

# महाराष्ट्र जीवन प्राधिकरण

## अधीक्षक अभियंता (यांत्रिकी)

मध्यवर्ती कार्यालय, दुसरा मजला, (दक्षिण कक्ष) सी.बी.डी.

बेलापूर, सिडको भवन, नवी मुंबई - ४००६१४

Email-[semechmjpthane@rediffmail.com](mailto:semechmjpthane@rediffmail.com)

दुरध्वनी क्रमांक : ०२२-२७५७१६४७ / ७७.

जा.क्र./मजीप्रा/अअ(यां)/ ३१६ /२०२२.

दि.१४/०७/२०२२

प्रति,

मा. मुख्य अभियंता, तथा

अध्यक्ष, दरसूची समिती २०२२-२३.

महाराष्ट्र जीवन प्राधिकरण,

प्रादेशिक विभाग,

पुणे.

**विषय :- म.जी.प्रा.ची सन २०२२-२३ ची यांत्रिकी/ विद्युत कामांच्या दरसूची बाबत.**

**संदर्भ :-** या कार्यालयाचे पत्र क्र.मजीप्रा/अअ(यां)/३०६/२०२२. दि.०८/०७/२०२२. (उप अभियंता

महाराष्ट्र जीवन प्राधिकरण, माहिती व तंत्रज्ञान कक्ष (I.T. Cell) बेलापूर, नवी मुंबई यांना अग्रेषित)

वरील संदर्भित विषयास अनुसरून महाराष्ट्र जीवन प्राधिकरणाच्या सन २०२२-२३ ची विद्युत/ यांत्रिकी दरसूचीस मा. सदस्य सचिव, महाराष्ट्र जीवन प्राधिकरण, मुंबई यांनी मान्यता दिलेली आहे. त्या अनुषंगाने संदर्भित पत्रानुसार उप अभियंता महाराष्ट्र जीवन प्राधिकरण, माहिती व तंत्रज्ञान कक्ष (I.T. Cell) बेलापूर, नवी मुंबई यांना महाराष्ट्र जीवन प्राधिकरणाच्या वेबसाईटवर Upload करणेकरीता Soft Copy पाठविलेली आहे. सदर दरसूची दि.०४/०७/२०२२ पासून लागू आहे. सोबत दरसूचीची Soft Copy सादर करित आहे.

हे आपल्या माहितीसाठी सादर.

**सोबत : वरीलप्रमाणे**

*Rajendra Chavan*  
राजेंद्र चव्हाण  
(अधीक्षक अभियंता) (यां.)

**प्रत:** मा. मुख्य अभियंता, महाराष्ट्र जीवन प्राधिकरण प्रादेशिक विभाग, ठाणे, नाशिक, औरंगाबाद, नागपूर, अमरावती यांना माहितीसाठी व कार्यवाहीसाठी सादर.

**सोबत : वरीलप्रमाणे**

**प्रत:** मा.अधीक्षक अभियंता, महाराष्ट्र जीवन प्राधिकरण मंडळ, ठाणे / पनवेल / नाशिक/ अहमदनगर / जळगांव/औरंगाबाद /नांदेड /लातूर/चंद्रपूर /नागपूर/अमरावती/सांगली/पुणे यांना माहितीसाठी व पुढील कार्यवाहीसाठी संस्नेह अग्रेषित, आपल्या अधिपत्याखालील सर्व अभियंत्यांना याबाबत अवगत करण्यात यावे ही विनंती.

**सोबत : वरीलप्रमाणे**

**प्रत :** अधीक्षक अभियंता (यां), म.जी.प्राधिकरण, नागपूर मोजा माहिती व पुढील कार्यवाहीसाठी संस्नेह अग्रेषित.  
**सोबत : वरीलप्रमाणे.**

# **MAHARASHTRA JEEVAN PRADHIKARAN**

(Government of Maharashtra Undertaking)



## **SCHEDULE OF RATES FOR YEAR 2022-23**

(EFFECTIVE FROM 04/07/2022)

**APPLICABLE IN  
ALL REGIONS OF MAHARASHTRA**

### **ELECTRICAL AND MECHANICAL WORKS**

**SD/-  
MEMBER SECRETARY**

**Maharashtra Jeevan Pradhikaran**

**MJP ELEC / MECH SSR – 2022-23**

**MAHARASHTRA JEEVAN PRADHIKARAN  
ELECTRICAL & MECHANICAL CSR 2022-23  
C O N T E N T S**

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# MAHARASHTRA JEEVAN PRADHIKARAN

## MJP ELECT. / MECH. CSR 2022-23

### 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 unto 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 0.5 km (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.

	<b>For Equipments manufactured out of Maharashtra</b>	<b>For Equipments manufactured in Maharashtra</b>
1) Budgetary offer / price list		
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 left over works for which separate analysis covering actual expenses shall be prepared.

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<b>SECTION 1 - PM [PUMPS]</b>				
	<b>PM1</b>	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.				
	<b>PM 1-1</b>	<b>Submersible Pump set 100 mm dia (with Polypropylene / Noryl Impeller) up to 20 stages</b>				
	PM 1-1-1	1.5 HP	Each	19699	4085	23784
	PM 1-1-2	2.0 HP	Each	20428	4085	24513
	PM 1-1-3	3.0 HP	Each	23032	4085	27117
	PM 1-1-4	4.0 HP	Each	24151	4085	28236
	PM 1-1-5	5.0 HP	Each	31187	4085	35272
	<b>Note 1</b>	Supply rate should be increased per stage for pump with more than 20 stages		253		
	<b>PM 1-2</b>	<b>Submersible Pump 150 mm dia (with Bronze / Stainless steel (CF8M) Impeller) up to 8 stages</b>				
	PM 1-2-1	1.5 HP	Each	26424	4085	30509
	PM 1-2-2	2.0 HP	Each	27814	4085	31899
	PM 1-2-3	3.0 HP	Each	29873	4085	33958
	PM 1-2-4	4.0 HP	Each	30949	4085	35034
	PM 1-2-5	5.0 HP	Each	32542	4085	36627
	PM 1-2-6	6.0 HP	Each	35676	5319	40995
	PM 1-2-7	7.5 HP	Each	37285	5319	42604
	<b>Note 2</b>	Supply rate should be increased per stage for pump with more than 8 stages		759		759
	<b>PM 1-2</b>	<b>Submersible Pump 150 mm dia (with Bronze / Stainless steel(CF8M) Impeller) up to 12 stages</b>				
	PM 1-2-8	8.0 HP	Deleted			
	PM 1-2-9	9.0 HP				
	PM 1-2-10	10.0 HP	Each	45531	5916	51447
	PM 1-2-11	11.0 HP	Deleted			
	PM 1-2-12	12.5 HP	Each	49498	6841	56339
	PM 1-2-13	15.0 HP	Each	52345	6841	59186
	<b>Note 3</b>	Supply rate should be increased per stage for pump with more than 12 stages		759		759
	<b>PM 1-2</b>	<b>Submersible Pump 150 mm dia (with Bronze / Stainless steel(CF8M) Impeller) up to 15 stages</b>				
	PM 1-2-14	17.5 HP	Each	57530	7767	65297
	PM 1-2-15	20.0 HP	Each	67558	7767	75325
	PM 1-2-16	22.5 HP	Each	83387	7767	91154
	<b>Note 4</b>	Supply rate should be increased per stage for pump with more than 15 stages for Borewell only.		759		759
		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				
	<b>PM 1-3</b>	<b>Submersible Pump 200 mm dia (with Bronze / Stainless steel (CF8M) Impeller) up to 5 stages of category A &amp; B</b>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 1-3-1	7.5 HP	Each	36556	5319	41875
	PM 1-3-2	10.0 HP	Each	42600	5916	48516
	PM 1-3-3	12.5 HP	Each	46575	6841	53416
	<b>Note 5</b>	Supply rate should be increased per stage for pump with more than 5 stages		2404		2404
	<b>PM 1-3</b>	<b>Submersible Pump 200 mm dia (with Bronze /Stainless steel (CF8M) Impeller) up to 8 stages of category A &amp; B</b>				
	PM 1-3-4	15.0 HP	Each	64302	7767	72069
	PM 1-3-5	17.5 HP	Each	68132	7767	75899
	PM 1-3-6	20.0 HP	Each	75357	7767	83124
	PM 1-3-7	22.5 HP	Each	84631	7767	92398
	PM 1-3-8	25.0 HP	Each	84701	7767	92468
	PM 1-3-9	27.5 HP	Each	98658	7767	106425
	<b>Note 6</b>	Supply rate should be increased per stage for pump with more than 8 stages		2404		2404
	<b>PM 1-4</b>	<b>Submersible Pump 250 mm dia (with Bronze / Stainless steel(CF8M) Impeller) up to 8 stages of category A &amp; B</b>				
	PM 1-4-1	15.0 HP	Each	66506	7767	74273
	PM 1-4-3	22.5 HP	Each	90985	7767	98752
	PM 1-4-4	25.0 HP	Each	95205	7767	102972
	PM 1-4-5	30.0 HP	Each	96940	7772	104712
	<b>PM 1-5</b>	<b>Submersible monoblock Pump set (with Bronze / Stainless steel(CF8M) Impeller) Horizontal / Vertical - up to 3 stages</b>				
		(Motor with water lubricated bearing to accept entire hydraulic thrust)				
	PM 1-5-1	3.0 HP	Each	17102	4085	21187
	PM 1-5-2	5.0 HP	Each	19017	4701	23718
	PM 1-5-3	7.5 HP	Each	34683	5319	40002
	PM 1-5-4	10 HP	Each	41591	5319	46910
	PM 1-5-5	12.5 HP	Each	42314	5319	47633
	PM 1-5-6	15.0 HP	Each	54632	5319	59951
	PM 1-5-7	17.5 HP	Each	56883	5319	62202
	PM 1-5-8	20.0 HP	Each	59136	5319	64455
	<b>Note 7</b>	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.				
	<b>Note 8</b>	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
	<b>PM 2</b>	<b>Centrifugal Monoblock Pump set</b>				
		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.				
	<b>PM 2-1</b>	<b>Centrifugal Monoblock Pump set (Single Stage)</b>				
	PM 2-1-1	2.0 HP	Each	15131	2872	18003
	PM 2-1-2	3.0 HP	Each	18341	2872	21213
	PM 2-1-3	5.0 HP	Each	22420	3775	26195
	PM 2-1-4	7.5 HP	Each	27315	3775	31090
	PM 2-1-5	10.0 HP	Each	36182	3775	39957
	PM 2-1-6	12.5 HP	Each	44098	4701	48799

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 2-1-7	15.0 HP	Each	48128	4701	52829
	PM 2-1-8	20.0 HP	Each	69386	4701	74087
	PM 2-1-9	25.0 HP	Each	91269	4701	95970
	PM 2-1-10	30.0 HP	Each	113004	4701	117705
	<b>PM 2 -2</b>	<b>Centrifugal Monoblock Pump set (Two Stage)</b>				
	PM 2-2-1	5.0 HP	Each	25407	3775	29182
	PM 2-2-2	7.5 HP	Each	30865	3775	34640
	PM 2-2-3	10.0 HP	Each	40917	3775	44692
	PM 2-2-4	12.5 HP	Each	50510	4701	55211
	PM 2-2-5	15.0 HP	Each	60083	4701	64784
	PM 2-2-6	20.0 HP	Each	66988	4701	71689
	<b>PM 3</b>	<b>Centrifugal Coupled Pump set</b>				
		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.				
	<b>PM 4</b>	<b>Centrifugal Coupled Pump set -- Erection charges</b>				
		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		5437	5437
	PM 4-2	31 to 50 HP	Each		6506	6506
	PM 4-3	51 to 100 HP	Each		7753	7753
	PM 4-4	101 to 150 HP	Each		9290	9290
	PM 4-5	151 to 200 HP	Each		10827	10827
	PM 4-6	201 to 250 HP	Each		12385	12385
	PM 4-7	251 to 300 HP	Each		14856	14856
	PM 4-8	More than 300 HP	HP		69	69
	<b>PM 5</b>	<b>Vacuum Pump set (Monoblock)</b>				
		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	24643	2872	27515
	PM 5-2	3 HP, three Ph (Type kV 30)	Each	46207	2872	49079
	<b>PM 6</b>	<b>Vacuum Pump set (Coupled)</b>				
		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	94659	4151	98810
	PM 6-2	10 HP (Type DV 50)	Each	117377	4151	121528
	<b>Note 9</b>	Cost of starters, cable, switches, suitable GI Pipe with coupling and specials, valves etc shall be added as per CSR.				
	<b>PM 7</b>	<b>V.T. Pumps, Water / Oil lubricated</b>				
		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.				
	<b>PM 8</b>	<b>V.T. Pump erection charges (For column length up to 6 m)</b>				
		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		6687	6687

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 8-2	31 HP to 100 HP	Each		9972	9972
	PM 8-3	101 HP to 200 HP	Each		13790	13790
	PM 8-4	201 HP to 300 HP	Each		18401	18401
	PM 8-5	above 300 HP	HP		68	68
	<b>Note 10</b>	For column length more than 6m additional rate per column joint				
		100 mm dia column pipe	Joint		202	202
		150 mm dia column pipe	Joint		379	379
		200 mm dia column pipe	Joint		422	422
		300 mm dia column pipe	Joint		576	576
		350 mm dia column pipe	Joint		753	753
		400 mm dia column pipe	Joint		929	929
		450 mm dia column pipe	Joint		1150	1150
		500 mm dia column pipe	Joint		1239	1239
		600 mm dia column pipe and above	Joint		1482	1482
	<b>Note 11</b>	Add 5 % for erection of oil lubricated pumps				
	<b>Note 12</b>	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).				
	<b>Note 13</b>	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.				
	<b>PM 9</b>	<b>Sewage Pump</b>				
		Sewage Pumps -Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
		<b>Head upto 10 Mtrs</b>				
	PM 9-1-1	1 HP (Up to 9000 LPH)	Each	73054	5385	78439
	PM 9-1-2	2 HP (Up to 12000 LPH)	Each	73582	5385	78967
	PM 9-1-3	3 HP (Up to 18000 LPH)	Each	98556	5385	103941
	PM 9-1-4	5 HP (Up to 35000 LPH)	Each	114230	5385	119615
	PM 9-1-5	7.5 HP (Up to 72000 LPH)	Each	119543	5385	124928
	PM 9-1-6	10 HP (Up to 90000 LPH)	Each	170016	5385	175401
	PM 9-1-7	15 HP (Up to 132000 LPH)	Each	205879	5385	211264
	PM 9-1-8	20 HP (Up to 192000 LPH)	Each	292215	5385	297600
	PM 9-1-9	25 HP (Up to 228000 LPH)	Each	351986	5385	357371
	PM 9-1-10	30 HP (Up to 240000 LPH)	Each	422384	5385	427769
	PM 9-1-11	35 HP (Up to 276000 LPH)	Each	511376	7061	518437

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	<b>PM 9-2</b>	<b>Head upto 20 Mtrs</b>				
	PM 9-2-1	7.5 HP (Up to 36000 LPH)	Each	114562	5385	119947
	PM 9-2-2	10 HP (Up to 48000 LPH)	Each	152749	5385	158134
	PM 9-2-3	15 HP (Up to 60000 LPH)	Each	205879	5385	211264
	PM 9-2-4	20 HP (Up to 90000 LPH)	Each	292215	5385	297600
	PM 9-2-5	25 HP (Up to 120000 LPH)	Each	351986	5385	357371
	PM 9-2-6	30 HP (Up to 168000 LPH)	Each	404102	5385	409487
	PM 9-2-7	35 HP (Up to 216000 LPH)	Each	462079	7061	469140
	<b>PM 9-3</b>	<b>Head upto 30 Mtrs</b>				
	PM 9-3-1	10 HP (Up to 18000 LPH)	Each	155405	5385	160790
	PM 9-3-2	15 HP (Up to 27000 LPH)	Each	218255	5385	223640
	PM 9-3-3	20 HP (Up to 36000 LPH)	Each	250560	5385	255945
	PM 9-3-4	25 HP (Up to 54000 LPH)	Each	351986	5385	357371
	PM 9-3-5	30 HP (Up to 78000 LPH)	Each	404102	7061	411163
	PM 9-3-6	35 HP (Up to 120000 LPH)	Each	440823	7061	447884
	<b>PM 10</b>	<b>Sewage Pump, Erection charges</b>				
		Erection and giving test and trial for directly coupled sewage pump set on provided foundation.				
	PM 10-1	Up to 30 HP	Each		5385	5385
	PM 10-2	31 HP to 100 HP	Each		7061	7061
	PM 10-3	101 HP to 200 HP	Each		9972	9972
	PM 10-4	201 HP to 300 HP	Each		13481	13481
	PM 10-5	Above 300 HP	HP		68	68
	<b>Note 14</b>	Add 25 % to above rates in case of submersible sewage pump set including guide rail etc or extended shaft of sewage pump.				
	<b>Note 15</b>	Erection of pumpset ( Above 100 HP ) must be done in presence & guidance of manufacturers representative.				
	<b>PM 11</b>	<b>Pressure gauges</b>				
		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	79	897
	PM 11-2	Pressure gauge (150 mm dia)	Each	940	79	1019
		<b>Glycerine Filled Pressure gauge Bourdon's type as IS 3624:1987</b>		0		
		Mounting - direct bottom, stainless steel body, toughened glass window		0		
	PM 11-3	Pressure gauge 100 mm dia (black & red marking)	Each	1303	79	1382
	PM 11-4	Pressure gauge 150 mm dia	Each	1926	79	2005
	<b>PM 12</b>	<b>Vacuum / Combination gauge</b>				
		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	79	1030

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	PM 12-2	Vacuum / Combination gauge - 150 mm dia	Each	1075	79	1154
	<b>PM 13</b>	<b>Foot Valve</b>				
		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.				
		<b>Screwed Type</b>				
	PM 13-1	50 mm	Each	465	147	612
	PM 13-2	65 mm	Each	618	147	765
	PM 13-3	80 mm	Each	791	147	938
	PM 13-4	100 mm	Each	1217	281	1498
	PM 13-5	125 mm	Each	1874	281	2155
	PM 13-6	150 mm	Each	2724	281	3005
		<b>Flanged Type</b>				
	PM 13-7	50 mm	Each	1254	530	1784
	PM 13-8	65 mm	Each	1476	530	2006
	PM 13-9	80 mm	Each	1679	530	2209
	PM 13-10	100 mm	Each	2305	689	2994
	PM 13-11	125 mm	Each	3852	689	4541
	PM 13-12	150 mm	Each	5621	689	6310
		<b>SECTION 2 - SP</b>				
		<b>[ SOLAR PUMPS ]</b>				
	<b>SP</b>	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.				
	<b>1</b>	<b>Solar pumps - SPV DC type</b>	As per PWD CSR			
	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				
	<b>2</b>	<b>Solar pumps - SPV AC type</b>				
	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				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<b>SECTION 3- VA</b>				
		<b>[ VALVE ACTUATOR ]</b>				
	<b>VA</b>	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				
	<b>VA -1</b>	<b>Electric Valve Actuator for non rising spindle type sluice valve, PN 1 &amp; PN 1.6 rating For Valve Size</b>				
	VA 1-1	50 mm dia	Each	75195	3653	78848
	VA 1-2	65 mm dia	Each	75195	3653	78848
	VA 1-3	80 mm dia	Each	76254	3653	79907
	VA 1-4	100 mm dia	Each	79961	3653	83614
	VA 1-5	125 mm dia	Each	83413	3653	87066
	VA 1-6	150 mm dia	Each	85256	3653	88909
	VA 1-7	200 mm dia	Each	88750	3653	92403
	VA 1-8	250 mm dia	Each	94576	3653	98229
	VA 1-9	300 mm dia	Each	101092	3653	104745
	VA 1-10	350 mm dia	Each	103843	3653	107496
	VA 1-11	400 mm dia	Each	106594	3653	110247
	VA 1-12	450 mm dia	Each	111223	3653	114876
	VA 1-13	500 mm dia	Each	121334	3653	124987
	VA 1-14	600 mm dia	Each	136500	3653	140153
	VA 1-15	700 mm dia	Each	142204	3653	145857
	VA 1-16	750 mm dia	Each	144955	3653	148608
	VA 1-17	800 mm dia	Each	148721	3653	152374
	VA 1-18	900 mm dia	Each	161599	3653	165252
	VA 1-19	1000 mm dia	Each	171006	3653	174659

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<b>SECTION 4 - PW</b>				
		<b>[ PIPE WORK AND VESSELS ]</b>				
	<b>PW 1</b>	<b>G.I. Bend "B" Class</b>				
		Supplying and erecting "B" class G.I. Bend in position with necessary material				
	PW 1-1	15 mm dia	Each	60	27	87
	PW 1-2	25 mm dia	Each	88	27	115
	PW 1-3	40 mm dia	Each	115	27	142
	PW 1-4	50 mm dia	Each	176	40	216
	PW 1-5	65 mm dia	Each	257	40	297
	PW 1-6	75 mm dia	Each	415	40	455
	PW 1-7	100 mm dia	Each	828	60	888
	<b>PW 2</b>	<b>G.I. Tee "B" Class</b>				
		Supplying and erecting "B" class G.I. Tee in position with necessary material				
	PW 2-1	15 mm dia	Each	37	27	64
	PW 2-2	25 mm dia	Each	78	27	105
	PW 2-3	40 mm dia	Each	158	27	185
	PW 2-4	50 mm dia	Each	249	40	289
	PW 2-5	65 mm dia	Each	464	40	504
	PW 2-6	75 mm dia	Each	663	40	703
	PW 2-7	100 mm dia	Each	1085	60	1145
	PW 2-8	150 mm dia	Each	1181	60	1241
	<b>PW 3</b>	<b>G.I. Coupling / Nipple "B" Class</b>				
		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	45	8	53
	PW 3-3	40 mm dia	Each	82	20	102
	PW 3-4	50 mm dia	Each	140	20	160
	PW 3-5	65 mm dia	Each	228	20	248
	PW 3-6	75 mm dia	Each	341	20	361
	PW 3-7	100 mm dia	Each	554	27	581
	PW 3-8	150 mm dia	Each	678	27	705
	<b>PW 4</b>	<b>G.I. Union (Heavy Duty)</b>				
		Supplying and erecting Heavy Duty G.I. Union in position with necessary material				
	PW4-1	15 mm dia	Each	63	8	71
	PW 4-2	25 mm dia	Each	115	8	123
	PW 4-3	40 mm dia	Each	222	20	242
	PW 4-4	50 mm dia	Each	341	20	361
	<b>PW 5</b>	<b>G.I. Elbow (Heavy Duty)</b>				
		Supplying and erecting Heavy Duty G.I. Elbow in position with necessary material				
	PW 5-1	15 mm dia	Each	20	14	34
	PW 5-2	25 mm dia	Each	60	20	80
	PW 5-3	40 mm dia	Each	127	20	147
	PW 5-4	50 mm dia	Each	197	20	217

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	<b>PW 6</b>	<b>Dismantling Joints</b>				
		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/cm2 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	7277	879	8156
	PW 6-2	150 mm dia Joint	Joint	11246	879	12125
	PW 6-3	200 mm dia Joint	Joint	11411	879	12290
	PW 6-4	250 mm dia Joint	Joint	15823	1126	16949
	PW 6-5	300 mm dia Joint	Joint	19171	1182	20353
	PW 6-6	350 mm dia Joint	Joint	26169	1549	27718
	PW 6-7	400 mm dia Joint	Joint	34994	1927	36921
	PW 6-8	450 mm dia Joint	Joint	42404	2380	44784
	PW 6-9	500 mm dia Joint	Joint	51426	2600	54026
	PW 6-10	600 mm dia Joint	Joint	63292	3094	66386
	PW 6-11	700 mm dia Joint	Joint	83072	3355	86427
	PW 6-12	750 mm dia Joint	Joint	98286	3678	101964
	<b>PW 7</b>	<b>Surge/ Air Vessels</b>				
		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	327	0	327
	<b>PW 8</b>	<b>Pressure Vessels</b>				
		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	0	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	0	154
	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	0	171
	PW 10-2	Above 300 NB	Kg	160	0	160

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<b>SECTION 5 - LF</b>				
		<b>[ LIFTING EQUIPMENT ]</b>				
	<b>LF 1</b>	<b>Chain Pulley Block</b>				
		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	15085	237	15322
	LF 1-2	2 Tonne Capacity	Each	21184	294	21478
	LF 1-3	3 Tonne Capacity	Each	29778	441	30219
	LF 1-4	5 Tonne Capacity	Each	39039	630	39669
	<b>LF 2</b>	<b>Travelling Trolley</b>				
		Providing, erecting Travelling Trolley of capacity as below with 6 m lift, tested to 50% over load				
	LF 2 -1	1 Tonne Capacity	Each	11852	179	12031
	LF 2 -2	2 Tonne Capacity	Each	14858	237	15095
	LF 2 -3	3 Tonne Capacity	Each	19984	294	20278
	LF 2 -4	5 Tonne Capacity	Each	28392	399	28791
	<b>Note 1</b>	Add for Additional 1 m load chain for Chain pulley block as under				
		For 1 Tonne	Mtr	654		654
		For 2 Tonne	Mtr	1252		1252
		For 3 Tonne	Mtr	1297		1297
		For 5 Tonne	Mtr	1564		1564
	<b>Note 2</b>	Add for Additional handling chain for Chain pulley block & Travelling Trolley				
		For 1 Tonne	Mtr	377		377
		For 2 Tonne	Mtr	377		377
		For 3 Tonne	Mtr	628		628
		For 5 Tonne	Mtr	628		628
	<b>LF 3</b>	<b>Hand Operated Circular or Rectangular Travelling Crane (Single Girder)</b>				
		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				
	<b>LF 3 -1-1</b>	<b>Up to 5 m span</b>	Each	210261	19368	229629
	<b>LF 3 -1-2</b>	<b>Above 5 m upto 6 m span</b>	Each	227413	20161	247574
	<b>LF 3 -1-3</b>	<b>Above 6 m upto 8 m span</b>	Each	265961	21998	287959
	LF 3 -1-4	Above 8 m upto 10 m span	Each	311303	22574	333877
	<b>LF 3-2</b>	<b>5 Tonne Capacity</b>				
	LF 3 -2-1	Up to 5 m span	Each	269707	19368	289075
	LF 3 -2-2	Above 5 m upto 6 m span	Each	289423	20161	309584
	<b>LF 3 -2-3</b>	<b>Above 6 m upto 8 m span</b>	Each	334166	21998	356164
	LF 3 -2-4	Above 8 m upto 10 m span	Each	404654	24072	428726
	<b>Note 4</b>	The rates are exclusive of corbel / rail / square bar and track girders for supporting rails.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	LF 4	Electric Operated Circular or Rectangular Travelling Crane (Single Girder)				
		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	655200	16014	671214
	i	Above 6 m upto 8 m span	Each	696150	21070	717220
	II	Above 8 m upto 10 m span	Each	750750	26067	776817
	LF 4-1	5 Tonne Capacity				
	LF 4-1-1	Upto 6 mt span	Each	892484	16014	908498
	LF 4-1-2	Above 6 m upto 8 m span	Each	957675	22403	980078
	LF 4-1-3	Above 8 m upto 10 m span	Each	1018797	27716	1046513
	LF 4-2	7.5 Tonne Capacity				
	LF 4-2-1	Upto 6 mt span	Each	1088892	23323	1112215
	LF 4-2-2	Above 6 m upto 8 m span	Each	1163968	27716	1191684
	LF 4-2-3	Above 8 m upto 10 m span	Each	1239061	30634	1269695
	LF 4-3	10 Tonne Capacity				
	LF 4-3-1	Upto 6 mt span	Each	1199450	26066	1225516
	LF 4-3-2	Above 6 m upto 8 m span	Each	1281190	30634	1311824
	LF 4-3-3	Above 8m upto 10 m span	Each	1362969	33553	1396522
	Note 5	For D.S.L. (Down Shop Lead) system for above crane Add per m length of longitudinal travel.		0	2502	2502
	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	2201	30	2231
	LF 5 -2	40 X 40 mm ( EN 8 )	Mtr	1403	30	1433

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.
		<b>SECTION 7 - TR</b>				
		<b>[ TRANSFORMER AND VOLTAGE STABILIZER ]</b>				
	<b>TR-1</b>	<b>Power Transformer (With Off Load Tap Changer)</b>				
		Providing, erecting and commissioning out door type copper wound transformer as per IS 1180 (Part I) : 2014 Level I 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.				
		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.				
		<b>Power Transformer 11000 / 433 Volt</b>				
		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	1536927	15639	1552566
	TR 2	Power Transformer 22000 / 433 Volt and other specification as per TR-1				
		<b>With off load Tap Changer -12.5% to +2.5% in steps of 2.5%</b>	As per PWD			
	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	1654983	21882	1676865

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TR 3	Power Transformer 33000 / 433 Volt and other Specification as per TR-1				
		<b>With off load Tap Changer -12.5% to +2.5% in steps of 2.5%</b>				
	TR 3-1	63 kVA	Each	358777	13134	371911
	TR 3-2	100 kVA	Each	430532	13134	443666
	TR 3-3	160 kVA	Each	554475	13134	567609
	TR 3-4	200 kVA	Each	782787	13134	795921
	TR 3-5	250 kVA	Each	913251	13134	926385
	TR 3-6	315 kVA	Each	1095901	13134	1109035
	TR 3-7	400 kVA	Each	1174179	13134	1187313
	TR 3-8	500 kVA	Each	1239411	21882	1261293
	TR 3-9	630 kVA	Each	1630805	21882	1652687
	TR 3-10	800 kVA	Each	1793885	21882	1815767
	TR-4	<b>Power Transformer (With On Load Tap Changer)</b>				
		Providing, erecting and commissioning out door type copper wound transformer as per IS 1180 (Part I) : 2014 Level II 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.				
		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).				
		<b>Transformer 11000 / 433 Volt</b>				
		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	2057964	21882	2079846
	TR 4-2	1000 kVA	Each	2157544	21882	2179426
	TR 4-3	1250 kVA	Each	2389893	21882	2411775
	TR 4-4	1600 kVA	Each	2974091	21882	2995973
	TR 4-5	2000 kVA	Each	3219718	21882	3241600
	TR 5	<b>Transformer 22000 / 433 Volt</b>				
		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	2027788	21882	2049670
	TR 5-2	1000 kVA	Each	2154525	21882	2176407

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TR 5-3	1250 kVA	Each	2344630	21882	2366512
	TR 5-4	1600 kVA	Each	2914946	21882	2936828
	TR 5-5	2000 kVA	Each	3168420	21882	3190302
	<b>TR 6</b>	<b>Transformer 33000 / 433 Volt</b>				
		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	2157544	21882	2179426
	TR 6-2	1000 kVA	Each	2290316	21882	2312198
	TR 6-3	1250 kVA	Each	2489473	21882	2511355
	TR 6-4	1600 kVA	Each	3106863	21882	3128745
	TR 6-5	2000 kVA	Each	3385683	21882	3407565
		<b>H.T. TRANSFORMER</b>				
	<b>TR 7</b>	<b>Transformer 11000 / 3300 Volt</b>				
		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	1671808	21882	1693690
	TR 7-2	1250 kVA	Each	1936154	21882	1958036
	TR 7-3	1600 kVA	Each	2121910	21882	2143792
	TR 7-4	2000 kVA	Each	2679179	21882	2701061
	TR 7-5	2500 kVA	Each	3029258	21882	3051140
	TR 7-6	3000 kVA	Each	3179292	21882	3201174
	<b>TR 8</b>	<b>Transformer 22000 / 3300 Volt</b>				
		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	1804490	21882	1826372
	TR 8-2	1250 kVA	Each	2082105	21882	2103987
	TR 8-3	1600 kVA	Each	2276435	21882	2298317
	TR 8-4	2000 kVA	Each	2755320	21882	2777202
	TR 8-5	2500 kVA	Each	3192560	21882	3214442
	TR 8-6	3000 kVA	Each	3664505	21882	3686387
	<b>TR 9</b>	<b>Transformer 33000 / 3300 Volt</b>				
		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	1873894	21882	1895776
	TR 9-2	1250 kVA	Each	2165389	21882	2187271
	TR 9-3	1600 kVA	Each	2359718	21882	2381600
	TR 9-4	2000 kVA	Each	2845543	21882	2867425
	TR 9-5	2500 kVA	Each	3255024	21882	3276906
	TR 9-6	3000 kVA	Each	3747788	21882	3769670

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TR 10	<b>Servo Controlled Automatic Voltage Stabilizer</b>				
		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				
	TR 10-1	<b>Servo Controlled Automatic Voltage Stabilizer (Out put 415 +/-1%)</b>				
	TR 10-1	<b>Input 220 to 460 Volt</b>				
	TR 10-1-1	3 kVA Air cooled	Each	62502	294	62796
	TR 10-1-2	5 kVA Air cooled	Each	72369	382	72751
	TR 10-1-3	7.5 kVA Air cooled	Each	81573	585	82158
	TR 10-1-4	10 kVA Air cooled	Each	106823	879	107702
	TR 10-1-5	12.5 kVA Air cooled	Each	117420	1170	118590
	TR 10-1-6	15 kVA Air cooled	Each	128014	1170	129184
	TR 10-1-7	20 kVA Air cooled	Each	139428	1460	140888
	TR 10-1-8	25 kVA Air cooled	Each	153450	1752	155202
	TR 10-1-9	30 kVA Air cooled	Each	186595	2044	188639
	TR 10-1-10	40 kVA Air cooled	Each	204750	2335	207085
	TR 10-1-11	50 kVA Oil cooled	Each	276779	2335	279114
	TR 10-1-12	60 kVA Oil cooled	Each	335562	2335	337897
	TR 10-1-13	75 kVA Oil cooled	Each	350887	2335	353222
	TR 10-1-14	100 kVA Oil cooled	Each	395392	3210	398602
	TR 10-1-15	125 kVA Oil cooled	Each	491154	3798	494952
	TR 10-2	<b>Servo Controlled Automatic Voltage Stabilizer (Out put 415 +/-1%)</b>				
		<b>Input 280 to 460 Volt</b>				
	TR 10-2-1	3 kVA Air cooled	Each	53192	294	53486
	TR 10-2-2	5 kVA Air cooled	Each	64206	585	64791
	TR 10-2-3	7.5 kVA Air cooled	Each	69091	585	69676
	TR 10-2-4	10 kVA Air cooled	Each	73728	879	74607
	TR 10-2-5	12.5 kVA Air cooled	Each	88963	1170	90133
	TR 10-2-6	15 kVA Air cooled	Each	99460	1170	100630
	TR 10-2-7	20 kVA Air cooled	Each	113795	1460	115255
	TR 10-2-8	25 kVA Air cooled	Each	123662	1752	125414
	TR 10-2-9	30 kVA Air cooled	Each	139555	1857	141412
	TR 10-2-10	40 kVA Air cooled	Each	164194	2335	166529
	TR 10-2-11	50 kVA Air cooled	Each	182689	2335	185024
	TR 10-2-12	60 kVA Air cooled	Each	208405	2335	210740
	TR 10-2-13	60 kVA Oil cooled	Each	249246	2335	251581
	TR 10-2-14	75 kVA Oil cooled	Each	258473	2335	260808
	TR 10-2-15	100 kVA Oil cooled	Each	310159	3210	313369
	TR 10-2-16	125 kVA Oil cooled	Each	356887	3798	360685
	TR 10-2-17	150 kVA Oil cooled	Each	367469	4088	371557
	TR 10-2-18	175 kVA Oil cooled	Each	422043	4088	426131
	TR 10-2-19	200 kVA Oil cooled	Each	460904	5256	466160
	Note 1	For oil cooled stabilizer, the supply cost is excluding cost of transformer oil.				
		<b>SECTION 8 - LT</b>		As per PWD CSR		
		<b>[ L.T. PANEL ]</b>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	<b>Note 1</b>	<b>For Labour charges for internal wiring of panels including all material Add as below</b>				
		1) Up to 5 HP twin set panel Rs.			1882	1882
		2) 6 to 10 HP twin set panel Rs.			2508	2508
		3) 11 to 30 HP twin set panel Rs.			3135	3135
		4) For connected load more than 60 HP Add per HP			58	58
	<b>Note 2</b>	a) Add Rs. 1400/- for shunt release coil				
		b) Add Rs. 1575/- for front operating mechanism				
		c) Add Rs. 5185/- for under voltage relay and Rs.2300/- for earth fault relay , if these protections				
		<b>SECTION 9 - CP</b>				
		<b>[ CAPACITOR ]</b>				
	<b>CP 1</b>	<b>All Polypropylene Capacitors (APP)</b>				
		Supplying and erecting bank of <b>All Polypropylene</b> 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	342	30	372
	<b>CP 2</b>	<b>Metalized polypropylene Capacitors (MPP)</b>				
		Supplying and erecting bank of <b>Metalized polypropylene</b> 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	315	30	345
	<b>CP 3</b>	<b>H.T. Capacitors</b>				
		Supplying and erecting bank of <b>All Polypropylene</b> 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	569	79	648

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<b>SECTION 10 - LG</b>				
		<b>[L.T. SWITCHGEAR AND PROTECTION]</b>				
	<b>LG 1</b>	<b>D.O.L. Starter</b>				
		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 enclosure.				
	LG 1-1	Up to 7.5 HP	Each	2295	98	2393
	LG 1-2	Up to 10 HP	Each	3739	208	3947
	<b>LG 2</b>	<b>Assembled D.O.L. Starter</b>				
		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	2170	120	2290
	LG 2-2	Up to 10 HP	Each	2811	235	3046
	<b>LG 3</b>	<b>F.A.S.D. Starter</b>				
		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 enclosure.				
	LG 3-1	> 7.5 HP & Up to 12.5 HP	Each	9034	211	9245
	LG 3-2	> 12.5 HP & Up to 20 HP	Each	11044	211	11255
	LG 3-3	> 20 HP & Up to 25 HP	Each	12847	235	13082
	LG 3-4	> 25 HP & Up to 35 HP	Each	29632	235	29867
	<b>Note 1</b>	Contactors rating should be same for STAR, LINE and DELTA Connection.				
	<b>LG 4</b>	<b>F.A.S.D. Starter ( Assembled )</b>				
		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	8904	235	9139
	LG 4-2	> 12.5 HP & Up to 20 HP	Each	10786	235	11021
	LG 4-3	> 20 HP & Up to 30 HP	Each	20929	265	21194
	LG 4-4	> 30 HP & Up to 35 HP	Each	29522	265	29787
	<b>Note 2</b>	Contactors rating should be same for STAR, LINE and DELTA Connection.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	<b>LG 5</b>	<b>Auto transformer Starter with air break contactor ( Locally Fabricated )</b>				
		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.				
		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".				
		<b>Cubical Panel Size</b>				
		<b>1.25 m height X 0.75 m width X 0.45 m deep.</b>				
	LG 5-1	40 HP (110 / 40 / 40)	Each	75754	3210	78964
	LG 5-2	60 HP (200 / 70 / 70)	Each	106056	3210	109266
	LG 5-3	80 HP (200 / 110 / 110)	Each	128783	3210	131993
	LG 5-4	100 HP (200 / 110 / 110)	Each	166759	3210	169969
	LG 5-5	120 HP (300 / 150 / 150)	Each	212112	3210	215322
		<b>Cubical Panel Size</b>				
		<b>1.5 m height X 0.9 m width X 0.5 m deep.</b>				
	LG 5-6	150 HP (300/150/150)	Each	215593	6421	222014
	LG 5-7	180 HP (400/170/170)	Each	247420	6421	253841
	LG 5-8	200 HP (400/200/200)	Each	269542	6421	275963
	LG 5-9	220 HP (400/200/200)	Each	338294	6421	344715
	LG 5-10	250 HP (400/300/300)	Each	349933	9627	359560
	LG 5-11	270 HP (630/300/300)	Each	362750	9627	372377
	LG 5-12	300 HP (630/300/300)	Each	376841	9627	386468
	<b>LG 6</b>	<b>FCMA / HFSR Electrical Soft starter</b>				
		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	3210	182710
	LG 6-14	120 HP (300)	Each	200014	3210	203224
	LG 6-15	150 HP (300)	Each	226636	6421	233057
	LG 6-16	180 HP (400)	Each	249544	6421	255965
	LG 6-17	200 HP (400)	Each	268048	6421	274469
	LG 6-18	220 HP (400)	Each	295595	6421	302016
	LG 6-19	250 HP (400)	Each	316939	9627	326566
	LG 6-20	270 HP (630)	Each	336119	9627	345746
	LG 6-21	300 HP (630)	Each	393296	9627	402923

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	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	8388	2524	10912
		<b>SECTION 11 - HG</b>				
		<b>[H.T. SWITCHGEAR &amp; PROTECTION]</b>				
	HG 1	Providing and erecting Vacuum Circuit Breaker out door type excluding cost of CT, PT and control relay panel.				
		<b>Vacuum Circuit Breaker (Out door type)</b>				
	HG 1-1	11 kV system 630 Amp 25 kA	Each	207208	16044	223252
	HG 1-2	22 kV system 630 Amp 25 kA	Each	213424	16044	229468
	HG 1-3	33 kV system 630 Amp 25 kA	Each	219827	16044	235871
	HG 1-4	11 kV system 1250 Amp 25 kA	Each	223146	16044	239190
	HG 1-5	22 kV system 1250 Amp 25 kA	Each	229841	16044	245885
	HG 1-6	33 kV system 1250 Amp 25 kA	Each	236736	16044	252780
	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	<b>Vacuum Circuit Breaker (Indoor type)</b>				
	HG 2-1	3.3 kV system 630 Amp 25 kA	Each	400932	16044	416976
	HG 2-2	6.6 kV system 630 Amp 25 kA	Each	400932	16044	416976
	HG 2-3	11 kV system 630 Amp 25 kA	Each	400932	16044	416976
	HG 2-4	22 kV system 630 Amp 25 kA	Each	698344	16044	714388
	HG 2-5	33 kV system 630 Amp 25 kA	Each	698344	16044	714388
	HG 2-6	3.3 kV system 1250 Amp 25 kA	Each	415252	16044	431296
	HG 2-7	6.6 kV system 1250 Amp 25 kA	Each	415252	16044	431296
	HG 2-8	11 kV system 1250 Amp 25 kA	Each	415252	16044	431296
	HG 2-9	22 kV system 1250 Amp 25 kA	Each	853224	16044	869268
	HG 2-10	33 kV system 1250 Amp 25 kA	Each	853224	16044	869268
	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	<b>Vacuum Contactor Panel (Indoor Type)</b>				
	HG 3-1	3.3 kV system ( 25 kA)	Each	329735	16044	345779
	HG 3-2	6.6 kV system ( 25 kA)	Each	379269	16044	395313
	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	<b>Resin Cast Indoor Single Phase, Double Core CT of required ratio</b>				
	HG 4-1	C.T. for 3.3/ 6.6 / 11 kV 15 VA Class 1/10-P-10	Each	10236	1460	11696
	HG 4-2	C.T. for 22/33 kV 15 VA Class 1/10-P-10	Each	16658	1460	18118
	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	10236	1460	11696
	HG 5-2	(22 kV / $\sqrt{3}$ ) / (110 Volt / $\sqrt{3}$ )	Each	15259	1460	16719
	HG 5-3	(33 kV / $\sqrt{3}$ ) / (110 Volt / $\sqrt{3}$ )	Each	16416	1460	17876

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	<b>HG 6</b>	<b>Protection and auxiliary relays</b>				
		Providing and erecting following type protection and auxiliary relay as required for Vacuum Circuit Breaker Panel / control relay panel.				
	HG 6-1	<b>Motor Protection Relays ( CT Operated)</b> Providing, installing numerical motor protection relay for motors controlled through circuit breaker / with vacuum cotactor, providing instantaneous 3 ph overcurrent , unbalance and single phasing ,earth fault and sepearate built in stalling proction similar to ABB make type REM 601 or similar				
		REM 601	Each	63471	1539	65010
	HG 6-2	<b>Over Current and Earth Fault Relay (C T Operated )</b>				
		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	19924	879	20803
	<b>HG 6-3</b>	<b>High Speed Trip Relay / Master Trip Relay</b>				
		Providing, installing in panel single element high speed trip relay with mechanical flag and hand reset contacts similar to GE / ABB				
		VAJH 13 / MVAJ053 / PQ8nCH2JS	Each	3985	79	4064
	HG 6-4	<b>Combiflex / Electromagnetic Realy ( Voltage operated )</b> 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	4370	320	4690
	<b>HG 6-5</b>	<b>Auxiliary Relay for Transformer Protection</b>				
	HG 6-5-1	Providing, installing in panel voltage operated auxiliary relay with flag, 2 NO + 2 NC, <b>self reset</b> contacts similar to GE / ABB				
		MVAA 11 / CV2 D 2 J	Each	3256	79	3335
	HG 6-5-2	Providing, installing in panel voltage operated auxiliary relay with flag, 2 NO + 2 NC, <b>hand reset</b> contacts similar to GE / ABB				
		MVAA 31/ AVA33 / CV2D2J	Each	5632	79	5711
	<b>HG 6-6</b>	<b>Power Factor Controller Relay</b>				
	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			
	<b>HG 6-7</b>	<b>Digital Timer</b>				
		Providing, installing static digital timer with time delay on pick-up.	Each	1662	79	1741
	<b>HG 6-8</b>	<b>Automatic Semaphore Indicator</b>				
		Providing, installing Automatic Semaphore indicator DC / AC operated for automatic indication of the position of Circuit Breakers				
		VAM 21	Each	3493	79	3572
	<b>HG 6-9</b>	CTMM 501-510 static motor protection relay similar to Alstom make for motors controlled through circuit breaker,	Each	36750	879	37629
	<b>HG 6-10</b>	CTMM 401-410 static motor protection relay similar to Alstom make for motors controlled by fused contactors,	Each	36750	879	37629
	<b>HG 6-11</b>	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				
	<b>a</b>	CDG 11, without High set/ MC 11A	Each	26250	879	27129

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	<b>b</b>	CDG 21, with High set/ MC 11A	Each	27510	879	28389
	<b>HG 6-12</b>	Triple pole non directional IDMT, 2 O/C and 1 E/F self powered relay, flush mounted, conforming to IS 3231		0		
	<b>a</b>	CDG 31, without High set	Each	34125	879	35004
	<b>b</b>	CDG 61 with high set	Each	35700	879	36579
	<b>HG 6-15</b>	Numerical communicable nondirectional overcurrent and earth fault T/R Differential relay,	Each	157500	1758	159258
	<b>HG 6-16</b>	Under voltage and over voltage relay .	Each	15750	879	16629
		<b>SECTION 12 - CB</b>				
		<b>[ L.T. CABLE ]</b>				
	<b>CB 1</b>	<b>3 core PVC insulated, PVC sheathed copper conductor flat submersible cable</b>				
		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	17	406
	CB 1-6	3 core 16 sq mm	Mtr	593	30	623
	CB 1-7	3 core 25 sq mm	Mtr	962	30	992
	CB 1-8	3 core 35 sq mm	Mtr	1368	30	1398
	<b>CB 2</b>	<b>Aluminium conductor single core, XLPE /PVC insulated &amp; armoured cable</b>				
		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	60	617
	CB 2-2	Single core 400 sq mm	Mtr	711	60	771
	CB 2-3	Single core 500 sq mm	Mtr	886	60	946
	CB 2-4	Single core 630 sq mm	Mtr	1143	60	1203
	CB 2-5	Single core 800 sq mm	Mtr	1409	91	1500
	CB 2-6	Single core 1000 sq mm	Mtr	1731	91	1822
	<b>CB 3</b>	<b>Aluminium conductor Twin core, XLPE / PVC insulated &amp; armoured cable</b>				
		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				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	<b>CB 4</b>	<b>Aluminium conductor Three core, XLPE / PVC insulated &amp; armoured cable</b>				
		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				
	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	33	502
	CB 4-10	3 Core 95 sq mm	Mtr	594	33	627
	CB 4-11	3 Core 120 sq mm	Mtr	716	60	776
	CB 4-12	3 Core 150 sq mm	Mtr	855	60	915
	CB 4-13	3 Core 185 sq mm	Mtr	1005	60	1065
	CB 4-14	3 Core 240 sq mm	Mtr	1347	60	1407
	CB 4-15	3 Core 300 sq mm	Mtr	1585	60	1645
	<b>CB 5</b>	<b>Aluminium conductor 3.5 Core, XLPE / PVC insulated &amp; armoured cable</b>				
		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	As per PWD			
	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				
	<b>CB 6</b>	<b>Aluminium conductor 4 Core, XLPE / PVC insulated &amp; armoured cable</b>				
		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	20	139
	CB 6-2	4 Core 6 sq mm	Mtr	135	20	155
	CB 6-3	4 Core 10 sq mm	Mtr	172	20	192
	CB 6-4	4 Core 16 sq mm	Mtr	192	20	212

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	<b>CB 7</b>	<b>Copper conductor PVC insulated, armoured control cable</b>				
	<b>CB 7-1</b>	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.				
		<b>1.5 sq mm Copper conductor PVC insulated, armoured control cable</b>				
	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
	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
	<b>CB 7-2</b>	<b>2.5 sq mm Copper conductor PVC insulated, armoured control cable</b>				
	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
	<b>CB 8</b>	<b>Copper conductor PVC insulated, Un-armoured control cable</b>				
		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
	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
	<b>CB 8-2</b>	<b>2.5 sq mm Copper conductor PVC Un-armoured control cable</b>				
	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	344	7	351
	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.
		<b>SECTION 13 - CB</b>				
		<b>[ H.T. CABLE ]</b>				
	<b>CB 9</b>	<b>Aluminium conductor XLPE / PVC insulated, armoured Cable</b>				
		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				
		<b>3.3 kV- XLPE / PVC</b>				
	CB 9-1	3 Core 25 sq mm	Mtr	520	33	553
	CB 9-2	3 Core 35 sq mm	Mtr	541	33	574
	CB 9-3	3 Core 50 sq mm	Mtr	618	33	651
	CB 9-4	3 Core 70 sq mm	Mtr	824	33	857
	CB 9-5	3 Core 95 sq mm	Mtr	1021	60	1081
	CB 9-6	3 Core 120 sq mm	Mtr	1150	60	1210
	CB 9-7	3 Core 150 sq mm	Mtr	1354	60	1414
	CB 9-8	3 Core 185 sq mm	Mtr	1515	60	1575
	CB 9-9	3 Core 240 sq mm	Mtr	1878	60	1938
	CB 9-10	3 Core 300 sq mm	Mtr	2197	93	2290
	CB 9-11	3 Core 400 sq mm	Mtr	2733	93	2826
	<b>CB 10</b>	<b>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</b>				
	<b>CB 10</b>	<b>6.6 kV -- XLPE / PVC</b>				
	CB 10-1	3 Core 35 sq mm	Mtr	667	33	700
	CB 10-2	3 Core 50 sq mm	Mtr	754	33	787
	CB 10-3	3 Core 70 sq mm	Mtr	897	33	930
	CB 10-4	3 Core 95 sq mm	Mtr	1060	33	1093
	CB 10-5	3 Core 120 sq mm	Mtr	1223	60	1283
	CB 10-6	3 Core 150 sq mm	Mtr	1366	60	1426
	CB 10-7	3 Core 185 sq mm	Mtr	1589	60	1649
	CB 10-8	3 Core 240 sq mm	Mtr	1907	60	1967
	CB 10-9	3 Core 300 sq mm	Mtr	2218	93	2311
	CB 10-10	3 Core 400 sq mm	Mtr	2787	93	2880
	<b>CB 11</b>	<b>Providing &amp; erecting INDOOR type termination Kit, for 3.3Kv/6.6kv/11Kv/6.6Kv XLPE 3 core cable</b>				
		<b>INDOOR type termination Kit, for 3.3Kv/6.6kv/11Kv/6.6Kv XLPE 3 core cable</b>				
	CB11-1	25-50 sqmm	Deleted			
	CB11-2	70-120	Each	4635	2918	7553
	CB11-3	150-185	Each	5251	2918	8169
	CB11-4	240-400	Each	5850	2918	8768
		<b>OUTDOOR type termination Kit, for 3.3Kv/6.6kv XLPE 3 core cable</b>				
	CB12-1	70-120 sq.mm	Each	6239	2918	9157
	CB12-2	150-185 sq.mm	Each	6726	2918	9644
	CB12-3	240-400 sq.mm	Each	8462	2918	11380
		<b>STRAIGHT THROUGH JOINT for 3.3Kv/6.6kv XLPE 3 core cable</b>				
	CB13-1	70-120 sq.mm	Each	15407	2918	18325
	CB13-2	150-185 sq.mm	Each	19599	2918	22517
	CB13-3	240-400 sq.mm	Each	21435	2918	24353
	<b>CB 14</b>	<b>INDOOR type termination Kit, for 11Kv Screened XLPE 3 core cable</b>				
	CB14-1	25-50 sqmm	Deleted			
	CB14-2	70-120	As per PWD			
	CB14-3	150-185				
	CB14-4	240-400				
	<b>CB 15</b>	<b>CABLE DUCT RCC M-150</b>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		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	Each	1444	0	1444
	CB15-2	cable Duct 2 tier - 750 W x 1000 D	Each	1696	0	1696
	CB15-3	cable Duct 2 x 3 tier - 1000W x 1000 D	Each	2107	0	2107

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<b>SECTION 14 - MO</b>				
		<b>[ L.T.MOTORS ]</b>				
	<b>MO 1</b>	<b>Foot Mounted Motors SPDP 1000 RPM</b>				
		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	302943	4377	307320
	MO 1-2	55 kW ( 75 HP )	Each	352204	4377	356581
	MO 1-3	75 kW ( 100 HP )	Each	418800	5840	424640
	MO 1-4	90 kW ( 120 HP )	Each	533658	5840	539498
	MO 1-5	110 kW ( 150 HP )	Each	682254	8753	691007
	MO 1-6	125 kW ( 170 HP )	Each	770051	8753	778804
	MO 1-7	135 kW ( 180 HP )	Each	814951	8753	823704
	MO 1-8	150 kW ( 200 HP )	Each	867157	8753	875910
	MO 1-9	160 kW ( 215 HP )	Each	939946	8753	948699
	MO 1-10	180 kW ( 240 HP )	Each	1059375	11673	1071048
	MO 1-11	187 kW ( 250 HP )	Each	1076300	11673	1087973
	MO 1-12	200 kW ( 270 HP )	Each	1104701	11673	1116374
	MO 1-13	225 kW ( 300 HP )	Each	1261545	11673	1273218
	<b>MO 2</b>	<b>Foot Mounted Motor TEFC 1500 RPM</b>				
		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	14564	294	14858
	MO 2-2	1.5 kW ( 2 HP )	Each	15774	294	16068
	MO 2-3	2.2 kW ( 3 HP )	Each	20990	294	21284
	MO 2-4	3.7 kW ( 5 HP )	Each	26976	441	27417
	MO 2-5	5.5 kW ( 7 HP )	Each	37127	729	37856
	MO 2-6	7.5 kW ( 10 HP )	Each	43449	729	44178
	MO 2-7	9.3 kW ( 12 HP )	Each	67526	1460	68986
	MO 2-8	11 kW ( 15 HP )	Each	70964	1460	72424
	MO 2-9	15 kW ( 20 HP )	Each	88124	1460	89584
	MO 2-10	18.5 kW ( 25 HP )	Each	108628	2918	111546
	MO 2-11	22 kW ( 30 HP )	Each	129132	2918	132050
	MO 2-12	30 kW ( 40 HP )	Each	174542	2918	177460
	MO 2-13	37 kW ( 50 HP )	Each	226084	4383	230467
	MO 2-14	45 kW ( 60 HP )	Each	273477	4383	277860
	MO 2-15	55 kW ( 75 HP )	Each	372836	4383	377219
	MO 2-16	75 kW ( 100 HP )	Each	477426	5840	483266
	MO 2-17	90 kW ( 120 HP )	Each	587155	5840	592995
	MO 2-18	110 kW ( 150 HP )	Each	711165	8753	719918
	MO 2-19	132 kW ( 160 HP )	Each	810128	8753	818881
	MO 2-20	135 kW ( 180 HP )	Each	833299	8753	842052
	MO 2-21	160 kW ( 215 HP )	Each	1053950	8753	1062703
	MO 2-22	180 kW ( 240 HP )	Each	1139263	11673	1150936
	MO 2-23	200 kW ( 270 HP )	Each	1186868	11673	1198541
	MO 2-24	225 kW ( 300 HP )	Each	1465191	11673	1476864

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	<b>MO 3</b>	<b>Vertical Hollow Shaft Motor TEFC 1500 RPM</b>				
		Providing, erecting and giving test and trial of vertical hollow shaft 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	166273	2918	169191
	MO 3-2	22 kW ( 30 HP )	Each	183951	2918	186869
	MO 3-3	30 kW ( 40 HP )	Each	200780	2918	203698
	MO 3-4	37 kW ( 50 HP )	Each	231423	4383	235806
	MO 3-5	45 kW ( 60 HP )	Each	295792	4383	300175
	MO 3-6	55 kW ( 75 HP )	Each	376163	4383	380546
	MO 3-7	67 kW ( 90 HP )	Each	498261	5840	504101
	MO 3-8	75 kW ( 100 HP )	Each	502819	5840	508659
	MO 3-9	90 kW ( 120 HP )	Each	520298	5840	526138
	MO 3-10	110 kW ( 150 HP )	Each	620606	8753	629359
	MO 3-11	125 kW ( 170 HP )	Each	634884	8753	643637
	MO 3-12	135 kW ( 180 HP )	Each	732750	8753	741503
	MO 3-13	150 kW ( 200 HP )	Each	859635	8753	868388
	MO 3-14	160 kW ( 215 HP )	Each	926415	8753	935168
	MO 3-15	180 kW ( 240 HP )	Each	962341	11673	974014
	MO 3-16	187 kW ( 250 HP )	Each	974085	11673	985758
	MO 3-17	200 kW ( 270 HP )	Each	1029353	11673	1041026
	MO 3-18	225 kW ( 300 HP )	Each	1073336	11673	1085009
	<b>MO 4</b>	<b>Vertical Solid Shaft Motor TEFC - 1500 RPM</b>				
	<b>Note 1</b>	Add 5 % on the rate of Horizontal foot mounted ( TEFC ) motor for vertical flange mounted solid shaft motor				
		<b>SECTION 15 - MO</b>				
		<b>[ H.T.MOTORS ]</b>				
	<b>MO 5</b>	<b>3.3 kV Foot Mounted Motor TEFC 1000 RPM</b>				
		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	988885	11673	1000558
	MO 5-2	250 kW ( 335 HP )	Each	1122246	14585	1136831
	MO 5-3	280 kW ( 375 HP )	Each	1330308	17502	1347810
	MO 5-4	340 kW ( 456 HP )	Each	1401881	17502	1419383
	MO 5-5	390 kW ( 523 HP )	Each	1477787	20424	1498211
	MO 5-6	440 kW ( 590 HP )	Each	1571406	20424	1591830
	MO 5-7	510 kW ( 684 HP )	Each	1796599	20424	1817023
	MO 5-8	580 kW ( 777 HP )	Each	1940822	23342	1964164
	MO 5-9	660 kW ( 885 HP )	Each	2179155	23342	2202497
	<b>MO 6</b>	<b>3.3 kV Foot Mounted Motor TEFC 1500 RPM</b>				
	MO 6-1	225 kW ( 300 HP )	Each	884846	11673	896519
	MO 6-2	250 kW ( 335 HP )	Each	1004076	14585	1018661
	MO 6-3	280 kW ( 375 HP )	Each	1189898	17502	1207400
	MO 6-4	330 kW ( 442 HP )	Each	1244096	17502	1261598
	MO 6-5	370 kW ( 495 HP )	Each	1429918	20420	1450338
	MO 6-6	425 kW ( 569 HP )	Each	1484114	20420	1504534
	MO 6-7	510 kW ( 683 HP )	Each	1618318	20420	1638738
	MO 6-8	660 kW ( 885 HP )	Each	1969317	23342	1992659
	<b>MO 7</b>	<b>3.3 kV Vertical Flange Mounted Motor TEFC 1000 RPM</b>				
	MO 7-1	225 kW ( 300 HP )	Each	801012	11673	812685
	MO 7-2	250 kW ( 335 HP )	Each	909145	14585	923730
	MO 7-3	280 kW ( 375 HP )	Each	1077514	17502	1095016

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	MO 7-4	340 kW ( 456 HP )	Each	1131700	17502	1149202
	MO 7-5	390 kW ( 523 HP )	Each	1191260	20424	1211684
	MO 7-6	440 kW ( 590 HP )	Each	1264713	20424	1285137
	MO 7-7	510 kW ( 684 HP )	Each	1431477	20424	1451901
	MO 7-8	580 kW ( 777 HP )	Each	1544637	23342	1567979
	MO 7-9	660 kW ( 885 HP )	Each	1730844	23342	1754186
	<b>MO 8</b>	<b>3.3 kV Vertical Flange Mounted Motor TEFC 1500 RPM</b>				
	MO 8-1	225 kW ( 300 HP )	Each	711659	11673	723332
	MO 8-2	250 kW ( 335 HP )	Each	807606	14585	822191
	MO 8-3	280 kW ( 375 HP )	Each	903553	17502	921055
	MO 8-4	330 kW ( 442 HP )	Each	1000675	17502	1018177
	MO 8-5	370 kW ( 495 HP )	Each	1131700	20420	1152120
	MO 8-6	425 kW ( 569 HP )	Each	1173393	20420	1193813
	MO 8-7	510 kW ( 683 HP )	Each	1276625	20420	1297045
	MO 8-8	660 kW ( 885 HP )	Each	1536696	23342	1560038
	<b>Note 2</b>	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.				
	<b>Note 3</b>	For any special purpose if RTD and space heater are required in addition, add following extra charges				
		a) Space heater (240 Volts) Rs 5250/- for set of two		6038		6038
		b) RTD Rs. 7500/- for six Nos.		7500		7500
	<b>Note 4</b>	<b>All motors shall be of BEE mark</b>				
		<b>SECTION 16 - TL</b>				
		<b>[ TOOLS ]</b>				
	TL 1	D.E. Open Jaw fix spanner 12 piece set - 6 -32 mm	Set	816		816
	TL 2	Bi-hexagon Ring spanner 12 piece set - 6-32mm	Set	1420		1420
	TL 3	Ball pen hammer with handle 800 gm	Each	367		367
	TL 4	Combination side cutting plier 200 mm KDPE coated	Each	269		269
	TL 5	Adjustable wrench chrome vanadium 250 mm - 30 mm	Each	350		350
	TL 6	Pipe wrench stillson pattern carbon steel 450 mm - 60 mm	Each	688		688
	TL 7	Pipe wrench stillson pattern carbon steel 600 mm - 76 mm	Each	1232		1232
	TL 8	Screw driver Engineering pattern 6 X 300 mm	Each	118		118
	TL 9	Screw driver Engineering pattern 8 X 200 mm	Each	102		102
	TL 10	Screw driver Engineering pattern 5 X 200 mm	Each	74		74
	TL 11	Screw driver Engineering pattern 5 X 300 mm	Each	76		76
	TL 12	Screw driver with green neon bulb line tester 3.6 X 60 mm	Each	74		74
	TL 13	Hack saw frame 300 mm size with heavy duty blade	Each	83		83
	TL 14	Tool box fabricated from MS sheet of 18 SWG of size 50 X 30 X 30 cm with locking arrangement	Each	1310		1310
	TL 15	Cold chisels chrome vanadium hexagonal 19/14 - 200 mm	Each	181		181
	TL 16	Chain pipe wrench IS 54123 -- 210 - 4"	Each	4871		4871
	TL 17	Chain pipe wrench IS 54123 -- 210 - 6"	Each	7150		7150
	TL 18	25 mm dia heavy duty 1.2 m long crow bar	Each	247		247
	TL 19	12 mm size 2 NT capacity wire rope 3 m long with dog bolt 2 Nos.	Each	328		328
	TL 20	50 mm size G.I. "B" class pipe 1.5 m long with coupling on both side, for use as lever	Each	294		294
	TL 21	Central punch Chrome Vanadium steel 175 mm	Each	76		76
	TL 22	Triangular file 300 mm size of "Standard" make	Each	410		410

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	TL 23	Half round file of 300 mm size " Standard" make	Each	410		410
	TL 24	Bearing puller three legs -- 8"	Each	434		434
	TL 25	Bearing puller three legs -- 10"	Each	567		567
	TL 26	Bearing puller three legs -- 12"	Each	688		688
	TL 27	Hydraulic flip flop crimping tool suitable for 6 to 500 sq mm size cable lugs (Usha-Ismail or similar make)	Each	40582		40582
	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	11458		11458
	TL 29	Insulator tester ( Megger ) cranking type having metal body of range 100 Volts 1000 Ohms.	Each	5270		5270
	TL 30	Earth Tester- 4 terminals of range 0-10-100-1000-10000 Ohms	Each	8105		8105
	TL 31	Tong Tester ( Clip on meter ) of range 0-10-30-100-1000 Amps and 0-300-600 Volts	Each	3977		3977
	TL 32	Engineer's precision steel level of size 300 mm	Each	491		491
	TL 33	Precision stainless steel rules 500 mm	Each	328		328
	TL 34	Allen Head Wrench Crome Vanadium 10 piece - 6-10mm	Set	398		398
	TL 35	Tubler box spanner set with Tommy bar 8 piece- 6-22mm	Set	984		984
	TL 36	Diagonal cutting pliers 150 mm PVC coated	Each	237		237
	TL 37	Long nose pliers carbon steel 200 mm PVC coated	Each	227		227
	TL 38	Water pump pliers chrome vanadium 259 mm - 40 mm	Each	331		331

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<b>SECTION 17 - EC &amp; GC</b>				
		<b>A - EC- ELECTRO CHLORINATION SYSTEM</b>				
	<b>EC</b>	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 form 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.				
		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	20552	243676
	EC 17-2	50 gms / hr	Each	330552	30444	360996
	EC 17-3	100 gms / hr	Each	585352	53910	639262
	EC 17-4	150 gms / hr	Each	654219	60251	714470
	EC 17-5	250 gms / hr	Each	785062	72304	857366
	EC 17-6	350 gms / hr	Each	922793	84987	1007780
	EC 17-7	500 gms / hr	Each	1170707	107818	1278525
	EC 17-8	750 gms / hr	Each	1485090	136771	1621861
	EC 17-9	1000 gms / hr	Each	1804265	166166	1970431
	EC 17-10	1500 gms / hr	Each	2272548	209289	2481837
	EC 17-11	2000 gms / hr	Each	2554897	235292	2790189
		<b>B - GC - [ AUTOMATIC GAS CHLORINATION SYSTEM ]</b>				
	<b>GC</b>	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				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		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.				
		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	239651	1984820
	GC 17-2	10 kg / hr (500 PPD)	Each	1826556	242168	2068724
		<b>C . GAS CHLORINATION SYSTEM (Manual)</b>				
		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. 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	46181	399403
	GC 17-4	10 kg / hr (500 PPD)		450753	43434	494187
		<b>Note: The autochlorination system shall be provided for water Treatment Plants of capacity 10 MLD and above.</b>				
	<b>NEW ITEM</b>	<b>D) Portable Water chlorination System</b>				
	SD -1	Supply of Sodium dichloroisocyanurate Granules as per ( IS 15773 : 2008)	Kg	755		755.00
		Supply of Sodium Dichloroisocyanurate Granules - (IS 15773:2008)				
		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.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	SD -2	Providing, installing & commissioning with satisfactory test & trial Chlorine/ sodium dichloroisocyanurate dosing portable water chlorination system ( Manual ) having chlorine as a sodium dichloroisocyanurate with following components, Capacity 5gm/hr. to 100gm/hr.	No.	130000	10000	140000
		<b>Sodium Dichloroisocyanurate Dosing Potable Water Chlorination System (Manual)</b>				
		Providing installing and giving satisfactory testing of Chlorine / Sodium Dichloroisocyanurate Dosing Potable Water Chlorination System (Manual) having Chlorine as Sodium Dichloroisocyanurate. The system should have following components.				
		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/cm2 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
		<b>Sodium Dichloroisocyanurate Dosing Potable Water Chlorination system: (Semi Automatic).</b>				
		Providing installing and giving satisfactory testing of Sodium Dichloroisocyanurate Dosing Potable Water Chlorination system: (Semi Automatic).				
		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				
		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/cm2 injection pressure.				
		All automatic operations are PLC controlled with HMI provided.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		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/cm2. Plastic wetted parts, with extruded aluminum body with				
		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				
		Chlorine Test kit to be provided for suitable to measure residual chlorine upto 5ppm				
		Capacity Min: Chlorine 10gm/hr to Max. Chlorine 250gm/hr				
		<b>Sodium Dichloroisocyanurate Dosing Potable Water Chlorination system: (Automatic).</b>				
	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.				
		Dosing Pump: 0 - 6 LPH @ 4 kg / cm2, 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/cm2. 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				
		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				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		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.
		<b>SECTION 18 - WM [ WATER METERS ]</b>				
	<b>WM 1</b>	<b>Mechanical Type Meters.</b>				
	<b>A)</b>	<b>Domestic Meters</b>				
	<b>a)</b>	<b>ISI mark as per IS 779/1994</b>				
		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	202	1410
	2	20 mm dia	Each	2254	202	2456
	3	25 mm dia	Each	3193	202	3395
	4	40 mm dia	Each	6994	202	7196
		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%			
	<b>b)</b>	<b>Multijet meters</b>				
		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	202	2333
	2	20 mm dia	Each	2641	202	2843
	3	25 mm dia	Each	4620	202	4822
	4	40 mm dia	Each	8790	202	8992
	<b>c)</b>	<b>AMR Meters</b>				
		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 transceiver 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	765	8155
	2	20 mm dia	Each	8130	876	9006
	3	25 mm dia	Each	12695	1082	13777
	4	40 mm dia	Each	17308	1476	18784

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	<b>B)</b>	<b>Bulk Meters.</b>				
		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.				
	<b>a)</b>	<b>Removable mechanism type as per IS2373</b>				
	1	200 mm dia	Each	23878	2430	26308
	2	250 mm dia	Each	45866	3201	49067
	3	300 mm dia	Each	60613	4151	64764
	<b>b)</b>	<b>Removable mechanism type Bulk water meter as per ISO 4064</b>				
		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	422	16141
	2	80 mm dia	Each	17464	1028	18492
	3	100 mm dia	Each	19211	1457	20668
	4	150 mm dia	Each	24397	2274	26671
	5	200 mm dia	Each	32149	2430	34579
	6	250 mm dia	Each	72844	3201	76045
	7	300 mm dia	Each	122686	4151	126837
	<b>NOTE</b>	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.				
	<b>c)</b>	<b>C.I. Strainer "T" (Basket) Type with flanged ends</b>				
		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	3219	422	3641
	2	80 mm dia	Each	4652	1028	5680
	3	100 mm dia	Each	6644	1457	8101
	4	150 mm dia	Each	12179	2274	14453
	5	200 mm dia	Each	18365	2430	20795
	6	250 mm dia	Each	24486	3201	27687
	7	300 mm dia	Each	47014	4151	51165
	<b>NOTE</b>	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.
	<b>WM 2</b>	<b>Ultrasonic / Electromagnetic Water Meter</b>				
	<b>A)</b>	<b>AMR Domestic Meters</b>				
		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.				
		<b>General Specifications</b>				
		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				
		7. Memory built-in and should have storage for atleast 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	883	10915
	2	20 mm dia	Each	10942	964	11906
	3	25 mm dia	Each	12759	1124	13883
	4	40 mm dia	Each	18212	1601	19813
	<b>B)</b>	<b>AMR Bulk Meters</b>				
		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	2317	29661
	2	80 mm dia	Each	31752	2689	34441
	3	100 mm dia	Each	37082	3142	40224
	4	150 mm dia	Each	51999	4403	56402
	5	200 mm dia	Each	78839	6676	85515
	6	250 mm dia	Each	151189	12800	163989
	7	300 mm dia	Each	209403	12800	222203

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	C)	<b>Ultrasonic Flow meters</b>				
		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	<b>Ultrasonic Clamp-on portable type Flow Meter (Single Channel)</b>				
		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.				
	2	<b>Ultrasonic Clamp-on Fixed type Flow Meter (Single Channel)</b>				
		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
	3	<b>Ultrasonic Insertion Fixed type Flow Meter (Single Channel)</b>				
		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
		<b>Mandatory Accessories:</b>				
		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)				
		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				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		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)				
		10) M.S. sensor protection boxes with suitable size for above ground lines where construction of chamber is not possible. (only required for category C-2)				
		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.				
		<b>Optional Accessories:</b>				
		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
		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 <sup>2</sup> 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 <sup>2</sup> PVC cable with common branded copper shield 7 mm dia and individually shielded cores.				
		Conductor resistance : $\leq 50$ Ohm/Km				
	<b>C)</b>	<b>Working Condition &amp; Specifications</b>				
		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 <sup>2</sup>				
		d) Pipeline MOC : CI, DI, MS with /without mortar lined, Non-metallic pipes.				
		e) Pipe diameter :> 1000 mm -4000 mm				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		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.				
		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.				
		t) Future upgradation to field bus foundation. Profibus should be possible with minimal changes.				
	D)	<b>Calibration, Testing &amp; Inspection</b>				
		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 FCR/CVPRS/IDEMI etc. for which third party inspection is not required.				
		For water meter/flowmeters- Third party inspection shall 15% of total qty.				
	E)	<b>Manufacturer's Guarantee, Certificate &amp; training</b>				
		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)	<b>O &amp; M towards flow meter &amp; accessories</b>				
		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)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		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.				
		e) Technical training/ trouble shooting training to the user by the supplier.				
		f) Providing complete technical details on instrument with necessary manuals				
	<b>G)</b>	<b>General Terms &amp; Conditions</b>				
		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				
		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.
	<b>WM 3</b>	<b>Full-Bore Electromagnetic Flow Meter:</b>				
		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 (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	4521	134620
	2	150 mm Nominal Diameter Flowmeter	Each	139573	5496	145069
	3	200 mm Nominal Diameter Flowmeter	Each	166006	5818	171824
	4	250 mm Nominal Diameter Flowmeter	Each	183106	6756	189862
	5	300 mm Nominal Diameter Flowmeter	Each	209441	8269	217710
	6	350 mm Nominal Diameter Flowmeter	Each	290828	10356	301184
	7	400 mm Nominal Diameter Flowmeter	Each	330090	11940	342030
	8	450 mm Nominal Diameter Flowmeter	Each	352681	13666	366347
	9	500 mm Nominal Diameter Flowmeter	Each	412031	14301	426332
	10	550 mm Nominal Diameter Flowmeter	Each	456260	15580	471840
	11	600 mm Nominal Diameter Flowmeter	Each	475202	16131	491333
	12	700 mm Nominal Diameter Flowmeter	Each	510570	17152	527722
	13	750 mm Nominal Diameter Flowmeter	Each	547083	18188	565271
	14	800 mm Nominal Diameter Flowmeter	Each	613539	20134	633673
	15	900 mm Nominal Diameter Flowmeter	Each	699094	22605	721699
	16	1000 mm Nominal Diameter Flowmeter	Each	748830	26368	775198
	<b>A)</b>	<b>Mandatory Accessories:</b>				
		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.				
		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>B)</b>	<b>Optional Accessories:</b>				
		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				
		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 <sup>2</sup> PVC cable with common, braided copper shield (-7mm dia) and individually shielded cores- with empty pipe detection 9 EPD): 4X0.38 mm <sup>2</sup> 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 <sup>2</sup> 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
	<b>C)</b>	<b>Working Condition &amp; Specifications</b>				
		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 <sup>2</sup>				
		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				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		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.				
		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				
		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				
	<b>D)</b>	<b>Calibration, Testing &amp; Inspection</b>				
		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.				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	E)	<b>Manufacturer's Guarantee, Certificate &amp; training</b>				
		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)	<b>O &amp; M towards flow meter &amp; accessories</b>				
		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.				
		e) Technical training/ trouble shooting training to the user by the supplier.				
		f) Providing complete technical details on instrument with necessary manuals				
	G)	<b>General Terms &amp; Conditions</b>				
		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				
		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				
		<b>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 .</b>				
	WM 4	<b>Battery Operated electromagnetic flow meter</b>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Providing, erecting, testing and commissioning of battery operated electromagnetic flow meter built in GSM ( with Simcard charges for 36 months validity ) of various diameters as per the following specifications including 36 months guarantee etc complete.				
	A)	<b>General Specifications</b>				
		<b>Sensor</b>				
		1) Sensor size (dia.) : DN 25 mm to 1200 mm				
		2) Process temperature : Ambient -1... +50°C				
		3) Type : In line full bore Electromagnetic				
		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				
		<b>Transmitter</b>				
		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				
		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	14129	144795
	2	150 mm line size	Each	140180	15157	155337
	3	200 mm line size	Each	166729	18026	184755
	4	250 mm line size	Each	183903	19883	203786
	5	300 mm line size	Each	210351	22743	233094
	6	350 mm line size	Each	292093	31581	323674
	7	400 mm line size	Each	331525	35844	367369
	8	450 mm line size	Each	354214	38298	392512
	9	500 mm line size	Each	413824	44742	458566
	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.
		<b>SECTION 19 - SA</b>				
		<b>[ SCADA &amp; AUTOMATION ]</b>				
	<b>SA 1</b>	<b>Raw Water Pump house</b>				
	<b>1.1</b>	<b>Ultrasonic level transmitter/ for pure water sump/ MBR/ ESR/ Wash Water Tank/ Filter bed</b>				
	<b>1.1. a</b>	Designing, Supplying, Installing, commissioning & testing of <b>Ultrasonic level transmitter</b> CE marked with following technical parameters Interfacing with PLC panel including mounting arrangement.	Each	<b>60102</b>	<b>4983</b>	<b>65085</b>
		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				
	<b>1.1. b</b>	<b>Ultrasonic level transmitter raddar type level transmeter for raw water pumping station</b>				
		Designing, Supplying, Installing, commissioning & testing of <b>Ultrasonic Raddar type Ultrasonic level transmitter</b> CE marked with following technical parameters at Raw Water Pump House and Interfacing with PLC panel including mounting arrangement.	Each	<b>63925</b>	<b>4983</b>	<b>68908</b>
		Output-4-20 mA / HART				
		Power supply - 24V DC ext.				
		Display - 4" LED				
		Range- 0 to ...30... mtrs				
		Accuracy - +/- 0.25% of Full Scale or better				
		Enclosure- IP 68				
		Mounting - On PLC panel				
	<b>1.2</b>	<b>Pressure Transmitter for raw &amp; pure water pumping station</b>	Each	<b>34308</b>	<b>2326</b>	<b>36634</b>
		Designing, Supplying, Installing, commissioning & testing of <b>pressure transmitter</b> 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				
	<b>1.3</b>	<b>Power Analyser</b>	Each	<b>30940</b>	<b>2193</b>	<b>33133</b>
		Designing, Supplying, Installing, commissioning & testing of Power Analyser <b>interfacing to PLC Panel with modbus communicatuion port , as per IEC 62053</b> and in the prescribed format including mounting arrangement.				
	<b>1.4</b>	<b>PLC Panel</b>				
		Designing, Supplying, Installing, commissioning & testing of <b>PLC Panel</b> . Including PLC with CPU & Power supply unit, power supply cables interfacing cards, interfacing cables, wireless modules with 25% extra quantity of all accessories.	Each	<b>39897</b>	<b>1661</b>	<b>41558</b>
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	<b>1.5</b>	<b>PLC based control monitoring and communication software</b>				
		Designing, Supplying, Installing, commissioning & testing of PLC based <b>control monitoring and communication software</b> as per IEC 61131 at Raw water Jackwell / Sump suitable for monitoring and control of Raw water Pumps, Pressure Transmitters, Level Transmitter, Flow Transmitter complete.	Each	<b>48939</b>	<b>6643</b>	<b>55582</b>
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	<b>NEW ITEM</b>					
	<b>1.4.1</b>	<b>PLC panel for Raw water pump House with two Pumps</b>		<b>146970</b>	<b>16330</b>	<b>163300</b>

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. 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 &amp; instruments at Raw water Pumphouse.</p> <p>PLC shall have Ethernet port &amp; protocol for Modbus TCP communication with following IO.</p>				
		<p>DI –16 num DO – 16 num AI –8 num AO – 4 num. 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 &amp; trouble free operation of pump house.</p>				
		<p>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</p>				
	1.4.2	PLC panel for Raw water pump House with four Pumps		193410	21490	214900
		<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 &amp; instruments at Raw water Pumphouse.</p> <p>PLC shall have Ethernet port &amp; protocol for Modbus TCP communication with following IO</p>				

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				
	1.4.3	PLC panel for Raw water pump House with Six Pumps		244530	27170	271700
		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.				
		DI –32 num DO – 32 num AI –24 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 – 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	27300	273000

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		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.				
		SCADA Software of reputed company with developer & runtime license with minimum 256 number of Tags with following features & functions 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.				
		4. Alarm summary & 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.  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	<b>Power Cable</b>				
		Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>2 C x 1.5 sq.mm</b> 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	<b>Communication Cable</b>				
		Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>CAT 6</b> as per ISO/IEC-11801 std.cable for networking on wall in GI tray or on ground etc.			As per PWD CSR	
	1.8	<b>Signal Cable</b>				
	1.8.1	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>2 Pair x 1 sq.mm</b> as per IS 694 copper Shielded twisted, multistranded armoured cable on wall in GI tray or on ground.	Mtr	187	12	199

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	1.8.2	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>3 Pairs x1 sq.mm.</b> as per IS 694 copper Shielded, twisted, multi stranded armoured cable on wall in GI tray or on ground.	Mtr	239	14	253
	1.8.3	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>4.5 Pairs x 1.0 sq.mm</b> as per IS 694 copper shielded, twisted, multi stranded armoured cable on wall in GI tray or on ground.	Mtr	351	21	372
	1.8.4	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>8 Pairs x 1.0 sq.mm</b> as per IS 694 copper shielded, twisted, multi stranded armoured cable on wall in GI tray or on ground.	Mtr	615	50	665
	1.9	<b>Surveillance System</b>				
		Designing, supplying, installing, commissioning & testing of CCTV IR water proof camera suitable for upto 100ft. with IR Dome camera, control key board, DVR, Hard Disk, cables, UPT transreceivers etc. complete.	Each	26296	1994	28290
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	( NEW ITEM ) 1.9.1	<b>Surveillance System</b>		50400	5600	56000
		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. 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 Channel DVR with metal body construction, 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 2	<b>Water Treatment Plant</b>				
		<b>Aeration Fountain</b>				
	2.1	<b>Open channel type ultrasonic flowmeter with FIT</b>	Each	51343	3321	54664
		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	<b>pH analyser</b>				
		Design, Supply, Installation, Testing of <b>pH analyser</b> 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	6643	104661
	2.3	<b>Turbidity Analyser</b>				
	2.3.1	Design, Supply, Installation, commissioning, testing of <b>Turbidity Analyser</b> 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	26129	254517

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Overall Range : 0 - 2000 NTU				
		Accuracy : +/- 0.02 NTU				
		Supply Voltage : 230 V ac				
		Output : 4-20 mA /HART				
		<b>Alum / PAC Dosing</b>				
	2.3.2	Design, Supply, Installing commissioning and testing <b>PLC compatible</b> Alum/PAC Mixing, Dosing and monitoring system for Dosing at raw water channel by applying suitable mechanism to control the available turbidity in desired limit. This system includes level switches for tank.	Each	214274	14946	229220
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	2.4	<b>Level transmitter</b>				
		Designing, Supplying, installing, commissioning & testing of <b>Ultrasonic level transmitter CE marked at each filter bed</b> with following technical parameters Interfacing with PLC panel including mounting arrangement.	Each	49010	3321	52331
		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				
	2.5	<b>Power Analyser</b>				
		Designing, Supplying, Installing, commissioning & testing of <b>Power Analyser interfacing to PLC Panel with modbus communication port, as per IEC 62053</b> and in the prescribed format including mounting arrangement.	Each	30940	2193	33133
	2.6	<b>PLC Panel with HMI for Filter Bed</b>				
		Designing, Supplying, Installing, commissioning & testing of <b>PLC Panel with HMI</b> including PLC with CPU & Power supply unit, power supply cable, Interfacing cards, interfacing cables, wireless modules with 25 % extra quantity of all accessories.	Each	39897	1661	41558
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	2.7	<b>Master PLC Panel</b>				
	A	Design, Supply, Installing, Commissioning & Testing of <b>Master PLC control monitoring and communication panel</b> as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed. WITHOUT FILTER CONTROL	Each	62997	1661	64658
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	B	Design, Supply, Installing, Commissioning & Testing of <b>Master PLC control monitoring and communication panel</b> as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed. WITH FILTER CONTROL	Each	75596	1661	77257
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	2.6.1( NEW ITEM)	PLC with HMI for sand filter ( with 2 Filter beds )		249930	27770	277700
		<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 &amp; instruments at WTP Plant (sand filter bed wasing &amp; operation).</p>				
		<p>PLC shall have Ethernet port &amp; protocol for Modbus TCP communication with following IO  DI –40 num  DO – 40 num  AI –16 num  AO – 12 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 &amp; trouble free operation of sand filters (sand filter bed wasing &amp; operation)</p>				
		<p>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</p>				
	2.6.2( NEW ITEM)	PLC with HMI for sand filter ( with 4 Filter beds )		303750	33750	337500
		<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 &amp; instruments at WTP Plant (sand filter bed wasing &amp; operation).</p>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<p>PLC shall have Ethernet port &amp; 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 &amp; trouble free operation of sand filters (sand filter bed wasing &amp; operation)</p> <p>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</p>				
		<p>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</p>				
	2.8	<b>Control Cable</b>				
	2.8.1	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>2 C x 1.5 sq.mm</b> as per IS 694 twisted shielded copper armoured conductor on wall in GI tray or in ground suitable for supplied DC Voltage				
	2.8.2	<b>Communication Cable</b>				
		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	<b>Signal Cable</b>				
	2.9.1	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>2 pair x 1.0 sq.mm.</b> as per IS 694 <b>copper shieled, twisted, multistraned</b> armoured cable on wall in GI tray or on ground.		As Above		
	2.9.2	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>3 pair x 1.0 sq.mm.</b> as per IS 694 <b>copper shieled, twisted, multistraned</b> armoured cable on wall in GI tray or on ground.		As Above		
	2.9.3	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>4.5 pair x 1.0 sq.mm.</b> as per IS 694 <b>copper shieled, twisted, multistraned</b> armoured cable on wall in GI tray or on ground.		As Above		
	2.9.4	Designing, Supplying, Installing, commissioning & testing with Terminating & Interfacing of <b>8 pair x 1.0 sq.mm.</b> as per IS 694 <b>copper shieled, twisted, multistraned</b> armoured cable on wall in GI tray or on ground.				
	3	<b>Blower</b>				
	3.1	<b>Pressure Transmitter for Blower</b>				
		Designing, Supplying, Installing, commissioning & testing of pressure transmitter CE markd with following technical parameters at Blower delivery and Interfacing with PLC panel.				
		Medium- Water				
		Pressure - 0-10 kg/cm2				
		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	<b>Ultrasonic Level Transmitter for Wash Water Tank</b>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Designing, Supplying, Installing, commissioning & testing of Ultrasonic level transmitter CE marked with following technical parameters and Interfacing with PLC panel including Mounting accessories. 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	Each	49010	3321	52331
	3.3	<b>Priming arrangement</b>				
		Desiding, supplying, installing, commissioning & testing with complete priming arrangements for centrifugal pumps as applicable & as required shall be done with interface with PLC panels & further to SCADA system.	Each	84202	13019	97221
	3.4 a	<b>Surveillance system</b>				
		Designing,supplying,installing,commissioning & testing of CCTV IR water proof camera suitable for upto 100ft. with IR Dome camera, control key board, DVR, Hard Disk, cables, UPT transreceivers etc. complete. (Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)	Each	26296	1994	28290
	3.4 b ( NEW ITEM )	<b>Surveillance system</b>	Each	50400	5600	56000
		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 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	<b>Flash Mixer &amp; Clariflocculator</b>				
		Designing,Supplying,Installing,commissioning & testing with operation, controlling & Monitoring of Flash Mixer and Clarifloccutor mechanism interfaced with Master PLC of WTP (Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)	Each	30588	1661	32249
	SA 4	<b>Valves with actuator</b>				
		Design, Supply, Installation, Testing of <b>Motor Actuated Valve</b> / 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				
	SA 5	<b>Pure Water Pump house</b>				
	5.1	<b>Ultrasonic level transmitter</b>				
		Designing, Supplying, Installing, commissioning & testing of <b>Ultrasonic level transmitter</b> CE marked with following technical parameters at pure Water Pump House and Interfacing with PLC panel including Mounting accesories. 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	Each	49010	3321	52331
	5.2	<b>Pressure Transmitter</b>				
		Designing, Supplying, Installing, commissioning & testing of <b>pressure transmitter</b> 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	Each	34308	2326	36634

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Accuracy - +/- 0.1 % of full scale or better				
		Enclosure- IP 68				
	<b>5.3</b>	<b>pH analyser</b>				
		Design, Supply, Installation, Testing of <b>pH Analyser</b> 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	<b>98018</b>	<b>6643</b>	<b>104661</b>
	<b>5.4</b>	<b>Turbidity meter / analyser</b>				
		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	<b>190459</b>	<b>13285</b>	<b>203744</b>
	<b>5.5</b>	<b>Residual chlorine analyser</b>				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Design, Supply, Installation, Testing of <b>Residual chlorine analyser / meter</b> 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) <b>must be</b> provided to avoid maintenance. IP 65 Nema 4 housing protection class required.	Each	256718	16606	273324
	<b>5.6</b>	<b>Power Analyzer</b>				
		Designing, Supplying, Installing, commissioning & testing of <b>Power Analyzer interfacing to PLC Panel with Modbus Communication Port, as per IEC 62053</b> and in the prescribed format including Mounting arrangement.		30940	2193	33133
	<b>5.7</b>	<b>PLC Panel</b>				
		Designing, Supplying, Installing, commissioning & testing of <b>PLC Panel</b> including PLC with CPU & Power supply unit, power supply cable, Interfacing cards, interfacing cables, wireless modules with 25 % extra quantity of all accessories.	Each	39897	1661	41558
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	( NEW ITEM ) 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			
	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			
	<b>5.8</b>	<b>PLC based control monitoring and communication software</b>				
		Design, Supply, Installing, Testing, PLC based control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter, residual chlorine analyser for all pumps installed.	Each	48939	6643	55582
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	<b>5.9</b>	<b>Surveillance system</b>				
		Designing, supplying, installing, commissioning & testing of CCTV IR water proof camera suitable for upto 100ft. with IR Dome camera, control key board, DVR, Hard Disk, cables, UPT transreceivers etc. complete.	Each	26296	1994	28290
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	<b>SA 6</b>	<b>SCADA Software</b>				
	<b>6.1</b>	Supply, Installation, Commissioning, Testing, Terminating & Interfacing Software Design to PLC and commissioning of <b>SCADA software with required hard tags plus 25% extra and with unlimited soft Tags &amp; life time licence</b> Development version	Each	262040	26568	288608
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	6.2	Developing/programming charges to install the software as per logic defined by the dept.	Each	153807	19927	173734
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	6.3	Supply, Installation, Testing, Terminating & Interfacing Centralised Historian Server grade Historian PC with Window 7 or latest window operating system & Historian software development cost etc. complete	Each	74822	4983	79805
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	6.4	Supply, Installation, Testing, Terminating & Interfacing Secondary Computer Station Secondary computer station etc.	Each	58951	4319	63270
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	6.5	Supply, Installation, Testing, Intgeration & Commissioning of 46" LCD monitor at Conf. Room for display of total water system (Online)	Each	78083	5979	84062
	6.1 ( NEW ITEM)	PLC Panel for WTP Automation		309060	34340	343400
		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 (raw water monitoring, alum dosing control,clariffaculator operation & control, recirculation & mud pump operation).				
		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  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. 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				
	6.2 ( NEW ITEM)	SCADA system for WTP		340200	37800	378000

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 SCADA System for WTP Plant, Sand Filter beds &amp; pump house.</p> <p>Windows based PC with latest configuration &amp; OS complete with necessary office &amp; 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 &amp; Rs485 port, 2 RJ45 ports, Keyboard, Optical Mouse, 32 inch color TFT Monitor, Latest Windows Pro OS, Microsoft Office &amp; Antivirus &amp; Internet Security software for 3 years license.</p> <p>SCADA Software of reputed company with developer &amp; runtime license with minimum 512 number of Tags with following features &amp; functions.</p> <p>1. Supervise real-time data in the form of graphical presentation.</p>				
		<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 summary &amp; 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 &amp; Historical time trend.</p> <p>6. Web Connectivity, Real-time displays can be accessed on remotely attached PCs and notebooks using internet.</p>				
		<p>SCADA Programming shall be done so as operator can visualize and control complete WTP operation from operator desk. All important alarms &amp; events shall be logged. All the data from field instruments &amp; equipments shall be logged. There shall be provision to take reports in required formats of real time &amp; historical data, events &amp; 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 ( NEW ITEM)	Secondary work station PC		67500	7500	75000
		<p>Windows based PC with latest configuration &amp; OS complete with necessary office &amp; 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 &amp; Rs485 port, 2 RJ45 ports, Keyboard, Optical Mouse, 32 inch color TFT Monitor, Latest Windows Pro OS, Microsoft Office &amp; Antivirus &amp; Internet Security software for 3 years license.</p>				
	SA7	MBR / GSR / ESR				
		Providing, installing, testing and commissioning of following equipments with satisfactory test and trial etc.as per detailed specification attached				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
	7.1	<b>Ultrasonic level transmitter</b>	Each	49010	3321	52331
		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				
	7.2	<b>PLC Panel suitable for Wireless communication</b>				
		Designing, supplying, Installing commissioning & testing of following equipments with satisfactory test and trial of PLC Panel control, monitoring and communication system along with PLC Panel at Central monitoring system.	Each	152161	11625	163786
		(Old item deleted. only for Evaluation Purpose of previous year DSR based tenders)				
	7.2.1 (NEW ITEM)	RTU (Remote terminal control & communication unit at each GSE/ESR)		75330	8370	83700
		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.  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.				
		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				
	7.2.2 (NEW ITEM)	SCADA System for MBR/GSR/ESR with PLC based control valves Management system		417600	46400	464000

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 SCADA System for MBR/GSR/ESR Management system Windows based PC with latest configuration &amp; OS complete with necessary office &amp; 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 &amp; Rs485 port, 2 RJ45 ports, Keyboard, Optical Mouse, 32 inch color TFT Monitor, Latest Windows Pro OS, Microsoft Office &amp; Antivirus &amp; Internet Security software for 3 years license.</p> <p>one LTE Cellular Gateway with minimum following specifications shall be provided with Dual Sim Support, Support for all LTE bands used by Indian Cellular Operators, with atleast one, Ethernet, one USB &amp; one serial port for connectivity with host device, rugged construction for hazardous location.</p>				
		<p>One remote dice mangement software shall be provided to manage IP addresses of RTUs SCADA Software of reputed compny with developer &amp; runtime license with unlimited number of Tags with following features &amp; functions</p> <ol style="list-style-type: none"> <li>1. Supervise real-time data in the form of graphical presentation</li> <li>2. Control MBR/GSR/ESR processes locally or through Remote locations</li> <li>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.</li> <li>4. Alarm summery &amp; 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.</li> </ol>				
		<ol style="list-style-type: none"> <li>5. Acquire real-time data as well as logs data with Real time trend &amp; Historical time trend.</li> <li>6. Web Connectivity, Real-time displays can be accessed on remotely attached PCs and notebooks using internet.</li> </ol> <p>SCADA Programming shall be done so as operator can visualize and control complete pump house operation from operator desk. All important alarms &amp; events shall be logged. All the data from field instruments &amp; equipments shall be logged. There shall be provision to take reports in required formats of real time &amp; historical data, events &amp; alarms. There shall be provision of broadcasting messages, emails of reporting information. There shall be provision of access security.</p>				
	7.3	<b>Solar Panel with Battery</b>				
		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	1196	20391
	7.3	<b>Solar Panel with Battery</b>				
		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	1196	20391
	SA 8 (I)	<b>ESR Management Systems (RMS)</b>				
		( For Inlet / outlet)				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		Designing, Supplying, Installing, Commissioning & testing of <b>Flow Control Valve / Pressure reducing valve</b> 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	13285	182769
	SA8-2	100 mm Dia	Each	182951	13285	196236
	SA8-3	150 mm Dia	Each	241004	13285	254289
	SA8-4	200 mm Dia	Each	307904	13285	321189
	SA8-5	250 mm Dia	Each	416010	13285	429295
	SA8-6	300 mm Dia	Each	493094	13285	506379
	SA8-7	350 mm Dia	Each	631656	13285	644941
	SA8-8	400 mm Dia	Each	827997	13285	841282
	SA8-9	450 mm Dia	Each	886899	13285	900184
	SA8-10	500 mm Dia	Each	1164080	13285	1177365
	SA8-11	600 mm Dia	Each	1674566	13285	1687851
	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	13285	94522
	b	100 mm	Each	88023	13285	101308
	c	150 mm	Each	158043	13285	171328
	d	200 mm	Each	240518	13285	253803
	e	250 mm	Each	369726	13285	383011
	f	300 mm	Each	502674	13285	515959
	g	350 mm	Each	613457	13285	626742
	h	400 mm	Each	900246	13285	913531
	i	450 mm	Each	1110680	13285	1123965
	j	500 mm	Each	1465305	13285	1478590
	k	600 mm	Each	2003096	13285	2016381
	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	13285	165568
	b	100 mm	Each	172737	13285	186022
	c	150 mm	Each	243197	13285	256482
	d	200 mm	Each	322746	13285	336031
	e	250 mm	Each	427298	13285	440583
	f	300 mm	Each	581852	13285	595137
	g	350 mm	Each	856928	13285	870213
	h	400 mm	Each	1110525	13285	1123810
	i	450 mm	Each	1464921	13285	1478206
	j	500 mm	Each	2047071	13285	2060356
	k	600 mm	Each	2363774	13285	2377059
	SA 8 (IV)	( Solenoid operated On / Off Valve with timer Controller ) 80 mm to 600 mm				

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		<b>Solonoid Operated On/Off Valve with Timer Controller</b> - 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 accessories like inbuilt timer controller, batteries etc. complete... as per given specifications				
	a	80 mm	Each	120776	13285	134061
	b	100 mm	Each	131390	13285	144675
	c	150 mm	Each	201497	13285	214782
	d	200 mm	Each	283515	13285	296800
	e	250 mm	Each	412724	13285	426009
	f	300 mm	Each	545672	13285	558957
	g	350 mm	Each	662451	13285	675736
	h	400 mm	Each	943244	13285	956529
	i	450 mm	Each	1249044	13285	1262329
	j	500 mm	Each	1508303	13285	1521588
	k	600 mm	Each	2061873	13285	2075158
	Note	(Third party inspection of 15% Quantity minimum)				
	SA11	<b>Comprehensive O &amp; M</b> 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		
		<b>Note : For Schemes upto 5 MLD capacity simple Automation shall be adopted.</b>				
		<b>SA 12 : Simple Automation</b>				
	New Item	<b>SA 12: SIMPLE AUTOMATION</b>				
		Simple Automation shall consist of following				
		1) GSM /GPRS base pump operating system (specifications as below) (one for each pump )				
		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, a. Auto Mode operation – Pump shall be operated with time inputs & limits. Pump shall be also programmed for the specific time pumping. b. Feedback - Shall produce feedback of Voltage, Current & power factor parameters. c. Cyclic timer – For daily operation d. Dry Run Protection  e. Overload Protection. f. Phase fail – Phase imbalance / Low Voltage. g. It shall have RS 485 port for optional operations. 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.		45000	5000	50000
		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	

Sr. No	Section & Code No.	Description	Unit	Supply Rate Rs	Erection Rate Rs	Total Amt Rs.
		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.
		<b>SECTION 20-LB Labour Charges</b>				
	<b>Code No.</b>	<b>Description</b>	<b>Labour charges for Removing</b>	<b>Labour charges for Dismantling</b>	<b>Labour charges for Assembling</b>	<b>Labour charges for Re-erection</b>
		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				
	B 1-1	Submersible pump set	80%	10%	20%	90%
	B 1-2	Monoblock pump motor set	25%	10%	20%	30%
	B 1-3	Rotating assembly of H.S. casing pump	-	20%	30%	-
	B 1-4	Coupled pump (without motor ) Not applicable for HS casing Pump	10%	15%	30%	30%
	B 1-5	Vacuum pump ( Monoblock )	25%	10%	20%	30%
	B 1-6	Vacuum pump ( Coupled with out motor )	10%	15%	30%	30%
	B 1-7-a	Vertical Turbine pump (upto 6 stage)( Without motor)	60%	15%	30%	90%
	B 1-7-b	Vertical Turbine pump (above 6 stages & upto 12 stages)( Without motor)	70%	25%	35%	90%
	B 1-8	Conventional sewage pump ( Without motor)	65%	65%	50%	50%
	B 1-9	Submersible sewage pump	20%	40%	40%	10%
	<b>LB 2</b>	Motor	20%	15%	20%	25%
	<b>LB 3</b>	Transformer				
	B 3-1	Up to 315 kVA capacity	70%	20%	35%	90%
	B 3-2	Above 315 to 750 kVA	80%	20%	35%	90%
	B 3-2	Valves				
	<b>LB 4</b>	Sluice Valve , Non return valve , butter fly valve and air valve	40%	50%	50%	60%
	<b>Note :</b>	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	350	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	-	-	-	-
<p><b>Note</b> 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.</p> <p>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.</p>							

## 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) =  $100 \times 0.5 = 50$  KVAR

## AMENDMENT NO. 4 MARCH 2021

### TO

## IS 1180 (PART 1) : 2014 OUTDOOR/INDOOR TYPE OIL IMMERSED DISTRIBUTION TRANSFORMERS UPTO AND INCLUDING 2 500 kVA, 33kV — SPECIFICATION

### PART 1 MINERAL OIL IMMERSED

( *Fourth Revision* )

[Foreword, para 5 (see also Amendment No. 2)] — Substitute the following for the existing:

‘During this revision scope of both standards IS 1180 (Part 1): 1989 and IS 1180 (Part 2) : 1989 have now been clubbed to make one combined standard for distribution transformer and designated as IS 1180 (Part 1). With the publication of this standard, IS 1180 (Part 2): 1989 would be withdrawn. In this revision maximum losses at 50 and 100 percent loading have been incorporated and the scope is extended up to 2 500 kVA. Further, single phase (3.3 kV to 33 kV) distribution transformers up to 100 kVA rating, have also been included to make it a comprehensive standard on Distribution Transformers.’

(Foreword, para 7, line 3) — Substitute ‘1 star to 5 star’ for ‘3 star, 4 star and 5 star’.

(Foreword, para 8) — Substitute the following for the existing:

‘This standard specifies five energy efficiency levels: level 1, level 2, level 3, level 4 and level 5 corresponding to 1 star, 2 star, 3 star, 4 star and 5 star labelled transformers respectively, as prescribed by BEE. In due course of time with improvements in technology and materials, higher levels of energy efficient transformers shall be progressively used.’

(Foreword, para 9) — Substitute the following for the existing:

‘This standard is a part of IS 1180 series on distribution transformers. Other standards in the series are:

Part 3 Natural ester/ synthetic organic ester immersed’

[Page 1, clause 1 (see also Amendment No. 1)] — Insert following new entry under Note 1:

r) Transformers for Static VAR Compensator

(Page 2, Table 1) — Substitute following for the existing:

**Table 1 Standard Ratings**

( Clause 6.1 )

Sl No.	Nominal System Voltage	Standard Ratings (kVA)
(1)	(2)	(3)
i)	Up to and including 11 kV	*6.3, *10, 16, *20, 25, *40, 63, 100, 160 and 200
ii)	Above 11 kV up to and including 22 kV	*6.3, *10, 16, *20, 25, *40, 63, 100, 160 and 200
iii)	Above 22 kV up to and including 33 kV	*6.3, *10, 16, *20, 25, *40, 63, 100, 160 and 200

NOTE — \*Ratings are non-preferred.

**Price Group 4**

(Page 2, clause 6.6) — Insert following para at the end of clause:

‘Alternatively [Dyn1, see IS 2026 (Part 1)] can also be specified. If system and application requirements demand different vector groups, the same can also be adopted.’

[Page 3, Table 3 (see also Amendment Nos. 1 and 3)] — Substitute the following for the existing table:

**Table 3 Maximum Total Losses up to 11kV Class Transformers**

( Clauses 6.8.1.1, 6.8.1.2, 6.8.1.3 and 6.8.2 )

Sl No.	Rating (kVA)	Impedance (Percent)	Maximum Total Loss (W)									
			Energy Efficiency Level 1		Energy Efficiency Level 2		Energy Efficiency Level 3		Energy Efficiency Level 4		Energy Efficiency Level 5	
			50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 percent Load	100 Percent Load
(1)	(2)	(3)	(4')	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	16	4.5	135	440	120	400	108	364	97	331	87	301
ii)	25	4.5	190	635	175	595	158	541	142	493	128	448
iii)	63	4.5	340	1 140	300	1 050	270	956	243	870	219	791
iv)	100	4.5	475	1 650	435	1 500	392	1365	352	1 242	317	1 130
v)	160	4.5	670	1 950	570	1 700	513	1547	462	1 408	416	1 281
vi)	200	4.5	780	2 300	670	2 100	603	1911	543	1 739	488	1 582

NOTE — For non-preferred ratings of Table 1, maximum losses are subject to agreement between the user and the supplier.

(Page 4, clause 7.8.2, line 2) — Substitute ‘is’ for ‘shall be’.

[Page 4, Table 6 (see also Amendment Nos. 1 and 3)] — Substitute the following for the existing table:

**Table 6 Maximum Total Losses up to 11kV Class Transformers**

( Clause 7.8.1.1 )

Sl No.	Rating (kVA)	Impedance (Percent)	Maximum Total Loss (W)									
			Energy Efficiency Level 1		Energy Efficiency Level 2		Energy Efficiency Level 3		Energy Efficiency Level 4		Energy Efficiency Level 5	
			50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load
(1)	(2)	(3)	(4')	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	250	4.50	980	2 930	920	2 700	864	2 488	811	2293	761	2 113
ii)	315	4.50	1 025	3 100	955	2 750	890	2 440	829	2164	772	1 920
iii)	400	4.50	1 225	3 450	1 150	3 330	1080	3 214	1 013	3102	951	2 994
iv)	500	4.50	1 510	4 300	1 430	4 100	1354	3 909	1 282	3 727	1 215	3 554
v)	630	4.50	1 860	5 300	1 745	4 850	1 637	4 438	1 536	4 061	1 441	3 717
vi)	800	5.00	2 287	6 403	2 147	5 838	2 015	5 323	1 892	4 853	1 776	4 425
vii)	1 000	5.00	2 790	7 700	2 620	7 000	2 460	6 364	2 310	5 785	2 170	5 259
viii)	1 250	5.00	3 300	9 200	3 220	8 400	3 142	7 670	3 066	7 003	2 991	6 394
ix)	1 600	6.25	4 200	11 800	3 970	11 300	3 753	10 821	3 547	10 363	3 353	9 924
x)	2 000	6.25	5 050	15 000	4 790	14 100	4 543	13254	4 309	12 459	4 088	11 711
xi)	2 500	6.25	6 150	18 500	5 900	17 500	5 660	16 554	5 430	15 659	5 209	14 813

[Page 5, Table 7 (see also Amendment No. 1)] — Substitute the following for the existing table:

**Table 7 Standard Ratings**

( Clause 8.1 )

SI No.	Nominal System Voltage	Standard Ratings (kVA)
(1)	(2)	(3)
i)	Up to and including 11 kV	5, 10, 16, 25, *50, *75 and *100
ii)	Above 11 kV up to and including 22 kV	5, 10, 16, 25, *50, *75 and *100
iii)	Above 22 kV up to and including 33 kV	5, 10, 16, 25, *50, *75 and *100

NOTE — \*Ratings are non-preferred.

(Page 5, clause 8.3) — Substitute the following for the existing clause:

### ‘8.3 Nominal System Voltage

Nominal system voltage shall be chosen from the following:

HV — 3.3, 6.6, 11, 22, and 33 kV

LV — 415 (240 V, 1 Phase)’

[Page 5, Table 8 (see also Amendment No. 1)] — Insert the following new rows at the top and renumber the subsequent SI no.:

SI No.	Nominal System Voltage	Minimum BIL
(1)	(kV) (2)	(kVp) (3)
i)	3.3	40
ii)	6.6	60

(Page 5, clause 8.5) — Insert following no-load voltage ratios at an appropriate place:

‘3 300/ $\sqrt{3}$  / 250 V ,    3 300 / 250 V  
6 600/ $\sqrt{3}$  / 250 V ,    6 600 / 250 V’

(Page 5, clause 8.8.1.1, line 1) — Substitute ‘up to 11 kV’ for ‘11 kV’.

(Page 5, clause 8.8.2, line 2) — Substitute ‘is’ for ‘shall be’.

[Page 5, Table 9 (see also Amendment No. 1)] — Substitute the following for the existing table:

**Table 9 Maximum Total Losses up to 11kV Class Transformers**

( Clauses 8.8.1.1, 8.8.1.2 and 8.8.1.3 )

SI No.	Rating (kVA)	Impedance (Percent)	Maximum Total Loss (W)									
			Energy Efficiency Level 1		Energy Efficiency Level 2		Energy Efficiency Level 3		Energy Efficiency Level 4		Energy Efficiency Level 5	
			50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load
(1)	(2)	(3)	(4)	(5)	(3)	(5)	(4)	(5)	(4)	(5)	(4)	(5)
i)	5	2.50	35	95	30	75	27	68	24	62	21	57
ii)	10	4.00	60	170	55	150	50	135	45	122	40	112
iii)	16	4.00	82	224	63	190	58	175	54	164	50	145
iv)	25	4.00	110	300	95	260	88	240	80	225	74	210
v)	50	4.00	210	590	190	520	177	480	160	451	148	420
vi)	75	4.00	310	880	285	780	265	720	242	670	223	625
vii)	100	4.00	410	1 140	375	1 030	350	964	320	900	299	842

[Page 6, clause 9.1(f)] — Delete NOTE.

(Page 6, clause 10.1.1, line 4) — Substitute 'IS/IEC 60137' for 'IS 2099'.

(Page 6, clause 10.1.3, para 2) — Substitute the following for the existing:

'The bushing shall conform to relevant Part/Section of IS 3347 depending on the voltage class.

NOTE — Any other suitable arrangement is subject to agreement between the user and the supplier.'

(Page 6, clause 10.1.5, informal table) — Insert following new entry at the end:

<i>Voltage Class</i>	<i>For Porcelain Parts</i>	<i>For Metal Parts</i>
52 kV bushings	IS 3347 (Part 8/Sec 1)	IS 3347 (Part 8/Sec 2)

[Page 6, clause 10.1.5, Notes (see also Amendment No. 1)] — Substitute following in place of the existing:

'NOTES:

1 For heavily polluted atmosphere, dimensions of bushings shall conform to IS 8603 or IS 8603 (Part 4) depending on the voltage class.

2 Cast resin or polymer bushing can also be used with performance requirements as per IS/IEC 60137 and IS 7421.

3 Epoxy bushings can also be used with performance requirements as per agreement between the user and the supplier.'

(Page 6, clause 10.2, para 1, line 1) — Substitute '3.3/√3, 6.6/√3, 11/√3, 22/√3 and 33/√3 kV' for '11/√3, 22/√3 and 33/√3 kV'.

(Page 6, clause 10.2, para 2, line 1) — Substitute '3.3, 6.6, 11, 22 and 33 kV' for '11, 22 and 33 kV'.

(Page 6, clause 10.2, para 3) — Substitute following for the existing:

'The HV bushings shall be fixed to the top cover or side walls and the LV bushings of 1.0 kV class shall be fixed to the transformer tank on sides or on the top cover.'

(Page 7, clause 13.4) — Substitute following for the existing:

**13.4** 'The distribution transformer conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the distribution transformer may be marked with the Standard Mark.'

(Page 7, clause 14.4) — Insert following Note at the end:

'NOTE — For single phase transformers above 25 kVA, base channels may be provided as per agreement between the user and the supplier.'

(Page 7, clause 15.1.5) — Substitute following for the existing:

'For round shape single phase sealed type transformers, the circular base plate edges of the tank shall be folded upward for at least 25 mm, to have sufficient overlap with vertical sidewall of the transformer.'

(Page 8, clause 15.2.1, para 3) — Substitute the following for the existing:

'For single phase transformers up to and including 100 kVA, the plain tank shall be capable of withstanding a pressure of 100 kPa and a vacuum of 760 mm of mercury. Limiting values of deflections are specified in **21.5.3.1**.

NOTE — Permanent deflection is not applicable for round tanks.

(Page 8, clause 15.2.2, para 1) — Insert the following at the end:

'For single phase transformers up to 100 kVA, transformer tanks with corrugations shall be designed for a pressure of 15 kPa measured at the top of the tank with no leakage.'

[Page 12, clause **20.1** (r) (see also Amendment No. 1)] — Insert the following Notes:

NOTES:

- 1 For cable box/ busduct arrangement, arcing horns are not required.
- 2 Providing arcing horn is optional in case lightning arrester is provided.

(Page 14, clause **21.4**, line 1 to line 3) — Substitute following for the existing:

‘The following constitutes the special tests which may be carried out subject to mutual agreement between the user and the supplier.’

[Page 14, clause **21.5.1.1** (see also Amendment No. 1)] — Insert following as Note 2 and renumber the existing as Note 1:

- 2 Vacuum is not applicable for corrugations.

[Page 14, clause **21.5.2.1** (see also Amendment No. 1)] — Insert following as Note 2 and renumber the existing as Note 1:

- 2 Vacuum is not applicable for corrugations.

(Page 15, clause **21.5.3.1**) — Substitute the following for the existing:

**‘21.5.3.1 Pressure test (type test)**

*For transformers up to and including 100 kVA*

The transformer tank shall be subjected to air pressure of 100 kPa for 30 min (15 kPa for 30 min for corrugated tanks) and vacuum of 760 mm of mercury for 30 min. There should be no air leakage at any point. The permanent deflection of flat plates, after pressure/vacuum has been released, shall not exceed the values given below:

<i>Length of Plate</i>	<i>Deflection</i>
Up to 750 mm	5 mm
751 mm to 1 250 mm	6.5 mm
1 251 mm to 1 750 mm	8.0 mm

NOTES:

- 1 Permanent deflection is not applicable for round tanks.
- 2 Permanent deflection is not applicable for corrugations.
- 3 Vacuum is not applicable for corrugations.’

(Page 15, clause **21.5.3.2**) — Substitute the following for the existing:

**‘21.5.3.2 Pressure (routine test)**

*For transformers up to and including 100 kVA*

The transformer tank shall be tested at a pressure of 35 kPa for 10 min (15 kPa for 10 min for corrugated tanks). There should be no leakage at any point.’

(Page 15, clause **21.5.3.3**) — Substitute the following for the existing:

**‘21.5.3.3 Oil leakage test (routine test)**

*For transformers up to and including 100 kVA*

The assembled transformer with all fittings including bushings in position, shall be tested at a pressure equivalent to twice the normal head measured at the base of the tank for 6 h. There should be no leakage at any point. Tank with corrugations shall be tested for oil leakage test at a pressure of 15 kPa measured at the top of the tank for 6 h. There should be no leakage at any point.’

## ‘ANNEX A

( Clause 2)

### LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>
191 : 2007	Copper — Specification ( <i>fourth revision</i> )
335 : 2018	New Insulating Oils — Specification ( <i>fifth revision</i> )
554 : 1999	Pipe threads where pressure tight joints are required on the threads — Dimensions, tolerances and designation ( <i>fourth revision</i> )
1576 : 1992	Solid pressboard for electrical purpose ( <i>first revision</i> )
1608	Metallic materials — Tensile testing
(Part 1) : 2018	Method of test at room temperature ( <i>fourth revision</i> )
(Part 3) : 2018	Method of test at low temperature
1747 : 1972	Nitrogen ( <i>first revision</i> )
1885	Electrotechnical vocabulary
(Part 38) : 1993	Power transformers and reactors ( <i>second revision</i> )
1897 : 2008	Copper strip for electrical purpose — Specification ( <i>third revision</i> )
2026	Power transformers
(Part 1) : 2011	General ( <i>second revision</i> )
(Part 2) : 2010	Temperature rise ( <i>first revision</i> )
(Part 3) : 2018	Insulation levels, dielectric tests and external clearances in air ( <i>fourth revision</i> )
(Part 5) : 2011	Ability to withstand short circuit ( <i>first revision</i> )
(Part 7) : 2009	Loading guide for oil-immersed power transformers
(Part 8) : 2009	Application guide
(Part 10) : 2009	Determination of sound levels
3024 : 2015	Grain oriented electrical steel sheets and strip ( <i>third revision</i> )
3347	Dimensions for porcelain transformer bushings for use in lightly polluted atmospheres
(Part 1/Sec 1) : 1979	Up to and including 1 kV, Section 1 Porcelain parts ( <i>first revision</i> )
(Part 1/Sec 2) : 1979	Up to and including 1 kV – Section 2 Metal parts ( <i>first revision</i> )
(Part 2/Sec 1) : 1979	3.6 kV bushings, Section 1 Porcelain parts ( <i>first revision</i> )
(Part 2/Sec 2) : 1979	3.6 kV bushings, Section 2 Metal parts ( <i>first revision</i> )
(Part 3/Sec 1) : 1988	17.5 kV bushings, Section 1 Porcelain parts ( <i>second revision</i> )
(Part 3/Sec 2) : 1982	17.5 kV bushings, Section 2 Metal parts ( <i>first revision</i> )
(Part 4/Sec 1) : 1988	24 kV bushings, Section 1 Porcelain parts ( <i>second revision</i> )
(Part 4/Sec 2) : 1982	24 kV bushings, Section 2 Metal parts ( <i>first revision</i> )
(Part 5/Sec 1) : 1979	36 kV bushings, Section 1 Porcelain parts ( <i>second revision</i> )
(Part 5/Sec 2) : 1979	36 kV bushings, Section 2 Metal parts ( <i>first revision</i> )
(Part 8/Sec 1) : 1988	52 kV Bushings, Section 1 Porcelain parts
(Part 8/Sec 2) : 1992	52 kV bushings, Section 2 Metal parts
3639 : 1966	Fittings and accessories for power transformers ( <i>under revision</i> )
4253 (Part 2) : 2008	Cork composition sheet: Cork and rubber ( <i>second revision</i> )

<i>IS No.</i>	<i>Title</i>
6162	Paper-covered aluminum conductors
(Part 1) : 1971	Round conductors
(Part 2) : 1971	Rectangular conductors
7404	Paper covered copper conductors —Specification
(Part1) : 1991	Round conductors ( <i>first revision</i> )
7421 : 1988	Porcelain bushings for alternating voltages up to and including 1000 V ( <i>first revision</i> )
8603 : 2008	Dimensions for porcelain transformer bushings for use in heavily polluted atmospheres 12/17.5 kV, 24 kV and 36 kV ( <i>first revision</i> )
8603 (Part 4) : 2003	Dimensions for porcelain transformer bushings for use in heavily polluted atmospheres: Part 4 52 kV Bushings
8999 : 2003	Gauging practice for pipe threads where pressure tight joints are required on the threads
9335	Cellulosic papers for electrical purposes
(Part 1) : 1979	Definitions and general requirements
(Part 2) : 1998	Part 2 Methods of test ( <i>first revision</i> )
(Part 3/Sec 1) : 1984	Specifications for individual materials, Section 1 General purposes electrical paper
(Part 3/ Sec 3) : 1984	Specifications for individual materials, Section 3 Crepe paper
(Part 3/ Sec 5) : 1985	Specifications for individual materials, Section 5 Special papers
11149 : 1984	Specification for rubber gaskets
12444 : 2020	Copper wire rods for electrical applications — Specification ( <i>first revision</i> )
13730	Specification for particular types of winding wires:
(Part 0/Sec 1) : 2018	General requirements, Section 1 Enamelled round copper wire ( <i>second revision</i> )
(Part 0/Sec 2) : 2018	General requirements, Section 2 Enamelled rectangular copper wire ( <i>second revision</i> )
(Part 0/Sec 3) : 2012	General requirements, Section 3 Enameled round aluminum wire ( <i>first revision</i> )
(Part 17) : 2014	Polyvinyl acetal enameled rectangular copper wire, Class 105 ( <i>first revision</i> )
(Part 27) : 2018	Paper tape covered rectangular copper wire ( <i>first revision</i> )
IS/IEC 60137 : 2017	Insulated bushings for alternative voltages above 1 000 volts



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Office of the Chief Engineer  
(Testing & QC)  
Plot No. G-9, Prakashgad, 5<sup>th</sup> FL  
Prof. A K Marg, Bandra (East),  
Mumbai - 400 051.

Date: 15/11/2021

No. CE/ Testing & QC / MSC -I/ 27887

To,  
All Transformer manufacturers

Sub: Revision in nomenclature of Energy efficient Level 2 (BEE star 1) to Energy efficient Level- 1 (BEE Star -1) in light of Amendment no.4 to IS 1180(part I) :2014, for Single phase and Three Phase Distribution Transformers ratings up to and including 2500 kVA, 33kV.

- Ref: 1. Notification of the Government of India in the Ministry of Power number S.O.185 (E), dated 12<sup>th</sup> January, 2009.  
2. Gazette Notification of Ministry of Consumer affairs Food and Public distribution dtd. 19- 07- 2014 for implementation of IS 1180(Part-1):2014.  
3. Gazette Notification of Govt. of India S.O. 4062 (E) No.2968 dt. 16/12/2016  
4. Gazette Notification of Govt. of India No.461 dt. 17/02/2017  
5. BIS amendment no. 1, 2 & 3 to IS 1180(Part-1):2014. March 2021.  
6. BIS amendment no. 4 to IS 1180(Part-1):2014 in March 2021.  
7. Gazette Notification CG-DL-E-08042021-226437, Sr.No.147, by reference HQ PUB014/2/ 2020-PUB-BIS (155) dt. 08/03/2021  
8. Representations from various manufacturers.  
9. ON approved from C.A. F -2021011310/2021 dt. 11.11.2021.

Sir,

In respect of your representation received vide letter under reference (8), it is to inform you that as per IS 1180 (Part-1):2014 BIS amendment (4) in March 2021, the distribution transformers with previous nomenclature of Energy Efficient level-2 is revised to Energy Efficient level -1 and old Energy Efficient level-3 is revised to Energy Efficient level-2 & so on and introduced additional Energy Efficient levels 3, 4 & 5 as prescribed by BEE according to Gazette Notification of Govt. of India S.O. 4062 (E) No.2968 dt. 16/12/2016.

The gazette notification has been issued from GOI on 08<sup>th</sup> March 2021, mentioned that the distribution transformers with existing Energy Efficiency Levels will be remained valid only up to 30<sup>th</sup> March 2022.

In view of the above, it is to inform you that in light of above Amendment no. (4) to IS 1180 (part-I):2014, it is decided that MSEDCL will procure Single phase and Three Phase distribution transformers ratings up to and including 2500 kVA, 33kV with (existing Energy Efficient level-2, BEE Star-1 ) revised nomenclature as Energy Efficient Level-1, BEE Star-1 through incoming e-tenders from April 2022 onwards.

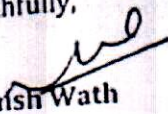
Administrative approval to revision in nomenclature of Energy efficient Level 2 (BEE star 1) to Energy efficient Level- 1 (BEE Star -1) in light of Amendment no.4 to IS 1180(part I) :2014, for Single phase and Three Phase Distribution Transformers ratings up to and including 2500 kVA, 33kV.

Page 1

The necessary amendment to technical specifications of Single and three phase distribution transformers will be issued for future procurement.

Thanking you,

Yours Faithfully,

  
Dr. Manish Wath  
Chief Engineer (Testing & QC)  
MSEDCL, Mumbai

Copy f. w. rs. to,

- 1) The Director (Projects)/(Operations) MSEDCL C.O. Mumbai.
- 2) The Executive director -II( Dist ) / (Infra)/(Projects) MSEDCL C.O. Mumbai.

Copy f. w. cs. to,

- 1) Chief Engineer, MSEDCL, All zones.
- 2) Chief Engineer, MMD/HVDS/PROJECTS/SP/DIST MSEDCL C.O. Mumbai.

Copy to,

- 1 Superintending Engineer, (Infra) / (MSC), MSEDCL C.O. Mumbai.
2. Superintending Engineer, (O&M), MSEDCL, All Circles.

Administrative approval to revision in nomenclature of Energy efficient Level 2 (BEE star 1) to Energy efficient Level- 1 (BEE Star -1) in light of Amendment no.4 to IS 1180(part I) :2014, for Single phase and Three Phase Distribution Transformers ratings up to and including 2500 kVA, 33kV.

Page 2

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