS 3231		0		
	a	CDG 31, without High set	Each	35309	932	36241
	b	CDG 61 with high set	Each	36939	932	37871
	HG 6-15	Numerical communicable nondirectional overcurrent and earth fault T/R Differential relay,	Each	162965	1863	164828
	HG 6-16	Under voltage and over voltage relay .	Each	16297	932	17229

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 12 - CB				
		[L.T. CABLE]				
	CB 1	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable				
		Supplying and erecting, Flat flexible submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.				
	CB 1-1	3 core 1.5 sq mm	As per PWD			
	CB 1-2	3 core 2.5 sq mm				
	CB 1-3	3 core 4 sq mm				
	CB 1-4	3 core 6 sq mm				
	CB 1-5	3 core 10 sq mm	Mtr	389	18	407
	CB 1-6	3 core 16 sq mm	Mtr	593	32	625
	CB 1-7	3 core 25 sq mm	Mtr	962	32	994
	CB 1-8	3 core 35 sq mm	Mtr	1368	32	1400
	CB 2	Aluminium conductor single core, XLPE /PVC insulated & armoured cable				
		Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade with ISI mark single core, stranded aluminium conductor with 6 mm thick 25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved manner.				
	CB 2-1	Single core 300 sq mm	Mtr	557	64	621
	CB 2-2	Single core 400 sq mm	Mtr	711	64	775
	CB 2-3	Single core 500 sq mm	Mtr	886	64	950
	CB 2-4	Single core 630 sq mm	Mtr	1143	64	1207
	CB 2-5	Single core 800 sq mm	Mtr	1409	96	1505

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	CB 2-6	Single core 1000 sq mm	Mtr	1731	96	1827
	CB 3	Aluminium conductor Twin core, XLPE / PVC insulated & armoured cable				
		Supplying and erecting XLPE / PVC insulated, armoured cable 1100 V grade with ISI mark Twin core, solid / stranded aluminium conductor with 6 mm thick 25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved manner.				
	CB 3-1	Two core 2.5 sq mm	As Per PWD CSR			
	CB 3-2	Two core 4 sq mm				
	CB 3-3	Two core 6 sq mm				
	CB 3-4	Two core 10 sq mm				
	CB 4	Aluminium conductor Three core, XLPE / PVC insulated & armoured cable				
		Supplying and erecting XLPE / PVC insulated, armoured cable 1100 V grade with ISI mark Three core, solid / stranded aluminium conductor with 6 mm thick 25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved manner.				
	CB 4-1	3 Core 2.5 sq mm				
	CB 4-2	3 Core 4 sq mm				
	CB 4-3	3 Core 6 sq mm				
	CB 4-4	3 Core 10 sq mm				
	CB 4-5	3 Core 16 sq mm				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	CB 4-6	3 Core 25 sq mm				
	CB 4-7	3 Core 35 sq mm				
	CB 4-8	3 Core 50 sq mm				
	CB 4-9	3 Core 70 sq mm	Mtr	469	35	504
	CB 4-10	3 Core 95 sq mm	Mtr	594	35	629
	CB 4-11	3 Core 120 sq mm	Mtr	716	64	780
	CB 4-12	3 Core 150 sq mm	Mtr	855	64	919
	CB 4-13	3 Core 185 sq mm	Mtr	1005	64	1069
	CB 4-14	3 Core 240 sq mm	Mtr	1347	64	1411
	CB 4-15	3 Core 300 sq mm	Mtr	1585	64	1649
	CB 5	Aluminium conductor 3.5 Core, XLPE / PVC insulated & armoured cable				
		Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade with ISI mark Three and half core, stranded aluminium conductor with 6 mm thick 25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved manner.				
	CB 5-1	3.5 Core 25 sq mm				
	CB 5-2	3.5 Core 35 sq mm				
	CB 5-3	3.5 Core 50 sq mm				
	CB 5-4	3.5 Core 70 sq mm				
	CB 5-5	3.5 Core 95 sq mm				
	CB 5-6	3.5 Core 120 sq mm				
	CB 5-7	3.5 Core 150 sq mm				
	CB 5-8	3.5 Core 185 sq mm				
	CB 5-9	3.5 Core 240 sq mm				
	CB 5-10	3.5 Core 300 sq mm				
	CB 5-11	3.5 Core 400 sq mm				

As per PWD

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	CB 6	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable				
		Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved manner.				
	CB 6-1	4 Core 4 sq mm	Mtr	119	21	140
	CB 6-2	4 Core 6 sq mm	Mtr	135	21	156
	CB 6-3	4 Core 10 sq mm	Mtr	172	21	193
	CB 6-4	4 Core 16 sq mm	Mtr	192	21	213
	CB 7	Copper conductor PVC insulated, armoured control cable				
	CB 7-1	Supplying and erecting armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.				
		1.5 sq mm Copper conductor PVC insulated, armoured control cable				
	CB 7-1-1	2 core 1.5 sq mm	Mtr	103	7	110
	CB 7-1-2	3 core 1.5 sq mm	Mtr	123	7	130
	CB 7-1-3	4 core 1.5 sq mm	Mtr	148	7	155
	CB 7-1-4	5 core 1.5 sq mm	Mtr	173	7	180
	CB 7-1-5	6 core 1.5 sq mm	Mtr	200	7	207
	CB 7-1-6	7 core 1.5 sq mm	Mtr	220	7	227
	CB 7-1-7	8 core 1.5 sq mm	Mtr	250	7	257

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	CB 7-1-8	9 core 1.5 sq mm	Mtr	262	7	269
	CB 7-1-9	10 core 1.5 sq mm	Mtr	318	7	325
	CB 7-1-10	12 core 1.5 sq mm	Mtr	423	7	430
	CB 7-1-11	14 core 1.5 sq mm	Mtr	482	7	489
	CB 7-2	2.5 sq mm Copper conductor PVC insulated, armoured control cable				
	CB 7-2-1	2 core 2.5 sq mm	Mtr	132	7	139
	CB 7-2-2	3 core 2.5 sq mm	Mtr	166	7	173
	CB 7-2-3	4 core 2.5 sq mm	Mtr	209	7	216
	CB 7-2-4	5 core 2.5 sq mm	Mtr	250	7	257
	CB 7-2-5	6 core 2.5 sq mm	Mtr	288	7	295
	CB 7-2-6	7 core 2.5 sq mm	Mtr	326	7	333
	CB 7-2-7	8 core 2.5 sq mm	Mtr	364	7	371
	CB 7-2-8	9 core 2.5 sq mm	Mtr	367	7	374
	CB 7-2-9	10 core 2.5 sq mm	Mtr	429	7	436
	CB 7-2-10	12 core 2.5 sq mm	Mtr	515	7	522
	CB 7-2-11	14 core 2.5 sq mm	Mtr	594	7	601
	CB 8	Copper conductor PVC insulated, Un-armoured control cable				
		Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.				
	CB 8-1-1	2 core 1.5 sq mm	Mtr	63	7	70
	CB 8-1-2	3 core 1.5 sq mm	Mtr	82	7	89
	CB 8-1-3	4 core 1.5 sq mm	Mtr	99	7	106
	CB 8-1-4	5 core 1.5 sq mm	Mtr	122	7	129
	CB 8-1-5	6 core 1.5 sq mm	Mtr	146	7	153

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	CB 8-1-6	7 core 1.5 sq mm	Mtr	160	7	167
	CB 8-1-7	8 core 1.5 sq mm	Mtr	180	7	187
	CB 8-1-8	9 core 1.5 sq mm	Mtr	203	7	210
	CB 8-1-9	10 core 1.5 sq mm	Mtr	221	7	228
	CB 8-1 -10	12 core 1.5 sq mm	Mtr	296	7	303
	CB 8-1 -11	14 core 1.5 sq mm	Mtr	340	7	347
	CB 8-2	2.5 sq mm Copper conductor PVC Un-armoured control cable				
	CB 8-2-1	2 core 2.5 sq mm	Mtr	87	7	94
	CB 8-2-2	3 core 2.5 sq mm	Mtr	119	7	126
	CB 8-2-3	4 core 2.5 sq mm	Mtr	148	7	155
	CB 8-2-4	5 core 2.5 sq mm	Mtr	177	7	184
	CB 8-2-5	6 core 2.5 sq mm	Mtr	211	7	218
	CB 8-2-6	7 core 2.5 sq mm	Mtr	244	7	251
	CB 8-2-7	8 core 2.5 sq mm	Mtr	270	7	277
	CB 8-2-8	9 core 2.5 sq mm	Mtr	304	7	311
	CB 8-2-9	10 core 2.5 sq mm	Mtr	305	8	313
	CB 8-2 10	12 core 2.5 sq mm	Mtr	456	7	463
	CB 8-2 11	14 core 2.5 sq mm	Mtr	527	7	534

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 13 - CB				
		[H.T. CABLE]				
	CB 9	Aluminium conductor XLPE / PVC insulated, armoured Cable				
		Supplying and erecting Aluminium conductor, XLPE / PVC - 3.3 kV, armoured cable complete erected in provided trench or on provided trays in an approved manner as per direction of Engineer In Charge				
		3.3 kV- XLPE / PVC				
	CB 9-1	3 Core 25 sq mm	Mtr	520	35	555
	CB 9-2	3 Core 35 sq mm	Mtr	541	35	576
	CB 9-3	3 Core 50 sq mm	Mtr	618	35	653
	CB 9-4	3 Core 70 sq mm	Mtr	824	35	859
	CB 9-5	3 Core 95 sq mm	Mtr	1021	64	1085
	CB 9-6	3 Core 120 sq mm	Mtr	1150	64	1214
	CB 9-7	3 Core 150 sq mm	Mtr	1354	64	1418
	CB 9-8	3 Core 185 sq mm	Mtr	1515	64	1579
	CB 9-9	3 Core 240 sq mm	Mtr	1878	64	1942
	CB 9-10	3 Core 300 sq mm	Mtr	2197	99	2296
	CB 9-11	3 Core 400 sq mm	Mtr	2733	99	2832
	CB 10	Supplying and erecting Aluminium conductor, XLPE / PVC - 6.6 kV, armoured cable complete erected in approved trench or on trays as per direction of Engineer In Charge				
	CB 10	6.6 kV -- XLPE / PVC				
	CB 10-1	3 Core 35 sq mm	Mtr	667	35	702
	CB 10-2	3 Core 50 sq mm	Mtr	754	35	789

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	CB 10-3	3 Core 70 sq mm	Mtr	897	35	932
	CB 10-4	3 Core 95 sq mm	Mtr	1060	35	1095
	CB 10-5	3 Core 120 sq mm	Mtr	1223	64	1287
	CB 10-6	3 Core 150 sq mm	Mtr	1366	64	1430
	CB 10-7	3 Core 185 sq mm	Mtr	1589	64	1653
	CB 10-8	3 Core 240 sq mm	Mtr	1907	64	1971
	CB 10-9	3 Core 300 sq mm	Mtr	2218	99	2317
	CB 10-10	3 Core 400 sq mm	Mtr	2787	99	2886
	CB 11	Providing & erecting INDOOR type termination Kit, for 3.3Kv/6.6kv/11Kv/6.6Kv XLPE 3 core cable				
	CB11-1	25-50 sqmm	Deleted			
	CB11-2	70-120	Each	4635	3093	7728
	CB11-3	150-185	Each	5251	3093	8344
	CB11-4	240-400	Each	5850	3093	8943
	CB-12	OUTDOOR type termination Kit, for 3.3Kv/6.6kv XLPE 3 core cable				
	CB12-1	70-120 sq.mm	Each	6239	3093	9332
	CB12-2	150-185 sq.mm	Each	6726	3093	9819
	CB12-3	240-400 sq.mm	Each	8462	3093	11555
	CB 13	STRAIGHT THROUGH JOINT for 3.3Kv/6.6kv XLPE 3 core cable				
	CB13-1	70-120 sq.mm	Each	15407	3093	18500
	CB13-2	150-185 sq.mm	Each	19599	3093	22692
	CB13-3	240-400 sq.mm	Each	21435	3093	24528
	CB 14	INDOOR type termination Kit, for 11Kv Screened XLPE 3 core cable				
	CB14-1	25-50 sqmm	Deleted			
	CB14-2	70-120	As per PWD			
	CB14-3	150-185				
	CB14-4	240-400				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	CB 15	CABLE DUCT RCC M-150				
		Providing and laying RCC (M-150) cable duct of size given below for laying electric cable including form work for centering M.S. bar reinforcement, necessary excavation bolder filling, PCC (M100), compacting, curing , plastering, including providing and fixing 35 X 35 X 5 mm M.S. angles, RCC pre cast cover of Adequate length with 100 mm over lap on either walls etc complete and providing RCC pre cast covers.				
	CB15-1	cable Duct 2 tier - 750 W x 750 D	Mtr	1444	0	1444
	CB15-2	cable Duct 2 tier - 750 W x 1000 D	Mtr	1696	0	1696
	CB15-3	cable Duct 2 x 3 tier - 1000W x 1000 D	Mtr	2107	0	2107

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 14 - MO				
		[L.T.MOTORS]				
	MO 1	Foot Mounted Motors SPDP 1000 RPM				
		Providing, erecting and giving test and trial of Foot Mounted SPDP motor 1000 RPM, squirrel cage induction motor, conforming to IS 325 having continuous rating suitable for operation at 415 Volts +/-10%, 3 Phase, 50 Hz +/-3% with "F" class insulation temperature rise limited to class "B" insulation.				
	MO 1-1	45 kW (60 HP)	Each	333237	4640	337877
	MO 1-2	55 kW (75 HP)	Each	387424	4640	392064
	MO 1-3	75 kW (100 HP)	Each	460680	6190	466870
	MO 1-4	90 kW (120 HP)	Each	587024	6190	593214
	MO 1-5	110 kW (150 HP)	Each	750479	9278	759757
	MO 1-6	125 kW (170 HP)	Each	847056	9278	856334
	MO 1-7	135 kW (180 HP)	Each	896446	9278	905724
	MO 1-8	150 kW (200 HP)	Each	953873	9278	963151
	MO 1-9	160 kW (215 HP)	Each	1033941	9278	1043219
	MO 1-10	180 kW (240 HP)	Each	1165313	12373	1177686
	MO 1-11	187 kW (250 HP)	Each	1183930	12373	1196303
	MO 1-12	200 kW (270 HP)	Each	1215171	12373	1227544
	MO 1-13	225 kW (300 HP)	Each	1387700	12373	1400073

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	MO 2	Foot Mounted / Vertical Mounted Solid Shaft Motor TEFC 1500 RPM				
		Providing, erecting and giving test and trial of Foot Mounted TEFC motor 1500 RPM, squirrel cage induction motor, conforming to IS 12615:2011 of efficiency class IE3 premium having continuous rating suitable for operation at 415 Volts +/-10%, 3 Phase, 50 Hz +/-3% with "F" class insulation.				
	MO 2-1	1.1 kW (1.5 HP)	Each	16020	312	16332
	MO 2-2	1.5 kW (2 HP)	Each	17351	312	17663
	MO 2-3	2.2 kW (3 HP)	Each	23089	312	23401
	MO 2-4	3.7 kW (5 HP)	Each	29674	467	30141
	MO 2-5	5.5 kW (7 HP)	Each	40840	773	41613
	MO 2-6	7.5 kW (10 HP)	Each	47794	773	48567
	MO 2-7	9.3 kW (12 HP)	Each	74279	1548	75827
	MO 2-8	11 kW (15 HP)	Each	78060	1548	79608
	MO 2-9	15 kW (20 HP)	Each	96936	1548	98484
	MO 2-10	18.5 kW (25 HP)	Each	119491	3093	122584
	MO 2-11	22 kW (30 HP)	Each	142045	3093	145138
	MO 2-12	30 kW (40 HP)	Each	191996	3093	195089
	MO 2-13	37 kW (50 HP)	Each	248692	4646	253338
	MO 2-14	45 kW (60 HP)	Each	300825	4646	305471
	MO 2-15	55 kW (75 HP)	Each	410120	4646	414766
	MO 2-16	75 kW (100 HP)	Each	525169	6190	531359
	MO 2-17	90 kW (120 HP)	Each	645871	6190	652061
	MO 2-18	110 kW (150 HP)	Each	782282	9278	791560
	MO 2-19	132 kW (160 HP)	Each	891141	9278	900419
	MO 2-20	135 kW (180 HP)	Each	916629	9278	925907
	MO 2-21	160 kW (215 HP)	Each	1159345	9278	1168623
	MO 2-22	180 kW (240 HP)	Each	1253189	12373	1265562
	MO 2-23	200 kW (270 HP)	Each	1305555	12373	1317928
	MO 2-24	225 kW (300 HP)	Each	1611710	12373	1624083

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	MO 3	Vertical Hollow Shaft Motor TEFC 1500 RPM				
		Providing, erecting and giving test and trial of vertical hollow shaft, TEFC motor 1500 RPM, squirrel cage induction motor, conforming to IS 12615, class IE3 premium, having continuous rating suitable for operation at 415 Volts +/-10%, 3 Phase, 50 Hz +/-5% with "F" class insulation temperature rise limited to class "B" insulation.				
	MO 3-1	18.5 kW (25 HP)	Each	182900	3093	185993
	MO 3-2	22 kW (30 HP)	Each	202346	3093	205439
	MO 3-3	30 kW (40 HP)	Each	220858	3093	223951
	MO 3-4	37 kW (50 HP)	Each	254565	4646	259211
	MO 3-5	45 kW (60 HP)	Each	325371	4646	330017
	MO 3-6	55 kW (75 HP)	Each	413779	4646	418425
	MO 3-7	67 kW (90 HP)	Each	548087	6190	554277
	MO 3-8	75 kW (100 HP)	Each	553101	6190	559291
	MO 3-9	90 kW (120 HP)	Each	572328	6190	578518
	MO 3-10	110 kW (150 HP)	Each	682667	9278	691945
	MO 3-11	125 kW (170 HP)	Each	698372	9278	707650
	MO 3-12	135 kW (180 HP)	Each	806025	9278	815303
	MO 3-13	150 kW (200 HP)	Each	945599	9278	954877
	MO 3-14	160 kW (215 HP)	Each	1019057	9278	1028335
	MO 3-15	180 kW (240 HP)	Each	1058575	12373	1070948
	MO 3-16	187 kW (250 HP)	Each	1071494	12373	1083867
	MO 3-17	200 kW (270 HP)	Each	1132288	12373	1144661
	MO 3-18	225 kW (300 HP)	Each	1180670	12373	1193043

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	MO 4	Vertical Solid Shaft Motor TEFC - 1500 RPM				
	Note 1	Rates of Horizontal foot mounted (TEFC) motor shall be adopted for vertical flange mounted solid shaft motor				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 15 - MO				
		[H.T.MOTORS]				
	MO 5	3.3 kV Foot Mounted Motor TEFC 1000 RPM				
		Providing, erecting and giving test and trial of Foot Mounted TEFC motor 1000 RPM, squirrel cage induction motor, conforming to IS 12615:2011 having continuous rating suitable for operation at 3300 Volts +/-10%, 3 Phase, 50 Hz +/-3% with "F" class insulation temperature rise limited to class "B" insulation. Motor shall be fitted with suitable space heater and six nos. RTD.				
	MO 5-1	225 kW (300 HP)	Each	1087774	12373	1100147
	MO 5-2	250 kW (335 HP)	Each	1234471	15460	1249931
	MO 5-3	280 kW (375 HP)	Each	1463339	18552	1481891
	MO 5-4	340 kW (456 HP)	Each	1542069	18552	1560621
	MO 5-5	390 kW (523 HP)	Each	1625566	21649	1647215
	MO 5-6	440 kW (590 HP)	Each	1728547	21649	1750196
	MO 5-7	510 kW (684 HP)	Each	1976259	21649	1997908
	MO 5-8	580 kW (777 HP)	Each	2134904	24743	2159647
	MO 5-9	660 kW (885 HP)	Each	2397071	24743	2421814
	MO 6	3.3 kV Foot Mounted Motor TEFC 1500 RPM				
	MO 6-1	225 kW (300 HP)	Each	973331	12373	985704
	MO 6-2	250 kW (335 HP)	Each	1104484	15460	1119944
	MO 6-3	280 kW (375 HP)	Each	1308888	18552	1327440
	MO 6-4	330 kW (442 HP)	Each	1368506	18552	1387058
	MO 6-5	370 kW (495 HP)	Each	1572910	21645	1594555
	MO 6-6	425 kW (569 HP)	Each	1632525	21645	1654170

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	MO 6-7	510 kW (683 HP)	Each	1780150	21645	1801795
	MO 6-8	660 kW (885 HP)	Each	2166249	24743	2190992
	MO 7	3.3 kV Vertical Flange Mounted Motor TEFC 1000 RPM				
	MO 7-1	225 kW (300 HP)	Each	881113	12373	893486
	MO 7-2	250 kW (335 HP)	Each	1000060	15460	1015520
	MO 7-3	280 kW (375 HP)	Each	1185265	18552	1203817
	MO 7-4	340 kW (456 HP)	Each	1244870	18552	1263422
	MO 7-5	390 kW (523 HP)	Each	1310386	21649	1332035
	MO 7-6	440 kW (590 HP)	Each	1391184	21649	1412833
	MO 7-7	510 kW (684 HP)	Each	1574625	21649	1596274
	MO 7-8	580 kW (777 HP)	Each	1699101	24743	1723844
	MO 7-9	660 kW (885 HP)	Each	1903928	24743	1928671
	MO 8	3.3 kV Vertical Flange Mounted Motor TEFC 1500 RPM				
	MO 8-1	225 kW (300 HP)	Each	782825	12373	795198
	MO 8-2	250 kW (335 HP)	Each	888367	15460	903827
	MO 8-3	280 kW (375 HP)	Each	993908	18552	1012460
	MO 8-4	330 kW (442 HP)	Each	1100743	18552	1119295
	MO 8-5	370 kW (495 HP)	Each	1244870	21645	1266515
	MO 8-6	425 kW (569 HP)	Each	1290732	21645	1312377
	MO 8-7	510 kW (683 HP)	Each	1404288	21645	1425933
	MO 8-8	660 kW (885 HP)	Each	1690366	24743	1715109

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	Note 2	For all types of motors above 200 HP the cost is inclusive of 2 space heater and for all types of HT motor the cost is inclusive of 2 Nos. space heater and 6 Nos. RTD. Necessary provision for control wiring and suitable contactor shall be made in the estimate of LT panel board.				
	Note 3	For any special purpose if RTD and space heater are required in addition, add following extra charges				
		a) Space heater (240 Volts) for set of two		6642		6642
		b) RTD for six Nos.		8250		8250
	Note 4	All motors shall be of BEE mark				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 16 - TL				
		[TOOLS]				
	TL 1	D.E. Open Jaw fix spanner 12 piece set - 6 -32 mm	Set	857		857
	TL 2	Bi-hexagon Ring spanner 12 piece set - 6-32mm	Set	1491		1491
	TL 3	Ball pen hammer with handle 800 gm	Each	385		385
	TL 4	Combination side cutting plier 200 mm KDPE coated	Each	282		282
	TL 5	Adjustable wrench crome vanadium 250 mm - 30 mm	Each	368		368
	TL 6	Pipe wrench stillson pattern carbon steel 450 mm - 60 mm	Each	722		722
	TL 7	Pipe wrench stillson pattern carbon steel 600 mm - 76 mm	Each	1294		1294
	TL 8	Screw driver Engineering pattern 6 X 300 mm	Each	124		124
	TL 9	Screw driver Engineering pattern 8 X 200 mm	Each	107		107
	TL 10	Screw driver Engineering pattern 5 X 200 mm	Each	78		78
	TL 11	Screw driver Engineering pattern 5 X 300 mm	Each	80		80
	TL 12	Screw driver with green neon bulb line tester 3.6 X 60 mm	Each	78		78
	TL 13	Hack saw frame 300 mm size with heavy duty blade	Each	87		87
	TL 14	Tool box fabricated from MS sheet of 18 SWG of size 50 X 30 X 30 cm with locking arrangement	Each	1376		1376

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TL 15	Cold chisels chrome vanadium hexagonal 19/14 - 200 mm	Each	190		190
	TL 16	Chain pipe wrench IS 54123 -- 210 - 4"	Each	5115		5115
	TL 17	Chain pipe wrench IS 54123 -- 210 - 6"	Each	7508		7508
	TL 18	25 mm dia heavy duty 1.2 m long crow bar	Each	259		259
	TL 19	12 mm size 2 NT capacity wire rope 3 m long with dog bolt 2 Nos.	Each	344		344
	TL 20	50 mm size G.I. "B" class pipe 1.5 m long with coupling on both side, for use as lever	Each	309		309
	TL 21	Central punch Chrome Vanadium steel 175 mm	Each	80		80
	TL 22	Triangular file 300 mm size of "Standard" make	Each	431		431
	TL 23	Half round file of 300 mm size "Standard" make	Each	431		431
	TL 24	Bearing puller three legs -- 8"	Each	456		456
	TL 25	Bearing puller three legs -- 10"	Each	595		595
	TL 26	Bearing puller three legs -- 12"	Each	722		722
	TL 27	Hydraulic flip flop crimping tool suitable for 6 to 500 sq mm size cable lugs (Usha-Ismail or similar make)	Each	42611		42611
	TL 28	Hand operated crimping tool with set of dies ranging from 6 to 185 sq mm cable lug, in pairs of hand ratches	Each	12031		12031

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TL 29	Insulator tester (Megger) cranking type having metal body of range 100 Volts 1000 Ohms.	Each	5534		5534
	TL 30	Earth Tester- 4 terminals of range 0-10-100-1000-10000 Ohms	Each	8510		8510
	TL 31	Tong Tester (Clip on meter) of range 0-10-30-100-1000 Amps and 0-300-600 Volts	Each	4176		4176
	TL 32	Engineer's precision steel level of size 300 mm	Each	516		516
	TL 33	Precision stainless steel rules 500 mm	Each	344		344
	TL 34	Allen Head Wrench Crome Vanadium 10 piece - 6-10mm	Set	418		418
	TL 35	Tubler box spanner set with Tommy bar 8 piece- 6-22mm	Set	1033		1033
	TL 36	Diagonal cutting pliers 150 mm PVC coated	Each	249		249
	TL 37	Long nose pliers carbon steel 200 mm PVC coated	Each	238		238
	TL 38	Water pump pliers chrome vanadium 259 mm - 40 mm	Each	348		348

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 17 - EC & GC				
		A - EC- ELECTRO CHLORINATION SYSTEM				
	EC	Providing, erecting, commissioning & giving test & trial for a period of one month including one year free maintenance after commissioning of Electro chlorinator capable of generating chlorine from common salt by electrolysis using electrodes in form of sodium hypo chlorite solution containing 6-8 gms/lit of available chlorine in batch or continuous process and capable of providing 8 hrs storage of hypochlorite in case of power failure. The electro chlorinator shall comprise of following.				
		Electrolytic cell consisting dimensionally stable electrodes made from Gr I Titanium sheet with multi metal Oxide coating.				
		Electolyzer tank made from PVC -FRP or Acrylic.				
		Power pack consisting of transformer rectifier for generating suitable DC current from AC supply along with the control switch for dosing pumps, etc through MCB's contacts, relays and wiring.				
		Control panel for the electro chlorinator consisting of DC voltage and current display income phase status unit on-off switches fuses etc.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Dosing tank of suitable capacity made from PVC/FRP.				
		Dosing pumps of special quality (1W+1S) suitable to handle hypo chlorite solution.				
		Entire chlorine solution pipeline shall be of PVC				
		Chlorine test kit suitable to measure residual chlorine up to 5ppm.				
	EC 17-1	25 gms / hr	Each	223124	21785	244909
	EC 17-2	50 gms / hr	Each	330552	32271	362823
	EC 17-3	100 gms / hr	Each	585352	57145	642497
	EC 17-4	150 gms / hr	Each	654219	63866	718085
	EC 17-5	250 gms / hr	Each	785062	76642	861704
	EC 17-6	350 gms / hr	Each	922793	90086	1012879
	EC 17-7	500 gms / hr	Each	1170707	114287	1284994
	EC 17-8	750 gms / hr	Each	1485090	144977	1630067
	EC 17-9	1000 gms / hr	Each	1804265	176136	1980401
	EC 17-10	1500 gms / hr	Each	2272548	221846	2494394
	EC 17-11	2000 gms / hr	Each	2554897	249410	2804307

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		B - GC - [AUTOMATIC GAS CHLORINATION SYSTEM]				
	GC	Providing, Erecting commissioning & giving test and trial including one year supervision of the system in day shift (General shift) and one year free maintenance of fully automatic gas chlorination system confirmation to all applicable NEC and Compressed Gas Associations recommendations and comprising of following				
		Automatic Vacuum operated Chlorinator unit of capacity as mentioned below with Actuator rotameter, injector, vacuum tubing special PVC Piping for Chlorine solution & suitable booster pumps(1W+1S) with GI piping valves, fittings etc.				
		Automatic Switchover type vacuum regulators(2 nos.) installed on tonners with suitable mounting & showing tonner status indication as standby, empty & in use.				
		Auto Control Panel of suitable capacity ,wall mounted industrial type with voltmeter, ammeter, starter MCB indicating lamps having automatic operation.				
		Microprocessor based Multi functional controller with digital & graphical display.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Online residual Chlorine Analyser without need of reagent utilizing unique, internally buffered sensor.				
		Gas leak & temperature detection two channel measuring system designed for gas and temperature monitoring in up to two rooms with necessary wiring & battery backup cum voltage stabilizer system of suitable capacity with batteries.				
		Preventing maintenance kit for injector, Rotameter & Vacuum regulator.				
	GC 17-1	4 kg / hr (200PPD)	Each	1745169	254030	1999199
	GC 17-2	10 kg / hr (500 PPD)	Each	1826556	256698	2083254
		C . GAS CHLORINATION SYSTEM (Manual)				
		Providing, Erecting, commissioning and giving test and trial of gas chlorination system confirmation to all applicable compressed Gas Association recommendations and comprising of following : Vacuum operated chlorinator unit of capacity as mentioned below : Two set of Rota meter assembly and control valve assembly, two sets of Remote injector assembly (1W + 1SB), 10 RMT of vacuum tubing , 10 meters of uPVC piping for chlorine solution & suitable booster pumps (1W + 1SB) with 10 meters water inlet piping , valves, fittings etc.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Automatic switchover type vacuum regulators(2 nos) or with vacuum operated switchover system. Control panel of suitable capacity wall mounted industrial type with voltmeter,ammeter,starter,MCB indicating lamps.				
		Preventive maintenance kit for injector,Rotameter & vacuum regulator including erection.Limits of toxic substances which are likely to be present in significant quantities from the current production process and raw materials are given in Table I.				
	GC 17-3	4 kg / hr (200PPD)		353222	48952	402174
	GC 17-4	10 kg / hr (500 PPD)		450753	46040	496793
		Note: The autochlorination system shall be provided for water Treatment Plants of capacity 10 MLD and above.				
		D) Portable Water chlorination System				
	SD -1	Supply of Sodium dichloroisocyanurate Granules as per (IS 15773 : 2008)	Kg	755		755.00
		Supply of Sodium Dichloroisocyanurate Granules - (IS 15773:2008)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		1. Physical Appearance: White Granular Powder 2. Packing : Air tight plastic drum with - ply polyethylene bag 3. Minimum chlorine content should be 55 % by mass for Sodium Dichloroisocyanurate, Dihydrate & 62 % by mass for Sodium Dichloroisocyanurate, Anhydrous.				
		Limits of toxic substances which are likely to be present in significant quantities from the current production process and raw materials As Per I.S.				
	SD -2	Providing, installing & commissioning with satisfactory test & trial Chlorine/ sodium dichoroisocyanurate dosing portable water chlorination system (Manual) having chlorine as a sodium dichoroisocyanurate with following components, Capacity 5gm/hr. to 100gm/hr.	No.	130000	10000	140000
		Sodium Dichlorolsocyanurate Dosing Potable Water Chlorination System (Manual)				
		Providing installing and giving satisfactory testing of Chlorine / Sodium Dichlorolsocyanurate Dosing Potable Water Chlorination System (Manual) having Chlorine as Sodium Dichlorolsocyanurate. The system should have following components.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		System should be capable to prepare fresh 0.3% to 5% Chlorine solution manually in a solution preparation tank				
		System should be capable of Dosing chlorine solution with solenoid driven dosing pump of 6LPH @ 4kg/cm ² at inlet of water storage tank/sump/online.				
		Mandatory Accessories: 1) Control: - level switch i.e. will stop at low water level at solution preparation tank 2) Chlorine Test kit for suitable to measure residual chlorine upto 5ppm				
		Capacity: Chlorine dose of 5gm/hr to 100gm/hr				
	SD -3	Providing, installing & commissioning with satisfactory test & trial Chlorine/ sodium dichloroisocyanurate dosing portable water chlorination system (Semi automatic) having chlorine as a sodium dichloroisocyanurate with following components, Capacity 10gm/hr. to 250gm/hr.	No.	620000	20000	640000
		Sodium Dichloroisocyanurate Dosing Potable Water Chlorination system: (Semi Automatic).				
		Providing installing and giving satisfactory testing of Sodium Dichloroisocyanurate Dosing Potable Water Chlorination system: (Semi Automatic).				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Chemical dispenser equipment using chemical having ingredient base of Sodium Dichloroisocyanurate. Chemical dispenser to prepare fresh 0.3% to 5% as chlorine solution. Chemical dispenser should consist of controlled Dispensing of Sodium Dichloroisocyanurate through a Feeder mechanism to a solution preparation tank. At solution preparation tank controlled proportionate amount of water shall be mixed to give required percentage of Chlorine solution.				
		Dosing metering pump should give the accurate online and continuous dosing of chlorine in the water to be chlorinated. Water level at solution preparation tank is to be controlled by level switch and solenoid valve.				
		Suitable control system for water pressure control to dosing pump.				
		Electronic Solenoid Driven dosing pump for Digital Proportional Dosing Control System should offer the facility of on-site digital dose rate setting in Ltr/hr with display. Dosing chlorine solution at inlet of water storage tank/sump/online				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		The electronic chemical dosing device of the plant should be capable of proportional injection of chemical solution. It should offer dosing pump of 6LPH @ 4kg/cm ² injection pressure.				
		All automatic operations are PLC controlled with HMI provided.				
		Mandatory Accessories: 1.SMPS-1- 110V to 270V with two phase. 2. Voltage Stabilizer- Panel parts, Voltage stabilizer of 6AMP @230V. 3.Pressure Switch – Range: 0.5-5 kg/cm ² . Plastic wetted parts, with extruded aluminum body with adjustable scale				
		Interlock :- Interlock will stop the dosing pump when 1. No water level at solution preparation tank 2. No water at inlet of the machine Interlock will automatically start the dosing pump when above issues are resolved.				
		Chlorine Test kit to be provided for suitable to measure residual chlorine upto 5ppm				
		Capacity Min: Chlorine 10gm/hr to Max. Chlorine 250gm/hr				
		Sodium Dichloroisocyanurate Dosing Potable Water Chlorination system: (Automatic).				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	SD -4	Providing, installing & commissioning with satisfactory test & trial Chlorine/ sodium dichloroisocyanurate dosing portable water chlorination system (Automatic) having chlorine as a sodium dichloroisocyanurate with following components, Capacity 10gm/hr. to 250gm/hr.	No.	1020000	20000	1040000
		Chemical dispenser equipment using chemical having ingredient base of Sodium Dichloroisocyanurate. Chemical dispenser to prepare fresh 0.3% to 5% as chlorine solution. Chemical dispenser should consist of Dispensing of Sodium Dichloroisocyanurate through a Feeder mechanism to a solution preparation tank. At solution preparation tank proportionate amount of water shall be mixed to give required percentage of Chlorine solution.				
		Dosing metering pump should give the accurate online and continuous dosing of chlorine in the water to be chlorinated. Water level at solution preparation tank is to be controlled by level switch and solenoid valve.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Dosing Pump: 0 - 6 LPH @ 4 kg / cm ² , Solenoid Operated Electro Mechanical Design with Mechanically linked Diaphragm With level switch arrangement, Material: PVDF/PTFE, Borosilicate NRV Ball, PTFE Diaphragm with Automatic Flow Variation based on pulse signal from MPSU (Multiple Parameter Sampling Unit).				
		Level Switch (Side Mounted) - For high/ low level to ensure proper reagent preparation.				
		SMPS-1- 110V to 270V with two phase.				
		Voltage Stabilizer- Panel parts, Voltage stabilizer of 6AMP @230V.				
		Pressure Switch – Range: 0.5-5 kg/cm ² . Plastic wetted parts, with extruded aluminum body with adjustable scale				
		PLC for chemical dispensing unit with HMI				
		Control Panel, Instruments and remote monitoring				
		CONTROL PANEL Enclosure MOC : MS POWDER COATED				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Outputs : Pulse output for dosing pump RS 485 Output for Remote monitoring Input : 2 analog inputs (free residual Chlorine and pH) One conductivity sensor				
		SMART pH TRANSMITTER WITH SENSOR Model : PO-600 PH Range : 00 to 14 Output : 4-20 mA current output				
		CHLORINE METER WITH SENSOR Range : 00 to 5 ppm Output : Potential free individual high & low relay output and 4-20 mA current output				
		MODEM (GPRS/GSM) for remote data monitoring				
		Electromagnetic flowmeter upto 100 NB Range : based on linesize Output : 4-20 mA current output				
		Capacity Min: Chlorine 10gm/hr to Max. Chlorine 250gm/hr				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 18 - WM [WATER METERS]				
	WM 1	Mechanical Type Meters.				
	A)	Domestic Meters				
	a)	I S I mark as per IS 779/1994				
		Providing, installing and giving satisfactory field testing of Domestic water meter, horizontal inferential multijet type with magnetic drive and dry dial suitable for ambient 50° C Temperature duly sealed against tampering complete with couplings at both ends and conforming to class B as per IS 779/1994 (VI Revision) with ISI mark along with manufacturer's test certificate and guarantee certificate, including cost of all materials and labour.				
	1	15 mm dia	Each	1208	214	1422
	2	20 mm dia	Each	2254	214	2468
	3	25 mm dia	Each	3193	214	3407
	4	40 mm dia	Each	6994	214	7208
		For Comprehensive Maintenance & Repairs of above water meters in water supply scheme, Following % shall be added on Supply rate.				
		1 First year	Free			
		2 Second year	4%			
		3 Third year	5%			
		4 Fourth year	6%			
		5 Fifth year	7%			

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	b)	Multijet meters				
		Providing, installing and giving satisfactory field testing of Domestic water meter, horizontal inferential multijet type with magnetic drive and dry dial suitable for ambient 50° C Temperature duly sealed against tampering complete with couplings at both ends and conforming to class B as per ISO 4064 along with manufacturer's test certificate and guarantee certificate, including cost of all materials and labour etc with OIML / MID certification for Abroad and FCRI for India including 36 months guarantee etc complete				
	1	15 mm dia	Each	2131	214	2345
	2	20 mm dia	Each	2641	214	2855
	3	25 mm dia	Each	4620	214	4834
	4	40 mm dia	Each	8790	214	9004

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	c)	AMR Meters				
		Providing, installing and giving satisfactory field testing of domestic multijet mechanical AMR water meters horizontal inferencial with magnetic drive and dry dial suitable for ambient 50°C temperature duly sealed against tampering complete with coupling at both ends and conforming to ISO 4064 with GSM / radio frequency (RF) for communication to server via transreceiver alongwith Hand held Device and PC software etc complete with EEC / OIML.MID certification for Abroad meter and FCRI for India including 36 months guarantee etc complete.				
	1	15 mm dia	Each	7390	811	8201
	2	20 mm dia	Each	8130	929	9059
	3	25 mm dia	Each	12695	1147	13842
	4	40 mm dia	Each	17308	1565	18873

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	B)	Bulk Meters.				
		Providing, installing and giving satisfactory field testing of flanged ends Bulk water meter of following type and as mentioned below with FGI-250 cast iron body, class "B" conforming to IS : 2373, to read in metric system, alongwith manufacturer's test and guarantee certificate including cost of all materials and labour with ISI mark etc complete.				
	a)	Removable mechanism type as per IS2373				
	1	200 mm dia	Each	23878	2576	26454
	2	250 mm dia	Each	45866	3393	49259
	3	300 mm dia	Each	60613	4400	65013

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	b)	Removable mechanism type Bulk water meter as per ISO 4064				
		Providing, installing and giving satisfactory field testing of bulk water meter, horizontal inferential multijet type with magnetic drive and dry dial suitable for ambient 50° C Temperature duly sealed against tampering complete with flanges at both ends and conforming to class B as per ISO 4064 along with manufacturer's test certificate and guarantee certificate, including cost of all materials and labour etc with OIML. MID certification for Abroad meter and FCRI for India including 36 months guarantee etc complete.				
	1	50 mm dia	Each	15719	447	16166
	2	80 mm dia	Each	17464	1090	18554
	3	100 mm dia	Each	19211	1544	20755
	4	150 mm dia	Each	24397	2410	26807
	5	200 mm dia	Each	32149	2576	34725
	6	250 mm dia	Each	72844	3393	76237
	7	300 mm dia	Each	122686	4151	126837

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	NOTE	1) The domestic and bulk water meter shall be suitable for water, minimum, maximum and transitional flow conforming to IS 779-(1994-6th edition), I S 2373 or ISO-4064 as applicable and shall be installed so as to have laminar flow with pipe running full.				
		2) Pressure rating (maximum working pressure 16 Kg. sqcm) suitable for forward and reverse flow.				
		3) Strainers (also called as filters or dirt boxes) are recommended for installation upstream of the water meter at a length not less than 12D - D is diameter of pipe)				
		4) For tapers, non-return valves, specials, pumps the meter shall be installed at a distance of not less than 15 D (D is diameter of pipe) downstream i.e. in the direction of flow.				
		5) The cost of cutting existing pipe, welding flanges, excavation, construction of chamber is not included in above rates.				
		6) Cost of Strainer (Filter/dirt box) is not included in above rates.				
		7) Guarantee period shall be 36 months.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	c)	C.I. Strainer "T" (Basket) Type with flanged ends				
		Providing, and fixing C.I.Strainer for water meters including cost of all material and labour.of "T" (Basket) Type with flanged ends and with stainless steel or brass mesh with openings of 2.5. mm to 3 mm and suitable for operating pressure of 16 Kg./cm2 and test pressure of 24 Kg./cm2				
	1	50 mm dia	Each	3412	447	3859
	2	80 mm dia	Each	4931	1090	6021
	3	100 mm dia	Each	7043	1544	8587
	4	150 mm dia	Each	12910	2410	15320
	5	200 mm dia	Each	19467	2576	22043
	6	250 mm dia	Each	25955	3393	29348
	7	300 mm dia	Each	49835	4400	54235
	NOTE	1) The cost of cutting existing pipe, welding flanges excavation, construction of chamber is not included in above rates.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	WM 2	Ultrasonic / Electromagnetic Water Meter				
	A)	AMR Domestic Meters				
		Providing, installing and giving satisfactory field testing of domestic battery operated AMR water meters with no measurement of air along with manufacturing test certificate and guarantee certificate with battery life of minimum 10 years with GSM / RF technology for communication to server with PC software including 36 months guarantee, etc. complete.				
		General Specifications				
		1. Meter should be battery operated with no moving parts, low pressure loss, dry type as per ISO 4064/OIML R49 and certification as per FCRI / MID.				
		2. Display : 9 digits LCD				
		3. Enclosure : Protection class IP 68				
		4. Temperature : Ambient 50 deg.C				
		5. Pressure : PN-16				
		6. Power Supply : 3.6 lithium battery with minimum life of 10 years				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		7. Memory built-in and should have storage for at least 12 months with daily / monthly accumulated totalised data with time and date should be available. It should be able to access memory of the meter through serial communication				
		8. End connections : Screwed upto 40 mm				
		9. Installation : should be able to install in any orientation				
	1	15 mm dia	Each	10032	936	10968
	2	20 mm dia	Each	10942	1022	11964
	3	25 mm dia	Each	12759	1191	13950
	4	40 mm dia	Each	18212	1697	19909

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	B)	AMR Bulk Meters				
		Providing,installing testing and commissioning of in line battery operated ultrasonic bulk type water meters ISO 4064 with built in data logger and GSM/GPRS modem for transfer of data communication to remote central computer as per working on following conditions and specifications.The meter shall be suitable for 50°C and provided with IP 68 protection class with complete immersion of water.The meter shall have battery life of min.10 years should be able to detect the reverse flow				
		volume and tampering.The accuracy of the meter shall be +/- 1 % of measured value including 36 months guarantee etc complete.(With Simcard and its charges,valid for 36 months)				
	1	50 mm dia	Each	27344	2456	29800
	2	80 mm dia	Each	31752	2850	34602
	3	100 mm dia	Each	37082	3331	40413
	4	150 mm dia	Each	51999	4667	56666
	5	200 mm dia	Each	78839	7077	85916
	6	250 mm dia	Each	151189	13568	164757
	7	300 mm dia	Each	209403	13568	222971

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	C)	Ultrasonic Flow meters				
		Providing, installing and giving satisfactory test & trial of Ultrasonic Flow meter of ISO working on 85 -260 V AC, 50 HZ electric power supply of following type working on time of flight principle suitable for satisfactory continuous operation in all seasons & with following accessories, working conditions, specifications & duly tested as specified below :				
	1	Ultrasonic Clamp-on portable type Flow Meter (Single Channel)				
		Providing, installing and giving satisfactory test & trial of ultrasonic clamp on portable type flow meter working on conditions & specifications, calibration, inspection, testing, training, guarantees and manufacturers test certificate/ declaration copy along with accessories as mentioned above along with accessories like	Each	306235		306235
		a) Magnetic Clamps-1 Pair &				
		b) Suitable carrying case-1 No.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	2	Ultrasonic Clamp-on Fixed type Flow Meter (Single Channel)				
		Providing, installing and giving satisfactory test & trial of ultrasonic clamp on Fixed type flow meter working on conditions & specifications, calibration, inspection, testing, training, guarantee and manufacturers test certificate/ declaration copy along with accessories as mentioned in a (1) to (16) below.	Each	266073		266073

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	3	Ultrasonic Insertion Fixed type Flow Meter (Single Channel)				
		Providing, installing and giving satisfactory test & trial of ultrasonic Insertion Fixed type flow meter working on conditions & specifications, calibration, inspection, testing, training, guarantee and manufacturers test certificate/ declaration copy along with accessories as mentioned in a (1) to (16) below & with inbuilt assembly to fix the insertion type transducer on the pipeline.	Each	272895		272895
		Mandatory Accessories:				
		1) Integrated signal converter transmitter enclosed in die cast aluminum case / any anticorrosive material confirming to IP-68 - 1 No.				
		2) Pair of transducers (Sensors) confirming to IP-68 with junction boxes - 1 No.				
		3)Stainless steel straps for mounting clamp on type sensors - 2 Nos.				
		4) Grease count plant, 100 ml : Bottle - 5 Nos.				
		5) Signal & power cables for each transducer -50 Mtrs length/each (insertion type flow meter) & 10 mtrs length /each (portable type flow meter)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		6) a) for fixed type flow meter-UPS working on 230 V AC, 50 Hz power supply suitable for 12 hrs continuous operation.-1 No. (only required for category C)				
		b) Built in portable type battery back up for minimum 5 Hrs continuous operation with spare battery and separate battery charger working on 230 V AC, 50 Hz power supply for charging battery- 1 No. (only required for category A)				
		c) Aluminium / anticorrosive carrying case for flow meter and all accessories (only required for category C-1)				
		7)Data storage capacity with built in or separate for date, time, actual flow rate, totaliser & error messages if any with storage capacity of 120 days and at 5 minutes interval data logging along with local indication and necessary cables and software to download data to laptop -1 No				
		8) Proper earthing shall be provided for protection against high voltage surge (only required for category B,C)				
		9) Suitable over voltage protection unit for protection of instrument from higher voltage (upto 275 V-300 V AC)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		11) Magnetic clamp for metallic pipe lines and Nylon / SS strips, chain arrangement for clamp on sensors suitable for pipe diameters 50 mm to 3000 mm (only required for category C-1)				
		12) Battery powered ultrasonic thickness gauge along with charger, test sample, coupling agent and carrying case suitable measuring thickness of 1 mm to 100 mm (only required for category C)				
		13) 5 meter steel measurement tape with level bottle.				
		14) Communication facility through GSM(without simcard (for category C)				
		15) Guarantee period shall be 36 months.				
		Optional Accessories:				
		1) Fixing flow meter transmitter to internal walls of buildings in a suitably designed panel cabinet with proper locking arrangement with glass window on front door for seeing the readings of flow transmitter and data logger without opening of the panel cabinet. It should house complete ancillaries and including the provision for connection of electrical power supply from nearby apparatus. The panel cabinet shall be prewired and with suitable gland entries.	Each	6603		6603

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		2) Wireless communication device to communicate between central computer & flow transmitter installed at remote site with GSM based system				
		3) DA Scheduler software for CSV file storage and data acquisition				
		4) Cables for pressure, flow & totalized details from transmitter to field gate system (10 Mtrs with each GSM / GPRS system)				
		5) OPC Software to be installed in central PC for SCADA interface as may be necessary				
		6) Commissioning charges for each locations.				
		7) Customized page with Java Applets XML-Data import software for online MIMIC				
		8) Sensor/Transmitter cable of following specification:				
		3 x 0.38 mm ² PVC cable with common branded copper shield 7mm dia and individually shielded cores-with empty pipe detection 9 EPD	Mtr	197		197
		4 x 0.38 mm ² PVC cable with common branded copper shield 7 mm dia and individually shielded cores.				
		Conductor resistance : ≤ 50 Ohm/Km				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	C)	Working Condition & Specifications				
		a) Water Temp : 10° to 50° C				
		b) Water Quality: Raw water, turbid in nature. Potable chlorinated water				
		c) Operating pressure:10-15 Kg./cm ²				
		d) Pipeline MOC : CI, DI, MS with /without mortar lined, Non-metallic pipes.				
		e) Pipe diameter :> 1000 mm - 4000 mm				
		f) Flow -Up to 300 Mld				
		g) Pipe condition: Pipe shall be running full.				
		h) Ultrasonic flow meters shall be designed, manufactured to international standards with accuracy of +/-2% of actual flow. The supplier should have full ISO -9000 series accreditation & facility for fully traceable calibration flow rig as per international standard				
		i) Functional details: Freely programmable.				
		j) Measurement - Volumetric flow rate, totalized flow.				
		k) Flow direction- Forward & Reverse.				
		l) Display- LCD display with suitable lines, digits, segments, markers, for identification of current output. The digit shall be clear, bold & can be read from 1 Mtr distance.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		m) Output - for current 4 mA - 20 mA HART (active/passive) for measuring flow in pipeline. Frequency output shall be 1 KHz, Open collector, passive.				
		n) Status output-open collector.				
		o) Meter shall be suitable for remote facility.				
		p) Power supply-85-260 V AC(45-65 Hz)/20-55 V AC (45-65 Hz)/16-62 V DC.				
		q) Galvanic isolation- input & output galvanically isolated from power supply from the sensor and from each other				
		r) Instruments must carry "CE" mark.				
		s) Functionality verification check should be possible inline using recommended software tools.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		t) Future upgradation to field bus foundation. Profibus should be possible with minimal changes.				
	D)	Calibration, Testing & Inspection				
		The total supply quantity shall be inspected and tested as below. The flowmeter shall be calibrated at manufacturers place as per international standard given above. Manufacturer having NABL lab accreditation ,the calibration testing shall be witnessed by Third party approved by MJP .The manufacturer not having NABL lab accreditation shall be tested at FCRI/CWPRS/IDEMI etc. for which third party inspection is not required.				
		For water meter/flowmeters-Third party inspection shall 15% of total qty.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	E)	Manufacturer's Guarantee, Certificate & training				
		The flow meter shall be supplied with manufacturer's test certificate as per international standards given above. calibration certificates. 36 months guarantee for the trouble free performance and given adequate training for handling flow meter and installation in field so that trainees can carryout the job independently.				
	F)	O & M towards flow meter & accessories				
		The O & M shall be decided based on " planned preventive maintenance" Program (PPM) to be finalized with suppliers with following service included (but not limited) for 36 months beyond standard warranty. However for project cases user must discuss with supplier for lumpsum O & M cost for the overall project.				
		Planned Preventive Maintenance (PPM):				
		a) Regular visit to the flow meters (once in 2 months to check the healthyness of instruments)				
		b) Repairs/ replacement of components/spare parts as may be necessary during the flow meter inspection.				
		c) Free replacement of the spare parts and consumables as necessary.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		d) Emergency visit to site within 48 hours for attending any major trouble shooting and break downs.				
		e) Technical training/ trouble shooting training to the user by the supplier.				
		f) Providing complete technical details on instrument with necessary manuals				
	G)	General Terms & Conditions				
		a) General Specifications with accessories (except required for each type of meter specified) working conditions, mandatory accessories, calibration, inspection testing manufacturers test certificates, installation and commissioning, guarantee and training shall be common for all flow meters as mentioned above. The optional accessories mentioned above to be considered as per project and site requirements.				
		b) The above prices include local inland transportation from manufacturer's godown /custom's godown upto sites anywhere in Maharashtra.				
		c) The above prices include necessary packing & forwarding charges as applicable for each project				
		d) The above prices are inclusive of Marine & inland insurance of flow meters up to site storage				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		e Meter shall be procured with prior permission from concerned superintending Engineer/Chief Engineer.				
		f) Planning for installation for meter shall be done during execution of pipe work. Straight pipe length of 5 D or more on up stream side and 2 D or more on down stream side of meter is necessary (D is diameter of flow meter) The meter shall be installed so as to have a laminar flow with pipe running full.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	WM 3	Full-Bore Electromagnetic Flow Meter:				
		Supply, install and commission Electromagnetic Flow Meter (EMF) As Per ISO 4064, for Raw/Pure water with accuracy +/- 0.5% of measured value & protection as per given specifications for size 100 mm-1000mm including sensor, transmitter surge arrestor, cable GI duct if suitable size for 25 mtrs built in GSM/GPRS (with Simcard and its charges,valid for 36 months) including the pipe cutting, leveling and installation of flow meter in the pipelines with necessary tool tackles, cranes including 36 months guarantee etc complete, as may be required at site & based on technical specifications.				
	1	100 mm Nominal Diameter Flowmeter	Each	130099	4792	134891
	2	150 mm Nominal Diameter Flowmeter	Each	139573	5826	145399
	3	200 mm Nominal Diameter Flowmeter	Each	166006	6167	172173
	4	250 mm Nominal Diameter Flowmeter	Each	183106	7161	190267
	5	300 mm Nominal Diameter Flowmeter	Each	209441	8765	218206
	6	350 mm Nominal Diameter Flowmeter	Each	290828	10977	301805

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	7	400 mm Nominal Diameter Flowmeter	Each	330090	12656	342746
	8	450 mm Nominal Diameter Flowmeter	Each	352681	14486	367167
	9	500 mm Nominal Diameter Flowmeter	Each	412031	15159	427190
	10	550 mm Nominal Diameter Flowmeter	Each	456260	16515	472775
	11	600 mm Nominal Diameter Flowmeter	Each	475202	17099	492301
	12	700 mm Nominal Diameter Flowmeter	Each	510570	18181	528751
	13	750 mm Nominal Diameter Flowmeter	Each	547083	19279	566362
	14	800 mm Nominal Diameter Flowmeter	Each	613539	21342	634881
	15	900 mm Nominal Diameter Flowmeter	Each	699094	23961	723055
	16	1000 mm Nominal Diameter Flowmeter	Each	748830	27950	776780
	A)	Mandatory Accessories:				
		1) The sensor should be as per IP-68 protection & with flanges of PN 10 rating from CS-1 No.				
		2) The sensor coil housing shall be IP-68.This protected against external magnetic field.				
		3) The transmitter shall have one current 4 m A-20 mA output.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		4) The current output shall be galvanically / optically isolated. transients without damage. It shall be fitted with switched mode power supply capability 85-260 V & 45-65 Hz to cope up with power transient without damage				
		5) Signal & power cables shall be of 50 Mtrs length/each.				
		6) Conduit pipe (PVC Plumbing schedule 4) 25 mm diameter with suitable rating of cable with digging, laying & concealed the duct - 25 mtrs/each				
		7) UPS working on 230 V AC, 50 Hz power supply suitable for 12 hrs continuous operation-1 No.				
		8) Data storage capacity with built in or separate for date time, actual flow rate, totaliser & error messages if any with storage capacity of 120 days -1 No.				
		9) Proper earthing shall be provided for protection against high voltage surge.				
		10) Suitable over voltage protection unit for protection of instrument from higher voltage (upto 275 V-300 V AC)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		11) Fixing flow meter transmitter to internal walls of buildings in a suitably designed panel cabinet with proper locking arrangement with glass window on front door for seeing the readings of flow transmitter and data logger without opening of the panel cabinet. electrical power supply from near by apparatus. The panel cabinet shall be It should house complete ancillaries and including the provision for connection of prewired and with suitable gland entries.				
	B)	Optional Accessories:				
		1) Providing and supplying DI/CI in-line adapters with mechanical joints & concentric tapers with flanges along with suitable gasket of SBR, complete with mild steel nut bolts coated or otherwise protected from rusting and suitable for DI pipes as may be necessary for the following line size x flow meter sizes. Applicable only for Sr.No. (2) Electromagnetic Flow meters.				
		2) Wireless communication device to communicate between central computer & flow transmitter installed at remote site with GSM based system				
		3) DA Scheduler software for CSV file storage and data acquisition				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		4) OPC Software to be installed in central PC for SCADA interface as may be necessary				
		5) Sensor/Transmitter cable of following specification:				
		3 X 0.38 mm ² PVC cable with common, braided copper shield (-7mm dia) and individually shielded cores- with empty pipe detection 9 EPD): 4X0.38 mm ² PVC cable with common, braided copper shield (-7 mm dia) and individually shielded cores-conductor resistance: ≤ 50 Ohm/Km-Capacitance: core/shield: ≤ 420 pF/m.- permanent operating temperature:-20.....+80 Deg C	Mtr	203		203
		8) Coil cable of following specifications :				
		3 X 0.75 mm ² PVC cable with common, braided copper shield (-7mm dia) Conductor resistance : ≤ 37 Ohm/Km-Capacitance: core/core, shield grounded :≤ 120 pF/m.-permanent operating temperature:-20+/-80 Deg C	Mtr	184		184
	C)	Working Condition & Specifications				
		a) Water Temp : 10 Deg to 50 Deg				
		b) Water Quality: Raw water, turbid in nature. Potable chlorinated water				
		c) Operating pressure:10-15 Kg./cm ²				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		d) Pipeline MOC:CI,DI,MS with /without mortar lined, Non-metallic pipes.HS & PSC				
		e) Pipe condition: pipe shall be running full.				
		f) Full-Bore Bi-directional Electromagnetic Flow meters shall be designed, manufactured & calibrated to international standards with accuracy of +/- 0.5% of reading.				
		g) The supplier should have full ISO-9000 series accreditation & full it aceable calibration methods to either of the two primary standard means of testing i.e. mass (ISO 4185) or volume (ISO 6817)				
		h) Each meter shall be wet calibrated at the place of manufacturing with 3 point calibration at sufficient flow rates. The testing facility shall be duly accredited in accordance to ISO 17025				
		i) The sensor shall be of standard length as per ISO 13359				
		j) The sensor shall have built in stainless steel Grounding Electrode & Empty pipe Detection. Any ground probes, rings, flanges or straps will be strictly not acceptable.				
		k) The liner material shall be either Certified Hard Rubber (HR) with Drinking water Approval or Polyurathane (PU) & teflon.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		l) The sensor & transmitter shall be capable of working in tropical environment.				
		m) The Meter body shall be flanged or with custom connector as per the requirement. Wafer designs will not be acceptable.				
		n) The housing of flow meter shall be Die cast Aluminum/painted steel with suitable anti-corrosive paint.				
		o) The flow meter shall be suitable for both submergence as well as burial installation & shall withstand all necessary natural shocks.				
		p) The transmitter & sensor shall not have any EMI interferences in the actual flow meter reading.				
		q) The transmitter shall be wall-mounted type with a 2-line display for the indication of Actual Flow rate & Totalized value. The material enclosure shall be sufficient to guarantee 5 year operation life.				
		r) The transmitter shall be capable of fully programmed with push button/using HART communicator. It shall have a set-up menu so that all relevant parameters may be user-set from the self-prompting driven menu. The repeatability shall be 0.1% of reading or better, minimum+/-0.5mm/s				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		s) The transmitter shall have one scalable pulse output. One current (HART) output. The current output shall be galvanically isolated. It shall be fitted with switched mode power supply capability 85-260 V & 45-65 Hz to cope with power transients without damage.				
		t) The totalizer value shall be protected by EEPROM during power outage, and utilizes an overflow counter.				
		u) The flow meter shall be provided with remote display suitable without any signal booster / amplifier for distance upto 150 Mtrs. for online MIMIC				
	D)	Calibration, Testing & Inspection				
		The 15% of total supply quantity shall be inspected and tested as below. The flowmeter shall be calibrated at manufacturers place as per international standard given above. Manufacturer having NABL lab accreditation ,the calibration testing shall be witnessed by Third party approved by MJP .The manufacturer not having NABL lab accreditation shall be tested at FCRI/CWPRS/IDEMI etc. for which third party inspection is not required.				
	E)	Manufacturer's Guarantee, Certificate & training				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		The flow meters shall be supplied with manufacturer's test certificate as per international standards given above. calibration certificates. 36 months guarantee for the trouble free performance and given adequate training for handling flow meter and installation in field so that trainees can carryout the job independently.				
	F)	O & M towards flow meter & accessories				
		The O & M shall be decided based on " planned preventive maintenance" Program (PPM) to be finalized with suppliers with following service included (but not limited) for 36 months beyond standard warranty. However for project cases user must discuss with supplier for lumpsum O & M cost for the overall project.				
		Planned Preventive Maintenance (PPM):				
		a) Regular visit to the flow meters (once in 2 month to check the healthyness of instruments)				
		b) Repairs/ replacement of components/spare parts as may be necessary during the flow meter inspection.				
		c) Free replacement of the spare parts and consumables as necessary.				
		d) Emergency visit to site within 48 hours for attending any major trouble shooting and break downs.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		e) Technical training/ trouble shooting training to the user by the supplier.				
		f) Providing complete technical details on instrument with necessary manuals				
	G)	General Terms & Conditions				
		a) General Specifications with accessories (except required for each type of meter specified) working conditions, mandatory accessories, calibration, inspection testing manufacturers test certificates, installation and commissioning, guarantee and training shall be common for all flow meters as mentioned above. The optional accessories mentioned above to be considered as per project and site requirements.				
		b) The above prices include local inland transportation from manufacturer's godown /custom's godown upto sites anywhere in Maharashtra.				
		c) The above prices includes necessary packing & forwarding charges as applicable for each project				
		d) The above prices are inclusive of Marine & inland insurance of flow meters up to site storage				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		e) Planning for installation for meter shall be done during execution of pipe work. Straight pipe length of 5 D or more on up stream side and 2 D or more on down stream side of meter is necessary (D is diameter of flow meter) The meters shall be installed so as to have a laminar flow with pipe running full				
		Note : While preparing the estimate of water meter / flowmeter(Other than WM 1Aa), 7% of amount of supply rate of water meter / flowmeter shall be added for comprehensive maintenance of water meter for 36 months after the guarantee period .				
	WM 4	Battery Operated electromagnetic flow meter				
		Providing, erecting, testing and commissioning of battery operated electromagnetic flow meter built in GSM/GPRS (with Simcard charges for 36 months validity) of various diameters as per the following specifications including 36 months guarantee etc complete.				
	A)	General Specifications				
		Sensor				
		1) Sensor size (dia.) : DN 25 mm to 1200 mm				
		2) Process temperature : Ambient -1... +50°C				
		3) Type : In line full bore Electromagnetic				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		6) Process Connection : Flanged AS per IS				
		7) Weather Protection class : IP 68				
		8) Liner : Neoprene or equivalent				
		9) Housing : corrosion resistant, non corrosive sensor can be buried.				
		10) Application : Water application and distribution network				
		11) Electrode : Stainless steel 316				
		12) Grounding electrode : Stainless steel 316				
		13) Flanges : Carbon steel				
		14) Operating Pressure : PN 16/232 psi				
		15) Cable : factory fitted 20 mtrs long				
		Transmitter				
		1) Type : Microprocessor based, with configurable parameter				
		2) Power supply : Inbuilt battery via internal D cell (3.6 V)				
		3) Input : From flow sensor				
		4) Output : pulse outputs				
		5) Display : Display with 8 digits for main information. Index, menu and status symbols for dedicated information. Resolution totalized information can be displayed with 1,2 or 3 decimals or automatic adjustment (default).				
		6) Display unit : Flow unit				
		7) Weather protection class : IP 68				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		8) Accuracy : +/- 0.5%				
		9) RS 232 / RS 485Serial interface				
		10) Diagnostic : Continuous self test including coil current to drive the magnetic field signal input circuit, data calculation, handling and storing alarm statistics and logging for fault analyzing electrode impedance to check actual media contact, flow simulation to check pulse and communication signal chain for correct scaling number of sensor measurements (excitations)				
	1	100 mm line size	Each	130666	14977	145643
	2	150 mm line size	Each	140180	16066	156246
	3	200 mm line size	Each	166729	19108	185837
	4	250 mm line size	Each	183903	21076	204979
	5	300 mm line size	Each	210351	24108	234459
	6	350 mm line size	Each	292093	33476	325569
	7	400 mm line size	Each	331525	37995	369520
	8	450 mm line size	Each	354214	40596	394810
	9	500 mm line size	Each	413824	47427	461251
	NOTE 1	Battery operated electromagnetic flow meter shall be considered for estimation and installation with prior approval from the Superintending Engineer (Mech.).				
	NOTE 2	All erection of water meters must be done in presence & guidance of manufacturers representative.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 19 - SA				
		[SCADA & AUTOMATION]				
	SA 1	Raw Water Pump house				
	1.1	Ultrasonic level transmitter/ for pure water sump/ MBR/ ESR/ Wash Water Tank/ Filter bed				
	1.1. a	Designing, Supplying, Installing, commissioning & testing of Ultrasonic level transmitter CE marked with following technical parameters Interfacing with PLC panel including mounting arrangement.	Each	60102	5282	65384
		Output-4-20 mA / HART				
		Power supply - 24V DC ext.				
		Display - 4" LED				
		Range- 0-10 mtr - 20 mtr.				
		Accuracy - +/- 0.25% of Full Scale or better				
		Enclosure- IP 68				
		Mounting - On PLC panel				
	1.1. b	Ultrasonic level transmitter raddar type level transmeter for raw water pumping station				
		Designing, Supplying, Installing, commissioning & testing of Ultrasonic Raddar type Ultrasonic level transmitter CE marked with following technical parameters at Raw Water Pump House and Interfacing with PLC panel including mounting arrangement.	Each	63925	5282	69207
		Output-4-20 mA / HART				
		Power supply - 24V DC ext.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Display - 4" LED				
		Range- 0 to ...30... mtrs				
		Accuracy - +/- 0.25% of Full Scale or better				
		Enclosure- IP 68				
		Mounting - On PLC panel				
	1.2	Pressure Transmitter for raw & pure water pumping station	Each	34308	2466	36774
		Designing, Supplying, Installing, commissioning & testing of pressure transmitter CE markd with following technical parameters at Raw Water Pump House and Interfacing with PLC panel including mounting arrangement.				
		Output 4-20 mA / HART				
		Power supply - 24V DC ext.				
		Display - 4" LED				
		Accuracy - +/- 0.1 % of full scale or better				
		Enclosure- IP 68				
	1.3	Power Analyser	Each	30940	2325	33265
		Designing, Supplying, Installing, commissioning & testing of Power Analyser interfacing to PLC Panel with modbus communicatuion port , as per IEC 62053 and in the prescribed format including mounting arrangement.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	1.4.1	PLC panel for Raw water pump House with two Pumps		146970	17310	164280
		<p>Design, manufacture, supply, installation, testing and commissioning of indoor type PLC panel of size approx. 1000 mm X 700 mm X 1500mm (LBH), fabricated out of min. 2 mm thick CRCA sheet powder coated to Siemens gray color.</p> <p>The Panel shall be provided with reputed make PLC with following accessories as well as input output configuration.</p> <p>The PLC shall be programmed with IEC 61131 standards for control, monitoring and communication of equipments & instruments at Raw water Pumphouse.</p> <p>PLC shall have Ethernet port & protocol for Modbus TCP communication with following IO.</p>				
		<p>DI –16 num DO – 16 num AI –8 num AO – 4 num.</p> <p>7 inch color TFT HMI complete with programming shall be provided to interact with PLC.</p> <p>The panel shall include all the accessories (not limited to following) to achieve purpose of smooth & trouble free operation of pump house.</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		MCB 10A DP – 1 num MCB 4A DP – 4 num 24 VDC Power Supply 10A – 1 num Push Buttons – 7 num Selector Switch - 2 num Control Contactor – 2 num Annunciator with 6 Windows NO to NC Type Electronic Hooter – 1 num Control Transformer – 1 num Emergency PB – 1 num Panel Cooling Fan – 1 num Panel Light with Door Switch – 1 num Control Indication Lamp – 5 num Wiring + TB etc – 1 lot Hardware – 1 lot				
	1.4.2	PLC panel for Raw water pump House with four Pumps		193410	22779	216189
		Design, manufacture, supply, installation, testing and commissioning of indoor type PLC panel of size approx. 1000 mm X 700 mm X 1500mm (LBH), fabricated out of min. 2 mm thick CRCA sheet powder coated to Siemens gray color. The Panel shall be provided with reputed make PLC with following accessories as well as input output configuration. The PLC shall be programmed with IEC 61131 standards for control, monitoring and communication of equipments & instruments at Raw water Pumphouse. PLC shall have Ethernet port & protocol for Modbus TCP communication with following IO				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		DI –16 num DO – 16 num AI –16 num AO – 8 num 7 inch color TFT HMI complete with programming shall be provided to interact with PLC. The panel shall include all the accessories (not limited to following) to achieve purpose of smooth & trouble free operation of pump house.				
		MCB 10A DP – 1 num MCB 4A DP – 4 num 24 VDC Power Supply 10A – 1 num Push Buttons – 7 num Selector Switch - 2 num Control Contactor – 4 num Annunciator with 6 Windows NO to NC Type Electronic Hooter – 1 num Control Transformer – 1 num Emergency PB – 1 num Panel Cooling Fan – 1 num Panel Light with Door Switch – 1 num Control Indication Lamp – 5 num Wiring + TB etc – 1 lot Hardware – 1 lot				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	1.4.3	PLC panel for Raw water pump House with Six Pumps		244530	28800	273330
		<p>Design, manufacture, supply, installation, testing and commissioning of indoor type PLC panel of size approx. 1000 mm X 700 mm X 1500mm (LBH), fabricated out of min. 2 mm thick CRCA sheet powder coated to Siemens gray color.</p> <p>The Panel shall be provided with reputed make PLC with following accessories as well as input output configuration. The PLC shall be programmed with IEC 61131 standards for control, monitoring and communication of equipments & instruments at Raw water Pumphouse</p> <p>PLC shall have Ethernet port & protocol for Modbus TCP communication with following IO.</p>				
		<p>DI –32 num DO – 32 num AI –24 num AO – 8 num.</p> <p>7 inch color TFT HMI complete with programming shall be provided to interact with PLC The panel shall include all the accessories (not limited to following) to achieve purpose of smooth & trouble free operation of pump house.</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		MCB 10A DP – 1 num MCB 4A DP – 4 num 24 VDC Power Supply 10A – 1 num Push Buttons – 7 num Selector Switch - 2 num Control Contactor – 6 num Annunciator with 6 Windows NO to NC Type Electronic Hooter – 1 num Control Transformer – 1 num Emergency PB – 1 num Panel Cooling Fan – 1 num Panel Light with Door Switch – 1 num Control Indication Lamp – 5 num Wiring + TB etc – 1 lot Hardware – 1 lot				
	1.4.4	Scada system for Raw water pump House		245700	28938	274638
		Design, manufacture, supply, installation, testing and commissioning of SCADA System for pump house. Windows based PC with latest configuration & OS complete with necessary office & antivirus softwares. PC configuration shall not be less than Intel i5 10th Gen CPU, 16 GB Ram, 128 GB SDD, 500 GB HDD, DVD RW, Rs232 & Rs485 port, 2 RJ45 ports, Keyboard, Optical Mouse, 32 inch color TFT Monitor, Latest Windows Pro OS, Microsoft Office & Antivirus & Internet Security software for 3 years license.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<p>SCADA Software of reputed company with developer & runtime license with minimum 256 number of Tags with following features & functions</p> <ol style="list-style-type: none"> 1. Supervise real-time data in the form of graphical presentation 2. Control pumping processes locally or through Remote locations 3. Dynamic process Graphic, It should resemble the process mimic. SCADA should have good library of symbols so that develop the mimic as per required. When operator sees the screen he should know what's going in plant. 				
		<ol style="list-style-type: none"> 4. Alarm summery & Alarm history, SCADA system must be able to detect, display, and log alarms and events. When there are problems the SCADA system must notify the operators to take corrective action. 5. Acquire real-time data as well as logs data with Real time trend & Historical time trend. 6. Web Connectivity, Real-time displays can be accessed on remotely attached PCs and notebooks using internet. 				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SCADA Programming shall be done so as operator can visualize and control complete pump house operation from operator desk. All important alarms & events shall be logged. All the data from field instruments & equipments shall be logged. There shall be provision to take reports in required formats of real time & historical data, events & alarms.				
		There shall be provision of broadcasting messages, emails of reporting information. There shall be provision of access security. An Industrial grade Din rail mounting ethernet switch with 5 ports shall be provided. An Industrial grade modem with 4G/5G GSM connectivity shall be provided.				
	1.6	Power Cable				
		Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of 2 C x 1.5 sq.mm as per IS 694 twisted shielded copper armoured conductor on wall in GI tray or in ground suitable for supplied D. C. Voltage.				As per PWD CSR
	1.7	Communication Cable				
		Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of CAT 6 as per ISO/IEC-11801 std.cable for networking on wall in GI tray or on ground etc.				As per PWD CSR

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	1.8	Signal Cable				
	1.8.1	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of 2 Pair x 1 sq.mm as per IS 694 copper Shielded twisted, multistranded armoured cablew on wall in GI tray or on ground.	Mtr	187	13	200
	1.8.2	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of 3 Pairs x1 sq.mm. as per IS 694 copper Shielded, twisted, multi stranded armoured cable on wall in GI tray or on ground.	Mtr	239	15	254
	1.8.3	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of 4.5 Pairs x 1.0 sq.mm as per IS 694 copper shielded, twisted, multi stranded armoured cable on wall in GI tray or on ground.	Mtr	351	22	373
	1.8.4	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of 8 Pairs x 1.0 sq.mm as per IS 694 copper shielded, twisted, multi stranded armoured cable on wall in GI tray or on ground.	Mtr	615	53	668

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	1.9	Surveillance System	Job	50400	5936	56336
		<p>Designing, supplying, installing, commissioning & testing of CCTV IR water proof camera suitable for upto 100ft. with control key board, DVR, Hard Disk,cables, UPT transreceivers etc. complete with not less than following specifications.</p> <p>1. Four numbers of IP Camera with night vision functionality with range up to 30 meters. Camera construction shall be suitable for weather proof outdoor installation.</p> <p>2. Eight Channel DVR with metal body construction, having software features of motion detect recording.</p> <p>3. 3.5 inch 2 GB HDD</p> <p>4. 8 port POE Switch</p> <p>5. 32 inch LED Screen, Keyboard & mouse.</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	SA 2	Water Treatment Plant				
		Aeration Fountain				
	2.1	Open channel type ultrasonic flowmeter with FIT	Each	51343	3520	54863
		Design, Supply, Installation, Testing & calibration of open channel type ultrasonic flow Transmitter CE marked with following technical parameters at Raw Water channel and Interfacing with PLC panel including mounting arrangement.				
		Range- 0 - 5 mtrs				
		Output-4-20 mA / HART				
		Power supply - 24V DC ext.				
		Display - 4" LED				
		Accuracy - +/- 0.25% of Full Scale or better				
		Enclosure- IP 68				
	2.2	PH analyser				
		Design, Supply, Installation, Testing of pH analyser as per IUPAC(International Union for Pure & Applied Chemistry)at A.F. and Interfacing with PLC panel including mounting arrangement. Range : 0 -14 , pH Accuracy : Better than 0.1% of full scale , Supply Voltage : 24V dc, Output : 4-20 mA /HART As per IEC 61000-6-2 & IEC 61000-6-3	Each	98018	7042	105060

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	2.3	Turbidity Analyser				
	2.3.1	Design, Supply, Installation, commissioning, testing of Turbidity Analyser as per ISO 7027 scattering light method at A.F. and Interfacing with PLC panel. Turbidity analyser shall comprises of 3 components i.e. sensors,signal distributor and transmitter with indicator. with 2 Outputs, 1 to PLC & another to Local Display with mounting arrangement.	Each	228388	27697	256085
		Overall Range : 0 - 2000 NTU				
		Accuracy : +/- 0.02 NTU				
		Supply Voltage : 230 V ac				
		Output : 4-20 mA /HART				
	2.4	Level transmitter				
		Designing, Supplying, installing, commissioning & testing of Ultrasonic level transmitter CE marked at each filter bed with following technical parameters Interfacing with PLC panel including mounting arrangement.	Each	49010	3520	52530
		Range- 0 - 5 mtrs				
		Output-4-20 mA / HART				
		Power supply - 24V DC ext.				
		Display - 4" LED				
		Accuracy - +/- 0.25% of Full Scale or better				
		Enclosure- IP 68				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	2.5	Power Analyser				
		Designing, Supplying, Installing, commissioning & testing of Power Analyser interfacing to PLC Panel with modbus communicatuion port, as per IEC 62053 and in the prescribed format including mounting arrangement.	Each	30940	2325	33265
	2.6.1	PLC with HMI for sand filter (with 2 Filter beds)		249930	29436	279366
		Design, manufacture, supply, installation, testing and commissioning of indoor type PLC panel of size approx. 1200 mm X 700 mm X 1500mm (LBH), fabricated out of min. 2 mm thick CRCA sheet powder coated to Siemens gray color. The Panel shall be provided with reputed make PLC with following accessories as well as input output configuration. The PLC shall be programmed with IEC 61131 standards for control, monitoring and communication of equipments & instruments at WTP Plant (sand filter bed wasing & operation).				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		PLC shall have Ethernet port & protocol for Modbus TCP communication with following IO DI –40 num DO – 40 num AI –16 num AO – 12 num 10 inch color TFT HMI complete with programming shall be provided to interact with PLC The panel shall include all the accessories (not limited to following) to achieve purpose of smooth & trouble free operation of sand filters (sand filter bed wasing & operation)				
		MCB 10A DP – 1 num MCB 4A DP – 4 num 24 VDC Power Supply 10A – 1 num Push Buttons – 30 num Selector Switch -15 num Control Contactor – 15 num Annunciator with 12 Windows NO to NC Type Electronic Hooter – 1 num Control Transformer – 1 num Emergency PB – 1 num Panel Cooling Fan – 1 num Panel Light with Door Switch – 1 num Control Indication Lamp – 15 num Wiring + TB etc – 1 lot Hardware – 1 lot 2 HP VFDs - 3 num				
	2.6.2	PLC with HMI for sand filter (with 4 Filter beds)		303750	35775	339525

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<p>Design, manufacture, supply, installation, testing and commissioning of indoor type PLC panel of size approx. 1200 mm X 700 mm X 1500mm (LBH), fabricated out of min. 2 mm thick CRCA sheet powder coated to Siemens gray color.</p> <p>The Panel shall be provided with reputed make PLC with following accessories as well as input output configuration. The PLC shall be programmed with IEC 61131 standards for control, monitoring and communication of equipments & instruments at WTP Plant (sand filter bed wasing & operation).</p>				
		<p>PLC shall have Ethernet port & protocol for Modbus TCP communication with following IO</p> <p>DI –72 num DO – 40 num AI –24 num AO – 16 num</p> <p>10 inch color TFT HMI complete with programming shall be provided to interact with PLC The panel shall include all the accessories (not limited to following) to achieve purpose of smooth & trouble free operation of sand filters (sand filter bed wasing & operation)</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		MCB 10A DP – 1 num MCB 4A DP – 4 num 24 VDC Power Supply 10A – 1 num Push Buttons – 30 num Selector Switch -15 num Control Contactor – 15 num Annunciator with 12 Windows NO to NC Type				
		Electronic Hooter – 1 num Control Transformer – 1 num Emergency PB – 1 num Panel Cooling Fan – 1 num Panel Light with Door Switch – 1 num Control Indication Lamp – 15 num Wiring + TB etc – 1 lot Hardware – 1 lot 2 HP VFDs - 3 num				
	2.8	Control Cable				
	2.8.1	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of 2 C x 1.5 sq.mm as per IS 694 twisted shielded copper armoured conductor on wall in GI tray or in ground suitable for supplied DC Voltage				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	2.8.2	Communication Cable				
		Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of CAT 6 as per ISO/IEC-11801 std.cable for networking on wall in GI tray or on ground etc.				
	2.9	Signal Cable				
	2.9.1	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of 2 pair x 1.0 sq.mm. as per IS 694 copper shielded, twisted, multistranded armoured cable on wall in GI tray or on ground.			As Above	
	2.9.2	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of 3 pair x 1.0 sq.mm. as per IS 694 copper shielded, twisted, multistranded armoured cable on wall in GI tray or on ground.			As Above	
	2.9.3	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of 4.5 pair x 1.0 sq.mm. as per IS 694 copper shielded, twisted, multistranded armoured cable on wall in GI tray or on ground.			As Above	
	2.9.4	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of 8 pair x 1.0 sq.mm. as per IS 694 copper shielded, twisted, multistranded armoured cable on wall in GI tray or on ground.				
	3	Blower				
	3.1	Pressure Transmitter for Blower				
		Designing, Supplying, Installing, commissioning & testing of pressure transmitter CE markd with following technical parameters at Blower delivery and Interfacing with PLC panel.				
		Medium- Water				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Pressure - 0-10 kg/cm ²	As Above			
		Output 4-20 mA / HART				
		Power supply - 24V DC ext.				
		Display - Large LED				
		Accuracy - +/- 0.5 % of full scale or better				
		Temp.- suitable for Amb.temp				
		Enclosure- IP 68 weatherproof				
		Mounting - In Line				
	3.2	Ultrasonic Level Transmitter for Wash Water Tank				
		Designing, Supplying, Installing, commissioning & testing of Ultrasonic level transmitter CE marked with following technical parameters and Interfacing with PLC panel including Mounting accessories.	Each	49010	3520	52530
		Range- 0 - 5 mtrs				
		Output-4-20 mA / HART				
		Power supply - 24V DC ext.				
		Display - 4" LED				
		Accuracy - +/- 0.25% of Full Scale or better				
		Enclosure- IP 68				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	3.3	Surveillance system	Each	50400	5936	56336
		<p>Designing, supplying, installing, commissioning & testing of CCTV IR water proof camera suitable for upto 100ft. with control key board, DVR, Hard Disk,cables, UPT transreceivers etc. complete with not less than following specifications</p> <ol style="list-style-type: none"> 1. Four numbers of IP Camera with night vision functionality with range up to 30 meters. Camera construction shall be suitable for weather proof outdoor installation. 2. Eight Channe DVR withmetal body consturction, having software features of motion detect recording. 3. 3.5 inch 2 GB HDD 4. 8 port POE Switch 5. 32 inch LED Screen, Keyboard & mouse. 				
	SA 4	Valves with actuator				
		<p>Design, Supply, Installation, Testing of Motor Actuated Valve / Gate at all required sizes and places of filter beds,Clarifier Drains,blowers and Interfacing with PLC panel, Supply Voltage : 415 V ac, Manual Operation : Hand wheel Position Indication : 01 Nos. Limit Switch for open, close Overload Protection : Torque Overload Limit Switch</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	SA 5	Pure Water Pump house				
	5.1	Ultrasonic level transmitter				
		Designing, Supplying, Installing, commissioning & testing of Ultrasonic level transmitter CE marked with following technical parameters at pure Water Pump House and Interfacing with PLC panel including Mounting accessories.	Each	49010	3520	52530
		Range- 0 - 5 mtrs				
		Output-4-20 mA / HART				
		Power supply - 24V DC ext.				
		Display - 4" LED				
		Accuracy - +/- 0.25% of Full Scale or better				
		Temp.- With Inbuilt temp compensation				
		Enclosure- IP 68 weatherproof				
		Mounting - Top/above FSL of Tank				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	5.2	Pressure Transmitter				
		Designing, Supplying, Installing, commissioning & testing of pressure transmitter CE markd with following technical parameters at Raw Water Pump House and Interfacing with PLC panel including Mounting arrangement.	Each	34308	2466	36774
		Output 4-20 mA / HART				
		Power supply - 24V DC ext.				
		Display - 4" LED				
		Accuracy - +/- 0.1 % of full scale or better				
		Enclosure- IP 68				
	5.3	pH analyser				
		Design, Supply, Installation, Testing of pH Analyser as per IUPAC (International Union for Pure & Applied Chemistry)at A.F. and Interfacing with PLC panel including Mounting arrangement. Range : 0 -14 , pH Accuracy : Better than 0.5% of full scale , Supply Voltage : 24V dc, Output : 4-20 mA As per IEC 61000-6-2 & IEC 61000-6-3	Each	98018	7042	105060

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	5.4	Turbidity meter / analyser				
		Design, Supply, Installation, Commissioning & Testing of Turbidity Analyser as per ISO 7027 scattering light method at A.F. and Interfacing with PLC panel. Turbidity Analyser shall comprises of 3 components i.e. sensors,signal distributor and transmitter with indicator with 2 outputs, 1 to PLC & another to local display including Mounting arrangement. Overall Range : 0 - 100 NTU Accuracy : +/- 0.02 NTU Supply Voltage : 230 V ac Output : 4-20 mA	Each	190459	14082	204541

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	5.5	Residual chlorine analyser				
		Design, Supply, Installation, Testing of Residual chlorine analyser / meter must have automatic sensor cleaning facility at pure water sump and Interfacing with PLC panel. Residual Chlorine meter shall comprises of 3 components i.e. sensors, flow through assembly and transmitter with indicator and gives 2 outputs one to Local display & other to PLC including Mounting arrangement. Overall Range : 0 - 8 mg/l (ppm) Accuracy : 2% of full scale Supply Voltage : 230 V ac Output : 4-20 mA Membrane free sensor of 2 gold plated electrodes for long term stability and reference electrode (ag/Agcl) must be provided to avoid maintenance. IP 65 Nema 4 housing protection class required.	Each	256718	17602	274320
	5.6	Power Analyzer				
		Designing, Supplying, Installing, commissioning & testing of Power Analyzer interfacing to PLC Panel with Modbus Communication Port, as per IEC 62053 and in the prescribed format including Mounting arrangement.		30940	2325	33265
	5.7	PLC panel for Pure water pump House				
	5.7.1	PLC panel for Pure water pump House with two Pumps	Rate & specifications as per new item 1.4.1 of this DSR			

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	5.7.2	PLC panel for Pure water pump House with four Pumps	Rate & specifications as per new item 1.4.2 of this DSR			
	5.7.3	PLC panel for Pure water pump House with six Pumps	Rate & specifications as per new item 1.4.3 of this DSR			
	SA 6	SCADA Software				
	6.1	PLC Panel for WTP Automation		309060	36400	345460
		<p>Design, manufacture, supply, installation, testing and commissioning of indoor type PLC panel of size approx. 1200 mm X 700 mm X 1500mm (LBH), fabricated out of min. 2 mm thick CRCA sheet powder coated to Siemens gray color.</p> <p>The Panel shall be provided with reputed make PLC with following accessories as well as input output configuration. The PLC shall be programmed with IEC 61131 standards for control, monitoring and communication of equipments & instruments at WTP Plant (raw water monitoring, alum dosing control, clarifaculator operation & control, recirculation & mud pump operation).</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<p>PLC shall have Ethernet port & protocol for Modbus TCP communication with following IO DI –72 num DO – 40 num AI –12 num AO – 4 num</p> <p>10 inch color TFT HMI complete with programming shall be provided to interact with PLC The panel shall include all the accessories (not limited to following) to achieve purpose of smooth & trouble free operation of WTP plant.</p> <p>MCB 16A DP – 3 num MCB 10A DP – 1 num MCB 4A DP – 4 num 24 VDC Power Supply 10A – 1 num Push Buttons – 30 num Selector Switch -16 num Control Contactor – 16 num Annunciator with 12 Windows NO to NC Type Electronic Hooter – 1 num Control Transformer – 1 num Emergency PB – 1 num Panel Cooling Fan – 1 num Panel Light with Door Switch – 1 num Control Indication Lamp – 16 num Wiring + TB etc – 1 lot Hardware – 1 lot</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	6.2	SCADA system for WTP		340200	40068	380268
		Design, manufacture, supply, installation, testing and commissioning of SCADA System for WTP Plant, Sand Filter beds & pump house. Windows based PC with latest configuration & OS complete with necessary office & antivirus softwares. PC configuration shall not be less than Intel i5 10th Gen CPU, 16 GB Ram, 128 GB SDD, 500 GB HDD, DVD RW, Rs232 & Rs485 port, 2 RJ45 ports, Keyboard, Optical Mouse, 32 inch color TFT Monitor, Latest Windows Pro OS, Microsoft Office & Antivirus & Internet Security software for 3 years license.				
		SCADA Software of reputed company with developer & runtime license with minimum 512 number of Tags with following features & functions. 1. Supervise real-time data in the form of graphical presentation.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<p>2. Control WTP processes locally or through Remote locations.</p> <p>3. Dynamic process Graphic, It should resemble the process mimic. SCADA should have good library of symbols so that develop the mimic as per required. When operator sees the screen he should know what's going in plant.</p> <p>4. Alarm summery & Alarm history, SCADA system must be able to detect, display, and log alarms and events. When there are problems the SCADA system must notify the operators to take corrective action.</p> <p>5. Acquire real-time data as well as logs data with Real time trend & Historical time trend.</p> <p>6. Web Connectivity, Real-time displays can be accessed on remotely attached PCs and notebooks using internet.</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<p>SCADA Programming shall be done so as operator can visualize and control complete WTP operation from operator desk. All important alarms & events shall be logged. All the data from field instruments & equipments shall be logged. There shall be provision to take reports in required formats of real time & historical data, events & alarms. There shall be provision of broadcasting messages, emails of reporting information. There shall be provision of access security.</p>				
		<p>An Industrial grade Din rail mounting ethernet switch with 5 ports shall be provided. An Industrial grade modem with 4G/5G GSM connectivity shall be provided.</p>				
	6.3	Secondary work station PC		67500	7950	75450
		<p>Windows based PC with latest configuration & OS complete with necessary office & antivirus softwares. PC configuration shall not be less than Intel i5 10th Gen CPU, 16 GB Ram, 128 GB SDD, 500 GB HDD, DVD RW, Rs232 & Rs485 port, 2 RJ45 ports, Keyboard, Optical Mouse, 32 inch color TFT Monitor, Latest Windows Pro OS, Microsoft Office & Antivirus & Internet Security software for 3 years license.</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	6.4	Supply, Installation, Testing, Intgeration & Commissioning of 49" LCD monitor at Conf. Room for display of total water system (Online)	Each	78083	6338	84421
	SA7	MBR / GSR / ESR				
		Providing, installing, testing and commissioning of following equipments with satisfactory test and trial etc.as per detailed specification attached				
	7.1	Ultrasonic level transmitter	Each	49010	3520	52530
		Medium- Water				
		Range- 0 - 5 mtrs				
		Output-4-20 mA / HART				
		Power supply - 24V DC ext.				
		Display - Large LED				
		Accuracy - +/- 0.25% of Full Scale or better				
		Enclosure- IP 68				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	7.2	RTU (Remote terminal control & communication unit at each GSE/ESR)		75330	8872	84202
		<p>Design, manufacture, supply, installation, testing and commissioning of indoor type PLC panel of size approx. 800 mm X 700 mm X 800mm (LBH) , fabricated out of min. 2 mm thick CRCA sheet powder coated to Siemens gray color.</p> <p>The Panel shall be provided with reputed make PLC with following accessories as well as input output configuration. The PLC shall be programmed with IEC 61131 standards for control, monitoring and communication of equipments & instruments at GSR/ESR Tank.</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		PLC shall have Ethernet port & protocol for Modbus TCP communication with following IO DI –16 num DO – 16 num AI –2 num AO – 1 num. The panel shall include all the accessories (not limited to following) to achieve purpose of smooth & trouble free operation at GSR/ESR functionality. Digital Flow Indicator-1 num Digital TDS Indicator – 1 num Led Level Indicator – 5 levels MCB 4A DP – 4 num 24 VDC Power Supply 10A – 1 num Push Buttons – 4 num Selector Switch - 1 num Control Relay –2 num Electronic Hooter – 1 num Control Transformer – 1 num				
		Emergency PB – 1 num Panel Cooling Fan – 1 num Panel Light with Door Switch – 1 num Wiring + TB etc – 1 lot Hardware – 1 lot				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	7.3	SCADA System for MBR/GSR/ESR with PLC based control valves Management system		417600	49184	466784
		<p>Design, manufacture, supply, installation, testing and commissioning of SCADA System for MBR/GSR/ESR Management system Windows based PC with latest configuration & OS complete with necessary office & antivirus softwares.</p> <p>PC configuration shall not be less than Intel i5 10th Gen CPU, 16 GB Ram, 128 GB SDD, 500 GB HDD, DVD RW, Rs232 & Rs485 port, 2 RJ45 ports, Keyboard, Optical Mouse, 32 inch color TFT Monitor, Latest Windows Pro OS, Microsoft Office & Antivirus & Internet Security software for 3 years license.</p> <p>one LTE Cellular Gateway with minimum following specifications shall be provided with Dual Sim</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<p>Operators, with atleast one, Ethernet, one USB & one serial port for connectivity with host device, rugged construction for hazardous location.</p> <p>One remote dice management software shall be provided to manage IP addresses of RTUs</p> <p>SCADA Software of reputed compny with developer & runtime license with unlimited number of Tags with following features & functions</p> <ol style="list-style-type: none"> 1. Supervise real-time data in the form of graphical presentation 2. Control MBR/GSR/ESR processes locally or through Remote locations 3. Dynamic process Graphic, It should resemble the process mimic. SCADA should have good library of symbols so that develop the mimic as per required. When operator sees the screen he should know what's going in plant. 4. Alarm summery & Alarm history, SCADA system must be able to detect, display, and log alarms and events. When there are problems the SCADA system must notify the operators to take corrective action. 5. Acquire real-time data as well as logs data with Real time trend & Historical time trend. 6. Web Connectivity, Real-time displays can be accessed on remotely attached PCs and notebooks using internet. 				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SCADA Programming shall be done so as operator can visualize and control complete pump house operation from operator desk. All important alarms & events shall be logged. All the data from				
		field instruments & equipments shall be logged. There shall be provision to take reports in required formats of real time & historical data, events & alarms. There shall be provision of broadcasting messages, emails of reporting information. There shall be provision of access security.				
	7.4	Solar Panel with Battery				
		Designing, Supplying, installing commissioning & testing of photovoltaic solar panel with its charger, MS Stand for mounting solar panel so as to have maximum exposure of sunlight for desired location and maintenance free battery with 3 days battery backup.	Each	19195	1268	20463

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	SA 8 (I)	ESR Management Systems (RMS)				
		(For Inlet / outlet)				
		Designing, Supplying, Installing, Commissioning & testing of Flow Control Valve / Pressure reducing valve for inlet with flow measuring, flow controlling, pressure monitoring & web based with cable, PLC etc. complete. Hydraulically operated self-actuated Flow & Level Control Valve (either with float or altitude pilot) with downstream orifice having Ductile Iron valve body, Y-Pattern, Double chamber unitized actuator, Fusion bonded Epoxy coating, Copper control tubing, with Latching Solenoid & Pilot operated as per design, additional Speed control feature, drip tight sealing, In-line serviceable, Internals Stainless steel & protected diaphragm suitable for drinking water WRAS/NSF/DVGW approved.				
	SA8-1	80 mm Dia	Each	169484	14082	183566
	SA8-2	100 mm Dia	Each	182951	14082	197033
	SA8-3	150 mm Dia	Each	241004	14082	255086
	SA8-4	200 mm Dia	Each	307904	14082	321986
	SA8-5	250 mm Dia	Each	416010	14082	430092
	SA8-6	300 mm Dia	Each	493094	14082	507176
	SA8-7	350 mm Dia	Each	631656	14082	645738
	SA8-8	400 mm Dia	Each	827997	14082	842079
	SA8-9	450 mm Dia	Each	886899	14082	900981

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	SA8-10	500 mm Dia	Each	1164080	14082	1178162
	SA8-11	600 mm Dia	Each	1674566	14082	1688648
	SA 8 (II)	(Pressure Reducing valve) 80 mm to 600 mm				
		Pressure Reducing Valve - Designing, Supplying, Installing, Commissioning & testing of Pilot operated hydraulically controlled Pressure reducing Valve for ESR/MBR outlet or distribution with pressure controlling / limiting application which maintains a constant downstream pressure regardless of fluctuations in inlet pressure or flow with fixed set points inclusive of all the accessories like pressure gauge etc. complete as per given specifications				
	a	80 mm	Each	81237	14082	95319
	b	100 mm	Each	88023	14082	102105
	c	150 mm	Each	158043	14082	172125
	d	200 mm	Each	240518	14082	254600
	e	250 mm	Each	369726	14082	383808
	f	300 mm	Each	502674	14082	516756
	g	350 mm	Each	613457	14082	627539
	h	400 mm	Each	900246	14082	914328
	i	450 mm	Each	1110680	14082	1124762
	j	500 mm	Each	1465305	14082	1479387
	k	600 mm	Each	2003096	14082	2017178

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	SA 8 (III)	(Flow cum Altitude Control valve) 80 mm to 600 mm				
		Hydraulically operated self-actuated Flow & Level Control Valve (either with float or altitude pilot) with downstream orifice having Ductile Iron valve body, Y-Pattern, Double chamber unitized actuator, Fusion bonded Epoxy coating, Copper control tubing, with Latching Solenoid & Pilot operated as per design, additional Speed control feature, drip tight sealing, In-line serviceable, Internals Stainless steel & protected diaphragm suitable for drinking water WRAS/NSF/DVGW approved.				
	a	80 mm	Each	152283	14082	166365
	b	100 mm	Each	172737	14082	186819
	c	150 mm	Each	243197	14082	257279
	d	200 mm	Each	322746	14082	336828
	e	250 mm	Each	427298	14082	441380
	f	300 mm	Each	581852	14082	595934
	g	350 mm	Each	856928	14082	871010
	h	400 mm	Each	1110525	14082	1124607
	i	450 mm	Each	1464921	14082	1479003
	j	500 mm	Each	2047071	14082	2061153
	k	600 mm	Each	2363774	14082	2377856

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	SA 8 (IV)	(Solonoid operated On / Off Valve with timer Controller) 80 mm to 600 mm				
		Solonoid Operated On/Off Valve with Timer Controller - Designing, Supplying, Installing, Commissioning & testing of Solonoid operated hydraulically controlled On/Off Valve with Timer Controller for ESR outlet with time based On-Off application which performs Opening and Closing operations on pre -set timings. The valve The valve should offer minimum restriction while allowing the flow inclusive of all the accesories like inbuilt timer controller, batteries etc. complete... as per given specifications				
	a	80 mm	Each	120776	14082	134858
	b	100 mm	Each	131390	14082	145472
	c	150 mm	Each	201497	14082	215579
	d	200 mm	Each	283515	14082	297597
	e	250 mm	Each	412724	14082	426806
	f	300 mm	Each	545672	14082	559754
	g	350 mm	Each	662451	14082	676533
	h	400 mm	Each	943244	14082	957326
	i	450 mm	Each	1249044	14082	1263126
	j	500 mm	Each	1508303	14082	1522385
	k	600 mm	Each	2061873	14082	2075955
		(Third party inspection of 15% Quantity minimum)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	SA11	Comprehensive O & M				
		Operation and Maintenance Charges of the whole water supply scheme on SCADA and generation of daily report of water quality parameters and electrical parameters with specific consumption in kWh/ml . The report shall be mailed daily to the head quarters for monitoring purpose.				
	1	During First year		Free		
	2	During Second year		3% of total cost		
	3	During Third year		5% of total cost		
	4	During Fourth year		7% of total cost		
	5	During Fifth year		7% of total cost		
	6	During Sixth year		7% of total cost		
		Note : For Schemes upto 5 MLD capacity simple Automation shall be adopted.				
	SA 12 : Simple Automation					
		Simple Automation shall consist of following				
		1) GSM /GPRS base pump operating system (specifications as below) (one for each pump)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<p>Supplying , Installing and Commissioning of SMS based ON / OFF operation of pumps at remote locations with test & trial including one year guaranty & two year comprehensive maintenance including SIM card & SMS charges. Wireless Motor Controller is suitable for all range of electrical motors and starters and pump sets. It shall protect pump set from dry run. Controller shall have inbuilt battery and charges automatically. Controller shall be controlled through SMS, Call, IVRS or Smart Phone application (All controlling modes are must). It shall have following features as,</p> <p>a. Auto Mode operation – Pump shall</p>		45000	5300	50300
		<p>be operated with time inputs & limits. Pump shall be also programmed for the specific time pumping.</p> <p>b. Feedback - Shall produce feedback of Voltage, Current & power factor parameters.</p> <p>c. Cyclic timer – For daily operation</p> <p>d. Dry Run Protection</p> <p>e. Overload Protection.</p> <p>f. Phase fail – Phase imbalance / Low Voltage.</p> <p>g. It shall have RS 485 port for optional operations.</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		h. High gain antenna for healthy reception of the signals. i. High durability PC-ABS-FR enclosure. j. Additional sensor interface. k. Shall have Pump house lamp control through remote signal.				
		2) Pressure transmitter suitable for operating system		As per MJP CSR		
		3) Level Transmitter for.Raw/ Pure water pumping station,ESR/MBR/GSR		As per MJP CSR		
		4) Residual chlorine Analyzer and transmitter for pure water pumping station.		As per MJP CSR		
		5) Solar panel with battery backup of 3days		As per MJP CSR		
		6) Providing, installing, testing and commissioning of Laptop or computer station with programming software (web based) run time version along with required cables and communication devices for PLC and programming (HTML /PHP based)		As per SA 6.3 New Item		
	NOTE -	1) The makes other than approved list shall be got approved from The Superintending Engineer (Mech.)				
		2) Rise of 10% rates on individual items for estimate of Maintainance & Repair works only.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		SECTION 20-LB Labour Charges				
	Code No.	Description	Labour charges for Removing	Labour charges for Dismantling	Labour charges for Assembling	Labour charges for Re-erection
		SECTION 20 - LB - [REMOVING , DISMANTLING , ASSEMBLING & RE-ERECTION]				
		The rates in this schedule are stated as percentage of rate for erection given in Section 1, 7, 14, 15 and Section of Civil CSR as applicable.				
	LB -1	Labour charges for removing, disassembling, assembling and re-erection of pumps				
	LB 1-1	Submersible pump set	80%	10%	20%	90%
	LB 1-2	Monoblock pump motor set	25%	10%	20%	30%
	LB 1-3	Rotating assembly of H.S. casing pump	-	20%	30%	-
	LB 1-4	Coupled pump (without motor) Not applicable for HS casing Pump	10%	15%	30%	30%
	LB 1-5	Vacuum pump (Monoblock)	25%	10%	20%	30%
	LB 1-6	Vacuum pump (Coupled without motor)	10%	15%	30%	30%
	LB 1-7-a	Vertical Turbine pump (upto 6 stage)(Without motor)	60%	15%	30%	90%

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	LB 1-7-b	Vertical Turbine pump (above 6 stages & upto 12 stages)(Without motor)	70%	25%	35%	90%
	LB 1-8	Conventional sewage pump (Without motor)	65%	65%	50%	50%
	LB 1-9	Submersible sewage pump	20%	40%	40%	10%
	LB 2	Motor	20%	15%	20%	25%
	LB 3	Transformer				
	LB 3-1	Up to 315 kVA capacity	70%	20%	35%	90%
	LB 3-2	Above 315 to 750 kVA	80%	20%	35%	90%
	LB 3-2	Valves				
	LB 4	Sluice Valve , Non return valve , butter fly valve and air valve	40%	50%	50%	60%
	Note :	1) Above rates are exclusive of transportation charges of equipments				
		2) Rates of re-erection are inclusive of jointing materials but excluding cost of fasteners				
		3) For removing and re-erection of transformer by using crane, rates mentioned above are not applicable				

CABLE SECTION CHART

Sr. No.	Conductor Size in Sq.mm.	Aluminium Conductor PVC insulated cable				Plain Copper Conductor PVC insulated flexible cable	
		(Maximum) in Ground		(Minimum) in Duct		Current Carrying Capacity in Amp	
no.	no.	Single Core	Multi Core	Single Core	Multi Core	Single Core	Multi Core
1	1.5	18	16	16	14	15	14
2	2.5	25	21	21	18	20	19
3	4	32	28	27	23	27	26
4	6	40	35	34	30	46	42
5	10	55	46	45	39	46	42
6	16	70	60	58	50	62	57
7	25	90	76	76	63	80	71
8	35	110	982	92	77	102	91
9	50	135	110	115	95	138	120
10	70	160	135	140	115	214	165
11	95	190	165	170	140	254	200
12	120	210	185	190	155	300	225
13	150	240	210	210	175	340	-
14	185	275	235	240	200	390	-
15	240	320	275	275	235	460	-
16	300	355	305	305	260	-	-
17	400	385	335	345	290	-	-

HP Vs Current

Approximate full load current for submersible pump motor, 3 phase, 50 cycles, 415-425 V.

HP	AMP
5.0	7.5
7.5	11.0
10.0	14.9
12.5	18.9
15.0	22.5
17.5	25.2
20.0	28.4

HP	AMP
25.0	35.6
30.0	42.3
35.0	50.4
40.0	62.1
50.0	67.5
55.0	73.8

XLPE Cable Selection Chart

Sr. No.	Conductor Size in	Current Carrying Capacity in AMP				Approximate Wt. of Cable Kg/Mtr.	Approximate Wt. of Cable Kg/Mtr.
		Single Core		3 Core			
		In Ground	In Air	In Ground	In Air		
1	25	-	-	93	100	-	-
2	35	115	140	110	120	3.470	59
3	50	135	170	130	145	3.830	62
4	70	135	210	150	180	4.330	66
5	95	200	255	190	220	4.940	70
6	120	225	295	215	255	5.580	75
7	150	255	335	240	285	6.180	78
8	185	285	385	270	330	6.820	82
9	240	330	455	315	385	8.040	89
10	300	375	520	355	440	9.080	94
11	400	425	610	405	510	10.240	101
12	500	480	700	455	590	12.170	108
13	630	550	830	-	-	-	-
14	800	650	950	-	-	-	-
15	1000	690	1080	-	-	-	-

Note Standard current carrying capacities are mentioned in the table for fixed basic assumptions, however for actual field conditions necessary de-rating factor should be applied for ambient temperature method of laying, etc.

Std. weight and overall dimensions are given in the table and the same should be considered for designing width and size of trench / duct / cable tray for PVC and XLPE cables.

Recommended Height of the Pump House

A) For V.T. Pumps

i) Single floor pump house

Sr. No.	HP of Pump	Pump Floor to corbel top	Corbel top to roof slab bottom	Pump floor to bottom of roof slab Total	Lifting Equipments
1	Upto 50 HP	-	-	5.5 m	Monorail
2	From 51 HP to 150 HP	5 m	1.5 m	6.5 m	HOT
3	From 151 HP to 300 HP	5.5 m	1.5 m	7 m	HOT
4	From 301 HP to 500 HP	5.5 m	2 m	7.5 m	EOT
5	501 HP and above	5.5 m	2.5 m	8 m	EOT

ii) Double floor pump house

Generally double floor arrangement shall be provided for the delivery pipes of ;diameter 350 mm or above
The height of pump house shall be as below

Pump floor to Panel floor	2.5 m
Panel floor to Corbel	5 m
Corbel to bottom of roof slab	2.5 m

B) For Centrifugal and Submersible Pumps

Sr. No.	HP of Pump	Pump Floor to corbel top	Corbel top to roof slab bottom	Pump floor to bottom of roof slab Total	Lifting Equipments
1	Upto 150 HP	-	-	4 m	Monorail
2	From 151 HP to 300 HP	3.5 m	1.5 m	5 m	HOT
3	301 HP and above	4 m	2.5 m	6.5 m	EOT

**MULTIPLYING FACTOR FOR CALCULATING THE SIZES OF CAPACITOR FOR
POWER FACTOR IMPROVEMENT**

Original Power Factor of Load before applying Capacitor	SIZE OF CAPACITORS IN KVAR PER KW OF LOAD FOR RAISING THE POWER FACTOR												
	0.8	0.85	0.9	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	UNITY
0.45	1.23	1.36	1.501	1.532	1.561	1.592	1.626	1.659	1.695	1.737	1.784	1.846	1.988
0.46	1.179	1.309	1.446	1.473	1.502	1.533	1.567	1.6	1.636	1.677	1.725	1.786	1.929
0.47	1.13	1.26	1.397	1.425	1.454	1.485	1.519	1.552	1.588	1.629	1.677	1.758	1.881
0.48	1.076	1.206	1.343	1.37	1.4	1.43	1.464	1.497	1.534	1.575	1.623	1.684	1.826
0.49	1.03	1.16	1.297	1.326	1.355	1.386	1.42	1.435	1.489	1.53	1.578	1.639	1.782
0.5	0.982	1.112	1.248	1.276	1.303	1.337	1.363	1.403	1.441	1.481	1.529	1.49	1.732
0.51	0.936	1.066	1.202	1.23	1.357	1.291	1.323	1.357	1.395	1.435	1.483	1.544	1.686
0.52	0.894	1.024	1.16	1.188	1.215	1.249	1.281	1.315	1.353	1.393	1.441	1.502	1.644
0.53	0.85	0.98	1.116	1.144	1.171	1.205	1.237	1.271	1.309	1.349	1.397	1.487	1.6
0.54	0.809	0.939	1.075	1.103	1.13	1.164	1.196	1.23	1.268	1.308	1.356	1.458	1.559
0.55	0.769	0.899	1.035	1.063	1.09	1.124	1.156	1.19	1.268	1.268	1.316	1.377	1.519
0.56	0.73	0.86	0.996	1.024	1.051	1.085	1.117	1.151	1.189	1.229	1.277	1.338	1.48
0.57	0.692	0.822	0.958	0.986	1.013	1.047	1.079	1.113	1.151	1.191	1.239	1.3	1.442
0.58	0.655	0.785	0.921	0.949	0.976	1.01	1.042	1.076	1.114	1.154	1.202	1.263	1.405
0.59	0.618	0.748	0.884	0.912	0.939	0.973	1.005	1.039	1.077	1.117	1.165	1.226	1.368
0.6	0.584	0.714	0.849	0.878	0.905	0.939	0.971	1.005	1.044	1.083	1.131	1.192	1.334
0.61	0.549	0.679	0.815	0.843	0.87	0.904	0.936	0.97	1.008	1.048	1.096	1.157	1.299
0.62	0.515	0.645	0.781	0.809	0.836	0.87	0.902	0.936	0.974	1.014	1.08	1.123	1.265
0.63	0.483	0.613	0.749	0.777	0.804	0.838	0.87	0.904	0.942	0.982	1.062	1.091	1.233
0.64	0.45	0.58	0.716	0.744	0.771	0.805	0.837	0.871	0.909	0.949	1.03	1.058	1.2
0.65	0.419	0.549	0.685	0.713	0.74	0.774	0.806	0.84	0.878	0.918	0.997	1.027	1.169
0.66	0.388	0.518	0.654	0.682	0.709	0.743	0.775	0.809	0.847	0.887	0.966	0.996	1.138
0.67	0.358	0.488	0.624	0.652	0.679	0.713	0.745	0.779	0.817	0.857	0.935	0.966	1.108
0.68	0.329	0.459	0.595	0.623	0.65	0.684	0.716	0.758	0.788	0.828	0.905	0.937	1.079
0.69	0.299	0.429	0.565	0.593	0.62	0.654	0.686	0.72	0.758	0.798	0.876	0.907	1.049
0.7	0.27	0.4	0.536	0.564	0.591	0.625	0.657	0.691	0.729	0.769	0.84	0.878	1.02
0.71	0.242	0.372	0.508	0.536	0.563	0.597	0.629	0.663	0.701	0.741	0.811	0.85	0.992
0.72	0.213	0.343	0.479	0.507	0.534	0.568	0.6	0.634	0.672	0.712	0.783	0.821	0.963
0.73	0.186	0.316	0.452	0.48	0.507	0.541	0.573	0.607	0.645	0.685	0.754	0.794	0.936
0.74	0.159	0.289	0.425	0.453	0.48	0.514	0.546	0.58	0.618	0.658	0.727	0.767	0.909
0.75	0.132	0.262	0.398	0.426	0.453	0.487	0.519	0.553	0.591	0.631	0.7	0.74	0.882
0.76	0.105	0.235	0.371	0.399	0.426	0.46	0.492	0.526	0.564	0.604	0.673	0.713	0.855
0.77	0.079	0.209	0.345	0.373	0.4	0.434	0.466	0.5	0.538	0.578	0.652	0.687	0.829
0.78	0.053	0.183	0.319	0.347	0.374	0.408	0.44	0.474	0.512	0.552	0.62	0.661	0.803
0.79	0.026	0.156	0.292	0.32	0.347	0.381	0.413	0.447	0.485	0.525	0.594	0.634	0.776
0.8	-	0.13	0.266	0.294	0.321	0.355	0.387	0.421	0.459	0.499	0.567	0.608	0.75
0.81	-	0.104	0.24	0.268	0.295	0.329	0.361	0.395	0.433	0.473	0.541	0.582	0.724
0.82	-	0.078	0.214	0.242	0.269	0.303	0.335	0.369	0.407	0.447	0.515	0.556	0.698
0.83	-	0.052	0.188	0.216	0.243	0.277	0.309	0.343	0.381	0.421	0.489	0.53	0.672
0.84	-	0.026	0.162	0.19	0.217	0.251	0.283	0.317	0.355	0.396	0.463	0.504	0.645
0.85	-	-	0.136	0.164	0.191	0.225	0.257	0.291	0.329	0.369	0.437	0.478	0.62
0.86	-	-	0.109	0.14	0.167	0.198	0.23	0.264	0.301	0.343	0.39	0.45	0.593
0.87	-	-	0.083	0.114	0.141	0.172	0.204	0.238	0.275	0.317	0.364	0.424	0.567
0.88	-	-	0.054	0.085	0.112	0.143	0.175	0.209	0.246	0.288	0.335	0.395	0.538
0.89	-	-	0.028	0.059	0.086	0.117	0.149	0.183	0.23	0.262	0.309	0.369	0.512
0.9	-	-	-	0.031	0.058	0.089	0.121	0.155	0.192	0.234	0.281	0.341	0.484
0.91	-	-	-	-	0.027	0.058	0.09	0.124	0.161	0.203	0.25	0.31	0.453
0.92	-	-	-	-	-	0.031	0.063	0.097	0.134	0.176	0.223	0.283	0.426
0.93	-	-	-	-	-	-	0.032	0.066	0.108	0.145	0.192	0.252	0.395
0.94	-	-	-	-	-	-	-	0.034	0.071	0.113	0.16	0.22	0.363
0.95	-	-	-	-	-	-	-	-	0.037	0.079	0.126	0.186	0.329
0.96	-	-	-	-	-	-	-	-	-	0.042	0.089	0.149	0.292
0.97	-	-	-	-	-	-	-	-	-	-	0.047	0.107	0.25
0.98	-	-	-	-	-	-	-	-	-	-	-	0.06	0.203
0.99	-	-	-	-	-	-	-	-	-	-	-	-	0.143

eg. : 100 KW load to be improved from 0.77 to 0.95 power factor from table is 0.500 i.e. capacitor (KVAR) = 100x0.5 = 50 KVAR

CE/Testing/Star Rated/DT/

№ 9923

Date: 28 APR 2017

CIRCULAR

Sub: Implementation of revised energy performance standards for Distribution Transformers up to 2500 KVA rating.

In exercise of the powers conferred by clause (a) of section 14 of the Energy Conservation Act, 2001, the Central Government in consultation with the Bureau of Energy Efficiency, has amended its notification i.e. S.O. 185(E) dated 12th Jan, 2009 vide S.O. No. 4062(E) dated 16th December 2016 and further amended vide S.O. No. 513(E) for distribution transformer dated 17/02/2017.

In reference with the said gazette of ministry of power ref no. S.O. No. 4062(E) dated 16th December 2016; energy performance standards for the distribution transformer have been revised in the star rating band.

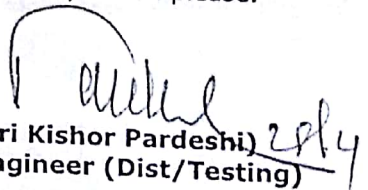
Accordingly the energy efficiency Level-1 of IS 1180(Part1):2014 is removed and energy efficiency Level 2 and Level-3 are re-designated as Star-1 and Star-2. As per the said notification the said revision have to be implemented from 01st Jan 2017 onwards.

However, now as per amendment notification no. S.O. No. 513(E), dated 17/02/2017 it is to inform that **the energy efficiency Level-1(old star-3) distribution transformers shall remain valid up to 30th June 2017. And Energy efficiency Level-2(revised star 1) distribution transformers shall be considered for procurement in various schemes up to 2500 KVA rating, with effect from 1st July 2017 onwards.**

The revised Star Rating and Standard Losses in Watts up to 11KV and 22KV class for 16 KVA to 2500KVA Outdoor Type Distribution Transformer are enclosed herewith as Annexure-A for ready reference.

This is for your information and further immediate necessary action please.

Encl: As Above.


(Shri Kishor Pardeshi)
Chief Engineer (Dist/Testing)

Copy s. w. r to:

- 1) The Director (Finance), / Director (Operations)/Director (Projects), MSEDCL.
- 2) The Executive Director, 1/1I/III/IV, MSEDCL.
- 3) The Regional Director, Pune/Konkan/Aurangabad/Nagpur, MSEDCL.

Copy f. w. cs to:

- 1) The Chief Engineer (Comm.)/APDRP/INFRA/PP/Stores/Civil, MSEDCL
- 2) All Chief Engineer, O & M Zones, MSEDCL

Copy to:

- 1) The OSD to Chairman & Managing Director, MSEDCL.
- 2) All Superintending Engineers, O&M Circles, MSEDCL.

Annexure-A

Maximum Total Losses for 11KV class Distribution Transformers

RATING TRANSFORMER CAPACITY IN KVA	1 STAR		2 STAR		3 STAR		4 STAR		5 STAR	
	MAX LOSSES AT 50% (WATTS)	MAX LOSSES AT 100% (WATTS)	MAX LOSSES AT 50% (WATTS)	MAX LOSSES AT 100% (WATTS)	MAX LOSSES AT 50% (WATTS)	MAX LOSSES AT 100% (WATTS)	MAX LOSSES AT 50% (WATTS)	MAX LOSSES AT 100% (WATTS)	MAX LOSSES AT 50% (WATTS)	MAX LOSSES AT 100% (WATTS)
16	135	440	120	400	108	364	97	331	87	301
25	190	635	175	595	158	541	142	493	128	448
63	340	1140	300	1050	270	956	243	870	219	791
100	475	1650	435	1500	392	1365	352	1242	317	1130
160	670	1950	570	1700	513	1547	462	1408	416	1281
200	780	2300	670	2100	603	1911	543	1739	488	1582
250	980	2930	920	2700	864	2488	811	2293	761	2113
315	1025	3100	955	2750	890	2440	829	2164	772	1920
400	1225	3450	1150	3330	1080	3214	1013	3102	951	2994
500	1510	4300	1430	4100	1354	3909	1282	3727	1215	3554
630	1860	5300	1745	4850	1637	4438	1536	4061	1441	3717
1000	2790	7700	2620	7000	2460	6364	2310	5785	2170	5259
1250	3300	9200	3220	8400	2142	7670	3066	7003	2991	6394
1600	4200	11800	3970	11300	3753	10821	3547	10363	3353	9924
2000	5050	15000	4790	14100	4543	13254	4309	12459	4088	11711
2500	6150	18500	5900	17500	5660	16554	5430	15659	5209	14813

Maximum Total Losses for 22KV class Distribution Transformers

RATING TRANSFORMER CAPACITY IN KVA	1 STAR		2 STAR		3 STAR		4 STAR		5 STAR	
	MAX LOSSES AT 50% (WATTS)	MAX LOSSES AT 100% (WATTS)	MAX LOSSES AT 50% (WATTS)	MAX LOSSES AT 100% (WATTS)	MAX LOSSES AT 50% (WATTS)	MAX LOSSES AT 100% (WATTS)	MAX LOSSES AT 50% (WATTS)	MAX LOSSES AT 100% (WATTS)	MAX LOSSES AT 50% (WATTS)	MAX LOSSES AT 100% (WATTS)
16	141.75	462	126	420	113.4	382.2	101.85	347.55	91.35	316.05
25	199.5	666.75	183.75	624.75	165.9	568.05	149.1	517.65	134.4	470.4
63	357	1197	315	1102.5	283.5	1003.8	255.15	913.5	229.95	830.55
100	498.75	1732.5	456.75	1575	411.6	1433.25	369.6	1304.1	332.85	1186.5
160	703.5	2047.5	598.5	1785	538.65	1624.35	485.1	1478.4	436.8	1345.05
200	819	2415	703.5	2205	633.15	2006.55	570.15	1825.95	512.4	1661.1
250	1029	3076.5	966	2835	907.2	2612.4	851.55	2407.65	799.05	2218.65
315	1076.25	3255	1002.75	2887.5	934.5	2562	870.45	2272.2	810.6	2016
400	1286.25	3622.5	1207.5	3496.5	1134	3374.7	1063.65	3257.1	998.55	3143.7
500	1585.5	4515	1501.5	4305	1421.7	4104.45	1346.1	3913.35	1275.75	3731.7
630	1953	5565	1832.25	5092.5	1718.85	4659.9	1612.8	4264.05	1513.05	3902.85
1000	2929.5	8085	2751	7350	2583	6682.2	2425.5	6074.25	2278.5	5521.95
1250	3465	9660	3381	8820	2249.1	8053.5	3219.3	7353.15	3140.55	6713.7
1600	4410	12390	4168.5	11865	3940.65	11362.05	3724.35	10881.15	3520.65	10420.2
2000	5302.5	15750	5029.5	14805	4770.15	13916.7	4524.45	13081.95	4292.4	12296.55
2500	6457.5	19425	6195	18375	5943	17381.7	5701.5	16441.95	5469.45	15553.65

Nature's Most Precious Resources
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